STATS 141SL Organizational Metrics Project

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1 Abstract

This project aims to study the influence of national societal culture on the personal leadership behaviors at work. We firstly evaluate the mean of some factors of personal performance in each country and then correlate the data with the national elements of corresponding countries. We are also interested in if EQ and IQ have influence on leadership levels.

2 Introduction

We use the culture scales data on the GLOBE Project Website (1), where the construct validity of the culture scales was confirmed by examining the correlations between the national societal culture and leadership scales with independent sources. Individual employees are grouped by country raised, and then compute the correlation matrix of the variables $Social\_EQ$, $Learning_IQ$, $Strives\_4\_Balance$, $Strives\_4\_Challenge$, $Strives\_4\_Collaboration$, $Strives\_4\_Independence$, $Strives\_4\_Power$, $Strives\_4\_Structure$ with the variables in the national societal culture and leadership scales data, then make plots to visualize the data.

3 Data Discussion

Our project mainly uses three datasets including $Leadership\_141SL\_doNotShare$, $GLOBE - Phase - 2 - Aggregated - Societal - Culture - Data$ and $GLOBE - Phase - 2 - Aggregated - Leadership - Data$.

In the first dataset, each row corresponds to a person and each column corresponds to a piece of personal information of that person. This dataset includes 61934 people and 23 items. However, there are a lot of missing valuse in this dataset. By removing rows with missing value, we left with 55169 observations.

In the remaining two datasets, each row corresponds to a country and each column corresponds to a cultural and primary leadership dimension, respectively of a country. There are 62 countries and 30 primary leadership dimensions in the global leadership data set, and 21 cultural dimensions in the global societal culture dataset. We combined the Global Leadership dataset and Global Societal Culture dataset into a new dataset, containing 62 observations and 48 features eventually. We combine rows $EastGerman$ and $WestGerman$ into observation $German$, rows $BlackSouthAfrica$ and $WhiteSouthAfrica$ into observation $SouthAfrica$ by taking average of each dimension of the existing two observations.

