DEVELOPMENT AND EVALUATION OF TWO-DIMENSIONAL SMOKING ABSTINENCE SELF-ESTEEM SCALE IN COLLEGE STUDENTS.

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Development and evaluation of two-dimensional smoking abstinence self-esteem scale in college students.

Abstract

Self-esteem is one of important factors regarding smoking abstinence in college students. The purpose of this study is to investigate the psychometric properties of a seven-item questionnaire of self-esteem under smoking abstinence context. The study sample consisted of 400 college students from a public university, Thailand. Data were collected by using self-administered questionnaire. Exploratory factor analysis provided two factors, i.e., smoking abstinence competency and smoking abstinence worthiness with Eigen-value of 3.48 and 1.31, respectively. The variance was explained 68.40%. All factor loadings were above 0.5. Confirmatory factor analysis revealed two interrelated factors, providing a good combinatorial fit indices with Degree of freedom 10, Normal Theory Weighted Least Squares Chi-Square = 16.140 (P = 0.0957), Root Mean Square Error of Approximation (RMSEA) = 0.0392, Comparative Fit Index (CFI) = 0.996, Standardized RMR = 0.0213. The findings support two dimensions of self-esteem under smoking abstinence context. The scale possesses psychometric properties, can assess self-esteem regarding in participants who want to quit smoking, and its predictive validity appears to be a good predictor of smoking behavior.

Key words

Self-esteem, Smoking abstinence, Competency, Worthiness, College students, Quit smoking

ACKNOWLEDGEMENTS

This report could not successfully complete without the students who participated in the project "Intention to reduce/quit smoking and counseling project for college students".

I am very appreciate and gratitude to Thai Health Promotion Foundation for granting funds under contract no. 55-06-005 to support the study.

I'd like to give special thanks to colleagues and friends for their invaluable assistance and encouragement.

I wish to express my love and gratitude to my beloved families; for their understanding, love, and care, through the duration of this study.

Monthira Bumroongkit THAVEESRI

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CHAPTER I

INTRODUCTION

Background and Significance of the Study

Adolescents try to smoking by themselves and/or with their friends. Survey data from 2011 estimated that 20.1% of people at age 15-24 years were current smokers [1]. An estimation of direct medical cost out-of pocket expenditures for treatment of three major diseases, i.e., lung cancer, chronic obstructive pulmonary disease, and coronary heart disease were about 10,000 million Baht in 2006 [2]. Death from smoking diseases in Thai people, each year was about 52,000, or each hour 6 people [3].

College students often get involved in risk behavior taking, included smoking [4]. It was found that a lower level of self-esteem correlates with risky behavior engagement among adolescents such as cigarettes smoking [5-6] and substance use [7]. A higher level of self-esteem is preventive factor for mental health problems among nursing students [8] and related to longer abstinence from substance use [9]. Self-esteem has become intensively embedded in popular culture. The term self-esteem has been conceptualized in many different ways. Self-esteem had been used at least in three ways as global self-esteem or trait self-esteem (i.e., represents the way people feel about themselves in general), state self-esteem (i.e. refers to feeling of self-worth that react to events), and a specific self-esteem (i.e., refers to the way people evaluate their abilities and attributes), suggested by Brown and Marshall [10].

Recently, the emphasis of global self-esteem involves the two important concepts; competence and worthiness: there is a connection between what people can do and how they feel about themselves. Tarafodi & Swann [11] named the two constructs as self-competence and worthiness and they view these two dimensions distinct, inter-correlation just as length and width define a rectangular as to form a global self-esteem.

Understanding self-esteem in this position can lend itself for an opportunity to establish a scale of specific self-esteem, i.e., refers to the way people evaluate their abilities and attributes in the specific way. It is worth to distinguish between global and specific self-esteem as suggested by Rosenberg et al. [12]. To understand the determinant factor of self-esteem in adolescents smokers, therefore, it is the need to have the exclusively scale appropriate. The study aimed to develop and validate

the specific scale of self-esteem in smoking abstinence context. The psychometric properties of a seven-item questionnaire to access smoking abstinence self-esteem were investigated. In a mean time the associations between self-esteem, intention to quit smoking, and nicotine independence were examined.

Purposes of the Study

Specifically, the objectives were as follows

1. To develop the specific scale of self-esteem in smoking abstinence context

2. To prove two dimensional of self-esteem under smoking abstinence context.

Delimitation and Limitation

Population study was delimited to King Mongkut's Institute of Technology Ladkrabang undergraduate students in Education year 2012, totally 20,314 students. Overall, 400 sample size was collected.

This study had some limitations. For instance, the temporal sequence of cognitive determinants and the actual smoking behavior could not be observed directly because actual behaviors of participants were obtained at the same time as the measures of behavioral intention. The study cannot make generalization to other group because the effects of factors may behave differently with other populations.

Assumption

It was assumed that participants provide their data corresponding to their thoughts trustfully, accurately, and precisely. The measurement model was tested under the assumption that it is a close model which means that the model has covered all variables to causing relationships to dependent factors.

Implications and expect outcomes from research

Smoking is a complex behavior which involves both logically and social processes. Information from descriptive analysis of sample could be useful to the University policy management for any appropriate action to prevent smoking and/or encourage quit smoking. Developed smoking abstinence self-esteem components scale should be easily to use in any setting and the scales should excel validity and reliability.

CHAPTER II

LITERATURE REVIEWS

Overview

Smoking is one of risk behavior problems worldwide, including Thailand. Tobacco use is the leading causes of morbidity and mortality globally. Long term smokers suffer from a range of cancers to organs, e.g., lung, oral, laryngeal, and esophageal. Attributable health risks account for asthma, allergic symptoms, respiratory tract infections and high blood pressure.

Survey data from 2011 estimated that 20.1% of people at age 15-24 years were current smokers [1]. Adolescents frequently bring themselves into the situations that facilitate taking risk behaviors, e.g., drinking, smoking, and unprotected sex [13-14]. College students often get involved in risk behavior taking including smoking [4]. It was 75% of initial adolescent smokers were not intended to smoke and the first stage of smoking is involved unplanned behavior [15]. Reyna and Farley suggested that risk-taking behaviors in adolescents can generate either intentionally or unintentionally [16].

Many factors, including intention, perceived ease of smoking, estimated number of friends' smoking, percentage of sibling' smoking, self-esteem, and extraversion explained smoking behavior [17]. A lower level of self-esteem correlated with risky behavior engagement among adolescents such as cigarettes smoking [5-6] and substance use [7]. A higher level of self-esteem is preventive factor for mental health problems among nursing students [8] and related to longer abstinence from substance use [9].

