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How does grade configuration impact student achievement in elementary and middle school grades?☆

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ABSTRACT

Recently, there has been a move towards K-8 schools as opposed to separate elementary and middle schools, especially among urban districts. In this paper, we examine the effect of enrollment in separate elementary and middle schools relative to enrollment in a K-8 school using longitudinal data from an anonymous district in the United States. The choice to enroll in a K-8 or separate elementary and middle schools is potentially endogenous. While previous research has taken steps to address the possible endogeneity when estimating the effects for separate middle schools, previous research has not addressed the possible endogeneity when examining the effect at the elementary level. Without generating an unbiased estimate during the elementary grades, we cannot fully understand the impact of policies that have shifted the grade arrangement of separate elementary and middle schools to K-8 schools. In this paper, we employ a research design that leverages the fact that the anonymous district closed several schools and rezoned their students to other schools with new boundaries. We compare students on the side of the new boundaries who are assigned to a separate middle or elementary school to students on the other side of the new boundaries who are assigned to a K-8 school. When taking into the consideration the effect at the elementary level, our results are much less supportive of a K-8 policy than previous research.

1. Introduction

In recent years, a number of districts, especially urban districts, have moved towards the use of K-8 schools instead of separate elementary and middle schools. In part, this movement has been in response to research suggesting middle school students often become disengaged, resulting in stagnant student learning and discipline problems and could ultimately lead to an increased likelihood of students dropping out during high school (Juvonen et al., 2004). Some believe that middle school students are vulnerable to poor long-term outcomes because of physical, emotional, and intellectual changes they experience during these years (Juvonen et al., 2004). Many educators believe that a K-8 environment can address some of these issues for middle school students by eliminating the transition between elementary and middle schools.

However, this argument does not consider the possible consequences for elementary students in a K-8 environment. One could argue that a policy move to K-8 schools could adversely affect elementary students, as they will be exposed to much older students, which could create an intimidating environment. In addition, a K-8 policy could adversely affect students of all grade ranges if the change to K-8 schools leads to larger schools with less intimate relationships between students/families and teachers, which could be especially detrimental to elementary students (Feldlaufer et al., 1988; Midgley et al., 1989). Furthermore, combining students who are at different developmental stages in a K-8 setting may not allow schools to specialize in appropriate developmental environments for either middle- or elementary-grade students. Finally, separate middle schools can develop instructional and pedagogical strategies best suited for middle school-aged students (Hough, 2005).

Advocates counter that eliminating the transition from elementary to middle schools can reduce stress for students, who are already feeling stress from social and biological changes from the onset of puberty (Juvonen et al., 2004; Eccles and Midgley, 1989; Eccles et al., 1984). This argument has some support, as Elias et al. (1985) found that students report a high level of stress from the new, complex social world in middle school. Furthermore, research by Rudolph et al. (2001) shows that students with maladaptive self-regulatory beliefs, such as

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decreased perception of academic control and importance, report more pressure during the transition to middle schools. Therefore, by reducing student stress, learning may improve.

Advocates also argue that teacher and student relations change during the transition from elementary to middle school. Research suggests that teachers in middle schools are on average less caring, friendly, and supportive than elementary school teachers (Feldlaufer et al., 1988). Deterioration in teacher/student relations in middle school could adversely affect students (Midgley et al., 1989) because positive relations with adults other than parents are important to the social and emotional development of young adolescents (Miller, 1970). These theoretical claims are supported by empirical research on student mobility, which suggests moving between schools can have adverse impacts on students (Schwartz et al., 2011; Hanushek et al., 2004; South et al., 2007; Xu et al., 2009; Ozek, 2009).[1,2] Because K-8 schools could eliminate a move from an elementary to middle school, there could be positive effects for students in K-8 schools. However, all of these arguments for a K-8 school focus on middle school-aged children without considering the effects on elementary-aged children.

Therefore, it is not surprising that the current research has exclusively focused on the effect for middle school students. In addition, most of this research has not dealt adequately with the non-randomness of students choosing to enroll in K-8 schools versus separate elementary and middle schools. For instance, it may be possible that some families see attending separate elementary and middle schools as more rigorous environments, while other families may see a K-8 school as more nurturing environment. Alternatively, some families may prefer the smaller and intimate environment of separate elementary schools (Schwartz et al., 2013). If families chose schools based on these features, these students could be different in unobserved ways. In these cases, a simple pairwise comparison in achievement between students from separate elementary and middle schools and K-8 schools is insufficient to draw any conclusion about the causal effects of attending separate elementary and middle schools because the grade arrangement of the school could affect the choice of school by families. Such self-selection can lead to biased results, as their choice to attend a K-8 school may be driven by non-random factors and it may be difficult to predict a priori the direction of the bias.

