International Journal of Engineering Education (IJEE)
e-ISSN : 2540-9808

Evidence on Bullying, Safety, and Belonging in Gifted Students at Secondary Education School

Chia-Yen Hsieh[1*]

[1]Department of Early Childhood Education, Dong Hwa University, Taiwan
E-mail: banduna@gmail.com

Abstract - *In this study, we examine one commonly cited mechanism, the top dog/bottom dog phenomenon, which states that students at the top of a grade span ("top dogs") have better experiences than those at the bottom ("bottom dogs") for gifted students. Using an instrumental variables strategy introduced in Rockoff and Lockwood (2010) and a longitudinal data set containing student survey data for Kaohsiung City (in Taiwan) public secondary education school gifted students, we estimate the impact of top dog and bottom dog status on bullying, safety, belonging, and academic achievement by Multiple Regression. This article provides the first credibly causal evidence that top dog status improves the learning environment. We further find that the top dog effect is strongest in sixth grade and in schools with longer grade spans and that the top dog effect is not explained by new students to a school or student height. Finally, we find that the gifted students model is similar to the generally students model.*

Keywords *– Bullying, gifted students, grade span, learning environment.*
Submission: February 6, 2021 Correction: June 13, 2022 Accepted: June 13, 2022

Doi: http://dx.doi.org/10.14710/ijee.4.1.26-40
[How to cite this article: Hsieh, C. (2022). Evidence on Bullying, Safety, and Belonging in Gifted Students at Secondary Education School. *International Journal of Engineering Education, 4*(1), 26-40. doi: http://dx.doi.org/10.14710/ijee.4.1.26-40]

1. Introduction

Bullying is the most malicious and malevolent form of deviant behavior present and widely practiced in our schools, yet it has until recently received only scant attention from the education community (Tattum, & Tattum, 2004). Many scholars want to find the reason, Adegboyega, Jacob, Uyanne, & Jacob (2016) believe that there was a significant relationship between school climate and bullying behavior. Konishi, Miyazaki, Hymel, & Waterhouse (2017) also discussed relationship between school climate and bullying behavior, and they found the effects of three school climate - peer support, discipline/fairness/clarity of rules, and school safety- remained significant predictors of being bullied and bullying others. And they suggested that building a safe and caring school environment would prevent bullying behavior. Mitsopoulou & Giovazolias (2015) conducted a literature review and a meta-analysis to understand the relation between personality, bullying, and victimization behavior. The result revealed that lower level of Agreeableness and Conscientiousness and higher levels of Neuroticism and Extraversion were associated with both bullying and victimization. On the contrary, cognitive and affective empathy were negatively associated only with bullying behavior (Mitsopoulou & Giovazolias, 2015).

The secondary school grades (seventh, eighth and ninth) are widely regarded as a difficult period for students due to hormonal changes, amplified social pressures, and increased bullying (Gregory, 2007). Nationally, a majority of students in seventh, eighth, and ninth grades are separated from students in elementary grades (K–6) and high schools (10–12), perhaps to provide targeted support to students during these difficult years. Recent research, however, finds that transitioning to middle school has a negative effect on student academic achievement (Rockoff & Lockwood, 2010; Schwartz, Stiefel, Rubenstein, & Zabel, 2011; Schwerdt & West, 2013).

There are many references to find the oldest students in school experience a more favorable school environment (including increased participation in leadership roles and decreased incidence bulling and frights) than the youngest students in school, who face increased victimization, exposure delinquent peer influences, and feelings anonymity (e. g. Cook, MacCoun, Muschkin, & Vigdor, 2008; Weiss & Kipnes, 2006). Therefore, there are some researchers called this situation is the top dog/ bottom dog (TDBD) phenomenon(e. g. Cook, MacCoun, Muschkin, & Vigdor, 2008; Weiss & Kipnes, 2006).

The TDBD hypothesis suggests that when students graduate from an elementary school—where they are oldest

students (top dogs)—to a secondary school—where they become newest students (bottom dogs)— they see a dip in quality of school experiences(Weiss & Kipnes, 2006). This TDBD effect may drive the dip in performance observed at the start of secondary school. Some researchers found the TDBD situation, and published the TDBD hypothesis, but there is little evidence to support the TDBD hypothesis much less its effect on academic performance. In this article, researchers begin to close this gap, providing causal evidence on the effects of top or bottom dog status on student learning environments and opening the black box of grade span effects. Specifically, researchers explore effects on bullying, safety, belonging, and academic achievement in the secondary school grades, contributing to the evolving literature on mechanisms through which grade span may affect academic performance.

The TDBD hypothesis was first introduced by Blyth, Simmons, & Bush (1978) in a study of 622students attending 14 schools. Blyth et al. (1978) found that seventh-grade students who were nearly top dogs in a K–8 were more confident, participated in more activities (such as science fair, physical activities, curricular class after school, and so on), and felt less anonymous than seventh-grade students who were bottom dogs in junior high schools after transitioning from a K–6. This provided suggestive evidence that students in the middle grades (7-9) could benefit from attending elementary schools with longer grade spans (hadn't to cross educational stage) rather than middle schools or junior high schools (had to cross educational stage). There are many scholars have been repeatedly observed that students at the top of grade span distribution are less bullied, safer, and feel more comfortable in school than those at the bottom (e.g. Byrnes & Ruby, 2007; Cook et al., 2008; Weiss & Kipnes, 2006). The TDBD hypothesis is widely cited and many scholars found this situation, but existing research is best more to find the confounding variables and the other correlational variables. (Maybe scholars can focus on differences across grades, or other potential confounders.) For example, the extent to which the TDBD effect is driven by new students (bottom dogs are almost always new) or student height (bottom dogs are most often shorter than top dogs) is unaddressed in previous literature.

Isolating the effects of top dog and bottom dog status on bullying, safety, and belonging is difficult for two key reasons. First, it is challenging to identify random variation in TDBD status. On the one hand, the TDBD effect has a confounding variable that students will likely transfer to other schools. For example, a bullied rising sixth grader in a K–8 school may use sixth grade as an opportunity to transfer to a 6–8 school, making the student a bottom dog. Perhaps this sixth grader is simply more prone to bullying than the average student, which precipitates the transfer and the student's bottom dog status in sixth grade. The second key challenge in testing the TDBD hypothesis is the scarcity of student-level data with good measures of bullying, safety, and belonging.

Our article explores the TDBD hypothesis using relatively new longitudinal data on students and schools in the nation's largest school district, Kaohsiung City in Taiwan, including student-level responses to questions on the Kaohsiung City School Survey regarding student experiences and the school environment. Researchers estimate the effects of TDBD status on bullying, safety, and belonging using two group of secondary education school students in Kaohsiung. These data allow the researchers to use both student fixed effects and a variety of student characteristics to control for potential differences between students. Further, researchers aim to address potential endogeneity of TDBD status using an instrumental variables strategy previously employed to study grade span and student mobility (Rockoff & Lockwood, 2010; Schwartz, Stiefel, & Cordes, 2016). Their ideas are as follows. The problem with the causal interpretation of correlations between outcomes and TDBD status is that students effectively choose top dog/bottom dog status by enrolling in a school with a particular grade span in a given grade. Thus, TDBD status reflects the combined effect of a student's grade and school grade span. But, as discussed in Rockoff and Lockwood (2010), grade span in third grade is plausibly exogenous to TDBD status in sixth, seventh, and eighth grades because grade span choice for third grade occurs long before middle school and is not likely to reflect anticipation of the middle school learning environment three to five years later. Grade span in third grade is, however, highly predictive of TDBD status in middle school grades. Thus, grade spans of students' third-grade schools can be used as a set of instruments for top dog/bottom dog status in sixth, seventh, and eighth grades.

In this article, then, we estimate the effects of TDBD status by examining student reports of the learning environment as students are promoted through and transfer between schools. We estimate how students' experiences and academic achievement change as they move from bottom to top dog or from top to bottom dog.

This article is organized as follows. In the following, the researchers review the literature on the TDBD phenomenon as it relates to grade span. Then, researchers discuss our methods, including our data and measures, descriptive statistics, and analytic approach. Finally, researchers summarize our results and discuss our conclusions.

1.1 TDBD and Grade Span

There are many studies suggesting that student academic performance in secondary education school grades is shaped by school grade span (Rockoff & Lockwood, 2010; Schwartz et al., 2011; Schwerdt & West, 2013). There are at least three plausible explanations for the why grade span matters. Grade span could affect a student's (a) top dog/bottom dog status; (b) mobility, due to school transitions; and (c) school and student characteristics, including school/cohort size, class size, subject-specific teachers, funding per pupil, and student motivation and self-concept. The researchers address a gap in the literature, providing insight into how

student experiences are shaped by grade span and complementing existing research exploring other potential mechanisms, for example, mobility, school characteristics such as cohort or school size and classroom environments, and student motivation and self-concept (Bloom & Unterman, 2012; Carolan, Weiss, & Matthews, 2015; Cordes, Schwartz, & Stiefel, 2014; Howley, 2002; Jones, Slate, Martinez-Garcia, & Moore, 2018 ;Napier, 2008; Offenberg, 2001; Rubenstein, Schwartz, Stiefel, & Zabel, 2009).

