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Measuring the impact of substance abuse on student academic achievement and academic growth

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This research presents data linking the impact of substance disorder to academic achievement, using data gathered at a recovery high school. Recovery schools provide recovery supports and a high-quality education to students with substance use disorders. The Global Appraisal of Individual Needs – Short Screener and the Northwest Evaluation Association Measures of Academic Progress were administered, and paired observations (Testing 1 (T1) vs. Testing 2 (T2)) were categorized based on information from the Global Appraisal of Individual Needs – Short Screen, as increased, decreased, or no change in substance disorder. Results confirm the impact of substance disorder on academic growth, with T1–T2 pairings in which substance disorder increased resulting in a decrease in academic growth, and T1–T2 pairings in which substance disorder decreased resulting in an increase in academic growth. The impact of no change in substance disorder from T1 to T2 varied by the time frame of the substance use, either in the past month or in the past year.

Keywords: substance abuse; academic achievement; recovery schools

There are many benefits to addressing behavioral health concerns for mental health and substance use disorders in schools; reductions in disciplinary referrals, increased motivation in students, and overall improved school culture are just a few that have been well documented in the prevention and behavioral health literature (Bradley & Greene, 2013; Zins, Bloodworth, Weissberg, & Walberg, 2007). While these are all worthwhile goals, the modern educational landscape is such that an increase in student achievement is often the most important factor being considered when school leaders and administrators are making their school improvement plans and deciding how to allocate their resources. Consequently, while all school leaders are concerned with the social and emotional development of their students, they are hesitant to commit resources to programs that cannot produce evidence for clear, discernible benefits to student's academic progress, as reflected by standardized test scores. *Therefore, in this era of academic accountability, evidence linking academic performance to programs addressing behavioral health concerns for substance use and mental health is essential.* To that end, this research presents data directly linking the impact of substance abuse disorder to academic achievement.

Since 1993, there has been an increase of 60% in the number of adolescents admitted to publicly funded treatment programs (Substance Abuse and Mental Health Services Administration, 2006). Unfortunately, the prognosis for substance-abusing adolescents,

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even those who complete treatment, is often poor with relapse rates ranging from 35% to 85% (Klitzner, Fisher, Stewart, & Gilbert, 1992). Typically, those who relapse do so in the first month after completion of a treatment program. Various treatment outcome studies have revealed the following relapse rates for substance-abusing adolescents who return to high school (with relapse defined as one or more drinks): 42% at one month (Spear & Skala, 1995); 64% at three months (Brown, Vik, & Creamer, 1989); 79% at six months (Brown et al., 1989); and 77% at 12 months (Winters, Stinchfield, Opland, Weller, & Latimer, 2000). Of those adolescents who relapse within one year, 45.9% have returned to pre-treatment levels of abuse (Spear, Ciesla, & Skala, 1999).

Research has suggested that one of the key components to adolescent failure or success in recovery is the social environment they return to after completing treatment. Hawkins and the Social Development Research Group (Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004; Catalano, Kosterman, Hawkins, Newcomb, & Abbott, 1996; Guo, Hawkins, Hill, & Abbott, 2001; Hawkins, Catalano, & Miller, 1992) have investigated common predictors of adolescent substance use and abuse, and have found that it is impacted by factors in the community (e.g., extreme poverty, disorganized neighborhoods, easy availability of substances, and community norms favorable to drug and alcohol abuse), in families (e.g., parental alcoholism, family conflict, attitudes favorable toward drug and alcohol abuse), and in schools and peer groups (e.g., lenient school policies and social norms favorable to drug and alcohol use, association with antisocial peers, drug and alcohol use by peers, low commitment to school, and academic failure).

