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## MEASURING POSITIVE PSYCHOLOGICAL CAPITAL: SCALE CONSTRUCTION AND VALIDATION BY STRUCTURAL EQUATING MODELING

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### **ABSTRACT**

*The field of psychology is broadly perceived in a wide scope of areas, including relationship, education, wellbeing, sports, military, professional and domestic life. Individuals' behaviors depend upon their psychological thinking style. An individual performs the tasks in a better way with positive psychological thinking instead of a negative thinker. This study was conducted to measure and validate the positive psychological capital scale by using structural equating modeling. Factors analysis was done for instrument validation. A quantitative approach was used to conduct this survey study. University teachers participated in the study as a research sample. A five-point Likert-type scale was used to obtain the information from respondents. The Smart PLS software was used for data analysis. The results of the study displayed that scale is valid and reliable. Teachers' psychological thinking consisted of four factors and all dimensions have a moderate positive relationship with positive psychological thinking. The R-value of the construct is 0.947 and it is much bigger than the required value. It seems that the goodness of the model exists that confirms the validation of the instrument. Further, all values of the tests applied in SEM ensure that the*

*questionnaire is a valid measure of the psychological capital in the Pakistani context. It is recommended to administer the questionnaire in local settings for upcoming quantitative research studies.*

**KEYWORDS**

*Psychological capital, hope, resilience, optimism, self-efficacy, Smart PLS-SEM.*

**INTRODUCTION**

Psychology is the study of the human mind. Side effects and illness are the exclusive concern of cognitive science. A number of studies focused on effects and illnesses rather than people's positive mental endowments (Myers, 2000; Schaufeli & Salanova, 2007). However, with the distribution of Seligman and Csikszentmihalyi, this paradigm of brain science lost its lustre (2000), who defended the idea that psychology should focus on the traits and mental constraints of people and groups, and how these might be improved. As a result, positive thinking emerges as a perspective based on three stages of study: (a) happy state of mind; (b) positive abilities and skills; and (c) positive workplaces that demonstrate the greatness and are encouraged by good emotions (Seligman, 2003). Confidence, self-adequacy, faithfulness, and resilience are the psychological or mental attributes that best match the criteria for positive behaviour. The phrase "psychological capital" was coined by experts in the field of psychology. This concept is used to promote positive employee behaviour and can be defined as a person's mental state of progress as expressed by idealism (producing productive attributions), self-viability (having trust), resilience (achieving success), and expectancy (finding different ways to attain goals) (Luthans, Avolio, & Avey, 2007; Luthans & Youssef, 2004, 2007).

According to Dawkins (2014) psychological capital is an individual's state of emotional growth that includes assets such as optimism, self-viability, adaptability, and expectancy. From an observational approach, the concept of positive mental capital has appeared inner cooperative energy through the four mental assets mentioned above, which indicates as a high-level paradigm, mental capital continues to exist (Luthans, Avolio, Avey, & Norman, 2007). Positive mental capital advances alluring work frames of mind and practices (e.g., imagination, institutional citizenship practices and work happiness) while adds to lessen undesired work dispositions and practices (e.g., pessimism, expectation to leave, turnover, and stress). This build permits superior institutional working because of the advantages it brings for specialists and might be considered as a competitive benefit (Avey et al., 2011; Rus & Jesus; 2010).

**Dimensions of Psychological Capital**

Different researchers, for example, Luthans and Youssef (2004), Luthans et al.

(2007), Sapyaprapa, Tuicomepee, and Watakakosol (2013), Dawkins (2014), Pillay, Buitendach, and Kanengoni (2014) described that Psychological Capital has four sub-factors, to be specific good faith or optimism, self-adequacy, resilience, and hope.

Optimism or good faith can be theorized into particular the level of stability. Individuals show their patience and are hopeful for their future. They encounter uncertain situations with positive behavior. It means that hopeful and positive people develop a positive logical style in which positive occurrences are related to inescapable, however sources of stress are tied to situational, transient, and external factors (Dawkins, 2014; Seligman, 2002).

