

Meta-Analysis Relation to the Role of Psychological Characteristics on Academic Achievement

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ABSTRACT

This research was done in order to Meta-analysis thesis done in relation to the role of Psychological characteristics on academic achievement. Statistical population of this research was all theses of M.s and PhDs. at Tehran universities (between years 1375-1390) in the field of academic achievement. Among them, 32 theses were selected by Judgmental Method Samplings. Tools for data collection in this study were thesis and a researcher-designed questionnaire. The reliability of the questionnaires as narrative content was assessed. Validated questionnaire based on the Cronbach alpha coefficients were calculated and the coefficient for the questionnaire was obtained 0.88. Descriptive statistic methods in this study included abundance and percent abundance. Inferential data analysis techniques were: determination of studies effect size, 95 percent estimated distance, Z value for a significant effect size, evaluation of publication bias, combination of effect sizes, analysis of covariance, analysis of variance and Z test. Results of meta-analysis indicated there was significant relationship between academic achievement, and Psychological characteristics Effects (ES=0/10).

KEYWORDS: Meta-analysis; academic achievement; Psychological characteristics

INTRODUCTION

Human beings need to, actively and consciously, adjust their lives, improve their goals, and respectfully interact with others. These issues have close relationship with learning. Generally, learning is considered as the action or process of acquiring knowledge or skill. A sign to recognize learning in an individual is the behavior demonstrated by the individual. These behaviors include both hidden and apparent behaviors. Some scholars have defined academic achievement as: evaluating the learners' performance and comparing the obtained results with predetermined educational goals in order to decide whether the educational (training) activities of teacher and efforts (attempts) of students have led to desirable results? (Seif, 2008).

This means that a main part of learning occurs in the school, in addition to family. The individual's learning in school is demonstrated in form of the academic achievement behavior. Every student spends half of a day time, about 12 hours, in the school where learning, which is evaluated by academic achievement, occurs.

Academic achievement is one of the factors of acceptability in classroom. Also it is of high importance in relation to gain a good job and a good level of life. The final outcome of the training and educational systems is a number of educated individuals who have qualified some of the required characteristics. For instance, academic achievement leads to improved self-concept and increased psychological health. These positive characteristics (improved self-concept and psychological health) have positive effects on our lives. Studies have demonstrated that there is a relationship between psychological health and academic achievement (Bahrami Ehsan, Bagherpoor Kamachali, Ashtiani & Ahmadi, 2008; qf Talebian, 2011; Zeighami, Poor Bahaoddini Zarandi, 2011; Ghamari Mohammadbeigi & Mohammad Salehi, 2010). In other words, competency in learning is related to the psychological health.

Many of the academic achievement models are based on the variables whose environmental and educational aspects play more notable roles (Ma & Wang, 2010) and the psychological and personality-related factors are understated. Although in some models few psychological factors such as motivation, ability, control position, cognitive characteristics, identity, etc, have been considered (e.g. Pintrich & De Groot, 1990; Berzonsky & Kuk, 2005), many researchers (Singh et al, 2002) believe that academic achievement is influenced by numerous correlated

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variables such as abilities and personality and psychological characteristics of the student, student’s attitudes and perceptions, economic and social variables, effects of family. Most of these variables are student-oriented variables including the students’ psychological characteristics such as variables of self-efficiency, self-esteem, academic failure self-evaluation, and interest (attachment). Other variables are related to the attitude and thought (ideology) such as meta-cognition, curiosity, and so on.

Now the question is that: how much is the effect of psychological characteristics in academic achievement? Is the amount of this effect meaningful? In addition, how the psychological characteristics influence the academic achievement?

RESEARCH METHOD

The present research’s method is of “meta-analysis with study effect approach” type. The statistical society is comprised of MA (postgraduate) dissertations and PhD (doctorate) theses. The dependent variable’s subject of these dissertations is academic achievement and the independent variable is related to the psychological characteristics. Dissertations used in this research are of public and non-profit (non-governmental) universities in Tehran during 1376 to 1390.

