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Relationships Between Academics and Problem Behavior in the Transition from Middle School to High School

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Given the increased risk factors in the transition from middle school to high school, this study tracked academic and school discipline records for students receiving general and special education services as they transitioned from Grade 8 to Grade 9. The authors employed analysis of variance and structural equation modeling to determine the significance and strength of the relationship between academic skills and behavior variables. Results indicated significant interactions between academic scores and office discipline referrals, both within and across grades. When controlling for the direct effects, crossover effects of Grade 8 discipline referrals on Grade 9 academic scores remained statistically significant, though effects of Grade 8 state reading assessment scores on Grade 9 discipline referrals did not. Results are discussed in terms of improving school environments and academic instruction to prevent school failure.

Keywords: *high schools; dropout prevention; academic assessment; positive behavior support; behavioral assessment*

There is a concern about the high dropout rate of students in high schools across North America. In the United States, 10.3% of 16- to 24-year-olds were dropouts in 2004, with 32.4% between 16 and 19 years of age (Bowlby, 2005; National Center on Educational Statistics, 2006), and in Canada, 9.8% of 20- to 24-year-olds were dropouts in 2005 (Bowlby, 2005). These concerns are well founded—dropping out of school puts students further at risk for poor adult outcomes. For instance, students who drop out of school are more likely to have lower incomes and to experience unemployment (Bowlby, 2005; Lehr, Johnson, Bremer, Cosio, & Thompson, 2004; Nagle & Hiller, 2003); in Canada, 62% of high school dropouts are unemployed (Bowlby, 2005). As a result, students who do not complete high school cost taxpayers billions of dollars in lost revenues, welfare, unemployment, crime prevention, and prosecution (Joint Economic Committee, 1991; Nagle & Hiller, 2003). In addition to economic disadvantage, school dropouts also experience higher than average rates of health problems (National Center on Educational Statistics, 2006), prison and death row incarceration (Lehr et al., 2004; U.S. Department of Justice, 2002), substance abuse (Alliance for Excellent Education, 2003; Hair, Ling, & Cochran, 2003; Office of Juvenile Justice and Delinquency Prevention, 1995), and dependence on government social assistance programs (Lehr et al., 2004; Rumberger, 1987).

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Even if students do not graduate from high school, every year of schooling is valuable. The National Research Council reported in 1993 that "each added year of secondary education reduces the probability of public welfare dependency in adulthood by 35%" (cited in Lerner & Galambos, 1998, p. 425). It also appears that most students decide to continue their school experience or drop out soon after they enter high school (Hertzog & Morgan, 1999; Mizelle & Irvin, 2000). We note here that dropout is not a single event at one point in time but rather the culminating activity of events that have happened during a student's entire schooling experience (Alexander, Entwisle, & Horsey, 1997; Christenson, Sinclair, Lehr, & Godber, 2001; Ensminger & Slusarcick, 1992; Finn, 1993; Rumberger, 1987). As such, the factors involved in dropout should be examined earlier than Grade 10 to predict dropout risk. Understanding these variables any later will likely prove to be too late to change student trajectories.

One area that may affect dropout and has been documented in the literature is the difficulty students often experience during the transition to high school (Chinien & Boutin, 2001; Forgan & Vaughn, 2000; George, 2000; Hertzog, Morgan, Diamond, & Walker, 1996; Mizelle & Irvin, 2000; Morgan & Hertzog, 2001; Newman, Lohman, Newman, Myers, & Smith, 2000; Reents, 2002). This transition requires students to experience new environments, new curricula, new class organizations, and new teachers at the same time they are in a stage of transition in their own development as well. In high school, students also experience a change in context, where school becomes a larger, more impersonal, teacher-centered, competitive school environment (Hertzog & Morgan, 1999; Mizelle & Irvin, 2000; Morgan & Hertzog, 2001). These new environments require students to make more choices in academic and extracurricular activities as well as face increased academic and social demands (Mizelle & Irvin, 2000; Morgan & Hertzog, 2001). Not surprisingly, student academic performance declines after the transition to high school (Isakson & Jarvis, 1999), and many students, particularly, those from underrepresented groups, perceive less social support upon transition (Reyes, Gillock, Kobus, & Sanchez, 2000). Although middle and high schools have begun to implement a number of practices to improve success during transitions, there are many students who still face difficulties. For example, Latino students perceive the transition to middle school as significantly more difficult compared to Caucasian and African American students (Akos & Galassi, 2004). Accordingly, Latinos were found to have the highest dropout rate of any ethnicity in the United States (National Center on Educational Statistics, 2006). The challenge is for middle school and high school educators to identify some of the key student variables that might affect dropout in high school. This information is potentially valuable to the field so that school personnel can provide additional support to students as they graduate from middle school.