Self-esteem has become intensively embedded in popular culture. Self-esteem was one of the factors used in applying life skills project for preventing secondary school students from smoking. Results revealed that higher self-esteem leading to decreasing intention to start smoking [18].

Self-esteem construct

The term self-esteem has been conceptualized in many different ways. Rosenberg [19] defined self-esteem in term of global self-esteem which is the perception of a feeling about one's worth or value as a person. It was a positive or negative attitude toward self. As individual expressed the feeling that one is "good enough" reflected "high self-esteem". The development of a 10-item, easy to use, became a gold standard for self-esteem measurement. Later it was suggested by Rosenberg et al., that it is worth to distinguish between global and specific self-esteem [12].

Suggestion by Brown and Marshall [10], self-esteem had been used as least in three ways as global self-esteem or trait self-esteem, state self-, and a specific self-esteem. Global self-esteem represents the way people feel about themselves in general. State self-esteem refers to feeling of self-worth that react to events. Specific self-esteem refers to the way people evaluate their abilities and attributes.

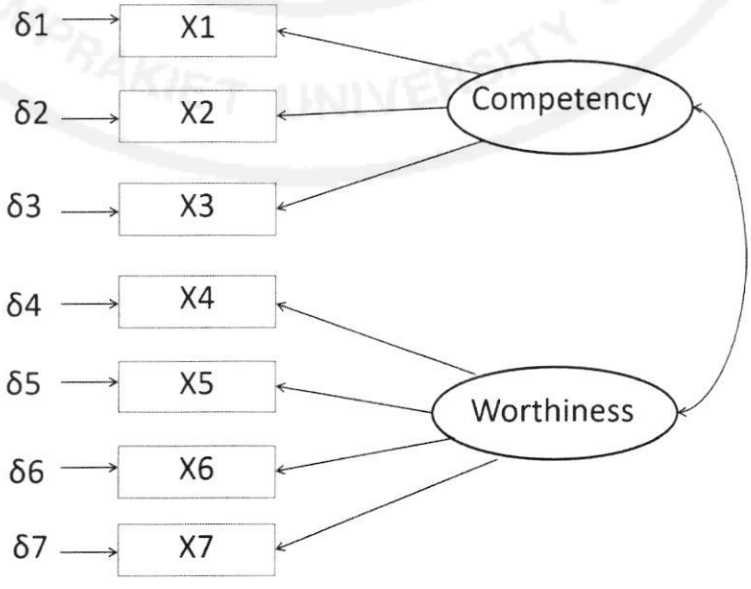
Recently, Tarafodi & Swann [11] have investigated the gold standard scale of self-esteem and found that there were two components exist in the scale. The emphasis of global self-esteem involves the two important concepts; competence and worthiness: there is a connection between what people can do and how they feel about themselves. They named the two constructs as self-competence and worthiness and they view these two dimensions distinct, inter-correlation just as length and width define a rectangular as to form a global self-esteem. In this aspect, "Self-esteem is seen as a "lived" phenomenon stated by Mruk [20]. It describes thought, feeling, and behavior that linked to each other as a harmonized form of perception and experience. People describe what happen to them in term of their ability and how they respect themselves.

However, not all forms of competence are related to self-esteem and some may even ignore it. People identify things or actions that have meaningful to them to live up with. Rationally, human beings have a basic need of feeling worthy if they have accomplish for these activities they would feel of their competence. Binding a sense of worth to competence must be based on appropriately corresponding behavior. Feeling worth derived from participating in healthy actions or not engaging destructive on ones. Otherwise it may facilitate a development of narcissism, or the risks to increase undesirable social behaviors [21].

According to Rosenberg [19], and the finding from Tarafodi and Swann [11], there is an opportunity to establish a scale of specific self-esteem, i.e., refers to the way people evaluate their abilities and attributes in the specific way. It is worth to distinguish between global and specific self-esteem as emphasized by Rosenberg et al. [12].

To understand the determinant factor of self-esteem in adolescents smokers, therefore, it is the need to have the exclusively scale appropriate. The study aimed to develop and validate the specific scale of self-esteem in smoking abstinence context. The psychometric properties of a seven-item questionnaire to access smoking abstinence self-esteem were investigated (Figure 1). In order to investigate a predictive validity of the developing scale, the associations between self-esteem and intention to quit smoking and nicotine independence were examined as well. Behavioral intentions reflect some degree of desires of a person to act on a behavior. The intentions imply for the readiness to perform a behavior. The higher intention, the more likeliness of the behavior would be performed. If behavior is measured after immediately accessing of intention, in case that the intention is a true reflective to the behavior, and the behavior is under volitional control; the accuracy of prediction of intention should occur in certain degree. Prediction of the behavior in a future at some point of time could be assessed by the intention [22].

Figure 1 Schematic presentation of the two-dimensional smoking abstinence self-esteem



CHAPTER III

METHODOLOGY

The chapter was divided into two parts. The first part contributed to the data collection process and the second part involved data analyses.

Data collection process

Research design

Cross-sectional survey research was conducted. Data were collected on a voluntary and anonymous basis by convenience sampling. Additionally, Snowball sampling was used in order to finding more participants by asking suggestions and connections to another college smokers. The study was a part of project "Intention to reduce/quit smoking and counseling project for college students" that was approved by the HCU ethic Committee, Huachiew Chalermprakiet University, Thailand (Appendix A).

Population

It was not known exactly of the amount of undergraduate students who were smoking. Calculation of total numbers of smokers based on national statistics data. Estimation of beginner smokers of age 18-24 was reported 47.5 (44.1-50.9) with 95% CI [23]. On education year 2012, number of students of age 18-24 were about 20,314. Calculation of total study's population was done with multiplication of 20,314 with 47.5%, this came up to population = 9,645.

Sample

Determination of sample size was based on Krejcie and Morgan's table [24]. Sample size should not be less than 370. Data collection was planned for N = 400 and all of questionnaires were completed between October and November 2012.

Measurement

Self-esteem questions in the context of smoking abstinence were developed using knowledge that based on the studies of Tarafodi & Swann [11], Rosenberg et al. [12], and Rosenberg [19]. Questions from two dimensions of self-esteem, i.e., competency and worthiness dimensions were presented as following. The competency dimension was named as *Smoking abstinence competency*, and the worthiness dimension was named as *Smoking abstinence worthiness*.

Competency dimension

Smoking abstinence competency was defined as perception of ability to perform smoking abstinence. Three items were measured. Cronbach's alpha was 0.770.

