Journal of
Applied Sciences

Effects of Personality Traits on the Degree of Exercise Participation, Physical Self-Description and Social Physique Anxiety of Hospital Employees

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Abstract: The purpose of this study was to investigate the effects of personality traits on the degree of exercise participation, job stress, physical self-description and social physique anxiety of hospital employees in Central Taiwan, including those who work in medical centers, regional hospitals and district hospitals. Additionally, in the study model, the concept of personality traits is proposed as a formative second-order construct comprising openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. The questionnaires were distributed to 500 employees and 307 completed questionnaires were retrieved, yielding a response rate of 61.4%. The validity and reliability of the scale were verified and the data was analyzed by conducting statistical analysis; SPSS for Windows 18.0 and SmartPLS were used for analyzing frequencies and means and for performing reliability analysis, factor analysis and path analysis. The results demonstrated that: (1) The model developed in this study has excellent reliability and validity, (2) The five dimensions of traits are key components of personality traits, (3) Personality traits have a substantial, direct and positive effect on degree of exercise participation and physical self-description, (4) Personality traits and degree of exercise participation have a substantial, direct and negative effect on job stress and (5) Physical self-description has a substantial, direct and negative effect on social physique anxiety. After using SmartPLS for analysis, the study results can be referenced for developing strategies for human resource management in Taiwanese hospitals.

Key words: Formative model, personality traits, exercise participation, physical self-description, social physique anxiety

INTRODUCTION

In 1948, in the constitution of the World Health Organization (WHO), health was defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. An international network of health-promoting hospitals was pioneered by the WHO to reintegrate healthcare institutions through health promotion, education and disease prevention. Health-promoting hospitals are institutions in which the health promotion concept has been adopted. Various countries have successively joined the international network of health-promoting hospitals and Taiwan is among these nations. Thus, hospitals are capable of playing crucial roles in healthcare systems and influencing the behaviors of other relevant institutions.

Exercise is a planned, structured and repetitive task for improving or maintaining one or multiple items of health-related fitness (Caspersen et al., 1985). Improving exercise conditions also promotes the positive development of emotional states (Teoman et al., 2004). Additionally, an increase in physical activity enhances how individuals manage stress and job stress (Lovelace et al., 2007). Exercise relieves stress; however, an individual's amount of experience and personality traits influences how they respond to external stress. Caspi (1987) proposed that personality traits are not solely a static representation but also influence how an individual chooses, explains and shapes the environments they encounter. In the recent decade, studies regarding personality traits in the West primarily adopted measurement methods that involved using the Big Five personality traits which have been widely accepted. Additionally, scholars found that the Big Five personality traits influence stress and the degree of exercise participation (Sulsky and Smith, 2005). In the workplace,

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employees typically sit for prolonged hours, lack opportunities for engaging in various fitness activities and eat unbalanced diets which subsequently lead to health problems such as chronic diseases and obesity. Thus, employees who encounter high levels of stress consume a large portion of social services (Sulsky and Smith, 2005). Additionally, a lack of physical activity tends to result in an increased use of personal medical resources and reduced health and productivity.

Social physique anxiety is anxiety produced when people experience others' judgment toward their physical shapes (Hart *et al.*, 1989). International scholars have used a social physique anxiety scale for analyzing conditions in which young people felt discomfort toward their physical shapes (Kowalski *et al.*, 2006) and conducting interventions involving exercise programs helped reduce peoples' degree of anxiety toward social physique (Williams and Cash, 2001; Lindwall and Lindgren, 2005). Sport psychology is extremely crucial in health promotion and can be studied through multiple approaches. These approaches include individual, psychological and social approaches which can be used for investigating the influence of exercise toward individuals' psychological health instead of merely focusing on the physiological change caused by changed levels of exercise. Workplace employees encounter increased stress levels during recessions and consequently generate numerous behavior patterns through the influence of psychological factors. Positive behavior patterns elevate the society as a whole. Therefore, the objective of this study was to determine how to enhance psychological experiences through increased exercise to subsequently improve physiopsychological health.