Researchers have begun to examine a number of features in the patterns leading to student dropout, such as academic failure (Finn & Rock, 1997), problem behavior (Sweeten, 2006; Tobin & Sugai, 1999), attendance rates (Neild & Balfanz, 2006), cultural and ethnic background (Akos & Galassi, 2004; Johnson, Crosnoe, & Elder, 2001; Losen & Orfield, 2002; National Center on Educational Statistics, 2006), first language (Gunderson, 2006), learning disabilities (Lehr et al., 2004), age and gender (Bowlby, 2005; Lehr et al., 2004; National Center on Educational Statistics, 2004), socioeconomic status (National Center on Educational Statistics, 2004), school engagement (Rumberger & Larson, 1998; Sinclair, Christenson, Evelo, & Hurley, 1998), school mobility (Rumberger & Larson, 1998), teacher–student relationships (Barber & Olsen, 1997), school and class size (Alspaugh, 1998, 2000; Nagle & Hiller, 2003), family structure and parental educational support (Duchesne, Larose, Guay, Vitaro, & Tremblay, 2005; Nagle & Hiller, 2003; Woolley & Grogan-Kaylor, 2006), and stressful life events (Lehr et al., 2004).

Studies have noted poor academic performance and problem behavior in particular as powerful predictors of high school dropout (Hale & Canter, 1998; Lehr et al., 2004; Sweeten, 2006; Tobin & Sugai, 1999). Persistently low academic skills drastically modify the school experience—academic problems restrict access to daily academic success and close teacher–student relationships, and persistent academic failure is clearly a risk factor for continued failure in high school (Finn & Rock, 1997; Slavin, 1999), even though cognitive ability has not been found to predict dropout (Bear, Kortering, & Braziel, 2006). Problem behavior presents another distinct barrier to high school graduation because of school disruption and increased use of exclusionary discipline, such as suspensions and expulsions (Tobin & Sugai, 1999). Students with emotional and/or behavioral disorders have been found to be twice as likely to drop out of school than students without such eligibility (Lehr et al., 2004). When compared with children from other high-incidence disability groups, children with emotional and/or behavioral disorders have lower graduation rates, higher rates of course failure and grade retention, and are less likely to attend secondary school at all (Kauffman, Davis, & James, 2001).

Unfortunately, problems in academics and behavior rarely exist in isolation, and multiple variables combine to put students in more dramatic risk of failure in high school. In fact, risk factors are cumulative in nature—the negative effect of each additional risk factor is multiplicative rather than additive (Jerald, 2006; Masten & Coatesworth, 1998). Thus, the relationship between academic performance and problem behavior in particular provides additional cause for concern because of their documented interaction (Maguin & Loeber, 1995; Roeser & Eccles, 2000). Students with early difficulties in behavior are at greater risk for developing academic problems (Fleming, Harachi, Cortes, Abbott, & Catalano, 2004; Kellam, Ling, Merisca, Brown, & Ialongo, 1998; Reid & Patterson, 1991), and students with early difficulties with academics are at greater risk for developing problems in social behavior (Dweck & Wortman, 1982; Hinshaw, 1992; McIntosh, Horner, Chard, Boland, & Good, 2006; Morrison, Anthony, Storino, & Dillon, 2001), but the mechanism needs further study. Possible explanations for this link include interruption of the learning process because of attention problems (Fleming et al., 2004), disruptive behavior (Dishion, French, & Patterson, 1995), or escape from aversive academic tasks (Lee, Sugai, & Horner, 1999; McIntosh, Horner, Chard, Dickey, & Braun, in press).

This interaction between problem behavior and academics reaches a critical mass in high school (Morrison et al., 2001; Nelson, Benner, Lane, & Smith, 2004), where students with deficits in both academics and social behavior are at a much greater risk of dropout than students with problems in one area only (McKinney, 1989). What is less known is how academic and behavior variables interact during the critical transition between Grades 8 and 9, where a change in environment provides an additional threat to students at risk of dropout. Such information could lead to improved programs intended to reduce the risk of dropout, as better performance during the transition to middle school could substantially reduce the likelihood of dropping out (Roderick, 1994). This study is an exploration of the relationship between academic and behavior variables in an effort to understand how problems in academics or behavior compound the risk for problems in both areas. Our particular interest was in investigating "crossover effects" (as termed by Kellam, Mayer, Rebok, & Hawkins, 1998), effects of behavior on academics and vice versa, as opposed to direct effects (behavior on behavior). We examined existing data that schools typically collect in Grades 8 and 9 for patterns and indicators that identify students at risk of school dropout or failure. First, we examined descriptive data of the prevalence of Grade 9 students with challenges in academics and/or behavior. Second, we used statistical analyses to answer the following research questions:

1. Does Grade 8 academic skill level predict Grade 9 problem behavior?
2. Does Grade 8 problem behavior predict Grade 9 academic performance?
3. When controlling for direct effects (e.g., Grade 8 academics on Grade 9 academics), are crossover effects (e.g., Grade 8 academics on Grade 9 behavior) still statistically significant?

