

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

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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.

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

INTRODUCTION

Survey data from 2011 estimated that 20.1% of people at age 15-24 years were current smokers [1]. College students often get involved in risk behavior taking, included smoking [2]. It was found that a lower level of self-esteem correlate with risky behavior engagement among adolescents such as cigarettes smoking [3, 4] and substance use [5]. A higher level of self-esteem is preventive factor for mental health problems among nursing students [6] and related to longer abstinence from substance use [7]. 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 as 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 [8].

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 [9] 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. 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.

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Rationally, human beings have a basic need of feeling worthy if they have accomplished 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 ones. Otherwise it may facilitate a development of narcissism, or the risks to increase undesirable social behaviors [10].

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. [11]. 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 assess smoking abstinence self-esteem were investigated. In a mean time the associations between self-esteem, intention to quit smoking, and nicotine independence were examined.

METHODS

Participants

Eligible participants were undergraduate smoking students on Education year 2012. Between October and November 2012, a total of 400 college students who were smokers completed self-administered questionnaire. 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 questionnaire assessed smoking abstinence self-esteem, intention to quit smoking, nicotine dependence, amount of cigarettes consumption, and socio-demographic data. The study was approved by the HCU ethic Committee, Huachiew Chalermprakiet University, Thailand.

Measures

Self-esteem questions in the context of smoking abstinence were developed using knowledge that based on the studies of Tarafodi & Swann [9], Rosenberg et al. [11], and Rosenberg [12]. 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 [13]: The six items of FTND were used to assess levels of nicotine dependence.

Smoking behavior

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

Data analysis

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 used.

Confirmatory factor analysis (CFA) was used to confirm the testing. 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 [14]. Determination of model fit was based on model characteristics and combinatorial fit indices. 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 [15]. Cluster analysis was used in order to determine the predictive validity of the smoking abstinence self-esteem to smoking behavior. Participants who had higher self-esteem should be contained in the lower 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 [16].

RESULTS

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

Table 1 Demographic characteristics of participants (N=400)

Characteristics	Percentage
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
Yes	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

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.

Factor analysis

The assumptions for factor analysis were met indicated by the KMO (0.73) and the significance of Bartlett's test of sphericity ($P < 0.001$). Two factors were derived from EFA with Eigen-value of 3.48 and 1.31, explaining 68.40% of the variance. Factor loadings and communality of self-esteem indicators were presented in Table 2.

Construct validity

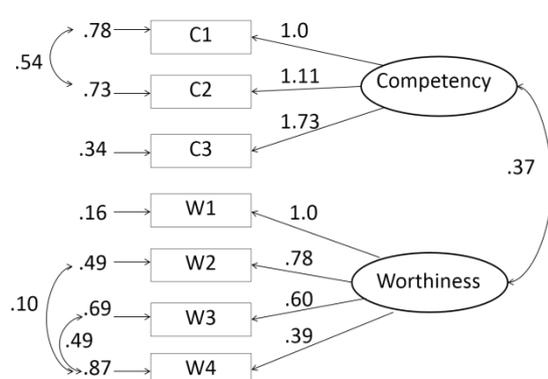
Confirmatory factor analysis of the measurement model revealed a good fit (Figure 1) with Normal Theory Weighted Least Squares Chi-Square = 16.140 ($P = 0.0957$), Root Mean Square Error of Approximation (RMSEA) = 0.0392, Comparative Fit Index (CFI) = 0.996, Standardized

Table 2 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

Table 3 Correlations among smoking abstinence self-esteem variables of the measurement model

Variables	1	2	3	4	5	6	7
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	-



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

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

RMR = 0.0213. Table 3 showed correlations matrix among smoking abstinence self-esteem variables of the measurement model. 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. 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 4). Significant differences in the intention to quit measures did exist across the clusters when it was added into cluster analysis. Cluster centers of each variable by K-Means analysis were demonstrated in Table 5.

DISCUSSION

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 with standardized loadings above 0.5. 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. However, there was covariance among some of the error terms existed, i.e., within-construct error covariance (Figure 1). Model had a combinatorial of good fit indices. Chi squares was insignificant

Table 4 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	-

Table 5 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

provided for the covariance matrices between observed data and measurement theory were indifference. Correlation between competency and worthiness was found about 0.37 (Figure 1). 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 [9], 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 [12] 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 (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 score high 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 [17].

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 [18].

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 abstinence self-esteem scores predict smoking status. However, 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 [19].

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.

LIMITATION

The actual behaviors of participants were obtained at the same time as the measures of smoking abstinence self-esteem indicators. Therefore, the temporal sequence of cognitive determinants and 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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