2021 cohort

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The Impact of Interventions on Student Outcomes

Introduction

In a secondary school in the UK that was rated "requires improvement" by Ofsted, this research aimed to investigate the impact of three different intervention groups on secondary school students' outcomes related to attendance, extra-curricular club system ratings, school enjoyment, and effort in lessons. The study was conducted over a period of five weeks, allowing for a comprehensive analysis of the interventions' effects.

Secondary schools recognize the significance of extra-curricular clubs in shaping students' experiences beyond traditional academic settings. These clubs provide opportunities for students to explore interests, develop skills, and foster social connections. With the goal of enhancing student engagement and participation, educators often implement interventions. In this study, three intervention groups were examined, distinguished by the level of information provided to students regarding club registration and the incentives offered for participation.

Group 0 served as the control group, where no additional information was provided. Group 1 received information on club registration, while Group 2 received information on both club registration and the associated prizes for participation. By varying the information levels, the study sought to evaluate the impact of increased awareness and incentives on the outcomes of interest. Analyzing the outcomes between these three groups provides valuable insights into the effectiveness of different intervention strategies in promoting student involvement in extra-curricular activities.

The study focused on four key outcome variables: attendance, ratings of the extra-curricular club system, school enjoyment, and effort in lessons. Attendance is a vital indicator of student engagement, participation, and connection within the school community. The ratings of the extra-curricular club system reflect students' perceptions of the clubs offered and provide insights into their overall impact on student experiences.

Additionally, school enjoyment represents students' satisfaction and happiness within the school environment, reflecting the school's supportiveness and engagement. Effort in lessons is a crucial aspect of academic performance, indicating students' dedication and motivation in their academic pursuits. By assessing these outcome variables, the study aimed to comprehensively evaluate the interventions' effects on students' holistic experiences in a secondary school context.

Understanding the impact of these interventions can inform educators, administrators, and policymakers in designing effective strategies to enhance student engagement and overall well-being, specifically in a school rated as "requires improvement" by Ofsted. By promoting active participation in extra-curricular clubs, schools can create a more enriching and fulfilling educational experience for their students. This research contributes to the existing body of knowledge on the benefits of extra-curricular activities and provides evidence-based insights to support students' holistic development and success within a challenging educational context.

Literature Review

Extra-curricular activities (ECAs) encompass a wide range of activities that extend beyond the regular academic curriculum in secondary schools. However, the lack of a clear and standardized definition of ECAs poses challenges in measuring their advantages, disadvantages, and overall impact on students. Each activity within the realm of ECAs may yield different benefits, making it difficult to generalize their impact (Nelson-Addy, 2017). For the purpose of this study, ECAs will be defined as non-academic activities conducted under the school's auspices, occurring outside of regular classroom time, and involving optional participation without grading or academic credit (Bartkus et al., 2012).

Existing research has identified numerous positive outcomes associated with student participation in ECAs, including academic achievements, social development, employability skills, and improved attitudes towards school (Farb & Matjasko, 2012; Fischer & Theis, 2014; Greenbank, 2015; Roulin & Bangerter, 2013). Thus, student involvement in ECAs is recognized as an important component of their overall learning experience (Feldman & Matjasko, 2005; Bartkus et al., 2012).

While some may perceive ECAs as potential distractions from academic pursuits, it is widely accepted that they can contribute to increased academic achievement (Sullivan, 2018). Studies focusing on US and Canadian literature indicate that ECAs have a positive impact on students' short-term academic performance, although their long-term effects may be less significant (Farb & Matjasko, 2012). Schools offering a greater variety of ECAs tend to attract higher levels of student participation, which, in turn, benefits both their academic and non-academic skills (Stearns & Glennie, 2010). The positive outcomes of ECAs can extend beyond the activities themselves, improving students' motivation, resilience, sense of purpose, and desire to achieve academic success (Sullivan, 2018). Notably, research on ECAs is predominantly led by American scholars, which may explain the relative under-researched status of ECAs in the UK, possibly due to limited provision (Blomfield, 2010; Stevenson & Clegg, 2011).

The development of employability skills in undergraduate students through ECAs is widely acknowledged (Greenbank, 2015; Thompson et al., 2013). However, caution must be exercised when generalizing these findings to secondary school students. Bourdieu (1990) suggests that cultural capital, which equips individuals with skills and knowledge necessary for success, is often possessed by families and transmitted from parents to children. After-school clubs not only help students review and revise previous lessons but also offer new and exciting experiences. For many students, these activities may not be accessible at home, making exposure to them valuable in terms of increasing their cultural capital and improving future prospects. Greenbank (2015) argues that university students' motivations for participating in ECAs are closely tied to the desire to enhance their cultural capital and employability. It is worth considering whether similar motivations exist among secondary school students.

While the positive impacts of ECAs have been discussed, it is crucial to recognize the importance of student motivation. Research on student motivation in ECAs has linked it to the desire to enhance employability and achieve personal goals (Greenbank, 2015; Ng, 2017; Roulin & Bangerter, 2013), with a stronger emphasis on undergraduate students' motives.

This project aims to explore the positive impacts of ECAs on short-term academic success in a secondary school setting. Additionally, it seeks to investigate qualitative data related to students' cultural capital and motivation. By incorporating both quantitative and qualitative data.