C1: Although I am among people who smoke, I am eagerly to quit smoking.

C2: I am ready to follow the quit advice from experts.

C3: The adverse effects from smoking lead me to conquer myself in smoking cessation.

Each measure was assessed on 7-point rating scales range from 1=certainly not agreeable to 7=certainly agreeable. Scores were reversed appropriately to the item questions.

Worthiness dimension

Smoking abstinence worthiness was defined as the feeling of worthiness toward self if one performs smoking abstinence. Cronbach's alpha of was 0.793.

W1: I have full respect of myself.

W2: If ever I can quit smoking, I would have self-proud.

W3: In total, I think I am failure.

W4: In total, I think I am a bad person.

Each measure was assessed on 7-point rating scales range from 1=certainly not agreeable to 7=certainly agreeable. Scores were reversed appropriately to the item questions.

Other informations such as intention to quit smoking, nicotine independence, smoking behavior, and demographic data were gathered.

Intention to quit smoking

Participants were asked about quitting experiences, whether they would have any intention to stop smoking. In additions, they were asked from now on if ever they would intend to quit in a week, in three months, in six months or in a year.

Nicotine dependence

Fagerstrom Test of Nicotine Dependence [25]: The six items of FTND were used to assess levels of nicotine dependence.

Smoking behavior

Participants were asked when they started smoking, and the amount of cigarettes consumption in a day.

Data analyses

Descriptive analysis

Preliminary analysis of items check was done. All data were displayed completely. Frequency, means, and standard deviations of data were analyzed using SPSS version 16 [26].

Exploratory Analysis (EFA)

Exploratory factor analysis (EFA) was conducted to identify the underlying factors and pattern of loadings. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were examined whether the data fulfilled requirement for factor analysis. The principal axis factoring with rotation method by Direct Oblimin with Kaiser Normalization was employed.

Evidence supporting factor solution was examined through a latent root criterion (Eigenvalue > 1). Items with low loadings were candidates for deletion. Scale modification was made based on the results. The purpose of factor analysis is to determine the underlying structure among variables by grouping the highly correlated variables together and uses the reduced data for further analysis in confirmatory factor analysis. These highly inter-correlated variables were called *"factor"* which represents dimensions within the data.

The exploratory factor analysis is very useful in searching the structure or for data reduction method. The data are explored; and the information about factors that best representatives of the data is provided. All measured variables are related to every factor by a factor loading estimate. Then, number of factors are derived from statistic results.

Confirmatory factor analysis (CFA)

Confirmatory factor analysis (CFA) was used to confirm the results of testing from exploratory factor analysis. The relationships between smoking abstinence competency and worthiness constructs were conceptualized in a measurement model. The first-order models were tested and the extent of covariance matrices accounted by the observed data was reported by LISREL 8.8 for Windows with Maximum Likelihood (ML) method [27]. Determination of model fit was based on model characteristics and combinatorial fit indices.

Under conceptual model guided by theories, confirmatory factor analysis can be used to test how well the measured variables represent the constructs. CFA is conducted by specifying a number of factors and the set of variables, in which factor, each variable loads highly on. CFA is used for providing a confirmation test of a measurement theory; therefore it can whether confirm or reject the preconceived theory. The model fits when the specification of factors which derived from theory is well matched with the actual data in reality or else, in the other way the model does not fit if the matching is rejected.

Construct validity analysis

With confirmatory factor analysis, construct validity of a measurement theory can be assessed. Construct validity is the extent to which a set of measured indicators actually reflects the theoretical latent construct, thus it deals with the accuracy of measurement. A measurement model of several uni-dimensional constructs with all cross-loadings constrained to zero and had no covariance between or within construct error variances is called a congeneric measurement model. The congeneric measurement model is considered to be sufficiently for construct validity and represent a good measurement model. Construct validity is comprised of four important components, i.e., face validity, convergent validity, discriminant validity, and nomological or predictive validity [28].

Face validity

Face validity must be established prior to any theoretical testing because it is the most important validity in a real way. The understanding of every item's meaning helps correctly specify a measurement theory. Face validity was accomplished at the time the instrument developed. Subjectively assessment of the correspondence between the individual

items and the concept was verified by expert judges. Wording in some items had been corrected.

Convergent validity

Several supports, such as factor loadings, variance extracted, and construct reliability can estimate the relative amount of convergent validity among item measures. Guidelines for factor loading should be at least 0.5 and preferably 0.7, variance extracted measures should be equaled to or more than 50 percent and the threshold for construct reliability is considered at 0.7.

Discriminant validity

The extent to which a construct is truly distinct from other constructs is discriminant validity. A test of discriminant validity can be concluded if the measurement model provides with no cross loadings either among the measured variables or among the error terms. This implies that the individual measure items represented only one latent construct or uni-dimensional scale.

Nomological validity or predictive validity

Nomological validity or predictive validity is supported if the correlations between the constructs in a measurement model make sense and reasonable. The predictive validity was determined via cluster analysis methods. Participant who had higher self-esteem should be contained in the lower level of nicotine dependence group while participants who had lower self-esteem should be contained in the higher level of nicotine dependence group. Validating of the cluster solutions was accomplished in two steps. First assessment was by applying alternative cluster method and comparing the solutions. The alternative method used in this study was TwoStep cluster analysis which was to comparing with K-Means method. The second way was assessed by adding variables that have a theoretically based relationship to clustering variables; in this case, the study used intention to quit measures. The significant differences in these variables across the clusters should exist [29].

Development of measurement model

The goal of measurement theory was to provide ways of measurement concept in a reliable and valid manner. Theories were tested by how well the observed indicators of constructs related to one another. The relationships between these indicators were represented in a covariance matrix. Validity of individual measures based on the model's overall fit and the evidence of construct validity. Construct validity is very important aspect of latent variable models. Measurement model validity depends on Goodness of Fit indices and evidence of construct validity. The variables used in each model corresponded to its hypothetical constructs.

There is no simple rule for index value to ascertain poor model to good model, it is recommended that combinatorial fit indices should be considered to determine the model fit. The index cutoff value should be adjusted by model characteristics. For example, a simple model and smaller samples should be accountable for more strict evaluation than more complex models with larger samples. Normal Theory Weighted Least Square Chi-Squares, Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Residual (SRMR) were used to evaluate model fit.

For Sample sizes > 250, and number of variables < 12, acceptable, model fit is considered from cut-off values greater than 0.95 or better for the CFI; TLI, RNI; lesser than 0.07 for the RMSEA with CFI of 0.97 or higher, and insignificant P-values of Chi-squares can result with good fit [30].

