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ANALYSIS OF VARIANCE AND MULTIPLE COMPARISONS ON INTELLIGENCE AND ACADEMIC PERFORMANCE IN VARIOUS DISCIPLINES OF STUDIES

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ABSTRACT

Multiple Comparison Procedures is use to investigate homogeneity and discrepancies between Intelligence and academic performance among different students Particularly of African and Asian origins from sharda university india where they study and live nearly on the same academic and environmental conditions. The level of intelligence of students is compared and the influence of academic performance and nationality is studied on the academic performance in which we intend to use it quantitatively into the arena of our study. We use primary source of data for analysis and enough data for a comprehensive study is obtained for our final inference using analysis of variance at 5% levels of significance, and Multiple Comparison Procedures

Key Words: ANOVA And Multiple Comparison Procedures,

I INTRODUCTION

Analysis of variance (ANOVA) is a technique for analyzing experimental data in which a multiple responses are measured and analyzed under various conditions which are identified from different variables, In an analysis of variance the variation in the response is separated into variation attributable to differences between the classification variables and variation attributable to random error, analysis of variance constructs tests to determine the significance of the classification effects, on the other hand would not only be able to assess both time and treatment in the same test, but also whether there is an interaction between the parameters. Hwang, Y. S., Echols, C., & Vrongistinos, K. (2002). A two-way test generates three p-values, one for each parameter independently, and one measuring the interaction between the two parameters (Drago, 2004). A typical goal in the analysis of variance is to compare means obtained from sample observations or variables all from same population. Analysis of variance is a powerful statistical tool for test of significance on two or more sample means in which one-way classification ANOVA or two-way classification ANOVA. are uses to determine the homogeneity or any discrepancy between

means obtained base on a particular level of the significance, One-way Classification analysis of variance tests allow to determining if one given factor, such as drug or treatment has a significant effect on a type of disease behavior across any of the groups population under study or tests to measure significant effects of one factor only, Goleman, 1996.

II RESEARCH METHODOLOGY

In this research we are going to use a statistical tool multiple comparison procedures to observed and analyze the intelligence of students with respects to their academic performance distribution from different countries of origins from the data collected in the research work from international division and Extermination cell of Sharda University of in which about 850 international students from twelve countries for both males and females are obtained and analyzed which effectively uses the following multiple comparison procedures and tools for the research work .

- One-way classification of ANOVA.
- Two way classification of ANOVA.
- Grouping Information Using the Tukey Method.
- Tukey Simultaneous Tests for Differences of Means .
- Grouping Information Using the Fisher LSD Method.
- Fisher Individual Tests for Differences of Means.
- Grouping Information Using the Dunnett Method.
- Dunnett Simultaneous Tests for Level Mean - Control Mean.
- Hsu Simultaneous Tests for Level Mean - Largest of Other Level Means,
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2.1 Source of Data

A primary source of data is used throughout the research work which was collected from Examination cell and International Division of Sharda University India, the real CGPA of many students from different countries of origin is obtained and categorized in to columns, and each column on the table of our data represents the CGPA of students from a particular country.

2.2 Analysis of the Data

In the first instance we used one-way analysis of variance to analyzed the data which we used many method of compares to confirmed our final ANOVA results

III HYPOTHESIS TESTING AND RESULTS

Null hypothesis	H_0: All means are equal
Alternative hypothesis	H_1: At least one mean is different

Equal variances were assumed for the analysis.

Factor Information

Factor	Levels	Values
Factor	12	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	11	39.07	3.55155	1.43	0.1534
Error	842	2089.31	2.48136		
Total	853	2128.38			

❖ **Model Summary**

S	R-sq	R-sq(adj)	R-sq(pred)
1.57523	1.84%	0.55%	0.00%

❖ **Analysis of Means**

Factor	N	Mean	StDev	95% CI
C1	99	6.4752	1.5379	(6.1644, 6.7859)
C2	94	6.2040	1.6459	(5.8851, 6.5229)
C3	91	6.8763	1.3917	(6.5522, 7.2004)
C4	96	6.3628	1.6958	(6.0472, 6.6783)
C5	76	6.6877	1.5523	(6.3331, 7.0424)
C6	44	6.4088	1.5724	(5.9427, 6.8749)
C7	48	6.6019	1.6952	(6.1556, 7.0482)
C8	36	6.4112	1.3758	(5.8959, 6.9265)
C9	44	7.0122	1.7530	(6.5461, 7.4783)
C10	93	6.3973	1.6456	(6.0767, 6.7179)
C11	68	6.5119	1.6102	(6.1370, 6.8869)

