This research paper discusses the impact of two programs, DISCIPLINYA and NUKARMA, on students at the fictional St. Anova's Day School. The Board of Trustees wanted to know if one or both of these programs would have positive effects on students' outlook (measured by Academic Belonging and Social Skills Index), student conduct (as measured by Attendance and Jenkins Impulse Control Scale), and academic performance (as measured by GPA).

Results

A correlation was run to determine the relationship between Social Skills Index 1 (SSI1) and Social Skills Index 2 (SSI2) scores, finding a significant correlation ($r = .939$, $p < .001$) that showed SSI2 scores increased as SSI1 scores increased. There was also a correlation between General Intellectual Aptitude (GenApt) and SSI2 ($r = .175$, $p = .007$), showing that higher GenApt scores correlate with higher SSI scores. Therefore, an ANCOVA was run to determine the effects of sex, grade, and group on SSI2 scores, controlling for SSI1 and for GenApt. There was a main effect of sex, with females showing higher levels of social skills than males ($F(1, 226) = 13.903$, $p < .001$), a main effect of group ($F(2, 226) = 23.020$, $p < .001$), with NUKARMA showing the highest scores, followed by the control group, then DISCIPLINYA, and a main effect of grade ($F(1, 226) = 5.699$, $p = .018$), with 10th graders showing the highest scores. Additionally, there was an interaction between grade and group ($F(2, 226) = 11.578$, $p < .001$).

A post-hoc Bonferroni pairwise comparison was run to explore the interaction between grade and treatment group. The results indicated that 10th graders in the NUKARMA program had the highest SSI scores and 9th graders in the DISCIPLINYA group had the lowest scores. See Table 1 for means, Table 2 for descriptive statistics, and Figure 1 for a line graph of the interaction.

Table 1
Social Skills Index means for Sex, Grade in School, and Treatment Group

2. Sex

Dependent Variable: Social Skills Index (end of year retest)

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
MALES	12.221[a]	.174	11.878	12.565
FEMALES	13.169[a]	.174	12.826	13.513

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

3. Grade in School

Dependent Variable: Social Skills Index (end of year retest)

Grade in School	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
9	12.139[a]	.262	11.622	12.655
10	13.252[a]	.262	12.736	13.769

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

4. Treatment Group

Dependent Variable: Social Skills Index (end of year retest)

Treatment Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control Group	12.489[a]	.207	12.080	12.897
NUKARMA Program (Exper. Gp. 1)	13.777[a]	.207	13.369	14.185
DISCIPLINYA Program (Exper. Gp. 2)	11.820[a]	.207	11.412	12.229

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

Table 2
Descriptive statistics of the interaction between Grade in School and Treatment Group

