



UNIVERSITI PUTRA MALAYSIA

***RELATIONSHIPS BETWEEN STUDENTS' PSYCHOLOGICAL FACTORS
AND SCIENCE PERFORMANCE AMONG IRANIAN STUDENTS***

MARYAM SAHRANAVARD

FPP 2012 46

**RELATIONSHIPS BETWEEN
STUDENTS' PSYCHOLOGICAL FACTORS AND SCIENCE
PERFORMANCE AMONG IRANIAN STUDENTS**

By

MARYAM SAHRANAVARD

**Thesis Submitted to the School of Graduate Studies, University Putra
Malaysia, in fulfilment of the Requirements for the Degree of
Doctor of Philosophy**

October 2012

Abstract of thesis presented to the Senate of University Putra Malaysia in
fulfilment of the requirement for the degree of Doctor of Philosophy

**RELATIONSHIPS BETWEEN STUDENTS' PSYCHOLOGICAL
FACTORS AND SCIENCE PERFORMANCE AMONG IRANIAN
STUDENTS**

By

MARYAM SAHRANAVARD

October 2012

Chairman: Siti Aishah Hassan, PhD

Faculty: Educational Studies

Numerous studies have been conducted on the relation between students' psychological factors and performance outcomes. Yet, no study investigated self-concept, self-efficacy, self-esteem and anxiety in science performance, simultaneously. Therefore, the main objective of the present study is to investigate relationship between self-concept, self-efficacy, self-esteem, anxiety, and science performance among Eighth Grade Iranian students with some demographic variables such as gender, geographical location and socio-economic status.

Six hundred and eighty Iranian eighth grade students were randomly selected out of twenty three schools. Five valid and reliable instruments were used to assess Self-concept Attribute Attitude Scale (SaaS), State-Trait Anxiety Inventory (STAI), Coopersmith Self-Esteem Inventory (CSEI), General Self-Efficacy scale

(GSE), and Science Self-Efficacy Questionnaire (SSEQ). Both descriptive and inferential statistics were used to analyze the data in the study using SPSS 18. The statistical techniques used were Descriptive Statistics, ANOVA, MANOVA, Multiple Regression Analysis, Pearson Correlation, and hierarchical Regression Analysis.

The results of ANOVA showed that there is no significant difference between male and female students in science performance, while, there is a significant difference between urban and suburban in science performance, and there is significant difference between low and high family's income groups in science performance. The results of MANOVA revealed that there were significant differences in the other variables between male and female groups except self-concept. Whereas, there were significant difference between groups (urban, suburban, rural areas) in science self-efficacy only. There were significant difference between groups (high, medium, low family's income) in science anxiety, self-esteem and self-efficacy. The results of multiple regression analysis showed that science self-concept and self-concept were statistically significant in science performance. The results of hierarchical regression analysis showed that gender did not moderate the relationship between predictor variables (science self-concept, self-concept, science anxiety, anxiety, self-esteem, self-efficacy, and science self-efficacy) and students' science score.

Therefore, based on the results of the findings mentioned, it is vital that the psychological theories about self-concept and science self-concept in science teaching were used. Hence, applying the knowledge and theories taught in Educational Psychology is important for teachers to know about their students' abilities. Consequently, it is important to focus on students' achievement and self-concept and science self-concept in guidance school education.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

HUBUNGAN ANTARA PELAJAR FAKTOR PSIKOLOGI DAN PRESTASI SAINS KALANGAN PELAJAR IRAN

Oleh

MARYAM SAHRANAVARD

October 2012

Pengerusi: Siti Aishah Hassan, PhD

Fakulti: Pengajian Pendidikan

Banyak kajian telah dijalankan ke atas hubungan antara faktor psikologi pelajar dan hasil prestasi. Namun, kajian tidak mengkaji konsep sendiri, efikasi sendiri, penghargaan sendiri, dan kebimbangan dalam prestasi sains, secara serentak. Oleh itu, Objektif utama kajian ini adalah untuk mengkaji hubungan antara konsep sendiri, efikasi sendiri, penghargaan sendiri, dan kebimbangan dalam prestasi sains di kalangan pelajar Iran dalam Gred Kelapan dengan beberapa pembolehubah demografi seperti jantina, lokasi geografi dan status sosio ekonomi.

