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Relation Between Locus of Control, Personality Traits and Academic Achievement

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Abstract: As the development of the psychology, people conceive the thought to know themselves in depth and curious the relation and consequence of each personality trait will have and how external factors will affect them. Hence after the idea of locus of control was developed, study over locus of control and other characteristics is endless. This article aims to find the relation between locus of control and personal traits when adding the consideration of academic achievement. The author uses data from a study of a group of elder African American female that has age of 65 and older in U.S. collected in between 1999 and 2000. This article focus on the internal control, also known as agency, represent locus of control and personality traits will be represented by self-esteem and self-efficacy. The academic achievement will be reflected by educated time. The method of this article is using STATA regression analysis to see the correlation between each variable. In conclusion, in general the correlation between self-esteem or self-efficacy and internal control become more and more stronger as the education increase, i.e., for high education group, the higher self-esteem or self-efficacy one has, the more internal control one has. This logic is bidirectional. For additional summary in responding the actual influence to self-esteem or self-efficacy and further extended to locus of control brought by education variable, increasing the education level or academic achievement will improve the mental health and efficiency on working or studying to some extent.

Keywords: locus of control, self-esteem, self-efficacy, education

1. Introduction

Since the data related to the psychological level is difficult to measure and to quantify, for example the confidence, the examiner cannot obtain its value by direct observation, hence it is more difficult to come to a certain conclusion between two psychological variables. Furthermore, the research of relation between locus of control and personality traits is inadequate, hence this article aims to give a summary to the past related essays and try to repeat their process onto a new data set to verify. The importance to this study is researcher can obtain inspiration on studying related psychological disease and further mental problem. In addition, this article also verifies whether the previous study method is feasible on the new data, which is universality. In summary, this essay aims to have a conclusion to the relationship to the locus of control and self-esteem using the media of education.

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2. Background

Locus of control is a perspective of which forces individuals think or believe is controlling their lives. To measure one's locus of control, the examiner will do a 29-item (including 6 filler items) questionnaire. The quantify scale range is from 0 to 23, this outcome number is also known as rotter score which is developed by Rotter in 1966. There are two outcomes from this measurement. Lower score indicates the candidate is internal control; higher score indicates external control. In which, internal control is also called "agency". People with agency have belief what they will get is a cause of what they did, while those people with external control have belief that their behaviors and actions do not affect what they will obtain, that is the external environment decides their rewards. In other word, the former people believe in themselves, and the latter people believe in fate. There is survey shows that students with external control are more likely to have high depression score, which is related to many other mental health indicator. And research shows that more external locus of control has strong connection with higher probability of having depression [1]. Those both indicates that people with external control are highly likely to have mental disease such as depression. In addition, locus of control will also influence one's behaviors. People who have high external control recognize their actions and outcomes are a result of external environment influences or luck. For example, after finishing a test, external control candidates with high score will think that they did it well because the test was easy instead of their hard working on the study. Intuitively, locus of control will also influence one's personality. However, personality affects locus of control and even one's success. Study shows that this hold for Javanese female merchants in Surabaya [2]. Which the author thinks the point of view can be extended for all people. In conclusion, the locus of control will influence the mental health, behavior and is affected by the personality.

The core of the topic is about locus of control. Since it is regarded as a side of personality and characteristic, intuitively thinking it is independent to other personal characters. And this assumption has been verified by many studies. Hence it is needed to introduce a new variable that has relation to both locus of control and personality trait so that it can help the researcher to establish connection to the two known variables. Here the author chooses education. Education and individual mental characteristics have strong connection to each other. Research shows that multiple personality traits and academic achievement are significantly related, such as openness, agreeableness and so on, in which responsible is the most related characteristic to the study achievement [3]. Here the author will focus on discussing the self-esteem, self-efficacy and self-confidence for personal characteristic part. Since they can be quantified and expressed in the psychological tests. Research indicates that self-esteem and self-efficacy both have distinct correlation to the academic achievement, and self-esteem have stronger connection compared to the self-efficacy [4]. And the higher self-esteem is, the higher score one will get during the study. As for self-confidence, it is reported to be one of the predictors of academic achievement, even more efficient the self-esteem [5]. In conclusion, self-esteem, self-efficacy and self-confidence all contribute to the academic achievement, in which self-esteem or self-confidence can be used as main measure variable. Since academic achievement can be also represented as years of education, the author will use the time of education as a variable, which it is able to quantify. The feasibility of arguing over relation between rotter score and education has been verified. Research using 8th grade student data shows that there are positive correlation over these two variables, which is internal control students receive higher scores [6]. This assures the education has connection to both locus of control and characteristic.