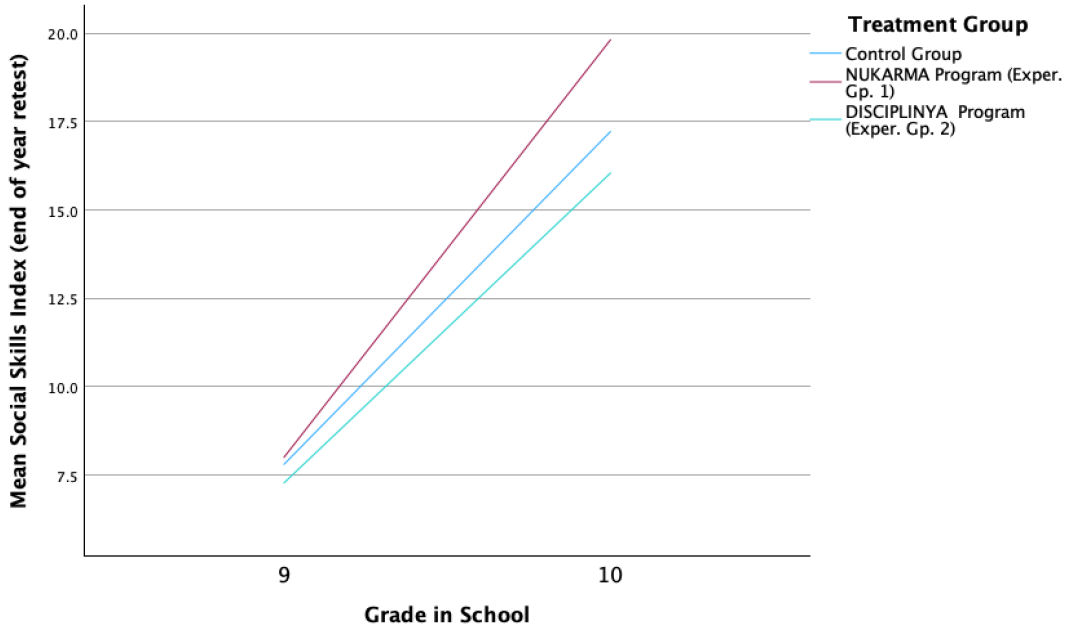
Descriptive Statistics

Dependent Variable: Social Skills Index (end of year retest)

Treatment Group	Grade in School	Mean	Std. Deviation	N
Control Group	9	7.80	3.546	40
	10	17.23	3.570	40
	Total	12.51	5.915	80
NUKARMA Program (Exper. Gp. 1)	9	8.00	3.524	40
	10	19.82	4.483	40
	Total	13.91	7.172	80
DISCIPLINYA Program (Exper. Gp. 2)	9	7.27	3.226	40
	10	16.05	3.809	40
	Total	11.66	5.639	80
Total	9	7.69	3.420	120
	10	17.70	4.245	120
	Total	12.70	6.320	240

Figure 1

Line graph of the interaction between Grade in School and Treatment Group



A correlation was run to determine the relationship between SSI1 and impulse control (JICS), finding a significant relationship ($r = .253$, $p < .001$), showing that high impulse control is correlated with higher social skills. Another correlation showed a significant relationship between GenApt and JICS ($r = .499$, $p < .001$), showing that high GenApt scores correlate with high impulse control. Therefore, an ANCOVA was run to determine the effects of group, sex, and grade on JICS, controlling for SSI1 and

GenApt. There was a main effect of sex ($F(1, 226) = 8.534$, $p = .004$), with females showing higher impulse control and a main effect of group ($F(2, 226) = 9.764$, $p < .001$), with NUKARMA showing highest impulse control, followed by DISCIPLINYA, then control. Finally, there was an interaction between sex and grade ($F(1, 226) = 12.015$, $p < .001$).

A post-hoc Bonferroni pairwise comparison was run to explore the interaction between sex and grade, showing that impulse control is highest in 10th grade females and lowest in 9th grade males. See Table 3 for means, Table 4 for descriptive statistics, and Figure 2 for a line graph of the interaction.

Table 3
JICS means for Treatment Group and Sex

4. Treatment Group

Dependent Variable: Jenkins Impulse Control Scale (end of yr)

Treatment Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control Group	2.734[a]	.105	2.527	2.941
NUKARMA Program (Exper. Gp. 1)	3.375[a]	.105	3.168	3.582
DISCIPLINYA Program (Exper. Gp. 2)	3.178[a]	.105	2.971	3.385

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

2. Sex

Dependent Variable: Jenkins Impulse Control Scale (end of yr)

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
MALES	2.908[a]	.088	2.734	3.082
FEMALES	3.284[a]	.088	3.110	3.458

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

Table 4
Descriptive statistics of the interaction between Grade in School and Sex