The development of Structural Equation Modelling (SEM) has facilitated the explanation of complex structural relationships. Consequently, studies adopting SEM have considerably increased in recent years (Rodgers and Guiral, 2011). The SEM is used for processing structural models and measurement models. However, most previous studies focused on determining the corresponding path relationships of structural models and the reliability and validity of the relationships between variables and latent variables, in contrast, the relationships formed between latent variables and variables remain scarce. In recent years, however, several such studies have been conducted (Bagozzi, 2007; Rodgers and Guiral, 2011). The relationships formed between latent variables and variables can be classified as those that involve formative or reflective indicators (Chin, 1998; Jarvis *et al.*, 2003). When investigating the path relationship among two or more quantitative

variables, the use of formative indicators is sometimes more suitable than the use of reflective indicators for measurements because misplacement problems in the relationship between latent variables and variables may occur (Jarvis *et al.*, 2003; Bagozzi, 2007; Rodgers and Guiral, 2011).

According to the viewpoint and suggestion proposed by Edwards and Bagozzi (2000), when a certain latent variable in a study model is based on the concept of formative indicators, such a study model must be completely analyzed and explained as a formative model.

Numerous previous studies have investigated the influence of the level of exercise on health. A majority of these studies determined the health benefits caused by exercise through fitness status and physiological indicators. For example, fitness-related indicators include flexibility, muscular endurance, cardiovascular endurance, Body Mass Index (BMI) and explosive strength (Delecluse *et al.*, 2003; Dunton *et al.*, 2003). Studies regarding psychological health conditions are relatively scarce, yet a considerable number of diseases are influenced by level of psychological health. Through this study, influence that exercise exerts on the level of psychological health of people was determined. Thus, the cited studies conducted overseas regarding the establishment of scales for hospital employees' personality traits, job stress, physical self-concept and social physique anxiety and calculated the respective scores using the degree of exercise participation formula proposed by Fox (1987) to determine the relationships between the aforementioned factors. The objectives of this study were: (1) To determine the influence of the personality traits of the employees in a case hospital on the degree of exercise participation, physical self-concept and job stress, (2) To determine the influence of case hospital employees' degree of exercise participation on physical self-concept, social physique anxiety and job stress and (3) To determine the influence of case hospital employees' degree of exercise participation and physical self-concept on social physique anxiety.

METERIALS AND METHODS

By using and expanding the findings and methods of previous studies, a fully functional model regarding the relationships among the personality traits, physical self-concept, degree of exercise participation, job stress and social physique anxiety were developed. Personality traits were modeled as exogenous variables, whereas physical self-concept, degree of exercise participation, job stress and social physique anxiety were modeled as
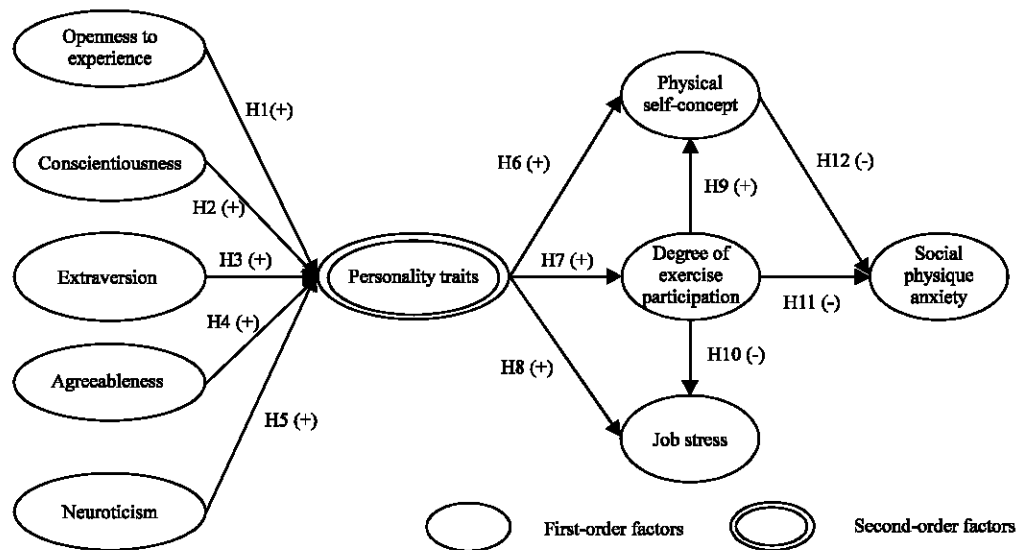
Fig. 1: Research model and hypotheses

endogenous variables; all these variables were modeled to be intercorrelated (Fig. 1). Consequently, in this study, the personality traits, physical self-concept, degree of exercise participation, job stress and social physique anxiety of hospital employees were analyzed to test the following hypotheses:

