

Does Pygmalion effect and Psycap Impact Academic Performance?

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To Cite this Article

Dr. S Gayathri and Dr. A S Saranya, "Does Pygmalion effect and Psycap Impact Academic Performance?", *International Journal for Modern Trends in Science and Technology*, 6(10): 96-102, 2020.

Article Info

Received on 26-September-2020, Revised on 10-October-2020, Accepted on 12-October-2020, Published on 18-October-2020.

ABSTRACT

Psychological capital defined as the optimistic and developmental state of an individual (Luthans et al., 2007) predicting a wide range of work-related behavioural and attitudinal outcomes and being positively associated with health, performance, satisfaction etc., and negatively associated with anxiety, depression, substance use etc. "Self-Fulfilling Prophecy" or "Pygmalion effect", is that which one person expects of another, which can come to serve as a self-fulfilling prophecy (Rosenthal & Jacobson, 1968). In the field of educational psychology Self-Fulfilling Prophecy or Pygmalion effect determines the impact of teacher's behaviour on the student's academic performance whereas Psychological capital measures an individual's state of mind of student. The study is unique since it aims to analyse the impact of an internal factor (psycap) and an external factor (Pygmalion effect) on the student's academic performance wherein the students are categorized into two groups namely high achievers and low achievers based on their academic results. This study aims to identify how educationists can use Neural Networking to understand the impact of the predictors' namely internal factor (Psychological capital) and external factor (Self Fulfilling Prophecy) on students' academic performance. The results showed that the most powerful predictor of Pygmalion effect is Teacher's Supportive Behaviour and of Psychological Capita is resilience.

KEYWORDS: Pygmalion effect, self-fulfilling prophecy, low achievers, high achievers, psycap

I. INTRODUCTION

PYGMALION EFFECT, SELF-FULFILLING PROPHECY, LOW ACHIEVERS, HIGH ACHIEVERS, PYSCAP

Psychological capital is a core construct developed by Fred Luthans based on the higher order construct of Positive Organisational Behaviour (POB). It is defined as the optimistic and developmental state of an individual (Luthans et al., 2007) predicting a wide range of work-related behavioural and attitudinal outcomes. Luthans et al. (2007) proposed that PsyCap offers a more comprehensive, higher-order conceptual

framework for understanding and capitalizing on human assets in organizations. It is positively associated with health, performance, satisfaction etc., and negatively associated with anxiety, depression, substance use etc.

Research has proved that PsyCap consists of four dimensions namely self-efficacy, hope, resilience, and optimism (Luthans et al., 2007). **Self-efficacy** refers to the confidence about one's abilities to use the cognitive resources, motivation, and courses of action to complete various tasks in a job context. **Hope** is the conviction of one's ability to continue working towards goals and find ways to

achieve them, even in difficult circumstances. It refers to a positive motivational state based on a sense of goal-directed energy and planning to meet goals. **Resilience** refers to the capability to overcome adversity and failure situations. **Optimism** is considered as attitudinal characteristics attributing positive events as permanent, personal, and pervasive, while expecting negative events as temporary, external, and situation-specific. There are a number of contextual factors that can affect the level of efficacy, hope, resilience, and optimism. Luthans et al. (2007) claimed that employees with high level of PsyCap are more intrinsically motivated and proactive at work.

SELF FULFILING PROPHECY or PYGMALION EFFECT

The myth of Self Fulfilling Prophecy or Pygmalion effect can be traced back to Greek mythology. Pygmalion was the king of Cyprus and also a sculptor. He carved a statue of a woman, which he fell in love with. He prayed continuously to Aphrodite, the Goddess of Love to bring her to life and granting his wish the statue came to life, thus fulfilling his prophecy. The statue was named Galatea. The basic Pygmalion story has been widely transmitted and re-presented in the arts through the centuries. For example, George Bernard Shaw's "Pygmalion" (1912, staged 1914), portrayed a king who lacked interest in women, but one day fell in love with a young beggar-girl, later educating her to be his queen. The play was the basis for the Broadway musical "**My Fair Lady (1956)**".

Thus "Self Fulfilling Prophecy" or "Pygmalion effect", is that which one person expects of another, which can come to serve as a self-fulfilling prophecy" (Rosenthal & Jacobson, 1968). In the field of education Rosenthal and Lenore Jacobson (1968) piloted a study that showed the degree to which teacher expectations influence student's experiences and motivation to learn. Positive expectations influence student's experiences, motivation to learn and perform positively, and negative expectations influence learners' experiences and motivation to learn and perform negatively. In educational spheres, this has been labelled the Pygmalion Effect, or Self-Fulfilling Prophecy.