Three recent studies (focusing only on middle school students) use an instrumental variable approach to address possible endogeneity (Rockoff and Lockwood, 2010; Schwerdt and West, 2013; Dhuey, 2013).[3] More specifically, these sets of authors instrument for the grade configuration during middle school years with the grade configuration of the school that the child attended in grade 3 or 4. They find that cumulative achievement growth through 8th grade is greater in K-8 schools than in separate elementary and middle schools, largely due to relative achievement loss during the transition year from elementary to middle school. However, the authors readily admit their approach is designed to address endogeneity for middle school grades but cannot produce an unbiased estimate at the elementary level. Therefore, unless we know the impact of grade configuration during elementary grades, we cannot know whether the cumulative impact by grade 8 is positive, negative, or negligible.

In this current paper, we employ a geographic quasi-experimental design similar to a regression discontinuity approach taking advantage of school closures in an anonymous midsize district. Much like the Rockoff and Lockwood (2010), Schwerdt and West (2013) and Dhuey (2013) papers, we find some evidence for adverse transitional effects of moving to a middle school. However, we do not find a cumulative negative effect from attending separate elementary and middle schools. This difference in results can be partially explained by evidence that elementary-grade students perform better in a K-5 school than a K-8 school – an effect for which the previous studies could not produce an unbiased estimate. It is not only useful for analyzing the effects of K-8 schools on middle school students, but also it broadens the scope of knowledge by examining the effects of K-8 for students in elementary grades, and thus of the cumulative effect from K through 8.

2. Research approach

For our analysis, we use a geographic quasi-experimental approach that mimics a geographical regression discontinuity design inspired by previous papers examining school quality using geographic boundaries (Black, 1999; Dhar and Ross, 2012; Gibbons et al., 2013). As noted above, a few previous papers have used an instrument for the grade configuration during middle school years with the grade configuration of the school that the child attended in grade 3 (or 4), which may address the possible endogenous decision to switch between separate elementary/middle schools to a K-8 school (or vice versa) (Rockoff and Lockwood, 2010; Schwerdt and West, 2013; Dhuey, 2013), but cannot address the original choice to attend a separate elementary/middle school or K-8 school. Our approach allows us to address this possible endogenous original choice, which the previous papers cannot.

Specifically, to account for the original choice, we leverage the fact that the anonymous district closed 20 schools (or about one-fourth of all schools) at the conclusion of the 2005–06 school year because of accumulated surplus capacity. Many closed middle schools were replaced by expanding existing elementary schools from K-5 to K-8 with the hope that the shift in grade configurations would reduce the disruption often associated with switching schools. As a result, there were 13 new K-8 schools at the beginning of the 2006–07 school year with new geographic boundaries. In addition, because of the new geographic boundaries, a number of students were reassigned from possibly going to a separate middle school to one of 14 existing K-8 schools and vice versa. These new school boundaries provide an opportunity for a strong identification strategy, as we can compare students on one side of the boundaries attending a separate middle or elementary school to students on the other side of the boundaries attending a K-8 school. In essence, this mimics a “spatial” regression discontinuity (RD) approach with equivalent comparison groups. We can observe students in neighborhoods that were originally assigned to the same school before the closure and assigned to different schools after the closure. From these patterns, we can observe pairs of students who live very close to each other that were assigned to the same school before the closure but were assigned to different types (K-5 vs. K-8) of schools after the closure. More specifically, we use students who live within distances of 0.5 miles or 0.3 miles to each other that were assigned to the same school before the closures but assigned to different schools with different grade configurations after school closures. These students should have similar observed and unobserved characteristics, including similar preferences for the various types of school configurations. By comparing their achievement, we are able to obtain the causal effect of the K-5/middle configuration relative to K-8 configuration.

We should note that using long-term existing school boundaries most likely would not create equivalent groups as many families may choose their residence on one side of the boundary based upon the characteristics of the school offerings, including whether it is a K-8

[1] However, it should be noted that there are two types of mobility—non-structural and structural mobility. Non-structural moves are the result of student choice. Students move to another school because of observed or unobserved preferences. Structural moves are related to grade configuration. Students move to another school because they finished the terminal grade at their current school and have to start the next grade in another school in a higher grade. It is important to distinguish between the two types of mobility as their policy implications are different. In this study, the effect of structural moves is most relevant.

[2] Despite this general evidence on student mobility, the existing literature paints an ambiguous picture on the transitional effect from elementary to middle schools. Some studies find adverse effects of mobility from elementary school to middle school (Bedard and Do, 2005; Cook et al., 2008; Schwartz et al., 2011) while other studies find no effect or a positive effect on achievement (Lippold et al., 2013; Gunter and Bakken, 2010; Weiss and Kipnes, 2006).

[3] In additional study, Schwartz et al. (2016) examined the learning environments of students using the same instrumental variable approach.