May 15, 2006

Sixth Graders in Middle School Behave Worse than Sixth Graders in Elementary School

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Abstract:

Using administrative data on public school students in North Carolina, we find that sixth grade students attending middle schools are much more likely to be cited for discipline problems than those attending elementary school. That difference remains after adjusting for the socioeconomic and demographic characteristics of the students and their schools. Furthermore, the higher infraction rates recorded by sixth graders who are placed in middle school persist at least through ninth grade. A plausible explanation is that sixth graders are at an especially impressionable age; in middle school, the exposure to older peers and the relative freedom from supervision have deleterious consequences.

What is the best grade configuration for schools that serve early adolescents? The predominant answer has changed over time. At the beginning of the twentieth century, school configuration in the United States began moving away from an eight-year primary and four-year secondary model, toward a definition of secondary education as beginning in the seventh grade. At that time and continuing through mid-century, middle schools known as "junior high" (grades 7-9 or 7-8) were the norm. This arrangement was intended to create a transitional period between the sheltered elementary school and the more demanding high school environment (*1*).

In recent decades there has been a marked shift away from junior high school, toward the middle school configuration of grades 6-8, or occasionally 5-8. In the early 1970s, less than one-quarter of middle schools incorporated sixth grade: by 2000, three-quarters of all middle schools enrolled sixth grade students (*2*). North Carolina's public middle schools, which form the basis for the analysis that follows, have led the national trend of incorporating sixth grade. In the 1999-2000 school year, more than 90% of the state's 379 middle schools served grades 6-8,

Why is the current generation of sixth graders attending middle school while preceding generations attended elementary school? The practical problem of dealing with swelling cohorts of students was a factor in promoting the shift in the 1970s, but there was also support from educators. In a survey of middle grade school administrators in 2000, 65 percent of respondents selected the 6-8 grade configuration as the "ideal" form of organization (*4*). Grade span re-configuration was part of a new paradigm for middle grade education that moved away from the "bridging" concept, toward focused consideration of the unique challenges faced by young teens (*5*). The debate over the proper configuration of grades has heated up again in recent years, with researchers and practitioners challenging the rationale of a separate middle school. One

influential proposal has been to reduce the number of school transitions through a configuration that combines elementary and middle grades (*6, 7*). What is lacking in this debate, and what we seek to provide, is direct evidence concerning what difference the grade configuration is likely to make for student behavior.

The middle school educational environment is different from the elementary school environment in several ways. A sixth grader in an elementary school will typically be assigned to one teacher and spend much of the day in that teacher's classroom with the same group of students. A sixth grader in middle school will typically be assigned to a team of teachers and move from classroom to classroom over the course of the school day, with somewhat different groups of students in each. Middle schools place greater emphasis on discipline and academic accomplishment (including greater use of between-classroom ability grouping), with less opportunity for close relationships to specific teachers. Perhaps the most important difference is that a sixth grader in elementary school is among the oldest students in the school; a sixth grader in middle school is among the youngest, with daily exposure to older adolescents.

In terms of both the developmental changes experienced by early adolescents, and the social and academic challenges that they face in the middle school environment, the influence of the peer group on behavior is particularly important. Research on adolescent delinquency suggests a developmental pattern of delinquent peer influence: the influence of peers on behavior already is significant in early adolescence, peaks during middle adolescence, and then begins to decline (*8*). Peer influence may take a variety of forms, both direct and indirect. Direct influence may include bullying and initiation of fights, recruitment into delinquent gangs, an enhanced supply of drugs and alcohol, seduction and sexual importuning, an appreciative