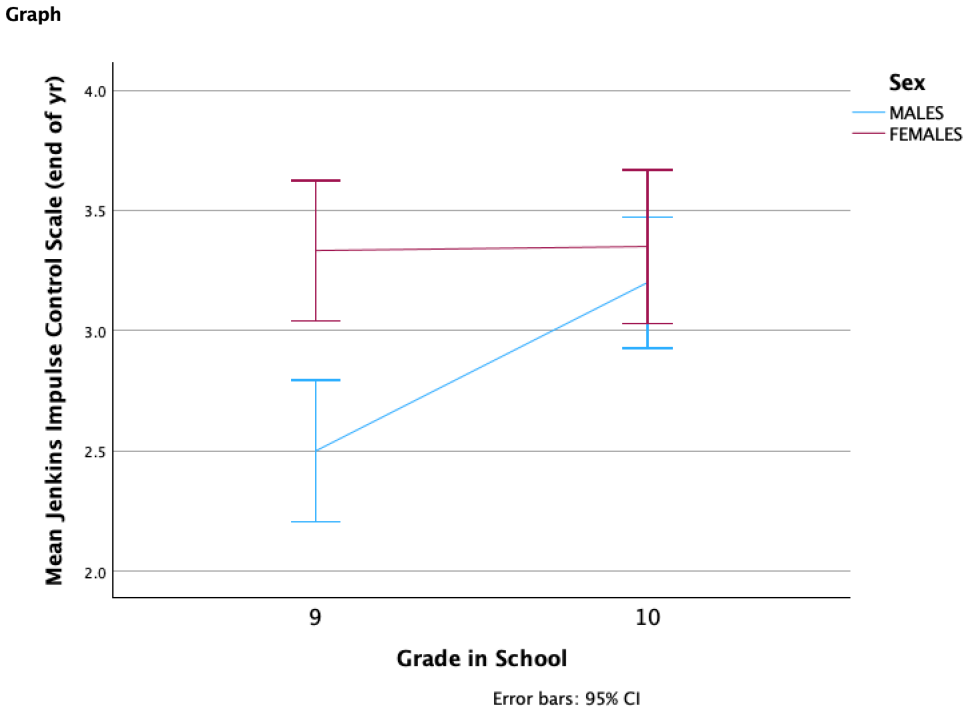
Descriptive Statistics

Dependent Variable: Jenkins Impulse Control Scale (end of yr)

Grade in School	Sex	Mean	Std. Deviation	N
9	MALES	2.50	1.142	60
	FEMALES	3.33	1.130	60
	Total	2.92	1.206	120
10	MALES	3.20	1.054	60
	FEMALES	3.35	1.233	60
	Total	3.28	1.145	120
Total	MALES	2.85	1.150	120
	FEMALES	3.34	1.177	120
	Total	3.10	1.187	240

Figure 2

Line graph of the interaction between Grade in School and Sex



A correlation was run to determine the relationship between academic belonging and SSI1, finding a significant correlation ($r = .740$, $p < .001$), showing that higher social skills is correlated with

higher academic belonging. A significant correlation was also found between GenApt and academic belonging ($r = .256$, $p < .001$), showing that higher GenApt scores predict more academic belonging. Therefore, an ANCOVA was run to determine the effects of grade, group, and sex on academic belonging, controlling for SSI1 and for GenApt. There was a main effect of sex ($F(1, 226) = 9.304$, $p = .003$), with females showing higher academic belonging than males, a main effect of grade, ($F(1, 226) = 62.892$, $p < .001$) with 10th graders showing higher academic belonging than 9th graders, and a main effect of group ($F(2, 226) = 19.474$, $p < .001$), with NUKARMA showing the highest academic belonging, followed by the control group, then DISCIPLINYA. Additionally, there was a slightly significant interaction between sex and group ($F(2, 226) = 3.090$, $p = .047$).

A post-hoc Bonferroni pairwise comparison was run to explore the interaction between sex and group, finding that females in the NUKARMA program showed the highest academic belonging and males in the DISCIPLINYA group showed the lowest. See Table 5 for means, Table 6 for descriptive statistics, and Figure 3 for a line graph of the interaction.

Table 5

Academic Belonging means for Treatment Group, Grade in School, and Sex

2. Sex

Dependent Variable: Academic Belonging Scale (end of yr)

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
MALES	20.472[a]	.359	19.764	21.181
FEMALES	22.069[a]	.359	21.361	22.777

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

3. Grade in School

Dependent Variable: Academic Belonging Scale (end of yr)

Grade in School	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
9	17.461[a]	.540	16.397	18.525
10	25.081[a]	.540	24.017	26.144

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

4. Treatment Group

Dependent Variable: Academic Belonging Scale (end of yr)

Treatment Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control Group	20.456[a]	.427	19.615	21.298
NUKARMA Program (Exper. Gp. 1)	23.425[a]	.427	22.584	24.266
DISCIPLINYA Program (Exper. Gp. 2)	19.931[a]	.427	19.090	20.772

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00, Social Skills Index (pretest) = 10.40.

