

The Study of the Relationship between Personality Domains, Critical Thinking and Reading Proficiency among Iranian Medical Students

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Abstract – The current research considers a cluster of characteristics, including, impulsivity/reflectivity, field-dependence/independence, critical thinking as well as reading ability of the subjects and endeavors to explore the differences and relationships among the above four variables. Therefore, the present study investigated whether there was any significant difference between impulsive/reflective Iranian medical students and their reading proficiency. This study also aimed to explore the relationship between critical thinking ability of Iranian medical students and their reading proficiency. In addition, the final aim of this study was to find out the differences between field-dependent/independent learners and their reading proficiency. To this end, 250 male and female Yazd university medical students, aged 19-22 participated in the study. They enjoyed an intermediate level of L2 proficiency and were selected based on Oxford Quick Placement Test. The first variable was impulsivity/reflectivity, which was measured by *Impulsivity Sub-scale of Eysenck's Impulsiveness Questionnaire*. The second variable was field-dependence/independence, which was measured by the Group Embedded Figures Test. The third variable investigated was critical thinking which California Critical Thinking Skill Tests assessed. The final variable was reading proficiency, which was measured via a test of reading comprehension in NTC's TOEFL. The results of the field-dependence/independence and reading comprehension test and impulsivity/reflectivity and reading comprehension ability revealed no statistically significant difference between these variables. Finally, there was a moderate relationship between the Iranian students' critical thinking skills and their reading comprehension skills. The overall results of the study implied that reading ability was not influenced by learning style preference.

Keywords: Field-dependent/independent, Impulsive/reflective, Critical thinking, Reading comprehension, Cognitive style

I. INTRODUCTION

Receiving a great deal of data from different sources of information all over the world makes individual human being select the data through thinking critically. The same is true for language learners. They are constantly exposed to different types of texts which require them

to tackle reading as well as thinking skills simultaneously. As far as language education is concerned, enabling students to become good language learners has always occupied the minds of researchers and teachers and they have been always attempting to find easy ways to facilitate it. Identification of learner characteristics and investigation of their effects on the cognitive processing of learning has received more attention by EFL/ESL researchers.

One of the intellectual abilities, which have been recognized as determiners of learning, is critical thinking. Freeley and Steinberg (2000) state critical thinking is "the ability to analyze, criticize, and advocate ideas; to reason inductively and deductively" (p. 2). Critical thinking skill is a successful strategy for academic learners because it helps them to do problem-solving, analytical, and critical thinking skills successfully (Gardner & Jewler, 2000).

In recent decades, language researchers suggested theories that were general in nature and often not productive. The individual differences were denied by these theories and looked for illustrating globally that how people learn and what common characteristics there are in language learning. Even though these theories have contributed much to our overall understanding of second language acquisition, some individuals are more successful in acquiring an L2 than others (Jamieson, 1992; Brown, 2000). Examining learners' variables and individual characteristics are the researchers' works in this area to explain differences in one's ability to acquire an L2. Many studies have tried to join learning differences to different variables such as lateral cerebral dominance, gender, age, and brain plasticity (Krashen, 1975; Walsh & Diller, 1981; Selinker, 1972, as cited in Mahdavizadeh and Molavizade, 2013). Other researchers have concentrated on variables such as integrative and instrumental motivation, attitude, anxiety, aptitude, ambiguity tolerance, field dependence/independence, and reflectivity/impulsivity, and critical thinking (Chapelle & Cheryl, 1984; Oxford & Nyikos, 1989). Cognitive style or "thinking style" is a term used in cognitive psychology to describe the way individuals think, perceive and remember information (as cited in Mahdavinia and Molavizade, (2013). Keefe (1997) defines cognitive styles "as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment". According to Ellis (1990), cognitive style is "a term used to describe the manner in which people receives, conceptualize, organize, and recall information" (p. 114). There are scores of different cognitive styles that more or less have an influence on language learning, the most important one of which is a field-dependence/field-independence (FD/FI) cognitive style attracting the attention of many researchers (Chapelle & Roberts, 1996). This can be measured using a psychological test called Group Embedded Figures Test (GEFT) developed by Witkin, Oltman, Raskin, and Karp (1971). As Kheirzadeh and Kassaian (2011) cited "the notion of field-dependence/independence refers to the extent to which a person can perceptually separate an object from the surrounding field rather than treating it as embedded within the field (Gass and Selinker, 1994)". Critical thinking is a cognitive skill and influences the way of our thinking; without critical thinking people cannot tackle a problem, as they must. As Halpern (1996, as cited in Yershova, De Jaeghere, & Mestenhauser, 2000) maintains, "Critical thinking is the use of those cognitive skills that increase the probability of a desirable outcome" (p. 49).