Enam ratus lapan puluh pelajar Iran gred 8 telah dipilih secara rawak daripada dua puluh tiga buah sekolah. Lima instrumen yang sah dan boleh dipercayai telah digunakan untuk menilai konsep sendiri seperti *Self-concept Attribute Attitude Scale (SaaS)*, *State-Trait Anxiety Inventory (STAI)*, *Coopersmith Self-Esteem Inventory (CSEI)*, *General Self-Efficacy scale (GSE)*, and *Science Self-Efficacy*

Questionnaire (SSEQ). Kedua-dua statistik deskriptif dan inferensi telah digunakan untuk menganalisis data kajian menggunakan SPSS 18. Teknik statistik yang digunakan ialah Statistik deskriptif, ANOVA, MANOVA, Analisis Regresi Berganda, Korelasi Pearson, dan Analisis Regresi hierarki.

Hasil kajian analisis ANOVA menunjukkan bahawa tiada perbezaan di antara pelajar lelaki dan perempuan dalam prestasi sains, namun, terdapat perbezaan prestasi pelajar di bandar dan pinggir bandar dalam pencapaian dalam sains, dan terdapat perbezaan diantara pendapatan keluarga rendah dan tinggi dalam prestasi sains sahaja. Hasil kajian analisis MANOVA menunjukkan terdapat perbezaan yang signifikan dalam pembolehubah lain di antara dua kumpulan gender kecuali konsep sendiri. Terdapat perbezaan yang signifikan antara kumpulan (bandar, pinggir bandar, kawasan luar bandar) dalam bidang efikasi sendiri sains sahaja. Di samping itu terdapat perbezaan yang signifikan antara kumpulan pendapatan keluarga (tinggi, sederhana, dan rendah) dalam kebimbangan, harga diri dan efikasi sendiri. Hasil analisis regresi berganda menunjukkan bahawa konsep sendiri sains dan konsep sendiri adalah signifikan dalam prestasi sains. Hasil kajian regresi hierarki menunjukkan jantina tidak menyederhanakan hubungan antara pemboleh ubah peramal (konsep sendiri sains, konsep sendiri, kebimbangan sains, kebimbangan, harga diri, efikasi sendiri, dan efikasi sendiri sains) dan skor sains pelajar.

Oleh itu, berdasarkan hasil penemuan tersebut, ia adalah penting bahawa teori-teori psikologi tentang konsep sendiri dan sains dalam pengajaran sains digunakan. Oleh itu, mengaplikasikan pengetahuan dan teori-teori yang diajar dalam Psikologi Pendidikan adalah penting bagi guru-guru untuk mengetahui tentang kebolehan pelajar mereka. Oleh itu, ia adalah penting untuk memberi tumpuan kepada pencapaian dan konsep sendiri pelajar dalam pendidikan sekolah bimbingan.



DEDICATION

This thesis is dedicated to:

My Parents

*Absolutely my very greatest, very best and most wonderful friends of
all time,*

And,

Teachers who always affected my mind and memory;

May God blesses them



ACKNOWLEDGEMENTS

First of all, praise is to “ALLAH” the cherisher, and the sustainers of the world for giving me strengths, health and determination to complete this thesis. This research effort represents a culmination of advice and great support of many people to whom I am deeply grateful. I wish to express my utmost appreciation and deepest gratitude. I wish to express my utmost appreciation and deepest gratitude to the following individuals;

I am greatly indebted to my thesis supervisory committee members. I would like to acknowledge their patience, guidance, and willingness to share their knowledge, skills, and time and experience particularly, my supervisor Dr. Siti Aishah Hassan and the committee members.

To Dr. Siti Aishah for her efforts as the source of my success, strength and inspiration for this work, she is a sincere and extremely caring educator who has always encouraged me to be creative in my research work. She has always to bring out the best in me to be a good researcher. She also patiently perused and validated the contents of the research instrument, from time to time. Her constant constructive ideas and criticisms as well as invaluable advice throughout this study provided me with the right direction and motivation to successfully complete this study.