The emergence of the recovery high school

There is a general consensus among alcohol and drug abuse researchers that providing post-treatment continuing care or "aftercare" services for persons recovering from alcohol and/or drug abuse is one of the most effective ways to increase treatment success (Brown & Ashery, 1979; Donovan, 1998; Godley, Godley, Dennis, Funk, & Passetti, 2002; Hawkins & Catalano, 1985; Kelly, Myers, & Brown, 2000; McKay, 2001; Spear & Skala, 1995). Despite the importance of aftercare to a successful recovery, overall research investigating the effects of post-treatment aftercare is sparse. The research that does exist (e.g., Garner, Godley, Funk, Dennis, & Godley, 2007; Godley et al., 2002; McKay, 2001; McKay, Lynch, Shepard, & Pettinati, 2005; Spear & Skala, 1995; Winters et al., 2000) suggests that strong aftercare increases the likelihood of continued recovery and abstinence. For example, in their study of over 350 alcohol- and/or cocaine-dependent adults, McKay et al. (2005) found that simply participating in a telephone-based continuing care intervention significantly increased abstinence in their participants. Similarly, Kelly et al. (2000) examined the relationship between participating in a 12-step program and substance use of adolescents during the first six months after completion of a recovery program and found that meeting attendance was positively associated with higher rates of abstinence. Godley et al. have examined the impact of post-treatment care on adolescent relapse and relapse trajectories (Garner et al., 2007; Godley, Dennis, Godley, & Funk, 2004; Godley et al., 2002). In a series of experiments examining the effectiveness of the assertive continuing care (ACC) protocol, they found that adolescents who participated in the ACC protocol showed reduced substance abuse and substance-related problems nine months after completing a residential treatment program.

The existing research base suggests that post-treatment continuing care has an impact on adolescent recovery success. The research also suggests that a return to previous social environments, such as neighborhoods and schools, poses a threat to that success. Recovery

high schools were developed to provide adolescents with the continuing care that would enable them to confront those factors that undermine their recovery, while providing a safe supporting social and educational environment. The first high school specifically designed for students recovering from substance abuse was Sobriety High in Minnesota, which opened in 1987. According to the Association of Recovery Schools, there are now 31 recovery high schools in 10 states, with most of the schools opening in the last seven years (Moberg & Finch, 2008). All of these schools offer their students a safe academic environment in which they can finish their high school education, coupled with a continuing care paradigm within a "recovery management system" (Godley et al., 2002).

There has been very little research conducted on recovery schools, and the majority of this work has been limited to theses and dissertations (e.g., Finch, 2003, 2005; Rubin, 2002; Teas, 1998) and unpublished reports (Moberg, 1999; Moberg & Thaler, 1995). Consequently, little is known about the impact of recovery schools on academic achievement, school culture, student engagement and bonding with the school, and students' recovery and continued sobriety. Despite the lack of empirical evidence, however, Hawkins and Catalano (1985), for example, have made the compelling case that factors associated with school effectiveness, when utilized in classrooms by committed and trained faculty, can curb alcohol abuse, drug abuse, and risky behavior in high-risk populations – as well as enhance student health-oriented behavior – all of which are key to recovery.

The goal of the research described here is to provide evidence of the impact of Hope Academy, a recovery high school located on the campus of Fairbanks Hospital. Fairbanks Hospital is a full continuum treatment center, with inpatient and outpatient programs, as well as extensive recovery management and community outreach services. The data described in this report are part of a larger project, which takes a developmental approach in order to provide a complete, longitudinal picture of Hope Academy students' academic, social, and recovery growth. This larger data-set includes student-level achievement data for each student's academic career both prior to their receiving treatment and after their subsequent matriculation at Hope Academy, data that track each student's recovery efforts, student and parent surveys, daily log entries, number of days sober, and the node-link mediated (Czuchry &Dansereau, 1999; Dansereau, Joe, & Simpson, 1993; Zielke & Zielke, 2010) "unpacking" of relapse events. Additional measures being administered include the Developmental Assets Profile, the Mayer–Salovey–Caruso Emotional Intelligence Scale, and a series of attachment measures. Results from these other measures can be found in Robinette and Fratzke (in press) and Zielke (2013). This extensive data package provides a complete picture of the impact of Hope Academy on the lives of its students, and provides much needed data regarding the effectiveness of the recovery school model.

Method

Characteristics of hope academy students

Hope Academy at Fairbanks Hospital is a public charter high school located in the Indianapolis greater metropolitan area, founded in 2006 and operating on the campus of Fairbanks Hospital. Hope Academy is not a large school, with 28 students enrolled in the first year of operation, and an average of 40 students in the subsequent school years. This number is misleading, however, in that many students come to Hope Academy and, for reasons as varied as lack of transportation, unwillingness to commit to recovery, or the desire to return to their previous high school, leave before completing a semester. Consequently, Hope Academy will serve an average of 70 students over the course of an

academic year, with a population of approximately 30–40 students enrolled for two contiguous semesters in any given school year.