4 Analysis of the Data — Important Findings and Methodology

4.1 Correlations of CEO leadership behavior and national societal culture and leadership

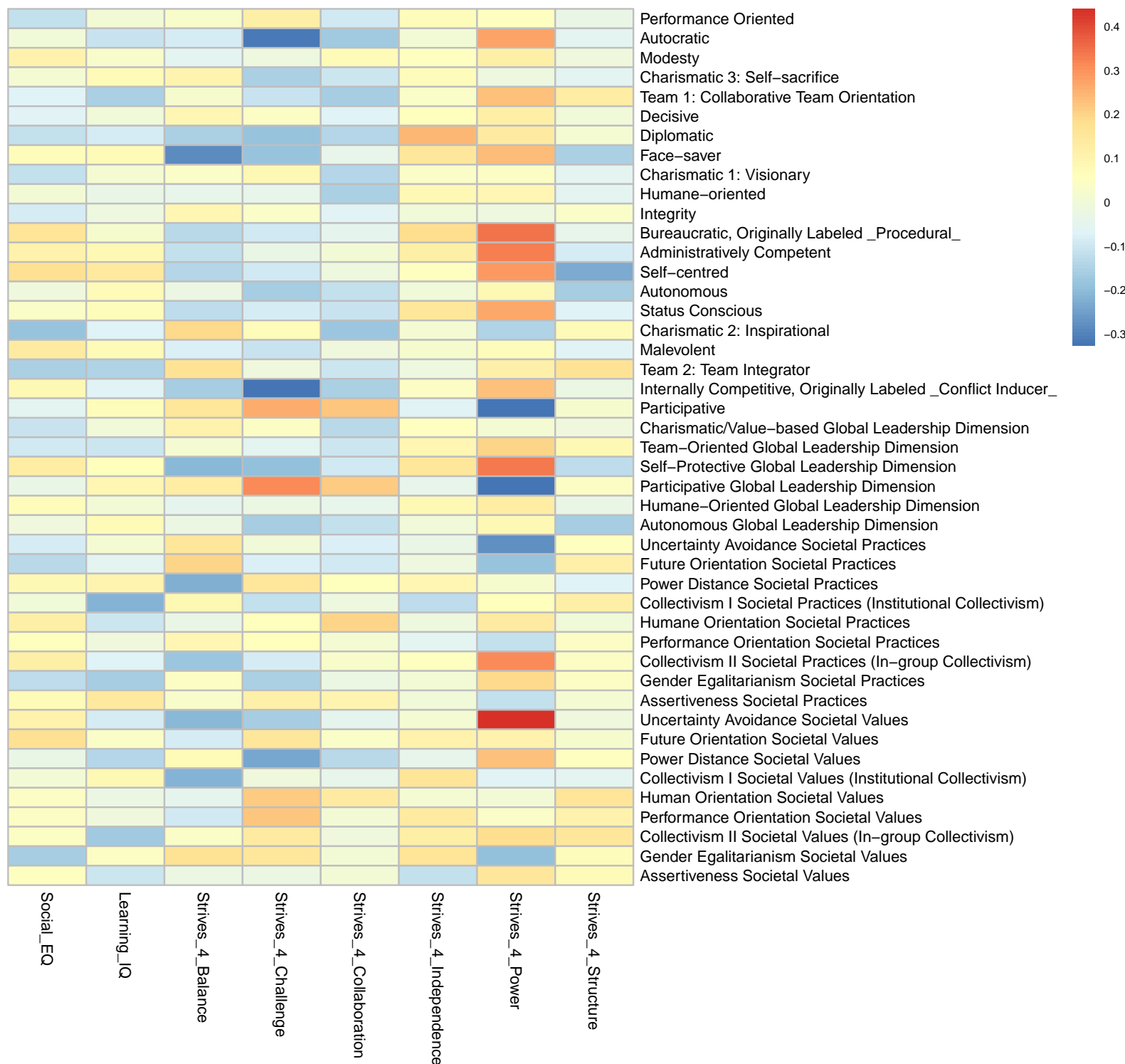**Figure 4.1.1: National Societal Culture and Leadership and CEO Leadership Behavior Correlation Plot**
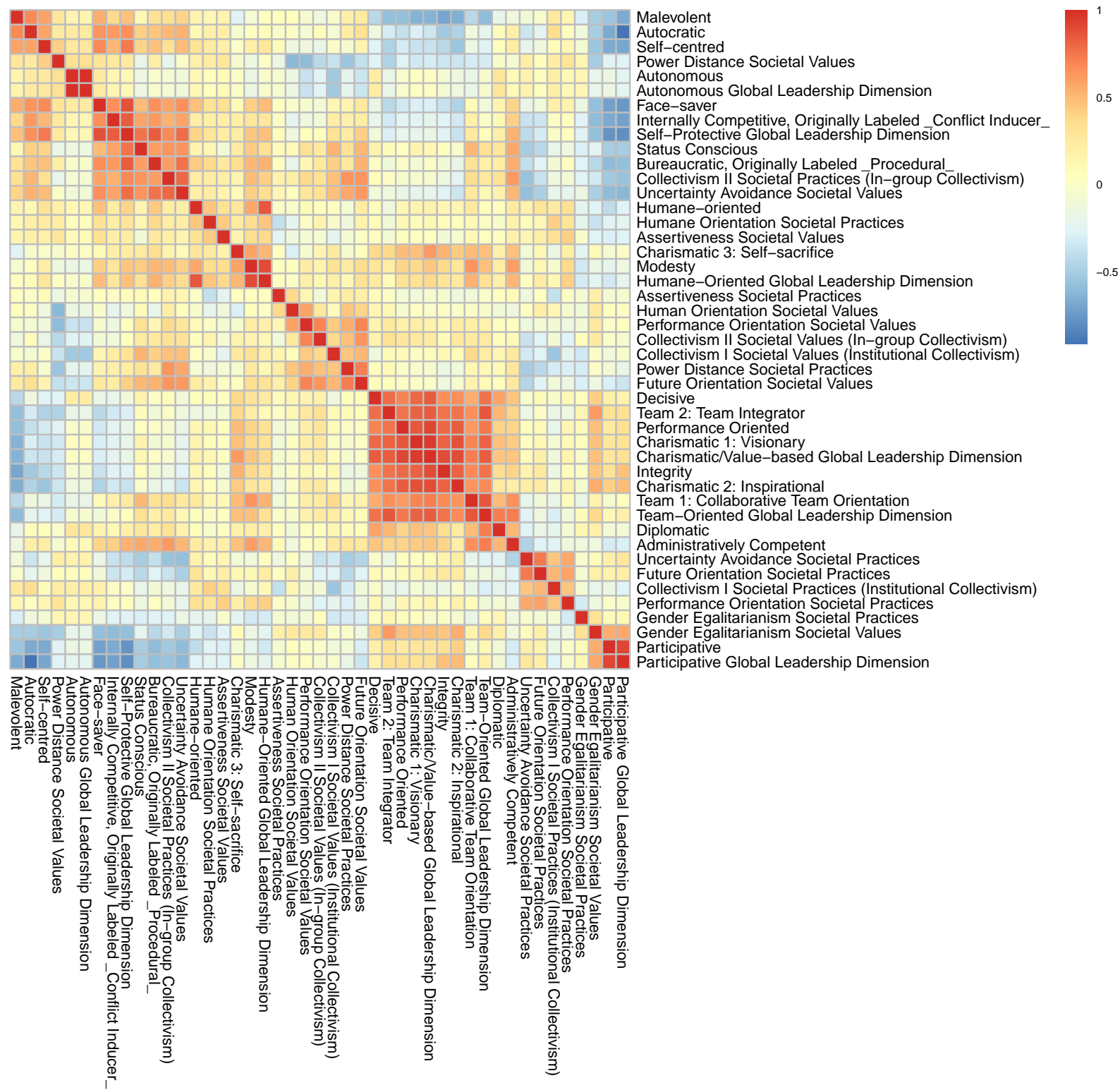