A. Research Questions and Hypotheses

By considering the above-mentioned purposes, the following research questions were raised:

- 1) Is there any significant difference between field dependent/independent Iranian medical students and their reading proficiency?
- 2) Is there any significant difference between impulsive/reflective Iranian medical students and their reading proficiency?
- 3) Is there any significant relationship between critical thinking ability of Iranian medical students and their reading proficiency?

With regard to the above research questions, the following null hypotheses were suggested:

- 1) There is no significant difference between field dependent/independent Iranian medical students and their reading proficiency.
- 2) There is no significant difference between impulsive/reflective Iranian medical students with their reading proficiency.
- 3) There is no significant relationship between critical thinking ability of Iranian medical students and their reading proficiency.

II. METHODOLOGY

A. Participants

The participants of the present study were 250, 70 male, and 180 female learners, ranging from 19 to 22. They were studying at medical sciences university in Yazd, Iran. They were all sophomores and their first language was Persian. The participants had no familiarity with any other foreign languages other than English. They studied English for about 4 hours per week as part of their academic requirements. To ensure that the students are at the required proficiency level and make a more homogeneous sample, the researchers administered a test of language proficiency as a means of further homogenizing the participants. They were found to be all at the intermediate level of proficiency and were selected based on their scores obtained from Oxford Quick Placement Test.

B. Instruments

The data for the present research were collected through the administration of the following instruments:

Critical thinking ability test. To determine the participants' critical thinking ability a Persian version of the California Critical Thinking Skill Tests (CCTST) form B, was used. This test is considered as a standard test and has been extensively used in most studies in the

fields of education and psychology. The CCTST consists of 34 items each followed by four or five alternatives. The recommended time for participants to complete the test was 45 minutes. In answering these questions, having knowledge in special areas was not necessary. It was stated to the test developers that the CCTST has been designed based on some general background knowledge, within years of education in schools or academic settings.

Through Kuder Richardson Formula (KR-20), the reliability of the test computed and it was reported to be between 0.78 and 0.80. In this study, the Persian version of the test the reliability of which was reported to be 0.62 was used (Khalili & Hosseinzadeh, 2003).

Group embedded figures test (GEFT). To measure the degree of the participants' field-dependence/independence, Group Embedded Figures Test (GEFT) was applied. GEFT is a psychological test used internationally and developed by Witkin, Oltman, Raskin, and Karp (1971). In the field of second language acquisition, Group Embedded Figures Test is a firmly established and widely used test. The GEFT instrument contains three sections with 25 complex figures out of which participants were asked to identify and trace specified simple forms. In the complex figures, the simple forms in the same size, the same proportions, and facing in the same direction appear as when they present alone (Salmani-Nodoushan, 2007). The more figures they are able to identify, the more field-independent they are supposed to be. GEFT has been reported to enjoy a Spearman-Brown reliability coefficient of 0.82 for both males and females (Witkin et al., 1971). Those who score above 12 out of 18 were identified as FI and those with a score of 11 and less than 11 were notified as FD cognitive stylists.

Impulsivity sub-scale of Eysenck's impulsiveness questionnaire. The 35-item IVE Questionnaire determines impulsiveness, venturesomeness and empathy. Correlations between impulsiveness and venturesomeness reported by Eysenck et al. (1985) range from $r = .35$ to $.38$. Also internal consistency results reported by Eysenck et al. (1985) ranges from $r = .83$ to $.84$. In addition, internal consistency results reported by Miksza (2005) with a sample of college brass players ($N=40$) ranges from $r = .81$ to $.85$.