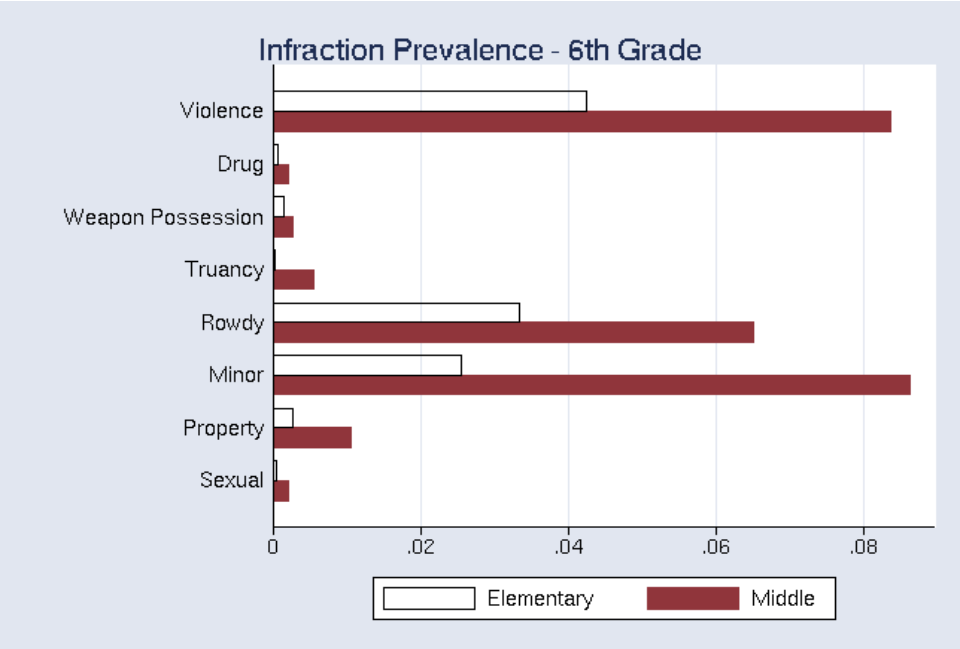
audience for rowdy behavior, companionship in truancy, and so forth. Indirect influence may occur through modeling illicit behavior (*9*).

Our analysis makes use of an administrative database covering all public schools and students in the state of North Carolina for a number of years. The data were provided by the North Carolina Education Research Data Center. The indicators of behavioral problems are derived from a statewide database of disciplinary infractions recorded during the 2000-2001 academic year. Each disciplinary report reflects a decision on the part of a school official (usually a teacher) of whether to "write up" a student for misbehaving, and then a decision on the part of the principal of whether to report to the state. (Schools are required to report incidents in the event that they result in the out-of-school suspension of one or more students, or if the offense is severe enough to warrant the contact of law enforcement officials, but reporting is otherwise discretionary.)

The districts in which sixth graders still attend elementary school in North Carolina are in small towns or rural areas, and are somewhat unrepresentative of the state school system as a whole in other respects as well. In our statistical work we used a matching procedure to select the middle schools for our sample; this procedure eliminated much of these differences. The matched sample included 41,833 middle-school sixth graders of the 76,915 total, and almost all of the elementary school sixth graders. Table 1 reports summary statistics for these samples. All told, these students were responsible for 20,433 reported disciplinary infractions over the course of the school year. The summary statistics indicate a large difference in the average number of infractions per student between middle and elementary schools: There were 47 recorded infractions for every 100 sixth graders attending middle school, compared with only 16 per 100

in elementary schools. When infractions are classified by type, middle school students record over twice the rate for each category (Figure 1).

Figure 1.



The large differences in the infraction rate may be partly due to differences in characteristics of the student populations that remain despite the matching procedure. We used regression analysis in an attempt to adjust for these remaining differences. The sample for this analysis consists of sixth grade students in North Carolina in 2000-1; the dependent variable indicates whether students appear in the infractions database. Control variables include indicators for the type of school attended, the number of students in sixth grade in that school, and school-level socioeconomic indicators, as well as individual characteristics including race and gender, parental education levels, and standardized EOG test scores from 5th grade. The results confirm that attending middle school in sixth grade is associated with greatly elevated

