

Toward a Structural Model of Challenge Experience in Adventure Recreation

Sheng-Hshiung Tsaur

National Chiayi University

Wei-Rong Lin

Far East University

Tien-Ming Cheng

National Chiayi University

Abstract

Perceiving challenge is an important aspect of adventure recreation. Yet few studies have considered the potential outcome of challenge perception among participants in adventure recreation. This study seeks to address this by establishing a comprehensive model of challenge perception in adventure recreation that additionally models the relationship between challenge and its outcome. A self-administered questionnaire is designed to collect empirical data from recreationists who engaged in scuba diving, high-altitude mountaineering, or white-water rafting in Taiwan. Using a structural equation modeling approach, the findings indicate that perception of challenge among recreationists has a positive impact on flow experience and, by extension, on satisfaction, and psychological well-being.

Keywords: *challenge perception, flow experience, satisfaction, psychological well-being, adventure recreation*

Sheng-Hshiung Tsaur is a professor in the Graduate Institute of Recreation, Tourism and Hospitality Management, National Chiayi University, Chiayi City, Taiwan. **Wei-Rong Lin** is an assistant professor in the Department of Leisure and Sports Management, Far East University, Tainan City, Taiwan. **Tien-Ming Cheng** is a professor in the Graduate Institute of Recreation, Tourism and Hospitality Management, National Chiayi University, Chiayi City, Taiwan. The authors would like to thank the Ministry of Science and Technology of Taiwan, ROC for the financial support (NSC 98-2410-H-415 -030 -SS2). Please send correspondence to Tien-Ming Cheng, tienming@mail.ncyu.edu.tw

Introduction

Adventure recreation is receiving growing attention in both the academic and business spheres (Wu & Liang, 2011). It is defined as an outdoor activity in which participants deliberately seek challenge through interaction with the natural world (Ford & Blanchard, 1993). Cordes and Ibrahim (2003) show that challenge and stimulation are among the major attractions of adventure recreation. Previous studies confirm that one of the motivations for engaging in adventure recreation is to experience challenge (Ewert & Hollenhorst, 1989; Lee, Graefe, & Li, 2007; Manfredo, Driver, & Brown, 1983), suggesting a close relationship between challenge and adventure recreation.

Recreation operators provide a variety of adventure activities to meet recreationists' expectation of challenge, such as mountaineering, whitewater kayaking, whitewater rafting, and scuba diving. Previous studies on adventure recreation have primarily looked at the psychological and behavioral aspects of participation in adventure activity from different theoretical points of view, including motivation (Lee et al., 2007), specialization (Thapa, Graefe, & Meyer, 2006), flow (Wu & Liang, 2011), fear (Carnicelli-Filho, Schwartz, & Tahara, 2010), and risk (Creyer, Ross, & Evers, 2003). Few studies have looked into psychological and behavioral models for participation in adventure activities from the perspective of challenge perception.

Psychological studies describe challenge as an outcome of stress appraisal. Individuals assess the interplay of person-environment, utilize their resources, and then embrace the potential for gain or growth (Lazarus & Folkman, 1984). Challenge can increase one's personal resource load yet retain the potential for benefit or growth (Lazarus & Folkman, 1984). Among the literature on leisure, challenge perception has been described as an extension of personal limits, a sense of novelty, and the experience of stimulation (Caldwell, Smith, & Weissinger, 1992). In leisure life, challenge can reduce boredom (Barnett, 2005; Caldwell et al., 1992). Priest (1992) believes that challenge is an interaction between external risks and internal abilities, or, in context of adventure recreation, a situation in which participants apply their personal abilities to resolve the risks produced by adventure. The motivation of challenge in adventure recreation embodies the motives of excitement, personal testing, and accomplishment (Pomfret, 2006).

Csikszentmihalyi (1975) defined flow as a situation in which an individual's perception of an activity's challenge matches the individual's perception of his or her personal skill. Flow is also described as the "state in which people are so involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it at great cost, for the sheer sake of doing it" (Csikszentmihalyi, 1992). Challenge therefore plays an important role in recreation participation. The subject of challenge has a long history of development in both the work and education fields. Numerous studies have demonstrated that challenge perception can evoke emotional and behavioral responses in individuals, such as satisfaction (Dewettinck & Buyens, 2006), effective commitment (Dewettinck & Buyens, 2006), positive emotion (Skinner & Brewer, 2004), enjoyment (Koka & Hein, 2003), happiness (Noor, 1995) and working smart (Holmes & Srivastava, 2002). Based on qualitative interviews, Schmidt and Little (2007) note that the sensation of challenge in an activity can trigger a spiritual experience in the participant. Although challenge seems to have positive results for activity participants, few empirical studies have verified the psychological process of challenge perception in adventure recreation participants.