Figure 4.1.2: National Societal Culture and Leadership Correlation Plot
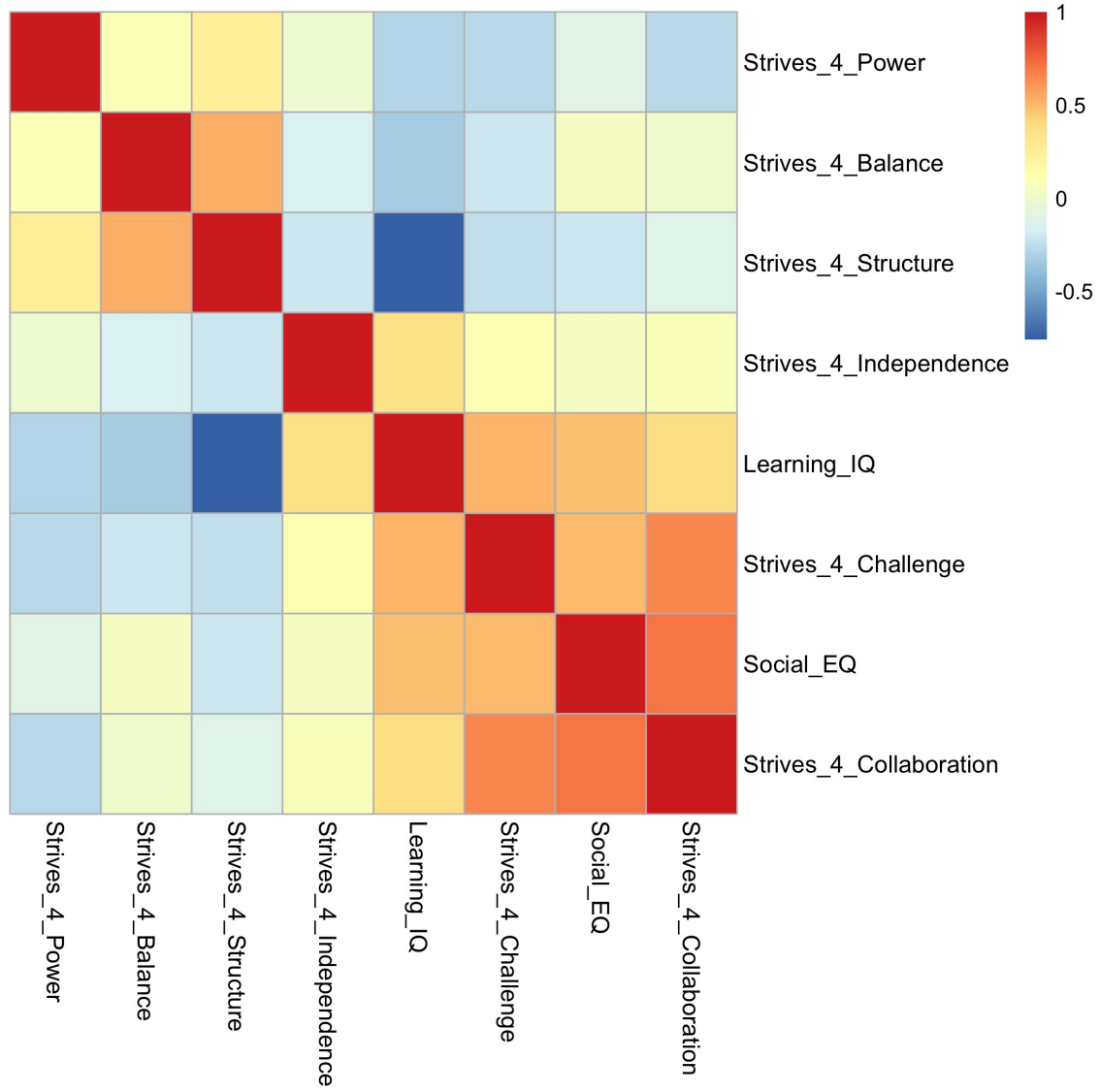
Figure 1: CEO Leadership Behavior Correlation Plot

