

Critique #2:

EDUC 8120

George Washington University

Were Vincent

The dataset you (and your fictitious peers) will be working with is located here ([Merged Round 8 data \(34 countries\) \(2022\) – Afrobarometer](#))

After reading through each of the three scenarios below, **for each scenario** you will do the following:

- 1) Examine the Afrobarometer dataset and determine if you believe (or do not believe) the suggested ANOVA investigation can be performed to inform the study
- 2) If you agree that the suggested ANOVA investigation can be performed, write a 2-3 paragraph brief persuasive essay explaining why the method is appropriate. Using a table, list ONE SET of possible variables, the variable levels of measurement, factor levels, independent/dependent, and descriptions that could be used to inform the study using the suggested ANOVA technique. Run the analysis including **descriptive statistics, assumption checking, minimum sample size, group comparison, post hoc, effect size, and power** (use subheading titles) generated evidences and interpretation of results.
- 3) If you disagree that the suggested ANOVA investigation can be performed, write a 2-3 paragraph brief persuasive essay explaining why the method is not appropriate. Next, suggest an ANOVA investigation method which would be appropriate. Using a table, list ONE SET of possible variables, the variable levels of measurement, factor levels, independent/dependent, and descriptions that could be used to inform the study using your alternate suggested ANOVA technique. Run the analysis including **descriptive statistics, assumption checking, minimum sample size, group comparison, post hoc, effect size, and power** (use subheading titles) generated evidences and interpretation of results.

Scenarios

A. James is a graduate student interested learning more about African society. More specifically, he is interesting in investigating if political views differ among Africans in different age groups. He decides to use the Afrobarometer dataset as a secondary source for his investigation. He believes that he can perform a one-way ANOVA analysis to help inform his study.

Table 1

Variable Information

Variable Type	Variable Labels	Levels of Measurement
Dependent Variable	Discuss Politics	Ordinal Variable

Independent Variable	Age_V5	Scale Variable
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Table 2

Descriptive Statistics

Descriptive Statistics							
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Q9. Discuss politics	40801	9	0	9	.86	.865	.749
Age_cond.v5 youth 18-30 / 31-45 / 46-60 / over 60	40801	8	1	9	1.90	.975	.950
Valid N (listwise)	40801						

Statistics			
		Q1. Age	Q10b. Freedom to join any political organization
N	Valid	40801	40801
	Missing	0	0
Mean		37.02	6.07
Median		33.00	4.00
Mode		25	4
Std. Deviation		19.662	15.357
Variance		386.582	235.823
Range		981	93

Table 3

Assumption Checking

ANOVA Effect Sizes ^a				
		Point Estimate	95% Confidence Interval	
			Lower	Upper
Age_cond.v5 youth 18-30 / 31-45 / 46-60 / over 60	Eta-squared	.001	.001	.002
	Epsilon-squared	.001	.000	.002
	Omega-squared Fixed-effect	.001	.000	.002
	Omega-squared Random-effect	.000	.000	.000

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.

Leven's Test

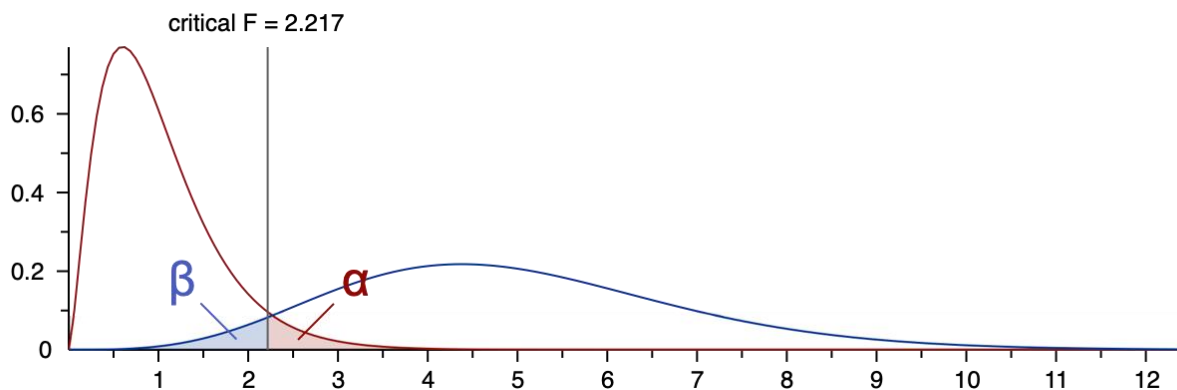
Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Q10c. Freedom to choose who to vote for	Based on Mean	4.597	83	40714	<.001
	Based on Median	2.721	83	40714	<.001
	Based on Median and with adjusted df	2.721	83	39530.193	<.001
	Based on trimmed mean	5.211	83	40714	<.001

To test for normality I used the Histogram and *Shapiro-Wilk test to check if the data distribution is normal*. If you plan to do group comparisons, the variances of the groups should be equal. Use to check this To test the homogeneity of variances I used the Leven's test. I ensured that the data points are independent of each other.