The Method Sampling of the present research is of judgmental type. From among 230 dissertations on academic achievement 32 dissertations were recognized as appropriate for the meta-analysis. Evaluating the dissertations in order to choose the appropriate ones was done based on the following criteria:

1. Having relationship with MA or PhD courses;
2. Having variables (independent & adjusting) related to the psychological characteristics;
3. Having quantitative and statistical values and using experimental methods (field study);
4. Having sufficient information for calculating the effect’s size.

Methods of the inferential data analysis include: determining the studies’ effect size, investigating the publication bias, combining the effect sizes, analyzing the studies’ homogeneity, and determining the adjusting variables.

Research tools

In order to do the meta-analysis the variables were divided into two categories; namely, methodological variables and specific variables. The methodological variables include:

Table 1: methodological variables

Subject	Time zone	Tools	Location zone	Research method	Statistical method
Variable	Year of research	Type of tools	Method Sampling	Research method	Statistical tools
		Validity, reliability	Sample size	Research plan	
			Determine community		

The independent variables include:

In this research, with regard to the information extensiveness of the chosen dissertations, the study unit embraces all the dissertations or theses. Thus, the whole research unit was photographed and studies exactly.

Table 2: categorization of the psychological characteristics influencing the academic achievement

Psychological characteristics	Mental health, personality characteristics, education of the healthy relationships, anxiety sensitivity, introversion and extroversion, Coping with stress, education of the emotional intelligence, The evolution of time, self-regulating learning methods, behavioral-cognitive processing, Gender beliefs, meta-cognitive strategies
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Research findings

Is the size of the psychological characteristics’ effect on academic achievement meaningful?

This question deals with calculating the effect size of each study and then investigates their meaningfulness through the Z-test. The results of calculation are shown in table 2.

Table 3: effect size and its meaningfulness test for each study N=32

No.	Name of study	Statistical indices				
		Effect size R	Lower limit	Upper limit	Z value	P value
1	Abdoli 2011	0	-0.72	0.72	0	P>0.05
2	Mir Hoseini 2011	0.54	-0.05	1.13	1.78	P>0.05
3	Naderi 2011	0.21	-0.33	0.75	0.77	P>0.05
4	Jafari Nezhad 2011	0.29	-0.14	0.72	1.31	P>0.05
5	Ghasemi 2010	0.27	0.07	0.47	2.71	P<0.01
6	Shamsi 2009	0.17	-0.55	0.89	0.46	P>0.05
7	Es'hagh Milani 2009	0.13	-0.09	0.35	1.14	P>0.05
8	Tabatabaei 2009	0.12	-0.12	0.36	0.97	P>0.05
9	Sheikholeslami 2009	0.28	-0.20	0.76	1.15	P>0.05
10	Vadoodi Mofid 2009	0.03	-0.26	0.33	0.22	P>0.05
11	Shahrestanaki 2009	0.45	-0.02	0.92	1.88	P>0.05
12	Saraei zadeh 2008	0.03	-0.06	0.12	0.65	P>0.05
13	Hormozi 2008	0.06	-0.06	0.18	0.97	P>0.05
14	Barzegari 2007	0.21	0.04	0.38	2.42	P<0.05
15	Malek zadeh 2007	0.12	-0.12	0.36	1	P>0.05
16	Mansoori 2007	0.47	-0.01	0.95	1.90	P>0.05
17	Dehghan 2006	0.43	-0.04	0.90	1.78	P>0.05
18	Mohajer 2006	0.18	-0.10	0.46	1.25	P>0.05
19	Naghsh 2006	0.09	-0.05	0.23	1.24	P>0.05
20	Nikoo Gofar 2006	0	-0.64	0.64	0	P>0.05
21	Pahlevan Sadegh 2005	0.12	-0.09	0.23	1.14	P>0.05
22	Miraei 2005	0	-0.02	0.02	0	P>0.05
23	Hashemi 2004	0.1	-0.12	0.32	0.91	P>0.05
24	Haghighi 2002	0.27	0.11	0.43	3.35	P<0.05
25	Asani 2002	0	-0.02	0.02	0	P>0.05
26	Karim zadeh 2001	0.33	0.25	0.41	8.25	P<0.05
27	Kalantari 2001	0.33	0.12	0.54	3.06	P<0.05
28	Faramarzi 2000	0.28	0.26	0.30	28	P<0.05
29	Zokaei 1999	0.03	-0.14	0.20	0.36	P>0.05
30	Jameh Bozorg 1998	0.67	0.50	0.84	7.95	P<0.05
31	Nekooei 1998	0.28	-0.27	0.83	1.01	P>0.05
32	Moosavi Nezhad 1997	0.21	-0.21	0.63	0.97	P>0.05