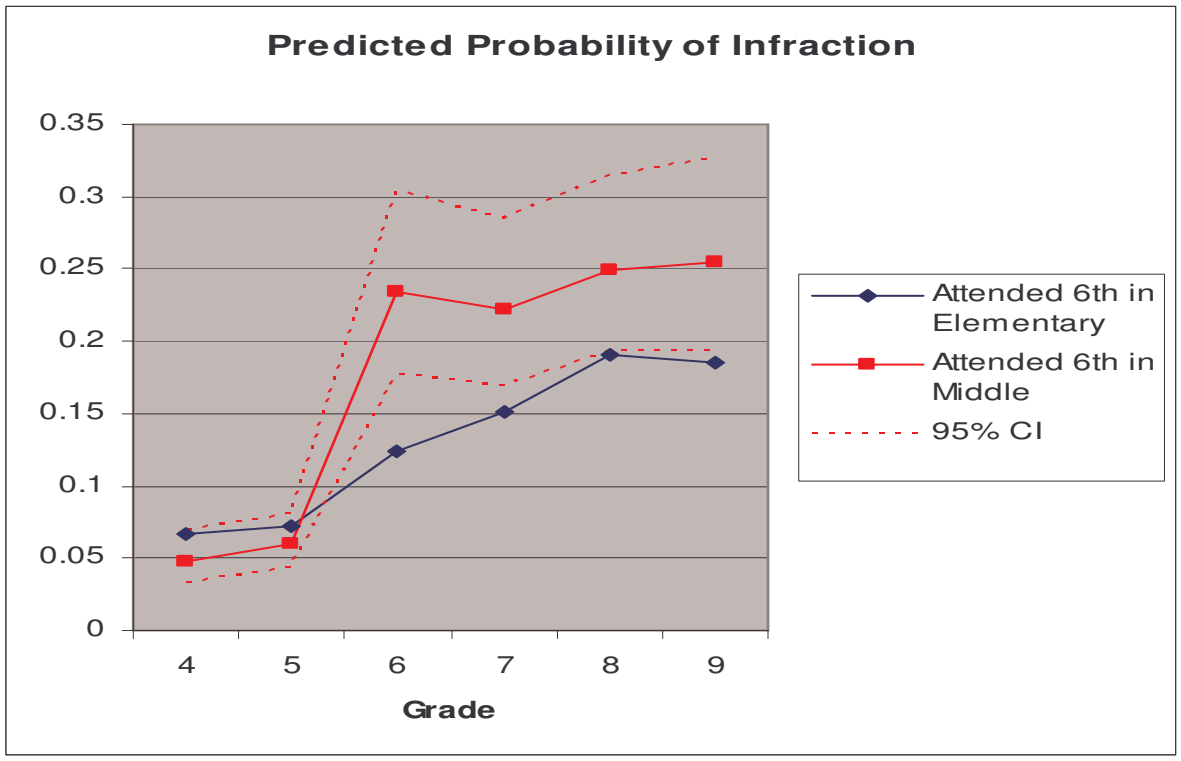
odds of an infraction. Our point estimates imply that other things equal, the odds of having at least one infraction in sixth grade are increased by a factor of 2.3 if in middle school; the odds of a violent infraction are increased by a factor of 2.0, and the odds of a drug infraction by a factor of 4.8.

It would be informative to follow these students over several years of schooling before and after sixth grade. Infractions in fourth and fifth grade would provide an individualized baseline on misbehavior. Infraction rates after sixth grade would allow a check on whether the elevated rate for the middle-school sixth graders is simply the result of problems resulting from a transition to a new school, or rather sustained over time. As it turns out, we only have infractions data for the single academic year (2000-1), so it is not possible to follow the behavior of individual students over time. However, we are able to perform a pseudo-longitudinal analysis of behavior based on the fact that our database, while only including one year of infractions data, does include a number of years' worth of data on other aspects of each student's career. In particular we know what sort of school the students who are in fourth or fifth grade in 2000-1 are destined to spend sixth grade, and we know in what sort of school older students in that year did spend sixth grade. Using this information, we sort all students in grades 4-9 in 2000-1 into two groups, which we identify as 6Es and 6Ms. For example, a ninth grader is a "6M" if she spent her sixth grade in middle school; a fourth grader is a "6E" if he subsequently attends sixth grade in an elementary school.