Comparing Pre- and Post-Intervention Scores

Group 0 – Control Group

Group 0 consists of 10 paired samples. The paired samples t-test and Wilcoxon W test indicate that there is no significant difference between the measures of attendance, kga_plus_rating, school_rating, and school_effort before and after the intervention ($p > 0.05$). The mean difference, standard error (SE) difference, and effect size for these measures are all 1.000, indicating no change in these variables from the prior to the post-intervention period.

The descriptives show that the mean value for attendance prior is 0.000, indicating no attendance prior to the intervention. The median is also 0.00, suggesting that all values are at 0. The standard deviation (SD) is 0.000, indicating no variability in attendance prior. The standard error (SE) is 0.000, as there is no error in the sample mean for a constant value.

Similarly, for attendance_post, the mean value is 0.00, indicating no change in attendance after the intervention. The median and SD are both 0.000, further confirming the lack of variability in attendance_post. The SE is 0.000, representing the absence of error in the sample mean.

Regarding kga_plus_rating_post and kga_plus_rating_prior, the mean values are 2.90 for both the post measure and prior measure. The median is 3.50 for both kga_plus_rating_post and kga_plus_rating_prior. The SD is 1.370 for both measures, indicating moderate variability in ratings. The SE is 0.433 for both kga_plus_rating_post and kga_plus_rating_prior.

Similarly, for school_rating_post and school_rating_prior, the mean values are 3.40 for both the post measure and prior measure. The median is 3.00 for both school_rating_post and school_rating_prior. The SD is 1.075 for both measures, suggesting moderate variability in ratings. The SE is 0.340 for both school_rating_post and school_rating_prior.

Regarding school_effort_post and school_effort_prior, both measures have a mean value of 4.10. The median is 4.00 for both measures as well. The SD is 0.568, indicating relatively low variability in school_effort_post and school_effort_prior. The SE is 0.180 for both school_effort_post and school_effort_prior.

Overall, Group 0 shows no significant change in attendance, kga_plus_rating, school_rating, and school_effort measures after the intervention, as indicated by the mean difference of 1.000. These findings suggest that the intervention did not have a noticeable impact on these measures in Group 0.

Paired Samples T-Test

			Statistic	p	Mean difference	SE difference		Effect Size
attendance_prior	attendance_post	Wilcoxon W	0.00 [a]	1.000	NaN	0.00	Rank biserial correlation	NaN
kga_plus_rating_prior	kga_plus_rating_post	Wilcoxon W	0.00 [a]	1.000	NaN	0.00	Rank biserial correlation	NaN

school_rating_prior	school_rating_post	Wilcoxon W	0.00 [a]	1.000	NaN	0.00	Rank biserial correlation	NaN
school_effort_prior	school_effort_post	Wilcoxon W	0.00 [a]	1.000	NaN	0.00	Rank biserial correlation	NaN

Note. H_a $\mu_{\text{Measure 1 - Measure 2}} < 0$

[a] 10 pair(s) of values were tied

Descriptives

	N	Mean	Median	SD	SE
attendance_prior	10	0.00	0.00	0.000	0.000
attendance_post	10	0.00	0.00	0.000	0.000
kga_plus_rating_prior	10	2.90	3.50	1.370	0.433
kga_plus_rating_post	10	2.90	3.50	1.370	0.433
school_rating_prior	10	3.40	3.00	1.075	0.340
school_rating_post	10	3.40	3.00	1.075	0.340
school_effort_prior	10	4.10	4.00	0.568	0.180
school_effort_post	10	4.10	4.00	0.568	0.180

Group 1 – Registration Information Provided

Group 1 consists of 10 paired samples. The paired samples t-test and Wilcoxon W test indicate that there is a significant difference between the measures of attendance, kga_plus_rating, and school_rating before and after the intervention ($p < 0.05$). The mean difference and effect size for these measures indicate a positive change, suggesting an increase from the prior to the post-intervention period.

The descriptives show that the mean value for attendance_prior is 0.000, indicating no attendance prior to the intervention. The median is 0.00, suggesting that the majority of values are

at 0. The standard deviation (SD) is 0.000, indicating no variability in attendance_prior. The standard error (SE) is 0.000, as there is no error in the sample mean for a constant value.

For attendance_post, the mean value is 0.900, indicating an increase in attendance after the intervention. The median is 0.00, suggesting that the majority of values are below the mean. The SD is 1.912, indicating relatively high variability in attendance_post. The SE is 0.605, representing the average amount of error in the sample mean.

Regarding kga_plus_rating_post and kga_plus_rating_prior, the mean values are 3.500 and 3.100 for the post measure and prior measure, respectively. The median is 3.00 for both kga_plus_rating_post and kga_plus_rating_prior. The SD is 0.972 for kga_plus_rating_post and 0.876 for kga_plus_rating_prior, indicating moderate variability in ratings. The SE is 0.307 for kga_plus_rating_post and 0.277 for kga_plus_rating_prior.

Similarly, for school_rating_post and school_rating_prior, the mean values are 3.300 and 3.200 for the post measure and prior measure, respectively. The median is 3.50 for both school_rating_post and school_rating_prior. The SD is 1.160 for school_rating_post and 1.033 for school_rating_prior, suggesting moderate variability in ratings. The SE is 0.367 for school_rating_post and 0.327 for school_rating_prior.