C12	65	6.4903	1.3391	(6.1068, 6.8738)

Pooled StDev = 1.57523

❖ **Grouping Information Using the Tukey Method and 95% Confidence**

Factor	N	Mean	Grouping
C9	44	7.0122	A
C3	91	6.8763	A
C5	76	6.6877	A
C7	48	6.6019	A
C11	68	6.5119	A
C12	65	6.4903	A
C1	99	6.4752	A
C8	36	6.4112	A
C6	44	6.4088	A
C10	93	6.3973	A
C4	96	6.3628	A
C2	94	6.2040	A

REMARKS: Means that do not share a letter are significantly different.

❖ **Tukey Simultaneous Tests for Differences of Means**

Diff. of Levels	Diff. of Means	SE of Diff.	95% CI	T-Value	Adjusted P-Value
C2-C1	-0.2712	0.2269	(-1.0123, 0.4699)	-1.20	0.9894
C3-C1	0.4012	0.2288	(-0.3462, 1.1485)	1.75	0.8429
C4-C1	-0.1124	0.2256	(-0.8495, 0.6247)	-0.50	1.0000
C5-C1	0.2126	0.2402	(-0.5722, 0.9974)	0.88	0.9993
C6-C1	-0.0664	0.2854	(-0.9988, 0.8660)	-0.23	1.0000
C7-C1	0.1268	0.2771	(-0.7783, 1.0318)	0.46	1.0000
C8-C1	-0.0640	0.3066	(-1.0655, 0.9375)	-0.21	1.0000
C9-C1	0.5371	0.2854	(-0.3953, 1.4695)	1.88	0.7709

C10-C1	-0.0779	0.2275	(-0.8210, 0.6652)	-0.34	1.0000
C11-C1	0.0368	0.2481	(-0.7738, 0.8473)	0.15	1.0000
C12-C1	0.0152	0.2515	(-0.8064, 0.8367)	0.06	1.0000
C3-C2	0.6723	0.2317	(-0.0844, 1.4291)	2.90	0.1399
C4-C2	0.1588	0.2286	(-0.5879, 0.9055)	0.69	0.9999
C5-C2	0.4837	0.2430	(-0.3101, 1.2776)	1.99	0.7000
C6-C2	0.2048	0.2877	(-0.7352, 1.1448)	0.71	0.9999
C7-C2	0.3979	0.2795	(-0.5150, 1.3108)	1.42	0.9591
C8-C2	0.2072	0.3087	(-0.8014, 1.2158)	0.67	1.0000
C9-C2	0.8082	0.2877	(-0.1317, 1.7482)	2.81	0.1760
C10-C2	0.1933	0.2304	(-0.5594, 0.9459)	0.84	0.9996
C11-C2	0.3079	0.2508	(-0.5113, 1.1272)	1.23	0.9869
C12-C2	0.2863	0.2541	(-0.5438, 1.1165)	1.13	0.9936
C4-C3	-0.5136	0.2305	(-1.2665, 0.2393)	-2.23	0.5287
C5-C3	-0.1886	0.2448	(-0.9882, 0.6111)	-0.77	0.9998
C6-C3	-0.4676	0.2892	(-1.4125, 0.4774)	-1.62	0.9035
C7-C3	-0.2744	0.2810	(-1.1924, 0.6436)	-0.98	0.9982
C8-C3	-0.4652	0.3102	(-1.4784, 0.5481)	-1.50	0.9411
C9-C3	0.1359	0.2892	(-0.8090, 1.0808)	0.47	1.0000
C10-C3	-0.4791	0.2323	(-1.2378, 0.2797)	-2.06	0.6498
C11-C3	-0.3644	0.2525	(-1.1893, 0.4605)	-1.44	0.9550
C12-C3	-0.3860	0.2558	(-1.2217, 0.4497)	-1.51	0.9386
C5-C4	0.3250	0.2419	(-0.4651, 1.1151)	1.34	0.9734
C6-C4	0.0460	0.2868	(-0.8908, 0.9829)	0.16	1.0000
C7-C4	0.2392	0.2785	(-0.6705, 1.1489)	0.86	0.9994
C8-C4	0.0484	0.3079	(-0.9573, 1.0541)	0.16	1.0000
C9-C4	0.6495	0.2868	(-0.2874, 1.5863)	2.26	0.5021
C10-C4	0.0345	0.2292	(-0.7142, 0.7833)	0.15	1.0000
C11-C4	0.1492	0.2497	(-0.6665, 0.9648)	0.60	1.0000
C12-C4	0.1276	0.2530	(-0.6990, 0.9542)	0.50	1.0000
C6-C5	-0.2790	0.2984	(-1.2538, 0.6959)	-0.93	0.9988
C7-C5	-0.0858	0.2904	(-1.0346, 0.8629)	-0.30	1.0000
C8-C5	-0.2766	0.3187	(-1.3177, 0.7646)	-0.87	0.9994