Schwartz et al. (2011) suggested that grade span may affect student achievement because grade span changes the social environment and particularly TDBD status. And Schwartz, Stiefel, & Cordes (2017) indicated transfer to another school changes the social environment. Thus, if a student always transfer to another school, it may affect their achievement. Holmlunda & Böhlmarkb (2019) indicated that effects of school reorganization on pupils' educational experience. They thought grade span or grade configuration could affect student achievement and social environment. Longer grade spans the effects are more significant than shorter grade spans , for example, extend students' opportunity to be among the oldest in a school, while students entering middle schools transition from being the oldest in elementary school to the youngest in secondary education school. In addition, Cook et al. (2008) suggested that secondary education school entry exposes sixth or seventh graders to older peers who can serve as negative influences and hinder academic performance. Malone, Cornell, & Shukla (2017) in accordance with seventh grade students placed in middle schools reported lower disciplinary structure and a higher prevalence of teasing and bullying in comparison to those in elementary schools. And they also found Eighth grade students in middle schools reported poorer disciplinary structure, lower student engagement, and a higher prevalence of teasing and bullying compared to those in high schools (Malone et al., 2017). Akos, Rose, & Orthner (2015) found the transition effect (defining the transition effect as a decline in student achievement between fifth and sixth grade) as an interruption in students' growth in achievement during elementary to middle school. Moreover, Blyth et al. (1978) hypothesize top dogs in schools with longer grade spans benefit from delaying school transitions, experiencing more welcoming school environments, and having greater opportunity to be nearly top dogs in their school. Conversely, new students may be particularly vulnerable to bullying and poorer perceptions of the learning environment, and bottom dogs are almost always new (Pellegrini et al., 2010).

The TDBD effect may also depend on student grade due to developmental differences across secondary education school grades, such as differences in prefrontal cortex development, pubescent physical maturation, and development of greater ability to think abstractly (Casey, Jones, & Hare, 2008; Eccles, 1999; Firat, 2019; Fuster, 2002; Yurgelun-Todd, 2007). For example, ninth graders may have matured to be better equipped to serve as school leaders than sixth graders, resulting in larger top dog effects among ninth graders than sixth graders. Alternatively, one might believe that sixth-grade top dog effects are greater than in ninth grade because ninth graders have greater ability to situate themselves in social contexts and may maintain better perceptions of the learning environment even without top dog status.

Many scholars have found that shorter and weaker students and who study in large and public secondary education schools are more susceptible to bullying (Borg, 1999; Lleras, 2008; Voss & Mulligan, 2000). Some scholars focus on the same appearance of Asian students. They found that in some Asian countries, Asian students whose height shorter or greater than average height, weaker or have poor mental health, and overweight are more vulnerable to bullying (Gofin & Gordon, 2006; Guo, Ma, Nie, Xu, Xu, & Zhang, 2010; Yang, Kim, Kim, Shin, & Yoon, 2006). Students sixth through ninth grades grow at a rapid rate, and differences in timing of growth spirts during early adolescents might matter. Thus, the TDBD effect may depend on student height or weight (Brixval, Rayce, Rasmussen, Holstein, & Due, 2012; Eccles, 1999; Guo et al., 2010).

Despite being widely cited in the grade span literature, there is little empirical evidence on the TDBD phenomenon per se. Some scholars compared student responses to surveys in sixth and seventh grades in an effort to disentangle the confounding effects of timing of middle school entrance and TDBD status (Blyth et al., 1978; Simmons & Blyth, 1987).They found negative effects of bottom dog status on female students. These effects, however, may reflect differences across students rather than the position of students in a school. Because parents may choose where to live or whether to keep their children in the public schools based, in part, on the configuration of grades. That sort of selection process may influence the characteristics of the student body in ways not necessarily reflected in observed indicators (Cook et al., 2008).

School choice could bias an estimate of the effect of TDBD status on student experiences, overestimating the TDBD effect in the previous example because only the relatively happy seventh-grade students stay enrolled long enough to become top dogs in eighth grade. As a result, previous research on the TDBD phenomenon falls short of establishing a causal relationship because it does not convincingly address the plausible endogeneity of enrollment decisions over time.

For the above reasons, the focus of this study is to find evidence of TDBD effect on bullying, safety, and belonging in secondary education school. The researches construct a baseline model links bullying, safety, belonging, and academic performance to TDBD status as well as a set of student characteristics, and grade, year, and student fixed effects. And construct another model to compare baseline model to find the preferred model.

1.2 Bullying and Gifted Students

In the above references, many scholars have researched the bullying behavior of general students. The researchers want to know the bullying behavior of gifted students. Peters

& Bain (2011) found that the rates of bullying and victimization found among gifted and HA (high-achieving) high school students were not significantly different from each other. However, they also suggested individual gifted students may need targeted interventions focused on reducing bullying and victimization (Peters & Bain, 2011). Peterson & Ray (2006) found that the gifted students had a lot of bullying experience during kindergarten through grade 8. Gallagher, Smith, & Merrotsy (2013) found a significant number of gifted students were concerned about being teased because of their academic ability and achievements. Ogurlu & Sarıçam (2018) aimed to add new evidence to the research base by comparing gender, bullying, victimization, submissive behavior, and forgiveness between gifted and non-gifted students. Their research findings showed that there was a statistical difference between gifted and non-gifted student's peer bullying, victimization, submissive behavior, and forgiveness levels. This means that gifted and non-gifted students (general students) may have different experiences and situations of being bullying.

Swearer, Wang, Maag, Siebecker, & Frerichs (2012) focus on students in general and special education experience bullying. They found seventh grader in general education reported more bullying behavior than sixth graders and ninth grades in general education. Fifth grader in general education reported more victimization than students in all other grades in general education (because seventh grader and fifth grader students usually are bottom dogs in elementary school and secondary education school). However, the grade differences were not significant for students in special education.

In summary, many scholars have different views on supporting the experience and situation of gifted students being bullied. So this study focus of the gifted students. And the researchers also want to know if the TDBD status is also appears in gifted students.

2. Methods

2.1 Participants

The researchers surveyed two groups of Kaohsiung and Tainan public elementary school general education and gifted education students, who entered fifth grade for first time in 2014, made standard academic progress from grades 5 to 9 in Taiwan. The sample spans a five -year period from 2014 through 2019, and each student is observed for five years. In 2014, the researchers worked on Kaohsiung Resource Center for Gifted and Talented (KRCGT). Every year, the KRCGT surveys the standard academic achievement of all gifted students in Kaohsiung. Therefore, the researchers can get proof of standard academic achievement for gifted students from 2014 to 2019. Altogether, our sample includes 822 general education students and 839 gifted education students.

Table 1 shows descriptive statistics on the sociodemographic characteristics of participants for fifth-grade in 2014. The students average age was 11.39±1.13 (rang= 10-12 years old). Most families had an education lever of a bachelor's degree (44.56%), including gifted education students and general education students. Each family has an average of 2.23 ± 1.17 siblings. Most families are the economic situation of middle class families (91.7%). Democratic style (87.6%) is the most teaching styles of parents. Academic achievements have significant difference between gifted education students and general education students. The gifted education students 92.97% got 60 T-score or more in semester in 2014, and the general education students only 56.7% got 60 T- score or more in semester.

2.2 Measures

The main outcome variables are student reports of experiences in school. Researchers referred to the New York City School Survey (NYC School Survey, 2014) and translated it from English to Chinese. While there are many measures of school learning environment in the NYC School Survey, researchers f rely on components that most closely match the outcomes studied in the TDBD literature—bullying, safety, and belonging. Following previous research, we use student-level survey data to construct measures of student experiences. As shown in Table 2, the measures include student reports of the frequency of school bullying, fights, and gang activity; how frequently a student stays home due to feeling unsafe; whether a student feels safe in school hallways, bathrooms, and locker rooms; and the extent to which a student feels he or she is known by school adults and welcome in school. The items of all measures made use of a 4-point Likert scale (1 to 4).The researchers use indicator variables for each measure of bullying, safety, and belonging, which take a value of 1 if the student reports the activity happens more frequently (all of the time or most of the time) or the student reports agreement (agree or strongly agree) and a value of 0 if the activity happens less frequently (some of the time or never) or the student reports disagreement (disagree or strongly disagree).

The researchers assess the uniqueness of these measures using a factor analysis, finding the seven school environment outcomes fall into three main factors but further finding that the uniqueness of these measures are relatively high, ranging from .59 to .92. Thus, researchers construct seven binary outcome variables in all, which we term *bullying, fights, gangs, stay home, safe school, known*, and *welcome* (see Table 2). Because the researchers reviewed that previous researchers have used the same measures of bullying, safety, and belonging and have found that they provide apt measures of the school learning environment (Lacoe, 2013; Schwartz et al., 2016). For example, in order to assess the construct validity of bullying measures, Lacoe (2013) compares student survey responses to school-level administrative measures of school violence. Lacoe (2013) found that student responses to these questions are highly correlated in the expected direction with violence reported annually through the New York State Violent and Disruptive Incident Reporting (VADIR) system.