CHAPTER IV

DATA ANALYSIS AND RESULTS

The study aimed to developing and validating the specific scale of self-esteem in smoking abstinence context. The psychometric properties of a seven-item questionnaire to access smoking abstinence self-esteem were investigated. In a mean time the associations between self-esteem, intention to quit smoking and nicotine independence were examined. Results were divided into 4 parts: demographic characteristics, exploratory factor analysis, confirmatory factor analysis, and construct validity analysis.

Demographic characteristics

Of 400 sample, 78.5% (N=314) was male, and 21.5% (N=86) was female. The age of the participants ranged from 18 to 24 years (*Mean = 20.0 years, SD* = 1.2). By average, participants had initial smoking at 18.4 years. Other characteristics of participants were demonstrated in Table 1. Most of participants (54.3%) never had quit experiences. When they were asked about the intention to quit smoking in a future, 64.8% had not make decision yet. Participants' Nicotine dependence was congruent with number of cigarettes consumption in a day.

Table 1: Demographic characteristics of participants

Characteristics	Percentage (N=400)
Gender	
Male	78.5
Female	21.5
Start smoking at age (Year)	
17	10.0
18	27.8
19	17.8
20	30.0
Others	14.4
Number of cigarettes/day	
1-5	11.3
6-10	41.5
11-15	26.5
16-20	16.0
21-25	4.8
Quit experience	
Never	54.3
Have	45.7
Intention to quit	
In 1 week	4.0
In 3 months	2.8
In 6 months	1.8
In 1 year	26.8
Not make decision yet	64.8
Nicotine dependence	
Very low	57.1
Low	24.5
Medium	13.8
High	4.5
Very high	0.003

Exploratory factor analysis (EFA)

All variables correlated significantly. The assumptions for factor analysis were met indicated by the KMO and the significance of Bartlett's test of sphericity (Table 2). Two factors were derived from EFA with Eigen-value above 1 (Table 3). Factor loadings and communality of self-esteem indicators were presented in Table 4.

Table 2: Correlations among smoking abstinence self-esteem variables of the measurement model

Variables	C1	C2	C3	W1	W2	W3	W4
C1: Although I am among people who smoke, I am eagerly to quit smoking.	-						
C2: I am ready to follow the quit advice from experts.	.76	-					
C3: The adverse effects from smoking lead me to conquer myself in smoking cessation.	.41	.47	-				
W1: I have full respect myself.	.30	.42	.72	-			
W2: If ever I can quit smoking, I will have self proud.	.28	.40	.60	.78	-		
W3: In total, I think I am failure.	.28	.27	.31	.57	.52	-	
W4: In total, I think I am a bad person.	.15	.18	.22	.40	.45	.80	-
Mean	.84	.60	.13	.31	.55	.28	.40
SD	.95	.89	.74	.86	.83	.03	.88
MSA	.659	.681	.844	.755	.823	.689	.641
Bartlett's Test of Sphericity Approx. Chi-Square 1.320E3, DF = 21, P-value < .001 Kaiser-Meyer-Olkin Measure of Sampling Adequacy = 0.726							

Table 2 shows correlation matrix of 21 pairs, all pairs reached the significance (P-value = .000) that the correlation of variables differed from zero by overall. A statistic test for a presence of correlation, Bartlett's Test of Sphericity Chi-Square 1.320E3, DF = 21, P-value < .001, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.726, and degree of inter-correlations (Measure of sampling Adequacy, MSA) for all variables were between 0.641 - 0.844 provided that the correlation matrix had significant correlations that suitable for factor analysis.

Table 3: Factor component, Eigenvalues, and the extraction sum of squared loadings of variables

Total Variance Explained							
Component	Initial Eigenvalues	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.477	49.664	49.664	3.477	49.664	49.664	2.794
2	1.310	18.709	68.374	1.310	18.709	68.374	2.729
3	.932	13.316	81.689				
4	.481	6.867	88.557				
5	.361	5.151	93.708				
6	.230	3.292	96.999				
7	.210	3.001	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 3 presented factor component and variance explained. Two factors were derived from EFA with Eigen-value of 3.48 and 1.31, explaining 68.40% of the variance

Table 4: Factor loadings and communality of smoking abstinence self-esteem indicators

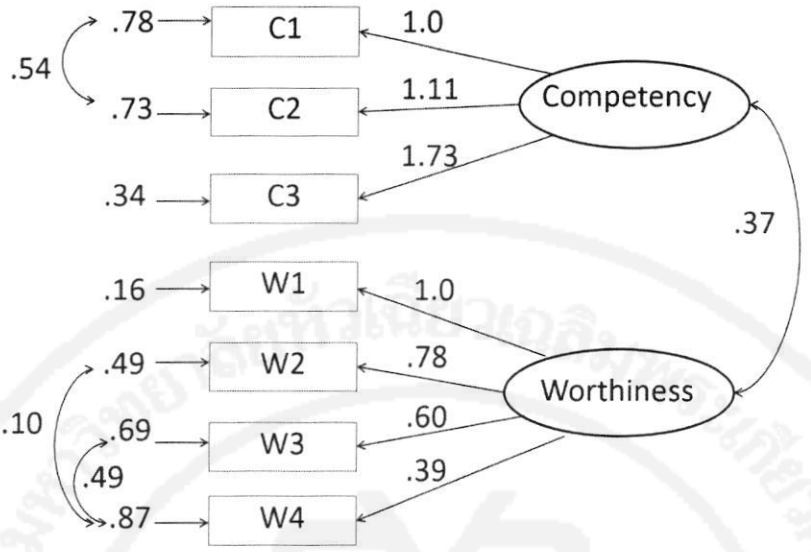
Construct and indicators	Factor loadings	Communality
Competency		
C1: Although I am among people who smoke, I am eagerly to quit smoking.	-.91	.77
C2: I am ready to follow the quit advice from experts.	-.90	.80
C3: The adverse effects from smoking lead me to conquer myself in smoking cessation.	-.54	.55
Worthiness		
W1: I have full respect myself.	.89	.67
W2: If ever I can quit smoking, I will have self proud.	.86	.56
W3: In total, I think I am failure.	.60	.73
W4: In total, I think I am a bad person.	.56	.71

This study provided all factor loadings were sufficient above 0.5. Communalities were above 0.5 as well.