To Professor Habibah Elias, for her concern, support and valuable remarks for continuous guidance especially in the statistical analysis of the data. She provided the necessary suggestions and ideas that contributed to the quality of the study. She scrutinized this work specially my results and gave valuable feedback which greatly improved it. I really extend particular thanks for her work tirelessly at guiding and constructively criticizing every step of my work.

To Dr. Maria Chong Abdullah for her comments, guidance and support, she provided the necessary advices for this work regarding the research ethics. She was always ready to listen and to give advice when it was needed most. Her contribution encouraged me to complete this work.

To Professor Ali Reza Kiamanesh for his comments, guidance and support especially in the research method, Once more, I would like to express my gratitude to the panel of languages and instruments experts for their valuable comments and suggestions. I am also indebted to the administration of the Ministry of Education of Iran where data were collected for their permission to allow the data collection from their students.

Finally, I would like to acknowledge all types of support rendered to me technically, financially, and morally from other parties not mentioned here that helped to make this research a success.

I certify that a Thesis Examination Committee has met on 5-10-2012 to conduct the final examination of Maryam Sahranavard on her thesis entitled “Relationships between students’ psychological factors and science performance among Iranian students” in accordance with the Universities and University Colleges Act 1971 and the constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 march 1998. The committee recommends that the student be awarded the doctor of philosophy.

Members of the Thesis Examination Committee were as follows:

Aminuddin bin Hassan, PhD

Associate Professor
Faculty of Educational studies
Universiti Putra Malaysia
(Chairman)

Marof b Redzuan, PhD

Associate Professor
Faculty of Human Ecology
Universiti Putra Malaysia
(Internal Examiner)

Nor Hayati bt Alwi, PhD

Senior lecturer
Faculty of Educational studies
Universiti Putra Malaysia
(Internal Examiner)

Darlene Demarie, PhD

Associate Professor
University of South Florida
United States
(External Examiner)

SEOW HENG FONG, PhD

Professor and Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 26 February 2013

This Thesis was submitted to the senate of the University of Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as followed:

Siti Aishah Hassan, PhD

Senior Lecturer
Faculty of Educational Studies
University Putra Malaysia
(Chairperson)

Habibah Elias, PhD

Professor
Faculty of Educational Studies
University Putra Malaysia
(Member)

Maria Chong bt Abdullah, PhD

Senior Lecturer,
Faculty of Educational Studies
University Putra Malaysia
(Member)

Ali Reza Kiamanesh, PhD

Professor
Faculty of Psychology and Education
Tarbiat Moallem University, Tehran, Iran
(External Member)

BUJANG BIN KIM HUAT, PhD

Professor and Dean,
School of Graduate Studies
Universiti Putra Malaysia

Date:

DECLARATION

I declare that the thesis is on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for other degree at Universiti Putra Malaysia or at any other institution.

MARYAM SAHRANAVARD

Date: 05 October 2012

TABLE OF CONTENTS

ABSTRACT	Page ii
ABSTRAK	v
DEDICATION	viii
ACKNOWLEDGEMENTS	ix
APPROVAL	xi
DECLARATION	xiii
LIST OF TABLES	xix
LIST OF FIGURS	xxi
LIST OF APPENDIES	xxii
LIST OF ABBREVIATIONS	xxiii

1 INTRODUCTION	1
1.1 Chapter Overview	1
1.2 Background of the Study	1
1.3 Statement of Problem	5
1.4 Research Questions	7
1.5 Objectives of the Study	8
1.6 Research Hypotheses	9
1.7 Significance of the Study	13
1.8 Scope of the study	17
1.9 Definition of Terms	18
1.9.1 Students' Science Performance	18
1.9.1.1 Conceptual definition	18
1.9.1.2 Operational definition	19
1.9.2 Students' Psychological Factors	19
1.9.2.1 Conceptual definition	19
1.9.2.2 Operational definition	19
1.9.3 Self-concept	20
1.9.3.1 Conceptual definition	20
1.9.3.2 Operational definition	20
1.9.4 Science self-concept	21
1.9.4.1 Conceptual definition	21
1.9.4.2 Operational definition	21
1.9.5 Self-efficacy	21
1.9.5.1 Conceptual definition	21
1.9.5.2 Operational definition	22
1.9.6 Science self-efficacy	22
1.9.6.1 Conceptual definition	22
1.9.6.2 Operational definition	22
1.9.7 Self-esteem	23

