

Investigating the Prevalence of Academic Redshirting Using Population-Level Data

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The practice of academic redshirting, or holding children back a year prior to their enrolling in kindergarten, continues to be a controversial practice. Although most studies investigating redshirting have used small statewide samples or older, nationally representative data sets, the current study uses population-level data from one state that spans several years. Findings indicate a downward trend in redshirting rates (3.5% in fall of 2012), and redshirted students were consistently more likely to be White boys who were not economically disadvantaged. Students with disabilities were also more likely to be red-shirted. Of the redshirted students, the majority were born in the summer months (>70%). Rates have been stable and lower than previously reported national estimates, suggesting that the practice is not as widespread as feared.

Keywords: *redshirting, delayed enrollment, big data, multilevel logistic regression*

THE controversial practice of academic *redshirting*, or holding age-eligible children back for a year prior to their enrolling in kindergarten, continues to receive attention in the popular press (e.g., Ashbrook, 2014; Bronson & Merryman, 2009; Gladwell, 2008; Gootman, 2006; Moyer, 2013; Paul, 2010; Safer, 2012; Wang & Aamodt, 2011; Weil, 2007) and in academic journals (e.g., Bassok & Reardon, 2013; Datar, 2006; Mendez, Kim, Ferron, & Woods, 2014; Oshima & Domaleski, 2006). To be eligible for kindergarten, most states require children to be 5 years of age at a specified cutoff date in the year that they are enrolling (Bush, 2010). However, some parents of age-eligible children may opt to hold their kids back for a year to allow the child more time to mature prior to kindergarten entry.

Even though redshirting continues to be of keen interest and concern for parents, teachers, administrators, and policymakers, there is a dearth of recent, large-scale empirical data that have been used to investigate this practice. Worries persist that academic redshirting may be on the rise as elementary schools become more academically demanding (Dougan & Pijanowski, 2011). A newspaper editorial titled “Redshirting’ Kindergarteners Getting Out of Hand” indicated that “in the early 1990s, about 9% of kindergarteners were redshirted . . . today, the percentage is double that” (“Editorial,” 2011). Popular news programs, such as *60 Minutes* and shows on Fox News, have indicated that “kindergarten redshirting has more than tripled since the 1970s” (Safer, 2012) and that redshirting is a “growing phenomenon” (“Parents ‘Redshirting’ Kindergartners,” 2010).

Conventional media outlets such as the New York Times and the Wall Street Journal have referred to the practice of redshirting as the new norm (Paul, 2010; Wallace, 2014). However, such statements may be based on anecdotal evidence, convenience samples with limited generalizability, or endorsements provided by individual parents or teachers. The current study makes use of a longitudinal, large-scale database to track the prevalence of redshirting over time at both the student and school levels.

Outcomes Related to Redshirting

Academic redshirting is very much a part of popular culture and is passed on by generations of individuals (Graue & DiPerna, 2000). Even though the study of kindergarten entry age of children and academic outcomes has spanned several decades (e.g., Baer, 1958; Halliwell, 1966; Huang, 2014; Langer, Kalk, & Searls, 1984; Spitzer, Cupp, & Parke, 1995; Stipek, 2002), the practice of redshirting has received renewed attention, possibly as schools have a greater focus on ensuring that students meet academic, grade-level requirements. The practice of redshirting is of practical significance to various stakeholders. A few studies have demonstrated some short-term benefits of academic redshirting (Bedard & Dhuey, 2006; Datar, 2006), although the majority of studies using either national data sets (e.g., Lincove & Painter, 2006), experimental data (Cascio & Schazebach, 2007), or quasiexperimental designs (Jaekel, Strauss, Johnson, Gilmore, & Wolke, 2015) have shown no particular



lasting advantages for redshirted students. On the contrary, researchers have found that redshirted students, compared to on-time students, had a higher probability of being placed in a special education program (Graue & DiPerna, 2000; Mendez et al., 2014), had a higher prevalence of behavioral problems and substance abuse (Byrd, Weitzman, & Auinger, 1997; Byrd, Weitzman, & Doniger, 1996; Guagliardo, Huang, Hicks, & D'Angelo, 1998), were more likely to have lower earnings as adults (Deming & Dynarski, 2008), or had higher high school dropout rates (Angrist & Krueger, 1991). Martin (2009) compared redshirted and on-time high school students and indicated that old-for-grade students were more disengaged, had lower homework completion rates, and performed at lower levels academically compared to younger students, who valued school more, had higher positive intentions, and had better attendance rates.

Redshirting has several repercussions for the schools as well. Teachers must accommodate for a wide range of maturity and skills as a result of redshirting (Noel & Newman, 2003) and may adopt developmentally inappropriate teaching practices as a result (Shepard & Smith, 1986). Redshirting has been suggested as one of the factors for increasing the academic demands in kindergarten, resulting in curriculum escalation (Cosden, Zimmer, & Tuss, 1993; Shepard & Smith, 1988). Increased pressure may be placed on parents to redshirt as a result of concerns that their child may not be able to cope with the increased demands of kindergarten (Stipek & Byler, 2001). As more children are redshirted, parents may begin to demand a more advanced curriculum (Meisels, 1992; Moyer, 2013), and a vicious cycle emerges. As a result, kindergarten has often been referred to as “the new first grade” (Deming & Dynarski, 2008; Paul, 2010; Tyre, 2006).

