The Lingering Effects of a Behavior Support System: A Cross-Sectional Study

This manuscript has been peer-reviewed, accepted, and endorsed by the International Council of Professors of Educational Leadership (ICPEL) as a significant contribution to the scholarship and practice of school administration and K-12 education.

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This cross-sectional study was undertaken to determine the impact of a behavior support program implemented in elementary school on students' high school behaviors. The research question driving the study was whether high school students who had received instruction in the Students Taking Appropriate Responsibility (STAR) program for four years during elementary school exhibited more self-regulation on selected measures of student behavior than students who had not received such instruction.

Independent samples t-tests comparing behaviors in the entire treatment population with the randomly selected control population revealed a statistically significant difference in attendance for twelfth graders. Non-significant findings included fewer missed days by ninth and eleventh graders in the treatment population and fewer discipline incidents by ninth graders in the treatment population. No differences were found between populations in the tenth grade nor in drop-out status. These findings suggest the STAR program in elementary school had positive enduring impacts on participating students' behaviors during high school.

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School divisions frequently implement school-wide discipline programs to create an atmosphere conducive to learning. According to Levin and Nolan (1996), studies have shown that reducing the number of referrals, suspensions, and disciplinary actions, and increasing attendance can improve student outcomes. Furthermore, as attendance decreases and disciplinary actions increase, students are more likely to drop-out due to academic difficulties and peer difficulties (Elias & Tobias 1996).

Studies of single rural schools, single urban schools, multiple schools, school systems, and statewide implementations of behavior support programs showed a decrease in disciplinary referrals when positive behavior supports were used with fidelity and training of teachers occurred (Bohanon et al., 2006; Luiselli, Putnam, & Sunderland, 2002; McCrary, Lechtenberger, & Wang, 2012; Muscott, 2004; Snyder et al., 2010; Taylor-Greene et al., 1997; Warren et al., 2006;). Luiselli, Putnam, and Sunderland (2002) found an increase in attendance for students in a rural public middle school over a four-year period when a positive behavior support program was implemented. Snyder et al (2010) found an increase in academic achievement and less absenteeism in a state-wide positive behavior support initiative in elementary schools.

If a student is taught in the early grades of school the proper behaviors for success, then it is logical to assume that the knowledge will carry over into the upper grades. This study tested this assumption by comparing discipline incidences, attendance, and drop-out rates of two populations to determine the efficacy of the Students Taking Appropriate Responsibility (STAR) program implemented during elementary school. The treatment sample population was drawn from students who participated in the STAR program at the one pre-kindergarten through seventh grade school in the county that used the STAR program. The other three schools in the county did not have a positive behavioral system or effective school-wide discipline program in place. All students in the school division attend one high school serving eighth through twelfth grades. The effectiveness of the STAR program during elementary schools was not in question. The question this study examined was whether there were long-lasting behavioral impacts on students following STAR program completion.

Materials and Methods

The purpose of this study was to determine if high school students who had received instruction in the STAR program for four years during elementary school demonstrated more self-regulation on selected measures of student behavior during high school than students who have not received such instruction. Cross-sectional measures of attendance, discipline incidents, and drop-out rates were compiled from school board reports on school effectiveness.

Description of the STAR Program

The STAR Program was developed by teachers and administrators at one elementary school in 2004 to encourage fourth through seventh grade students to be involved in and to make positive changes concerning their own education. Based on the concept that a strong coach keeps the team focused, the STAR program helps students set goals, focus, and reap the rewards. The faculty and staff felt this positive approach was more beneficial for students.

Training occurred within the school by the principal and a group of teacher leaders. All teachers were trained on how to keep accurate records, how to talk to students about the program and consequences, and how to encourage the parents and community to be involved. Each year

the fourth through seventh grade teachers met to discuss the program and determine what changes needed to be made. Since the program spanned fourth through seventh grade and students changed classes for different subject areas, the teachers were very consistent in how the program was administered by classroom. The principal also followed up to make sure the behaviors were consistent for students. The tracking system allowed teachers and the principal to see which students were falling behind academically or increasing in negative behaviors. This allowed for earlier interventions with students.