1.9.7.1	Conceptual definition	23
1.9.7.2	Operational definition	23
1.9.8	Anxiety	23
1.9.8.1	Conceptual definition	23
1.9.8.2	Operational definition	24
1.9.9	Science anxiety	24
1.9.9.1	Conceptual definition	24
1.9.9.2	Operational definition	24
1.9.10	Gender differences	25
1.9.10.1	Conceptual definition	25
1.9.10.2	Operational definition	25
1.9.11	Eighth Grade in Iran	25
1.9.11.1	Operational definition	25
1.9.12	Demographic variables	26
1.9.12.1	Conceptual definition	26
1.9.12.2	Operational definition	26
1.9.13	Geographical location	27
1.9.13.1	Conceptual definition	27
1.9.13.2	Operational definition	27
1.9.14	Socioeconomic status	27
1.9.14.1	Conceptual definition	27
1.9.14.2	Operational definition	28
2	LITERATURE REVIEW	29
2.1	Chapter Overview	29
2.2	Educational System of Iran	29
2.3	Science Curriculum in Ministry of Education Iran	32
2.3.1	Science Curriculum in Eight Grades of Iran	33
2.4	Students' Psychological Factors and Science Performance	35
2.4.1	Self-concept	36
2.4.1.1	Academic self-concept	37
2.4.1.2	Science Self-Concept	39
2.4.2	Self-efficacy	44
2.4.2.1	Academic self-efficacy	45
2.4.2.2	Science Self-Efficacy	46
2.4.3	Self-esteem	48
2.4.3.1	Academic self-esteem	52
2.4.4	Anxiety	54
2.4.4.1	Academic anxiety	55
2.4.4.2	Science Anxiety	57
2.5	Previous Research Conducted on Relationship between Students' Psychological Factors and Science Performance	59
2.6	The Relevant Theories	68
2.6.1	Rogers' Theory of Self-concept	68
2.6.2	Bandura's Theory of Self-efficacy	71

2.6.3	Maslow's Theory of Self-esteem	74
2.6.4	Spielberger's Theory of Anxiety	79
2.7	Demographic Variables and Students' Psychological Factors	82
2.7.1	Geographical Location	82
2.7.2	Socioeconomic Status	84
2.8	Gender as Antecedent and Moderating variable	88
2.8.1	Gender as Antecedent and Moderating variable in Iran	92
2.9	Students' Psychological Factors and Guidance School (middle school years)	94
2.10	Previous Research Conducted on Students' Psychological factors and Science Performance in Iran	95
2.11	Conceptual Framework	97
2.12	Chapter Summary	98
3	METHODOLOGY	101
3.1	Chapter Overview	101
3.2	Research Design	101
3.3	Research Framework	103
3.4	Population and sample	105
3.4.1	Sample size determination	106
3.4.2	Sampling Technique of the study	109
3.5	Instruments of the Study	111
3.5.1	Demographic questionnaire	112
3.5.2	Self-Concept Attribute Attitude Scale (SaaS)	112
3.5.3	State-Trait Anxiety Inventory (STAI)	113
3.5.4	Coopersmith Self-Esteem Inventory (CSEI)	115
3.5.5	General Self-Efficacy (GSE)	116
3.5.6	Science Self-Efficacy Questionnaire (SSEQ)	117
3.5.7	Students' Science Performance Score (SSPS)	119
3.6	Validity and Reliability of the Instruments of the study	119
3.6.1	Validity of the instruments of the study	120
3.6.1.1	Validity of Self-Concept Attribute Attitude Scale (SaaS)	120
3.6.1.2	Validity of State-Trait Anxiety Inventory (STAI)	120
3.6.1.3	Validity of Coopersmith Self-Esteem Inventory (CSEI)	121
3.6.1.4	Validity of General Self-Efficacy (GSE)	122
3.6.1.5	Validity of Science Self-Efficacy Questionnaire (SSEQ)	122
3.6.2	Validity for Persian instruments of the study	123
3.6.2.1	Validity for Persian SaaS and SSEQ Version	123
3.6.2.2	Validity for Persian STAI, CSEI, and GSE Version	125
3.6.3	Validity of Students' Science Performance Score (SSPS)	126
3.7	Reliability of the instruments of the study	127
3.7.1	Pilot Study of the Instruments	131