All students at Hope Academy have completed a recovery program, usually within one to two months prior to enrollment at Hope. As a public school, Hope Academy accepts all students from across the state of Indiana; however, the majority of Hope Academy students are white, middle to upper class, and live in the metropolitan area. The percentage of African-American or Hispanic students at Hope Academy has ranged from 2% to 10% of the student body since the school opened, with the remainder of students being white. Free and reduced meals, which is often used as an indicator of socio-economic status, has ranged from 8% to 28% of the student body over the same time period.

The majority of students at Hope Academy are enrolled by their parents, often due to behavioral and academic issues at their previous high school leading to suspension or expulsion. Many students are also referred by the juvenile justice system. A small group of Hope Academy students are over the age of 18 and enroll on their own initiative. The majority of Hope Academy students transferred to Hope Academy in their Junior or Senior year of high school, and most are one to two years behind in credits toward graduation when they arrive. The age of Hope Academy students ranges from 15 to 18 during any academic year. The majority of Hope Academy students began abusing drugs or alcohol during middle school and many have completed multiple recovery programs.

Procedure and results

Academic behavior data

One challenge when examining academic achievement in students in recovery from substance abuse disorder is the difficulty in finding an appropriate comparison group for this student population, who, in addition to problems of addiction, may also have other cognitive and social deficits. To investigate whether there is a marked difference in students' academic performance after they have been through a recovery program and attended a recovery high school, a methodology which takes a "before and after" snapshot of the academic careers of current Hope Academy students was used. To do this, academic data from the entirety of a student's academic career were obtained. Specifically, student achievement and behavior data from *before* a student's recovery and matriculation at Hope Academy were compared to student achievement and behavior data from *after* their matriculation at Hope. Thus, this within-participant design has each student serving as their own "control."

A data-set from the Indiana Department of Education (DOE) for the Hope Academy students was obtained which included attendance and disciplinary records for each student while they were at Hope Academy. The data-set also included data from any school attended prior to Hope Academy. A preliminary analysis of the attendance and discipline data revealed a pattern of results suggesting differences in student behavior "before and after" their enrollment in Hope Academy. This preliminary analysis of the data has revealed that Hope Academy students do in fact show a decrease in the average number of school days missed (8.1 before Hope Academy vs. 6.3 after) and in the average number of days suspended (9.75 days before Hope Academy vs. 2.9 days after).

NWEA measures of academic progress

In addition to the achievement data provided by the DOE, standardized test scores have been obtained from the Northwest Evaluation Association (NWEA) Measures of

Academic Progress (MAP) test. The NWEA MAP is a growth test, and is designed to longitudinally measure a student's academic growth. Specifically, instead of comparing a student's performance to either a cut score or the normal distribution of other students' scores, growth tests compare the student's own scores over time. The NWEA MAP uses computer adaptive testing (CAT) to dynamically choose test items from a large pool of potential questions. CAT successively selects questions from the pool based on the difficulty of the last question answered correctly by the student. From the student's perspective, the difficulty of the exam seems to tailor itself to his or her level of ability. For example, if a student correctly answers an item of intermediate difficulty, he will then be presented with a more difficult question. If he answers the question incorrectly, he will be presented with an easier question. This allows for a more accurate measure of the student's current academic level and also for a measure of growth comparisons across multiple testing. The CAT testing used by NWEA MAP results in students' growth measured in RIT (Rasch Units) scores.

The NWEA MAP is one of the most widely used growth tests. Students take the test twice a year (fall and spring), and the difference between these scores is a measure of student growth over the course of that academic year. More than 3100 school districts across the USA administer the MAP Mathematics, Reading, and Language Usage tests. These tests are aligned to each state's measurement scales and content standards and are often used as an indicator of preparedness for state assessments.