Salimi (2001) prepared a Persian version of this questionnaire and its impulsiveness subscale was validated with 1820 subjects from Tarbiat Modares University. By using Cronbach's alpha and Spearman Brown's unusual length split, half reliability the reliability of the Persian impulsiveness subscale was tested. Alpha reliability was found to be 0.86, which is an acceptable indicator of reliability. The same Persian version of impulsivity subscale serves the impulsivity scale of the present research (Ghapanchi & Dashti, 2011).

Reading comprehension test. In order to test the reading comprehension ability of the participants, four reading passages were selected from the reading comprehension test section of the NTC's TOEFL with the 30 reading comprehension questions. The TOEFL reading comprehension test (1991) was used in order to find out the participants' reading comprehension ability. The test was composed of 30 reading comprehension questions and students were expected to answer within 40 minutes. The test was a standard test and its reliability and validity was approved.

C. Procedures

The three above-mentioned questionnaires as well as a reading comprehension test were given to the participants in two phases. First, the participants were demanded to answer the reading comprehension tests to assess their proficiency in reading comprehension followed by GEFT tests to measure their field dependency/independency. Each reading comprehension text consisted of six questions, for which, the participants were asked to identify the correct responses and underline or circle them with the time allocation of 40 minutes and the GEFT test contained three sections totaling 25 figures. Second, one week later, the participants were asked to answer the CCTST and Eysenck's impulsiveness questionnaires at the same time. The CCTST questionnaire consists of 34 questions and it has a hard time limit of 45 minutes. The most valid measure of overall strength in critical thinking is the CCTST total score. The maximum total score is 34. High critical thinking skills indicate a total score of 24 or higher. A mid-range skill level indicates score in the 13-23 range which is suitable for learning and employee development. Fundamental weaknesses in critical thinking skills indicate scores of 12 or lower.

It was asked the participants to answer to the Persian version of Eysenck's impulsiveness subscale (IVE) and mark their answers on the questionnaire itself. This questionnaire consists of 35 items and the participants were asked to answer them in 40 minutes. For each item, the participants were required to answer YES (2 points) or NOT (1 point). The total score is the sum of the points; a high score indicates a high level of impulsivity.

The researchers allocated certain amount of time and set a place in order to have an almost similar setting for the all participants to minimize extraneous factors in participants' performance. The participants were also ensured about the confidentiality of the collected data and anonymity of their identities in the study. After answering the test, the results of the three questionnaires and the reading comprehension test were compared and analyzed for addressing the research questions.

D. Data Analysis

In order to examine the hypotheses, the researchers analyzed the data in two different ways. First, to describe the basic features of the data descriptive statistical analyses were used. Second, inferential statistical analyses were utilized to draw up some conclusions.

III. RESULTS

To answer the first question if there is any significant relationship between FD/FI Iranian medical students and their L2 reading proficiency. Table 1 presents the overall scores of the students based on the Group Embedded Figures Test (GEFT) instrument. The mean, median, standard deviation and other descriptive statistics are demonstrated in this table.

Table 1: Descriptive statistics of GEFT

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
GEFT	246	5.00	25.00	16.8780	5.53886	-.215	.155	-1.203	.309
Valid N (list wise)	246								

Based on the results obtained from Table1, the numbers of field-dependent/ independent participants are further illustrated in Table 2 below.

Table 2: Percentage of FD/FI participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Field Independent	163	66.3	66.3	66.3
	Field Dependent	83	33.7	33.7	100.0
Total		246	100.0	100.0	

The reading comprehension scores were obtained from the reading comprehension test section of the NTC TOEFL with the 30 reading comprehension questions. The participants' correct answer to each question received 1 point. The descriptive statistics of students' reading comprehension scores are presented in Table 3 below.