Table 1. Descriptive Statistics, Fifth-Grade Students, in 2014

		All (*n* =1661)	Gifted Students (*n* = 839)	General Students (*n* = 822)	*p* - Value
Age		11.39 ± 1.13	11.31 ± 1.01	11.48 ± 1.11	.377
Sex (%)	Girl	753 (45.33)	357 (42.55)	396 (48.17)	.71
	Boy	908 (54.67)	482 (57.45)	426 (51.83)	
Parents' educational level (%)	Primary School	32 (1.93)	15(1.79)	17 (2.07)	.051
	Junior High School	241 (14.51)	96 (11.45)	145 (17.64)	
	Senior High School	350(21.08)	158(18.84)	192(23.36)	
	Bachelor's Degree	740 (44.56)	382 (45.53)	358 (43.56)	
	Master's Degree	242 (14.57)	146 (17.41)	96 (11.68)	
	PhD Degree	56(3.38)	42(5.01)	14(1.71)	
Number of sibling (include yourself)		2.23 ± 1.17	2.19 ± 1.57	2.27 ± 1.27	.766
Academic Achievement (%)	70 T-score or more	804(48.41)	589 (70.20)	215 (26.16)	.018
	60-69 T-score	442(26.61)	191(22.77)	251(30.54)	
	50-59 T-score	263(15.84)	30(3.58)	233 (28.35)	
	T-score below 50	152(9.16)	29(3.46)	123(14.97)	
The economic situation of family (%)	A rich family	12(0.73)	7(0.84)	5(0.61)	.611
	Upper class family	82(4.94)	56(6.68)	26(3.17)	
	Middle class family	1523(91.7)	752(89.63)	771(93.8)	
	Working class family	44(2.65)	24(2.86)	20(2.42)	
Teaching Styles of Parents (%)	Democratic style	1455(87.6)	744(88.68)	711(86.5)	.831
	Authoritarian style	159(9.58)	72(8.59)	87(10.59)	
	Permissive style(indulge)	47(2.82)	23(2.75)	24(2.92)	

Table 2. Measures of Bullying, Safety, and Belonging

Category	NYC School Survey Question	Variable Name	= 1 If Respond
Bullying	Students threaten or bully other students at school.	Bullying	Most or all of the time
	Students get into physical fights at my school.	Fights	
	There is gang activity in my school.	Gangs	
Safety	I stay home because I don't feel safe at school.	Safe home	
Belonging	I am safe in the hallways, bathrooms, and locker rooms at my school.	Safe school	Agree or strongly agree
	Most of the teachers, counselors, school leaders, and other adults I see at school every day know my name or who I am.	Known	
	I feel welcome in my school.	Welcome	

While answers to individual survey questions are likely imperfect, collectively, they provide a clear picture of student perceptions of the school environment. For example, the bullying measure asks whether "students threaten or bully other students at school". Through this question, we can't directly identify whether students are actually bullied themselves. Students self-reports, like this, "I have been bullying at my school this year" or " I have bullied my

classmates at classroom this year". Through the above answers, we can understand students think that there are bullying situation in there school. The above answer is the most commonly used measure in the bullying literature, and peer nominations are a distant second (see Kim & Leventhal, 2008; Moore, Norman, Suetani, Thomas, Sly, & Scott, 2017; Nakamoto & Schwartz, 2010). Some NYC School Survey questions on student safety, however, ask about individual experiences (e.g., "I stay home because I don't feel safe at school" and "I am safe in the hallways, bathrooms, and locker rooms at my school"). Previous research suggests these measures collectively offer a strong indication of student perceptions of bullying and safety in school (see Kim & Leventhal, 2008).

Our main independent variable is student TDBD status, defining top dogs as students at the top of a grade span (sixth-grade students are the top dogs in a elementary school, ninth-grade students are the top dog in a secondary education school) and bottom dogs as those at the bottom of a grade span. "Middle dogs" are enrolled in any grade between the top and bottom (e.g., eighth-grade students are middle dogs in a secondary education school, and fifth-grade students are middle dogs in elementary school).In Taiwan, there are only two school types from elementary school to secondary education school (1-6 and 7-9, or 1-9). But the school type of grade 1-9 is almost less 2% of student choices. Thus, the researchers don't care about this school type in this study. We can imagine the result, because the sixth-grade students would be top dogs in a 1–6 but bottom dogs in a 7-9. Therefore, when a sixth-grade student graduates from elementary school and enters a secondary education school, he will change from top dog to bottom dog. All of the secondary education school students have subject-specific teachers rather than a single teacher for all subjects.(But the elementary school students have single teacher for all subject). Moreover, class sizes are similar when comparing students in the same grades (Rockoff & Lockwood, 2010).

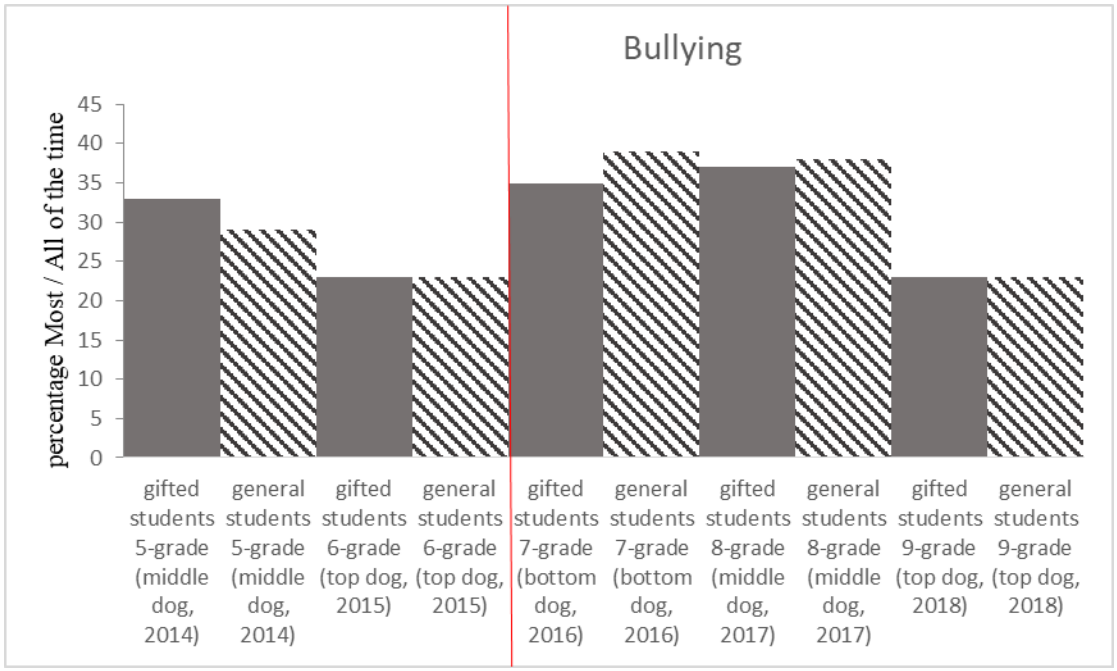
The researchers also distinguish "new dogs," who have just enrolled in a new school (most but not all of whom are also bottom dogs, such as transfer students), and "big dogs," who are tall compared to other students in their school. The height of the student is measured once a year, the "big dog" we define is a student who is two standard deviations taller than the mean student in his or her school. New bottom dogs begin a new school at a standard time, but new middle dogs enter a new school midway through the normal grade progression. The researchers also get students' academic achievement from school.

2.3 Descriptive Statistics

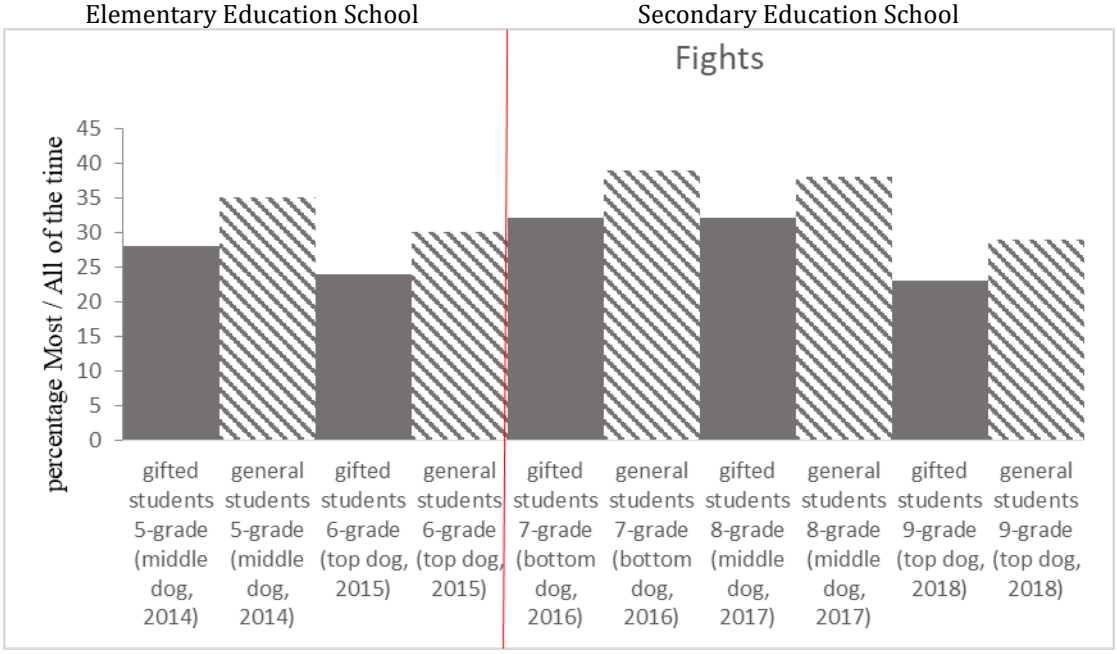
Figure1 and Figure2 shows student responses (2014 fifth grader to 2019 ninth grader) to survey questions regarding bullying, safety, and belonging (7 factors in all) for the gifted education students and general education students in elementary school and secondary education school. Figure1 shows the histograms of the four factors of bullying, fights, gangs and stay at home in the fifth grader to ninth grader. If the reader splits the figure1 into the part of elementary school and secondary education school, they can find among top dogs report bullying, fights, gangs, and stay at home less than bottom and middle dogs. If we compare gifted education students and general education students, there is no different of bullying, and fights (the percentage of gifted students is less). And there is an interesting situation about gangs, among gifted students report gangs act less than generally students.