Confirmatory factor analysis

Confirmatory factor analysis of the measurement model revealed a good fit (Figure 1) with Normal Theory Weighted Least Squares Chi-Square = 16.140 (P = 0.0957), Root Mean Square Error of Approximation (RMSEA) = 0.0392, Comparative Fit Index (CFI) = 0.996, Standardized RMR = 0.0213 (Appendix B).

Figure 1: Measurement model of the two-dimensional of smoking abstinence self-esteem.



χ^2 (10, n = 400) = 16.140, P = *0.0957*, CFI = 0.996; RMSEA = 0.0392; CFI = 0.996; SRMR = 0.0213.

Construct validity analysis

With confirmatory factor analysis, convergent validity and discriminant validity among item measures were assessed. A good rule of thumb for standardized loading estimates ought to >= 0.5. A test of discriminant validity could be examined whether the measurement model provides no cross loadings among the constructs. This implies that the individual measure items represented only one latent construct or uni-dimensional scale.

Table 5: Cluster solutions by Two-step and K-Mean analysis (N=400)

Cluster	Two-steps (%)	K-Mean (%)
1	89.2	89.8
2	10.8	10.2

The predictive validity of variables to nicotine dependence depicted as group classification by the TwoStep, and K-Means methods. Both methods yielded 2 clusters. Number of cases by the TwoStep was 357 in cluster 1, and 43 in cluster 2, respectively. The K-Means had slightly different with number of cases 359, and 41 in each cluster.

Table 6: Cluster centers of smoking abstinence self-esteem variables by K-Means analysis

Variables	Cluster number	
	1 (N=359)	2 (N=41)
C1: Although I am among people who smoke, I am eagerly to quit smoking.	6	4
C2: I am ready to follow the quit advice from experts.	6	4
C3: The adverse effects from smoking lead me to conquer myself in smoking cessation.	6	5
W1: I have full respect myself.	7	4
W2: If ever I can quit smoking, I will have self proud.	7	5
W3: In total, I think I am failure.	6	4
W4: In total, I think I am a bad person.	7	5

Table 6 demonstrated cluster centers of variables in the two components of smoking abstinence self-esteem. It was definitely that both clusters did have different centered positioning in each of variables.

Table 7: Cluster number of case and quit intention at a time

	Quit intention N (%)					
Cluster	1 week	3 month	6 month	1 year	not limit	Total
1	0 (0)	6 (1.7)	7 (1.9)	89 (24.8)	257 (71.6)	359 (100)
2	16 (39)	5 (12.2)	0 (0)	18 (43.9)	2 (4.9)	41 (100)
Total	16 (4.0)	11 (2.8)	7 (1.8)	107 (26.8)	259 (64.8)	400 (100)

It was seen that participants who were in cluster 1 could not make decision when to quit smoking in a high percentage compared to

participants in cluster 2. Differences in the intention to quit did exist across the cluster when it was added into cluster analysis.

Table 8: Correlations among summative intention to quit, self-esteem abstinence competency, and self-esteem abstinence worthiness

	Intention to quit	Self-esteem abstinence competency	Self-esteem abstinence worthiness
Intention to quit	-	-	-
Self-esteem abstinence competency	.169	-	-
Self-esteem abstinence worthiness	-.234	.425	-

Additionally, it was found that the summative of competency construct and the worthiness were associated with intention to quit at 0.169, and -0.234, respectively (*P=.01*) (Table 8).

CHAPTER V

DISCUSSION AND CONCLUSIONS

Discussion

Data was collected by using convenience sampling. It was not easy to find students who smoked, for one reason it may be due to the prohibition to smoking inside University. Students often have their hidden places to smoke. Thus, to finding smokers, additionally, Snowball method was used. Snowball sampling provides recommendations and connections to other smokers by some of participants. Most of participants had low level of nicotine dependence. More than a half of participants (54.3%) never had quit experiences and 64.8% did not make decision to stop smoking when they were asked about their intention to quit smoking in a future. Young people are not unaware of negative health outcomes caused by smoking cigarettes, many of them begin or continue taking up this unhealthy behavior [31]. The reason to continue smoking may be because of the immediate pleasures whereas any adverse effects are apparently in longer term.

Comparing to the mean scores of smoking abstinence components, the competency aspects had a bit lower than the worthiness dimension. Respondents had concern regarding to their competency less than the respect to their selves. This suggested that there was distinction between these two dimensions.

The purpose of the present study was to develop and investigate psychometric properties of self-esteem in smoking abstinence context. The internal consistency of competency and worthiness were above acceptable values as 0.77 and 0.79, respectively. Exploratory factor analysis showed two factors of competency and worthiness with variance explanation of 68%. All loadings were sufficient above 0.5. All indicators of self-esteem were correlated to one another. Results from CFA provided the convergent validity. There were no significant cross-loadings of indicators between two factors dimension which implied for the discriminant validity of each latent construct of a model [28]. However, there was covariance among some of the error terms existed, i.e., within-construct error covariance (see Figure 2). Model had a combinatorial of good fit indices. Chi squares was insignificant provided for the covariance matrices between observed data and measurement theory were indifference. Correlation between competency and worthiness was found about 0.37. All these findings supported the inter-correlated of two factors but distinct in its own dimension. Consistent to

the results reported by Tarafodi and Swann [11], two-dimensional of global self-esteem provided relatively fit indices. It is worth to mention that the present study provided a room for measuring global self-esteem under the worthiness construct as suggested by Rosenberg [19] who defined self-esteem in terms of the perception of a feeling about one's worth or value as a person. It was a positive or negative attitude toward self. As individual expressed the feeling that one is "good enough" reflected "high self-esteem". However, in the present study it seemed that the indicators of global self-esteem (W3: In total, I think I am failure; loading .60, and W4: In total, I think I am a bad person; loading .56) had a relatively low factor loadings (see Table 2) compared with the specific self-esteem (W2: If ever I can quit smoking, I will have self-proud; loading .86).

The predictive validity of smoking abstinence self-esteem to predict nicotine dependence of participants was found. Cluster analysis classified participants into two groups based on the characteristics of self-esteem variables they possess. These clusters met the test of predictive validity and distinctiveness on set of smoking abstinence self-esteem variables. The solutions compared by the TwoStep and K-Means methods were very slightly difference, clearly for both methods yielded 2 clusters distinctiveness. The participants who had higher scores of self-esteem variables were classified in different group from the participant who had lower scores. It indicated that people who had high score on self-esteem were classified in the lower nicotine dependence group. People who have high or low self-esteem are clearly different in certain key ways. For example, both groups may have the same value as being successful but they may hold different expectations of how likely they are to achieving what they value. For individuals who contain high self-esteem, they usually feel competent enough to take some risks that might occur. The individuals with low self-esteem frequently utilize self-protective strategy by avoiding the loss of worthiness and likely to gaining more [32].