Table 3: Descriptive statistics of Reading Comprehension Test

	N	Minimum	Maximum	Mean	SD	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Read	246	7.00	30.00	22.5976	4.37952	-.445	.155	.045	.309
Valid N (list wise)	246								

Based on the GEFT scores, the participants were divided into two groups, namely field-dependent and field-independent. Field-dependent subjects were coded as 1 and field-independent subjects were coded as 2. The group statistics are presented in Table 4. As the

table indicates, the mean performance of both groups (calculated out of 30) was similar to each other with a mean difference of 0.17.

Table 4: Group Statistics of Field-Dependency and Reading Comprehension

		GEFT Coded	N	Mean	Std. Deviation	Std. Error Mean
Read	Independent	2.00	163	22.5399	4.59233	.35970
	Dependent	1.00	83	22.7108	3.95255	.43385

To find out any significant difference between FD/FI Iranian medical learners and their reading proficiency, an independent samples t-test was run. Table 5 shows the results of the t-test. In the following table, the distributional differences between the field-dependence/independence, reading comprehension means, standard deviation, and standard error of mean have been displayed.

Table 5: Independent Samples Test for Field-Dependency and Reading Comprehension

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Read	Equal variances assumed	3.038	.083	-.289	244	.773	-.17097	.59166	-1.33639	.99446
	Equal variances not assumed			-.303	188.414	.762	-.17097	.56357	-1.28268	.94075

The results of the test revealed that there was no statistically significant difference between the means of the field-independent group and field-dependent group at the level of $\alpha = 0.05$. The conclusion is that the two groups are not different in terms of reading comprehension [$t(244) = -.289, p = .773$]. It can be claimed that in terms of their related reading proficiency the field-independent group and the field-dependent group are similar. Since the value of significant amounts of $t(0.773)$ is higher than the assumed level of significance (0.05), the hypothesis is confirmed. In other words, it is concluded that there is no significant relationship between field-independence/dependence and reading comprehension.

The second research question pursued in this study was to find out if there was any significant difference between impulsive/reflective Iranian medical students and their reading proficiency.

In order to respond to research question two, the students' scores on Eysenck's impulsiveness subscale (IVE) were obtained. The range of impulsiveness scores was between 0 and 35. According to the test guide, the participants who received the scores between 0 and 17 were categorized in group 1, i.e. – reflective participants – and those who received the scores between 19 and 35 were categorized in group 2, i.e. –impulsive participants. Those who scored 18 were discarded from the analysis. In this case, the scores of 246 out of 250 subjects were eligible for data analysis. Table 6 presents the overall scores of the students based on the Eysenck's impulsiveness subscale (IVE) instrument. The mean, median, standard deviation and other descriptive statistics are demonstrated in this table.

Table 6: Descriptive Statistics of Impulsiveness Scale

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
Style	246	7.00	30.00	19.9024	5.60963	-.032	.155
Valid N (list wise)	246						

Analyzing the obtained scores, the researchers identified the number of impulsive and reflective participants. The descriptive results are depicted in Table 7 below.

Table 7: Frequency analysis of impulsive and reflective participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Reflective	109	44.3	44.3	44.3
	Impulsive	137	55.7	55.7	100.0
	Total	246	100.0	100.0	

Based on the impulsiveness scale scores, the participants were divided into two groups, namely reflective and impulsive. Reflective participants were coded as 1 and impulsive subjects were coded as 2. The descriptive statistics of the participants' performance in the reading test are presented in Table 8.

Table 8: Group Statistics of Impulsive and reflective learners in the reading test

	Style coded	N	Mean	Std. Deviation	Std. Error Mean	
Read	Reflective	1.00	109	22.8624	4.62174	.44268
	Impulsive	2.00	137	22.3869	4.18198	.35729

As can be seen from the above table, the participants in both groups performed similarly in the reading test with a mean difference of 0.47.

In order to find out if there was any significant difference between impulsive/reflective Iranian medical learners and their reading proficiency, an independent samples t-test was run. Table 9 shows the results of the t-test.