Variation in Redshirting Rates

In the United States, kindergarten entry age requirements have increased, resulting primarily by state-driven legal changes to school entry age requirements (Deming & Dynarski, 2008). Redshirting studies that have used county, state, or school division samples have yielded large levels of variation. For example, Graue and DiPerna's (2000) study using a statewide sample in Wisconsin showed an average redshirting rate of 7%, although district-level redshirting rates varied from a low of 3% to a high of 94%. A study in a single county in the San Francisco Bay Area between 1988 and 1991 showed that girls had a redshirting rate of 3.7%, whereas boys had a much higher rate at 19.3% (Bellisimo, Sacks, & Mergendoller, 1995). In a study, however, of three school districts in Southern California, which had a December cutoff date for kindergarten entry, Cosden et al. (1993) reported relatively more modest redshirting rates of 10% to 11%. In Winsler et al.'s (2012) study of Miami-Dade's public school system in Florida with an at-risk sample of children, only 62 out of 13,191 (0.5%) students were

redshirted. Overall, evidence suggests that there is a large amount of variation in redshirting rates that may be sample and location specific, although trends cannot be gauged without the use of data over several years.

Trends in National Redshirting Rates

Several nationally representative surveys have been used over the past several decades to estimate the prevalence of redshirting. Using data from the National Education Longitudinal Study (NELS) of 1998, Lincove and Painter (2006) estimated that redshirting rates in the late 1970s to be approximately 9%. Byrd et al. (1997) analyzed data from the 1988 Child Health Supplement to the National Health Interview Data and indicated that the prevalence of redshirting rates from the '70s to the '80s was on average 12% (range 10% to 14%). Years later, data from both the 1993 and 1995 National Household Education Surveys (NHES) showed that 9% of first and second graders were redshirted (Zill, Loomis, & West, 1995). Using the Early Childhood Longitudinal Study (ECLS)–Kindergarten Cohort of 1998–1999, Datar (2006) stated that delayed entry rates ranged from 5% to 7%, depending on the calculation method used and source of information (e.g., parent or school reported). Based on an analysis of the same data set, Bassok and Reardon (2013) estimated redshirting rates of first-time public school kindergarteners to be 5.5%. Using the ECLS–Birth Cohort, Bassok and Reardon reported lower redshirting rates in 2006 at 4%. Based on the School Readiness Survey of the NHES in 2007, O'Donnell (2008) reported that on average, 7% of parents were planning to delay their child's enrollment in kindergarten. Finally and most recently, the ECLS Class of 2010–2011 data showed that 5.6% (or 5.9% if retained students are excluded) of kindergarteners who attended public school experienced delayed entry (Snyder & Dillow, 2013). Generally, national redshirting rates have been declining. Even though earlier studies have shown a large amount of variability within states (e.g., Bellisimo et al., 1995; Cosden et al., 1993; Graue & DiPerna, 2000), national-level multivariate analyses indicated that differences in redshirting rates between regions (i.e., South, Midwest, West) were not statistically significant (Bassok & Reardon, 2013), suggesting that variability between states is not that large.

Factors Associated With Redshirting

At the student level, redshirted students were more likely to be White boys with parents of higher levels of socioeconomic backgrounds (Bassok & Reardon, 2013; NCES, 2013; Winsler et al., 2012). Based on the NHES 2006–2007, 9% of White parents and 8% of those living above the poverty threshold had planned to redshirt their children (O'Donnell, 2008). This is in contrast to the only 2% of Black parents and 3% of economically disadvantaged families who planned to delay

kindergarten entry. In addition, parents may also choose to delay kindergarten entry for their children if they suspect that their child has developmental problems (Jaekel et al., 2015).

Although several studies have presented student-level profiles of redshirted students, virtually little is known about the factors at the school level that may be associated with the practice. One hypothesis is that student-level variables aggregated to the school level may have an association with the likelihood of redshirting. Aggregate measures are often used in school effectiveness studies and commonly include the percent of non-White students enrolled at the school and the percentage of children eligible for free or reduced-price meals (FRPM), an often-used proxy for socioeconomic status. Bassok and Reardon (2013), in one of the few studies to specifically look at school redshirting rates, indicated that as school-level socioeconomic status (SES) levels increased, so did redshirting rates. However, that association ceased to be statistically significant once race-/ethnicity-related variables were entered in the model.

Another possible factor is how likely a school is to retain or hold back a student (see Safer, 2012). Research has shown that young-for-grade students, typically children born in the summer months, are more likely to be retained in kindergarten (Huang, 2014), and parents who would want to avoid having their child retained may opt to delay enrollment instead (see Mendez et al., 2014, for a comparison of retained and redshirted student characteristics). Redshirting and retention are likely linked in practice and important to consider together (Winsler et al., 2012). Delaying kindergarten entry has been seen as a way for educators to mitigate the harmful effects of retention practices (Frey, 2005). As a result, schools with high retention rates may also have high redshirting rates.