Method

Setting and Participants

The setting for the study was a small but growing school district in the Pacific Northwest during the 2003–2004 and 2004–2005 school years. At the start of the study (2003–2004 school year), total district K–12 enrollment was 5,542 students. The district's ethnic composition was 2.5% African American, 2.4% Asian American or Pacific Islander, 83.6% European American, 9.2% Hispanic or Latino, and 2.3% Native American or Native Alaskan. The percentage of students in the district receiving free or reduced lunch was 53% (with school means ranging from 32% to 73%). The district has implemented and sustained both schoolwide positive behavior support (SWPBS; Horner, Sugai, Todd, & Lewis-Palmer, 2005) and a schoolwide reading improvement model (Simmons et al., 2002) for more than 10 years with documented effectiveness of both programs (Colvin & Fernandez, 2000; McIntosh, Chard, Boland, & Horner, 2006). The participants were all students who completed at least a term of both Grades 8 and 9 in the district ($N = 330$).

Measures

Problem behavior. To provide a large-scale indication of problem behavior, the authors used office discipline referrals (ODRs). In the district studied, school personnel use ODRs as a method of documenting incidents of problem behavior that require administrative involvement (e.g., physical assault, serious disruptive behavior, harassment, or extreme noncompliance). ODRs are used for various purposes: as a corrective consequence, as data to track patterns of behavior schoolwide, and as a method to track and analyze individual student problem behavior (Sugai, Sprague, Horner, & Walker, 2000). As a measure of behavior, ODRs possess sufficient construct validity and adequate concurrent validity with a number

of standardized measures of individual behavior (as cited in Irvin, Tobin, Sprague, Sugai, & Vincent, 2004). ODRs possess predictive validity for future negative school outcomes, including physical assaults and dropout (Tobin & Sugai, 1999). Finally, ODRs have been identified as an effective and efficient measure for decision making in schools (Irvin et al., 2006). Because ODRs may be completed by any adult in the school building, the reliability of ODRs may vary by school personnel or building (Kern & Manz, 2004); as a practice to counter this threat, personnel in the district studied provide annual trainings on determining what types of behavior should or should not result in an ODR for all schools in the district.

One common method of using ODRs in data-based decision making for individual students is to divide students into groups based on the number of ODRs received per year. Using descriptive criteria observed in more than 400 schools at the elementary, middle, and high school levels in a report by Sugai (2002), students with 0 to 1 ODR per year are determined to be adequately supported by the schoolwide system of behavior support (primary support). Students with 2 to 5 ODRs are likely to need moderate additional support to be successful (secondary support). Students with 6 or more ODRs are likely to need intensive, individualized support (tertiary support). Although there may be variations in ODR patterns because of school demographics, there is emerging support for the utility of using these cut points to assess need for support—students with 2 or more ODRs have been shown to have significantly higher levels of problem behavior on the *Behavior Assessment Scale for Children–2* (Reynolds & Kamphaus, 2004) and the *Social Skills Rating System* (Gresham & Elliott, 1990; McIntosh, Campbell, Carter, & Zumbo, 2008) than students with 0 or 1 ODR (Walker, Cheney, Stage, & Blum, 2005). This distribution of scores also reduces the effects of extreme outliers (e.g., students with 20 or more ODRs), allowing for valid statistical analysis.

Academic skills. To assess academic skills, the participating district uses the *Oregon State Assessment* (OSA; Oregon Department of Education, 2003) reading test. The OSA reading test is a group-administered state outcomes assessment that is provided yearly to all students in the state from Grades 3 to 10, excluding Grade 9. The assessment has been in use since 1992, has undergone regular revisions, and is now computer based for all grades. Each grade level assessment measures different reading skills, from decoding to reading comprehension. The Oregon Department of Education Web site reports the following technical adequacy medians (and ranges): concurrent validity with the *California Achievement Test*, .77 (.74–.80); concurrent validity with the *Iowa Test of Basic Skills*, .82 (.78–.84); marginal reliability, .88 (.80–.90); and split-half reliability, .79 (.75–.86). The OSA yields a criterion-based score (with a range of 150–300), and these scores are most commonly interpreted on the basis of the following three labels for score ranges: *does not meet expectations* (150–230), *meets expectations* (231–238), and *exceeds expectations* (239–300). For participants in the study, the mean OSA score was 232.46, and the standard deviation was 9.48.

Academic performance. An indication of academic performance in Grade 9 was derived from individual student grade point averages (GPAs). Because there were variations in the number and degree of difficulty of various elective courses (e.g., home economics, low-demand social studies, or targeted social-skills groups), the authors eliminated the elective classes and used the grades from the three core academic courses—language arts, mathematics, and science—in which all students were enrolled and generated a core GPA that assessed these three main areas of academic coursework (without excluding any students from the sample).