- **Hypothesis 1:** Openness to new experiences is positively associated with personality traits
- **Hypothesis 2:** Conscientiousness is positively associated with personality traits
- **Hypothesis 3:** Extraversion is positively associated with personality traits
- **Hypothesis 4:** Agreeableness is positively associated with personality traits
- **Hypothesis 5:** Neuroticism is negatively associated with personality traits
- **Hypothesis 6:** Personality traits are positively associated with physical self-concept
- **Hypothesis 7:** Personality traits are positively associated with degree of exercise participation
- **Hypothesis 8:** Personality traits are negatively associated with job stress
- **Hypothesis 9:** Degree of exercise participation is positively associated with physical self-concept
- **Hypothesis 10:** Degree of exercise participation is negatively associated with job stress
- **Hypothesis 11:** Degree of exercise participation is negatively associated with social physique anxiety
- **Hypothesis 12:** Physical self-concept is negatively associated with social physique anxiety

Instrumentation: For data collection, a two-part questionnaire was designed to conduct a survey. The first part was designed to examine the respondents' basic information by using a nominal scale. The second part was designed to examine the respondents' perceptions of personality traits, physical self-description, social physique anxiety and job stress by using five-point Likert scales. The questionnaire was used for collecting basic information regarding the respondents such as age, gender, formal education and the frequency, intensity and duration of exercise.

The instruments were developed after conducting a thorough review of several related studies and measurement items were modified to conform to the context of how hospital employees adopt health-promotion practices in the workplace. For scale development, MacKenzie *et al.* (2011) recommendations were followed and the standard psychometric scale development procedures suggested by DeVellis (2003). The items for measuring personality traits, including openness to experience (6 items), conscientiousness (6 items), extraversion (6 items), agreeableness (7 items) and neuroticism (7 items), were adapted from the measurement methods developed by Dobewall *et al.* (2014), Leutner *et al.* (2014), Saucier (1994) and Goldberg (1992). The degree of exercise participation based on the equation adopted by Fox (1987) was calculated:

$$\text{Degree of exercise participation} = \text{frequency of exercise} \times (\text{intensity of exercise} + \text{duration of exercise})$$

Table 1: Descriptive statistics of respondents (N = 307)

Factor/level	Frequency	Column (%)
Gender		100.0
Male	44	14.3
Female	263	85.7
Duration of exercise		100.0
Less than 30 min	200	65.1
31-60 min	74	24.1
Greater than 61 min	33	10.8
Intensity of exercise		100.0
Not tired at all	12	3.9
Not tired	38	12.4
Slightly tired	201	65.5
Very tired	40	13.0
Extremely tired	16	5.2
Formal education		100.0
High school/technical school	9	2.9
Faculty degree/bachelor's degree	241	78.5
Master's degree or above	57	18.6
Frequency of exercise		100.0
0 times per week	8	2.6
1 time per week	192	62.5
2 times per week	40	13.0
3 times per week	52	16.9
4 times per week	2	0.7
5 times per week	4	1.3
6 times per week	5	1.6
7 times per week	4	1.3

The physical self-concept measure includes 35 items based on the recommendations of Marsh *et al.* (1994) and Fox and Corbin (1989) and the 12 items for social physique anxiety were based on one study (Song *et al.*, 2014; Cox *et al.*, 2011; Hart *et al.*, 1989). Finally, for job stress, we used 15 items adapted from Caplan *et al.* (1975) were used. Thus, this study measurement instrument consists of 86 items for measuring the nine constructs of the structural model. Perception measurement items were measured using a five-point Likert scale, with 5 = strongly agree and 1 = strongly disagree.