It is the large number of students taking the MAP test that makes it an ideal way to measure academic growth. Using the data from more than 10 years of testing, NWEA maintains a Growth Research Database that contains millions of records of student achievement from across the nation. The database maintains records based on demographics such as ethnicity, gender, age, and socio-economic status, and school information such as class size, district size, and location. As a result, researchers can construct a customized control group based on characteristics of an individual student to define a comparison group that shares these same characteristics. These "Virtual Control Groups (VCG)" are formed from aggregate control students, which are created by taking the average scores from approximately 50 students, matched to each individual student in the group of interest on the demographic characteristics determined by the researcher. Thus, each control student's score is actually the aggregate of many similar students, making the data-set far more representative of the population as a whole.

To form a VCG for this work, each Hope Academy student was matched on demographic variables, such as gender, grade, and ethnicity, to 50 control students from the state of Indiana drawn from the Growth Research Database. Most importantly, the Hope Academy and control students were also matched for beginning MAP scores, ensuring that both the Hope Academy and the control students start the comparison at the same academic level. The average MAP score for the 50 control students were then computed and served as the "virtual control" for that Hope Academy student. Analyses on data from 30 Hope

Table 1. NWEA MAP scores for Hope Academy students versus a VCG.

	Fall-Hope	Fall-VCG	Spring-Hope	Spring-VCG	Difference Hope	Difference VCG
Language Usage (7)	225.14	225.2	226.57	224.96	1.43	(0.24)
Mathematics (13)	230.92	231.01	234.5	231.39	3.58	0.38
Reading (6)	221.16	221.21	221.33	221.35	0.17	0.14

Note: The number of students matched with a VCG is in parentheses.

Academy students' NWEA MAP data from the 2007–2008 and the 2008–2009 school years, comparing each Hope Academy student to a custom VCG, can be seen in Table 1. Note that the fall NWEA scores for the Hope Academy and VCG students are roughly the same as a result of the students being matched for fall MAP scores (approximately 225 RIT units in Language Usage, 231 in Math, and 221 in Reading). The crucial measure is the comparison between the academic growth shown by Hope Academy students through the course of an academic year as compared to the growth of the matched VCG sample. Note that the Hope Academy students gained 1.43 RIT units in Language Usage and 3.58 RIT units in Mathematics, as compared to the VCG students who decreased 0.24 RIT units in Language Usage and showed only a 0.38 RIT unit gain in Math. These differences were found to be significant by independent samples *t*-tests for Language Usage and Mathematics (Language Usage, $t(56) = 1.87$, $p < 0.05$; Mathematics, $t(56) = 2.35$, $p < 0.05$). There was no difference in the amount of academic growth between the Hope Academy students and the VCG in Reading.

The second goal of this research is to examine the impact of Hope Academy on students' maintenance of their sobriety and the impact of their sobriety on academic growth as measured by the NWEA MAP. To examine their path to sobriety, the Global Appraisal of Individual Needs – Short Screen (GAIN-SS) is currently being administered. The GAIN-SS is designed to serve as a screener to quickly and accurately identify students who may have one or more behavioral health disorders (e.g., internalizing or externalizing psychiatric disorders, substance use disorders, or crime/violence problems), which would suggest the need for referral to some part of the behavioral health treatment system. Students at Hope Academy are asked to rate the recency of particular behaviors on a scale of 3 (past month), 2 (2–12 months ago), 1 (1+ years ago), or 0 (Never). Each of the four subscales (Internalizing Disorder Screener, Externalizing Disorder Screener, Substance Disorder Screener (SDScr), and Crime/Violence Screener) contains five questions and the students are asked to self-report the "last time you had the problem." Topics covered by the five questions in the SDScr, which is the measure of interest in this research, include asking the student about how recently they used drugs or alcohol, spent time obtaining or using alcohol or other drugs, or continued using when their use was causing social, emotional, or physical problems.

The GAIN-SS is currently being administered at Hope Academy on a 6–8 week schedule with at least two administrations per year occurring within a two-week window of the NWEA testing. The pairing of the GAIN-SS with the NWEA MAP provides a rich data-set that directly tests the impact of a student's level of sobriety on their academic achievement. The current data-set contains NWEA MAP and GAIN-SS data from the fall of 2010 to the current school year. Because of the small number of students served at Hope Academy in each academic year, coupled with the high mobility of substance-impacted students, only 32 students (17 male and 15 female) were successfully administered both the MAP and the GAIN-SS for at least two contiguous testing. The data from those students were formed into paired observations that examined changes in both sobriety and academic growth from Testing 1 (T1) to Testing 2 (T2), resulting in 60 T1 versus T2 paired observations from the 32 students (Rattermann, Dennis, & Funk, 2011; Rattermann, Gardner, & Stone, 2012). It is important to note that, depending on the amount of time the student spent at Hope Academy, some students contributed several pairs of data, while others contributed only one.