Therefore, Pygmalion effect contains mutually positive expectations and negative expectations with respect to teacher's controlling and supportive behaviour. If teachers express positive/ negative expectations to learners, the students will get into favourable/ unfavourable learning situations resulting in high achievers / low achievers respectively. According to this phenomenon, higher expectations can lead to an increase in performance. Psychologists from the University of Michigan and Rutgers University concluded that teacher expectations can predict student achievement for years. Thus Pygmalion Effect is a form of self-fulfilling prophecy which can predict how teacher expectations influence student performance. In this study, teachers' behaviour is divided into two categories: (1) Teachers' Supportive Behaviour and (2) Teachers' Controlling Behaviour. Thus, the students' perception of whether they find their teacher more supportive or whether they find them more controlling is measured.

REVIEW OF LITERATURE

Lynn, Powell, and Adama (2016) in a study "An intervention to enhance psychological capital and health outcomes in homeless female youths" found that intervention participants had significant improvements in psychological capital, hope, resilience, and self-efficacy to refuse alcohol and substance abuse. **Dina, Paul, and Harms** (2015) conducted a study to see the effect of Psychological capital on Mental Health and Substance abuse and found that the effects of psychological capital on mental health diagnosis were mediated by soldiers' overall health perceptions. **Azimi** in 2014 conducted a research study to determine the role of Psychological Capital in predicting Mental Health and Well-being of 280 female employees and found a significant positive correlation between Psychological Capital and Well-being and also between PsyCap and Mental Health. **Davood, Hasan and Javanmard** (2013) carried out a research study comparing psychological capital and Meta-cognitive beliefs between drug dependent students and normal students and found that both the groups differ significantly in terms of psychological capital and meta-cognitive beliefs. Drug-dependent students suffer lower psychological capital and impair meta-cognitive beliefs than normal students. The study conducted by Sandra Teodora Carmne

(2013) revealed that the students who had consistent presence at courses were aware of the teacher's positive approach and benefitted from its influence. The study undertaken by Leonard Karakowsky (2012) revealed that Pygmalion model had offered tremendous insight into the power of leader expectations. Jit Chang's (2011) study on "Teacher expectation and student achievement" concluded that there was no doubt that teacher's motivation and enthusiasm influenced student motivation and student performance. Tripathi and Pankaj (2011) conducted a study aimed to explore the role of Psychological Capital on employee Well-being and Satisfaction with Life and results revealed that Psychological Capital is a better predictor of employee Well-being and Satisfaction with Life.

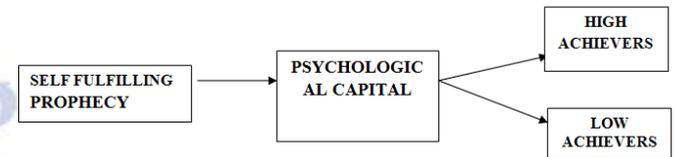
NEED FOR THE STUDY

Education plays a vital part in life today and is a subject that has been frequently explored by researchers the world over. It is through extensive research that better systems have been developed in the field of education to impart knowledge effectively and to understand better the student-teacher psychology. In order to investigate and develop better understanding of educational psychology, research on the perception of students regarding their teachers and the effect it has on their performance in class has been conducted. Self-Fulfilling Prophecy or Pygmalion effect determines the impact of teacher's behaviour on the student's academic performance whereas Psychological capital measures an individual student's state of mind. The study is unique since it aims to analyse the impact of an internal factor (psycap) and an external factor (Pygmalion effect) on the student's academic performance wherein the students are categorized into two groups namely high achievers and low achievers based on their academic results. Since there is dearth of literature wherein both an internal factor and an external factor has been considered together, this study will bring to light new perspectives relating to the impact of Pygmalion effect on Psychological capital and academic performance of the students. This study aims to identify how educationists can use Neural Networking to understand the impact of the predictor's namely internal factor (Psychological capital) and external factor (Self Fulfilling Prophecy) on students' academic performance. This will definitely help

teachers to design timely interventions that enhance students' performance.

CONCEPTUAL FRAMEWORK

The conceptual model developed and tested for the study is given below



OBJECTIVES OF THE STUDY

The objectives are

- i) To examine the factors of Self Fulfilling Prophecy or Pygmalion effect
- ii) To examine the factors of Psychological capital
- iii) To examine the independent impact of Pygmalion effect and Psychological capital

on High Achievers and Low Achievers

RESEARCH METHODOLOGY

Primary data has been collected through a structured standardised questionnaire by adopting purposive sampling technique for selecting students based on academic performance classified into two groups as High Achievers (above 75% marks) and Low achievers (below 50% marks). 50 UG and 50 PG students constituted the sample. The statistical tools used were weighted mean and neural networking.