Figure 2 graphs the trajectories for the two groups with respect to probability of an infraction. These prevalence trajectories are computed for the same set of values for the regression covariates; the difference in trajectories reflects the proportional effect on the infraction probability estimated from the logistic regression, and the 95% confidence interval

represents the uncertainty in that estimate (*10*). We see that in the baseline period, grades 4 and 5, there is little difference between 6Es and 6Ms. A large gap opens up in sixth grade. The gap narrows a bit in seventh grade, when most of 6Es enter middle school, but is then sustained in eighth and ninth grades and remains statistically significant throughout. Other measures of misbehavior produce qualitatively similar results.

Figure 2



These results do not rule out the logical possibility that the observed differences are due to differences in school reporting practices rather than in the actual behavior of the students. It seems reasonable to suppose that middle schools tend to be more formal and severe than elementary schools, which might explain the infraction gap between 6Es and 6Ms in sixth grade. However, it does not explain why that gap persists in seventh, eighth, and ninth grades, when all the students have moved on past elementary school. Hence we believe that the "infraction gap" reflects a "behavior gap."

The causal mechanisms that account for this difference in behavior cannot be identified directly from our data. Several differences between elementary and middle school may be relevant. In comparison with elementary school, middle school provides students more freedom and lacks the continuity and close connection provided by having one primary teacher. Most obviously, middle school brings sixth graders into routine contact with older adolescents who are likely to be a bad influence: older adolescents as a group are more rebellious and more involved in delinquency, sex, illicit drugs, and other activities that violate school rules. Of greatest concern is that the negative influence of middle school on sixth graders appears to linger into subsequent years.

References and notes

1. J. Juvonen, V. Le, T. Kaganoff, C. Augustine and L. Constant. (2004) *Focus on the Wonder Years: Challenges Facing the American Middle School*. Santa Monica: RAND Corporation.

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8. S.J. Jang (1999) "Age-Varying Effects of Family, School and Peers on Delinquency: A Multilevel Modeling Test of Interactional Theory." *Criminology* v.37 pp.643-85.

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10. The values assumed for the covariates generally refer to an average male student. Parental education is specified as high school graduate, and the race variable is 25% black (in line with the sample). Any changes in these or other covariates would only serve to shift both lines either up or down by the same proportional amount. The key is the significant difference across the groups holding all else equal.

11. We are grateful to Josh Kinsler for exceptional research assistance, and to Katherine Conner, Camden Cook, Brad McMillan, and Allison Whitaker for their suggestions. This research is supported by grants from the National Institute on Drug Abuse and the William T. Grant Foundation. Any views expressed in this paper are the authors' alone and should not be associated with any affiliated institution.

Table 1: Summary Statistics for 6th Graders, 2000/2001, North Carolina Public Schools in Matched Sample

	Middle School Students	Elementary Students
Number of students	41,833	5,109
Total infractions	19,623	810
Infractions/student	0.47	0.16
% Male	50.91	50.75
% White	67.87	67.57
% Black	24.79	23.39
% Hispanic	3.95	3.07
% Asian	1.08	2.11
% Other	2.31	3.86
Parents' education:		
% High School Grad	46.37	48.18
% 2-year college grad	18.84	19.71
% 4-year college grad	22.25	19.31
% Reduced/Free Lunch	43.26	48.55
Avg. Math EOG Score, 5th	159.58	159.07
Avg. Reading EOG Score	155.16	154.98
School level variables		
% Reduced/Free lunch	40.35	44.70
% Black	25.03	24.01
Number of Grades	2.99	6.26
Number of 6th Graders	256.59	119.24

Captions

Figure 1. The fraction of sixth graders in North Carolina public schools who received at least one infraction of the specified type in 2000/2001.

Figure 2. The prevalence of infractions for students who attend 6th grade in elementary school, compared with the adjusted prevalence of infractions for students who attend 6th grade in middle school. The adjustment is accomplished by restricting the sample to middle schools that are similar to the elementary schools, and then by logistic regression on individual and school characteristics.