Procedures

With the assistance of school district officials, we collected extant data accessed through archival databases maintained by the school district. These data included individual student grades from the district academic records database, individual scores from state-level assessment records, and student discipline records from electronic databases such as the School-Wide Information System (SWIS; May et al., 2002). These data sets were merged through the use of Microsoft Access and Excel and were later analyzed with SPSS 13.0 for Windows. To maintain confidentiality, any identifying student information was removed prior to researcher access.

Design

Missing cases. Because of missing data, some modifications were made to the number of participants in the analyses. Nine students (2%) who were enrolled in Grades 8 and 9 had some missing data. More important, between Grades 8 and 9, a number of students were disenrolled in the district (89, or 22%). These students may have transferred to another district or dropped out of school before entering high school, but the reasons for disenrollment were unavailable. To determine whether this attrition was random or based on Grade 8 performance, we completed *t* tests comparing students who left the sample with students remaining in the sample on the

two main student variables in the study. Students who left the district had lower mean OSA scores and higher mean ODRs than students who remained in the district. Differences in scores on the OSA reading test, $t(399) = 3.79$, $p < .001$, and level of support indicated by ODRs, $t(430) = -2.60$, $p = .01$, were significant, indicating that both of these variables were associated with disenrollment during the course of the study and before starting Grade 9. To further investigate, we computed effect sizes using Cohen's *d* (Cohen, 1988) to determine if the differences were meaningful or solely because of the large size of the sample. The effect size for reading was .46 (a medium effect), and the effect size for behavior was .27 (a small effect). Although obtaining no differences between groups is more desirable for statistical purposes, the results obtained indicated that academics and behavior may have played a role in disenrollment. In light of this evidence of the influence of Grade 8 reading and behavior scores, we deemed it important to continue the analyses with this limitation in mind. Because of the drawbacks of missing-data substitution when data are missing not completely at random, we excluded these students analysis by analyses, reducing the number of participants from 411 originally enrolled in Grade 8 to between 321 and 330, depending on the data used in each analysis (specific *n*s are provided for each analysis below).

Prevalence data. To determine prevalence of challenges in academics or behavior, we consulted with district administrators to determine a priori criteria for what constituted a challenge in either area. The criterion for challenges in behavior was receiving two or more ODRs in Grade 9. This criterion was based on the ODR summary data described in the Measures section. The criterion for challenges in academics was receiving a mean GPA of 1.0 (D average) or below in core classes in spring semester of Grade 9. This criterion was chosen because failure or risk of failure in multiple courses puts students at significant risk of dropout (Neild & Balfanz, 2006). After these criteria were established, the data were summarized on the basis of these cutoff scores.

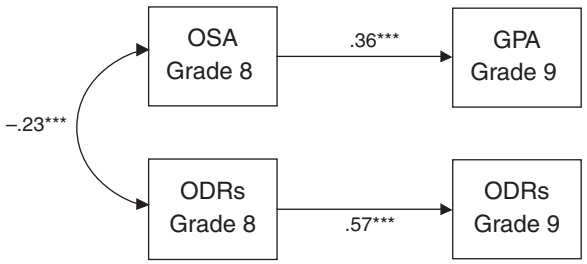
Prediction of academic performance and problem behavior. We used analysis of variance (ANOVA) techniques to assess whether Grade 8 academic skills predicted Grade 9 behavior and whether Grade 8 behavior predicted Grade 9 academic performance. For the prediction-of-behavior analysis, the independent variable was the student score range on the Grade 8 OSA reading test (did not meet, met, or exceeded expectations), and the dependent variable was the level of support needed as indicated by Grade 9 ODRs (primary, secondary, or tertiary support). The *n* for this analysis was 330. For the prediction of academic performance analysis, the independent variable was the level of support needed as indicated by Grade 8 ODRs, and the dependent variable was the Grade 9 spring core GPA. The *n* for this analysis was 326.

Structural equation modeling. To provide a measure of crossover effects, we used path analysis modeling with a hierarchical (nested) models approach. This sophisticated technique allows the testing of direct effects of academics and behavior from Grade 8 to 9, as well as crossover effects between the areas, all within one overall model. This permits an estimation of the relationship between two variables while simultaneously controlling for the other relationships. It provides a more precise test of the previous questions because it can calculate each variable's unique prediction of the outcome variables.

The hierarchical modeling approach compares the estimates of both models and provides a determination of which model better fits the actual data. The first model we constructed (Model 1; see Figure 1) assumes a correlation between OSA scores and ODRs in Grade 8 (denoted by the curved arrow) as well as direct effects of Grade 8 variables on Grade 9 variables (the straight arrows). In Model 1, no crossover effects were assumed between Grade 8 OSA scores and Grade 9 ODRs or Grade 8 ODRs and Grade 9 GPA. The second model (Model 2; see Figure 2) added these effects—this model included all of the paths from the first model but added estimation for paths from Grade 8 OSA to Grade 9 ODRs and Grade 8 ODRs to Grade 9 GPA (the crossover effects).