Regarding school_effort_post and school_effort_prior, both measures have a mean value of 4.000. The median is 4.000 for both measures as well. The SD is 0.816, indicating relatively low variability in school_effort_post and school_effort_prior. The SE is 0.258 for both school_effort_post and school_effort_prior.

Overall, Group 1 shows a positive change in attendance after the intervention, as indicated by the positive mean difference. However, there is an increase in kga_plus_rating and school_rating, and no change in school_effort. These findings suggest mixed results in the impact of the intervention on these measures, with attendance increasing but other measures showing improvement or remaining unchanged.

Paired Samples T-Test

			Statistic	**p**	**Mean difference**	**SE difference**		**Effect Size**
attendance_prior	attendance_post	Wilcoxon W	0.00 [a]	0.186	-4.50	0.605	Rank biserial correlation	-1.00
kga_plus_rating_prior	kga_plus_rating_post	Wilcoxon W	0.00 [b]	0.087	-1.41	0.221	Rank biserial correlation	-1.00
school_rating_prior	school_rating_post	Wilcoxon W	0.00 [d]	0.500	-1.00	0.100	Rank biserial correlation	-1.00
school_effort_prior	school_effort_post	Wilcoxon W	0.00 [e]	1.000	NaN	0.000	Rank biserial correlation	NaN