Finally, a school's reputation for having redshirted students may also be a signal that redshirting is an acceptable practice, as redshirting is "promoted through informal communication and folk wisdom" (Graue & DiPerna, 2000, p. 531). Redshirting may be recommended by school officials and teachers as older children are likely to be more mature and have more advanced academic skills (Deming & Dynarsky, 2008; Dougan & Pijanowski, 2011). From the perspective of school administrators, redshirting may be viewed as a free or low-cost way of addressing school-readiness concerns (Graue & DiPerna, 2000). Consequently, the prior year's redshirting rates may be associated with the current year's redshirting rates. If redshirting is seen as the norm at the school, more parents may be willing to engage in the practice (Paul, 2010), and some may even be pressured by others to do so (Safer, 2012).

The Present Study

Early studies on redshirting were largely based on convenience samples that limited the generalizability of findings

(see Graue & DiPerna, 2000, and Uphoff & Gilmore, 1985, for lists of studies). More recent research on redshirting has used older, nationally representative data sets—such as the ECLS—or large, state-level samples to look at a single snapshot in time (Bassok & Reardon, 2013; Graue & DiPerna, 2000; Lincove & Painter, 2006). The current study adds to the growing body of knowledge on redshirting and addresses some limitations of prior research by making use of a longitudinal, population-level data set of kindergarteners from one state. We asked the following questions: (a) What was the prevalence of academic redshirting, and has the rate of redshirting changed over the years? (b) Did the prevalence of redshirting differ based on student demographic information? (c) Were school-level variables associated with the student-level likelihood of redshirting? Answering these questions will provide additional information on the prevalence and practice of redshirting that goes beyond the use of anecdotal evidence or samples collected more than a decade ago.

The current study adds to prior research on redshirting in several important ways. First, the last large-scale, statewide analysis of redshirting was conducted more than a decade ago (i.e., Graue & DiPerna, 2000), and the academic environment has changed since then. Second, the use of population-level data provides more reliable information on the prevalence of redshirting and reduces the potential measurement errors associated with sample-based studies. Third, we revisit the demographic characteristics of students who experienced delayed enrollment, and results are not hampered by sampling error. Fourth, school-level factors associated with redshirting have not been explored in more depth. Finally, the use of longitudinal data allows the current research to detect overall trends over time and allows us to see how prior redshirting or retention rates at the school level may be associated with future redshirting rates. To our knowledge, no other peer-reviewed study has used state-level, population-level data to investigate the phenomenon of academic redshirting, let alone data spanning several years.

Method

Data Source

Data for the current study come from the Virginia Department of Education (VDOE) administrative records. Student demographic data from school years (SY) 2010–2011, 2011–2012, and 2012–2013 were analyzed and comprised over approximately 80,000 students per year who attended full-day kindergarten. There were around 1,000 schools in each of the years examined (see Table 1). Schools that provided services primarily to students with disabilities (i.e., special education centers) or had a small kindergarten enrollment (i.e., <15 students) were excluded from the analyses.

TABLE 1
Student- and School-Level Descriptive Statistics by School Year (SY)

| Variable | SY 2010–2011 | | | SY 2011–2012 | | | SY 2012–2013 | | |
|------------------------|--------------|----------|-----------|--------------|----------|-----------|--------------|----------|-----------|
| | % | <i>M</i> | <i>SD</i> | % | <i>M</i> | <i>SD</i> | % | <i>M</i> | <i>SD</i> |
| Student level | | | | | | | | | |
| Female | 48.35 | | | 48.75 | | | 48.57 | | |
| White | 50.41 | | | 49.60 | | | 49.19 | | |
| Black | 24.76 | | | 24.09 | | | 24.04 | | |
| Hispanic | 14.81 | | | 15.31 | | | 15.79 | | |
| Asian | 5.06 | | | 5.60 | | | 5.42 | | |
| Two or more races | 4.97 | | | 5.40 | | | 5.56 | | |
| With a disability | 9.76 | | | 9.08 | | | 7.32 | | |
| Eligible for FRPM | 46.26 | | | 46.87 | | | 44.13 | | |
| School level | | | | | | | | | |
| Kindergarteners/school | | 81.94 | 38.74 | | 86.20 | 38.41 | | 85.98 | 37.24 |
| % FRPM | | 48.83 | 23.47 | | 49.16 | 24.47 | | 46.14 | 24.72 |
| % With disability | | 11.48 | 6.58 | | 10.68 | 5.88 | | 8.67 | 4.92 |
| % White | | 54.22 | 29.04 | | 53.72 | 28.60 | | 53.43 | 28.97 |
| % Retained | | 4.29 | 5.28 | | 3.97 | 4.91 | | 3.67 | 6.01 |
| % Redshirted | | 3.49 | 3.48 | | 3.44 | 3.30 | | 3.33 | 3.32 |
| Number of schools | | 1,020 | | | 1,009 | | | 1,000 | |

Note. FRPM = free or reduced-price meals.