In table 3 the first column indicates the researcher's name and year of the research. In the second column the index R has been calculated as the effect size (effect volume) of each study. And the third to sixth columns, respectively, demonstrate the upper and lower limits of 95% confidence gap, Z value, and its probability level. As it can be observed, except Barzegari86, Karimzadeh 80, Haghighi 81, Faramarzi 79, Jameh Bozorg 77, Ghasemi 89, and Kalantari 80 who have reported the meaningful effect, other studies demonstrate the meaningless effect.

In order to investigate the studies' publication bias the Nfs index (number of safe incomplete or number of faulty safe) has been used. The results show that Nfs=0.59; this means that we don't need to include the missed studies or studies with zero effect in this research because, in the present research, we have used dissertations and since all of the dissertations have been published it is evident that there is no publication bias.

Regarding the fact that the Nfs is equal to zero, the fixed effects model has been used. In order to examine the general meaningfulness of the size of the Mental disorder (disturbance) individual factors' effect on academic achievement, we performed Z-test after merging (combining) the studies.

Under the fixed effects model, the value of r effect size for 32 studies is equal to 0.10 which is included in 0.09-0.11 range with 99% confidence. This value of effect size is evaluated as a low value based on Kohen's interpretation. The Z value for the effect size is 18.75, which is meaningful with a probability less than 0.01; therefore, it can be concluded that, with 99% confidence, combination of the studies related to the effect of psychological characteristics on academic achievement is meaningful. In other words, based on the results obtained from combining 32 studies, the psychological characteristics have effect on the academic achievement.

As for examining the studies homogeneity test the $Q=X^2=383/52$ which is not meaningful with probability less than 0.01. So the hypothesis-0, expressing the studies homogeneity, is rejected and it is concluded that the under-

investigation studies group is not homogenous. This heterogeneity indicates existence of error variance in the effect size, which is resulted by other variables hence we examine the adjusting variables.

In the present research variables such as study assessment, research method, statistical method, dependent variable tools, test power, Sample size (sample size), and data accuracy underwent investigation as the adjusting variables. The effect sizes calculated in the adjusting variables were not meaningful. In other words, none of these variables acted as adjusting variables.

DISCUSSION AND CONCLUSION

Now we are going to proceed with the question: is the size of the psychological characteristics' effect on academic achievement meaningful?

Combination of the studies related to the effect of psychological characteristics on academic achievement is 0.10; that is, 10% of the academic achievement is related to the individual's psychological characteristics.

By examining homogeneity of the psychological characteristics studies the hypothesis-0, expressing the studies' homogeneity, with a probability less than 0.01 was rejected so it can be concluded that the under-investigation studies group is heterogeneous. Hence this heterogeneity is due to the error variance. Since the adjusting variables have had no effect, it appears that lack of precise and accurate tools (instruments) for measuring and evaluating the dependent variable has caused such heterogeneity, because in most of the dissertations the average has been used for measuring the academic achievement.