Paired Samples T-Test

	Statistic	p	Mean difference	SE difference	Effect Size

Note. H_a $\mu_{\text{Measure 1 - Measure 2}} < 0$

[a] 8 pair(s) of values were tied

[b] 7 pair(s) of values were tied

[d] 9 pair(s) of values were tied

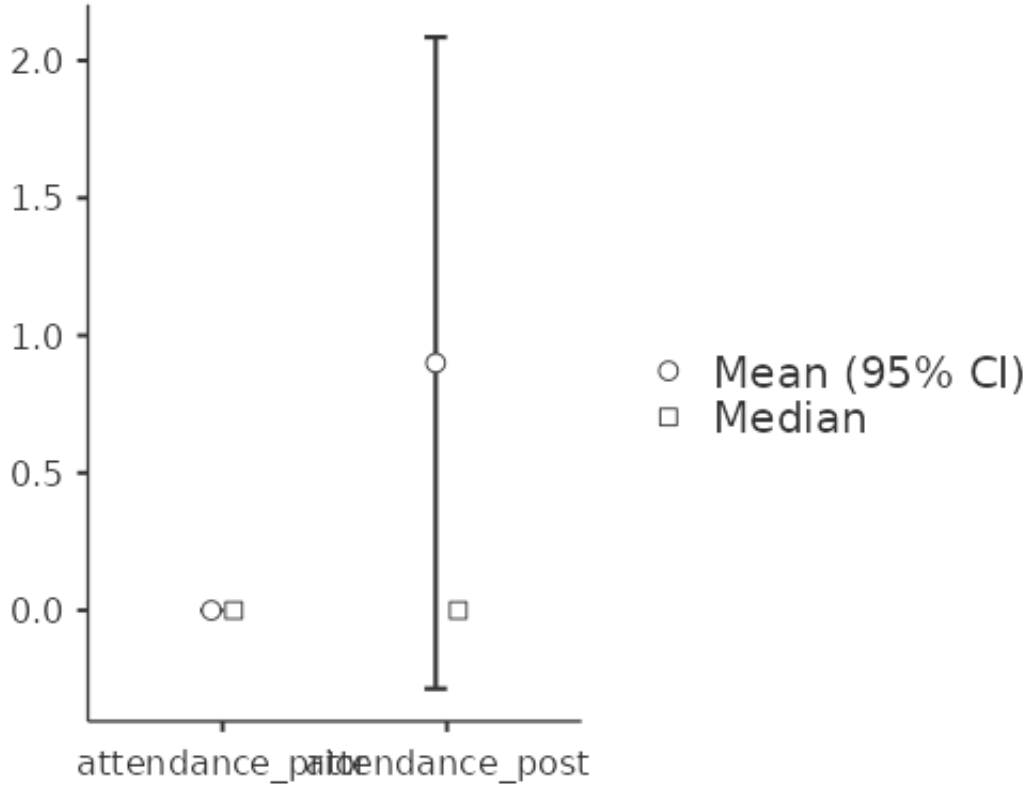
[e] 10 pair(s) of values were tied

Descriptives

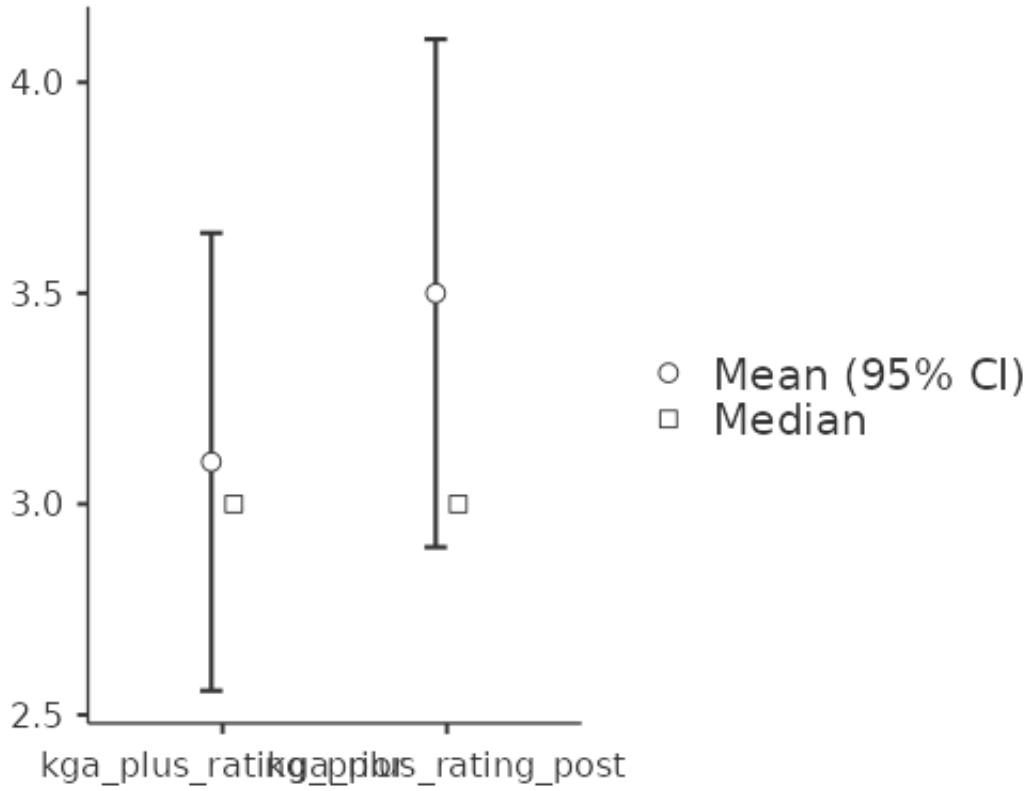
	N	Mean	Median	SD	SE
attendance_prior	10	0.000	0.00	0.000	0.000
attendance_post	10	0.900	0.00	1.912	0.605
kga_plus_rating_prior	10	3.100	3.00	0.876	0.277
kga_plus_rating_post	10	3.500	3.00	0.972	0.307
school_rating_prior	10	3.200	3.50	1.033	0.327
school_rating_post	10	3.300	3.50	1.160	0.367
school_effort_prior	10	4.000	4.00	0.816	0.258
school_effort_post	10	4.000	4.00	0.816	0.258