Measures

Student level. In SY 2012–2013, 49% of kindergarteners were White, 23% were Black, 16% were Hispanic, 5% were Asian, and 6% were of another race/ethnicity or of two or more races. In terms of SES, 44% of students were eligible for FRPM, a commonly used proxy for SES. Forty-nine percent of kindergarteners were girls, and approximately 7% had an identified disability. Prior year’s demographic characteristics were relatively similar as well (see Table 1). In comparison, nationally, the kindergarten population in the fall of 2010 was 51% White, 14% Black, 25% Hispanic, and 5% Asian, and 6% were of some other or two or more races/ethnicities (NCES, 2013).

School level. At the school level, on average, 85.98 (*SD* = 37.24) kindergarteners were enrolled per school in 2012–2013. The percentage of students eligible for FRPM was 46.14 (*SD* = 24.72), and the percentage of White students enrolled was 53.43 (*SD* = 28.97). School-level demographic have remained relatively stable over the years as well (see Table 1). The percentage of students with disabilities decreased from 9.8% in 2010–2011 to 7.3% in 2012–2013.

Analytic Strategy

In the Commonwealth of Virginia, a child must be 5 years of age on or before September 30th of the SY to be eligible

for kindergarten (VDOE, 2012). Excluding children who were retained and using the state-mandated cutoff date together with the child’s birthday, we determined if a child was redshirted, enrolled on time, or enrolled early. Several checks were made to review the quality of the data. Considerable effort was spent retrieving, cleaning, converting, joining, and aggregating the different sources of data, which were inspected prior to analysis (e.g., duplicate records were removed, date of birth was reviewed). Individual-level data were aggregated to form school-level composites (e.g., percentage of White students in kindergarten). All data management and analyses were done using SAS 9.3.

The first part of the analyses focused on presenting descriptive population prevalence rates for the three SYs. Comparisons were made with students who were redshirted, enrolled early, and enrolled on time using student demographic characteristics, including race/ethnicity, gender, FRPM eligibility, and disability status. As the study focused on first-time kindergarteners, students who were retained in prior years, who are more often older as a result, are excluded from the analyses as these children may be different based on a variety of characteristics (Mendez et al., 2014). In addition, the month of birth of redshirted students is examined in more detail to assess whether students born in the summer months were consistently and disproportionately redshirted over the years.

School-level redshirting rates were then investigated. The distributions of redshirting rates were also examined over the years. As SES is often cited as a driver of redshirting, we broke out redshirting rates of schools based on the school-level SES quartiles based on the percentage of students at the school eligible for FRPM, with lower percentages indicating higher-SES schools.

Finally, to account for both student- and school-level characteristics, we ran a series of multilevel logistic regression models with students nested within schools (i.e., a random-intercepts model using a hierarchical generalized linear model with a binary outcome using a logit link function). The model predicted whether a student was redshirted or not (1 = yes, 0 = no) based on student-level demographic variables (i.e., gender, race/ethnicity, disability status, eligibility for FRPM) and school-level variables. School demographic variables (i.e., percentage of White students, percentage of students eligible for FRPM, number of kindergarteners enrolled, and percentage of students with disabilities) were grand-mean centered. Prior year's redshirting rates (i.e., SYs 2010–2011 and 2011–2012) and retention rates were left uncentered as a number of schools had neither redshirted students (~20%) nor retained students (~15%). We included SY as a fixed effect. Multilevel models were conducted using SAS PROC GLIMMIX.

As with logistic regression models, results are shown using odds ratios (ORs) and a 95% confidence interval for the OR. A statistically significant OR of more than 1 signifies a positive association with the independent variable and a higher likelihood of being redshirted. An OR of less than 1 signifies a negative association and a lower likelihood. In addition, we provide approximations of Cohen's d , using Chinn's (2000) computation (i.e., $d = [\sqrt{3} / \pi] \times \ln[OR]$), for categorical variables and used Cohen's (1992) guidelines for interpreting d as an effect size, in which .20 = small, .50 = moderate, and .80 = large.

Results

Prior to computing the redshirting rates per SY, we excluded retained students. The numbers of kindergarteners retained were 3,519 (4.21%), 3,231 (3.72%), and 3,006 (3.50%) students for SY 2010–2011, SY 2011–2012, and SY 2012–2013, respectively. Retention rates had declined over the years of the study.

Redshirting Rates Across the Years

Table 2 presents the prevalence rates for kindergarteners who were enrolled early and on time and were redshirted. Only a very small percentage of students (~0.20%) enrolled early, whereas the majority (96%) were on-time enrollees. Over the years, redshirting rates have dropped from 3.55%

in fall 2010 to 3.36% in fall 2012. In SY 2011–2012, 2,957 kindergarteners were redshirted compared to 2,785 kindergarteners a year later.