Self-efficacy alludes to a person's certainty concerning his/her capacity to actuate subjective assets, set up a strategy, and discover the inspiration expected to effectively execute certain undertakings in a given setting (Stajkovic & Luthans, 1998). It means, when a person's self-viability is high, the individual is all the more ready and ready to confront difficulties and to expand his or her exertion and inspiration to effectively accomplish objectives and targets (Dawkins, 2014). According to Luthans et al. (2007), an employee with high self-adequacy values five characteristics: (1) setting high goals; (2) grasping problems and then succeeding; (3) behaving naturally stimulated or motivated; (4) making a battle to attain goals; and (5) persevering in overcoming obstacles.

Resilience as an element of psychological thinking. It is a characteristic of humans who show their positivity and consistency even in the worst circumstances at the workplace. They do not indulge themselves in negative thinking and issues. If a person cannot control and think positively in a resilience situation then it leads to burnout, increase stress, and negativity level (Dawkins, 2014).

Hope or expectation is also a sub-factor of psychological capital. It can be characterized as the willpower and determination (to have inspirational desires and objectives) and the way-power that representatives have towards a specific target (Luthans, Vogelgesang, & Lester, 2006).

An imperative logical idea to check the validity of a variable. There are no absolute or defined criteria to measure or ensure the construct validity (DeVellis, 2003). Luthans et al. (2007) developed a questionnaire to measure psychological capital. This scale consisted of four sub-factors (optimism, self-viability, flexibility, and expectation). A questionnaire on a five-point Likert-type scale was used. After analysis, some questions were eliminated or removed and replaced with new questions to ensure the validity and reliability of the instrument and fitness of the scale. Questionnaire of the study based on twenty-four items and variables, to be specific, trust, self-adequacy,

strength, and good faith (Dawkins et al., 2013). They stated that the inside dependability which consists of reliability of the PCQ scale was observed to be generally predictable over the 29 studies incorporated into the scientific research. The findings of the study revealed that two factors have low value of reliability and do not fulfill the standard point. It was a good effort by the researchers to validate the instruments.

Gorgens-Ekermans and Herbert (2013) described different dimensions model and pointed out the acceptable value of internal consistency of two factors hope and self-viability. They conducted a study and findings highlighted optimism and resilience values of internal consistency 0.67 and 0.69, and minimum 0.70 is required for reliability. Pillay, Buitendach, and Kanengoni (2014) utilized a central segment investigation on the PCQ, bringing about a one-factor arrangement, the subscales hope, optimism, resilience, and self-adequacy all stacked on one factor with a Cronbach alpha estimation of 0.87.

### **Psychological capital questionnaires around the world**

The Psychological Capital questionnaire developed by Luthans et al., (2007) is a premium questionnaire available on paying a licensing fee to use. It has also used the same four factors as mentioned in the literature above. The questionnaire has 24 items with six under each factor. Lorenz et al. (2016) developed and validated the psychological capital questionnaire in the German context and used a compound scale having the same four factors mentioned in the literature above. The compound tool has 12 items on it.

Cid, Martins, Dias, and Fidelis (2020) assessed the psychometric properties of the 24-item psychological capital survey PCQ24 in the Brazilian context. They found the questionnaire to be valid for both males and females. Meng, Sun, Guo, Wu, Wang, Yang, and Peng (2021) in China, used the same four factors in developing and validating the psychological capital tool for food security social co-governance. Their questionnaire had 23 items. Santisi, Lodi, Magnano, Zarbo, and Zammitti (2020) in Italy, studied the relationship between psychological capital and quality of life. They used the 12-item psychological capital questionnaire based on the same four factors as explained above. Pedro, Soler-Sanchez, Fernandez-Valera, Garcia-Izquierdo, (2017) measured psychological capital in Spanish workers and used three items in each of the four factors as discussed in the literature above.