Minimum Sample Size

Determine based on desired power (typically 0.8) and significance level (typically 0.05).



Output parameters

Noncentrality parameter λ	19.8528000
Critical F	2.2169873
Numerator df	5
Denominator df	3096
Total sample size	3102
Actual power	0.9504029

Sample Size is 3102.

We run the Tukey test because the assumptions have been met, and there is a significant mean difference (reject the null) to see which variable means within test are significantly different

Group Comparison/Post Hoc

Since the ANOVA is significant using the Tukey multiple comparison test reveals there is a sig value of 0.792, This means there is a Significant difference between the categories in the dependent variable. The groups that are specifically different are ages 18-30 in comparison to ages over 60. See Table below.

Multiple Comparisons							
Dependent Variable: Q9. Discuss politics							
	(I) Age_cond.v5 youth 18-30 / 31-45 / 46-60 / over 60	(J) Age_cond.v5 youth 18-30 / 31-45 / 46-60 / over 60	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
Tukey HSD	18-30	31-45	-.049*	.010	<.001	-.08	-.02
		46-60	-.058*	.012	<.001	-.09	-.02
		Over 60	-.018	.016	.792	-.06	.03
		Don't know/Refused	-.025	.324	1.000	-.91	.86
	31-45	18-30	.049*	.010	<.001	.02	.08
		46-60	-.008	.013	.966	-.04	.03
		Over 60	.031	.017	.328	-.01	.08
		Don't know/Refused	.024	.324	1.000	-.86	.91
	46-60	18-30	.058*	.012	<.001	.02	.09
		31-45	.008	.013	.966	-.03	.04
		Over 60	.040	.018	.175	-.01	.09
		Don't know/Refused	.033	.324	1.000	-.85	.92
	Over 60	18-30	.018	.016	.792	-.03	.06
		31-45	-.031	.017	.328	-.08	.01
		46-60	-.040	.018	.175	-.09	.01
		Don't know/Refused	-.007	.324	1.000	-.89	.88
	Don't know/Refused	18-30	.025	.324	1.000	-.86	.91
		31-45	-.024	.324	1.000	-.91	.86
		46-60	-.033	.324	1.000	-.92	.85
		Over 60	.007	.324	1.000	-.88	.89
Games-Howell	18-30	31-45	-.049*	.010	<.001	-.08	-.02
		46-60	-.058*	.012	<.001	-.09	-.02
		Over 60	-.018	.017	.822	-.06	.03
		Don't know/Refused	-.025	.327	1.000	-1.24	1.19
	31-45	18-30	.049*	.010	<.001	.02	.08
		46-60	-.008	.013	.964	-.04	.03
		Over 60	.031	.017	.369	-.02	.08
		Don't know/Refused	.024	.327	1.000	-1.19	1.24
	46-60	18-30	.058*	.012	<.001	.02	.09
		31-45	.008	.013	.964	-.03	.04
		Over 60	.040	.019	.211	-.01	.09
		Don't know/Refused	.033	.327	1.000	-1.19	1.25
	Over 60	18-30	.018	.017	.822	-.03	.06
		31-45	-.031	.017	.369	-.08	.02
		46-60	-.040	.019	.211	-.09	.01
		Don't know/Refused	-.007	.328	1.000	-1.22	1.21
	Don't know/Refused	18-30	.025	.327	1.000	-1.19	1.24
		31-45	-.024	.327	1.000	-1.24	1.19
		46-60	-.033	.327	1.000	-1.25	1.19
		Over 60	.007	.328	1.000	-1.21	1.22

*. The mean difference is significant at the 0.05 level.

Effect Size - 0.08

Calculate appropriate effect size

Power - 0

Ensure you have adequate power (preferably above 0.8) based on effect size, sample size, and alpha level

1. Based on your effect size, sample size, and alpha level (usually 0.05), calculate the statistical power. This indicates the likelihood that if there is a true effect, you will detect it. Aim for power values of 0.8 or higher.