3. Analysis

This article will use the data collected from a group of elder African American female in U.S. who has age of 65 and above. Here are several reasons choosing this particular study. First, although the

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data is collected more than 20 years ago, African American is the largest group of ethnic minority no matter 20 years ago or now in 2023 in U.S. population, and African Americans make up large proportion which is approximately one half of all racial minority elders [7]. This means that the data can represent the general situation for whole U.S. elder population. Second, the data has more than 500 cases, which is a sample large enough to analyze and can avoid the problem of outliers. Third, although this data set only contains female, there is a study shows the gender of the candidate is irrelevant. During the test of rotter score, the measurement of locus of control show that the statistical consistency between male and female [8]. So, the data has universality and it is suitable for this article. However, the data use multidimensional health locus of control (MHLC) scale instead of typical rotter score. MHLC is an upgraded method of measuring locus of control designed based on rotter score and is developed by Ken Wallston. It has three dimensions: Internality (I-HLOC); powerful others externality (P-HLOC) and chance externality (C-HLOC). Each dimension has 6 questions and each question with 1-6 points. The data using in this article is I-HLOC, which has the same logic as rotter score. The lower score one gets, the more internal control one will get; vice versa. Note here the external result in internality test means that the candidate does not believe themselves' actions can change what they will obtain, which is more focus on oneself. In the contrary, the P-HLOC and C-HLOC is focus on others and small possibility respectively. The only difference is the points of each question is adjusted from 1-6 to 1-4. The code for locus of control is IHLC4PT. The range of this data is from 6 to 24. This data has self-esteem and self-efficacy for characteristics trait variables. The self-efficacy, code SELFEFFICACY, has range 0-2. Since there is no measurement to self-confidence and self-esteem has higher correlation to locus of control, The author chooses self-esteem to be the main independent variable and self-efficacy the auxiliary independent variable in this article. In the data, self-esteem is measure by Rosenberg's self-esteem scale. This test contains 10 questions that measures both positive and negative feelings about oneself and each question has 1-4 points. Here the data adjusts from 10 questions to 6 questions. The code for self-esteem is SELFESTEEM. The range of this data is from 13 to 24. The academic achievement is expressed in education in years. The code for this is K5 and the range of it is from 1 to 17. With these four variables stated clearly, the analyze may begin.

To verify the data is reasonable and do not exist obvious deviation and outliers, the author uses the educational attainment survey in U.S. collected in 2000 to prove [9]. The survey shows that for 65-year-old and above group has population of 34,978,972. For high school graduate and more people is 65.5%; for some college and more people have 33.5%; for bachelor's degree and more people make up 15.4% and for more educated people is 6.4%. For the relevant data in this article is 70.9%, 40.8%, 13.4% and 9.4%, which is approximately the same as above survey. This implies that the data in this article is reliable, and the sample has no significant deviation to the population.

The author will use STATA to analyze the data. By doing a regression analysis between internal control and self-esteem, the p-value for this is 0.007. This implies it is insignificant under 5% significance hence the null hypothesis is rejected (Figure 1). Since the null hypothesis is that two variables are uncorrelated in the default setting in STATA, we have locus of control and self-esteem are correlated. This outcome is opposite to the assumption that locus of control is uncorrelated to other personal traits. However, there is study shows that the agency has positive connection with self-esteem while external control has negative impact and analysis indicates this is valid for both male and female [10]. This can prove that the reason internal control and self-esteem are correlated in STATA. Then by doing regression analysis on agency to education and self-esteem to education, the result p-values are 0.006 and 0.013 respectively as shown in Figure 1. By using the same way, it can show that the self-efficacy has correlation to locus of control and education. This indicates that in this data the education has correlation to internal control, self-esteem and self-efficacy, which accord with

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the research results mentioned before. Since there multiple research prove that self-esteem and self-efficacy has positive correlation the author will not mention it here.