C9-C5	0.3245	0.2984	(-0.6503, 1.2993)	1.09	0.9952
C10-C5	-0.2905	0.2436	(-1.0862, 0.5053)	-1.19	0.9896
C11-C5	-0.1758	0.2629	(-1.0348, 0.6832)	-0.67	1.0000
C12-C5	-0.1974	0.2661	(-1.0668, 0.6720)	-0.74	0.9999
C7-C6	0.1931	0.3288	(-0.8809, 1.2672)	0.59	1.0000
C8-C6	0.0024	0.3540	(-1.1541, 1.1589)	0.01	1.0000
C9-C6	0.6035	0.3358	(-0.4937, 1.7006)	1.80	0.8202
C10-C6	-0.0115	0.2882	(-0.9531, 0.9301)	-0.04	1.0000
C11-C6	0.1031	0.3048	(-0.8925, 1.0988)	0.34	1.0000
C12-C6	0.0816	0.3075	(-0.9231, 1.0862)	0.27	1.0000
C8-C7	-0.1908	0.3473	(-1.3253, 0.9438)	-0.55	1.0000
C9-C7	0.4103	0.3288	(-0.6637, 1.4843)	1.25	0.9850
C10-C7	-0.2046	0.2800	(-1.1192, 0.7099)	-0.73	0.9999
C11-C7	-0.0900	0.2970	(-1.0601, 0.8801)	-0.30	1.0000
C12-C7	-0.1116	0.2998	(-1.0909, 0.8677)	-0.37	1.0000
C9-C8	0.6011	0.3540	(-0.5554, 1.7575)	1.70	0.8697
C10-C8	-0.0139	0.3092	(-1.0240, 0.9962)	-0.04	1.0000
C11-C8	0.1007	0.3247	(-0.9599, 1.1614)	0.31	1.0000
C12-C8	0.0792	0.3273	(-0.9900, 1.1483)	0.24	1.0000
C10-C9	-0.6150	0.2882	(-1.5566, 0.3266)	-2.13	0.5984
C11-C9	-0.5003	0.3048	(-1.4960, 0.4953)	-1.64	0.8937
C12-C9	-0.5219	0.3075	(-1.5265, 0.4827)	-1.70	0.8700
C11-C10	0.1146	0.2513	(-0.7064, 0.9357)	0.46	1.0000
C12-C10	0.0931	0.2547	(-0.7389, 0.9250)	0.37	1.0000
C12-C11	-0.0216	0.2732	(-0.9143, 0.8711)	-0.08	1.0000

Individual confidence level = 99.89%

Grouping Information Using the Fisher LSD Method and 95% Confidence

Factor	N	Mean	Grouping
C9	44	7.0122	A

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C3	91	6.8763	A		
C5	76	6.6877	A	B	
C7	48	6.6019	A	B	C
C11	68	6.5119	A	B	C
C12	65	6.4903	A	B	C
C1	99	6.4752	A	B	C
C8	36	6.4112	A	B	C
C6	44	6.4088	A	B	C
C10	93	6.3973		B	C
C4	96	6.3628		B	C
C2	94	6.2040			C

REMARKS: Means that do not share a letter are significantly different.