This study attempts to establish a model of challenge perception in adventure recreation from the perspective of personal experience. Past studies have noted that flow state, satisfaction, and psychological well-being are potential outcomes of participation in recreation activi-

ties (Jones, Hollenhorst, Perna, & Selin, 2000; Lee, Shafer, & Kang, 2005; Poon & Fung, 2008). From the vantage of recreation operators, an important business consideration is how to give customers a feeling of satisfaction and happiness. Clarification of the relation between challenge and its outcomes can help companies to develop strategies leading to customer satisfaction. In terms of theory development, exploration and confirmation of a challenge perception model for adventure activity can address a gap in previous research. In sum, the purpose of this study is to examine the potential outcomes of challenge perception, including flow experience, satisfaction, and psychological well-being, among participants in adventure recreation.

Literature Review and Research Hypothesis

Adventure Recreation

Adventure recreation encompasses a broad variety of land, air, and water activities, such as whitewater rafting and kayaking, rock climbing, hiking, paragliding, and scuba diving (Pomfret, 2006). Ewert, Galloway, and Estes (2001) define adventure recreation as “recreational and/or educational activities utilizing a closer interaction with the natural environment, that contain elements of real or perceived risk and danger, in which the outcome, while uncertain, can be influenced by the participant and circumstance.” Robinson (1992) believes that a fundamental element distinguishing adventure recreation from other recreation activities is “duality of experience.” That is, when a participant in adventure recreation has sufficient control over the outcome of an activity, it is likely to evoke a positive experience, such as sense of competence and increased stimulation. On the other hand, when the individual is unable to control the outcome of the activity, the experience is more likely to be characterized by negative feelings, such as fear or anxiety.

Challenge perception. Challenge perception has roots in the stress appraisal theory of Lazarus and Folkman (1984). Stress is defined as a relationship between an individual and the environment related to his or her well-being, where this relationship increases or exceeds personal resource loading (Lazarus & Folkman, 1984). According to the stress appraisal theory, stress may be assessed as a threat or a challenge (Lazarus & Folkman, 1984). A threat refers to the potential for harm or loss that has not yet occurred but is anticipated. An example of a threat appraisal in a stressful recreational situation is “I started to doubt my ability.” Challenge appraisals are generally more positive and reflect the anticipation of mastery or a beneficial outcome. Examples of challenge appraisals are “I feel positive about demanding encounters” and “I am in control of the situation.” Recreationists experience challenge in situations where they need to use resources or capabilities with a positive attitude in order to control the situation (Tsauro, Lin, & Liu, 2013). Thus, recreationists who perceived challenge are more likely to have a positive experience.

Baird and Penna (1996) believed that challenge includes cognitive and affective components that must reach a certain level in order to be perceived. Challenge generally occurs in situations of stress (Skinner & Brewer, 2004). In this context, stress means the hindrance one faces when exerting effort in the overcoming process (Smith & Ellsworth, 1985) and which heightens an individual's level of concentration towards the task at hand (Krohne, 1996). Challenge perception can also increase one's sense of control in specific situations and increase or maintain levels of confidence, sensitivity, and a proper level of arousal (Anshel, 2001).

In a study by Smith and Ellsworth (1985), respondents describe the feeling of challenge as confidence. They believe that, despite the additional effort needed, they could achieve the

expected goal. The perception of challenge was also associated with many positive emotions in addition to confidence, such as eagerness, hope, and excitement (Anshel, 2001; Folkman & Lazarus, 1985). Pintrich and Schrauben (1992) also find that challenge is fundamentally related to the perception of positive feeling and that this perception tends to encourage participation in learning.