EQ: From Table 1, we can see that EQ is most correlate with $Bureaucratic$, $Self-centered$, $Inspirational$, $Future Orientation Societal Values$ and $Gender Egalitarianism Societal Values$. But the correlation is not strong, which are around 0.15 to 0.17.

Highest	Correlation		Lowest	Correlation
$Future Orientation Society$	0.178		$Collectivism I Societal Practice$	-0.00602
$Charismatic$	-0.175		$Collectivism I Societal Values$	0.00549
$Self-centred$	0.167		$Autocratic$	-0.00459
$Gender Egalitarianism$	-0.163		$Autonomous$	-0.00384
$Bureaucratic, Original$	0.158		$Autonomous Global Leadership D$	0.00384

Table 1: Highest and Lowest Correlation with EQ

IQ: From Table 2, we can see that IQ is most correlate with Collaborative Team Orientation, Team Integrator, Collectivism I Societal Practices (Institutional Collectivism), Gender Egalitarianism Societal Practices and Collectivism II Societal Values (In-group Collectivism). But the correlation is also not strong, which are around 0.15 to 0.20.

Highest	Correlation		Lowest	Correlation
$CollectivismISocietalPractice$	-0.208		$Humane-OrientedGlobalL$	-0.0112
$CollectivismIISocietalValues$	-0.175		$PerformanceOriented$	0.00429
$GenderEgalitarianismSocietal$	-0.164		$PerformanceOrientation$	-0.00300
$Team1:CollaborativeTeamOr$	-0.151		$Decisive$	-0.00214
$Team2:TeamIntegrator$	-0.151		$Charismatic/Value-based$	-0.0000860

Table 2: Highest and Lowest Correlation with IQ

Balance: From Table 3, it shows the top 5 and least 5 Global variables correlated to the individual $Strives_4Balance$ factor. $Face-saver$ has the highest correlation to the Balance, which is -0.287, while $AssertivenessSocietalValues$ is least correlated to Balance, meaning that, Balance has less relation with the degree to which an individual shows self-confidence and aggressive in the relationship with others (1). The overall range of the absolute correlation is [0.00913, 0.287], which is relatively weak.

Highest	Correlation		Lowest	Correlation
$Face-saver$	-0.287		$Autonomous$	-0.0234
$CollectivismISocietal$	0.221		$AutonomousGlobalL$	0.0234
$PowerDistanceSocietal$	-0.217		$Team1:Collaborate$	-0.0207
$Self-ProtectiveGlobalL$	-0.207		$Team-OrientedGlobalL$	-0.0118
$UncertaintyAvoidanceSo$	0.204		$AssertivenessSociety$	0.00913

Table 3: Highest and Lowest Correlation with Balance

Challenge: From Table 4, it shows the top 5 and least 5 Global variables correlated to the individual $Strives_4Challenge$ factor. $Autocratic$ has the highest correlation to the Balance, which is -0.325, meaning that the individualistic, independence and autonomous are correlated to the performance of an individual facing challenge (1). $CollectivismISocietalValues(InstitutionalCollectivism)$ is least correlated to Balance, indicating that the degree to which the encourage and reward from the organizational and institutions collective distribution of resources and collective action does not influence the personal performance on balance a lot (1). The overall range of the absolute correlation is [0.00759, 0.325].

Highest	Correlation		Lowest	Correlation
$Autocratic$	-0.325		$Integrity$	0.0274
$InternallyCompetitive$	-0.325		$Modesty$	-0.0267
$Participate$	0.315		$Team:TeamIntegral$	-0.0233
$PowerDistanceSociety$	-0.233		$UncertaintyAvoidance$	0.0193
$Participate$	0.225		$CollectivismISociety$	0.00759

Table 4: Highest and Lowest Correlation with Challenge

Collaboration: From Table 5, we can see that the names of five highest associate variables with $Strives\_4\_Collaboration$. The highest correlation variable is $Participate$ and correlation is 0.2224, reflecting that the extent to which managers involve others in making decision do affect the collaboration ability most among all factors (1). The lowest correlation variable is $PerformanceOrientationSocietalPractices$ and the correlation is -0.0017, showing that the degree to which a collective rewards for performance improvement does not affect the collaboration ability a lot (1). But overall the correlation between $Strives\_4\_Collaboration$ and 45 other variables are very weak, the absolute range is (0.0017, 0.2224).

Highest	Correlation		Lowest	Correlation
$Autocratic$	-0.1833		$Selfcentred$	-0.0070
$Humaneoriented$	-0.1717		$Malevolent$	-0.0039
$Charismatic2:Inspirational$	-0.1882		$PerformanceOrient\ s$	-0.0017
$Participate$	0.2224		$CollectivismIISociety\ s$	0.0039
$ParticipateGlobalLeader$	0.2197		$PerformanceOrient\ s$	0.0033

Table 5: Highest and Lowest Correlation with Collaboration

Independence: From Table 6, we can see that the names of five highest associate variables with *Strives_4_Independence*. The highest correlation variable is *Diplomatic* and correlation is 0.2159. The lowest correlation variable is *FutureOrientationSocietalPractices* and the correlation is -0.0005, telling that the degree to which individual participate in future oriented behaviors, such as planning, investing in the future, does not correlate to the personal independence behaviors (1). But overall the correlation between *Strives_4_Independence* and 45 other variables are very weak, the absolute range is (0.0005, 0.2159).