Additionally, it was found that the summative of competency and the worthiness constructs were associated with intention to quit. The same finding to the study among Jordanian college students, correlation between Rosenberg self-esteem scale and intention to undergo smoking cessation was found rather low, but significantly [33].

The results of current study indicate that to measuring self-esteem under specific situation such as smoking abstinence context could draw relative associations with the intention to quit and the FTND dependence scores. The two inter-correlated components, with seven items could be easily used in a clinic setting for smoking cessation. The longitudinal study design should be conducted whether respondents' smoking abstinent self-esteem scores predict smoking status. A number of studies have demonstrated that personal, socio-cultural, and environmental factors are related to adolescents smoking [34-36]. Self-esteem should be considered not only one factor, other important factors such as attitudes, norms, perceived behavior control, or typical images of smokers, should be incorporated in a theoretical framework as well [37].

Conclusions

The current findings provided support for two dimensions of self-esteem under smoking abstinence context. The scale possesses psychometric properties, can assess self-esteem regarding in participants who want to quit smoking, and its predictive validity appears to be a good predictor of smoking behavior.

Policy Recommendation

The participants sample did not aware of long-term negative effects due to smoking. Very effective interventions are in need to help and guide the students to quit smoking and preventing of who has prone to engaging in smoking behavior. Lopez, Litvin, and Brandon [38] found that perceived negative body images produced urges to smoke in college female. It is possible that the same reason may occur in female sample of this study. Further study may find a cause and a strategy to prevent or change smoking behavior.

Limitation

Actual behaviors of participants were obtained at the same time as the measures of smoking abstinence self-esteem indicators. The present study depicted the intention to quit smoking as a proxy for the actual behavior. Therefore, the temporal sequence of cognitive determinants and the level of nicotine dependence of participants could not be observed directly. Due to a small number of female participants compared with male participants, the measurement model of two factors smoking abstinence self-esteem based on gender might behave differently with the other populations.

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APPENDICES

Appendix A
Approval from HCU Ethic Committee

Acquire Knowledge to Serve Society

THE CERTIFICATE OF ETHICAL APPROVAL

The Ethics Committee of Research

Huachiew Chalermprakiet University

October 10, 2012

Project title	Intention to Reduce/Quit Smoking and Counseling Project for College Students
Principal investigator	Monthira Bumroongkit THAVEESRI, F.A.C.P. (Social and Administrative Pharmacy)
Faculty / Program	The Faculty of Pharmaceutical Sciences Huachiew Chalermprakiet University

This is to certify that the research project above has been approved in accordance with the Declaration of Helsinki by the Research Ethics Committee at Huachiew Chalermprakiet University.

Signature Jariyawat Kompayak.

(Assoc. Prof. Jariyawat Kompayak, Dr.P.H.)
Chairperson
Research Ethics Committee
Huachiew Chalermprakiet University

Approval Date October 10, 2012

Certificate Number OR.098/2012

Appendix B
Confirmatory factor analysis results

DATE: 11/12/2013
TIME: 12:19

L I S R E L 8.72

BY

Karl G. J"reskog & Dag S"rbom

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The following lines were read from file C:\Users\thaveesri\Documents\About Lisrel\EST.ls8:

```
TI CFA for Esteem
DA NI=7 NO=400 MA=KM
RA FI='C:\Users\thaveesri\Documents\EST.psf'
SE
1 2 3 4 5 6 7 /
MO NX=7 NK=2 LX=FU,FI PH=SY TD=SY
LK
CPT WORTH
FR  LX(2,1) LX(3,1) LX(5,2) LX(6,2) LX(7,2)
FR TD(7,6) TD(2,1) TD(7,5)
VA 1 LX(1,1) LX(4,2)

PD
OU SE TV SC RS MR FS MI ND=3
```

TI CFA for Esteem

Number of Input Variables 7
Number of Y - Variables 0
Number of X - Variables 7
Number of ETA - Variables 0
Number of KSI - Variables 2
Number of Observations 400

TI CFA for Esteem

Covariance Matrix

	C2	C3	C4	W1	W2	W3
C2	1.000					
C3	0.781	1.000				
C4	0.382	0.420	1.000			
W1	0.356	0.394	0.649	1.000		
W2	0.299	0.375	0.512	0.652	1.000	
W3	0.288	0.283	0.337	0.518	0.391	1.000
W4	0.149	0.181	0.228	0.334	0.357	0.684

Covariance Matrix

	W4
W4	1.000

TI CFA for Esteem

Parameter Specifications

LAMBDA-X

	CPT	WORTH
C2	0	0
C3	1	0
C4	2	0
W1	0	0
W2	0	3
W3	0	4
W4	0	5

PHI

	CPT	WORTH
CPT	6	
WORTH	7	8

THETA-DELTA

	C2	C3	C4	W1	W2	W3
C2	9					
C3	10	11				

C4	0	0	12			
W1	0	0	0	13		
W2	0	0	0	0	14	
W3	0	0	0	0	0	15
W4	0	0	0	0	16	17

THETA-DELTA

	W4
W4	18

TI CFA for Esteem

Number of Iterations = 19

LISREL Estimates (Maximum Likelihood)

LAMBDA-X

	CPT	WORTH
C2	1.000	- -
C3	1.108	- -
	(0.085)	
	13.103	
C4	1.731	- -
	(0.212)	
	8.174	
W1	- -	1.000
W2	- -	0.778
		(0.052)
		14.927
W3	- -	0.603
		(0.054)
		11.184
W4	- -	0.389
		(0.056)
		6.892

PHI

	CPT	WORTH
CPT	0.220	
	(0.049)	
	4.441	
WORTH	0.372	0.845
	(0.052)	(0.079)
	7.164	10.701

THETA-DELTA

	C2	C3	C4	W1	W2	W3
C2	0.780					
	(0.059)					
	13.122					
C3	0.538	0.731				
	(0.051)	(0.057)				
	10.530	12.828				
C4	- -	- -	0.342			
			(0.062)			
			5.542			
W1	- -	- -	- -	0.155		
				(0.038)		
				4.072		
W2	- -	- -	- -	- -	0.489	
					(0.042)	
					11.617	
W3	- -	- -	- -	- -	- -	0.693
						(0.052)
						13.230
W4	- -	- -	- -	- -	0.105	0.487
					(0.028)	(0.047)
					3.739	10.330