Figure2 shows the histograms of the three factors of safe at school, known, and welcome in the fifth grader to ninth grader. Among top dogs report feeling safer and greater belonging than bottom and middle dogs. Similarly, on average, middle dogs report better experiences than bottom dogs. A greater share of top dogs report they agree (or strongly agree) that most of the teachers, counselors, school leaders, and other adults in school know who they are compared to bottom dogs.

Taken together, the descriptive statistics are consistent with the TDBD hypothesis. We turn next to impact estimates using regression analysis.



Elementary Education School Secondary Education School



Elementary Education School Secondary Education School

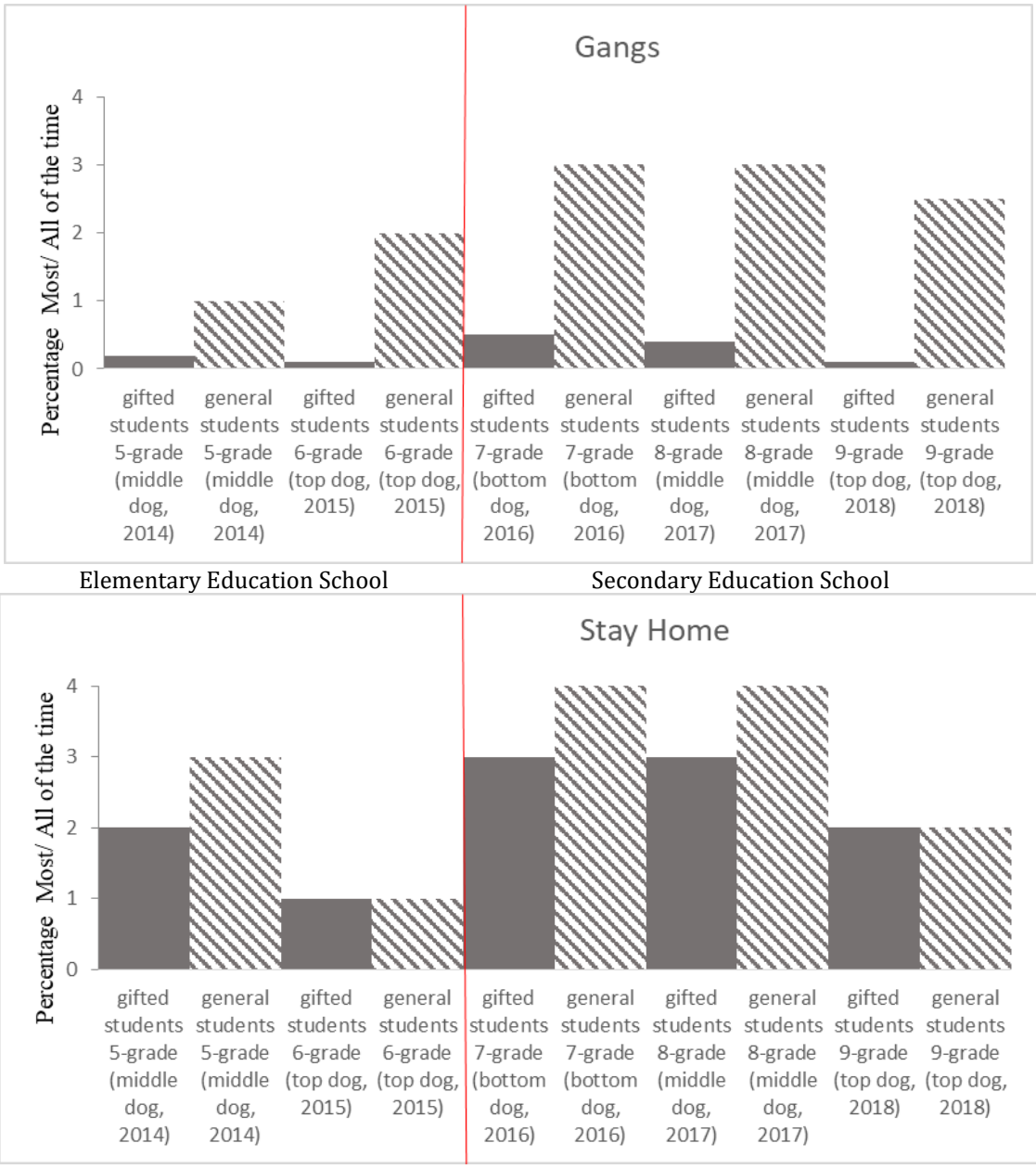
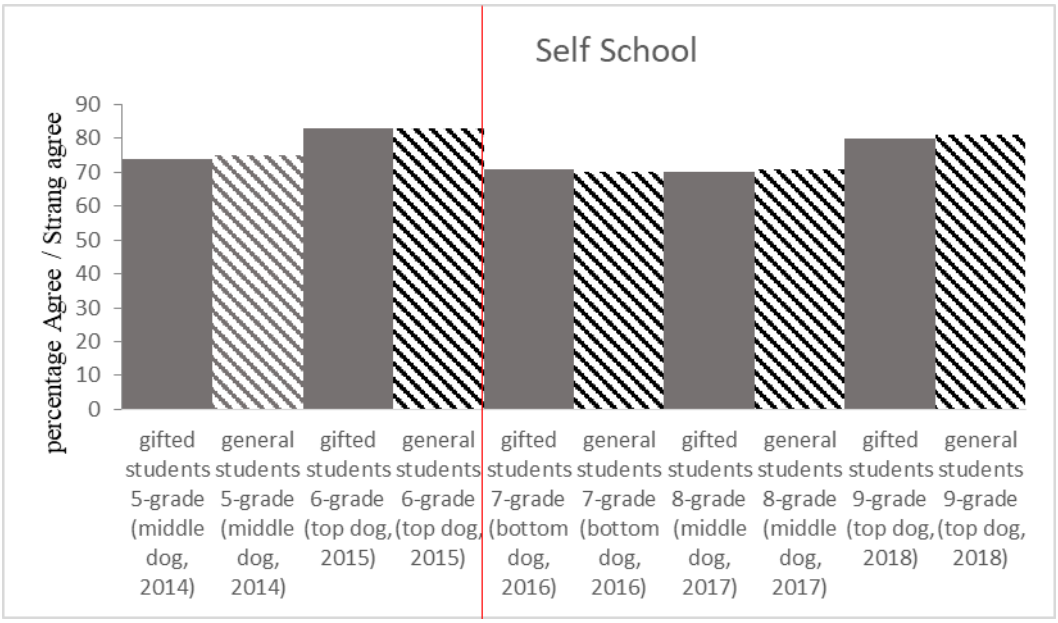
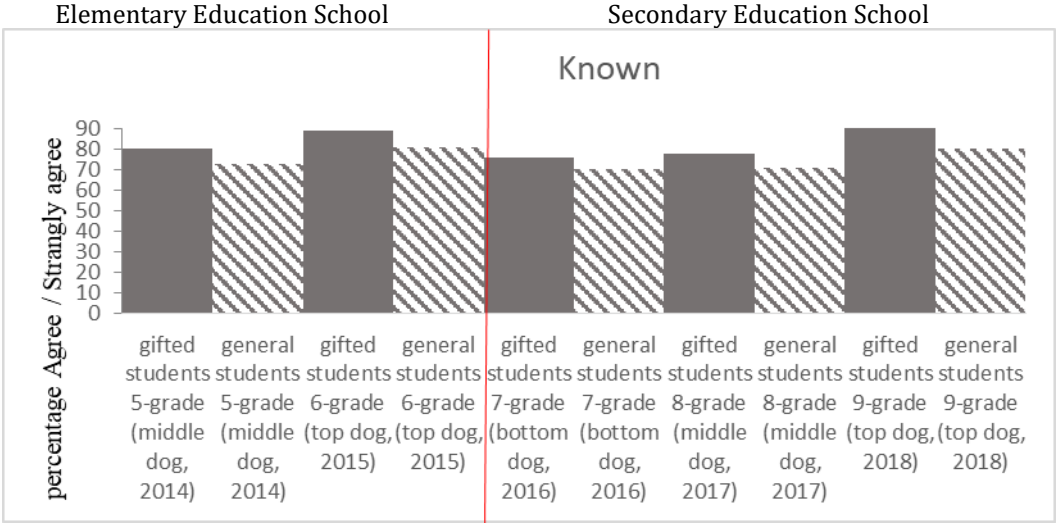