Highest	Correlation		Lowest	Correlation
$Diplomatic$	0.2159		$Charismatic2 : Inspirational$	0.0023
$Facesaver$	0.1616		$UncertaintyAvoidanceSocietalPractices$	-0.0041
$Bureaucratic$	0.1720		$FutureOrientationSocietalPractices$	-0.0005
$StatusConscious$	0.1473		$AssertivenessSocietalPractices$	-0.0031
$SelfProtectiveGlobalLeader\ n$	0.1467		$UncertaintyAvoidanceSocietalValues$	0.0022

Table 6: Highest and Lowest Correlation with Independence

Power: From Table 7, we can see that the names of five highest associate variables with *Strives_4_Power*. The highest correlation variable is *UncertaintyAvoidanceS* and correlation is 0.429. This interestingly shows that the degree of a society and organization rely on social norms, rules and procedures to mitigate the unpredictability of future events is correlated to the power of individual most (1). The lowest correlated variable is *Charismatic/Value − based* and the correlation is -0.00198, reflecting that the ability to motivate, inspire, and expect others to achieve high performance results based on firm core values has most powerful influence on the power ability (1). But the overall the correlation between *Strives_4_Power* and 45 other variables are very weak, the absolute range is (0.00198, 0.429).

Highest	Correlation		Lowest	Correlation
$UncertaintyAvoidanceS$	0.429		$Integrity$	-0.0285
$Bureaucratic, Original$	0.339		$PerformanceOrientation$	0.0242
$Self − ProtectiveGlobal$	0.335		$PowerDistanceSocietal$	0.0124
$ParticipateGlobalLe$	-0.332		$HumanOrientationSociety$	0.00785
$Participate$	-0.329		$Charismatic/Value − based$	-0.00198

Table 7: Highest and Lowest Correlation with Power

Structure: From Table 8 we can see that the names of five highest associate variables with *Strives_4_Structure*. The highest correlation variable is *Self − centred* and correlation is -0.237, giving information that focusing on improving status to ensure the safety of individuals and groups would relate to the personal structure capability (1). The lowest correlation variable is *Modesty* and the correlation is 0.00445. But overall the correlation between *Strives_4_Structure* and 45 other variables are very weak, the absolute range is (0.00445, 0.237).

Highest	Correlation		Lowest	Correlation
$Self − centred$	-0.237		$PerformanceOriented$	-0.0142
$Team2 : TeamIntegrate$	0.173		$Decisive$	0.0135
$CollectivismIISociety$	0.169		$Charismatic/Value − b$	0.00785
$Autonomous$	-0.162		$UncertaintyAvoidance$	-0.00624
$AutonomousGlobalLea$	-0.162		$Modesty$	0.00445

