GloBox Hypothesis Test for the Difference in Conversion Rates

Two-sample z-test with pooled proportion

Measures for Data Set

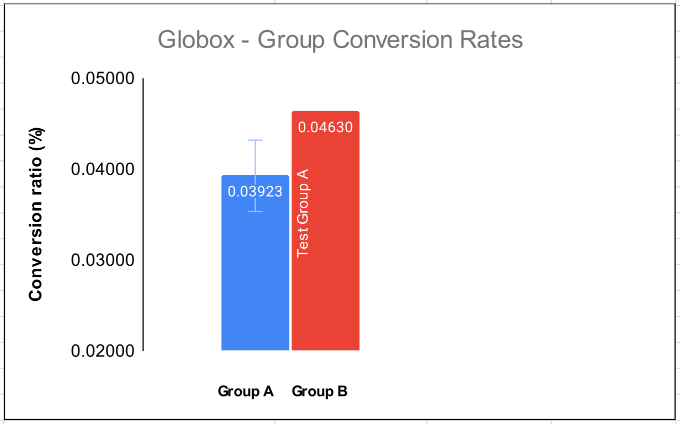
	Full Population	Test Group A	Test Group B
Sample Size	48943	24343	24600
Mean Sales	3.3827	3.3745	3.3910
Conversions	2095	955	1139
Conversion ratio	0.04280	0.03923	0.04630
Standard Deviation	25.6749	25.9364	25.4146

Hypothesis

Null:	There is no difference in the convertion rate between the control group and the treatment group
	H0:Conversion rate of control group=Conversion rate of treatment group
Alternative:	The treatment group has a higher sales convertion rate than the control group.
	H1: Conversion rate of control group < Conversion of treatment group
Conclusion:	With the p-value<0.05, we reject the null hypothesis that stated H0=H1 in favor of the alternate hypothesis which stated Ho<H1.

Calculations

Calculations	Notations	Value	Equation
Sample Size (control)	n1	24343	
Sample Size (Treatmentl)	n2	24600	
Sample Proportion(Control)	p1_hat	0.03923	p1_hat=Conversions/Sample Size
Sample porportion (treatment)	p2_hat	0.04630	
Pooled Proportions	p_hat	0.04280	
Standard Error	SE	0.00124	SE=SQRT(((.03923*(1-.03923)/24343)+((.04630*(1-.03630))
Test Statistic	T	-3.86351	T=(p1_hat-p2_hat)/ (SQRT(p_hat*(1-p_hat))*((1/n1)+(1/n2)))
p-value	p-val	0.00011	p_val=T.DIST.2T(3.86351, 24342)



GloBox Confidence Interval for the Difference in Conversion Rates

Two-sample z-interval with unpooled proportions

Measures for Data Set

	Full Populatioi	Test Group A	Test Group B
Sample Size	48943	24343	24600
Mean Sales	3.3827	3.3745	3.3910
Conversions	2095	955	1139
Conversion ratio	0.04280	0.03923	0.04630
Standard Deviation	25.6749	25.9364	25.4146

Calculation	Notation	Value	Equation
Sample size (control)	n1	24343	
Sample size (treatment)	n2	24600	
Sample proportion(control	p1_hat	0.03923	.=conversion/sample
Sample proportion treatment)	p2_hat	0.04630	
Sample statistic	stat	0.00707	.=p1_hat-p2_hat
Standard error	SE	0.00183	SQRT(((p1_hat*(1-p1_hat))/N1)+(p2_hat*(((1-p2_hat))/N2)))
Z-score	z	-3.86652	z=(p-hatA-p-hatB)/SE
Critical value	cv	-1.9816	.=Z(1-(a/2)
Margin of error	ME	-0.0036	ME=SE*Z
Lower bound		0.00345	.=stat=ME
Upper bound		0.01069	.=stat+ME

Conclution

In our two-sample z-interval proportion test, we aimed to determine if there is a significant difference in proportions between two independent groups. Analysis of the 95% confidence interval revealed a range from 0.00345 to 0.01069, which did not encompass zero, indicating a statistically significant distinction in proportions between the groups.