These 60 pairs of data were then grouped based on students GAIN-SS scores from T1 to T2. For the current analysis, the GAIN-SS's SDScr was used and student responses stating that they had engaged in the behavior in the "past month" (SDScrM) or "2 to 12

months ago" (SDScrY) were used to measure change in substance use, abuse, and dependence problems. In this analysis, a decreased score on the SDScrM or SDScrY signified that the student has either improved or maintained their recovery efforts, and no change or an increase in scores on the SDScrM or SDScrY signified either a lack of improvement or, in the case of increased SDScr scores, a possible relapse. Using the data from the SDScrM, the T1–T2 observations were grouped into 16 pairs that showed a reduction in substance problems from T1 to T2, 33 pairs that showed no change in substance problems from T1 to T2, and 11 pairs that showed an increase in substance problems from T1 to T2. Using the data from the SDScrY, the T1–T2 observations were grouped into 22 pairs that showed a reduction in substance problems from T1 to T2, 30 pairs that showed no change in substance problems from T1 to T2, and 8 pairs that showed an increase in substance problems from T1 to T2. The NWEA MAP scores associated with each observational pair were then examined to measure changes in student academic skills.

The results of the analysis of these 60 paired observations (T1 vs. T2) can be seen in Figures 1 and 2, which show the difference scores for all the three MAP tests combined (obtained by subtracting the total fall MAP score of each student from their spring MAP score), with the three groups of T1–T2 observations graphed separately based on student responses to the SDScrM measure (Figure 1) and student responses to the SDScrY (Figure 2). As can be seen in Figure 1, those T1–T2 pairings that showed no change in the SDScrM, or even showed an increase in students' substance disorder as measured by the SDScrM, did not show any academic growth as measured by the MAP. In fact, these T1–T2 pairings revealed a significant decline in student academic achievement, as evidence by the decrease in MAP scores from T1 to T2 in the increased SDScrM pairs. In contrast, those T1–T2 pairings that reflected a reduction in student substance use disorder showed a significant increase in student achievement as measured by the MAP. The differences in academic growth from T1 to T2 between the three groups of T1–T2

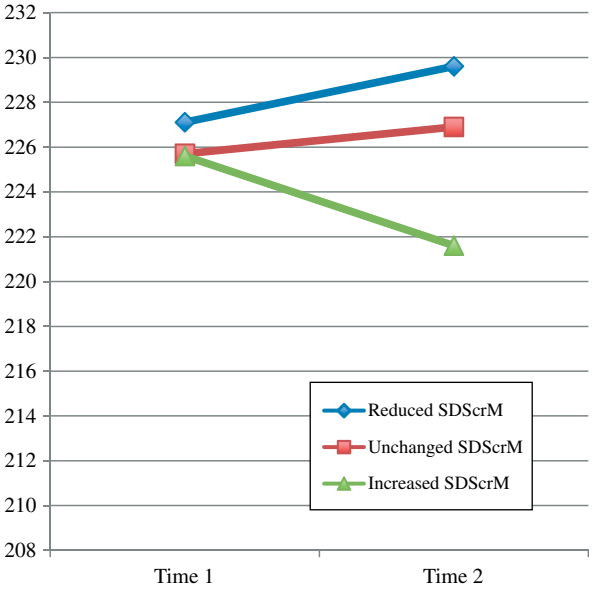

Figure 1. Change in academic growth by change in substance disorder screener past month.