In the Pakistani context, Abdullah, Javaid, and Omar (2020) developed a tool to measure the psychological capital of the destitute children living in a welfare organization set up by the Government. They used the same four factors to assess the psychological capital of the children. However, the tool was specific to the context of

the child welfare bureau and hence cannot be utilized in the general context of universities. In all the above-mentioned tools, developed across different countries of the world including Pakistan, the same four factors were used to measure the psychological capital. However, it is evident from the above section that there is a dire need to make a tool contextualized in local settings. Hence, this study uses the structural equating model to validate the psychological capital questionnaire developed in the local context.

### **RESEARCH OBJECTIVE**

1. To create and validate a local questionnaire to measure psychological capital.

### **RESEARCH QUESTIONS**

1. Is there a significant correlation between positive psychological capital and its dimensions?
2. Are the path coefficients between positive psychological capital and its dimensions significant?
3. Are the outer loadings between positive psychological and its dimensions significant?
4. Is there any significant correlation between latent variable and dimensions of positive psychological?
5. Is the value of R square significantly predicting the data set of the proposed model?
6. Are the construct validity and reliability of the psychological capital significant to determine the psychometric properties of the questionnaire?
7. Is the discriminant validity of all four factors taken as sub-scales significant to determine the mutual exclusiveness of the factors?
8. Are bootstrapping path coefficients of different dimensions of the positive psychological instrument showing significant values for the validation of the questionnaire?

### **RESEARCH METHODOLOGY**

The current investigation was conducted using a quantitative methodology. The research was specific in validating a locally developed and context-fit psychological capital questionnaire for Pakistan.

#### **Items development of the questionnaire**

The literature on psychological capital was reviewed. A comparison of already developed questionnaires was done. The four factors of the psychological capital were studied and based on those factors the items were developed considering the local context of Pakistan and universities. Initially, 20 items were developed, five for each of the four factors.

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**Content Validity of the questionnaire**

Experts of psychology and education discipline were selected. The characteristics of the experts included university teachers having at least 10 years of teaching and research experience. Three experts were from the psychology discipline and two belonged to education. In their initial opinion, the questionnaire was translated into Urdu language and then translated back into the English language. This was done to maintain the essence and meaning of the items. Two language experts were further accessed to check the translation and re-translation of the questionnaire. Two university teachers one of the English department and one from the Urdu department checked the language accuracy and clarity of the meaning. The wording of three items was changed and one item was deleted after this translation-re-translation method. The item deleted was from the 'hope' factor.

The revised questionnaire was again shared with the experts for evidence of content validity. The experts validated the questionnaire items against the following criteria. The items were checked for meaning and their relevance with the factors of the questionnaire. The items were reviewed to see the match with each factor and the overall psychological capital. Three out of five experts were of the view to eliminate an item each from the factors because of non-conformance with the essence of the factors. While the other two experts suggested altogether change the item, hence those items were deleted. The resultant questionnaire had 15 items, four items each in self-efficacy, resilience, and optimism, while hope had three items.

**Reliability of the questionnaire**

For the reliability check in the SPSS, the data were collected from the university teachers. The public and private sector universities of Lahore were selected. The four universities (2 from sector public and private) were part of the study. From each university four departments: business/commerce, social work, psychology, and education were selected. A sample of 150 university teachers was selected and the questionnaire was administered to them. The opinions of the respondents were measured on a five-point Likert-type scale.

