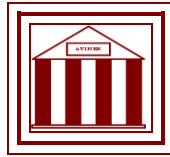


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Development of Self-Immunity Scale

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Abstract

The purposes of this study were to develop a valid and reliable self-immunity scale and verify dimensions of self-immunity. The sample consisted of 800 undergraduate students in public universities in Bangkok, Thailand. The major instrument was self-immunity scale that contained 30 items. Each item was rated on a five-point rating scale, from (1) never true of me to (5) always true of me. Besides, there were other measures of similar and different constructs from the self-immunity scale used to test convergent and discriminant validity. All measures were acceptable in terms of discrimination power, validity, and reliability. The results indicated that the self-immunity scale had good psychometric properties and distinguished between those with greater and lesser self-immunity. The self-immunity scale's internal consistency reliability (Cronbach's Alpha) was .91. Based on a factor analysis, five dimensions of self-immunity were identified. There were the factors of mindfulness, self-reliance, hope, coping, and resilience. The self-immunity scale was positively correlated with self-control, locus of control, self-esteem and optimism. In fact, the positive correlations among these dispositional constructs support convergent validity of self-immunity. The self-immunity scale is a unidimensional scale that has the potential for significant usage in the development and testing of theory, as well as practical implications.

Keywords: Self-immunity, resilience, self-reliance, coping, psychometric properties

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Introduction

The philosophy of sufficiency economy has been developed by His Majesty King *Bhumipol Adulyadej* and has been used as the core principle in 10th and the Current 11th National Economic and Social Development Plan (Office of National Economic and Social Development Board, 2010). The philosophy provides guidance on appropriate conduct covering numerous aspects of life that will lead to a better quality of life and be able to cope appropriately with challenges arising from globalization and other changes. Sufficiency economy is a philosophy that stresses the three principles (moderation, reasonable, and self-immunity) and requires two conditions: knowledge and morality. Such a way of life based on three principles with the two conditions, Thai people would be able to live securely in harmony amongst rapid socioeconomic, environmental, and cultural changes in the world.

According to the philosophy of sufficiency economy, self-immunity refers to the ability of an individual to protect oneself from helplessness and insecurity risks and to cope appropriately with events that are unpredictable or uncontrollable. In other words, self-immunity reflects self-reliance (the ability to tolerate and deal with all kinds of problems by oneself). As a result, self-immunity is an important characteristic that is necessary to be instilled and developed in Thai people.

Although self-immunity has been identified as a buffer for preventing various risks that individual may encounter in one's life, there are few studies investigating the structure of self-immunity. Specifically, a standardized measure of self-immunity is needed. Consequently, this study aimed to develop a reliable and valid self-immunity scale and verify dimensions of self-immunity. The development and validation of self-immunity scale is a necessary step that will facilitate and extend the body of knowledge in psychological characteristics. These benefits should have positive effects on individual well-being.

Conceptual and Theoretical Perspectives on Self-Immunity

According to the philosophy of sufficiency economy, self-immunity is an important protective factor against behavioral problems and adversity such as helplessness and anxiety (Office of National Economic and Social Development Board, 2010). It is suggested that individuals with high self-immunity adopt adaptive strategies that can deal with problems such as spending more time and effort solving problems. In addition, self-immunity serves as an essential role in helping individuals to adapt functionally in the midst of challenges and difficulties.

Based on theoretical perspectives of sufficiency economy (Office of National Economic and Social Development Board, 2010), personal resources (Van den Heuvel et al., 2010), and positive psychology (Snyder & Lopez,

2002), self-immunity is a psychological construct and the dimensions of self-immunity may relate to resilience, mindfulness, coping, hope, and self-reliance.

Self-reliance

According to the American Heritage Dictionary of the English Language (2000), self-reliance is being independent, which is being to depend on one's own capabilities, judgment, or resource. The concept of living in a state of self-reliant sustainability involves a natural simple lifestyle with enough for basic needs (Marinova & Hossain, 2006; Office of National Economic and Social Development Board, 2010). It does not encourage ill health, famine, illiteracy or inadequate living standards. Self-reliant living is a viable means of caring for nature and other human beings, and hence, for sustainability. Thus, self-reliance in terms of sustainability consisted of five characteristics: simplicity, responsibility, respect, commitment, and creativity (Marinova & Hossain, 2006). Self-reliance is promoted as a coping strategy to reduce service use and increase client's resources (Ortega & Alegria, 2002). Moreover, self-reliance is positively related to self-esteem that has often been used as an indicator of well-being (e.g., Snyder & Lopez, 2002). Thus, self-reliance is self-worth. People with high self-reliance perceive themselves as successful and effective.