Source	SS	df	MS	Number of obs	=	520
				F(1, 518)	=	7.36
Model	60.5143811	1	60.5143811	Prob > F	=	0.0069
Residual	4257.4837	518	8.21908049	R-squared	=	0.0140
				Adj R-squared	=	0.0121
Total	4317.99808	519	8.31984215	Root MSE	=	2.8669

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.1520623	.0560408	2.71	0.007	.0419672	.2621575
_cons	13.58053	1.230499	11.04	0.000	11.16315	15.99791

Source	SS	df	MS	Number of obs	=	520
				F(1, 518)	=	7.60
Model	62.4072355	1	62.4072355	Prob > F	=	0.0061
Residual	4255.59084	518	8.21542633	R-squared	=	0.0145
				Adj R-squared	=	0.0126
Total	4317.99808	519	8.31984215	Root MSE	=	2.8663

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
K5	.1263491	.0458427	2.76	0.006	.0362887	.2164095
_cons	15.35123	.5764998	26.63	0.000	14.21867	16.4838

Source	SS	df	MS	Number of obs	=	521
				F(1, 519)	=	6.24
Model	31.1379029	1	31.1379029	Prob > F	=	0.0128
Residual	2589.31891	519	4.98905378	R-squared	=	0.0119
				Adj R-squared	=	0.0100
Total	2620.45681	520	5.03934003	Root MSE	=	2.2336

SELFESTEEM	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
K5	.0892473	.035724	2.50	0.013	.019066	.1594287
_cons	20.74348	.4492124	46.18	0.000	19.86098	21.62598

Source	SS	df	MS	Number of obs	=	520
				F(1, 518)	=	13.56
Model	110.143653	1	110.143653	Prob > F	=	0.0003
Residual	4207.85442	518	8.12327109	R-squared	=	0.0255
				Adj R-squared	=	0.0236
Total	4317.99808	519	8.31984215	Root MSE	=	2.8501

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFEFFICACY	.8437505	.2291394	3.68	0.000	.3935937	1.293907
_cons	15.93066	.2918817	54.58	0.000	15.35725	16.50408

Source	SS	df	MS	Number of obs	=	521
				F(1, 519)	=	33.84
Model	9.47215385	1	9.47215385	Prob > F	=	0.0000
Residual	145.252228	519	.279869417	R-squared	=	0.0612
				Adj R-squared	=	0.0594
Total	154.724382	520	.297546888	Root MSE	=	.52903

SELFEFFICACY	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
K5	.0492238	.0084611	5.82	0.000	.0326015	.0658461
_cons	.5472101	.1063948	5.14	0.000	.3381927	.7562275

Figure 1: Result of the regression p-values between internal control, self-esteem, self-efficacy, education

To measure if the education level will actually affect the rotter score, it is important to have further classification to the candidates. The age of the examiners, code A1Y, has mean of 51 years old. By

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wikipedia, US has applied K-12 education system widespread since 1965s. Hence it is reasonable to assuming that the examiner all had K-12 education system. Hence, the author classifies the group as “primary”, corresponding to education less than 6 years; “middle”, corresponding to 6-9 years education; “high”, corresponding 9-12 yeas; “college”, corresponding to over 12 years education. Then doing regression between agency and self-esteem over these groups respectively, the p-values are 0.504, 0.487, 0.449, 0.023 as shown in Figure 2. Apparently, the former three are above 5% hence are significant and the last one is insignificant. This implies that the higher education group will have correlation between internal control and self-esteem. In addition, although education less than 12 years show the insignificant correlation among agency and self-esteem, the progressive increasing p-value indicates the trend is that as the education level increasing, the connection between internal control and self-esteem will become stronger and at some point they will be correlated. The author assume that the critical point is 12 years, which correspond to the high school degree and above. The same result has shown on the relation between agency and self-efficacy who has p-values of 0.655, 0.405, 0.036, 0.013 respective to each group in above order as shown in Figure 3. The only difference is the correlation start from “high” education instead of “college” education under 5% significance level. In summary, although the result is statistically insignificant, the trend is the higher education one has, the stronger connection between personal control and self-esteem or self-efficacy one will get.