In terms of the sociodemographic characteristics of the redshirted students, Table 3 summarizes the results over the three SYs. Based on race/ethnicity, the proportions of redshirted students remained relatively stable with only slight changes over time. In fall 2012, the percentage of White students redshirted (5.09%) was lower than in both prior years. As a result, in fall 2012, White students were approximately 4 times more likely to be redshirted compared to Black students (1.29%). Based on the descriptive statistics in SY 2012–2013, boys (4.53%) were more than twice as likely to be redshirted compared to girls (2.12%). In terms of SES, using eligibility for FRPM as a proxy, students who were not eligible for FRPM were redshirted at much higher rates (4.72%) compared to students who were eligible for FRPM (1.63%). Based on disability status, students with an identified disability were more than twice as likely to be redshirted (7.34%) compared to students without an identified disability (3.04%). Notable is the general consistency of the trends over the years. Even though there were some fluctuations over time, redshirted students were more likely to be White boys from higher-SES backgrounds with an identified disability.

Month of Birth of Redshirted Students

A closer inspection of the birth dates of redshirted students indicates that the majority of redshirted students had summer birthdays (see Figure 1). Over the three SYs, more than 70% of all redshirted students had birthdays in July, August, and September. Notable is that approximately 40% of redshirted students every year were born in September, or the cutoff month by which they had to turn 5 to qualify for kindergarten. A very small proportion of redshirted students (<4%) were born in October to December. In terms of overall whole-day, first-time kindergarteners, there were fewer than 100 students out of almost 83,000 students who had fall birthdays (<0.001%). As a result, even though redshirting may potentially widen the age gaps in the kindergarten classroom, where the youngest student just turned 5 by the cutoff date and the oldest child could be almost 7 years old, such cases were not common.

School-Level Redshirting Rates

Approximately 20% of schools (around 200 schools annually) did not have redshirted students. In each of the SYs examined, only one school each year had redshirting rates that were in excess of 20%, and it was the same school in two out of the three instances. Only two schools out of over 1,000 schools had redshirting rates over 20%, and of

TABLE 2
Enrollment Status of First-Time Kindergarteners in Virginia by School Year (SY)

| Enrollment Status | SY 2010–2011 | | SY 2011–2012 | | SY 2012–2013 | |
|-------------------|--------------|-------|--------------|-------|--------------|-------|
| | <i>N</i> | % | <i>N</i> | % | <i>N</i> | % |
| Enrolled early | 175 | 0.20 | 172 | 0.22 | 158 | 0.19 |
| Enrolled on time | 77,039 | 96.23 | 80,611 | 96.26 | 80,027 | 96.45 |
| Redshirted | 2,845 | 3.55 | 2,957 | 3.53 | 2,785 | 3.36 |
| Total | 80,059 | | 83,740 | | 82,970 | |

TABLE 3
Percentage of Redshirted Students by Race/Ethnicity, Gender, Economic Status, and Disability Status by School Year (SY)

| Characteristic | SY 2010–2011 | SY 2011–2012 | SY 2012–2013 |
|----------------------------------|--------------|--------------|--------------|
| Race/ethnicity | | | |
| White | 5.20 | 5.36 | 5.09 |
| Black | 1.47 | 1.28 | 1.29 |
| Hispanic | 1.98 | 1.76 | 1.51 |
| Asian | 2.74 | 2.69 | 2.78 |
| Other/two or more races | 2.69 | 2.70 | 2.77 |
| Gender | | | |
| Male | 4.59 | 4.69 | 4.53 |
| Female | 2.44 | 2.32 | 2.12 |
| Economic status | | | |
| Eligible for FRPM | 2.12 | 1.88 | 1.63 |
| Not eligible for FRPM | 4.59 | 4.99 | 4.72 |
| Disability status | | | |
| With an identified disability | 7.23 | 6.54 | 7.34 |
| Without an identified disability | 3.16 | 3.23 | 3.04 |

Note. FRPM = free or reduced-price meals.

those schools, the population was primarily White (>90%) with students who were not economically disadvantaged (<4% eligible for FRPM). When broken down into SES quartiles, the schools with the highest SES had an average redshirting rate of 5.5% compared to the lowest-SES schools with a redshirting rate of 1.8% (see Figure 2).

Multilevel Logistic Regression Models Results

Although prior analyses presented profiles of redshirted students, regression models were used in order to control for the different predictors simultaneously. Based on student-level characteristics, logistic regression results (see Table 4) were consistent with all of the prior descriptive findings even when controlling for observed student- and school-level characteristics. Non-White students (ORs = 0.40–0.62, $p < .001$) and students eligible for FRPM (OR = 0.56, $p <$

.001) had a much lower likelihood of being redshirted compared to White students and students not eligible for FRPM. In addition, students with disabilities had odds of being redshirted that were higher by a factor of 2.11 compared to students with no identified disabilities. Effect sizes for student demographic variables can be considered small to moderate in size based on Cohen’s (1992) guidelines ($d_s = 0.26–0.50$).