Table 8: Highest and Lowest Correlation with Structure

4.2 Relationship Between EQ, IQ and Leadership Level

$H_0 : \mu_{Executive} = \mu_{Low_LevelLeader} = \mu_{Mid_LevelLeader} = \mu_{None}$
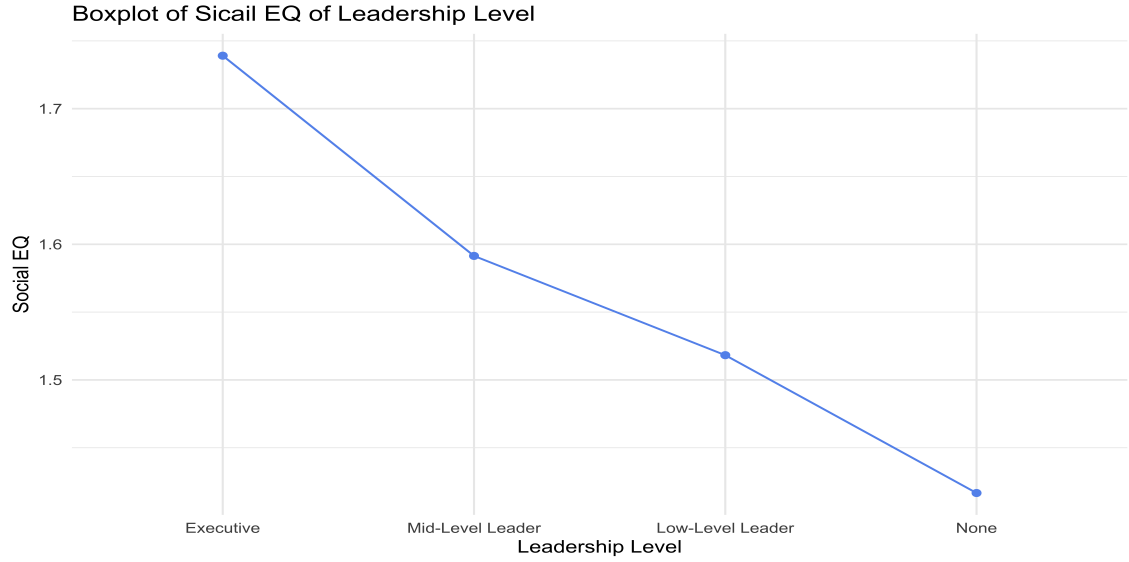$H_a : \mu_{Executive} \neq \mu_{Low_LevelLeader} \neq \mu_{Mid_LevelLeader} \neq \mu_{None}$

Figure 2: Mean Plot of Social EQ of Leadership Level

Predictors	Df	Sum Sq	Mean Sq	F Value	Pr(>F)
$LeadershipLevel$	3	293	97.30	281.8	$< 2e-16 ***$
$Residuals$	55165	19048	0.35		

Table 9: ANOVA Table of EQ and Leadership Level

From figure 2, we can see that EQ decrease as leadership level change from executive to med-level, low-level, and none. Also from table 9, we can see that the F-statistic value are 281.8, and it is highly significant as the corresponding p-value is very small. Thus, we can reject the null hypothesis of equal mean value of EQ with leadership level. In other words, the average EQ of the four level of leadership are not equal.

Figure 3: Mean Plot of Learning IQ of Leadership Level

Predictors	Df	Sum Sq	Mean Sq	F Value	Pr(>F)
$LeadershipLevel$	3	224	74.80	106	$< 2e-16 ***$
$Residuals$	55165	38913	0.71		

Table 10: ANOVA Table of IQ and Leadership Level

From figure 3, we can see that IQ decrease as leadership level change form executive to med-level, low-level. But IQ increases a little bit when leadership level change from low-level to none. Also from table 10, we can see that the F-statistic value are 106, and it is highly significant as the corresponding p-value is very small. Thus, we can reject the null hypothesis of equal mean value of IQ with leadership level. In other words, the average IQ of the four level of leadership are not equal.

5 Findings and Conclusions

From the three correlation plots, we can see that the correlation between the individual factors and the national factors is not significant, that is to say, there is no statistically significant correlation. However, the correlation between the individual factor and itself and the correlation between national factors and itself is relatively significant, and the color is also relatively dark from the picture. This means that they are associated with each other, but the association between individual factors and national factors is low.

In other words, the relationship between the national societal culture values and the national leadership culture values and personal leadership behaviors is very low, and cannot be used as important factors to predict personal leadership behaviors.

Nevertheless, judging from the mean plot, there are correlation between personal social EQ and learning IQ and leadership level. From figure 2 and 3, we can see that with the changes of different leadership levels, the changes in social EQ and learning IQ are relatively significant.

References

[1] Understanding the Relationship Between National Culture, Societal Effectiveness and Desirable Leadership Attributes,
https://globeproject.com/study_2004_2007