Supporting On-Line Material

Table A1
Logistic regression results for matching procedure*

Dependent Var: Indicator for 6th grade in Middle School

	Coeff.	SE
Average Math Score	0.461	0.686
% Black	**3.343**	1.094
% Hispanic	**9.146**	3.442
% Parents withou HS diploma	-2.454	1.993
% Students receiving free or reduced lunch	**-3.418**	1.554
% of students old for grade	**9.235**	2.350
% of students learning disabled	-0.101	4.001
Per Pupil Expenditure - Local (thousands)	**0.002**	0.001
Per Pupil Expenditure - Federal (thousands)	0.001	0.001
Constant	**-3.023**	1.259
N	344	
Pseudo R-sq	0.226	

*The sample includes schools containing 6th grade students that can be categorized as either an elementary or middle school.The regressors are characteristics of the 6th grade students only. Because all of the elementary schools containing 6th grade are located in small towns or in rural areas, only middle schools from those locales are included in the sample. Using the estimated coefficients a p-score for each school is computed. The maximum p-score for the elementary schools and the minimum p-score for the middle schools was computed. Schools with p-scores between these values are included in the matched sample. This ensures a common support across the two groups.

Table A2
Characteristics of sixth graders and their schools, 2000/2001, North Carolina
All Schools

	Middle School Students	Elementary Students
Number of students	76915	5320
Total infractions	33367	824
Infractions/student	0.43	0.15
% Male	50.88	50.53
% White	61.19	66.50
% Black	30.52	22.71
% Hispanic	4.35	2.95
% Asian	1.72	2.05
% Other	2.21	5.79
Parents' education:		
% High School Grad	44.24	48.72
% 2-year college grad	17.36	19.47
% 4-year college grad	27.82	18.92
% Reduced/Free Lunch	42.36	49.49
Avg. Math EOG Score, 5th	159.62	159.06
Avg. Reading EOG Score	155.25	154.95
School level variables		
% Reduced/Free lunch	39.36	46.18
% Black	30.97	23.27
Number of Grades	2.98	6.33
Number of 6th Graders	273.55	116.86

Table A3.
Logistic regression results on the likelihood of an infraction during the school year, Matched Sample, North Carolina 6th Graders, 2000/2001

	Any Infraction	Violent Infraction	Drug Infraction
In middle school	0.835	.702	1.560
	(.215)	(.220)	(.775)
Grade size	-.037	-.027	-.203
	(.116)	(.106)	(.245)
Male	1.090	1.195	1.096
	(.041)	(.054)	(.299)
Race (White omitted)			
Black	0.602	0.614	
	(.052)	(.072)	-0.882
Hispanic	-0.339	-0.470	(.369)
	(.105)	(.132)	-0.240
Asian	-1.370	-1.178	(.583)
	(.266)	(.323)	
Other	-0.194	-0.176	0.037
	(.132)	(.164)	(.481)
Parents' education (High school grad omitted):			
High School dropout	0.349	0.350	0.733
	(.045)	(.053)	(.275)
Trade school	-0.111	-0.185	-1.138
	(.081)	(.099)	(1.018)
Community college	-0.154	-0.132	-0.394
	(.056)	(.071)	(.466)
4-year college	-0.561	-0.692	-0.738
	(.067)	(.082)	(.395)
Graduate degree	-0.730	-0.925	
	(.145)	(.178)	
Reduced/Free Lunch	0.379	0.344	0.646
	(.045)	(.051)	(.239)
Old for grade	0.351	0.334	0.417
	(.044)	(.054)	(.194)
Math EOG Score, 5th	-0.214	-0.220	-0.381
	(.030)	(.037)	(.160)
Reading EOG Score, 5th	-0.193	-0.142	-0.096
	(.029)	(.034)	(.136)
School level variables			
% Reduced/Free lunch	-1.117	-0.980	-1.260
	(.580)	(.507)	(1.608)
% Black	0.521	0.452	-1.124
	(.397)	(.358)	(1.677)
Constant	-3.035	-3.918	-7.656
	(.364)	(.338)	(.987)