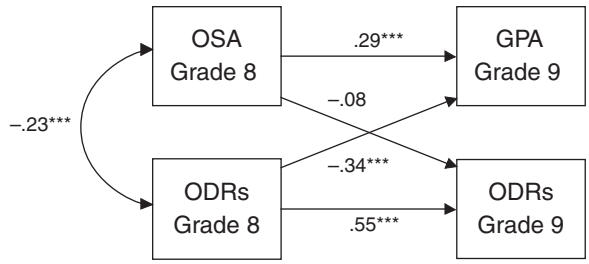
Because adding paths to an existing model generally results in better model fit (Kline, 2005), we evaluated not only increased model fit but also the statistical significance of the increase in model fit as well as the statistical significance of the added pathways. The key test statistics were (a) the model chi-square (χ^2_M) and comparative fit index (CFI; Bentler, 1990) and goodness-of-fit indices, showing how well each model accurately represents the data; (b) the chi-square difference statistic (χ^2_D), showing the difference in model chi-square fit between the two models; and (c) the individual parameter estimates, presented as (and interpreted in the same way as) standardized regression coefficients (*r*). All analyses were completed using AMOS 6.0 software (Arbuckle, 2005) and using maximum likelihood estimation techniques.

Figure 1
Structural Equation Model 1, Used to Test Associations Between Academic and Behavior Variables in Grades 8 and 9 (Assuming No Crossover Effects)



Note: OSA = *Oregon State Assessment* (Oregon Department of Education, 2003) reading test score; GPA = grade point average; ODR = office discipline referral.
***$p < .001$.

Figure 2
Structural Equation Model 2, Used to Test Associations Between Academic and Behavior Variables in Grades 8 and 9 (Assuming Crossover Effects)



Note: OSA = *Oregon State Assessment* (Oregon Department of Education, 2003) reading test score; GPA = grade point average; ODR = office discipline referral.
***$p < .001$.

Table 1
Number (and Percentage) of Grade 9 Students With Challenges in Academics (Core Grade Point Average [GPA] of 1.0 or Below), Behavior (Two or More Total Office Discipline Referrals [ODRs]), or Both

	Academics (GPA)	
Behavior (ODRs)	No Academic Challenges (GPA > 1.0)	Academic Challenges (GPA ≤ 1.0)
No behavior challenges (0 to 1 ODRs)	213 (65%)	59 (18%)
Behavior challenges (2 or more ODRs)	16 (5%)	38 (12%)

Note: For visual clarity, residuals were included in both models but not in the figures. The n for these analyses was 321.

Table 2
One-Way Analysis of Variance Summary Table for the Prediction of Grade 9 Office Discipline Referrals (ODRs) From Grade 8 Oregon State Assessment (OSA) Reading Scores

Source	*df*	*F*	η^2	*p*
Grade 8 OSA score	2	9.18***	.05	< .001
Error	327	(0.25)		
Total	330			

Note: Value enclosed in parentheses represents mean square error.
***$p < .001$.

Results

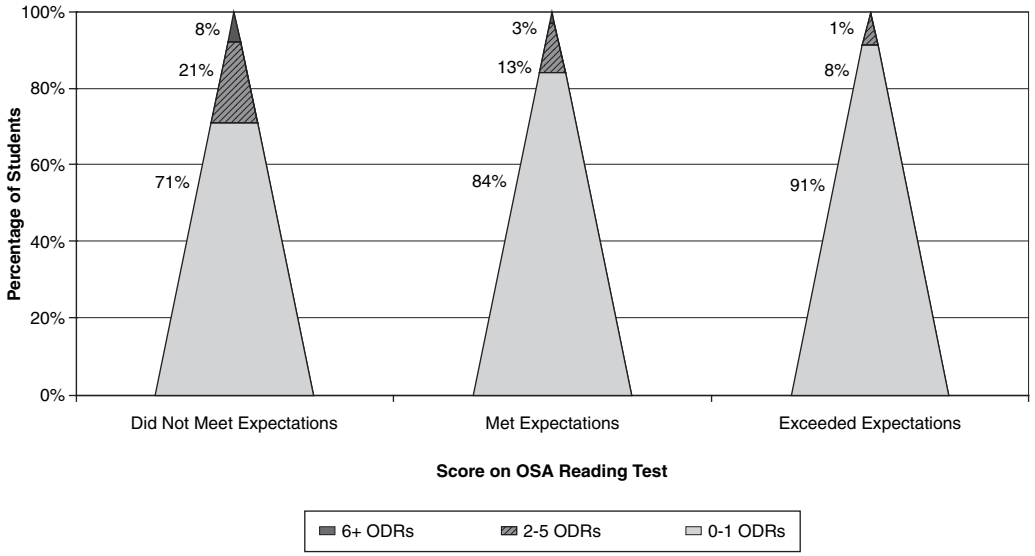
Prevalence Data

Table 1 shows the prevalence of students with academic and/or behavior challenges in Grade 9. The majority of students (65%) did not have challenges in either academics or behavior. The next largest percentages were for students with academic challenges only (18%) and academic and behavior challenges (12%). The smallest group was students with challenges in behavior but not academics (5%).