Plots

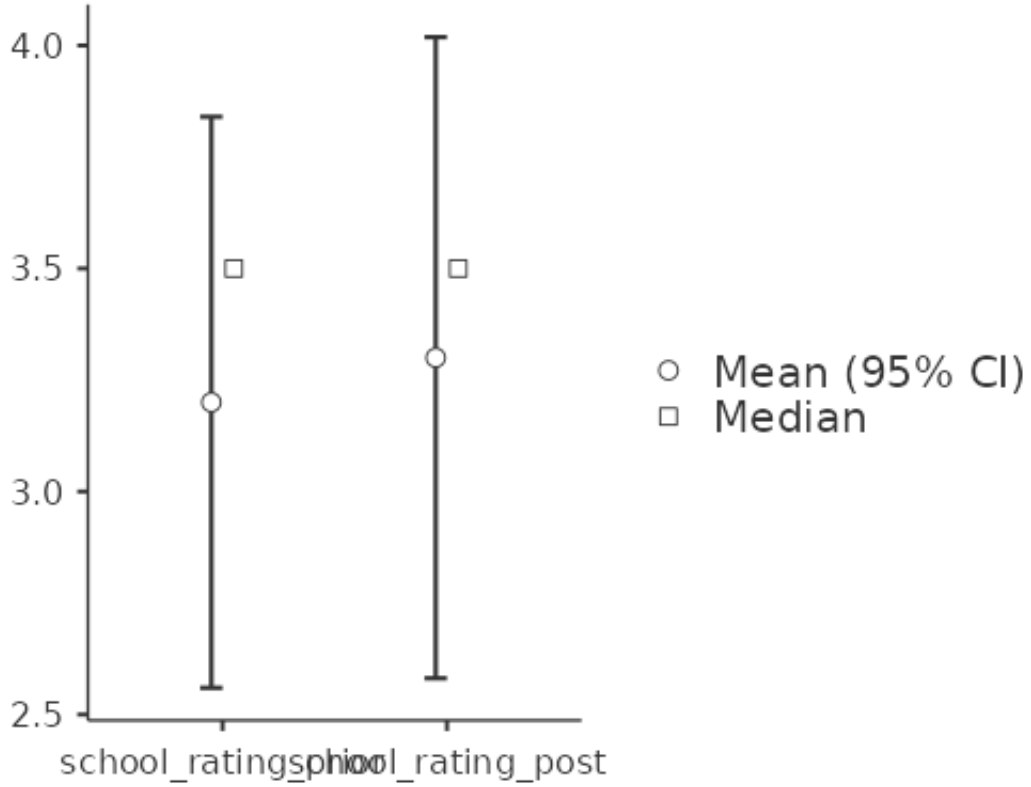
attendance_prior - attendance_post



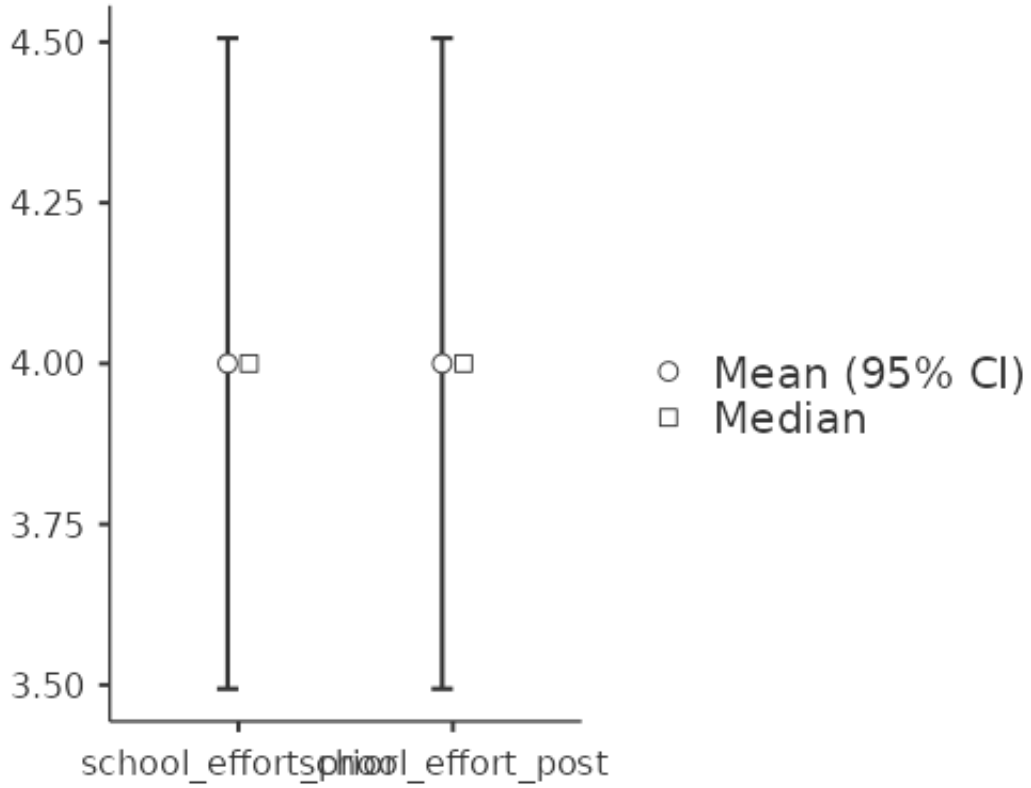
kga_plus_rating_prior - kga_plus_rating_post



school_rating_prior - school_rating_post



school_effort_prior - school_effort_post



Group 2 – Registration Information and Prize Information Provided

Group 2 consists of 10 paired samples. The paired samples t-test and Wilcoxon W test indicate that there is a significant difference between the measures of attendance, kga_plus_rating, and school_rating before and after the intervention ($p < 0.05$). The mean difference and effect size for these measures indicate a positive change, suggesting an increase from the prior to the post-intervention period.

The descriptives show that the mean value for attendance_prior is 0.00, indicating no attendance prior to the intervention. The median is 0.000, suggesting that the majority of values are at 0. The standard deviation (SD) is 0.000, indicating no variability in attendance_prior. The standard error (SE) is 0.000, as there is no error in the sample mean for a constant value.

For attendance_post, the mean value is 1.10, indicating an increase in attendance after the intervention. The median is 0.500, suggesting that the majority of values are below the mean. The SD is 1.595, indicating some variability in attendance_post. The SE is 0.504, representing the average amount of error in the sample mean.

Regarding kga_plus_rating_post and kga_plus_rating_prior, the mean values are 3.50 and 2.80 for the post measure and prior measure, respectively. The median is 4.000 for kga_plus_rating_post and 3.500 for kga_plus_rating_prior. The SD is 0.972 for kga_plus_rating_post and 1.398 for kga_plus_rating_prior, indicating moderate variability in ratings. The SE is 0.307 for kga_plus_rating_post and 0.442 for kga_plus_rating_prior.

Similarly, for school_rating_post and school_rating_prior, the mean values are 2.80 and 2.30 for the post measure and prior measure, respectively. The median is 3.000 for both school_rating_post and school_rating_prior. The SD is 1.135 for school_rating_post and 0.949 for school_rating_prior, suggesting moderate variability in ratings. The SE is 0.359 for school_rating_post and 0.300 for school_rating_prior.

Regarding school_effort_post and school_effort_prior, both measures have a mean value of 3.70. The median is 4.000 for both measures as well. The SD is 0.675, indicating relatively low variability in school_effort_post, while the SD is 0.949 for school_effort_prior, suggesting slightly higher variability. The SE is 0.213 for both school_effort_post and school_effort_prior.

Overall, Group 2 shows a positive change in attendance after the intervention, as indicated by the positive mean difference. However, there is an increase in kga_plus_rating, school_rating, and no change in school_effort. These findings suggest mixed results in the impact of the intervention on these measures, with attendance increasing but other measures showing improvement or remaining unchanged.