FINDINGS AND DISCUSSIONS

Table No: 1 Self Fulfilling Prophecy or Pygmalion Effect- Weighted Mean

S.NO	FACTORS	WT.MEAN
1	Controlling Behaviour	3.47
2	Supportive Behaviour	3.50

The above Table depicts the weighted mean score of Teacher's supportive and controlling behaviour which were measured using 10 statements each. It is found that the supportive behaviour (3.50) of the teacher has the highest weighted mean score than controlling behaviour. The students opine that the teacher's advice, support, encouragement and praise motivate them to become High Achievers. It is also inferred that the teacher's controlling behaviour has the weighted mean score of 3.47 indicating that the teacher also pays a lot of attention to the student's disciplinary problems in

order to keep them under control, frequently warning and scolding them on disciplinary issues.

Table No:2 Psychological Capital – Weighted Mean

S.NO	FACTORS	WT.ME AN
1	Resilience	3.80
2	Self efficacy	3.73
3	Hope	3.03
4	Optimism	3.30

The four factors of Psycap namely resilience, self-efficacy, hope and optimism are measured on a five point Likert scale of six statements each. Out of the four factors Resilience (3.80) has emerged with the highest weighted mean score followed by Self Efficacy (3.73), Optimism (3.30) and Hope (3.03). With respect to the factor **Resilience** the students opine that they can decide on their own and handle difficult times. They are confident that they can manage stressful situations tactfully in one way or another in the class. As regards **Self Efficacy**, the level of the confidence of the students are really high in setting a target for themselves, presenting the information and in getting touch with the people even outside the class. They also feel confident in analysing a problem discussing about their performance with their teachers. As far as **Hope** is concerned, they have very high positive hopes, that there are lots of ways to solve any problem and they also opine that they think of many ways to get out of it. They also can think of many ways to reach their goals which they energetically pursue with great hope. They are very much **optimistic** about their future and they always look at the brighter side of their college life and always expect the best even if situations are uncertain.

NEURAL NETWORKING

Multilayer Perceptron type neural networks consist of neurons or nodes which are information processing units arranged in three layers and interconnected by synaptic weights (connections). The three layers are The Input layer, The Hidden layer, and The Output layer.

NEURAL NETWORK – SELF FULFILLING PROPHECY

The aim of this study was to determine whether Multilayer Perceptron Neural networking can help teachers identify the important predictors of Pygmalion effect on high achievers and low achievers.

Table No.3 shows the number of neurons in every layer and the two independent variables namely Teachers’ Supportive Behaviour and Teachers’ Controlling Behaviour. There is one node for the hidden layer and two nodes for the output layer. For the hidden layer, the activation function was the hyperbolic tangent, while for the output layer Softmax function was used. Cross entropy was used as error function because of the use of Softmax function.

Table No. 3 Network Information – Self Fulfilling Prophecy

Input Layer	Covariates	1	Supporting behaviour
		2	Ctrl behaviour
Hidden Layer(s)	Number of Units ^a		2
	Rescaling Method for Covariates		Normalized
	Number of Hidden Layers		1
Output Layer	Number of Units in Hidden Layer 1 ^a		1
	Activation Function		Hyperbolic tangent
Output Layer	Dependent Variables	1	Achievers
	Number of Units		2
	Activation Function		Softmax
	Error Function		Cross-entropy

a. Excluding the bias unit

Figure No.1 shows the two input nodes (Teacher’s Supportive Behaviour and Teacher’s Controlling Behaviour), one hidden node and two output nodes, representing High Achievers (Achievers =1) and Low Achievers. (Achievers = 2). Self-Fulfilling Prophecy (Input layer) covariates with these two output layers. The figure below depicts the impact of the factors of Pygmalion effect on the academic performance of the two groups of the students. Teacher’s supportive behaviour seems to predict better performance of high achievers than teacher’s controlling behaviour.

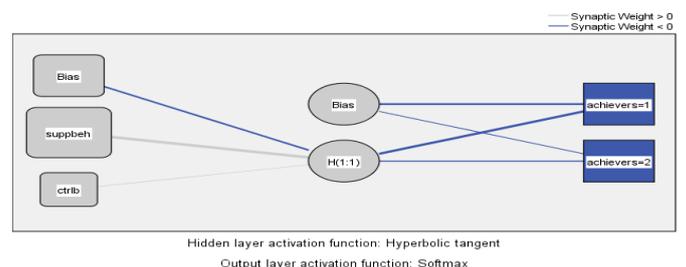


Figure No.1 Self Fulfilling Prophecy – Neural Networking

Table No. 4 which displays the synaptic weights (contributory and inhibitory) attached to the two input variables of Pygmalion effect, affecting the hidden node show the interconnection strength of the input and output layer. The parameter estimate value ranges from +1 to -1.