❖ **Grouping Information Using the Dunnett Method and 95% Confidence**

Factor	N	Mean	Grouping
C1 (control)	99	6.4752	A
C9	44	7.0122	A
C3	91	6.8763	A
C5	76	6.6877	A
C7	48	6.6019	A
C11	68	6.5119	A
C12	65	6.4903	A
C8	36	6.4112	A
C6	44	6.4088	A
C10	93	6.3973	A
C4	96	6.3628	A
C2	94	6.2040	A

Remark:-Means not labeled with the letter A are significantly different from the control level mean.

❖ **Dunnett Simultaneous Tests for Level Mean - Control Mean**

Diff. of Levels	Diff. of Means	SE of Diff.	95% CI	T-Value	Adjusted P-Value
C2-C1	-0.2712	0.2269	(-0.9013, 0.3590)	-1.20	0.8847
C3-C1	0.4012	0.2288	(-0.2343, 1.0366)	1.75	0.4848
C4-C1	-0.1124	0.2256	(-0.7392, 0.5144)	-0.50	0.9999
C5-C1	0.2126	0.2402	(-0.4548, 0.8799)	0.88	0.9831
C6-C1	-0.0664	0.2854	(-0.8592, 0.7264)	-0.23	1.0000
C7-C1	0.1268	0.2771	(-0.6429, 0.8964)	0.46	0.9999
C8-C1	-0.0640	0.3066	(-0.9156, 0.7876)	-0.21	1.0000
C9-C1	0.5371	0.2854	(-0.2558, 1.3299)	1.88	0.3930
C10-C1	-0.0779	0.2275	(-0.7098, 0.5540)	-0.34	1.0000
C11-C1	0.0368	0.2481	(-0.6524, 0.7259)	0.15	1.0000
C12-C1	0.0152	0.2515	(-0.6834, 0.7137)	0.06	1.0000

Individual confidence level = 99.44%

❖ **Fisher Individual Tests for Differences of Means**

Diff. of Levels	Diff. of Means	SE of Diff.	95% CI	T-Value	Adtd P-Value
C2-C1	-0.2712	0.2269	(-0.7164, 0.1741)	-1.20	0.2323
C3-C1	0.4012	0.2288	(-0.0478, 0.8502)	1.75	0.0799
C4-C1	-0.1124	0.2256	(-0.5553, 0.3305)	-0.50	0.6185
C5-C1	0.2126	0.2402	(-0.2590, 0.6841)	0.88	0.3765
C6-C1	-0.0664	0.2854	(-0.6266, 0.4938)	-0.23	0.8161
C7-C1	0.1268	0.2771	(-0.4170, 0.6706)	0.46	0.6474
C8-C1	-0.0640	0.3066	(-0.6657, 0.5378)	-0.21	0.8347
C9-C1	0.5371	0.2854	(-0.0231, 1.0973)	1.88	0.0602
C10-C1	-0.0779	0.2275	(-0.5244, 0.3686)	-0.34	0.7321
C11-C1	0.0368	0.2481	(-0.4502, 0.5237)	0.15	0.8823
C12-C1	0.0152	0.2515	(-0.4784, 0.5088)	0.06	0.9519
C3-C2	0.6723	0.2317	(0.2176, 1.1270)	2.90	0.0038
C4-C2	0.1588	0.2286	(-0.2899, 0.6074)	0.69	0.4875
C5-C2	0.4837	0.2430	(0.0068, 0.9607)	1.99	0.0468
C6-C2	0.2048	0.2877	(-0.3600, 0.7695)	0.71	0.4768