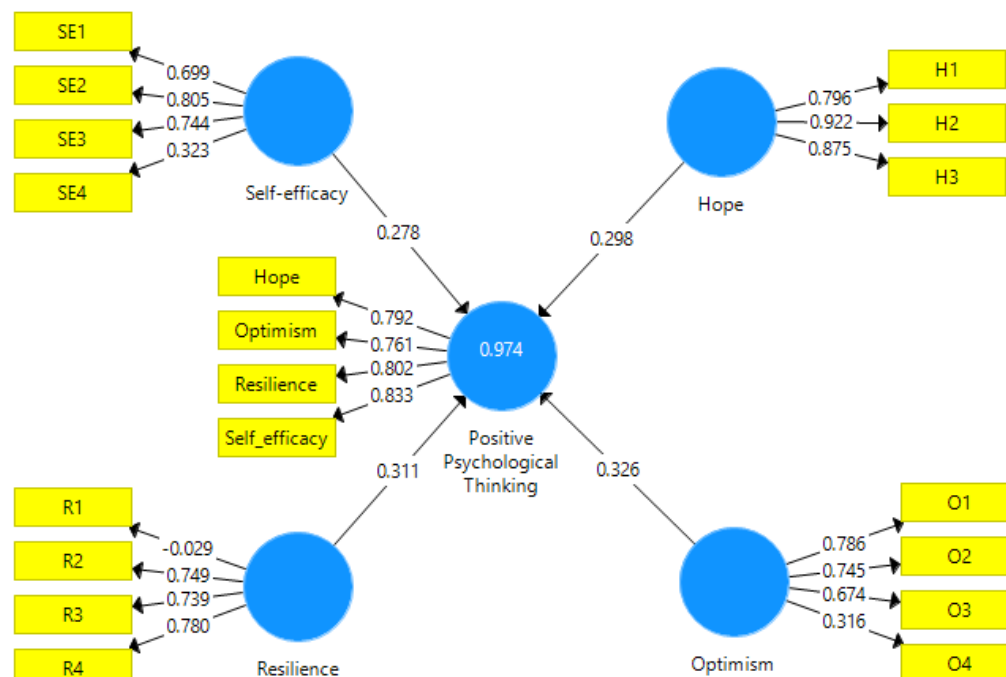
After the filled questionnaires were received, the data were entered in the SPSS and checked for internal consistency of items. Coefficient of Cronbach's Alpha showed an overall score of 0.809, and the values of reliability for each of the factor was above 0.85. The items can be approved if the reliability alpha is between 0.70 and 0.99, according to Fraenkel and Wallen (1996), although Kubiszyn and Borich (2000) proposed that a value between .80 and .90 is acceptable. In social sciences, a reliability value greater than 0.60 is considered acceptable (Ghazali, 2008). Hence, the reliability of the questionnaire was considered appropriate for this study as well.

## FINDINGS

### Analysis of Structural Equating Model

To test the questionnaire further, advance software smart-PLS was used to apply the recent and advanced statistical tests. A structural equating model was developed and path analysis was performed to see the factors and items loading with their values.

### PLS Algorithm



**Figure 1. PLS-SEM Structural Model**

Path analysis is demonstrated in Figure 1. It depicts the factors relationship. The psychological thinking consists of four factors. Their self-efficacy  $r=0.278$  to perform job duties. Hope is also a core dimension of psychological thinking and it shows a moderate relationship  $r=0.298$ . Teachers have to face resiliency in different forms. As figure showing resiliency  $r=0.311$  of teachers during the job at workplace. Optimism is a basic characteristic of a good teacher. This trait gives motivation and develops future brightness related to jobs among individuals. They control uncertain situations easily due to optimistic thinking at work. There is a moderate positive relationship between positive psychological thinking and its optimism dimension  $r=0.326$ .