Table 6
Descriptive statistics of the interaction between Treatment Group and Sex

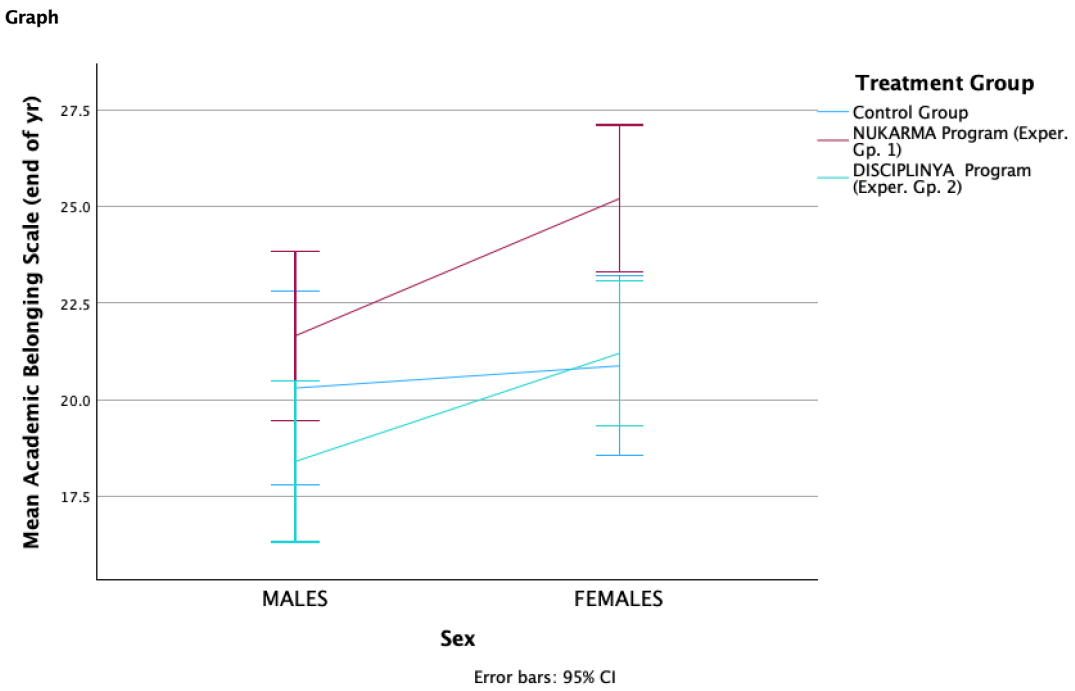
Descriptive Statistics

Dependent Variable: Academic Belonging Scale (end of yr)

Sex	Treatment Group	Mean	Std. Deviation	N
MALES	Control Group	20.30	7.839	40
	NUKARMA Program (Exper. Gp. 1)	21.65	6.867	40
	DISCIPLINYA Program (Exper. Gp. 2)	18.40	6.488	40
	Total	20.12	7.154	120
FEMALES	Control Group	20.88	7.268	40
	NUKARMA Program (Exper. Gp. 1)	25.20	5.949	40
	DISCIPLINYA Program (Exper. Gp. 2)	21.20	5.863	40
	Total	22.42	6.639	120
Total	Control Group	20.59	7.517	80
	NUKARMA Program (Exper. Gp. 1)	23.42	6.629	80
	DISCIPLINYA Program (Exper. Gp. 2)	19.80	6.303	80
	Total	21.27	6.983	240

Figure 3

Line graph of the interaction between Treatment Group and Sex



A correlation was run between GenApt and attendance, finding a significant relationship (r = -.338, $p < .001$), showing that lower GenApt scores correlate with more absences. Therefore, an ANCOVA was run to determine the effects of group, sex, and grade on attendance, controlling for

GenApt. There was a main effect of sex ($F(1, 227) = 137.06$, $p < .001$), with males having worse attendance than females, and a main effect of group ($F(2, 227) = 7.390$, $p < .001$), with DISCIPLINYA showing the lowest levels of attendance, followed by NUKARMA, then control, indicating that both interventions had detrimental effects on attendance. There was also an interaction between sex and group ($F(2, 227) = 64.041$, $p = .009$).

A post-hoc Bonferroni pairwise comparison was run to explore the interaction between sex and group, finding that females in the NUKARMA program had the fewest absences and males in the DISCIPLINYA program had the most absences. See Table 7 for means, Table 8 for descriptive statistics, and Figure 4 for a line graph of the interaction.