The STAR program rewarded students for successful school behaviors by allowing them to choose an activity for the last twenty minutes of the school day if all criteria are met. Students should have completed all homework, should be ready for each class, and not have any behavioral issues for the day. If a student had not completed the requirements for the Student Activity Choice (SAC) time, then the student would go to a required study hall time to complete assignments, receive remediation, or work on homework. The teachers kept track of infractions as they would occur and gathered the data at the end of the day to see if students were responsible enough to report to the correct location. If the student failed to report, a teacher, teacher assistant, or another student found the offending student who then had to report to study hall again the following day. Every six weeks, the Parent Teacher Organization (PTO) funded a field trip for students who did not have to attend study hall for a certain number of times.

The manifestations of the program during elementary school included fewer days of school missed, fewer disciplinary incidents, and the active involvement of students as far as consequences of choices in their education. As a result of the program, students wanted to attend school and make appropriate choices. As appropriate choices were made, students were rewarded with an activity of their choice. As the students mature and change, the underlying goal of the program was to keep students coming to school and out of trouble.

Population

The population of this study consisted of all 619 students from grades nine through twelve who were enrolled during the 2012-2013 academic year at a single high school that serves an entire county in the southeast portion of Virginia. The one high school contains grades eight through twelve for all students of the county. However, eighth grade students were not chosen for inclusion in the study because the first year of high school is a transition year.

The treatment sample of this study attended one of four elementary schools serving pre-kindergarten through seventh grades in the division. This one elementary school implemented the STAR program to help students begin to self-regulate behavior. For the purposes of this study, the elementary school that utilized the STAR program was referred to as School A. The largest elementary school in the school division was School B, while the next largest was be School C. The smallest school was referred to as School D.

According to the Virginia Department of Education website, the school division had 34% free and reduced lunch in the 2004-2005 academic year. In 2012-2013, the school division in this study had 46% free and reduced lunch. During the seven years, the number gradually increased as factories closed, jobs were relocated, and people were unemployed. The population in the county has increased from 14,493 people in 2005 to 15,378 people in 2010. People have apparently stayed in the county even as jobs became scarce. They have just managed the best they could which has led to an increase in the free and reduced lunch percentage. The special education population was 18% of all students in 2004-2005 and in 2012-2013 the

population was 15% of all students. This percentage remained comparable. Total division enrollment has decreased over the years with 2,095 students in 2004-2005 and 2,027 in 2012-2013.

The student population was chosen based on the date of the inception of the STAR program at School A. Since the STAR program targeted fourth through seventh grade students, the first group of fourth graders that received four years of instruction with the program was the group that was in fourth grade during the 2004-2005 academic year. Each succeeding fourth grade class was also instructed in the program for four years. The students in first grade in 2004-2005 were ninth graders in 2012-2013. While second grade students in 2004-2005 were tenth graders in 2012-2013. Therefore, those students in first through fourth grade during the academic year of 2004-2005 were ninth through twelfth grade students for the 2012-2013 academic year and were the sample population of the treatment group. The ninth graders are two years removed from the program, tenth graders are three years removed, eleventh graders are four years removed, and twelfth graders are five years removed. The research question was how long did students demonstrate results of a positive behavioral system after completing the instruction.

Only students who received four years of instruction in the STAR program from School A and continued their education within the school division were included in the treatment sample. Based on the information provided by the central office staff report to the School Board, 72 students from School A began the STAR program in the fourth grade and completed four years of the program. This translated to the following high school enrollment from School A: 20 ninth graders, 18 tenth graders, 17 eleventh graders, and 17 twelfth graders.