Figure 1. Bullying, fights, gangs and stay at home by relative position and grade span, gifted and general students, 2014 to 2019





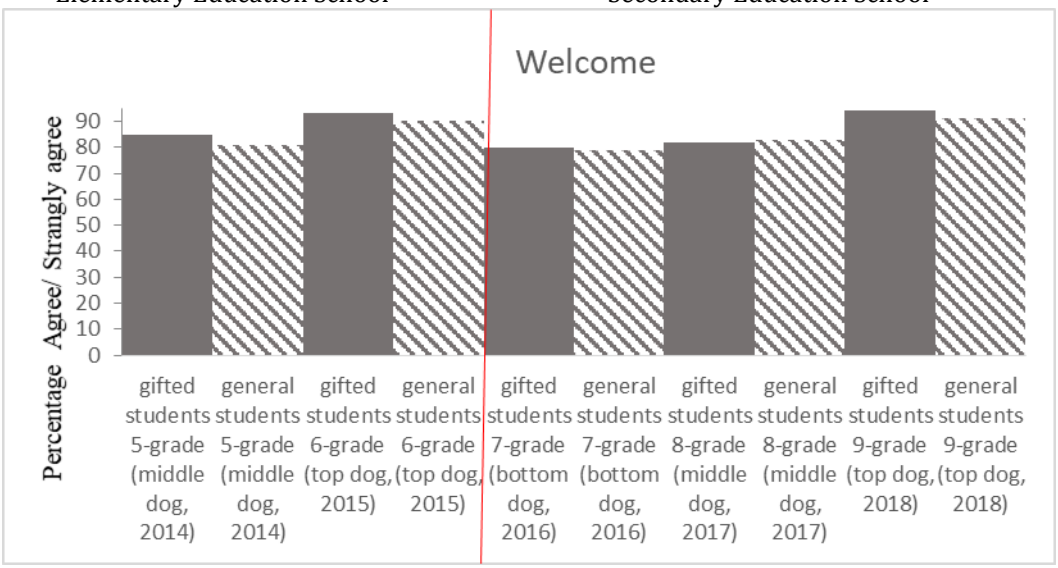
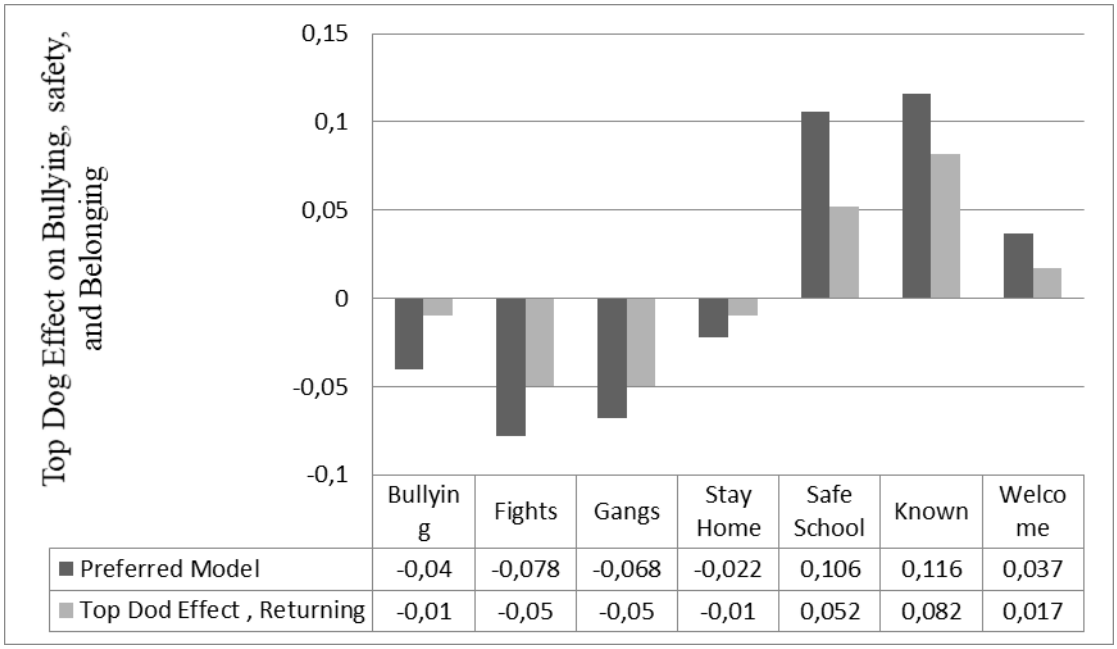


Figure 2. Safe school, known, and welcome by relative position and grade span, gifted and general students, 2014 to 2019



	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
Preferred Model	-0,04	-0,078	-0,068	-0,022	0,106	0,116	0,037
Top Dod Effect , Returning	-0,01	-0,05	-0,05	-0,01	0,052	0,082	0,017

Figure 3. Digging deeper: regression results, returning and new dogs, and TDBD effect

Note. Returning students are those attending the same school in the previous year. None of the reported estimates are statistically different across models. Returning bottom dogs and new top dogs are exceedingly rare, and results are not shown here. See Table S5 in the online journal for coefficient estimates and standard errors. TDBD = top dog/bottom dog.

2.4 Analytic Strategy

Baseline Model

Our baseline model links bullying, safety, belonging, and academic performance to TDBD status as well as group of student type (gifted or general students), and grade, and student fixed effects, as follows:

$$BSB_{it} = \beta_0 + \beta_1 TD_{it} + \beta_2 BD_{it} + \beta_3 G_{it} + \beta_0 X_{it} + \alpha_i + \mu_{it} \quad (1)$$

where BSB_{it} is a bullying, safety, or belonging outcome for student i in year t; TD_{it} is a variable indicating top dog status; BD_{it} is variable indicating bottom dog status; G_{it} is a series of binary variables indicating if student i is he/she a gifted students; X_{it} is a vector of time-varying student characteristics (academic achievement, the economic situation of family), X also includes time-invariant student characteristics (gender, parents' educational level, teaching styles of parents); α_i is a student fixed effect; and μ_{it} is an error term.

Our key coefficients are β_1 and β_2, which capture the effect of top dog and bottom dog status on student perceptions of the learning environment, respectively. For some of these outcomes, such as bullying, fights, gangs, and stay home, negative coefficients reflect a better learning environment, indicating students are less likely to report these negative conditions. For the other outcomes, including safe school, known, and welcome, positive coefficients indicate a better learning environment. Negative β_1 (β_2) coefficients in bullying, stay home, fights, and gangs models indicate top dogs (bottom dogs) reported less bullying, staying home because they feel unsafe, fights, and gangs compared to middle dogs. If β_1 equals –.01 in the fights model, for example, it indicates that top dogs are one percentage point less likely to report frequent physical fights at school (all or most of the time) compared to middle dogs(As a reference, when fights is the outcome of interest, the fully specified equation for Model 1 takes the form in appendix). Positive $\beta 1$ ($\beta 2$) coefficients in safe school, known, and welcome models indicate top dogs (bottom dogs) reported feeling safer, more known, and more welcome in school compared to middle dogs. If β_1 equals .01 in the safe school model, for example, it indicates that top dogs are one percentage point more likely to report (strongly) agreeing that they feel safe in the hallways, locker rooms, and bathrooms at school compared to middle dogs.

Heterogeneity by Grade and Grade Span Length

We explore effect heterogeneity to analyze when students obtain the greatest boost from top dog status. We assess heterogeneity of TDBD effects by grade, as follows:

$$BSB_{it} = \beta_0 + \beta 1^G TD_{it} + \beta 2^G BD_{it} + \beta_3 G_{it} + \beta_0 X_{it} + \alpha_i + \mu_{it} \quad (2)$$

where all variables are as previously defined, and superscript G indicates that student grade is interacted with the variable. As suggested previously, the size of the TDBD effect may also depend on grade span length (heap size). We estimate a model in which we interact TDBD status with heap size to test whether longer grade spans (bigger heaps) are associated with larger TDBD effects. In the heap size models, β_1 and β_2 are estimated coefficients of the interaction effect of heap size and TDBD status (similar to the interaction effects outlined previously for grade and TDBD status).

Digging Deeper Into the TDBD Effect

One explanation for the TDBD phenomenon is that it merely reflects bottom dog difficulties adjusting to a new school. Thus, the estimated bottom dog effect may reflect the relative disadvantage of being new to a school rather than bottom dog status per se. Conversely, one might instead argue that being new to a school is a component of bottom dog status. We estimate how much of the TDBD effect can be explained by new student status using variation in student entry into new schools. Importantly, middle dogs are often new students as well.