C7-C2	0.3979	0.2795	(-0.1506, 0.9464)	1.42	0.1548
C8-C2	0.2072	0.3087	(-0.3988, 0.8132)	0.67	0.5024
C9-C2	0.8082	0.2877	(0.2435, 1.3730)	2.81	0.0051
C10-C2	0.1933	0.2304	(-0.2589, 0.6455)	0.84	0.4017
C11-C2	0.3079	0.2508	(-0.1843, 0.8001)	1.23	0.2198
C12-C2	0.2863	0.2541	(-0.2124, 0.7851)	1.13	0.2601
C4-C3	-0.5136	0.2305	(-0.9659, -0.0612)	-2.23	0.0261
C5-C3	-0.1886	0.2448	(-0.6690, 0.2919)	-0.77	0.4412
C6-C3	-0.4676	0.2892	(-1.0353, 0.1002)	-1.62	0.1064
C7-C3	-0.2744	0.2810	(-0.8260, 0.2771)	-0.98	0.3291
C8-C3	-0.4652	0.3102	(-1.0739, 0.1436)	-1.50	0.1340
C9-C3	0.1359	0.2892	(-0.4318, 0.7036)	0.47	0.6386
C10-C3	-0.4791	0.2323	(-0.9350, -0.0232)	-2.06	0.0395
C11-C3	-0.3644	0.2525	(-0.8600, 0.1312)	-1.44	0.1493
C12-C3	-0.3860	0.2558	(-0.8881, 0.1161)	-1.51	0.1317
C5-C4	0.3250	0.2419	(-0.1497, 0.7997)	1.34	0.1794
C6-C4	0.0460	0.2868	(-0.5169, 0.6089)	0.16	0.8725
C7-C4	0.2392	0.2785	(-0.3074, 0.7857)	0.86	0.3907
C8-C4	0.0484	0.3079	(-0.5558, 0.6527)	0.16	0.8751
C9-C4	0.6495	0.2868	(0.0866, 1.2124)	2.26	0.0238
C11-C4	0.1492	0.2497	(-0.3409, 0.6392)	0.60	0.5504
C12-C4	0.1276	0.2530	(-0.3691, 0.6242)	0.50	0.6143
C6-C5	-0.2790	0.2984	(-0.8647, 0.3067)	-0.93	0.3501
C10-C4	0.0345	0.2292	(-0.4153, 0.4844)	0.15	0.8803
C7-C5	-0.0858	0.2904	(-0.6559, 0.4842)	-0.30	0.7677
C8-C5	-0.2766	0.3187	(-0.9021, 0.3490)	-0.87	0.3858
C9-C5	0.3245	0.2984	(-0.2612, 0.9102)	1.09	0.2772
C10-C5	-0.2905	0.2436	(-0.7686, 0.1876)	-1.19	0.2334
C11-C5	-0.1758	0.2629	(-0.6919, 0.3403)	-0.67	0.5039
C12-C5	-0.1974	0.2661	(-0.7198, 0.3249)	-0.74	0.4584
C7-C6	0.1931	0.3288	(-0.4522, 0.8384)	0.59	0.5570
C8-C6	0.0024	0.3540	(-0.6924, 0.6972)	0.01	0.9946
C9-C6	0.6035	0.3358	(-0.0557, 1.2626)	1.80	0.0727

C10-C6	-0.0115	0.2882	(-0.5772, 0.5542)	-0.04	0.9682
C11-C6	0.1031	0.3048	(-0.4951, 0.7013)	0.34	0.7351
C12-C6	0.0816	0.3075	(-0.5220, 0.6851)	0.27	0.7909
C8-C7	-0.1908	0.3473	(-0.8724, 0.4909)	-0.55	0.5830
C9-C7	0.4103	0.3288	(-0.2350, 1.0556)	1.25	0.2124
C10-C7	-0.2046	0.2800	(-0.7541, 0.3448)	-0.73	0.4650
C11-C7	-0.0900	0.2970	(-0.6729, 0.4929)	-0.30	0.7619
C12-C7	-0.1116	0.2998	(-0.7000, 0.4768)	-0.37	0.7098
C9-C8	0.6011	0.3540	(-0.0938, 1.2959)	1.70	0.0899
C10-C8	-0.0139	0.3092	(-0.6208, 0.5930)	-0.04	0.9642
C11-C8	0.1007	0.3247	(-0.5365, 0.7380)	0.31	0.7564
C12-C8	0.0792	0.3273	(-0.5632, 0.7215)	0.24	0.8089
C10-C9	-0.6150	0.2882	(-1.1807, -0.0492)	-2.13	0.0332
C11-C9	-0.5003	0.3048	(-1.0985, 0.0979)	-1.64	0.1010
C12-C9	-0.5219	0.3075	(-1.1255, 0.0817)	-1.70	0.0900
C11-C10	0.1146	0.2513	(-0.3787, 0.6080)	0.46	0.6484
C12-C10	0.0931	0.2547	(-0.4068, 0.5929)	0.37	0.7149
C12-C11	-0.0216	0.2732	(-0.5579, 0.5147)	-0.08	0.9370