At the school level, the proportion of White students and kindergarten enrollment size were both not statistically significant ($p_s > .05$). Prior year’s retention rate was also not predictive of redshirting, contrary to our hypothesis (OR = 1.00, $p = .41$). Further inspection indicated that the correlation between school-level redshirting and retention rates was negligible and not statistically significant as well ($r = -.04$, $p > .05$). However, the proportion of students eligible for FRPM (OR = 0.994, $p < .001$) and students with disabilities

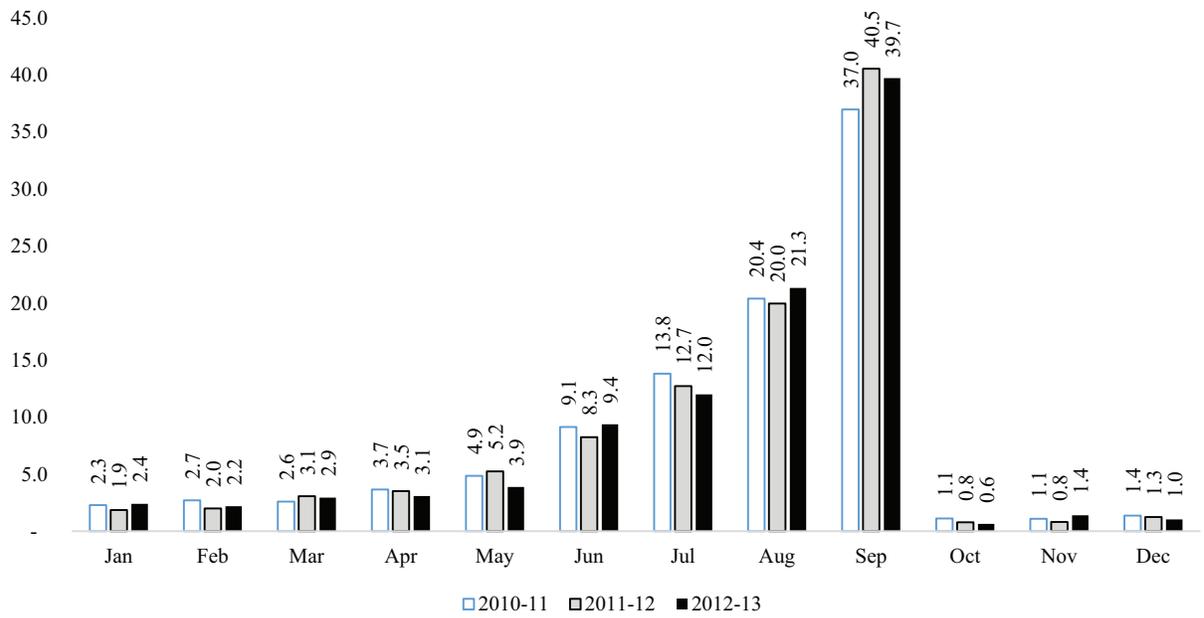


FIGURE 1. Percentage of redshirted kindergarteners by birth month and school year.