Another feature of the TDBD phenomenon is that top dogs tend to be taller than bottom dogs, and, as discussed previously, taller students may have better experiences. Top dogs are in higher grades than bottom dogs within the same school and are usually taller, especially in middle school, when students are still growing. The TDBD effect could be driven or exacerbated by student height as being relatively tall might be a component of top dog status (height could be an explanation or a mechanism). We explore this in two ways. First, we explore the moderating effect of height by interacting TDBD status with relative height in a school. Second, we explore the potential mediating effect by including height as a control variable. We use both zHeight and zHeight squared to allow for possible nonlinearity in the relationship between height and perceptions of the school environment (since there could be distinct advantages to being of average height). Here, we restrict our analyses to the 85% of the sample with height data and reestimate our preferred model.

3. Results

3.1 Baseline Results

Table 3 shows OLS (Ordinary Lest Squares, OLS), instrumental variables (IV), and IV with student fixed effects (FE) estimates of the TDBD effect in the secondary education school grades. In the OLS model (Panel A), we estimate that top dogs are less likely to report that there is gang activity in their schools (1.9 percentage point decrease in probability of reporting gangs) and more likely to report feeling safe in hallways, locker rooms, and bathrooms (2.7 percentage point increase in probability of reporting safe school) and that they are known (1.6 percentage point increase in probability of reporting known) than middle dogs. In the OLS model, we further estimate that bottom dogs are more likely to report bullying (2.3 percentage points), gangs (3.8 percentage points), and stay home (1.1 percentage point increase in the probability of reporting staying home from school because he or she feels unsafe) and less likely to report safe school (–4.2 percentage points), known (–3.8 percentage points), and welcome (–1.2 percentage points) than middle dogs. Top dogs also are less likely to report bullying, gangs, and stay home but more likely to report safe school, known, and welcome than bottom dogs, which we estimate by subtracting the coefficients on bottom dog status from the coefficients on top dog status and testing for significance using *t* tests.

The main results remain largely unchanged when accounting for student selection into timing of top dog and bottom dog status (as determined by middle school grade span) using the instrumental variables strategy. In the IV model (Panel B of Table 3), we estimate that top dog status decreases a student's likelihood to report fights, gangs, and stay home and increases a student's likelihood to report safe school and known than middle dogs. The estimated effect of bottom dog status is robust to the instrumental variables model for regressions estimating the effect on gangs, safe school, and known. Bottom dog status increases a student's likelihood to report gangs and decreases probability to report safe school and known.

Our estimated effects of top dog status are stronger when we address the endogeneity of selection into middle school and control for time-invariant student characteristics. The results from our preferred models—which include the instrumental variables and student fixed effects—are shown in Panel C of Table 3. We estimate that top dogs compared to middle dogs are 4.7 percentage points less likely to report bullying, 7.8 percentage points less likely to report fights, 6.8 percentage points less likely to report gangs, and 2.2 percentage points less likely to report staying home due to feeling unsafe in school. Furthermore, top dogs are 10.6 percentage points more likely to report feeling safe in hallways, locker rooms, and bathrooms; 11.6 percentage points more likely to report feeling they are known; and 3.7 percentage points more likely to report feeling welcome.

In summary, OLS, IV, and IV student fixed effects models all indicate that top dogs fare better than middle and bottom dogs. These estimated effects are quite large, showing marked changes in perceptions of the learning environment for students who are top dogs. Conversely, as models better address causality, bottom dogs fare similarly to middle dogs but worse than top dogs. This suggests that negative coefficients for bottom dogs in an OLS model might be biased by the effects of selection through, for example, endogenous student mobility.

3.2 Heterogeneity by Grade and Grade Span Length

Table 4 presents our preferred model estimates of TDBD effects for same type and different grades. We interact TD and BD with student grade to estimate the differential effects of top dog and bottom dog status in sixth and ninth grades, finding that sixth graders have a greater bump from top dog status than do eighth graders (the TDBD effects for elementary school students more than secondary education school students). We found sixth-grade top dogs face better learning environments than they would as middle and bottom dogs. For example, as a result of top dog status, sixth-grade top dogs are 7.8 percentage points less likely to report bullying and14.9 percentage points more likely to report known than they would as middle dogs (see Top6 – Middle5 in Table 4). Similarly, as a result of their status, sixth-grade top dogs see a 9.5 percentage point decrease in probability of gangs and a 14.9 percentage point increase in probability

to feel known as compared to if they were bottom dogs (see Top6 – Bottom4 in Table 4).

However, we also found ninth-grade top dogs face better learning environments than they would as middle and bottom dogs. For example, as a result of top dog status, ninth-grade top dogs are 8.6 percentage points more likely to report known and6.0 percentage points more likely to report safe school than they would as bottom dogs (see Top9 –Bottom7 in Table 4).

In sum, we find that there is a larger top dog effect in sixth than ninth grade and for students serving as top dogs over larger compared to smaller heap sizes. Further, we find that long grade spans (larger heaps) do not harm bottom dogs as compared to shorter grade spans (smaller heaps). These results suggest, consistent with developmental theory, that timing of top dog status matters and further, that longer grade spans may help top dogs more than shorter grade spans.

Table 3. Regression Result students, Baseline, Instrumental Variables (IV), and IV Student Fixed Effect (FE) Models

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
A. Ordinary lest squares							
Top dog	-.004 (.011)	.007 (.016)	-.019** (.009)	-.001 (.002)	.027***(.011)	.016*(.009)	.005 (.007)
Middle dog	-	-	-	-	-	-	-
Bottom dog	.023**(.011)	.020 (.014)	.038**(.009)	.011***(.002)	-.042***(.013)	-.038***(.011)	-.012**(.005)
Top-bottom	-.029**	-.013	-.057***	-.012***	.069***	.054***	.017***
Student FE	No	No	No	No	No	No	No
IV	No	No	No	No	No	No	No
B. Instrumental Variables(IV)							
Top dog	-.004 (.022)	-.047*(.028)	-.045**(.018)	-.015**(.007)	.074***(.021)	.052**(.020)	.017(.013)
Middle dog	-	-	-	-	-	-	-
Bottom dog	.012 (.014)	-.011 (.021)	.038(.013)	.006 (.006)	-.025*(.016)	-.075*(.016)	.002 (.010)
Top-bottom	-.016	-.036	-.083***	-.021***	.099***	.127***	. 015
Student FE	No	No	No	No	No	No	No
IV	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C. IV student FE							
Top dog	-.047**	-.078**(.030)	-.068***(.022)	-.022** (.009)	.106***(.022)	.116*** (.019)	.037*** (.014)
Middle dog	-	-	-	-	-	-	-
Bottom dog	-.021	-.070***(.014)	-.001(.011)	-.006(.006)	.014 (.014)	-.001(.013)	.021 (.009)
Top-bottom	-.026	-.008	-.067***	-.016**	.092***	.117***	.016
Student FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
IV	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. IV estimates instrument for top dog/bottom dog (TDBD) status using the grade span of student's third-grade school (secondary education school). Model controls include: indicators for girl, Parents' educational level up than Bachelor's Degree, Middle class family, Upper class family. Cohort fixed effects are also included in the OLS and IV specifications. Reference group = middle dogs.
*p < .10. **p < .05. ***p < .01.

Table 4. Regression Results, Same Type, Different Grade, Instrumental Variables (IV) and Student Fixed Effects (FE)

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
Top dog							
Grade6	-.055**(.023)	-.052*(.032)	-.103***(.022)	-.024**(.010)	.115***(.023)	.114***(.020)	.046***(.015)
Grade9	-.025***(.006)	-.044***(.009)	-.011**(.005)	.000(.005)	.049***(.007)	.052***(.005)	.010**(.005)
Middle dog							
Grade5	-.023*(.011)	-.062***(.014)	-.013(.009)	-.008(.006)	.032***(.011)	-.037***(.010)	-.001(.007)
Grade8	-	-	-	-	-	-	-
Bottom dog							
Grade4	-.003(.005)	-.025***(.006)	-.008(.005)	-.001(.005)	-.013**(.001)	-.035***(.004)	.018***(.003)
Grade7	-.005(.005)	-.018***(.007)	.004(.009)	.000(.002)	-.011**(.005)	-.034***(.006)	.020***(.004)
Top6-Bottom4	-.052**	-.027	-.095***	-.023**	.128***	.149***	.028*
Top9-Bottom7	-.020*	-.026	-.007	.000	.060***	.086***	-.010
Top6-Middle5	-.078 ***	-.114***	-090***	-.032**	.083**	.149***	.028*

Note. Model controls include: indicators for girl, Parents' educational level up than Bachelor's Degree, Middle class family, Upper class family. Cohort fixed effects are also included in the OLS and IV specifications. Reference group = Grade 8 middle dogs.
*p < .10. **p < .05. ***p < .01