Source	SS	df	MS	Number of obs	=	7
				F(1, 5)	=	0.52
Model	2.14880952	1	2.14880952	Prob > F	=	0.5036
Residual	20.7083333	5	4.14166667	R-squared	=	0.0940
				Adj R-squared	=	-0.0872
Total	22.8571429	6	3.80952381	Root MSE	=	2.0351

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.3958333	.5495421	0.72	0.504	-1.01681	1.808476
_cons	7.604167	11.87934	0.64	0.550	-22.93264	38.14098

Source	SS	df	MS	Number of obs	=	49
				F(1, 47)	=	0.49
Model	3.26773435	1	3.26773435	Prob > F	=	0.4873
Residual	313.262878	47	6.66516761	R-squared	=	0.0103
				Adj R-squared	=	-0.0107
Total	316.530612	48	6.59438776	Root MSE	=	2.5817

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.116281	.1660699	0.70	0.487	-.2178086	.4503707
_cons	13.7731	3.520398	3.91	0.000	6.690968	20.85522

Source	SS	df	MS	Number of obs	=	95
				F(1, 93)	=	0.58
Model	5.19987787	1	5.19987787	Prob > F	=	0.4490
Residual	836.421175	93	8.99377607	R-squared	=	0.0062
				Adj R-squared	=	-0.0045
Total	841.621053	94	8.95341545	Root MSE	=	2.999

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.0946338	.1244574	0.76	0.449	-.1525139	.3417815
_cons	14.39616	2.735769	5.26	0.000	8.963461	19.82885

Source	SS	df	MS	Number of obs	=	369
				F(1, 367)	=	5.21
Model	43.0324238	1	43.0324238	Prob > F	=	0.0230
Residual	3031.72096	367	8.26082006	R-squared	=	0.0140
				Adj R-squared	=	0.0113
Total	3074.75339	368	8.35530812	Root MSE	=	2.8742

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.1569006	.0687445	2.28	0.023	.0217179	.2920832
_cons	13.67551	1.516241	9.02	0.000	10.6939	16.65712

Figure 2: Result of different educated groups p-values between internal control and self-esteem

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Source	SS	df	MS	Number of obs	=	7
				F(1, 5)	=	0.52
Model	2.14880952	1	2.14880952	Prob > F	=	0.5036
Residual	20.7083333	5	4.14166667	R-squared	=	0.0940
				Adj R-squared	=	-0.0872
Total	22.8571429	6	3.80952381	Root MSE	=	2.0351

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.3958333	.5495421	0.72	0.504	-1.01681	1.808476
_cons	7.604167	11.87934	0.64	0.550	-22.93264	38.14098

Source	SS	df	MS	Number of obs	=	49
				F(1, 47)	=	0.49
Model	3.26773435	1	3.26773435	Prob > F	=	0.4873
Residual	313.262878	47	6.66516761	R-squared	=	0.0103
				Adj R-squared	=	-0.0107
Total	316.530612	48	6.59438776	Root MSE	=	2.5817

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.116281	.1660699	0.70	0.487	-.2178086	.4503707
_cons	13.7731	3.520398	3.91	0.000	6.690968	20.85522

Source	SS	df	MS	Number of obs	=	95
				F(1, 93)	=	0.58
Model	5.19987787	1	5.19987787	Prob > F	=	0.4490
Residual	836.421175	93	8.99377607	R-squared	=	0.0062
				Adj R-squared	=	-0.0045
Total	841.621053	94	8.95341545	Root MSE	=	2.999

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.0946338	.1244574	0.76	0.449	-.1525139	.3417815
_cons	14.39616	2.735769	5.26	0.000	8.963461	19.82885

Source	SS	df	MS	Number of obs	=	369
				F(1, 367)	=	5.21
Model	43.0324238	1	43.0324238	Prob > F	=	0.0230
Residual	3031.72096	367	8.26082006	R-squared	=	0.0140
				Adj R-squared	=	0.0113
Total	3074.75339	368	8.35530812	Root MSE	=	2.8742

IHLC4PT	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
SELFESTEEM	.1569006	.0687445	2.28	0.023	.0217179	.2920832
_cons	13.67551	1.516241	9.02	0.000	10.6939	16.65712

Figure 3: Result of different educated groups p-values between internal control and self-efficacy

After verified the relation between these variables, the author will try to establish connection between internal control and self-esteem using education by previous studies. In a Nigerian study of relationships locus of control, self-esteem and study scores in a group of students shows that locus of control have huge interrelation with achievement during the study and since self-esteem is positively related to academic score hence there is relevance between personal control and self-esteem and some other personalities [11]. This is the same opinion that this article wants to show. However, the

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variables in this study is too wide that the data in this article do not meet the requirement to repeat this method of analysis. Another study over this indicates the background education is a factor needed to consider, it mentions that educational or occupational attainments are able to affect locus of control to some extent and may be influence to psychological variables such as self-esteem further[12]. And the author attempts to use the parental education to replace the educational attainment variable, but failed because the missing value for parental education is more than 50%, therefore it may be not convinced enough to have a conclusion for it. Hence this method is also inimitable in this data.