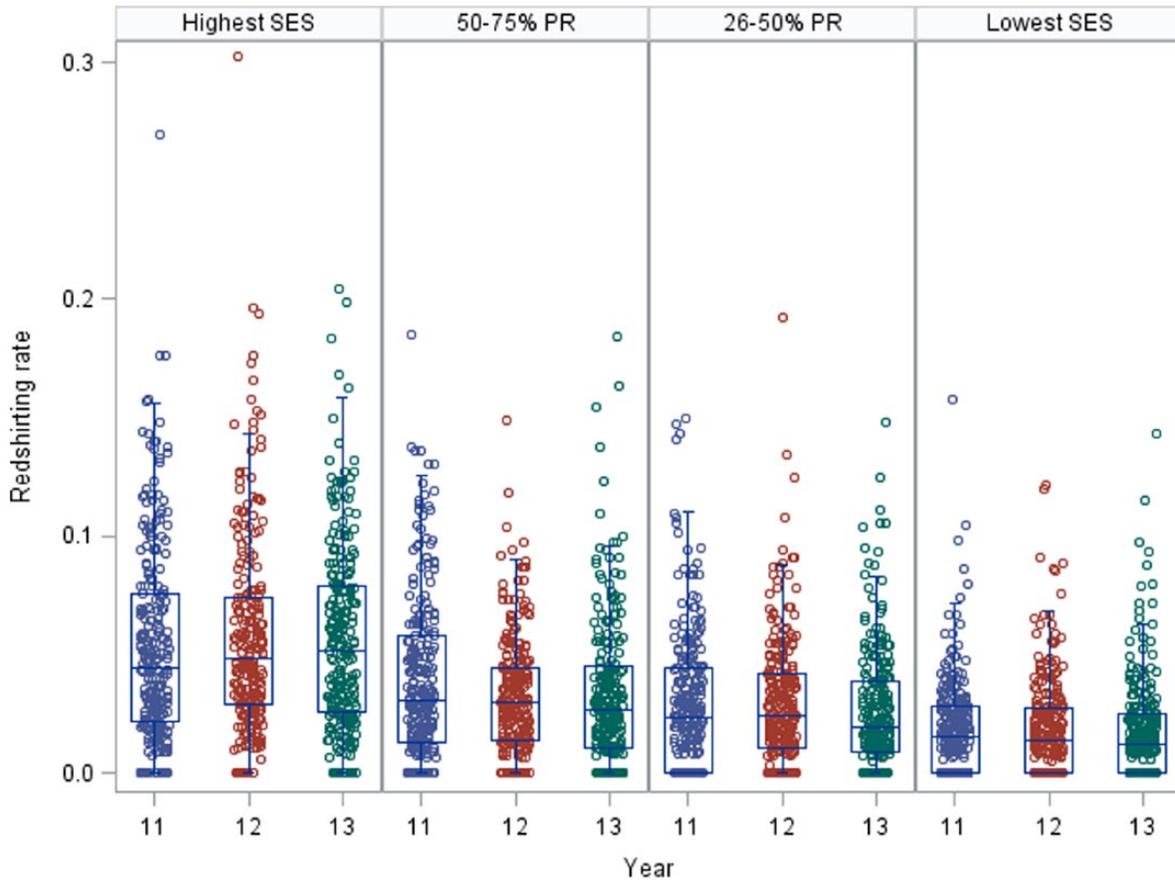


FIGURE 2. School-level redshirting rates by school year and socioeconomic status (SES) quartiles. PR = percentile rank. SES measured by the percentage of students at the school eligible for free or reduced-price meals. Lower percentages = higher SES.

TABLE 4
Multilevel Logistic Regression Results (N = 162,391)

| Variable | Model A | | Model B | | <i>d</i> |
|-------------------------------|---------|--------------|---------|--------------|----------|
| | OR | 95% CI | OR | 95% CI | |
| Student level | | | | | |
| Female | 0.50*** | [0.47, 0.53] | 0.50*** | [0.47, 0.53] | .38 |
| Black | 0.35*** | [0.32, 0.39] | 0.40*** | [0.36, 0.45] | .50 |
| Hispanic | 0.45*** | [0.41, 0.51] | 0.48*** | [0.43, 0.54] | .40 |
| Asian | 0.50*** | [0.44, 0.58] | 0.53*** | [0.46, 0.61] | .35 |
| Other | 0.60*** | [0.52, 0.68] | 0.62*** | [0.54, 0.71] | .26 |
| Eligible for FRPM | 0.52*** | [0.48, 0.55] | 0.56*** | [0.52, 0.61] | .32 |
| With a disability | 2.13*** | [1.97, 2.29] | 2.11*** | [1.95, 2.28] | .41 |
| School level | | | | | |
| % of White students | | | 1.00 | [1.00, 1.00] | |
| % eligible for FRPM | | | 0.99*** | [0.99, 1.00] | |
| % with disabilities | | | 1.02*** | [1.01, 1.02] | |
| Kindergarten enrollment | | | 1.00 | [0.99, 1.01] | |
| Prior year's redshirting rate | | | 1.03*** | [1.02, 1.04] | |
| Prior year's retention rate | | | 1.00 | [0.99, 1.00] | |

Note. OR = odds ratio. CI = confidence interval. FRPM = free or reduced-price meals. School year is included as a fixed effect.
 *** $p < .001$.

(OR = 1.016, $p < .001$) were predictive of student-level redshirting. Finally, the prior year's redshirting rates were also predictive of student-level redshirting (OR = 1.034, $p < .001$). As an example, a student in a school with a 5% prior redshirting rate had higher odds of being redshirted (OR = 1.18) compared to a student in a school that did not have any students redshirted in prior years.

Discussion

The prevalence rates in the current study were lower than the national rate reported by O'Donnell (2008) and more in line with the estimates of Bassok and Reardon (2013; i.e., 4.0% to 5.5%). Findings indicate that, contrary to reports in the popular media, redshirting rates, at least in Virginia, are not as high as many may be led to believe. In addition, redshirting rates have not risen in recent years but have actually decreased.

In terms of student-level characteristics associated with redshirting, findings are consistent with prior studies reporting that redshirted students are more likely to be White boys who were not economically disadvantaged (Bassok & Reardon, 2013; NCES, 2013; O'Donnell, 2008; Zill et al., 1997). Findings were also relatively consistent over the three SYs. Parents who can afford another year of child care prior to entering their child into kindergarten may be choosing to do so, whereas parents from economically disadvantaged homes may not have that luxury (Winsler et al., 2012). In households where both parents have to work, delaying kindergarten may be too expensive an option (Frey, 2005).

Even though prior studies have shown that students born in the summer months are more likely to be redshirted (Graue & DiPerna, 2000; Uphoff & Gilmore, 1985), our findings indicate that only a relatively small percentage of students actually have birthdays that would make them almost 2 years older than the youngest child. As a result, the large age gaps between redshirted students versus on-time students may not be as inflated, as over 70% of redshirted students may be older than the naturally oldest child in the classroom by only 1 to 3 months.