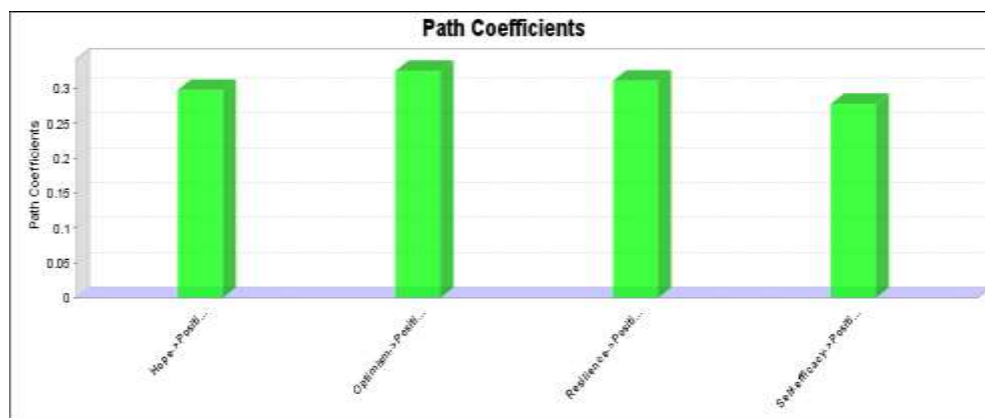
However, three items are showing very low values to be considered in the final

questionnaires. Keeping these items will also affect the overall value of the questionnaire. Further tests were applied to see other statistical values in SEM. These three items were deleted in the final questionnaire.

**Table 1: Path Coefficients of Sub-Factors of Psychological Thinking**

Sub-Factors	Psychological Thinking
Self-efficacy	.278
Hope	.298
Resilience	.311
Optimism	.326

The connection between constructs and their dimensions determines the path coefficient. There are four sub-dimensions of psychological thinking in the above table. All factors have moderate positive association with the main construct.



**Figure 2. PC**

**Table 2: Outer Loadings**

Dimensions	Psychological Discerning
Self-efficacy	.833
Hope	.792
Resilience	.802
Optimism	.761

The inner model is the part of a structural equation modelling (SEM) analysis that specifies the associations of dimensions. The element of the model that specifies relationships between latent variables and their indicators is known as the outer model. Here all four dimensions are showing a strong positive relationship with psychological discerning. It means four dimensions are valid, part and parcel to measure the



psychological thinking of teachers.

**Table 3: Latent Variable Correlations through Cross Loading**

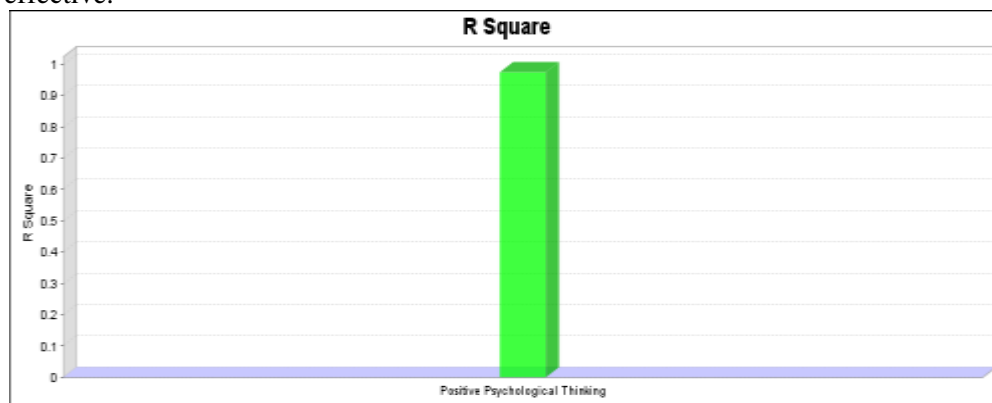
Variables	1	2	3	4	5
Psychological Thinking	1.000	0.837	0.789	0.811	0.779
Self-efficacy		1.000	0.512	0.637	0.638
Hope			1.000	0.616	0.481
Resilience				1.000	0.424
Optimism					1.000

Through cross-loading, table 3 depicts the correlation between components. The basic goal of cross-loading is to align the values of variables. Wherein the element has the highest value when used alone, however has a lower value when used with other variables. With their own constructs, all constructs exhibit maximal values, whereas, with others, they exhibit less. In this way, cross-loading of the scale is significant and reliable.