Mindfulness

Originating in contemplative traditions such as Buddhism, mindfulness is defined as a state of enhanced attention to and awareness of, what is taking place in the present (Brown, Ryan & Creswell, 2007). Researchers have viewed mindfulness as a self-regulation, and a meta-cognitive skill (Brown, Ryan & Creswell, 2007). Many studies of mindfulness have reported on positive correlations between mindfulness and psychological health, life satisfaction, conscientiousness self-esteem, empathy, sense of autonomy, competence, optimism, and pleasant affect. Studies have also demonstrated significant negative correlations between mindfulness and depression, difficulties in emotion regulation, and general psychological symptoms ((Brown, Ryan & Creswell, 2007).

Coping

The construct of coping has been defined as the behavioral and cognitive efforts of an individual to manage the internal and external demands encountered during a specific stressful situation (Lazarus & Folkman, 1984). According to the coping trait paradigm, coping represents the actions that people usually perform under stressful circumstances. Several coping strategies such as task-oriented coping, emotion-oriented coping, avoidance-oriented coping, and approach-oriented coping have been studied. Coping is positively associated with the use of more approach than avoidance strategies, which generally results in more positive affective experiences (Connor-Smith & Flachsbart, 2007). Higher coping is associated with the use of problem solving, cognitive restructuring, emotional social support, instrumental social support, and emotion regulation (Connor-Smith & Flachsbart, 2007). In sum,

individuals high in coping tend to use more problem-focused coping strategies, which appear effective when used in situations over which the individuals perceive they have some control (O'Brien & DeLongis, 1996).

Hope

Based on a synthesis of theoretical works on hope, hope is necessary to overcome obstacles and involve both wishing and planning. In addition, hope is positively connected with human well-being or betterment. Hope as a psychological construct encompassing affirmative beliefs about one's ability to accomplish personal goals (Snyder, 2002). Snyder's formulation of hope comprises two related constructs (Pathways and Agency). The Pathways component refers to an individual's perceived means or routes available to achieve goals. Agency is described as the belief in one's ability to succeed in using pathways to realize desired aims. High Agency is characterized by determination, motivation and energy directed toward meeting one's goals. Studies have found that higher hope is related to better adjustment, life satisfaction, well-being, academic achievement, and higher job performance (Snyder & Lopez, 2002).

Resilience

Resilience has been defined as the ability to bounce back from adverse events, or cope successfully (Rotter, 1985). Resilience or stress resistant is related to process of adaption under stress, or the capacity to maintain positive outcomes in the face of negative life events. Several studies have shown that at-risk adolescents with lower levels of resilience are more likely to report mental health problems (eg., depression, hopelessness, and loneliness), interpersonal conflicts (eg., disconnection with others), behavioral disorders (eg., violent behaviors, smoking and drug abuse, and sexual activity), and poor academic performance than those with higher levels of resilience (Van den Heuvel et al., 2010).

Method

Sample

Subjects were 800 undergraduate students in public universities in Bangkok. Sixty-two percent of the sample were female, and 38% were male. The average age for participants was 21 with range 18-25 years old.

Measure

Scale Development of Self-Immunity

To develop the reliable and valid self-immunity scale, the operational definition and content of the scale were drawn from philosophy of sufficiency economy (National Economic and Social Development Board, 2010), personal resources (Van den Heuvel et al., 2010), and positive psychology (Snyder & Lopez, 2002).

An initial pool of 50 items with five-point Likert scales ranging from (1) untrue to 5 (true) was constructed according to operational definition of self-immunity. Some items were positively worded and some items were negatively worded.

At a preliminary examination for psychometric properties, the 50 items of self-immunity scale were administered to 100 undergraduate students to estimate an initial internal consistency reliability. Moreover, the Pearson product moment correlation coefficients between each item and total score were also calculated. Items which were not significantly related to the total score were removed from the scale. Thirty items remained in the final version of the scale. The total score ranges from 30-150, with higher scores reflecting greater self-immunity.

The self-immunity scale consists of five domains. The domains are described as follows:

Mindfulness refers to self-awareness in thinking, talking, and acting appropriately.

Self-reliance refers to one's ability to do things by oneself.

Hope is defined as the ability to plan pathways to desired goals despite obstacles.

Resilience refers to the ability to adapt and bounce back from adverse events and cope with difficulties.

Coping is defined as the conscious approach efforts to manage or solve problems and demands.

Additional Measures

The Self-report inventories with five-point Likert scales ranging from (1) untrue to 5 (true) were additional measures to seek evidence of convergent and discriminant validity of self-immunity. The inventories measuring self-control, self-esteem, and locus of control were adopted from self survey developed by Choochom (2012). Each measure is described below.