Since the birth dates of redshirted students are quite close to the cutoff dates, this may suggest that parents redshirt students to avoid or mitigate any disadvantages associated with being the youngest in the class (Bracey, 1989). Several studies have shown the various disadvantages that the youngest child in the class generally faces (Huang, 2014; Dhuey & Lipscomb, 2010; Evans, Morrill, & Parente, 2010). Interestingly, decades ago, it may have been a source of parental pride to report that children had skipped a grade and were ahead in school (Ashbrook, 2014), but in more recent times, early kindergarten enrollment is not a common phenomenon, with less than 0.20% enrolling early.

Of interest as well is that students with disabilities were more likely to be redshirted. However, parents who are redshirting their children to allow them more time to mature should carefully consider that early intervention may address the child's needs better than redshirting alone (Jaekel et al., 2015). Jaekel et al. (2015) indicated that delaying formal instruction and not providing special education services during a key developmental period may be detrimental to

children with special needs, given that redshirting does not necessarily bestow an academic advantage.

Even though there is a large amount of variation in terms of school-level redshirting rates, having rates over 20% is not at all common (see Figure 2), and redshirting rates of 94%, such as reported by the early study of Graue and DiPerna (2000), are unheard of (though Graue and DiPerna stated that the high rate was not typical and was a result of a small district with only one kindergarten class). Again, though, SES is associated with the prevalence of redshirting at both the student and the school level.

Prior year's retention rates were not predictive of redshirting and actually had no correlation with redshirting rates. Even though theoretically and conceptually, redshirting and retention are related as they both involve holding children back a year and are often studied together (Mendez et al., 2014; Winsler et al., 2012), our findings did not support that relationship. However, the prior year's redshirting rates were predictive of redshirting and have a similar effect compared to school-level FRPM. Although it may not be surprising that schools that have been known to allow redshirting are also the schools with the higher redshirting rates, such a relationship has not been empirically shown. Some school districts (e.g., Chicago Public Schools) have set age caps in which if a child turns 6 by a particular cutoff, the student will have to enroll in first grade instead of kindergarten at certain schools (Dizikes, 2011). In such an instance, if a child is older than necessary, he or she will be placed in first grade instead of kindergarten. In cases where some schools have previously allowed redshirted students, this may be a signal to parents that redshirting is an acceptable practice.

Limitations

Although a large, statewide, longitudinal data set was used in the analysis, several limitations must be kept in mind when interpreting results. First, the study was limited to one state, although the race/ethnicity compositions of White and non-White kindergarteners were comparable to national averages. The pattern, though, of redshirting rates by race/ethnicity in the current study was approximately the same as those found using national data (Snyder & Dillow, 2013). In addition, redshirting rates within a state may vary widely (e.g., Graue & DiPerna, 2000), but average redshirting rates between regions in the United States may not be that different (Bassok & Reardon, 2013). However, Virginia (in 2009–2010), compared to 49 other states, had below-average public school teacher salaries and state and local per-pupil funding for preK–12 students (Joint Legislative Audit and Review Commission [JLARC], 2013). Based on the National Assessment for Educational Progress (2014), fourth-grade math and reading scores for Virginia in 2013 were higher than the national average. For a more detailed comparison of the similarities and differences of Virginia to other states on

different indicators (e.g., population, percentage living below the poverty line), see JLARC (2013). Second, even though redshirted students could be identified, the motivations for redshirting are unknown. More qualitative studies, such as that of Noel and Newman (2003) could shed light on the actual reasons behind redshirting. Finally, even though we had population-level data, this also limited the type of data that could be included in our analysis. Other measures that may be associated with redshirting, such as socioemotional skills, could not be evaluated. Winsler et al. (2012) showed in their study that redshirted students had lower cognitive, behavioral, language, motor, and social skills. Despite these limitations, however, the current study adds to our understanding of statewide trends in redshirting and the patterns of the practice over time.

Conclusions

Although alarming headlines may indicate that redshirting has become the new norm and is on the rise, the opposite may actually be true. Using recent, longitudinal, statewide population-level data, the current study shows that the average redshirting rates in Virginia have hovered around 3.5% from 2010 to 2013 and have gotten slightly lower over time. Even a review of redshirting rates using national data sets has suggested that redshirting rates have been on a downward trend. However, what the popular press may likely be reporting on are atypical schools with a very high percentage of parents who may choose to delay kindergarten enrollment. In those cases, schools are more likely to be high-SES schools with a greater percentage of White students. However, citing high rates of redshirting may wind up promoting the practice, as this suggests that redshirting is a very common practice (e.g., “Everyone is doing it anyway”) when in actuality, schools with high prevalence rates are actually not the norm (e.g., one out of 1,000).

Although the widening age differences in the classroom resulting from redshirting may be a cause for concern, most redshirted students (>70%) are born in the summer months, indicating that the age difference between the naturally oldest child and the majority of redshirted students may be only 1 to 3 months. In particular, approximately 40% of redshirted students had birthdays in September that would have made them the youngest child in the class, which suggests that parents may be delaying entry to avoid the problems associated with being the youngest in the classroom. However, this is not to say that the unnatural age spans in a classroom are not a cause for concern, but school policies that promote or discourage redshirting are likely associated with the prevalence of the practice.

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