The population of control students consisted of a random sample of students from the remainder of the elementary schools. This was done by randomly selecting the appropriate number of students from the rest of the high school population that equaled the number from School A by grade level. Using a stratified random sampling method allowed each grade level in the treatment sample to have a corresponding control sample. Since Schools B, C, and D did not have instruction in the STAR program, all students from those schools were combined in order to draw a random sample. However, only students who had spent their elementary school years in the other schools and completed their education with the school division were eligible for the control group. Therefore, 20 ninth grade students were chosen from the 86 students who had attended fourth through seventh grade in Schools B, C, and D. Eighteen students were chosen from the 92 available tenth graders, 17 were chosen from the 103 available eleventh graders, and 17 were chosen from the 112 available twelfth graders.

Variables of Interest

A report on the attendance, discipline, and drop-out rates of all students who were in the elementary schools of the county beginning with the 2004-2005 school year and ending five years later was prepared by the administrative staff of the school division to the School Board on October 14, 2013. This report was to inform the school board of trends in absences, discipline incidences, and drop-out rates of the high school based on which elementary school each student attended. The purpose was to determine the successful interventions that could be occurring in any of the elementary schools so it could be replicated division wide. The report from the central office staff listed each student from the 2004-2005 academic year that continued to be a student in the same school division for the 2012-2013 academic year. Beside each number that represented a student was the number of absences and number of discipline incidents reported to the main office by school year, whether the student had dropped out of school or not, and the school attended for

elementary school. This report to the school board is a public document and is available to the general public.

Data Analysis

An independent samples t-test was used to compare the discipline incidents, attendance records, and drop-out statuses from students who had instruction in the STAR program from those that did not. The purpose of running the t-test was to determine if there was a significant statistical difference of the means between the control group and treatment group of students. This allowed the dependent variables (attendance, discipline, and dropout status) to be tested based on the independent variable (whether the school offered the program or not) to determine statistical significance ($p \leq .05$).

After running the t-test, the two-tailed significance was used to determine whether the null hypothesis would be rejected or accepted. If the significance was smaller than the probability value of 0.05, then the null hypothesis would have to be rejected because there would be a statistical significant difference showing the program works. Three different variables were used as measures of self-regulation, so three t-tests were run using all the dependent variables by grade level to see the effect of each self-regulation measure.

Multiple independent t-tests were run instead of multi-variate test, and as a result inflation of the type 1 error could be an issue. In order minimize the inflation effect both the Bonferroni correct and a power analysis were utilized. Since there were three dependent variables of interest each with three associated hypotheses that were tested using independent t-tests, the Bonferroni correct was calculated by dividing the set significance level of .05 by three. The resulting significance level with the Bonferroni correction was set at 0.016 for all hypotheses. Using this more stringent significance level, the results of the one statistically significant hypothesis at the .05 level, remained statistically significant. As an add layer of protection against type 1 error, a post-hoc power analysis, using G*Power version 3.1.9.3 (Faul, Erdfelder, Lang, & Buchner 2007), was also conducted for the hypothesis with statistical significance at the 0.016 level. The resulting power was .73 indicating that there is a 73% probability of correctly rejecting a null hypothesis. The resulting Cohens d effect size of 0.90 indicates a large effect with the intervention and control groups' means differing by 0.90 standard deviation. Because of the Bonferroni correction, the high power, and large effect size, the researcher has confidence that twelve graders in the intervention condition had significantly fewer missed days than those in the control condition.

Results

Three sub-questions were framed to support the main research question. Do high school students who have received instruction in the STAR program for four years *have better attendance* records than students who have not received such instruction based on the results of a t-test to show significant difference? Do high school students who have received instruction in the STAR program for four years *exhibit fewer disciplinary incidents* than students who have not received such instruction based on the results of a t-test to show significant difference? Do fewer high school students who have received instruction in the STAR program for four years *drop out of school* than students who have not received such instruction based on the results of a t-test to show significant difference? Each of the three independent samples t-tests were run on the applicable

data by grade level using all students in the treatment group and an equal random sampling of students in the control group.