Simultaneou confidence level = 28.11%

Factor	N	Mean	Grouping
C1 (control)	99	6.4752	A
C9	44	7.0122	A
C3	91	6.8763	A
C5	76	6.6877	A
C7	48	6.6019	A
C11	68	6.5119	A
C12	65	6.4903	A
C8	36	6.4112	A
C6	44	6.4088	A
C10	93	6.3973	A

C4	96	6.3628	A
C2	94	6.2040	A

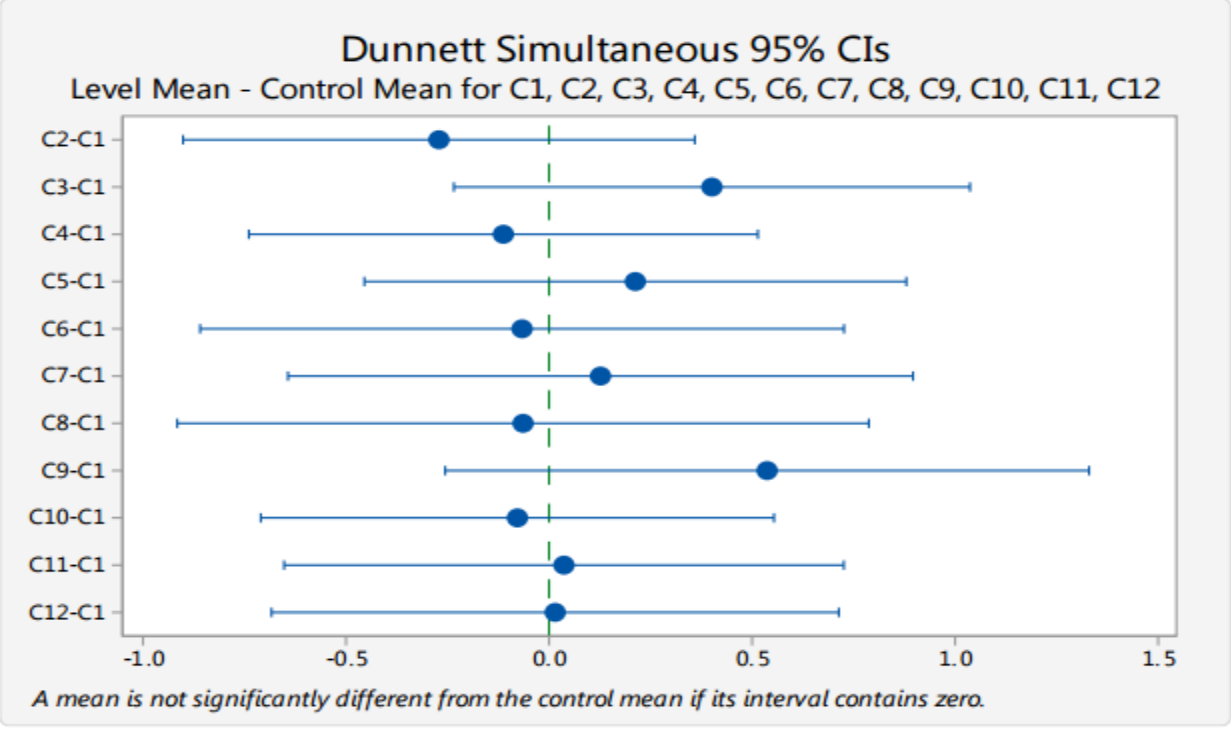
Remarks;-Means not labeled with the letter A are significantly different from the control level mean.