Prediction Analyses

Prediction of behavior based on academic skills. Table 2 shows results from the ANOVA assessing the prediction of Grade 9 ODRs from Grade 8 OSA reading scores. As seen, results were statistically significant, $F(2, 327) = 9.18$, $p < .001$, indicating that Grade 8 OSA scores and Grade 9 ODRs were related. Figure 3 shows a visual depiction of these results. The three triangles depict the percentages of students with ODRs in Grade 9, and each triangle shows students at each level of academic skill. For example, the triangle on the left shows the percentages for the students who did not meet expectations on the OSA test; 8% of these students had six or more ODRs in Grade 9, compared to only 1% for students who exceeded expectations.

Figure 3
Differences in Distribution of Office Discipline Referrals [ODRs] in Grade 9 by Scores on State Reading Assessment in Grade 8



Note: Not meet, $n = 122$; met, $n = 115$; exceeded, $n = 98$; $N = 335$ OSA = *Oregon State Assessment* (Oregon Department of Education, 2003).

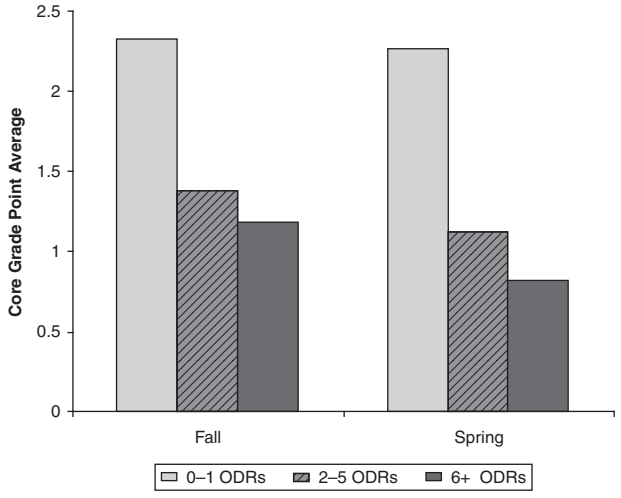
Table 3
One-Way Analysis of Variance Summary Table for the Prediction of Grade 9 Core Grade Point Average from Grade 8 Office Discipline Referrals (ODRs)

Source	*df*	*F*	η^2	*p*
Grade 8 ODRs	2	23.99***	.13	< .001
Error	323	(1.22)		
Total	326			

Note: Value enclosed in parentheses represents mean square error.
***$p < .001$.

Prediction of academic performance based on behavior. Table 3 shows results from the ANOVA assessing the prediction of Grade 9 core GPA from Grade 8 ODRs. As seen, results were statistically significant, $F(2, 323) = 23.99$, $p < .001$, indicating that Grade 8 ODRs and Grade 9 core GPA were related. Figure 4 shows a chart of the results. The cluster of bars on the left shows Grade 9 core GPA in the fall semester, and the cluster on the right shows core GPA in the spring semester. Each bar represents the mean GPA for students according to the number of ODRs received in Grade 8. For example, students with six or more ODRs in Grade 8 had a Grade 9 fall GPA of 1.18 and a spring GPA of 0.82. The chart shows that students with more referrals had lower average GPAs and that GPAs for students with two or more referrals dropped from fall to spring, whereas the mean GPA of students with up to one referral was stable.

Figure 4
Differences in Grade Point Average in Grade by Scores on Number of Office Discipline Referrals (ODRs) Received in Grade 8



Note: 0–1 ODRs, $n = 254$; 2–5 ODRs, $n = 49$; 6+ ODRs, $n = 23$; $N = 326$

Structural Equation Modeling Analyses

Model fit. The first step in assessing structural equation models is to assess the extent to which models we created fit the actual data. The goodness-of-fit indices used were the model chi-square statistic (χ^2_M) and the

CFI. The criteria that indicate good model fit are a nonsignificant (i.e., low) χ^2_M value, which is a rarely achieved goal (Kline, 2005), and a CFI of .90 or higher (Bentler & Bonett, 1980; Hoyle & Panter, 1995). Model 1 (with no crossover effects) fit the data poorly, with a model chi-square that was high, $\chi^2_M(3) = 59.09$, $p < .001$, and CFI that was lower than acceptable criteria, CFI = .76. Model 2 (including crossover effects) fit the data better than Model 1, with a lower model chi-square, $\chi^2_M(1) = 14.25$, $p < .001$, and CFI that met criteria for acceptable model fit, CFI = .94. The chi-square difference statistic (measuring the difference in fit between the two models) was statistically significant, $\chi^2_D = 44.84$, $p < .001$, indicating that the model with crossover effects fit the data significantly better than the model without them.