3.7.1.1	Reliability of Self-Concept Attribute Attitude Scale (SaaS)	132
3.7.1.2	Reliability of State-Trait Anxiety Inventory (STAI)	133
3.7.1.3	Reliability of Coopersmith Self-Esteem Inventory (CSEI)	133
3.7.1.4	Reliability of General Self-Efficacy (GSE)	134
3.7.1.5	Reliability of Science Self-Efficacy Questionnaire (SSEQ)	134
3.7.2	Reliability of the Instruments in Final Stage	135
3.7.2.1	Reliability of Self-Concept Attribute Attitude Scale (SaaS)	135
3.7.2.2	Reliability of State-Trait Anxiety Inventory (STAI)	136
3.7.2.3	Reliability of Coopersmith Self-Esteem Inventory (CSEI)	136
3.7.2.4	Reliability of General Self-Efficacy (GSE)	137
3.7.2.5	Reliability of Science Self-Efficacy Questionnaire (SSEQ)	137
3.8	Data Collection Procedure	137
3.9	Data Analysis	138
4	RESULTS & DISCUSSION	141
4.1	Chapter overview	141
4.2	Participants' Profile	142
4.3	Preliminary Analysis	143
4.3.1	Descriptive Statistics	144
4.4	Factorial ANOVA for Science Performance in demographic variables	146
4.4.1	Investigation of assumptions of ANOVA	146
4.4.1.1	Normality	146
4.4.1.2	Equality of Variance	147
4.5	Factorial MANOVA for Demographic variables and Students' Psychological Factors	150
4.5.1	Investigation of assumption of MANOVA with respect to Gender	150
4.5.1.1	Normality	150
4.5.1.2	Outlier	151
4.5.1.3	Homogeneity of Variance-Covariance Matrices	152
4.5.2	Investigation of assumption of MANOVA with respect to Geographical Location	155
4.5.2.1	Normality	155
4.5.2.2	Outlier	157
4.5.2.3	Homogeneity of Variance-Covariance Matrices	157
4.5.3	Investigation of assumption of MANOVA with respect to Socio-Economic Status (family's income)	161
4.5.3.1	Normality	162

4.5.3.2	Outlier	163
4.5.3.3	Homogeneity of Variance-Covariance Matrices	163
4.5.4	Correlation among the Constructs	167
4.6	Multiple Regression Analyses (MRA)	168
4.6.1	Investigate assumptions of Multiple Regression	169
4.6.1.1	Multicollinearity	169
4.6.1.2	Singularity	169
4.6.1.3	Outlier	170
4.6.2	Regression	170
4.7	Hierarchical Multiple Regression (HMR)	172
4.7.1	Investigation of the role of Gender as a Moderating variable by Hierarchical Multiple Regression	172
4.8	Summary of Results	174
4.9	Discussion	176
4.9.1	Demographic Variables and Students' Science Performance	177
4.9.1.1	Gender differences in Students' Science Performance	177
4.9.1.2	Geographical Location differences in Students' Science Performance	177
4.9.1.3	Socio-Economic Status differences in Students' Science Performance	178
4.9.2	Demographic Variables and Students' Psychological Factors	178
4.9.2.1	Gender differences in Students' psychological factors	179
4.9.2.2	Geographical Location differences in Students' Psychological Factors	180
4.9.2.3	Socio-Economic Status differences in Students' Psychological Factors	180
4.9.3	Students' Psychological Factors and Science Performance	181
4.9.4	Gender as Moderating variable of Students' Psychological Factors and Science Performance	183
4.10	Chapter Summary	184
5	CONCLUSION, IMPLICATION & SUGGESTION	186
5.1	Chapter overview	186
5.1.1	Summary of the study	186
5.1.2	Conclusion of the study	188
5.1.3	Concluding Remark	191
5.2	Limitations of the study	194
5.3	Implications of the study	195
5.3.1	Theoretical Implication	195
5.3.2	Practical Implication	198
5.4	Suggestion for Future Research	200

REFERENCES	203
APPENDICES	224
BIO DATA OF STUDENT	274
LIST OF PUBLICATIONS	275