4. Suggestions

There are some problems and suggestions need to be mentioned. When measuring locus of control, no matter which questionnaire is used, the outcome of internal or external control is relatively. Since the result of these questionnaire is numbers and definition of internal and external base on a general standard, for example in Rosenberg's Self-esteem Scale has score range of 0-30 and for score over 25 points implies high self-esteem, for score lower than 15 points stands for low self-esteem, and for those scores in between 15-25 points show medium self-esteem which is a transition range in between high and low [13]. It is obvious the critical points are 15 and 25. In this case, people score 1 and 11 are both called high self-esteem, however the latter one may not be as "high" as the former one is, the result still be the same. The same situation appears in locus of control too, it is confused to connecting the number with a certain psychological condition. So, the data in this article only reflect this certain group at this certain time, as the locus of control may varies from time to time. However, the conclusion in this article will not be changed by this since the measurement of locus of control is a continuous value, that is, the real condition of a person is floating around the outcome number. And the range of it may varies from each individual but will not be very wide. Furthermore, fewer people are entirely internal or external control. Most people are identified as a bit of both internal and external control at the same time, since they lie between the continuum of the two extremes. For example, one has internal control but still believe there are things that are not in their control. In this circumstance, if the reader wants to add this complex variable in, further discussion is needed. But a rough sketch is to use the MHLC score and do regression analysis over I-HLOC, P-HLOC and C-HLOC respectively. Then researchers may have more finding for group of people that are both internal and external. Moreover, the data this article using is not good enough, it is better to have field investigation so that researcher can choose the ideal variables by themselves. The author tried several methods that previous studies and research used but failed all due to lack of detailed variables. Hence the validity of those method is left to be checked be the readers.

In addition, the high correlation between education and self-efficacy may be attributed to a viewpoint that academic self-efficacy can be used to forecast academic achievement, not only the score during the study but also the completeness of how to think and see a subject, and academic achievement is considered as a part of self-efficacy [14]. A noticeable situation in this data is that although the trend of p-values of self-esteem and self-efficacy both are decreasing with the ascending of education time, the acceleration of self-efficacy is larger than self-esteem, that is the p-value trend is steeper compared to self-esteem and p-value indicate self-efficacy has correlation with agency from 9 years of education. This phenomenon may be attributed to above study. Since they are inclusion relation, it is inevitable that they will highly correlated. Hence the discussion between self-efficacy and education seems to be unnecessary. Nonetheless, the author have chosen two independent variables to study, so despite self-efficacy is a controversial variable to education, the conclusion will still hold.

Another suggestion is that the education level is an essential factor when discussing the locus of control and personal traits. Although the conclusion this article made is that the correlation between internal control and self-esteem or self-efficacy become higher as the educated time increase, this is

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a general trend that the author interprets from the data, i.e., the decreasing p-value implies that the two variables are becoming more and more correlated and finally at some point they are correlated. But this data set shows that the critical point of educated time is 12 years, so for less than 12 years internal control and self-esteem or self-efficacy are not actually correlated yet. The author's opinion is that this is probably one of the reasons that the locus of control is considered as irrelevant to self-esteem or self-efficacy since many research did not classify the education level or did not notice the correlation start when educated time is high.

5. Conclusion

In conclusion, although locus of control is not statistically correlated to self-esteem and self-efficacy, the author finds their connection and establish simple logic relation. That is, with the assist of education factor, the internal control has positive correlation to self-esteem and self-efficacy. Furthermore, the higher the education level the stronger relation they will have, for example, for people who have education level of university and above, their high self-esteem and self-efficacy implies they have relative internal locus of control, and this logic is bidirectional. This phenomenon is supported by the STATA regression analysis in this article as shown in Figure 2&3. In summary of extension, education is essential, since high education level will increase self-esteem and self-efficacy. The author interprets this process as promoting mental health, since self-esteem and education are positively correlated, and education negatively correlated to external control where external control is related to mental problem. High self-esteem also will show a positive and even optimistic attitude to the society. For self-efficacy, it reflects the efficiency of people's work and study. Also, when people with high self-efficacy encounter difficulties and obstacles, they are more likely to choose to face them directly and overcome them instead of trying to avoid them. Therefore, increase the education time or academic achievement will benefit one's mental health and the efficiency in life and positive attitude when facing problems and challenges.

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