The descriptive statistics for ninth through twelfth grade student attendance, discipline, and drop-out status by grade level are displayed in Tables 1-4. The ninth-grade treatment group had fewer absences and discipline referrals than the control group, and no drop-outs (Table 1). The tenth-grade treatment group had higher absences and lower discipline referrals than the control group, and no drop-outs (Table 2). The eleventh-grade treatment group had lower absences and higher discipline referrals than the control group, and no drop-outs (Table 3). The twelfth-grade treatment group had significantly lower absences, lower discipline referrals, and higher drop-out rates than the control group (Table 4).

Table 1

Ninth Grade Descriptive Statistics

	Program	N	Mean	Std. Deviation	Std. Error Mean
Attendance	No	20	8.40	8.744	1.955
	Yes	20	7.55	6.669	1.491
Discipline	No	20	1.80	4.112	.919
	Yes	20	1.25	2.845	.636

Table 2

Tenth Grade Descriptive Statistics

	Program	N	Mean	Std. Deviation	Std. Error Mean
Attendance	No	18	8.17	6.176	1.456
	Yes	18	9.22	9.607	2.264
Discipline	No	18	.78	1.060	.250
	Yes	18	.44	.856	.202

Table 3

Eleventh Grade Descriptive Statistics

	Program	N	Mean	Std. Deviation	Std. Error Mean
Attendance	No	17	6.53	5.959	1.445
	Yes	17	5.88	6.264	1.519
Discipline	No	17	.18	.529	.128
	Yes	17	.41	.618	.150

Table 4

Twelfth Grade Descriptive Statistics

	Program	N	Mean	Std. Deviation	Std. Error Mean
Attendance	No	17	10.82	6.347	1.539
	Yes	17	5.06	6.329	1.535
Discipline	No	17	.18	.393	.095
	Yes	17	.41	1.004	.243
Drop-Out	No	17	.06	.243	.059
	Yes	17	.24	.437	.106

Tables 5-8 display the results of the independent samples t-test for ninth through twelfth grade for attendance, discipline, and drop-out status. Though no significant differences were found for ninth through eleventh grade on any of the dependent variables, a significant difference was found between the students instructed in the STAR program (M=5.06, SD=6.33) and students not instructed in the STAR program (M=10.82, SD=6.35); t(32)=2.65, p=0.012 for attendance for twelfth graders (Table 8).

Table 5

Ninth Grade Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Attendance	Equal variances assumed	.104	.749	.346	38	.731	.850	2.459
	Equal variances not assumed			.346	35.515	.732	.850	2.459
Discipline	Equal variances assumed	.786	.381	.492	38	.626	.550	1.118
	Equal variances not assumed			.492	33.799	.626	.550	1.118

Table 6

Tenth Grade Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Attendance	Equal variances assumed	1.943	.172	-.392	34	.697	-1.056	2.692
	Equal variances not assumed			-.392	29.002	.698	-1.056	2.692
Discipline	Equal variances assumed	1.413	.243	1.038	34	.307	.333	.321
	Equal variances not assumed			1.038	32.547	.307	.333	.321

Table 7

Eleventh Grade Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Attendance	Equal variances assumed	.459	.503	.729	32	.472	1.765	2.422
	Equal variances not assumed			.729	30.609	.472	1.765	2.422
Discipline	Equal variances assumed	3.244	.081	-1.193	32	.242	-.235	.197
	Equal variances not assumed			-1.193	31.244	.242	-.235	.197

Table 8

Twelfth Grade Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Attendance	Equal variances assumed	.489	.490	2.652	32	.012	5.765	2.174
	Equal variances not assumed			2.652	32.000	.012	5.765	2.174
Discipline	Equal variances assumed	3.005	.093	-.900	32	.375	-.235	.261
	Equal variances not assumed			-.900	20.793	.378	-.235	.261
Drop-Out	Equal variances assumed	10.618	.003	-1.455	32	.155	-.176	.121
	Equal variances not assumed			-1.455	24.995	.158	-.176	.121

Limitations and Further Study

Several limitations in this study must be noted when examining the relationship between the students who have been treated using the STAR program and the number of absences, discipline referrals, and dropouts in later years. The first limitation was the difference in faculty and staff within the schools. Since only one school in four used the STAR program, results could be explained by the relationships built with students by the specific faculty and staff within that school rather than the STAR program content. A second limitation was school size. One school in particular was notably smaller than the other schools. The size of the schools could impact relationships between students and faculty and staff.