Sample and descriptive statistics: This survey was designed for investigating hospital employees. About 500 questionnaires were distributed to 10 target hospitals (including medical centers, regional hospitals and district hospitals). Because of the conventional expectation of low response rates in survey studies, we endeavored to find a local contact person for each target hospital to be in charge of questionnaire distribution. To increase the return rate, a follow-up measure was made by reminding these appointed contacts about the questionnaires after 2 weeks; 362 questionnaires were retrieved but 55 responses were incomplete and had to be discarded; therefore, 307 valid responses were obtained for statistical analysis and the initial sample generated a valid response rate of 61.4%.

Of the 307 usable responses, 44 and 263 were obtained from male and female participants, respectively. The average age of the respondents was 32.77 years old

and the standard deviation was 7.62 years. Regarding the formal education of the sample population, the results indicated that 78.5% held faculty or bachelor's degrees; regarding exercise, 65.1% exercised for durations of less than 30 min, 65.5% felt slightly tired because of the intensity of their exercise and 62.5% exercised once a week (Table 1). Through calculations using Fox (1987) equation, the degree of exercise participation yielded an average score of 7.68 and the standard deviation was 6.19.

RESULTS

Data analysis: The SEM was used in a comprehensive, combined analysis of both measurement and structural models. The most common structural equation modeling techniques include: Linear structural relations and partial least-squares (Joreskog and Sorbom, 2005; Chin, 1998). The PLS is component-based and involves using a least-squares estimation procedure which can be used for both construct validity and structural validity and can also be adopted for analyzing measurements and structural models. Using PLS enables latent constructs to be modeled as reflective indicators or formative indicators, as was the case with the study model of this study. The PLS was used because this study model contains a formative second-order construct (i.e., personality traits). Moreover, PLS was used to analyze the study model.

Measurement validity: The convergent validity and discriminant validity of each first-order construct were assessed in the measurement model. Each first-order construct was modeled as a reflective latent construct accounting for its indicators. Three criteria were considered for assessing convergent validity (Bagozzi and Yi, 2012; Fornell and Larcker, 1981; Hair *et al.*, 2010; Joreskog and Sorbom, 2005; Chin, 1998) which were: (1) All item loading (λ), (2) Investigation of reliability coefficients (Cronbach's alpha) and Composite Reliability coefficients (CR) and (3) Average Variance Extracted (AVE).

Table 2 shows the indices of reliability and convergent validities for the scale. The standardized item loadings ranged from 0.621-0.932; all items are larger than 0.60 and are all significant at the 0.05 level (Hair *et al.*, 2010). Internal consistency was assessed by the Cronbach's alpha coefficient for each of the multiple-item factors included in the model. The Cronbach's alpha coefficients ranged from 0.640-0.897 which suggests a high level of reliability. In addition, all constructs displayed a higher Cronbach's alpha coefficient than the 0.60 benchmark suggested by Hair *et al.* (2010). Composite reliability is a set of latent construct indicators
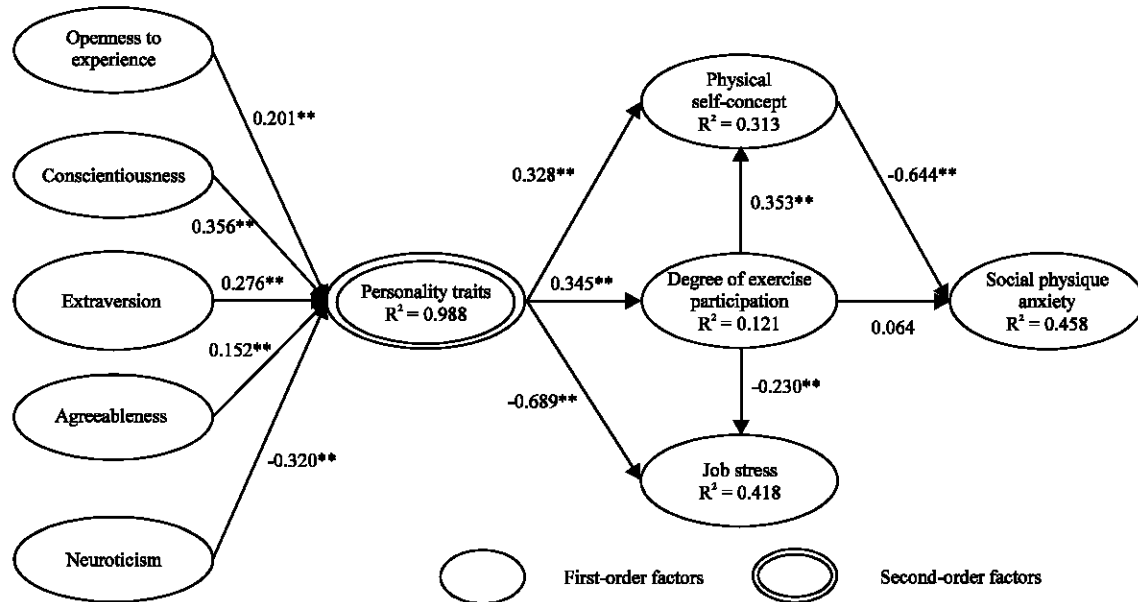
Fig. 2: Results of the structural model. Value on path: Standardized coefficients (β), R^2: Coefficient of determination and *p<0.05, **p<0.01