The literature on leisure and recreation defines challenge from a number of different perspectives. From the viewpoint of the characteristics of recreation activities, the challenges presented by the activity (and perceived by the individual) are central to the model of flow-producing experiences (Csikszentmihalyi, 1975). Wu and Liang (2011) define challenge as the complexity of an activity based on flow theory. However, most studies proceed from the viewpoint of personal experience to define challenge as a tendency of a person to reach beyond their limits and a recreational experience imparting a sense of novelty and thrill (Barnett, 2005; Caldwell et al., 1992). When high intrinsic challenge is a motivating factor in an activity, participants tend to choose recreational activities that require skills slightly higher than their own (Weissinger & Bandalos, 1995). Moreover, they tend to perceive this state as a challenge and not as a detriment or a threat (Weissinger & Bandalos, 1995). This study is based on stress appraisal theory (Lazarus & Folkman, 1984). The challenge measured is the result of interaction between the individual and the environment. Therefore, this study defines challenge perception as the recreationists' perception of using their abilities to the fullest in an activity, as well as the sense of involvement and excitement (Caldwell et al., 1992).

Outcome of challenge perception: Flow experience, satisfaction, and psychological well-being. The concept of flow presented by Csikszentmihalyi (1975) is a mental state produced when there is balance between the challenge presented by an activity and the skill required to perform the activity. Massimini and Carli (1988) developed a model that operationalized the following four channels of flow: (1) flow occurs when challenge and skill are above one's personal mean, (2) anxiety occurs when challenge is above the personal mean and skill is below, (3) boredom occurs when skill is above the personal mean and challenge is below, and (4) apathy occurs when both challenge and skill are below the personal mean (cited as Jones et al., 2000). The emotions predicted by the flow model are unrelated to the objective nature of the activity and come, rather, from an individual's subjective perception of the challenge of the activity and available skills (Decloe, Kaczynski, & Havitz, 2009). Asakawa (2010) points out that, apart from the balance between challenge and skill, flow is an optimal inner state involving a sense of absorption, high motivation, and a high level of pleasure. Flow is characterized as high involvement, deep concentration, and sense of passage of time (Csikszentmihalyi, 1975; Han, 1988). In physical activity, the experience of flow is considered an especially important factor in raising self-esteem and encouraging future participation (Stein, Kimiecik, Daniels, & Jackson, 1995).

Flow theory explicitly identifies challenge as an important antecedent of flow experience. Many studies demonstrate a positive relationship between challenge perception and flow experience in adventure recreation (Jones et al., 2000; Wu & Liang, 2011). Heo, Lee, McCormick, and Pedersen (2010) noted that flow experience is easily produced in serious leisure activities because these activities typically entail substantive challenge. Challenge perception implies that a participant is focused on the activity at hand, and this focus is an antecedent leading to a flow state (Stein et al., 1995). Wu and Liang (2011) show that rafting activities require greater degrees of concentration as the level of challenge rises, leading to a sense of the rapid passage of time and state of flow. Based on the above, this study makes the following hypothesis:

Hypothesis 1: Challenge perception has a positive effect on flow experience.

Satisfaction can be generally defined from affective and cognitive perspectives. In its affective sense, it is a real experience derived from the inner feelings produced in a visitor through interaction with the destination and activity (Baker & Crompton, 2000). Satisfaction is also an appraisal of the recreation experience overall and creates a state of inner pleasure (Lee et al., 2005). In terms of cognitive dimension, satisfaction is the consumer's response to the conformance between performance and expected standards; or alternately, a subjective assessment as to whether the chosen program meets or exceeds the expectations of the consumers (Oliver, 1980). Looked at broadly, satisfaction is a cognitive-affective state produced by cognitive assessment (including disconfirmation) and the feelings engendered by that assessment (Bigne, Andreu, & Gnoth, 2005).

People engage in adventure recreation for the challenge perception, since challenge is a principle motive (Ewert & Hollenhorst, 1989; Lee et al., 2007). Thus, participants in adventure recreation feel satisfaction when the expectation of challenge is satisfied by the activity. Further, the perception of challenge in recreation is also accompanied by a sense of novelty and thrill. Duman and Mattila (2005) demonstrate that, as the main motivations for participants, novelty and thrill can positively affect satisfaction. Therefore, this study expects challenge perception to have a positive impact on the satisfaction of recreation participants. Based on the above, this study makes the following hypothesis:

Hypothesis 2: Challenge perception has a positive effect on satisfaction.