Table 5. Regression Results, Big Dogs, and TDBD Effect

	Bullying	Fights	Gangs	Stay Home	Safe School	Known	Welcome
A. preferred							
Top dog	-.047**	-.078**(.030)	-.068***(.022)	-.022** (.009)	.106***(.022)	.116*** (.019)	.037*** (.014)
Middle dog	-	-	-	-	-	-	-
Bottom dog	-.021	-.070***(.014)	-.001(.011)	-.006(.006)	.014 (.014)	-.001(.013)	.021 (.009)
B. Hight							
Top dog	-.058** (.022)	-.116** * (.048)	-.088***(.028)	-.030**(.017)	.114***(.021)	.122***(.020)	.047*** (.013)
Middle dog	-	-	-	-	-	-	-
Bottom dog	-.029* (.016)	-.079*** (.020)	.038(.013)	.006 (.006)	-.012 (.006)	-.001(.012)	.029 (.011)
zHeight	-.006 (.005)	-.006 (.008)	.003 (.004)	.001 (.002)	.005 (.005)	-.005 (.003)	.004 (.003)
$zHeight^2$	-.002 (.001)	-.001 (.001)	.002 (.001)	.001** (.001)	.002** (.001)	.001 (.002)	.002 (.002)
C. Interaction							
Top dog	-086(.038)***	-.106***(.022)	-.043***(.012)	-.149*** (.038)	.149***(.027)	.10*** (.029)	.077*** (.019)
Middle dog	-	-	-	-	-	-	-
Bottom dog	-.061***(.022)	-.024(.016)	-.015(.011)	-.117*** (.026)	.064 (.024)	-.009(.023)	.039*** (.010)
Top × zHeight	-.006* (.004)	-.002(.002)	.000(.001)	-.010**(.004)	.011**(.005)	.001(.004)	.000(.003)
Middle × zHeight	-.011*(.004)	.005(.004)	.005(.003)	-.005(.005)	.006(.006)	-.001(.006)	.000(.005)
Bottom × zHeight	-.010*(.006)	-.001(.005)	-.003(.003)	-.014*(.007)	.012*(.007)	-.007(.005)	.003(.004)

Note. zHeight measures student relative height as compared to other students in the school; TDBD = top dog/bottom dog
*p < .10. **p < .05. ***p < .01

3.3 Digging Deeper Into the TDBD Effect

Bottom Dog Effect or New Dog Effect?

Figure 3 shows estimates of the TDBD effect for returning and new students side by side with our preferred model TDBD estimates. As shown in Figure 3 Panel A, the top dog effect for returning students is about the same as the top dog effect estimates in our preferred model; all results point in the same direction and are of roughly the same magnitude (though a little smaller). That is, top dog status improves the student learning environment, even among returning students.

Top Dog Effect or Big Dog Effect?

The results shown in Table 5 tease apart the extent to which the TDBD effect is explained by student height. Panel a of Table 5 shows the estimates from our preferred model without height controls, but for the subset of students with height measures. As shown in Panel B, including controls for relative student height (zHeight and the quadratic form) does not change our primary results much. That is, top dogs benefit from their status independent of the role of height.

As shown in Panel C of Table 5, the main TDBD effect holds even with the inclusion of the interaction terms between TDBD status and student relative height. Top dog status improves student perceptions of the school environment as compared to middle and bottom dog status. For example, top dog status decreases the probability of reporting bullying by 8.6 percentage points as compared to middle dog status. While student height matters, it does not explain the TDBD effect on perceptions of the learning environment.

4. Discussion

In brief, we find that top dog status improves a student's learning environment. Top dogs are *less likely* to report bullying, fights, and gang activity and *more likely* to report feeling safe and welcome in school than bottom dogs due to their top dog status. In contrast, bottom dogs report *higher* rates of bullying, fighting, and gang activity and *lower* rates of safety and belonging than top and middle dogs, although the bottom dog results are sensitive to the inclusion of student fixed effects and addressing selection into TDBD status. We note that there is greater variation in TDBD status among sixth graders than among ninth graders. Thus, we explore possible heterogeneity by grade of the top dog effect, finding a larger top dog effect in sixth grade than ninth grade. Moreover, we show that top dog status leads to improved academic achievement and provide correlational evidence that this could operate through improved student experiences for top dogs.

This article offers the first credibly causal evidence on the TDBD hypothesis. We find that top dogs are less likely to report problems with bullying or safety and are more likely to report feeling welcome and belonging in school compared to bottom dogs. These effects are robust to controls for a variety of student characteristics, student fixed effects, and corrections for potential selection into grade spans. Conversely, bottom dogs are more likely to report bullying, feeling unsafe, and like they do not belong in school than they do as middle or top dogs. Unlike the top dog effect, our results suggest that the bottom dog effect results, at least in part, from student selection. We find moving from elementary to middle school hurts bottom dogs because they lose the top dog status they previously held in their old school. Put differently, the TDBD effect is significant both substantively and statistically.

Our results also suggest that students may benefit from longer grade spans. We find the top dog effect is larger in schools with longer grade spans (larger heap sizes), while the effect on bottom dogs in longer grade spans (at the bottom of larger heap sizes) is no worse than in schools with shorter grade spans. Moreover, in longer grade spans, the closer students are to the top, the better they do; that is, promotion through school improves learning environments.

We explore possible mechanisms for the TDBD effect, including (a) student height and (b) whether a student is returning or new to a school. First, we find that the jump in perceptions of learning environment for top dogs comes

from the status afforded to them by their grade and not their height. Second, we find the top dog effect holds even when controlling for continued enrollment in the same school. While being a new student and student height affect student experiences, they do not drive or explain the TDBD phenomenon.

We suggest that other plausible explanations for the negative consequences of the middle school environment on the whole are unlikely. First, we estimate the TDBD effect in models that include student fixed effects and therefore estimate the impact of TD and BD status within students over time. In alternative model specifications, we find, for example, that ninth graders in a 6–9 middle school environment have better perceptions of the learning environment than they did as sixth graders in 6–8 schools, suggesting that there is an independent top dog effect in addition to any plausible negative consequences of the middle school environment on the whole.

While every school has both top and bottom dogs, grade organization defines when and how frequently students serve as top and bottom dogs. Thus, our results can inform policy decisions on school organization. We find, for example, that the top dog premium increases in the length of the grade span. Moreover, our results offer insight into how school administrators may want to target their resources. We find, for example, that even returning students in the middle of a grade span feel less like they belong (less likely to report they are known or welcome) than top dogs. This suggests benefits to targeting resources to foster more welcoming environments for middle dogs and not just new students. Further, our evidence links TDBD status to academic outcomes, suggesting that fostering safer environments for bottom dogs may ease their transition to middle school and improve academic performance as well.

Our results provide empirical support for the TDBD hypothesis, even after addressing endogeneity of school grade span choice and time-invariant student characteristics. This suggests that the effect of TDBD status on student experiences ought to be considered to make optimal decisions on grade span length. In particular, the evidence in this article suggests that longer grade spans that enable middle grade students to serve as relative top dogs would improve student experiences in school and academic achievement. Moreover, in places that do not reorganize elementary and middle school grade spans, this article provides strong evidence that resources should be committed to fostering safe learning environments for students who are not top dogs. While we can only speculate on how these policy recommendations would impact elementary-aged students, we are more certain of the positive effects they can have on the experiences and academic achievement of students in the middle grades.

References

Adegboyega, L.O., Jacob, A.J., Uyanne, E.O., & Jacob, O.A. (2016). School climate as correlate of bullying behaviour among secondary school students in Yagba West of Kogi State, Nigeria. *Nigerian Journal of Guidance and Counselling, 21* (1), 102-110.

Akos, P., Rose, R. A., & Orthner, D. (2015). Sociodemographic moderators of middle School transition effects on academic achievement. *The Journal of Early Adolescence, 35*(2), 170-198. doi: https://doi.org/10.1177/0272431614529367

Bloom, H. S., Unterman, R. (2012). *Sustained positive effects on graduation rates produced by New York City's small public high schools of choice*. NY: MDRC.

Blyth, D. A., Simmons, R. G., & Bush, D. (1978). The transition into early adolescence: A longitudinal comparison of youth in two educational contexts. *Sociology of Education, 51*(3), 149–162. doi: https://doi.org/10.2307/2112661

Borg, M. G. (1999). The extent and nature of bullying among primary and secondary schoolchildren. *Educational Research, 41*(2), 137–153. doi: https://doi.org/10.1080/0013188990410202

Brixval, C. S., Rayce, S. L. B., Rasmussen, M., Holstein, B. E., & Due, P. (2012). Overweight, body image and bullying—an epidemiological study of 11- to 15-years olds. *European Journal of Public Health, 22* (1), 126-130. doi: https://doi.org/10.1093/eurpub/ckr010

Byrnes, V., Ruby, A. (2007). Comparing achievement between K–8 and middle schools: A large-scale empirical study. *American Journal of Education, 114*, 101–135. doi: https://doi.org/10.1086/520693

Carolan, B. V., Weiss, C. C., Matthews, J. S. (2015). Which middle school model works best? Evidence from the early childhood longitudinal study. *Youth & Society, 47*(5), 591–614. doi: https://doi.org/10.1177/0044118X13478625

Casey, B. J., Jones, R. M., & Hare, T. A. (2008). The adolescent brain. *The Year in Cognitive Neuroscience, 1124* (1), 111-126. doi: https://doi.org/10.1196/annals.1440.010

Cook, P. J., MacCoun, R., Muschkin, C., & Vigdor, J. (2008). The negative impacts of starting middle school in sixth grade. J*ournal of Policy Analysis and Management, 27*(1), 104–121. doi: https://doi.org/10.1002/pam.20309

Cordes, S., Schwartz, A. E., Stiefel, L. (2014). *Does residential mobility harm school performance*? NY: Institute for Education and Social Policy.