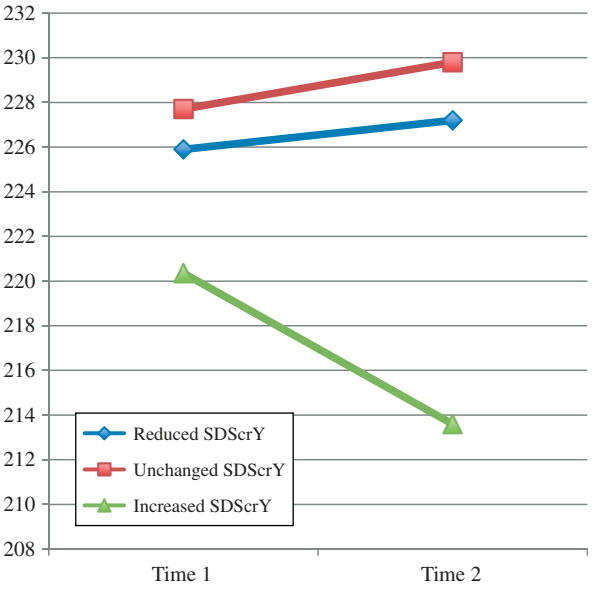

Figure 2. Change in academic growth by change in substance disorder screener past year.

observations (reduced, unchanged, and increased SDScrM) were confirmed by a one-way analysis of variance performed on the difference scores between T1 and T2 ($F(2,59) = 2.83$, $p > 0.05$). This analysis confirms that the three different groups of T1–T2 pairings overall showed significantly different levels of academic growth as measured by the MAP. Post hoc analyses using the Bonferroni correction indicated that the difference in MAP scores from T1 to T2 for the reduced SDScrM group was significantly different than that of the increased SDScrM group ($p < 0.05$), and was also significantly different than that of the unchanged SDScrM group ($p < 0.05$). These post hoc analyses confirm that when students indicated a decrease in their substance use (as evidence by decreased SDScrM scores), they showed increases in academic achievement as measured by the MAP. However, it seems clear from Figure 1 that when students indicated an increase in their substance use (as indicated by higher SDScrM scores), in addition to showing a decline on the MAP, they also scored significantly lower than those with unchanged or reduced SDScrM scores. This pattern was confirmed by a one-way analysis of variance performed on the NWEA MAP scores at T2 ($F(2,59) = 3.24$, $p < 0.05$). Post hoc analyses using the Bonferroni correction indicated that the MAP scores at T2 for the reduced SDScrM group were significantly greater than that of the increased SDScrM group ($p < 0.05$).

The results of the SDScrY, as seen in Figure 2, support and extend the findings of the SDScrM. Again, those T1–T2 pairings in which students indicated an increase in their substance use, as indicated by an increase in their SDScrY scores, did not show any academic growth as measured by the MAP. In fact, they showed a significant decrease in MAP scores. In contrast, those T1–T2 pairings in which students indicated a decrease in their substance use, as indicated by a decrease in their SDScrY scores, revealed a significant increase in student achievement as measured by the MAP. The data also reveal that the NWEA MAP scores associated with the T1–T2 pairings in which SCScrY scores increased were overall lower than the MAP scores associated with decreased or unchanged SCScrY

scores. The differences in academic growth from T1 to T2 between the three groups of T1–T2 pairings (reduced, unchanged, and increased SDScrY) was confirmed by a one-way analysis of variance performed on the difference scores between T1 and T2 ($F(2,59) = 4.39$, $p < 0.05$). Post hoc analyses using the Bonferroni correction indicated that the difference in MAP scores from T1 to T2 for the reduced SDScrY group was significantly different than that of the increased SDScrY group ($p < 0.05$), and the increased SDScrY was also significantly different than that of the unchanged SDScrY group ($p < 0.05$). As was found in the SDScrM data, students with reduced GAIN-SS scores showed higher NWEA MAP scores than those with either reduced or unchanged GAIN-SS scores at T2. This pattern was confirmed by a one-way analysis of variance performed on the NWEA MAP scores at T2 ($F(2,59) = 5.25$, $p < 0.05$). Post hoc analyses using the Bonferroni correction indicated that the MAP scores at T2 for the reduced SDScrY and unchanged SDScrY were significantly greater than that of the increased SDScrY group ($p < 0.05$).

Discussion

Recovery schools fill a need for post-treatment continuing care for adolescents recovering from drug and alcohol abuse. The dual mission of recovery schools – to provide supports for students in recovery and to provide them with a high-quality education – offers a unique opportunity to study the impact that substance abuse, and recovery from substance abuse, has on academic growth and achievement. A research project at Hope Academy using a variety of student academic measures directly examines the relationship between substance abuse and academic achievement.