Table 9: Independent Samples Test for Personality Traits and Reading Comprehension

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Read	Equal variances assumed	.652	.420	.845	244	.399	.47552	.56244	-.63233	1.5833
	Equal variances not assumed			.836	220.29	.404	.47552	.56888	-.64562	1.5966

In the above table, the distributional differences between the two variables of field-dependency/independence and reading comprehension mean, standard deviation and standard error of the mean can be observed. The results of the t-test revealed that there was not a statistically significant difference between the means of the reflective group and an impressive group at the level of $\alpha = 0.05$ s [t (244) = -.845, $p = .399$]. The conclusion is that the two groups are similar in terms of reading comprehension. It can be claimed that the reflective group and the impulsive group are similar in terms of their related reading proficiency. The interval confidence is 95% and t is .845 ($t = .845$).

Since the value of significant amounts of t (0.399) is higher than the assumed level of significance (0.05), the hypothesis is confirmed. In other words, it is concluded that there is no

significant difference between personality traits of impulsivity and reflectivity and reading comprehension.

The purpose of the third research question was to detect whether there was any significant relationship between critical thinking ability of Iranian medical students and their reading proficiency.

Table 10 presents the descriptive statistics related to the critical thinking questionnaire. The critical thinking scale indicates that the higher the participants' scores on the test are, the higher their critical thinking ability can be. There were 34 items in the critical thinking tests. The minimum and maximum scores obtained were 5 and 34 respectively. The mean score of all the participants (246) was 22.67 out of 34.

Table 10: Descriptive Statistics of Critical Thinking Scale

	N	Minimum	Maximum	Mean	SD	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
CT	246	5.00	34.00	22.679	6.6103	-.501	.155	-.328	.309
Valid N (list wise)	246								

As the above table shows, there was a positive correlation between the two variables and the linearity assumption can be safely confirmed. In order to answer the third research question, a Pearson product-moment correlation coefficient was used to figure out the relationship between the two variables of critical thinking and reading proficiency. The following table shows the correlation coefficient between reading comprehension and critical thinking.

Table 11: Correlations results between Critical Thinking and Reading Comprehension

		Read	CT
Reading	Pearson Correlation	1	.411**
	Sig. (2-tailed)		.000
	N	246	246
CT	Pearson Correlation	.411**	1
	Sig. (2-tailed)	.000	
	N	246	246

** Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 11, there was a positive correlation between the two variables, $r = .41$, $n = 246$, $p < .000$, with high level of reading comprehension associated with high level of critical thinking. This indicates that the hypothesis is rejected and there is a moderate relationship between the Iranian students' critical thinking skills and their reading comprehension skills.

IV. DISCUSSION

Learning styles are approaches to learning and studying. Although many different learning styles have been described, but differences between deep and surface approaches to processing information in learning situations is the most of the styles (Snow, Corno, & Jackson, 1996).

The present study was firstly concerned with the field-dependence and independence and its relationship with reading proficiency. Field-dependent learners tend to perceive a pattern as a whole, not separating one element from the total visual field. They cannot focus on one aspect of a situation, picking out main details, analyzing a pattern into different parts. They tend to work well in groups, have a good memory for social information, and prefer subjects such as literature and history. In contrast, people with field independence are more likely to monitor their own information processing. They perceive separate parts of a total pattern and are able to analyze a pattern according to its components. They are not as attuned to social relationship as field dependent people, but in math and science, they do well.

Furthermore, another aspect of cognitive style is impulsivity versus reflectively. An impulsive learner makes many mistakes, but works very quickly. The more reflective learner, on the other hand, makes fewer errors but works slowly. As with field-dependence/independence, impulsive and reflective cognitive styles are not highly related to intelligence within the normal range.

The present study further investigated the critical thinking ability. As cited by Schafersman (1998) "Critical thinking is known as logical thinking, analytical thinking, reasonable thinking, higher order thinking, reasoning skills, and also scientific learning." To the ordinary world, critical thinking can also be described as the scientific method used by ordinary people. Rezaei et al. (2011) stated that critical thinking is scientific thinking and believe "this is true since critical thinking is aligned with the well-known method of scientific investigation: a question is posed and a hypothesis formulated, the hypothesis is further tested on the basis of the data, and conclusions are made at the end of the process. All the skills of scientific investigation map onto critical thinking abilities." (p. 770)

The findings of this study indicated that there was no meaningful and significant effect of field-dependency on reading comprehension of Iranian medical students. The mean scores of the reading test were 22.5 and 22.7 for field-dependent and independent learners, respectively.