GloBox Hypothesis Test for the Difference in average amount spent

Two-sample T-interval with unpooled proportions

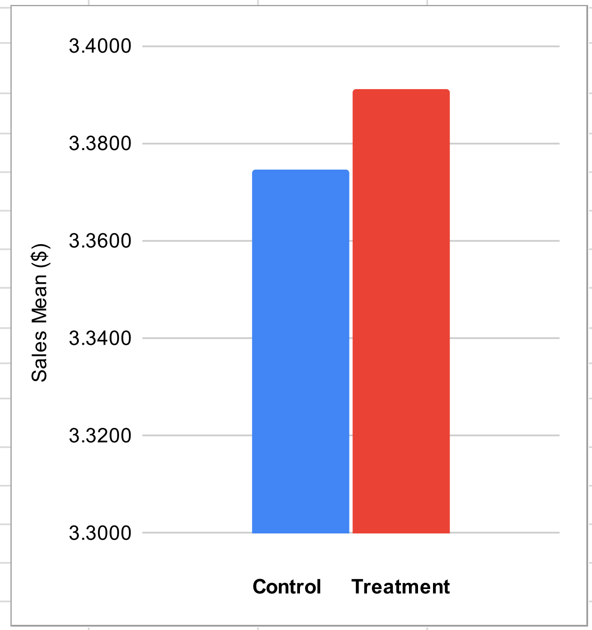
Hypothesis

NULL	H0: mu1_bar = mu2_bar
Alternate	H1: mu1_bar <mu2_bar

With an alpha thershold of 0,05 we are testing the null hypothesis where sample mean1 is equal to sample mean2 to decide to reject or fail to reject H0. If we reject the null hypothesis we will adopt the alternative hypothesis where the sample mean2 is greater than sample mean 1.

Measures for Data Set

	Full Populatioı	Test Group A	Test Group B
Sample Size	48943	24343	24600
Mean Sales	3.3827	3.3745	3.3910
Conversions	2095	955	1139
Conversion ratio	0.04280	0.03923	0.04630
Standard Deviation	25.6749	25.9364	25.4146



Calculation	Notation	Value	Equation
Sample size (control)	n1	24343	
Sample size (treatment)	n2	24600	
Sample mean (control	x1_bar	3.3745	
Sample mean (treatment)	x2_bar	3.3910	
Sample STD (control)	s1	25.9364	
Sample STD (treatment)	s2	25.4146	
Standard error	SE	0.2321	.= √(s1^2/n1 + s2^2/n2)
Test statistic	T	0.0711	.=(x1_bar-x2_bar)/SE
Degrees of freedom	df	24342	.=n1-1
p-value	pval	0.9433	.=T.TEST.2T(T, df)

Conclution

In our two-sample t-test with unpooled means, we investigated whether there is a statistically significant difference between the two groups. The test yielded a p-value of 0.9439, which is significantly higher than the alpha level of 0.05. As a result, we fail to reject the null hypothesis, suggesting that there is insufficient evidence to conclude that the means of the two groups are different. Therefore, we can reasonably assume that the two samples are not significantly distinct in their means.

GloBox Confidence Interval for the Difference in Avg. Amount Spent

Two-sample T-interval with unpooled proportions

Measures for Data Set

	Full Population	Test Group A	Test Group B
Sample Size	48943	24343	24600
Mean Sales	3.3827	3.3745	3.3910
Conversions	2095	955	1139
Conversion ratio	0.04280	0.03923	0.04630
Standard Deviation	25.6749	25.9364	25.4146

Calculation	Notation	Value	Equation
Sample size (control)	n1	24343	
Sample Size (treatment)	n2	24600	
Sample Mean(control	x1_bar	3.3745	
Sample Mean (treatmen	x2_bar	3.3910	
Sample std dev (control)	s1	25.9364	
Sample std dev (treatme	s2	25.4146	
Sample statistic	stat	0.0165	.=x1_bar-x2_bar
Standard Error	SE	0.2321	.= √(s1^2/n1 + s2^2/n2)
Degrees of Freedom	df	24342	n1-1
Critical Value	T	1.9601	.=T.INV(probability, df)
Margin of Error	ME	0.4550	.=T*SE
lower bound		-0.4385	.=stat-ME
upper bound		0.4715	.=stat+SE

Conclusion

We conducted a two-sample t-test to assess potential differences between two groups. The resulting confidence interval ranged from -0.4386 to 0.4715. This interval reflects the likely range of the true difference in means between the two groups. As it includes both positive and negative values around zero, it suggests that we cannot assert a statistically significant difference between the groups at the chosen confidence level. Our analysis indicates that, with the available data and confidence level, the means of the two groups are consistent with being equal, highlighting the importance of reliable data and careful interpretation.