**Table 4: R Square ( $R^2$ )**

Variable	R Square
Psychological Thinking	0.974

The R Square indicates how well the data is predicted by the PLS model. The model's internal consistency is demonstrated in this way. Its level should be more 0.3. The value of R square for the variable is 0.974 in the table above. This number is higher than the stated benchmark value, indicating that the psychological thinking model is effective.



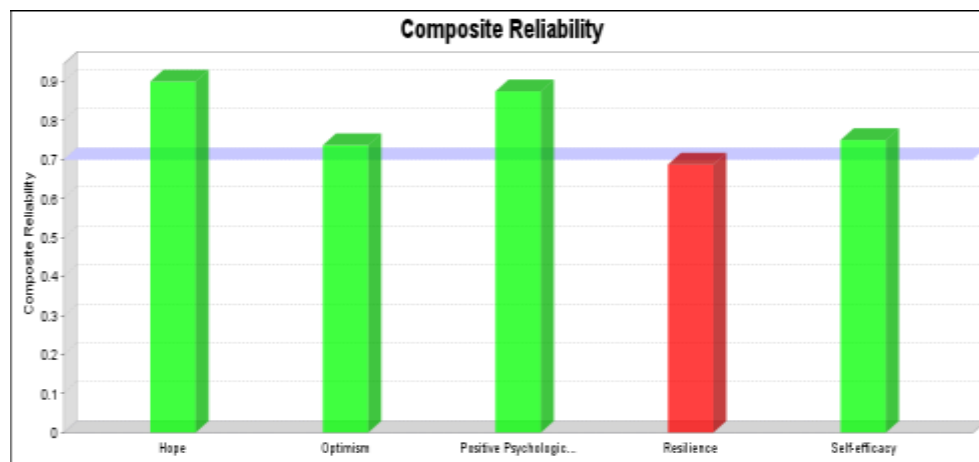
**Figure 3. R Square**

**Table 5: Construct Reliability and Validity**

Factors	CA	<i>rho_A</i>	CR	AVE
Psychological Thinking	.809	.812	.875	.636
Self-efficacy	.545	.607	.750	.449
Hope	.832	.839	.900	.750
Resilience	.588	.604	.687	.429
Optimism	.515	.582	.736	.432

Table 5 determines the factors (one main factor and the other four its sub-factors) validity and reliability. Three alternative approaches (Cronbach's Alpha, rho A, and Composite Reliability) were used to assess reliability. Hair (2014) claims that reliability levels of 0.7 are adequate. All of the constructs in the table above have values that are higher than the threshold. Two dimensions are below the cut-off point. However, under the umbrella of composite, all constructs show good and statistically significant values.

Average Variance Extracted, according to Wah-Yap, Ramayah, Nushazelin, and Wan-Shahidan (2012), is the point that reveals a fact or sustains the convergent validity. Hair (2014) stated that an AVE value of 0.5 is appropriate. It is the minimum standard; higher levels indicate that the constructions are very valid. In the current study, one component (hope) has an AVE value more than .5, indicating a strong relationship. Overall, the construct is valid.

**Figure 4. Composite Reliability**

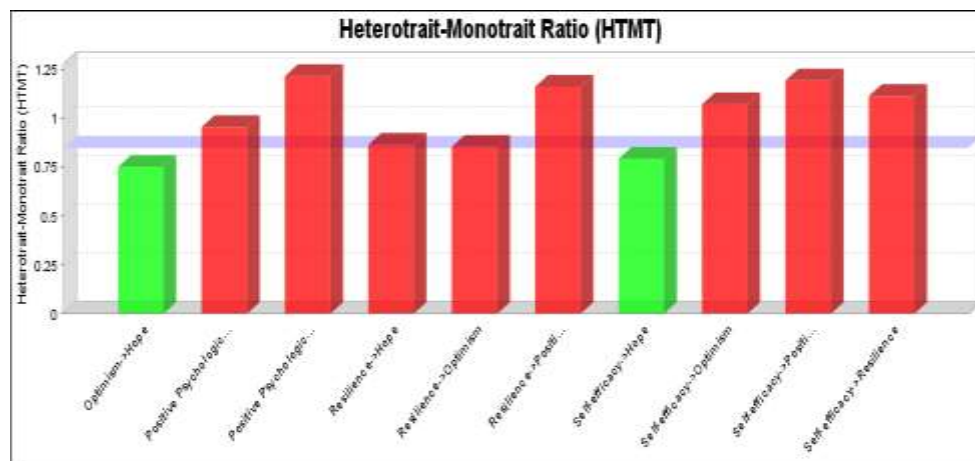
The composite reliability is shown in the diagram above. Except for resilience, which