Table 7
Attendance means for Sex and Treatment Group

1. Sex

Dependent Variable: # of days absent from school

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
MALES	7.657[a]	.334	6.999	8.315
FEMALES	2.126[a]	.334	1.468	2.784

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00.

2. Treatment Group

Dependent Variable: # of days absent from school

Treatment Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control Group	3.737[a]	.409	2.930	4.543
NUKARMA Program (Exper. Gp. 1)	4.980[a]	.409	4.174	5.785
DISCIPLINYA Program (Exper. Gp. 2)	5.959[a]	.409	5.153	6.765

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00.

Table 8

Descriptive statistics of the interaction between Treatment Group and Sex

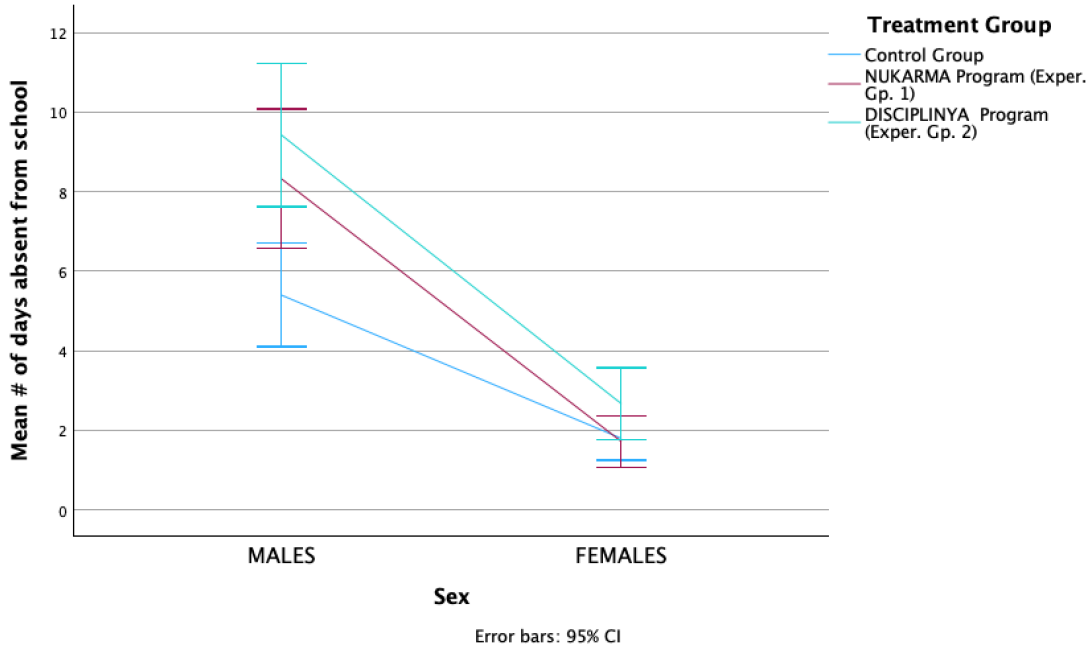
Descriptive Statistics

Dependent Variable: # of days absent from school

Sex	Treatment Group	Mean	Std. Deviation	N
MALES	Control Group	5.40	4.069	40
	NUKARMA Program (Exper. Gp. 1)	8.33	5.470	40
	DISCIPLINYA Program (Exper. Gp. 2)	9.43	5.652	40
	Total	7.72	5.349	120
FEMALES	Control Group	1.80	1.728	40
	NUKARMA Program (Exper. Gp. 1)	1.73	2.025	40
	DISCIPLINYA Program (Exper. Gp. 2)	2.67	2.814	40
	Total	2.07	2.259	120
Total	Control Group	3.60	3.595	80
	NUKARMA Program (Exper. Gp. 1)	5.03	5.275	80
	DISCIPLINYA Program (Exper. Gp. 2)	6.05	5.587	80
	Total	4.89	4.980	240

Figure 4

Line graph of the interaction between Treatment Group and Sex



A correlation was run between GenApt and GPA ($r = .536$, $p < .001$), showing a significant positive relationship, meaning high GenApt scores predicted high GPA scores. Therefore, an ANCOVA was run to determine the effects of grade, group, and sex on GPAs, controlling for GenApt. There was a main effect of sex ($F(1, 227) = 19.339$, $p < .001$), showing that females have higher GPAs on average than

males. However, there were no main effects of group or grade and no significant interactions. See Table 9 for means.