Eccles, J. S. (1999). The development of children ages 6 to 14. T*he Future of Children, 9*(2), 30–44. doi: http://dx.doi.org/10.2307/1602703

Firat, R. B. (2019). Opening the "Black Box": Functions of the frontal lobes and their implications for sociology. Frontiers in Sociology, 4 (3), 1-14. doi: https://doi.org/10.3389/fsoc.2019.00003

Fuster, J. M. (2002). Frontal lobe and cognitive development. *Journal of Neurocytology, 31*(3–5), 373–385. doi: https://doi.org/10.1023/A:1024190429920

Gallagher, S., Smith, S., & Merrotsy, P. (2013). You turn up the first day and they expect you to come back! Gifted students' perspectives on school and being smart. *Gifted and Talented International, 28* (1-2), 111-121. doi: https://doi.org/10.1080/15332276.2013.11678407

Gofin, R., & Gordon, H. P. (2006). Bullying in Jerusalem schools: Victims and perpetrators. *Public Health, 116* (3), 173-178. doi: https://doi.org/10.1038/sj.ph.1900843

Green, G. (2007). Bullying: A concern for survival. *Education, 128*(2), 333-336.

Guo, Q.- Z., Ma, W.- J., Nie, S.- P., Xu, Y.- J., Xu, H.- F., & Zhang, Y.- R. (2010). Relationships between weight status and bullying victimization among school-aged adolescents in Guangdong province of China. *Biomedical and Environmental Sciences, 23* (2), 108-112. doi: https://doi.org/10.1016/S0895-3988(10)60039-6

Holmlunda, H., & Böhlmarkb, A. (2019). Does grade configuration matter? Effects of school reorganization on pupils' educational experience. *Journal of Urban Economics, 109*, 14-26. doi: https://doi.org/10.1016/j.jue.2018.11.004

Howley, C. (2002). Grade-span configurations. School Administrator, 59(3), 24–29.

Jones, M. C., Slate, J. R., Martinez-Garcia, C. & Moore, G. W. (2018). Differences in academic achievement by grade span configuration: A multiyear Texas investigation. *Journal of Advances in Education Research, 3* (2), 75-85. doi: https://dx.doi.org/10.22606/jaer.2018.32001

Kim, Y. S., & Leventhal, B. (2008). Bullying and suicide. A review. *International Journal of Adolescent Medicine and Health, 2*0(2), 133–154.

Konishi, C., Miyazaki, Y., Hymel, S., & Waterhouse, T. (2017). Investigating associations between school climate and bullying in secondary schools: Multilevel contextual effects modeling. *School Psychology International, 38* (3), 240-263. doi: https://doi.org/10.1177/0143034316688730

Lacoe, J. (2013). *Too scared to learn? The academic consequences of feeling unsafe at school* (Institute for education and social policy working paper No. 02-13). Retrieved 6/21/2018, from https://steinhardt.nyu.edu/scmsAdmin/media/users/ggg5/Working_Paper_02-13.pdf

Lleras, C. (2008). Hostile school climates: Explaining differential risk of student exposure to disruptive learning environments in high school. J*ournal of School Violence, 7* (3), 105-135. doi: https://doi.org/10.1080/15388220801955604

Malone, M., Cornell, D., & Shukla, K. (2017) Association of grade configuration with school climate for 7th and 8th grade students. *School Psychology Quarterly, 32*(3), 350-366. doi: https://doi.org/10.1037/spq0000174

Mitsopoulou, E., & Giovazolias, T. (2015). Personality traits, empathy and bullying behavior: A meta-analytic approach. *Aggression and Violent Behavior, 21*, 61-72. doi: https://doi.org/10.1016/j.avb.2015.01.007

Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal Psychiatry, 7* (1), 60-76. doi: https://doi.org/10.5498/wjp.v7.i1.60

Nakamoto, J., & Schwartz, D. (2010). Is peer victimization associated with academic achievement? A meta-analytic review. *Social Development, 19*(2), 221–242. doi: https://doi.org/10.1111 / j.1467-9507.2009.00539.x

Napier, P. (2008). *Negotiating the complexities of elementary grade span reconfiguration: A review of literature*. Boston, MA: Boston College.

NYC School Survey. (2014). *New York City School Survey*. Retrieved 5/28/2014, from https://www.schools.nyc.gov/about-us/reports/school-quality/nyc-school-survey

Offenberg, R. M. (2001). The efficacy of Philadelphia's K-to-8 schools compared to middle grades schools. *Middle School Journal, 32*(4), 23–29. doi: https://dx.doi.org/10.1080/00940771.2001.11495283

Ogurlu, U., & Sarıçam, H. (2018). Bullying, forgiveness and submissive behaviors in gifted students. Journal of Child and Family Studies, 27 (9), 2833-2843.

Pellegrini, A. D., Long, J. D., Solberg, D., Roseth, C., Dupuis, D., Bohn, C., Hickey, M. (2010). Bullying and social status during school transitions. In Jimerson, S. R., Swearer, S. M., Espelage, D. L., Gutgsell, E. W., Gutgsell, J. M. (Eds.), *International handbook of school bullying: An international perspective* (pp. 199–210). NY: Routledge.

Peters, M. P., & Bain, S. K. (2011). Bullying and victimization rates among gifted and high-achieving students. *Journal for the Education of the Gifted, 34* (4), 624-643. doi: https://doi.org/10.1177/016235321103400405

Peterson, J. S., & Ray, K. E. (2006). Bullying and the gifted: victims, perpetrators, prevalence, and effects. *Gifted Child Quarterly, 50* (2), 148-168. doi: https://doi.org/10.1177/001698620605000206

Rockoff, J. E., Lockwood, B. B. (2010). Stuck in the middle: Impacts of grade configuration in public schools. *Journal of Public Economics, 94*(11-12), 1051–1061. doi: http://doi.org/10.1016/j.jpubeco.2010.06.017

Rubenstein, R., Schwartz, A. E., Stiefel, L., Zabel, J. (2009). Spending, size, and grade span in K–8 schools. *Education Finance and Policy, 4*(1), 60–88. doi: https://doi.org/10.1162/edfp.2009.4.1.60

Schwartz, A. E., Stiefel, L., & Cordes, S. (2016). Moving matters: The causal effect of school mobility on school performance. *Education Finance and Policy, 12* (4), 419-446. doi: https://doi.org/10.1162/edfp_a_00198

Schwartz, A. E., Stiefel, L., Rubenstein, R., & Zabel, J. (2011). The path not taken: How does school organization affect eighth-grade achievement? *Educational Evaluation and Policy Analysis, 33*(3), 293–317. doi: http://doi.org/10.3102/0162373711407062

Schwartz, A. E., Stiefel, L., & Cordes, S. A. (2017). Moving matters: The causal effect of moving schools on student performance. *Education Finance and Policy, 12* (4), 419-446. doi: https://doi.org/10.1162/edfp_a_00198

Schwerdt, G., West, M. R. (2013). The impact of alternative grade configurations on student outcomes through middle and high school. *Journal of Public Economics, 97*, 308-326. doi: http://doi.org/10.1016/j.jpubeco.2012.10.002

Simmons, R. G., Blyth, D. A. (1987). *Moving into adolescence: The impact of pubertal change and school context*. New York, NY: Gruyter.

Swearer, S. M., Wang, C., Maag, J. W., Siebecker, A. B., & Frerichs, L. J. (2012). Understanding the bullying dynamic among students in special and general education. *Journal of School Psychology, 50* (4), 503-520. doi: https://doi.org/10.1016/j.jsp.2012.04.001

Tattum, D., & Tattum, E. (2004). Bullying: A whole-school response. In B. J. Eileen, & J. Neville (Eds.), *Learning to Behave: Curriculum and Whole School Management Approaches to Discipline* (pp. 18–20). London : Routledge.

Voss, L. D., & Mulligan, J. (2000). Bullying in school: are short pupils at risk? Questionnaire study in a cohort. *BMJ, 320*, 612–613. doi: https://doi.org/10.1136/bmj.320.7235.612

Weiss, C. C., & Kipnes, L. (2006). Reexamining middle school effects: A comparison of middle grades students in middle schools and K–8 schools. *American Journal of Education, 112*(2), 239–272. doi: https://doi.org/10.1086/498996

Yang, S.-J., Kim, J.- M., Kim, S.-W., Shin, I.-S., & Yoon, J.-S. (2006). Bullying and victimization behaviors in boys and girls at South Korean primary schools. J*ournal of the American Academy of Child & Adolescent Psychiatry, 45* (1), 69-77. doi: https://doi.org/10.1097/01.chi.0000186401.05465.2c

Yurgelun-Todd, D. (2007). Emotional and cognitive changes during adolescence. *Current Opinion in Neurobiology, 17*(2), 251–257. doi: http://dx.doi.org/10.1016/j.conb.2007.03.009