According to previous studies, psychological well-being has at least three attributes: First, it is a subjective experience denoting the degree of happiness a person feels. Second, it is an expression of positive feeling and reduction of negative feeling. Third, it is a global judgment (Bradburn, 1969). Psychological well-being is defined as the "sum or balance of independent positive and negative feelings emerging from a given quality of life" (Bradburn, 1969). Psychological well-being is measured by the inclination of an individual's perception of happiness or pleasure, based on Bradburn Positive Affect Scales proposed by Bradburn (1969). Iwasaki and Smale (1998) noted that this scale has been among the most frequently used instruments to operationalize psychological well-being.

Some studies note that personal perception of challenge is accompanied by the positive feelings of excitement and pleasure (Dewettinck & Buyens, 2006; Skinner & Brewer, 2004). Dewettinck and Buyens (2006) further note that challenge produces a degree of activation that makes the central nervous system operate more efficiently, produces intelligence, and enhances behavior and positive feelings. Similarly, the concept of novelty inherent in challenge perception has been shown to be conducive to heightening sensory stimulation, enjoyment, arousal, and positive feelings (Duman & Mattila, 2005). The positive feelings mentioned are important components of psychological well-being. Therefore, challenge perception should lead to positive psychological well-being.

Hypothesis 3: Challenge perception has a positive effect on psychological well-being.

Relationships among flow experience, satisfaction, and psychological well-being. Flow experience is an important factor in understanding customer satisfaction (Chhetri, Colin, & Mervyn, 2004). Wu and Liang (2011) show that satisfaction in rafting activities increases with the level of flow experienced by rafters since flow can meet the individual's expectation and then enhance satisfaction. Furthermore, recreationists in a state of flow have a greater sense of control

over their external environment (Han, 1988). From a consumer assessment perspective, sense of control can increase satisfaction since greater sense of control can help the consumer make correct evaluations (Duman & Mattila, 2005). Therefore, when recreationists have an adequate sense of control over the adventure environment, the activity is more likely to proceed according to the recreationists' expectation, imparting a greater feeling of satisfaction. One aspect of flow experience is focused attention, here denoting the level of concentration during participation in recreation activities (Han, 1988). Herrick and McDonald (1992) demonstrate that the difficulty of rapids can enhance overall satisfaction among users of a recreational river. Difficult rapids encourage river users to concentrate, creating an overall sense of satisfaction with the recreation experience. In other words, focused attention can help people to overcome obstacles in the recreation process and gain a sense of satisfaction from achieving anticipated goals. Based on the above, this study makes the following hypothesis:

Hypothesis 4: Satisfaction increases with flow experience

Some studies have noted that psychological well-being can be improved through engagement in leisure activities (Brajša-Žganec, Merkaš, & Šverko, 2012; Staempfli, 2007). However, an activity's ability to positively influence psychological well-being hinges on whether the participant is satisfied with the outcome of the activity (Staempfli, 2007). Staempfli (2007) shows how leisure satisfaction can positively affect psychological well-being in young people, indicating that the more a leisure activity succeeds in satisfying psychological, educational, social, and relaxational motives, the greater the impact of such activity on heightening the physical and psychological health of the participant. Furthermore, Tinsley and Eldredge (1995) indicated participants' sense of psychological well-being from recreation increase with the perception that needs have been satisfied by the activity. Participation in recreation activities can improve recreationists' psychological well-being by meeting certain needs, such as acquisition of skill/knowledge or formation of social relations (Brajša-Žganec et al., 2012; Iwasaki & Smale, 1998). Based on the above, this study makes the following hypothesis:

Hypothesis 5: Psychological well-being increases with satisfaction

Studies have shown that flow experience can positively affect individual well-being (Asakawa, 2010; Wanner, Ladouceur, Auclair, & Vitaro, 2006). People who experience flow can gain joy from and fully immerse in the process of the activity, engendering positive feelings. Looking at participants in sports and games, Wanner et al. (2006) show that the dimensions of flow experience (including sense of passage of time and concentration) can positively affect the positive feelings associated with psychological well-being. They find that immersion in an activity can produce self-confidence in one's ability to control the overall progress of the activity and this creates the potential for greater psychological well-being. Wu and Liang (2011) further note that participants in certain activities (such as whitewater rafting) often become fully immersed in the activity to the point of obliviousness to the passage of time, resulting in pleasure, excitement, and other positive moods. Therefore, this study offers the following hypothesis:

Hypothesis 6: Psychological well-being increases with the flow experience

Methods

Conceptual Framework

Previous studies look at challenge in terms of activity attributes and treat challenge simply as one factor in the formation of the flow experience (Jones et al., 2000). This study, on the other

hand, treats challenge as an important experience in adventure recreation. It also attempts, from the perspective of personal experience (Barnett, 2005; Caldwell et al., 1992), to investigate challenge perception and its outcome among participants in the process of adventure recreation. Furthermore, since a causal relationship is likely to be present among these outcomes, this study also looks at the relationship among flow experience, satisfaction, and psychological well-being. The conceptual framework is shown in Figure 1.