Regarding the second research question of the study, the results revealed that there was no effect of reflectivity and impulsivity as cognitive styles on reading comprehension. The mean scores of reflective and impulsive learners were 22.86 and 22.36, respectively. This finding was in agreement with the findings of Lynee Hansen-Strain's (1987) and Jamieson's (1992) studies.

The present study revealed that impulsivity/reflectivity tendencies do not have a basic role in learning English as a foreign language among the Iranian EFL learners. That is to say, the findings of the present study indicate that personality trait does not facilitate learning English as a foreign language in terms of reading comprehension.

The last research question of the present study investigated the relationship between critical thinking ability of Iranian medical students and their reading proficiency. The mean score of the participants on critical thinking test was 22.68. The obtained results showed that critical thinking correlated positively and significantly with reading proficiency. This finding is consistent with other findings such as Dordinejad and Heydari (2012); Hosseini, Khodaei, and Dolatabadi (2012); Nikoopour, AminiFarsani and Nasiri (2011); Jamshidian and Khamijani Farahani (2010); Deghani, Jafarisani, Pakmehr and Malekzadeh (2011); Roghanizadeh (2011), and Nuray and Sezgi (2010). By analyzing the results of their study and the results of the present study, the researchers can claim that critical thinking affects language learning and this also supports the claim of Kamali and Fahim (2011) who reported EFL learners' critical thinking levels have significant effects on their reading comprehension ability when faced with unknown vocabulary items.

To sum up, this study showed that there is a close relationship between reading comprehension and critical thinking skill. In fact, reading, thinking, and especially critical thinking are interconnected, and they are logically dependent on each other. The results also indicated that field-dependence/independence and impulsivity/reflectivity cognitive style do not significantly affect the reading comprehension of Iranian medical university students.

A. Implications of the Study

The first and foremost implication of this study is the theoretical issue. In this study, the cognitive styles of field-dependence/independence and impulsivity/reflectivity were found to have no effect on the reading comprehension ability of the Iranian medical university students. Such a result can increase the validity of the test, as no bias was observed in the reading proficiency scores of the participants. The existence of such cognitive bias can negatively affect the validity of the test results.

Reading the pedagogical implications of the study, although the cognitive style did not have a significant influence on the results, teachers can observe and manipulate these traits in their classrooms and make learners conscious of their behavior. Impulsive learners can be advised to postpone their guesses until they become sure of the correctness of their answers. Contrary to impulsive, reflective learners should be taught to increase their speed since most tests are time limited.

Consequently, teachers who are aware of their learning styles, as well as the styles of their students, are better able to ensure that any differences between their learning styles will not impede learning. The key to teaching students with different learning styles is the identification of teachers' own learning style as well as the students' styles.

The findings of the critical thinking can be helpful to those who develop curriculum for EFL teachers because they can add some purposeful course(s) of reading with the aim of training capable and competent critical readers as well as critical thinkers. In addition, these findings might be of benefit to those who teach reading courses in English, to apply their creativity and add some suitable activities to increase learners' critical reading skill along with their critical thinking ability.

B. Suggestions for Further Study

The current study was exposed to a number of limitations. The following suggestions are offered for possible future studies. A) This study was conducted among medical university students. Participants from other fields of study can be selected for future research. B) Moreover, in this study, reading comprehension was chosen as a language skill. Further studies can take other language skills as listening, writing, and speaking. Finally, C) personal variables such as age and gender can be examined in future investigations in relation to the variables of the present study.

ACKNOWLEDGEMENT

I would like to thank some people from the early days. I feel a lasting gratitude to Dr. Mozayan, my best professor during my B.A. and M. A. degrees, and Dr. Sareban, the most reliable advisor, one could have. Most of all, I would like to thank my family, especially my dear daughter, Melina, for their absolute confidence in me.

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