The effect size of this category on academic achievement was recognized meaningful but the obtained effect size has been calculated less than the real value. Regarding the fact that these psychological characteristics influence the academic achievement, the question is that what is the reason for existence of such an effect? To answer this question we can deduce four reasons: the first reason is related to the concept of self or self-concept. The factors influence the academic achievement from the self-concept aspect. Bloom points out that the individual's success in mastery-learning has positive effect on his self or self-concept concept, thus this kind of learning has been considered as one of the powerful sources of mental health (Seif, 2013). Learning to reach to the mastery level is one of the most powerful sources of the mental health and if the students are taught and educated through this method their need to the remedial and auxiliary methods will be reduced (Bloom, qf Sha'bani, 1992). In relation to the concept of self-education Bloom points out that: this concept is indication of the individual's general suppositions and assumptions about himself in relation to the academic learning. The student's successful and unsuccessful experiences in the first years of academic learning influence his assumptions about his ability in different areas, particularly education; this is called subject-related emotion (or lesson-related emotion). After gaining more experiences of this kind the academy-related emotion and finally the self-education concept (educational self-concept) are formed (Seif, 2013). By gaining evidences proving the individual's competency, especially during the childhood and latency period (6 to 11 years of age) and adolescence period, a powerful sense of self-confidence and self-respect and a powerful "I" (self or ego) is created in the individual. Since the school-time (6 to 18 years of age) embraces both the above-mentioned steps, it appears that the evidences of continuous success and failure in school have fundamental effects on the individual's mental health. Mental health and concept of self cannot be completely separated from each other. The mental health can be defined in positive relation with growth of the individual's "I", decrease of anxiety, ability of bearing pressure and deprivation, in addition to avoiding its negative effects (Bloom, 1986). Therefore increase of learning, on one hand, leads to improvement of educational self-concept and consequently reinforcement of academic achievement, and, on the other hand, influences the individual's mental health. Eizeng, in his theory, describes some personality characteristics which influence the individual's mental health. The type of the individual's personality has effects on his attitude toward his surrounding world and his thoughts. Eizeng has recounted the aspects of personality as extroversion, introversion, psychoneurotic temper, emotional stability, psychotic temper, pulse (stroke) control (Rio, 2010). On the whole it can be said that these individuals have better mental health. Higher emotional stability improves the ability of problem-solving and leads to the individual's better control on his life. Mental health and high academic achievement have relationship with each other.