Parameter estimates. All parameter estimates are presented as standardized regression weights, so they can be directly compared to one another and are equivalent to linear regression coefficients (for those unfamiliar with structural equation modeling). These estimates are provided in Figures 1 and 2. All parameter estimates in Model 1 were significant at the $p < .001$ level, including positive effects of Grade 8 behavior on Grade 9 behavior and Grade 8 academics on Grade 9 academics and, as expected, an inverse relationship between academics and behavior in Grade 8 (i.e., as ODRs increased, OSA scores decreased and vice versa).

In Model 2, all but one of the estimates were significant at the $p < .001$ level. When the crossover effects were specified, the direct relationships (e.g., academics to academics) were weaker but still remained statistically significant. This reduction occurred because the crossover variables had noticeable effects, even when direct effects were controlled. The crossover effect of Grade 8 ODRs on Grade 9 GPA ($r = –.34$, $p < .001$) was at least as strong (or perhaps stronger) than the direct effect of Grade 8 OSA scores on Grade 9 GPA ($r = .29$, $p < .001$). But the crossover effect of Grade 8 OSA scores on Grade 9 ODRs ($r = –.08$, $p = .09$) did not reach a level of statistical significance, indicating that the effect seen in the earlier analyses may have been because of existing correlations between academics and behavior in Grade 8.

Discussion

The transition from middle school to high school presents considerable challenges to students at risk for dropping out of school. This study was designed to explore the interactions in this transition between the critical student variables of academic skills and problem behavior, which have been shown to be related in other studies. Results of the analyses showed statistically significant links between problem behavior in Grade 8 and academic performance in Grade 9 and academic skills in Grade 8 and problem behavior in Grade 9, and the crossover effects from behavior to academics were significant even when the model controlled for direct effects. This was not the case for effects from academics to behavior, where the effects were not significant after direct effects were controlled. These results provide a unique view of the relationship between academics and behavior during this crucial time and point to the need for interventions that address academic skills as a tool to prevent dropout.

The prevalence data in Grade 9 provide a backdrop for understanding the statistical analyses and a snapshot of what proportions of students need support at the beginning of high school. A look at these data shows that the majority of students (65%) were not facing challenges in either academics or behavior. Although this is large, the numbers also show that 35% of the students in Grade 9 needed additional support in one or both areas. That number is daunting, especially given the smaller numbers reported in the same district's elementary schools (McIntosh, Chard, et al., 2006), and speaks to the challenges facing high school personnel in supporting student success. Clearly, there is a great need to assess and support the academic and behavior needs of students as they start high school.

The prevalence results provide additional cause to explore the relationship between these two variables as a way to understand and prevent challenges in high school. Generally, the statistical analyses produced results that were consistent with our hypotheses and with previous studies linking academic skills and problem behavior in middle schools (Lassen, Steele, & Sailor, 2006; Tobin & Sugai, 1999). The results obtained from the regression analyses showed strong prediction of Grade 9 academic performance from Grade 8 behavior and Grade 9 behavior from Grade 8 academic scores. Likewise, the second structural equation model, which included crossover effects, explained the actual data significantly better than the model that did not include these effects. Based on the extensive literature documenting the relationship between academics and behavior, these results make logical sense in terms of the etiology of school failure and a functional approach to problem behavior.

Yet, a more critical look reveals some results about the nature of the relationship that were unexpected. From the prevalence data, the percentage of students with challenges in academics but not behavior (18%) was almost 4 times the percentage of students with challenges in behavior but

not academics (5%). In other words, students with behavioral problems were more likely to have problems in both areas than students with academic problems. The other analyses also highlight this trend. Although the prediction analysis indicated that challenges in academics significantly predicted challenges in behavior, when the structural equation model analyses controlled for Grade 8 behavior, the prediction was not statistically significant. These results indicate some differences in the directionality of the relationship. Clearly, the relationship between academics and behavior exists and is powerful, and problems in either area are a risk factor for problems in the other, but in this study, problems in behavior seemed to have a greater impact on problems in academics. This indicates that the presence of low academic skills often interferes with social behavior, but the presence of problem behavior nearly always interferes with academic learning.