THETA-DELTA

	W4
W4	0.874

(0.062)
14.046

Squared Multiple Correlations for X - Variables

C2	C3	C4	W1	W2	W3
0.220	0.269	0.658	0.845	0.511	0.307

Squared Multiple Correlations for X - Variables

W4
0.128

Goodness of Fit Statistics

Degrees of Freedom = 10
Minimum Fit Function Chi-Square = 16.421 (P = 0.0882)
Normal Theory Weighted Least Squares Chi-Square = 16.140 (P = 0.0957)
Estimated Non-centrality Parameter (NCP) = 6.140
90 Percent Confidence Interval for NCP = (0.0 ; 21.243)

Minimum Fit Function Value = 0.0412
Population Discrepancy Function Value (F0) = 0.0154
90 Percent Confidence Interval for F0 = (0.0 ; 0.0532)
Root Mean Square Error of Approximation (RMSEA) = 0.0392
90 Percent Confidence Interval for RMSEA = (0.0 ; 0.0730)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.658

Expected Cross-Validation Index (ECVI) = 0.131
90 Percent Confidence Interval for ECVI = (0.115 ; 0.169)
ECVI for Saturated Model = 0.140
ECVI for Independence Model = 4.099

Chi-Square for Independence Model with 21 Degrees of Freedom = 1621.615
Independence AIC = 1635.615
Model AIC = 52.140
Saturated AIC = 56.000
Independence CAIC = 1670.556
Model CAIC = 141.986
Saturated CAIC = 195.761

Normed Fit Index (NFI) = 0.990
Non-Normed Fit Index (NNFI) = 0.992
Parsimony Normed Fit Index (PNFI) = 0.471
Comparative Fit Index (CFI) = 0.996
Incremental Fit Index (IFI) = 0.996

Relative Fit Index (RFI) = 0.979

Critical N (CN) = 564.963

Root Mean Square Residual (RMR) = 0.0213
Standardized RMR = 0.0213
Goodness of Fit Index (GFI) = 0.989
Adjusted Goodness of Fit Index (AGFI) = 0.968
Parsimony Goodness of Fit Index (PGFI) = 0.353

TI CFA for Esteem

Fitted Covariance Matrix

	C2	C3	C4	W1	W2	W3
C2	1.000					
C3	0.781	1.000				
C4	0.380	0.421	1.000			
W1	0.372	0.412	0.644	1.000		
W2	0.289	0.321	0.501	0.657	1.000	
W3	0.224	0.249	0.388	0.509	0.396	1.000
W4	0.145	0.161	0.251	0.329	0.360	0.685

Fitted Covariance Matrix

	W4
W4	1.002

Fitted Residuals

	C2	C3	C4	W1	W2	W3
C2	0.000					
C3	0.000	0.000				
C4	0.002	-0.001	0.000			
W1	-0.016	-0.018	0.005	0.000		
W2	0.009	0.054	0.011	-0.005	0.000	
W3	0.063	0.034	-0.051	0.009	-0.005	0.000
W4	0.004	0.020	-0.023	0.005	-0.004	-0.001

Fitted Residuals

	W4
W4	-0.002

Summary Statistics for Fitted Residuals

Smallest Fitted Residual = -0.051
Median Fitted Residual = 0.000
Largest Fitted Residual = 0.063

Stemleaf Plot

- 4|1
- 2|3
- 0|865542110000000
0|2455991
2|04
4|4
6|3

Standardized Residuals

	C2	C3	C4	W1	W2	W3
C2	- -					
C3	- -	- -				
C4	0.201	-0.201	- -			
W1	-1.277	-2.117	1.278	- -		
W2	0.314	2.004	0.661	-1.327	- -	
W3	1.735	0.983	-2.043	1.373	-0.214	- -
W4	0.104	0.499	-0.774	0.635	-0.214	-0.214

Standardized Residuals

	W4
W4	-0.214

Summary Statistics for Standardized Residuals

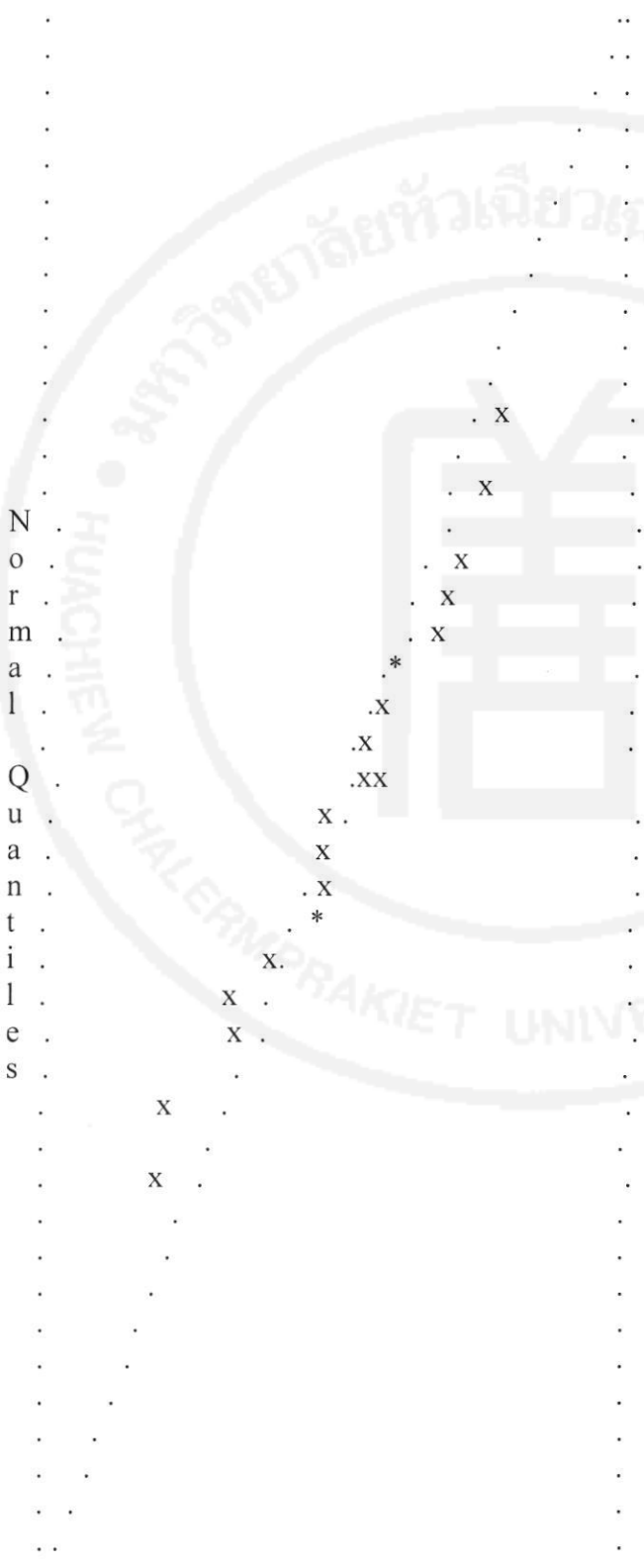
Smallest Standardized Residual = -2.117
Median Standardized Residual = 0.000
Largest Standardized Residual = 2.004