Optimism Scale consisted of eight items assessing an individual's disposition in positive way of life and having hope. The optimism items were adapted from optimism subscale (Bar-On, 1997). The internal consistency reliability for this optimism scale was .71.

Self-control scale with eight items assessed an individual's ability to control his/her own emotion, desires, and impulses, as well as to refrain undesirable acts. The internal consistency reliability of this scale was .76.

Self-esteem scale with eight items measured the general approval of the self. The internal consistency reliability of this scale was .80.

Locus of control scale with eight items measured the perception of an individual's ability to control over his or her environment. The internal consistency reliability of this scale was .74.

Data Analysis

Data were analyzed in three stages. The preliminary stage (n = 100) was to examine item analysis (intercorrelation items and item-total correlations)

with the 50 initial self-immunity items. The internal consistency reliability with Cronbach's Alpha coefficient was also estimated.

The second stage ($n = 100$) was to explore the underlying factor structure of the 30 self-immunity items using exploratory factor analysis. Principle component with varimax rotation was used to extract factors. Eigenvalues (> 1) and the scree plot were used to determine the number of factors.

The last stage ($n = 800$) was to confirm the factorial structure of 30 self-immunity items derived from the exploratory factor analysis by using confirmatory factor analysis. This data set was also used to replicate the reliability. In addition, a correlation analysis of convergent and discriminant validity was conducted by correlating with similar and dissimilar constructs.

Results

Reliability

The internal consistency reliability coefficient for the full scale of self-immunity was high (Cronbach's alpha = .92) and item-total correlations ranged from .31 to .64. The Cronbach's alphas assessing the internal consistency of subscales on mindfulness, self-reliance, hope, resilience, and coping were .65, .72, .79, .83, and .67 respectively.

Exploratory Factor Analysis

Factor analysis was conducted on 30 items. Principle component analysis with varimax rotation was used to extract factors. The result from factor analysis revealed a five-factor solution, which accounted for 57% of variance. The first factor had 10 items and it accounted for 30% of variance. This factor was labeled "resilience" because the variables in this factor were all related to adapting and bouncing back from adversity (e.g., I am able to get through the difficult times). The second factor contained 7 items that pertained to self-reliance, autonomy, and independence (e.g., when working with others, I tend to rely on their ideas more than my own). This factor was called "self-reliance" and it accounted for 11% of variance. The third factor was named "hope" and it accounted for 7% of variance. The 6 items of the third factor reflected the ability to plan pathways to desired goals despite of obstacles (e.g., I energetically pursue my goals"). The fourth factor was called "coping" and it accounted for 5% of variance. This factor contained 4 items concerning approach coping strategy (e.g., I think about what I need to know to solve the problem). The last factor (3 items) was named "mindfulness" because the items in this factor were all related to awareness of thinking, feeling, and acting (e.g., I find myself doing something without paying attention) and it accounted for 3% of variance.

Inter-factor correlations among self-immunity factors ranging from .41 to .65 are presented in Table 1. The factors were correlated to each other suggesting that these are all dimensions of the same trait.

Table 1. *Inter-factor Correlations among Self-immunity Factors*

	Self-reliance	Mindfulness	Hope	Coping	Resilience
Self-reliance	1				
Mindfulness	.41**	1			
Hope	.60**	.28**	1		
Coping	.65**	.48**	.42**	1	
Resilience	.63**	.43**	.49**	.59**	1

** Significance at .01 level

Confirmatory Factor Analysis

The result from exploratory factor analysis revealed that self-immunity was a unidimensional scale comprising five factors. As a result, a confirmatory factor analysis using AMOS was conducted on self-immunity scale to determine whether the factorial structure of the self-immunity scale was five-factor model as hypothesized. The goodness of fit of the five factor model, as evidenced by a variety of indices, was acceptable: Chi-square statistics ($\chi^2 = 4.798, p = .091$), goodness of fit (GFI = .997), adjusted goodness of fit index (AGFI = .982), comparative fit index (CFI = .998), root mean square error of approximation (RMSEA = .042). The results of fit indices indicated that the data fitted the model very well. The model is shown in Figure 1. Each of the hypothesized factor loadings was statistically significant at the .01 level, and all of the standardized factor loadings were higher than .40. Five factors shown in Table 2 were mindfulness ($\beta = .49$), self-reliance ($\beta = .85$), hope ($\beta = .69$), resilience ($\beta = .75$), and coping ($\beta = .78$). That is, the self-immunity scale was consistent with its theoretical framework indicating the construct validity.