What might account for these unequal crossover effects? Research indicates that academic skill deficits can precede problem behavior (McIntosh, Horner, et al., 2006), and the relationship extends through high school (Morrison et al., 2001; Nelson et al., 2004). These and the analyses in this study provide evidence that the relationship does in fact exist, but we do present one possible factor as a hypothesis that may describe why the results obtained here show a difference in strength. It is possible that the differences are because of the typography of behavior—that the behavior exhibited by students in response to aversive academic tasks may adapt to the context of high school. For example, when presented with an aversive task, the student may engage in disruptive or aggressive behavior (a behavior likely to elicit removal of the task for the student or the student from the classroom), or the student may engage in less disruptive escape-maintained behavior, such as staying seated and being off task. The latter choice can be a vastly more efficient way to escape aversive work, especially in a high school class of 40 to 50 students, with more emphasis on independent work and less on academic engaged time and less immediate accountability for work completion. The 2006 MetLife Survey of the American Teacher (Markow, Moessner, & Horowitz, 2006), a survey of more than 1,000 elementary and secondary school teachers, revealed that 69% of secondary teachers reported that "student apathy that affects learning" is a problem in their classroom, as opposed to 41% of elementary teachers. In this example, teachers might have defined less disruptive, escape-maintained behavior as "apathy." Yet, we note here that this is only a hypothesis that is in need of further testing to determine its merit.

Limitations

This study does have three significant limitations that we caution readers to consider when interpreting its results. First, the sample of students came from the same district, and the results may not be generalizable to students across North America. Some uniquenesses of the district include its small size, homogeneity of the ethnic background distribution, and implementation of both SWPBS and reading improvement models. On the basis of these differences, the district studied does not mirror the North American school population as a whole. Of particular note is the sustained implementation of durable schoolwide reading and behavior support systems. It is unknown whether results would be similar in schools without these features, and our estimation is that the number of students needing support would be higher in schools without systematic, evidence-based approaches to student support in reading and behavior. The results presented may be a "best-case scenario" in terms of proportion of students served by the general education academic and behavior curriculum. As such, replication of these analyses in schools with different characteristics is needed to validate further the results presented here.

Second, the measures used in this study were derived from existing records kept by schools themselves. ODRs, though shown as valid and reliable through some analyses (Irvin et al., 2004, 2006), require a higher level of inference and may be less reliable than direct observation of student behavior. In addition, information about the adherence to standardization of the state assessments or consistency of the criteria used to grade students was unknown and may have contributed to measurement error. Furthermore, the differences between performance in Grades 8 and 9 could be because of different expectations for both academics and behavior between middle and high school settings.

Third, the attrition of the sample and the significant differences between students who were and were not enrolled in Grade 9 indicates that these variables should be measured earlier than the transition from Grade 8 to 9 and that some predictive power was lost. There is the possibility that an undetermined common cause predicted attrition, poor skills, and high levels of problem behavior. Considering these limitations, we encourage some caution in reading these results and applying them to all students.

Implications

This article provides some descriptions of key variables during the transition from middle school to high school. School districts across North America have recently

redoubled their dropout prevention efforts and implemented programs aimed at dropout prevention. Much of the existing literature describes targeted programs to prevent dropout in high school. One example of an evidence-based intervention for students at risk of dropout is the Check and Connect program (Sinclair et al., 1998; Sinclair, Christenson, & Thurlow, 2005), which targets school engagement as a critical variable. Engagement is related to experiences of success at school (i.e., academic success), and these results indicate that it may be necessary to add academic support to behavior support to allow students access to success and, therefore, engagement.

However, results from this study indicate that waiting until high school to identify individual students at risk for dropout may be too late to provide benefits for students already on a path to dropout in middle school. Some direction may be taken from this study to assist in the prevention of school dropout during this vulnerable time, especially in teaching both academics and behavior skills. There is a common public perception that middle and high school students do not need to be taught how to behave according to teacher expectations, but these results provide evidence that student problem behavior directly predicts academic achievement. If teachers are expected to provide successful academic instruction, it may be necessary to provide behavior instruction to lay the groundwork for effective teaching to take place without distraction.

Recent research in SWPBS (Horner et al., 2005) has provided an evidence-based methodology to teach students expected behavior in a manner that promotes prosocial interactions and lifelong social skills and provides a safe, predictable environment where academic learning can occur. SWPBS has a long history of demonstrated effects in middle schools (Colvin, Kame'enui, & Sugai, 1993; Lassen et al., 2006; Metzler, Biglan, Rusby, & Sprague, 2001; Taylor-Greene et al., 1997) as well as an emerging case study research base in high schools (Bohanon et al., 2006; Bohanon-Edmonson, Flannery, Eber, & Sugai, 2004).

There is preliminary evidence that implementation of SWPBS may produce crossover effects on academic achievement (Horner et al., 2005; Lassen et al., 2006; McIntosh, Chard, et al., 2006), but further research is still needed in this area. This study presents a relatively simple use of structural equation modeling, but more information (e.g., gender, socioeconomic status, or special education status) could be included in more sophisticated analyses to examine more complex research questions. This research may point the way to using systems-level approaches to improve academic and behavior outcomes for even more students. Results from future studies may show more definitively how SWPBS can contribute to improved outcomes for students in high school and reduced risk of school failure and dropout.

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