The impact of mental health and substance abuse on educational behavioral variables is well documented (Arbuthnot, 1992; Elias, Gara, Schuyler, Branden-Muller, & Sayette, 1991; Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999), with many reviews and meta-analyses providing good evidence that mental health and substance use impact student behavior (Hoagwood et al., 2007). Data from academic behavioral variable at Hope Academy are in line with the overall findings in the literature, with student days absent and number of disciplinary referrals decreasing during their time at Hope Academy as compared to their behavior prior to coming to Hope Academy.

Evidence for the impact of attending a recovery high school on student academic growth can be seen in the comparison between Hope Academy students and a VCG matched to Hope Academy students on age, gender, and, most importantly, on beginning MAP scores. The data revealed significantly higher growth for Hope Academy students on the NWEA measures of Mathematics and Language Use as compared to students in the VCG. It is important to note that both the Hope Academy and VCG fall scores in Reading and Mathematics are below the 2008 national normative data provided by NWEA. Reading scores were approximately 221 RIT Units for the Hope and VCG student in the fall, while the normative data show that 225.2 was the mean reading score across the NWEA testing population. Similarly, Mathematics scores were approximately 230 RIT Units for the Hope and VCG students in the fall, while the normative data show that 237.1 was the mean reading score across the NWEA testing population. This comparison to the national norms suggests that Hope Academy students arrive with academic skills below the national average, and that the significant gains in MAP scores are indicative of the effects of sobriety and a stable school environment, as well as their substantial "room to grow."

More direct evidence for the impact of substance use on academic growth can be seen in the relationship found between substance use, as measured by the GAIN-SS SDScr past

month and past year data and the NWEA MAP. In data gathered over three academic years, a clear relationship between SDScr scores and growth on the NWEA MAP has been found. Students with decreasing SDScr scores show significant increases in their MAP scores, both in the Past Month and Past Year data. Simply put, as students' substance use decreases, their academic growth increases. Conversely, students with SDScrM scores that are increasing or show no change show decreases in their MAP scores. A similar pattern of results was found when data from the SDScrY were analyzed.

The different effects on the student academic growth found by the two different time frames may be a reflection of the long-term effects of Hope Academy on student's recovery. Students' reports of no change in SDScrY scores may be indicative of long-term abstention from drug use, and the concomitant rise in NWEA MAP scores may be indicative of long-term academic growth. Conversely, the data from Hope Academy also suggests that consistent drug use, or a relapse into drug use, has a deleterious effect on student academic growth and that this effect may be felt for many months after, even as their SDScrM scores remain unchanged. It is only as their SDScrM scores decrease, and the incidents of substance disorder become less frequent, that their academic growth continues.

The data from the comparison of substance disorder and academic growth suggest that as Hope Academy students display the long-term ability to control their substance disorder – as reflected in the decreased SDScrY scores – their academic growth benefits from the stability. When the student's ability to control their substance disorder wavers – as reflected in the increased SDScrM and SDScrY scores – their academic growth falters. It is important to note that the NWEA MAP is a *growth test*, and as such it is designed to reflect either no change or an increase in academic skills. As part of the CAT used by the MAP, student performance should not significantly decrease over time – that is, the MAP is not designed to measure *decreases* in academic skills. Yet, many students at Hope Academy, particularly those with increasing SDScrM scores, show consistent and reliable decrements in their NWEA MAP scores. The increase in substance disorder, and the potential impact on recovery, may be disrupting students' cognitive abilities at all levels.

A consistent decrease in MAP scores across a student population is unusual, and other reasons for a decrease in MAP scores should be considered. Decreasing MAP scores could be caused by problems with the testing environment, or a lack of student investment in standardized testing, or the possibility that the NWEA MAP is not the appropriate measure to use for this project. However, in response to the initial students whose MAP scores decreased, the testing environment was revised with an instructional aide present during testing to ensure that the students were engaged and motivated and that the testing environment was quiet and conducive to testing. These changes ensured an optimal testing environment; however, the decreases in MAP scores continued. Further, the NWEA MAP is a well-designed and valid test of academic growth that has been used to accurately assess millions of students.

In summary, the data examining the impact of substance disorders on student achievement support the efficacy of recovery schools, and also shed light on the devastating effects of substance abuse on student academic growth, as well as the positive impact of control over a substance use disorder on academic growth.

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