❖ **Dunnett Simultaneous Tests for Level Mean - Control Mean**

Diff. of Levels	Diff. of Means	SE of Diff.	95% CI	T-Value	Adjusted P-Value
C2-C1	-0.2712	0.2269	(-0.9013, 0.3590)	-1.20	0.8847
C3-C1	0.4012	0.2288	(-0.2343, 1.0366)	1.75	0.4848
C4-C1	-0.1124	0.2256	(-0.7392, 0.5144)	-0.50	0.9999
C5-C1	0.2126	0.2402	(-0.4548, 0.8799)	0.88	0.9831
C6-C1	-0.0664	0.2854	(-0.8592, 0.7264)	-0.23	1.0000
C7-C1	0.1268	0.2771	(-0.6429, 0.8964)	0.46	0.9999
C8-C1	-0.0640	0.3066	(-0.9156, 0.7876)	-0.21	1.0000
C9-C1	0.5371	0.2854	(-0.2558, 1.3299)	1.88	0.3930
C10-C1	-0.0779	0.2275	(-0.7098, 0.5540)	-0.34	1.0000
C11-C1	0.0368	0.2481	(-0.6524, 0.7259)	0.15	1.0000
C12-C1	0.0152	0.2515	(-0.6834, 0.7137)	0.06	1.0000

Individual confidence level = 99.44

❖ Dunnett Simultaneous 95% CIs



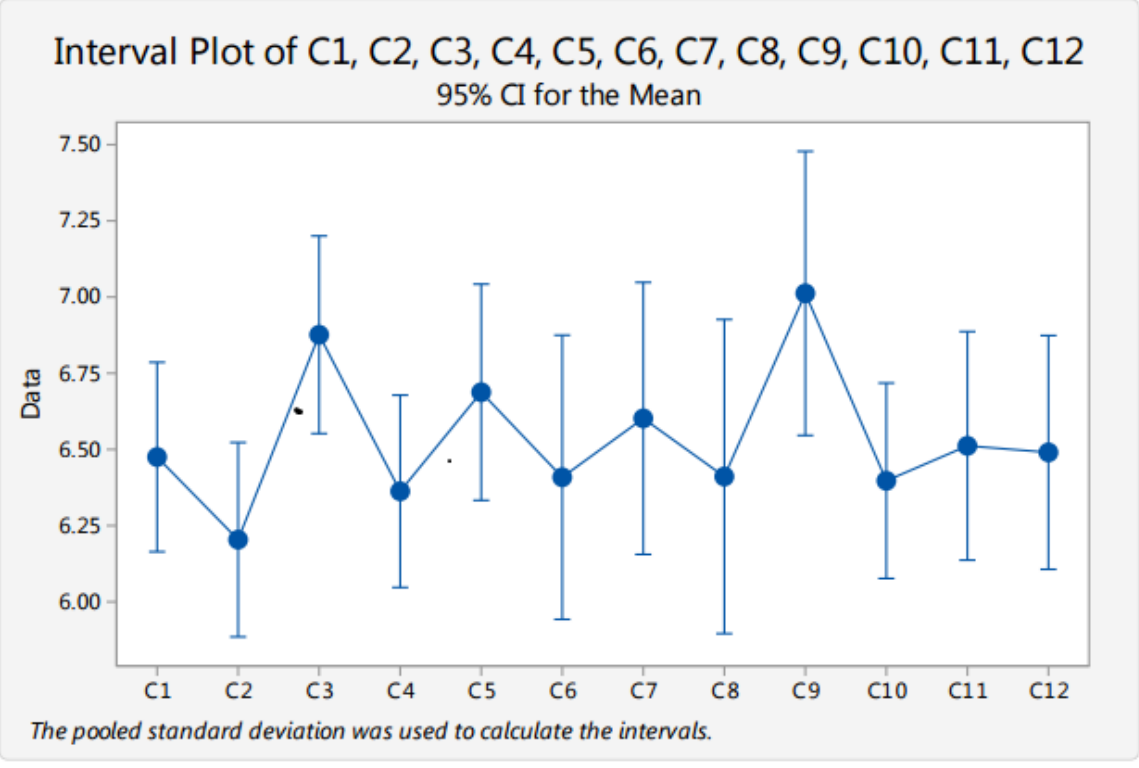
Remarks:- A mean is not significantly different from the control mean if its interval contains zero.