Table 2: Summary of construct validity and reliability results

Construct	No. of items	Item loading	Cronbach's α	CR	AVE
Openness to experience	6	0.754-0.858	0.809	0.868	0.537
Conscientiousness	6	0.712-0.826	0.861	0.916	0.785
Extraversion	6	0.648-0.821	0.653	0.788	0.558
Agreeableness	7	0.702-0.785	0.897	0.921	0.662
Neuroticism	7	0.722-0.851	0.858	0.903	0.700
Physical self-concept	35	0.731-0.891	0.724	0.856	0.503
Social physique anxiety	12	0.763-0.932	0.814	0.914	0.843
Job stress	15	0.621-0.822	0.640	0.798	0.544

that are measured consistently. These composite reliability coefficients range from 0.788-0.921. The constructs also exhibited a higher composite reliability than the 0.6 benchmark advised by Fornell and Larcker (1981).

Convergent validity was examined using AVE. In this study, all the constructs demonstrated AVE values between 0.503 and 0.843. The value of the AVE for all constructs is above 0.5 which exceeds the limit recommended by Fornell and Larcker (1981). Overall, the AVE from the constructs demonstrated a satisfactory reliability and validity. In summation, the internal reliability and validity results were acceptable which enabled us to proceed to an estimation of the structural model.

Hypotheses testing: To verify study hypotheses, the paths we specified between constructs to build a structural model that matches the relationships we proposed. Figure 2 shows the results of the SEM estimation, including standardized path coefficients for each hypothesized path in the model, significance based on one-tailed t tests and the amount of variance explained (R^2). In the PLS analysis, the R values were used as a goodness-of-fit measure (Hulland, 1999). Standardized beta-coefficients from the estimated structural model are reported in Table 3 along with the associated t-values for each construct.

Regarding the components of personality traits, openness to experience, conscientiousness, extraversion, agreeableness and neuroticism were all reported as the crucial antecedents of personality traits (β = 0.201, 0.356, 0.276, 0.152 and -0.320, p<0.01). Therefore, Hypotheses 1-5 are all supported. Thus, these five constructs jointly explain 98.8% of the variance in personality trait (R^2 = 0.988). The construct of personality trait is a significant determinant of physical self-concept (β = 0.328, p<0.01) and degree of exercise participation (β = 0.345, p<0.01). Hypotheses 6 and 7 are thus supported. The construct of personality traits is a negative and significant determinant of job stress (β = -0.689, p<0.01); thus, Hypothesis 8 is supported.

Table 3: Estimation results for hypotheses 1-8

Hypothesis	Standardized coefficient	t-value	Test results
H1: Openness to experience-Personality traits	0.201	12.178**	Supported
H2: Conscientiousness-Personality traits	0.356	23.285**	Supported
H3: Extraversion-Personality traits	0.276	11.154**	Supported
H4: Agreeableness-Personality traits	0.152	5.491**	Supported
H5: Neuroticism-Personality traits	-0.320	-16.387**	Supported
H6: Personality traits-Physical self-concept	0.328	3.979**	Supported
H7: Personality traits-Degree of exercise participation	0.345	7.200**	Supported
H8: Personality traits-Job stress	-0.689	-17.270**	Supported
H9: Degree of exercise participation-Physical self-concept	0.353	4.705**	Supported
H10: Degree of exercise participation-Job stress	-0.230	-3.632**	Supported
H11: Degree of exercise participation-Social physique anxiety	0.064	1.129	Rejected
H12: Physical self-concept-Social physique anxiety	-0.644	-14.268**	Supported