Additional limitations were related to the geographic layout of the schools within the county. Though the demographics of each elementary school were similar, the school zones differed. Since this study focused on long-term effects measured when all students were going to the same school, the distance from home to school could affect students and parental involvement and be factors in the success or lack thereof for students. Additionally, parents and other family

members could emphasize or de-emphasize the STAR program and the importance of the tenets of the program which could in turn affect program results.

Another limitation was the transience of students in particular areas. Though transient student data were not included in the study, it is possible this caused a shift in the data influencing tests of significance.

The fourth limitation was the amount of time away from the program itself. Students in the eighth and ninth grade could show more of an effect from the program learned in fourth through seventh grade than eleventh and twelfth graders. Students in ninth and tenth grade are two and three years out from instruction respectively, whereas students in eleventh and twelfth grade are four and five years out from instruction.

A final limitation of the study was that only one specific program in one specific county was examined. Since other programs or counties were not studied, the results cannot be generalized to other locales or programs.

Future studies could include the students in the eighth grade as part of the population. This would explore whether the benefits of the program are stronger when the student has just completed instruction. Another possibility would be to follow students overtime by including individual student data from each year following STAR program completion through graduation so as to examine longitudinal trends. Future studies could also include academic achievement as well as other variables to measure success. Also, increasing the sample size and including more school divisions may increase the likelihood of a more robust study. Another future study would be the addition of a qualitative component for a mixed methods approach that could investigate community and students' views about the STAR program. A qualitative approach could also examine whether teachers and administrators observe differences in students or hold different expectations of students based on whether they have been instructed in the STAR program.

An interesting follow-up study would be to delve further into the reasons for the number of drop-outs in the division and the role of STAR instruction in reducing the number of drop-outs. Each if these possible studies could expand on the findings reported here.

Discussion and Conclusion

Previous studies have demonstrated that fewer absences and disciplinary referrals were the norm in short term studies of different students in the same school (Bohanon et al. (2006); Luiselli et al. (2002); McCrary et al. (2012); Muscott, (2004); and Snyder et al. (2010); Taylor-Greene et al. (1997); and Warren et al. (2006)). As with previous studies, in this cross-sectional study of students who were instructed in the STAR program during elementary school and then transitioned to the high school environment, there was a trend toward fewer absences and disciplinary referrals with an additional finding of a statistically significant difference in higher attendance for twelfth graders.

Descriptive statistics for the 2012-13 school year revealed fewer absences for students in the ninth, eleventh, and twelfth grades who had been instructed in the STAR program. Discipline incidents were fewer for students in the STAR program for ninth and tenth grade students, but higher for the eleventh and twelfth grade students. Drop-out statistics were lower in the treatment sample except for twelfth grade students.

Higher attendance implied that former STAR students wanted to be at school or understood they were expected to be at school. Much of the success of students starts with being present. Perhaps the STAR program helped to teach intrinsic motivation and the feeling of success that

comes when students are at school and not getting in trouble. The unexpected increase in drop outs in the twelfth grade merits further investigation. Perhaps the transient nature of the treatment school affected the drop-out rate due to broken relationships or a loss of student engagement. Perhaps that particular year group of students had a unique experience given they were in the first year of STAR implementation.

The conclusion of this study is the STAR program could be considered successful as measured by overall better attendance (with statistical significance for twelfth graders) and decreased disciplinary referrals in the treatment population. This study provided as a solid foundation for further study, which is needed to specifically correlate the STAR program with conditions for success for students. While the STAR program did not demonstrate statistically significant findings apart from twelfth grade attendance, this cross-sectional study suggests positive behavior support programs, like STAR, have the potential to keep students coming to school and out of trouble.

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