Table 9
GPA means for Sex

1. Sex

Dependent Variable: End of Year Grade Point Avg

Sex	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
MALES	2.977[a]	.040	2.899	3.055
FEMALES	3.223[a]	.040	3.145	3.301

a. Covariates appearing in the model are evaluated at the following values: General Intellectual aptitude assessed at end of Grade 8 = 123.00.

was run to examine the relationship of attendance, academic belonging, impulse control, and social skills with GPA. There was a negative correlation between absences and GPA, meaning as absences increase, GPAs decrease (r = -.369, p < .001). There was a positive correlation between academic belonging and GPA, indicating that as academic belonging increases, GPA increases (r = .146, p = .024). There was a positive correlation between impulse control and GPA as well, showing that impulse control increases as GPA increases (r = .400, p < .001). Finally, there was a positive correlation between social skills and GPA, meaning as social skills increase, GPA increases (r = .149, p = .021).

Discussion

The Board of Trustees at St. Anova's Day School implemented two programs, DISCIPLINYA and NUKARMA, to test improvement on Covid's negative effects on their students' school outlook (as measured by Academic Belonging and the Social Skills Index), student conduct (as measured by Attendance and the Jenkins Impulse Control Scale), and academic performance (as measured by GPA), with the goal of choosing one program to implement permanently.

Results indicated that both treatment groups improved in social skills throughout the duration of the study, but NUKARMA showed the most improvement while DISCIPLINYA showed the least, and both showed more significant improvement among 10th graders than 9th graders. NUKARMA and

DISCIPLINYA both showed higher results than the control group in academic belonging, with NUKARMA having greater effect than DISCIPLINYA. Additionally, females had higher academic belonging than males. These findings suggest that NUKARMA is more effective than DISCIPLINYA on improving school outlook.

Both the NUKARMA program and the DISCIPLINYA program showed higher impulse control than the control group, as measured by the Jenkins Impulse Control Scale, but NUKARMA had the best results. 10th grade males performed significantly better than 9th grade males, whereas there was no significant difference in impulse control between 9th and 10th grade females. Interestingly, however, both NUKARMA and DISCIPLINYA showed an increase in absences in comparison to the control group. NUKARMA showed fewer absences than DISCIPLINYA, with females having the fewest absences overall, but both treatment groups had a negative effect on attendance. This is important to note, because both treatment groups showed improvement on one measure of school conduct (impulse control), but showed the opposite for the other measure (attendance).

Neither NUKARMA or DISCIPLINYA showed significantly better GPAs than the control group, suggesting that neither treatment group improved academic performance. Overall, this study indicates that NUKARMA is the most effective of the three groups in improving school outlook and impulse control, and was less detrimental on attendance than DISCIPLINYA, but a follow-up study would be necessary to further explore the effect of treatment groups on school conduct as a whole, as the two measures show conflicting results. Still, NUKARMA is shown to be the most effective program, particularly for females and for 10th graders, for St. Anova's Day School to implement.

Limitations

Some limitations of this study include a relatively small sample size, looking at only 80 participants from two grades at one school, which limits the generalizability of this study. Additionally, if any of these measures were evaluated by students self-reporting, there could be biases affecting the results. There was no categorization of race, sexuality, or genders identities beyond the binary, which

could also prove to be influential factors in each of the measures used. A similar study with a larger sample size including a variety of demographics would increase the study's generalizability.

There is a high correlation between attendance and GPA, so a follow-up study on the same participants at a later time may show that both treatment groups led to a decrease in GPAs over time. This would be helpful in determining whether to implement either program, because if GPAs decrease as a function of attendance decreasing, the programs may be overall more harmful than they are helpful. In the same vein, a follow-up study exploring *how* both treatment groups counterintuitively led to a decrease in attendance would be valuable. Additionally, there were correlations that showed as impulse control, social skills, and academic belonging increase, GPA increases. This suggests that, while neither program directly increased GPAs, a follow-up study to assess how the increases in impulse control, social skills, and academic belonging affect GPAs over time if NUKARMA is implemented would be valuable in assessing the program's effect on academic performance.