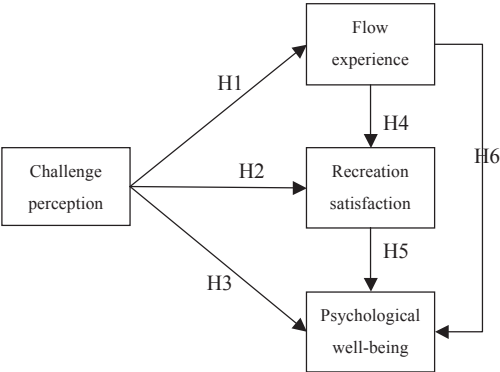


Figure 1. Conceptual Model

Sample Design and Data Collection

The subjects of this study were participants in adventure recreation. Samples were collected for three types of activities: scuba diving, high-altitude mountaineering, and whitewater rafting (Bentley, Page, & Laird, 2001). All samples were amalgamated for further analysis to increase the external validity of the results and generalize the model to other adventure activities.

Scuba diving. As an island, Taiwan is well suited for scuba diving activities. Kenting National Park, located in southern Taiwan, has the greatest abundance and variety of marine resources along the coast of Taiwan and is a popular spot for many foreign and domestic divers (Kenting National Park, 2001). This study conducted a field investigation on Houbihu, a popular diving location at Kenting National Park. Diving in this area is primarily guided. The average diving depth is 10–13m and the average diving time is 30–35 minutes.

High-altitude mountaineering. Taiwan has more than one hundred mountains with altitudes of 3,000 or more meters above sea level, including Yushan, the highest peak in Northeast Asia. Located in Yushan National Park, Yushan rises to an altitude of 3,952 meters. The mountaineering route to the highest peak of Yushan is popular with both locals and foreign visitors, attracting between 40,000 to 50,000 climbers each year. The questionnaires for this study were collected from this group. Visitors can climb individually or participate in itineraries planned by mountaineering associations. It takes at least two days to climb on the highest peak of Yushan, involves at least 10 hours of hiking, and requires some mountaineering skill. At night, climbers can camp on the mountain or stay in cabins.

Whitewater rafting. The Xiuguluan River in Hualien County is the origin of whitewater rafting in Taiwan and the most popular rafting spot for tourists. According to the Tourism Bureau of Taiwan, the American Whitewater Affiliation (AWA) has rated the Xiuguluan River as a

Class II river. However, the river has numerous strong rapids that make it comparable to a class 4 or 5 river. For safety reasons, private rafting is prohibited on the river. All trips must be commercially operated and accompanied by certified lifeguards. The rafts are paddleboats propelled by several passengers with instruction from a guide and require physical strength to operate. The rafting trip takes four to five hours, which includes navigating the rapids that are along the way.

Questionnaires were distributed based on convenience sampling. Recreation participants were asked to fill in the questionnaires at the end of the activity. Since most of the subjects participated in the activities with partners, in order to avoid sample errors caused by high degree of homogeneity, only one person per group was asked to answer the questionnaire. The reviewer asked the first member of the group encountered to fill in the questionnaire. The person sampled was also asked to identify fellow tour members to prevent their inclusion in the survey. A total of 350 samples were obtained for each activity. Nunnally (1978) suggested that in SEM estimation, "a good rule is to have at least ten times as many subjects as variables (p.421)." After eliminating incomplete questionnaire, a total of 949 valid questionnaires were obtained, representing a response rate of 90.4%.

Measurement

This study revised five items for measuring challenge perception based on Schmidt and Little (2007) and Weissinger and Bandalos (1995). The items were examined by two scholars for content validity. Content validity is defined as the degree to which a sample of items constitutes an adequate operational definition of a construct (Polit & Beck, 2006). Therefore, they are categorized according to degree of correspondence with the definition of challenge perception into three states: "clearly corresponding," "slightly corresponding," and "not clearly corresponding." Content validity has been achieved when all of the items were determined to be "clearly corresponding."