Table No. 4 Parameter Estimates - Self Ful filling Prophecy

Predictor	Predicted		
	Hidden Layer 1	Output Layer	
	H(1:1)	[achievers =1]	[achievers =2]
Input Layer (Bias)	-0.136		
Support beh	0.587		
Ctrl beh	0.012		
Hidden Layer 1 (Bias)		-0.344	-0.0071
H(1:1)		-0.404	-0.0125

Table No. 4 reveals that Teachers’ Supportive Behaviour (0.587) and Teachers’ Controlling Behaviour (0.012) shows the positive impact on hidden node 1, with teachers supportive behaviour having a stronger impact on the students than teachers controlling behaviour.

Table No.5 Classification Matrix – Self Ful filling Prophecy

Sample	Observed	Predicted		
		1	2	Percent Correct
Training	1	0	26	0.0%
	2	0	38	100.0%
	Overall Percent	0.0%	100.0%	59.4%
Testing	1	0	19	0.0%
	2	0	17	100.0%
	Overall Percent	0.0%	100.0%	47.2%

Dependent Variable: achievers

Table No.5 displays a classification table for categorizing dependent (outcome variable), that is, High Achievers and Low Achievers by partition and overall. In the training sample the accuracy of the model was 59.4% and in the testing sample, the

accuracy of the model was 47.2%, indicating prediction accuracy.

Normalized importance shown in chart 1 below is simply the importance value divided by the largest importance value and is expressed in percentages (Table No. 6)

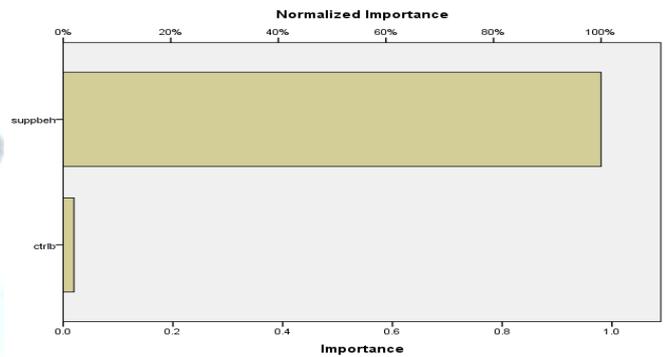


Chart No. 1 Importance – Self Fulfilling Prophecy

Table No.6 Independent Variable Importance – Self Ful Filling Prophecy

	Importance	Normalized Importance
Supportive behaviour	0.980	100.0%
Controlling behaviour	0.020	2.0%

Chart No.1 and Table No.7 gives the impact of the each independent variable in terms of relative and normative importance. From both it is apparent the teacher’s supportive behaviour has the greatest impact on students’ performance to the extent of 98% whereas teacher’s controlling behaviour is able to predict performance only to the extent of 2%.

NEURAL NETWORK – PSYCHOLOGICAL CAPITAL

This study also aimed to determine whether Multilayer Perceptron Neural networking can help to identify the important predictors of Psycap on high achievers and low achievers.

Table No.7 shows the number of neurons in the input layer, ie, the four independent variables, namely self efficacy, hope, resilience and optimism. There are four nodes for the hidden layer and two nodes for the output layer.

Table No. 7 Network Information - Psycap

Input Layer	Covariates	1	Selfefficacy
		2	hope
		3	resilience
		4	optimism
	Number of Units ^a		4
	Rescaling Method for Covariates		Normalized
Hidden	Number of Hidden Layers		1

Layer(s)	Number of Units in Hidden Layer 1 ^a	4
Output Layer	Activation Function	Hyperbolic tangent
Dependent Variables	1	achievers
Number of Units		2
Activation Function		Softmax
Error Function		Cross-entropy

a. Excluding the bias unit

Figure No.2 shows the four input nodes, four hidden nodes (self-efficacy, hope, resilience and optimism) and two output nodes, representing High Achievers (achievers =1) and Low Achievers (achievers = 2). Psycap (Input layer) covariates with these two output layers. The figure below depicts the impact of the factors of Psycap on the academic performance of the two groups of the students. Resilience seems to predict better performance than the other three factors of Psycap for low achievers, whereas hope and optimism seem to predict better performance for high achievers than the other two factors of psycap.