❖ **Hsu Simultaneous Tests for Level Mean - Largest of Other Level Means**

Diff. of Levels	Diff. of Means	SE of Diff.	95% CI	T-Value	Adjd P-Value
C1-C9	-0.5371	0.2854	(-1.2564, 0.1754)	-1.88	0.1988
C2-C9	-0.8082	0.2877	(-1.5334, 0.0000)	-2.81	0.0229
C3-C9	-0.1359	0.2892	(-0.8649, 0.5931)	-0.47	0.8413
C4-C9	-0.6495	0.2868	(-1.3722, 0.0673)	-2.26	0.0921
C5-C9	-0.3245	0.2984	(-1.0766, 0.4276)	-1.09	0.5715
C6-C9	-0.6035	0.3358	(-1.4499, 0.2430)	-1.80	0.2303
C7-C9	-0.4103	0.3288	(-1.2389, 0.4183)	-1.25	0.4881
C8-C9	-0.6011	0.3540	(-1.4933, 0.2911)	-1.70	0.2704
C9-C3	0.1359	0.2892	(-0.5931, 0.8649)	0.47	0.8413
C10-C9	-0.6150	0.2882	(-1.3414, 0.1063)	-2.13	0.1222
C11-C9	-0.5003	0.3048	(-1.2684, 0.2678)	-1.64	0.2948
C12-C9	-0.5219	0.3075	(-1.2969, 0.2531)	-1.70	0.2707

Individual confidence level = 98.81%

❖ **95% CI for the Mean**



Remark:-The pooled standard deviation was used to calculate the intervals.

IV CONCLUSION AND DISCUSSION

The appropriate use and interpretation of statistical tests is necessary to evaluate this scientific research work and results obtained from the data analysis which shows that there is no enough evidence to reject Null Hypotheses H0: at 5% significant level, this means there is no much discrepancies between the means observed and analyzed which was generated from twelve different countries named as (C1,..., C12) because the calculated F-test value which is 1.430 is less than the tabulated F-test value which is 2.40 and importantly the p-value from analysis is 0.1534 which is greater than alpha-value 0.05. Both value lies in the accepting region of H0:, After applying the analysis of variance which shows there is no significant overlap between different statistical means that was obtained in this research work using ANOVA technique which is verified subsequently by

- Grouping Information Using the Tukey Method and at 95 percent Confidence.
- Tukey Simultaneous Tests for Differences of Means at Individual confidence level = 99.89 percent.
- Grouping Information Using the Fisher LSD Method and 95 percent Confidence.
- Fisher Individual Tests for Differences of Means at Simultaneous confidence level = 28.11 percent.
- Grouping Information Using the Dunnett Method and at 95 percent Confidence.

- Dunnett Simultaneous Tests for Level Mean - Control Mean at Individual confidence level = 99.44 percent.
- Hsu Simultaneous Tests for Level Mean - Largest of Other Level Means at Individual confidence level = 98.81 percent.

Hence all the above eight analysis confirmed our final finding in this research work without any prejudice or discrepancies showing the same homogeneous results throughout the analysis and the academic performance of students that was used as yard stick to laterally measure the student's academic performance by CGPA of each and every students is found to be averagely the same irrespective of a student's contrary of origin, multiple comparisons reduces the number of tests required to identify a significant difference in means for comparing group of means which prevents further unnecessary analysis if the omnibus test (F-test) is not statistically significant the adjusted p-value in this multiple comparisons is the General Linear Model of ANOVA and the adjusted p-value indicates which factor level comparisons within a family of comparisons (hypothesis tests) are significantly different. If the adjusted p-value is less than alpha, then the null hypothesis will be rejecting. The adjustment limits the family error rate to the alpha level that was chosen. If a regular p-value for multiple comparisons is use, then the family error rate grows with each additional comparison. The adjusted p-value also represents the smallest family error rate at which a particular null hypothesis will be rejected. It is important to consider the family error rate when making multiple comparisons because the chance of committing a type I error for a series of comparisons is greater than the error rate for any one comparison alone.

V SUMMARY

A statistic value F-test is calculated to be 1.40 at 5 percent level of significance while the tabulated F-test value is 2.40 which is obtained from this research work that measure the size of no effects and no significance difference between the whole means from C1 to C12 by comparing a ratio of the differences between the means of the groups to the variability within groups at 0.55 percent, the less the value of F-statistics that is calculated at 1.430 from the research work and the more likely that there are no effects or any overleaf among the means that was analyzed. The effects of variability among the means is less, the probability of finding an F-ratio equal to or larger than the one found in the study given that there were no effects. Since exact significance level is at 5% and the p-value 0.1534 greater than alpha 0.05 then is conclude that there is no much effects of variability among the means from twelve countries.

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