Stemleaf Plot

- 2|10
- 1|
- 1|33
- 0|8
- 0|222220000000
0|123
0|567
1|034
1|7

TI CFA for Esteem

Qplot of Standardized Residuals



-3.5.....
-3.5 3.5

Standardized Residuals

TI CFA for Esteem

Modification Indices and Expected Change

Modification Indices for LAMBDA-X

	CPT	WORTH
C2	- -	0.040
C3	- -	0.040
C4	- -	- -
W1	0.046	- -
W2	1.932	- -
W3	1.280	- -
W4	0.011	- -

Expected Change for LAMBDA-X

	CPT	WORTH
C2	- -	-0.024
C3	- -	0.027
C4	- -	- -
W1	-0.128	- -
W2	0.566	- -
W3	-0.316	- -
W4	0.030	- -

Standardized Expected Change for LAMBDA-X

	CPT	WORTH
C2	- -	-0.022
C3	- -	0.025
C4	- -	- -
W1	-0.060	- -
W2	0.265	- -
W3	-0.148	- -
W4	0.014	- -

Completely Standardized Expected Change for LAMBDA-X

	CPT	WORTH
C2	- -	-0.022
C3	- -	0.025

C4	- -	- -
W1	-0.060	- -
W2	0.265	- -
W3	-0.148	- -
W4	0.014	- -

No Non-Zero Modification Indices for PHI

Modification Indices for THETA-DELTA

	C2	C3	C4	W1	W2	W3
C2	- -					
C3	- -	- -				
C4	0.040	0.040	- -			
W1	0.016	1.591	2.966	- -		
W2	1.373	4.703	0.016	1.837	- -	
W3	4.604	0.419	4.769	1.531	0.046	- -
W4	1.966	0.404	0.348	0.011	- -	- -

Modification Indices for THETA-DELTA

	W4
W4	- -

Expected Change for THETA-DELTA

	C2	C3	C4	W1	W2	W3
C2	- -					
C3	- -	- -				
C4	0.005	-0.006	- -			
W1	-0.003	-0.027	0.078	- -		
W2	-0.027	0.049	0.004	-0.078	- -	
W3	0.044	-0.013	-0.058	0.041	-0.008	- -
W4	-0.031	0.014	0.016	-0.004	- -	- -

Expected Change for THETA-DELTA

	W4
W4	- -

Completely Standardized Expected Change for THETA-DELTA

	C2	C3	C4	W1	W2	W3
C2	- -					
C3	- -	- -				

C4	0.005	-0.006	- -			
W1	-0.003	-0.027	0.078	- -		
W2	-0.027	0.049	0.004	-0.078	- -	
W3	0.044	-0.013	-0.058	0.041	-0.008	- -
W4	-0.031	0.014	0.016	-0.004	- -	- -

Completely Standardized Expected Change for THETA-DELTA

	W4
W4	- -

Maximum Modification Index is 4.77 for Element (6, 3) of THETA-DELTA

TI CFA for Esteem

Covariances

X - KSI

	C2	C3	C4	W1	W2	W3
CPT	0.220	0.243	0.380	0.372	0.289	0.224
WORTH	0.372	0.412	0.644	0.845	0.657	0.509

X - KSI

	W4
CPT	0.145
WORTH	0.329

TI CFA for Esteem

Factor Scores Regressions

KSI

	C2	C3	C4	W1	W2	W3
CPT	0.020	0.049	0.213	0.167	0.043	0.030
WORTH	0.012	0.030	0.131	0.599	0.156	0.107

KSI

	W4
CPT	-0.010
WORTH	-0.037

TI CFA for Esteem

Standardized Solution

LAMBDA-X

	CPT	WORTH
C2	0.469	- -
C3	0.519	- -
C4	0.811	- -
W1	- -	0.919
W2	- -	0.715
W3	- -	0.554
W4	- -	0.358

PHI

	CPT	WORTH
CPT	1.000	
WORTH	0.865	1.000

TI CFA for Esteem

Completely Standardized Solution

LAMBDA-X

	CPT	WORTH
C2	0.469	- -
C3	0.519	- -
C4	0.811	- -
W1	- -	0.919
W2	- -	0.715
W3	- -	0.554
W4	- -	0.357

PHI

	CPT	WORTH
CPT	1.000	
WORTH	0.865	1.000

THETA-DELTA

C2	C3	C4	W1	W2	W3

C2	0.780					
C3	0.538	0.731				
C4	- -	- -	0.342			
W1	- -	- -	- -	0.155		
W2	- -	- -	- -	- -	0.489	
W3	- -	- -	- -	- -	- -	0.693
W4	- -	- -	- -	- -	0.105	0.486

THETA-DELTA

	W4
W4	0.872

Time used: 0.016 Seconds

BIOGRAPHY

Monthira Bumroongkit THAVEESRI

Educational Background

12 June 2012	Federations of Asian Pharmaceutical Associations College of Pharmacy Fellow of Asian College of Pharmacy F.A.C.P. (Social and administrative pharmacy)
24 September 1993	Vrije Universiteit Brussel (VUB) Master of Information Technology Brussel / BELGIUM
30 March 1985	Chiang Mai University B. Pharm. (Pharmacy) Chiang Mai /THAILAND

Working Experiences

1997 to Present	Faculty of Pharmaceutical Sciences Huachiew Chalermprakiet University 18/18 Bangna-Trad Rd., Bang Plee, Samut Prakarn, THAILAND 10540
1995-1996	Ramathibbodi Hospital (Part-time) Rama VI Rd., Rajthevi, Bangkok, THAILAND 10400
1987-1989	Welcome Company Ltd. (THAILAND) Pan Rd., Silom, Bangkok THAILAND
1988-1989	Vichaiyuth Hospital (Part-time) 114/4 Sethasiri Rd., Phayathai, Bangkok, THAILAND
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Activities

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