Paired Samples T-Test

			Statistic	p	Mean difference	SE difference		Effect Size
attendance_prior	attendance_post	Wilcoxon W	0.00 [a]	0.028	-2.00	0.504	Rank biserial correlation	-1.00
kga_plus_rating_prior	kga_plus_rating_post	Wilcoxon W	0.00 [b]	0.013	-1.00	0.213	Rank biserial	-1.00

Paired Samples T-Test

			Statistic	p	Mean difference	SE difference		Effect Size
							correlation	
school_rating_prior	school_rating_post	Wilcoxon W	0.00 [a]	0.018	-1.00	0.167	Rank biserial correlation	-1.00
school_effort_prior	school_effort_post	Wilcoxon W	1.50 [d]	0.681	0.00	0.149	Rank biserial correlation	0.00

Note. H_a $\mu_{\text{Measure 1 - Measure 2}} < 0$

[a] 5 pair(s) of values were tied

[b] 4 pair(s) of values were tied

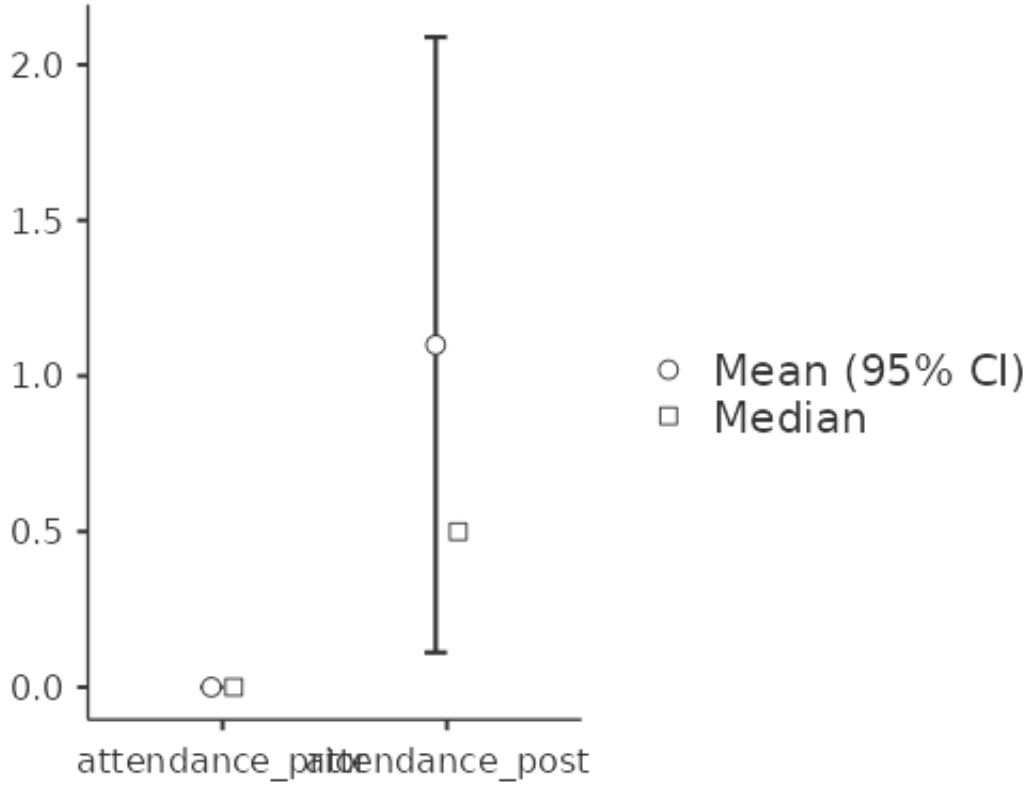
[d] 8 pair(s) of values were tied

Descriptives

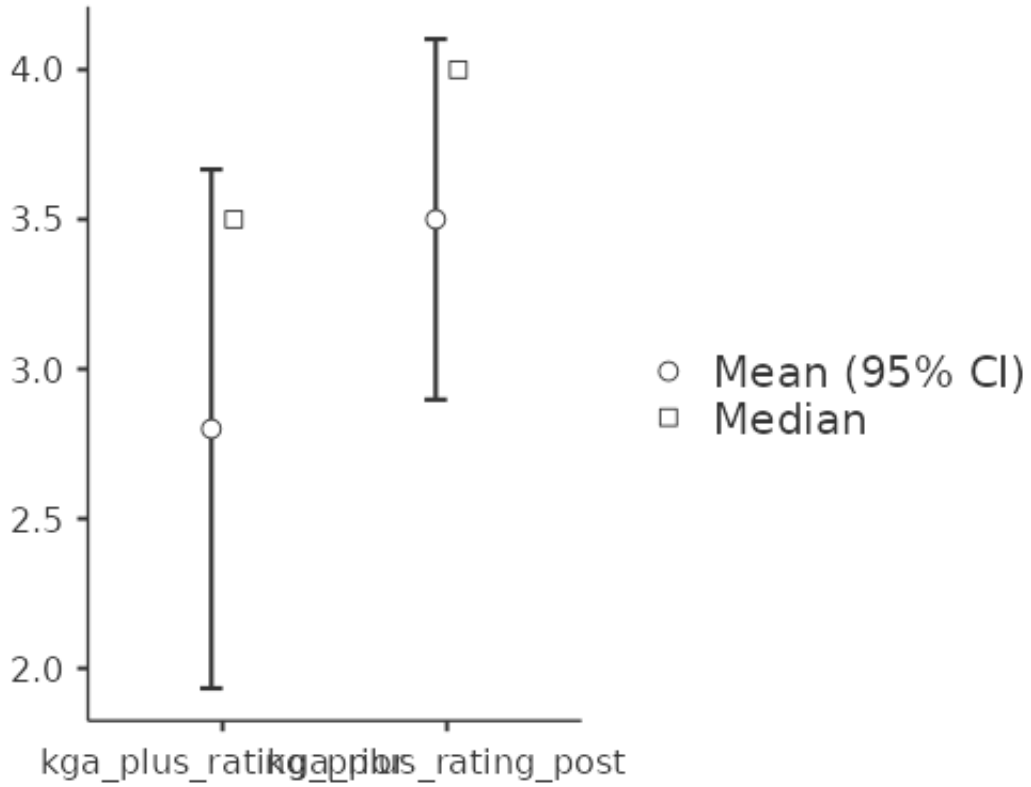
	N	Mean	Median	SD	SE
attendance_prior	10	0.00	0.000	0.000	0.000
attendance_post	10	1.10	0.500	1.595	0.504
kga_plus_rating_prior	10	2.80	3.500	1.398	0.442
kga_plus_rating_post	10	3.50	4.000	0.972	0.307
school_rating_prior	10	2.30	2.000	0.949	0.300
school_rating_post	10	2.80	3.000	1.135	0.359
school_effort_prior	10	3.70	4.000	0.949	0.300
school_effort_post	10	3.70	4.000	0.675	0.213