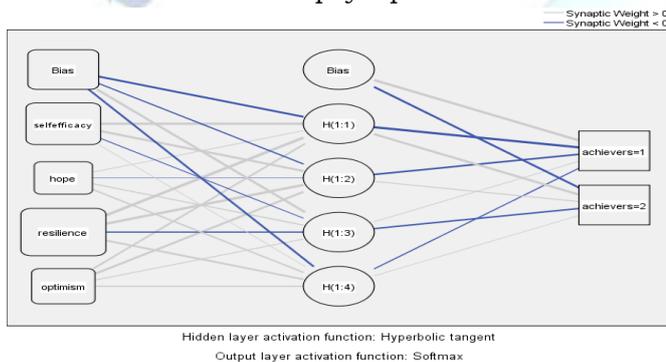


Figure No.2 Psychological Capital - Neural Networking

Table No.8 which displays the synaptic weights (contributory and inhibitory) attached to the four input variables of Psychological Capital, affecting the hidden node is explained below.

Table No. 8 Parameter Estimates- Psycap

Predictor	Predicted					
	Hidden Layer 1				Output Layer	
	H(1:1)	H(1:2)	H(1:3)	H(1:4)	[achievers=1]	[achievers=2]
Input Layer (Bias)	-0.5	-0.1	0.85	-.03		
Self-efficacy	0.9	0.92	-0.12	0.04		
Hope	0.0	-0.0	0.18	0.25		
Resilience	1.4	1.16	-0.22	0.42		
Optimism	0.3	0.67	0.13	0.20		
Hidden Layer (Bias)					0.983	-0.430

n	H(1:1)					-0.949	0.936
Layer 1	H(1:2)					-0.403	0.151
	H(1:3)					0.084	-0.316
	H(1:4)					-0.177	0.063

Resilience (1.414) followed by self-efficacy (0.984), optimism (0.332) and Hope (0.089) show positive impact on **hidden node 1**. Resilience (1.161) followed by self-efficacy (0.920) and optimism (0.675) show positive impact and hopeshows (-0.017) negative impact on **hidden node 2**. Optimism (0.138) and hope (0.184) show positive impact and resilience (-0.227) followed by self-efficacy (-0.124) shows negative impact on **hidden node 3**. Resilience (0.427) followed by hope(0.253), optimism (0.207) and self-efficacy (0.044) show positive impact on **hidden node 4**. Table No. 9 displays a classification table for categorizing dependent variables (outcome variables), that is, High Achievers and Low Achievers by partition and overall.

TableNo. 9 Classification - Psycap

Sample	Observed	Predicted		
		1	2	Percent Correct
Training	1	15	15	50.0%
	2	6	27	81.8%
	Overall Percent	33.3%	66.7%	66.7%
Testing	1	6	9	40.0%
	2	5	17	77.3%
	Overall Percent	29.7%	70.3%	62.2%

Dependent Variable: achievers

In the training sample the prediction accuracy of the model was 66.7% and in the testing sample, the prediction accuracy of the model was 62.2%

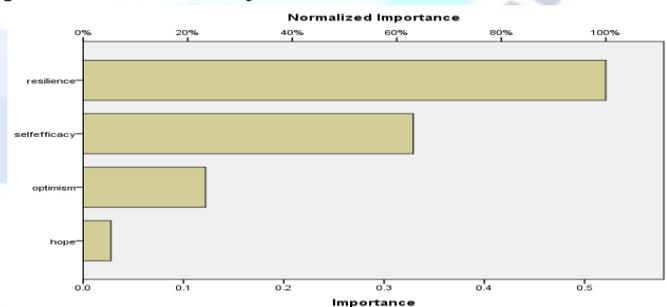


Chart. No.2 Normalized Importance - Psycap

Table. No.10 Independent Variable Importance-Psycap

	Importance	Normalized Importance
Self-efficacy	0.329	63.2%
Hope	0.028	5.3%
Resilience	0.521	100.0%
Optimism	0.122	23.4%

Chart No.2 and Table No.10 give the impact of each independent variable in terms of relative and normative importance. From both it is apparent that resilience has the greatest impact on students to the extent of 100% followed by self-efficacy with 63.2 %, optimism with 23.4 % and hope with 5.3%.

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LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

Future work will need to validate these findings in larger and more diverse samples. The proposed model can be used effectively to predict student's achievement and help teachers to develop strategies to increase student's academic performance.

CONCLUSION

The aim of this research was to determine the effectiveness of Neural Networking in understanding the extent to which the internal predictor (psychological Capital) and external predictor (Self Fulfilling Prophecy or Pygmalion effect), affect student's academic performance. The results showed that the most powerful predictor of Pygmalion effect is Teacher's Supportive Behaviour and of Psychological Capital is Resilience.

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