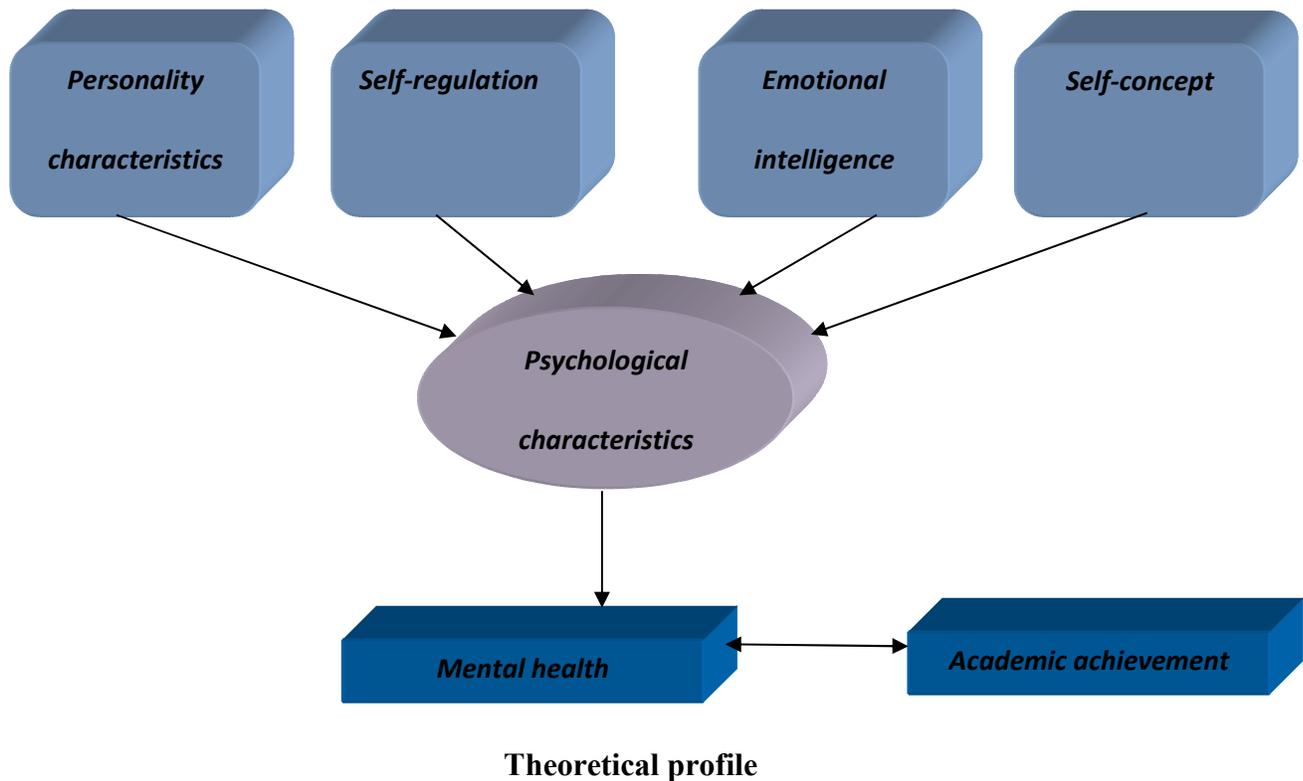
Besides, the self-regulating students have some characteristics such as internal motivation and self-sufficiency beliefs, apply more cognitive and meta-cognitive strategies, trust on their ability, use more sources to achieve their goals, and demonstrate better performance (Pintrich & Shunk, 2002). Bendora (1986) considers the self-regulating learning as including three sub-processes; namely, self-supervision, self-judgment, and self-reflection which have interaction with each other. Zimmerman (2001) assumes the self-regulating learning as a self-leading or self-guiding process through which the learners change their mental abilities into duty-related practical skills. In this approach,

learning is an activity which is done by the students through an active method. The self-regulating individuals should demonstrate higher academic achievement.

At the end, it is noted that in Bar-Ann (2006) the emotional quotient pattern is a combination of emotion-related capabilities, personality streaks, and other associated areas and fields; this is the reason for calling this pattern as combined pattern. Bar-Ann (2006) supposed the emotional intelligence as a set of abilities, capabilities, and skills which an individual acquires for effective adapting with the environment and gaining success in life. Gellman believes that emotional intelligence embraces both internal and external elements. The internal elements include the amount of self-consciousness, sense of independence, self-blooming capacity, and decisiveness; while, the external elements include inter-personal relationships, ease of sympathy, and sense of responsibility. It seems that those individuals with higher emotional intelligence have higher ability to accept the realities, better ability to solve the emotional problems, and proper ability to repel the stresses.

The psychological characteristics are those ones which exist in the person's sustainable aspects. The psychological characteristics are influenced by self-concept, emotional intelligence, self-regulation, and personality characteristics. The common factor in all of these variables is the mental health; that is, all of these variables can increase the mental health. Besides, there is a close relationship between mental health and academic achievement; a combination of all of these effects and relationships results in formation of such a relationship between these two variables.

To elaborate this finding it can be said that there is a mutual relationship between mental health and academic achievement. This relationship has created a health-achievement cycle. Academic achievement is capable of being manipulated while mental health cannot be directly manipulated. We cannot say that academic achievement influences the mental health or the mental health has effects on academic achievement since the relationship between these two variables is a cyclic relationship. By manipulating each of these variables, the other variables will undergo the effect.



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