Convergent Validity

Convergent validity was tested by using related constructs that self-immunity has been theoretically and empirically associated with in previous studies (Van den Heuvel, et al., 2010). The self-immunity scale was positively correlated with optimism ($r = .76, p < .001$), self-control (.71, $p < .001$), self-esteem (.75, $p < .001$), and locus of control (.62, $p < .001$). In fact, the positive correlations among these dispositional constructs support convergent validity of self-immunity. It was also found that there were high correlations among self-immunity subscales, ranging from .41 to .65.

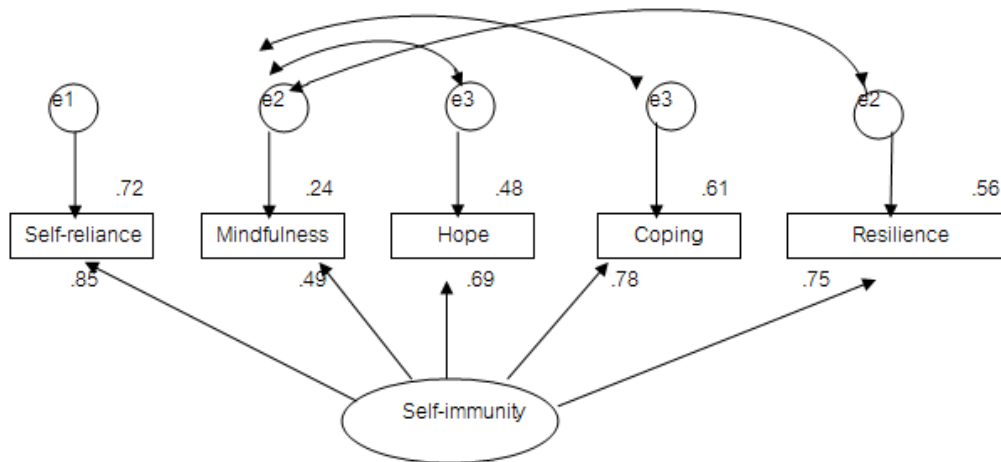
Table 2. *Factor Loadings of Self-Immunity for the Five-Factor Model Confirmatory Factor Analysis*

Self-immunity	Factor loadings	R ²
Self-reliance	.850**	.722
Mindfulness	.491**	.241
Hope	.690**	.476
Coping	.780**	.608
Resilience	.745**	.555

$\chi^2 = 4.798, p = .091$; AGFI = .982; CFI = .998; RMSEA = .042

** Significance at .01 level

Figure 1. *Confirmatory Factor Analysis of Self-Immunity*



Discriminant Validity

According to discriminant validity, dissimilar constructs of self-immunity should not be related to each other. In this study, self-immunity was not correlated with grade ($r = .07$) and knowledge concerning sufficiency economy philosophy ($r = .05$).

Discussion

In accordance with the research objectives of this study, the development and validation process undertaken for the self-immunity scale result in five factors scale that shows acceptable levels of reliability, convergent and discriminant validity. In addition, it was found that items were positively correlated with total scores of self-immunity at .01 significant level, indicating that self-immunity scale measures the same psychological trait or construct. Similarly, the results from exploratory and confirmatory analyses showed that the self-immunity scale was consisted of five factors that the self-immunity scale was consistent with its theoretical framework indicating the construct validity. Moreover, the five factors of the self-immunity scale were also positively related to each other. It is implied that the self-immunity scale can be assessed as a general self-immunity or an individual factor of self-immunity. However, there were not equal numbers of items in factors. Consequently, future research may develop a self-immunity scale that has the same numbers of items in factors. Although the results of this study indicated that the self-immunity had convergent validity, one should be aware of all related constructs using the same type of Likert scale. As a result, it may appear mono-method bias and affect convergent validity.

Recommendations for Future Research

In closing at least three important recommendations are based on the above results and discussion. First, it may be useful to validate self-immunity scale in terms of antecedents and consequences of self-immunity model. This kind of the model could help clarify the conditions under which self-immunity scale correlates more or less with each other. In addition, the causal model also facilitates understanding of individuals' self-immunity. Second, future research should not only continue to focus on the refinement of self-immunity scale, but also on the development of alternative methods to measure self-immunity other than a self-report measure in order to establish convergent validity. Lastly, the results of this research need to be reexamined to determine if they can be replicated with other students and different population. Furthermore, other reliability estimates such as test-retest reliability should be conducted in future studies to assess the stability of individuals' self-immunity overtime.

Implications for Practice

Two areas can be identified where the self-immunity scale might be applied. The first application is to use the self-immunity scale for research studies so as to gain body of knowledge concerning psychological characteristics and well-being. The second application of the scale is that the self-immunity scale can be used as a tool to assist in screening individuals who have low self-immunity. In practice scores on these sub scales may guide the development of interventions for at risk individuals.

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