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Interpretation

James' plan to use a one-way ANOVA analysis is suitable for comparing means among different age groups. However, he should ensure that the assumptions of ANOVA are met and consider additional analyses or post-hoc tests if necessary, depending on the nature of the dependent variable's measurement. The groups that are significantly different are the groups that are above the age of 30. Political views (A-political and political vary in ages)

B. Joyce is a graduate student member of an international education services support team. Ever since the height of the COVID-19 lockdown crisis starting in 2020, they have been assigned to offer equity support services to families with children enrolled in African schools. Joyce and her team suspect that differences in poverty levels are detectable given implemented COVID-19 related considerations and race. To help inform their study, Joyce's team believes will use the Afrobarometer dataset and believe that a within-subject ANOVA can help inform the study.

Descriptive Statistics:

- Independent Variable: Race (Nominal) Q102 & COVID-19
- Dependent Variable: Poverty Levels - lived Poverty Index (Scale) - Line 403

Table 1

Variable Information

Variable Type	Variable Labels	Levels of Measurement
Dependent Variable	Poverty Index	Scale Variable
Independent Variable	Race	Nominal Variable

Table 2

Descriptives Table

Descriptives			
		Statistic	Std. Error
Lived Poverty Index (average index of 5 poverty items)	Mean	1.3375	.00429
	95% Confidence Interval for Mean	Lower Bound	1.3291
		Upper Bound	1.3459
	5% Trimmed Mean	1.3003	
	Median	1.2000	
	Variance	.876	
	Std. Deviation	.93577	
	Minimum	.00	
	Maximum	4.00	
	Range	4.00	
	Interquartile Range	1.40	
	Skewness	.399	.011
	Kurtosis	-.574	.022

Research Question: Is poverty level associated with race?

Null: There is no difference in mean poverty scores between race groups

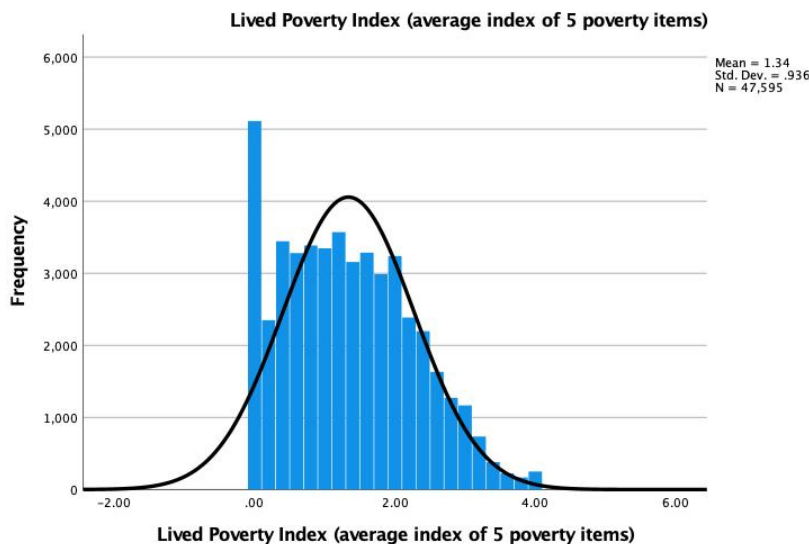
Alternative: There is a significant mean difference between the two variables.

Table 2
Tests of Normality

Tests of Normality			
	Kolmogorov-Smirnov ^a		
	Statistic	df	Sig.
Lived Poverty Index (average index of 5 poverty items)	.086	47595	.000

a. Lilliefors Significance Correction

Figure 1
Histogram



What is the Homogeneity of Variances: If there are repeated measures (within-subjects), you need to check for assumption. Mauchly's test can be used to assess sphericity assumption.

What is the Minimum Sample Size:

What is the sample size

Is there a need for Post Hoc?

What is the Effect size? Use G*Power

What is the Power Used? Why?

Interpret: write a 2-3 paragraph brief persuasive essay explaining why the method is appropriate (If you agree that the suggested ANOVA investigation can be performed)

C. Kai is a political science graduate student interested in democracy and African governments. Recently he has wondered about the existence of relationships between how views related to the characteristics of presidential candidates and democracy considerations. He recently discovered the Afrobarometer dataset. In his graduate statistics course he learned about the factorial ANOVA analysis technique and believes he can use it to inform his study.

Variable:

Presidential Candidates

Democracy Consideration