This study measured flow experience using the three items proposed by Han (1988), which contains three concepts: sense of control, focus, and sense of passage of time. Three items were used to assess overall recreation satisfaction in reference to Yoon and Uysal (2005). Finally, based on the positive affects scale proposed by Bradburn (1969), a total of five items were used to measure psychological well-being and assess individual inner health (Iwasaki & Smale, 1998). Each item used a five-point Likert scale scoring ranging from *strongly disagree* to *strongly agree*, with scores of one to five, accordingly.

Analysis and Results

Sample Characteristics

The sample comprised more male respondents (69.0%) than females. By age, the most represented group was 26 to 35 (38.1%), followed by 18 to 25 (25.9%), and 36 to 45 (16.5%). Nearly 80% (77.5%) of the respondents had at least a university/college level of education. There was a fairly even distribution by occupation, with students forming the largest group (22%), followed by professionals such as engineers, physicians, or lawyers (18.1%). The preponderance of males around the age of 30 is indicative of the physical strength required for participation in adventure recreation. The characteristics, such as gender or age of the sample in this study, were approximately the same as characteristics in previous research related to adventure recreation (Kyle, Bricker, Graefe, & Wickham, 2004; Thapa et al., 2006).

Measurement Model

In line with the two-step approach proposed by Anderson and Gerbing (1988), a measurement model was tested before testing the structural model. A confirmatory factor analysis was conducted to investigate measurement reliability and validity. The measurement model is detailed in Table 1. The goodness of fit index of the model is: χ^2/df ($df = 98$) = 4.3, GFI = 0.95, SRMR = 0.034, RMSEA = 0.059, CFI = 0.99, and PGFI = 0.68. These index values indicate that the measurement model has an acceptable model fit. Composite reliability (CR) is employed to corroborate internal consistency of measurement. As shown in Table 1, the CR of the all constructs range from 0.79 to 0.89. Most of the values are well above the recommended value of 0.7, indicating internal consistency among the measurements adopted by this study (Jöreskog & Sörbom, 1993).

Convergent validity is present when each indicator's estimated path coefficient mapping to potential constructs is statistically significant ($t > 1.96$) (Bagozzi, Yi, & Phillips, 1991). Convergent validity is also exhibited when the average variances extracted (AVE) from latent variables and their corresponding measurement items exceeds 0.50 (Fornel & Larcker, 1981). Table 1 shows that all items clearly ($p < 0.01$) fall within the construct with a path coefficient between 0.67 and 0.88. Furthermore, the AVE of each construct ranges between 0.55 and 0.66, indicating good convergent validity of the measurements in this study.

Discriminant validity refers to the variance in the measurement of different constructs. It is considered present if the square root of the construct AVE exceeds the correlation coefficient of the other construct (Fornel & Larcker, 1981). The correlation coefficients for all constructs are shown in Table 2. The minimum construct AVE square root value is 0.74, higher than largest correlation coefficient of 0.69 among constructs, indicating that the measurements adopted by this study have good discriminant validity.

Table 1
Confirmatory Factor Analysis of Constructs and Items

Constructs and Items	Factor loading	t-value	AVE	CR
Challenge perception			0.58	0.87
I can amply use my personal abilities.	0.74	25.57		
I need to involve in the activity with full attention.	0.77	26.78		
I am willing to accept the possible uncertainty.	0.73	24.87		
I feel challenging.	0.78	27.42		
I perceive novelty and excitement.	0.78	27.45		
Flow experience			0.55	0.79
I was very focused during the activity.	0.74	24.07		
I felt the time passed quickly during the activity.	0.76	24.96		
I was in control throughout the activity.	0.73	23.50		
Recreation satisfaction			0.66	0.85
Overall, the activity met my expectations.	0.83	29.90		
This activity was worth the time and energy spent.	0.76	26.25		
I am satisfied with the activity overall.	0.85	31.10		
Psychological well-being.			0.62	0.89
I feel on top of the world.	0.81	29.44		
I feel particularly excited and interested.	0.88	33.57		
I feel pleased about accomplishing something.	0.86	32.32		
I feel proud because someone complimented me on completing the activity	0.70	24.22		
Things went the way I had hoped.	0.67	22.55		