exhibits significant and acceptable reliability values, all constructs in the form of green pillars are touching the defined cut line.

**Table 6: Discriminant Validity**

Factors	1	2	3	4	5
Psychological Thinking	0.798				
Self-efficacy	0.837	0.670			
Hope	0.789	0.512	0.866		
Resilience	0.811	0.637	0.616	0.655	
Optimism	0.779	0.638	0.481	0.624	0.657

The discriminant validity of components and sub-factors is shown in table 6. Discriminant validity was described by Surienty, Ramayah, Lo, and Tarmizi (2014), among other scholars. This validity, they claim, demonstrates separate conceptions of dimensions. They stated that in this case, results should be more than 0.6. This validity, in my opinion as a researcher, demonstrates the discriminating of variables. There is a maximum value for each factor and other variables have a lower value. For example, psychological thinking is the main construct in the table above, and it has a maximum value of 0.798. Thus, it is concluded from the results that factor and its all dimensions have discriminant validity except two green pillars. Figure 5 also highlights the detailed discrimination among constructs.



**Figure 5. Discriminant Validity**

**Table 7: Bootstrapping Path Coefficients**

Dimensions	SM	SD	t	p
Self-efficacy	0.292	0.073	3.829	0.000

Hope	0.291	0.050	5.910	0.000
Resilience	0.295	0.053	5.843	0.000
Optimism	0.309	0.072	4.540	0.000

Table 7 shows the results of bootstrapping by displaying T Statistics and P-values that are used to support or oppose the hypotheses. T-Statistics should be larger than 1.96 and the p value should be less than 0.05 (Hair, 2014). Thus, values of four sub-dimensions self-efficacy are  $T=3.829$ ,  $P=.000$ ; hope,  $T=5.910$ ,  $P=.000$ ; resilience,  $T=5.843$ ,  $P=.000$ ; and optimism,  $T=4.540$ ,  $P=.000$ . Positive, strong, and substantial values greater than the threshold can be found in all dimensions. It indicates that there is a good fit. It is concluded that sub-factors have a strong connection with main factor psychological thinking.

#### Evaluation of questionnaire after analysis

After considering the findings of all the statistical techniques and tests applied, three items that showed low values on the correlation in figure 1, were deleted and the final questionnaire had 12 items, 3 items for each of the four factors.

#### Re-administration of the questionnaire

The questionnaire needed further authentication; therefore, it was administered to another sample. A sample of 200 university teachers was selected randomly and the psychological capital questionnaire was administered to them as well (Ahmad & Hussain, 2019). The overall reliability of the questionnaire was 0.84 on the coefficient of Cronbach alpha in the SPSS. The factor-wise reliability of the questionnaire is given in the table as under.