$*p<0.05, **p<0.01$

The construct of degree of exercise participation is a significant determinant of physical self-concept (β = 0.353, $p<0.01$) and exerts a negative effect on job stress (β = -0.230, $p<0.01$); Hypotheses 9 and 10 are thus supported. In summary, personality traits singly explain 12.1% of the variance of degree of exercise participation (R^2 = 0.121). Together, personality traits and degree of exercise participation explain 31.3% of the variance in physical self-concept (R^2 = 0.313). Personality traits and degree of exercise participation together explain 41.8% of the variance in job stress (R^2 = 0.418). The components of physical self-concept exert a negative effect on social physique anxiety (β = -0.644, $p<0.01$). Therefore, Hypotheses 12 is supported. Hypothesis 11 is not supported because degree of exercise participation did not affect social physique anxiety (β = 0.064, $p>0.05$). Finally, physical self-concept explains 45.8% of the variance in social physique anxiety (R^2 = 0.458).

DISCUSSION

People have become increasingly health-conscious; the WHO held the First International Conference on Health Promotion in 1986, during which the Ottawa Charter was proposed, a charter that contains the concept of health promotion. The Taiwanese government has also vigorously promoted and developed health-promoting schools, communities and hospitals. During the development of these institutions, health-promoting hospitals have actively incorporated health-promotion concepts into healthcare institutions. Regarding the aspects of personality traits, job stress, physical self-concept and social physique anxiety, we calculated the respective scores using the degree of exercise participation formula proposed by Fox (1987) to determine the relationships between these factors and degree of exercise participation among hospital employees. Regarding personality trait measurements, the Big Five personality traits are the most widely adopted by studies conducted in the West. Thus, we used the five personality dimensions of openness to new experiences, conscientiousness, extraversion, agreeableness and neuroticism to evaluate the personality traits of hospital employees and subsequently determine the influence that these factors exerted on physical self-concept, degree of exercise participation, job stress and social physique anxiety.

An increase in the level of an individual's physical activities tends to facilitate the resolution and management of job stress. However, the results regarding the degree of exercise participation significantly influenced stress relief which corresponded with the conclusions from a previous study (Lovelace *et al.*, 2007). The investigation results showed that nearly 80% of hospital employees exercise less than three times per week because they were typically highly busy working. Subsequent studies can investigate other stress relief factors for the purpose of health promotion.

People with varying personalities exhibit differing expectations for their physical shapes; for example, many modern women desire perfectly curved bodies. The results of this study showed that personality traits exerted a significant and positive influence toward physical self-concepts, indicating that individuals with differing personalities and traits have varying levels of acceptance toward their physical shapes, thereby presenting various levels of self-confidence.

We recommend that organization employees and high-level administrators investigate the causes of exercise barriers to identify and resolve why hospital employees do not perform sufficient exercise. Exercise barriers can be distinguished as intrapersonal, interpersonal and structural barriers (Crawford and Eklund, 1994) and these barriers are sequentially related. Organizations can instill employees with the habit of exercising, establish a culture of health promotion and increase interpersonal exchange among employees; hospitals can provide health-promoting policies, equipment and relevant courses so that each employee is willing to exercise and participate in activities, thereby elevating their physiopsychological statuses.

CONCLUSION

This study investigates the relationships of personality traits on the degree of exercise participation and social physique anxiety. We propose a causal model by using and expanding the findings and methods of previous studies. In the PLS analysis, standardized beta-coefficients from the estimated structural model are reported along with the associated t-values for each construct. The statistical findings of the study illustrated empirical support for all hypotheses except hypothesis 11. The empirical results showed that personality traits were positively influenced by openness to new experiences, conscientiousness, extraversion and agreeableness and were negatively influenced by neuroticism. These results indicated that the five personality traits proposed in this study can be used as a measuring standard for the personality traits of hospital employees. Based on the objectives of this study and the empirical results, a conclusion was proposed; practical recommendations were also provided to serve as references for the industry and future researchers.

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