Table 2
Correlation Coefficient Matrix among Constructs

Construct	Challenge perception	Flow experience	Recreation Satisfaction	Psychological well-being
Challenge perception	0.76			
Flow experience	0.45**	0.74		
Recreation satisfaction	0.47**	0.44**	0.81	
Psychological well-being	0.48**	0.52**	0.69**	0.79

Note: The diagonal elements are the squared roots of the AVE. The off-diagonal elements are the correlations between the constructs (**p<0.01)

Structural Model

This study utilized maximum-likelihood estimation via LISREL 8 (Jöreskog & Sörbom, 1993) software to examine the hypothesized relationships. The results of hypothesis testing for this study are presented in Table 2. The overall goodness of fit index for the hypothesis model is: $\chi^2 = 421.48$, $df = 98$, $\chi^2/df = 4.3$, $GFI = 0.95$, $RMSEA = 0.059$, $SRMR = 0.034$, $CFI = 0.99$, $NFI = 0.98$, $PGFI = 0.68$, indicating that the structural model and data have a good fit.

First, challenge perception has a significant positive impact on flow experience ($\gamma = 0.55$, $p < 0.01$), satisfaction ($\gamma = 0.33$, $p < 0.01$), and psychological well-being ($\gamma = 0.07$, $p < 0.05$). Therefore, hypotheses 1, 2, and 3 are supported. Secondly, flow experience significantly and positively influence satisfaction ($\gamma = 0.36$, $p < 0.01$) and psychological well-being ($\gamma = 0.24$, $p < 0.01$), indicating that hypotheses 4 and 6 are supported. Finally, satisfaction has a significantly positive impact on psychological well-being ($\gamma = 0.62$, $p < 0.01$), supporting hypothesis 5. In this model, the variance of flow experience, satisfaction, and psychological well-being accounted for 30%, 47%, and 68% respectively.

There are direct and indirect relationships among challenge perception, satisfaction, and psychological well-being. As shown in Table 3, the direct effect of challenge perception on satisfaction is 0.33 and the indirect effect is 0.20. Overall effect is significant at 0.53. Direct effect of challenge perception on psychological well-being is lower at 0.07. However, indirect effect is 0.46. Total effect is 0.53 and it is significant ($p < 0.01$).

Table 3
Direct Effect, Indirect Effect, and Total Effect

Independent variable	Dependent variables		
	Flow experience	Recreation Satisfaction	Psychological well-being
<i>Challenge perception</i>			
Direct effect	0.55**	0.33**	0.07*
Indirect effect	–	0.20**	0.46**
Total effect	0.55**	0.53**	0.53**

Note: * p<0.05; **p<0.01

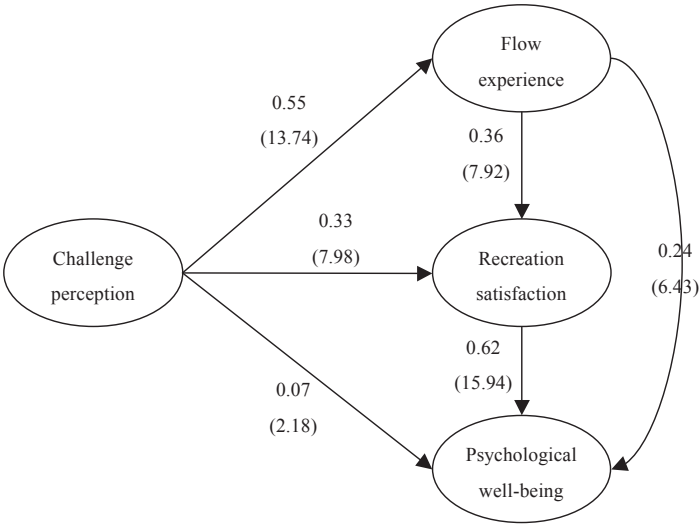


Figure 2. Path Analysis of the Structural Equation Model

Discussion

This study integrates samples from three adventure recreation activities to investigate the outcomes of challenge perception among participants. The model of challenge experience proposed by this study has not been examined in past research. The process of recreational experience among adventure participants can be more broadly understood by comprehensively examining the relationship among the variables in the challenge perceptual model. This study not only demonstrates that challenge perception has an impact on flow, satisfaction, and well-being, but also confirms the relationships among those outcome variables. The resultant findings contribute to the overall understanding of participating adventure activity. Firstly, research results show that perception of challenge can heighten flow experience, satisfaction, and psychological well-being in adventure recreationists. Ryan & Deci (2000) argued that action upon intrinsic motivation helps individual to perceive enjoyment and inherent satisfaction. The pursuit of challenge perception is an important intrinsic motivation for engaging in adventure recreation (Ewert & Hollenhorst, 1989; Lee et al., 2007). Therefore, realizing the motivation of seeking challenge is realized can produce the positive outcome of satisfaction.