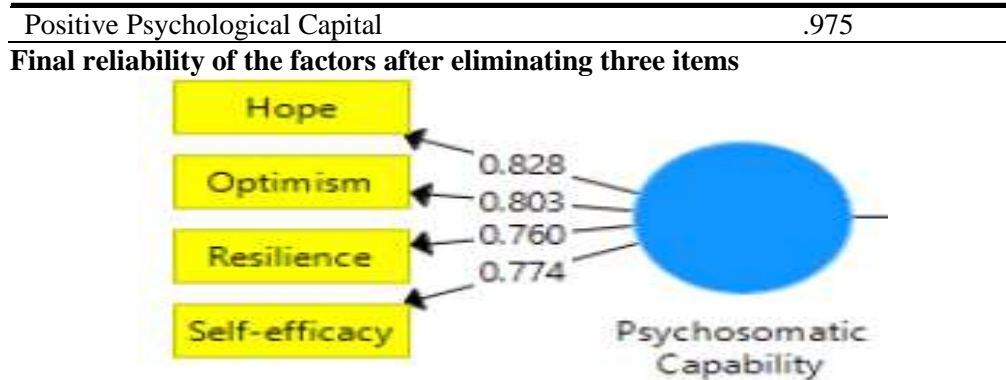
**Table 8: Cronbach alpha Reliability of Factors**

Factors	Reliability values
Hope	.849
Optimism	.864
Resilience	.834
Self-efficacy	.826

All values of Cronbach alpha were above 0.80 which as mentioned above in the methodology section are considered good for a questionnaire. The data were further validated in the smart-PLS for again checking the reliability values. Table 8 and figure 6 given below display the reliability and correlation values of the factors in Smart-PLS, respectively.

**Table 9: Reliability**

Factor	Reliability values
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**Figure 6. Correlation values of the factors of the questionnaire**

Figure 6 show that each factor has a correlation value of above 0.75 in the SEM. Hence, the final revised questionnaire was considered as a valid measure of psychological capital.

## DISCUSSION

The main focus of the study was to validate the psychological capital scale using different statistical tests and techniques in SPSS and Smart-PLS software. The outcome questionnaire is a valid and authentic measure of the variable psychological capital that consisted of factors as established in the literature. The questionnaire has not only gone through expert opinions for content validity but also it was administered in multiple studies to ascertain the evidence of reliability. Authentication and validation of the questionnaire are done by applying different sophisticated and advanced statistical tests through path analysis. The structural model highlights the correlation among variables. It is concluded from the study findings that four factors have a moderate positive association with the targeted variable (psychological approach). Thus, all four dimensions are showing a strong positive relationship with psychological discerning in the outer model. It seems that sub-dimensions are valid, part and parcel to measure the psychological thinking of personnel. Researchers applied cross-loading (in which, each factor has maximum value and less in remaining) in path analysis to validate the scale. The results of cross-loading highlighted that scale is also significant and reliable. To measure the goodness of the psychological thinking model, the  $R$  square was used. The  $R$  value of the construct is 0.947 and it is much bigger than the required value. It is concluded that the goodness of the model exists that confirms the validation of the instrument. Discriminant validity and bootstrapping upgraded the authentication of the scale. Thus, it is concluded that the instrument used to conduct this study is valid and reliable after removing the unreliable items or questions from the scale. The contextual construction of questionnaires in psychological capital is a worldwide phenomenon and different studies in various

countries report an evidence of a localized psychological capital questionnaire. Cid, Martins, Dias and Fidelis (2020) performed psychometric validity evidence on psychological capital questionnaire (PCQ-24) and made it contextual for Brazil. Similarly, in Thailand context, Sapyaprapa, Tuicomepee, Watakakosol (2013) validated a contextual psychological capital questionnaire and ascertained its psychometric properties for using in Thailand context. Likewise, through this study a Pakistani psychological capital questionnaire is validated and ready to administer in local settings. However, there is one limitation in this validation of this questionnaire that for every sample drawn for its reliability and accuracy, the respondents belonged to the groups of university teachers.

### RECOMMENDATIONS

1. The questionnaire is validated for measuring the psychological capital on the four sub-scales i.e. Hope, resilience, self-efficacy, and optimism. In the Pakistani context, the questionnaire can be used in studies concerning quantitative studies on cross-sectional, longitudinal, and survey design researches.
2. The questionnaire can be administered to a general sample that does not have any other specific characteristics, otherwise.

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