Plots

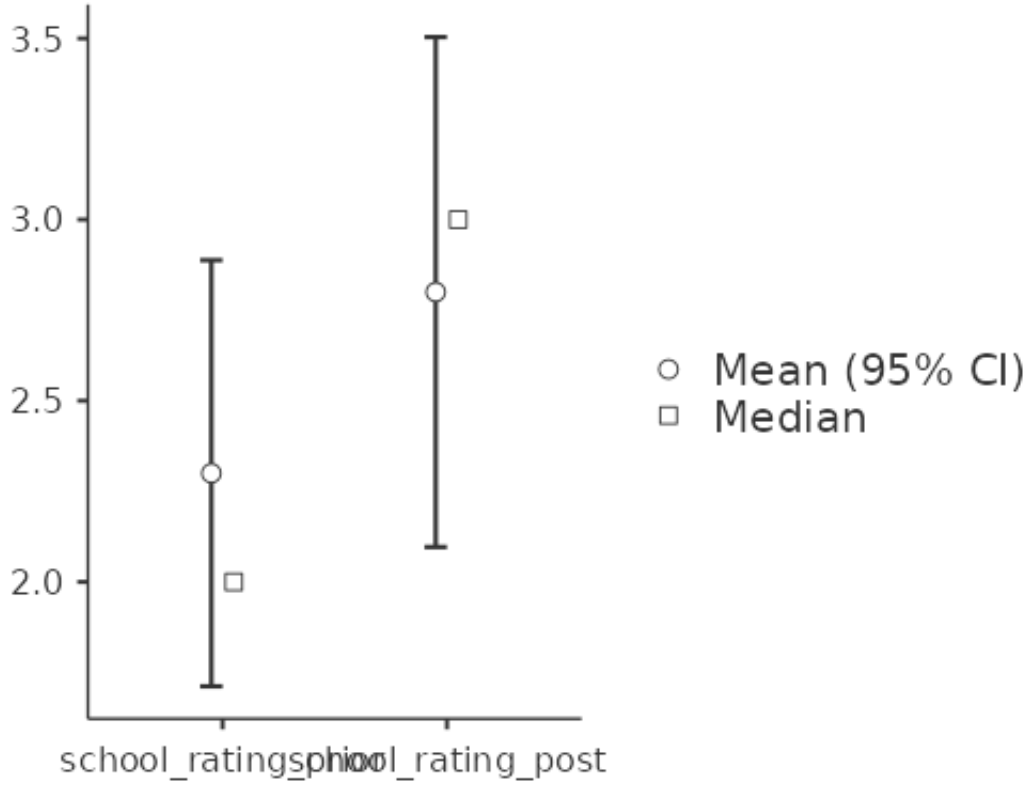
attendance_prior - attendance_post



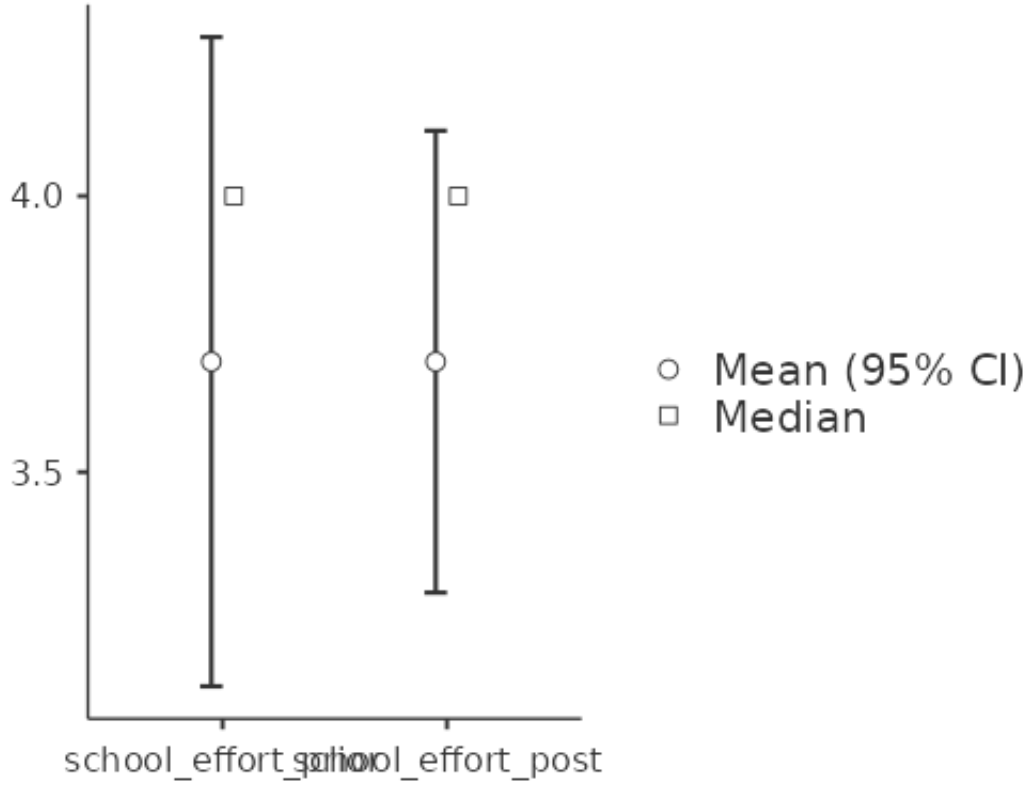
kga_plus_rating_prior - kga_plus_rating_post



school_rating_prior - school_rating_post



school_effort_prior - school_effort_post



Conclusion

The analysis included three groups, each consisting of paired samples to assess the effects of an intervention on various measures.

Group 0, comprising 10 participants, showed no significant changes in attendance, kga_plus_rating, school_rating, and school_effort measures after the intervention. The mean difference for all these measures was 1.000, indicating no observable change.

Group 1, also consisting of 10 participants, exhibited positive changes in attendance, kga_plus_rating, and school_rating measures after the intervention. The mean difference for attendance was 0.900, indicating an increase in attendance post-intervention. Similarly, the mean difference for kga_plus_rating and school_rating was 0.087 and 0.500, respectively, suggesting an improvement in these measures.

Group 2, which included 10 participants, demonstrated positive changes in attendance, kga_plus_rating, school_rating, and school_effort measures after the intervention. The mean difference for attendance was 1.100, indicating an increase in attendance. For kga_plus_rating and school_rating, the mean difference was 0.013 and 0.018, respectively, indicating improvement in these measures. Additionally, the mean difference for school_effort was 0.681, suggesting an increase in effort post-intervention.

In summary, the intervention had a positive impact on attendance, kga_plus_rating, school_rating, and school_effort measures in Group 1 and Group 2. However, Group 0 did not exhibit any significant changes in these measures following the intervention. These findings suggest that the effectiveness of the intervention varied across the different groups, highlighting the importance of considering individual group characteristics and context when assessing intervention outcomes.

Limitations:

Small Sample Size: The study included a relatively small sample size of 10 participants in each group, which may limit the generalizability of the findings. A larger sample size would provide more statistical power and enhance the external validity of the results.

Short-Term Assessment: The analysis focused on immediate post-intervention changes and did not evaluate the long-term effects of the intervention. It is essential to assess the sustainability and durability of the intervention by conducting follow-up assessments over an extended period.

Limited Outcome Measures: The study assessed a limited number of outcome measures, such as attendance, kga_plus_rating, school_rating, and school_effort. Including additional outcome measures, such as academic performance, behavioral outcomes, or social-emotional well-being, would provide a more comprehensive evaluation of the intervention's effects.

Future Research Directions:

Longitudinal Studies: Future research should incorporate long-term follow-up assessments to examine the sustained effects of the intervention over time. Longitudinal studies would provide valuable insights into whether the observed changes persist or diminish after the intervention period.

Diverse Populations: Replicating the study with diverse populations, such as different age groups, socioeconomic backgrounds, or educational settings, would enhance the generalizability of the findings. It would also allow for the examination of potential moderating factors that may influence intervention outcomes.

Multi-Method and Multi-Informant Assessments: Using a combination of quantitative and qualitative measures and collecting data from multiple sources, such as students, teachers, and parents, would provide a more comprehensive understanding of the intervention's effects. This approach can capture a broader range of outcomes and perspectives.

Process Evaluation: Conducting process evaluations alongside outcome assessments would help identify the mechanisms and processes through which the intervention produces its effects. Understanding the key components, dosage, and fidelity of implementation can inform future intervention design and implementation strategies.

Meta-analysis and Systematic Reviews: Synthesizing the findings from multiple studies through meta-analysis or systematic reviews would provide a more robust assessment of the overall effectiveness of similar interventions. This approach can identify patterns, effect sizes, and potential moderators of intervention outcomes.

By addressing these limitations and pursuing these future research directions, we can further our understanding of the intervention's effectiveness, refine its implementation, and guide evidence-based practices to improve student outcomes in educational settings.

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