Challenge perception is an important antecedent of flow experience: a finding that echoes previous studies (Jones et al., 2000; Wu & Liang, 2011). Compared to general outdoor activities, adventure recreation provides participants with more opportunity to perceive challenge. The greater the challenge perception, the more fully the participants need to dedicate their abilities and concentrate, leading to immersion in the activity, obliviousness to the passage of time, and a flow state. The perceived challenge exists in high-risk and high-competency situations. It means recreationists try to overcome various kinds of difficult situations by their competence in order to attain optimal arousal (Priest, 1992). Priest (1992) suggested that adventure recreationists would pursue the optimal arousal in order to have peak experience similar to flow experience. For example, a diver able to fully utilize his or her skills is more likely to fully enjoy the seascape view, completely focus on the present, and achieve a flow state.

The overall satisfaction of participants in adventure recreation is affected by challenge perception. The results of this study accord with theoretical expectations (Oliver, 1980) that satisfaction results when prior expectations of challenge are realized. In whitewater rafting, for example, challenge often is the main motivation for participation (Lee et al., 2007). Rafters feel stimulation and challenge from the activity and a sense of satisfaction from completing the task. Likewise, adventure recreationists seek adventure activities in fields suitable to testing their personal limits. When individuals perceive challenge, they are satisfied by demonstrating their skill. Challenge perception can also enhance the psychological well-being of recreation participants, although the degree of influence is far lower than that for flow experience and overall satisfaction. This finding mirrors the findings of Poon and Fung (2008), which believes that participation in more challenging physical activity can enhance psychological well-being. For example, high-altitude mountaineering often requires sustained hiking for over 10 hours, posing a major challenge for the climber both physically and emotionally. When the activity is completed, a climber is likely to feel pride and happiness in overcoming the challenge.

Finally, the relationships among flow, satisfaction, and well-being were verified. Previous studies have shown that flow experience affects satisfaction (Wanner et al., 2006; Wu & Liang, 2011). The greater the sense of flow, the more likely that participants in adventure recreation will have a positive assessment of the activity outcome and believe that participation in the activity was worthwhile and consistent with their expectations. For example, the majority of whitewater rafters who feel the rapid passage of time and active absorption during a rafting course feel pleasure and satisfaction in the activity. Secondly, this study corroborates the finding of previous studies (Wanner et al., 2006) that flow experience is conducive to improving psychological well-being. For example, scuba diving is challenging due to professional knowledge and skill required to complete the dive. Divers who achieve a flow state and immerse entirely in the activity feel a sense of pleasure both during and after the activity. Finally, the impact of satisfaction on psychological well-being echoes Staempfli (2007), who finds that the satisfaction of an individual's needs can enhance physical and psychological health. For example, climbers are likely to feel joy and pride from achieving the objective of the challenge (i.e., reaching the mountain peak and enjoying the view).

Implications and Suggestions

Diving, mountaineering, and rafting are popular adventure recreational activities in Taiwan, with many companies planning and operating related activities. The results of this study therefore have significant management implications. Participant satisfaction is a major objective of recreation operators, and participants hope to derive pleasure, happiness, and other positive feelings from recreation activities. This study confirms that challenge perception is an important antecedent in the formation of the positive outcomes of flow state, satisfaction, psychological well-being among participants in adventure recreation. Tour planners would therefore be well advised to consider whether the element of challenge is included in their adventure recreation packages, and to attempt to provide, within safe limits, opportunities for participants to experience challenge to the extent possible. Furthermore, since flow can result in a sense of satisfaction and happiness, operators should help each participant to achieve a flow state. Tour guides and trainers should regularly note the physical and psychological state of each participant and provide due assistance to help them achieve a flow state.

The following limitations and suggestions apply to the findings of this study. First, although the study looks at three different activities, there are numerous types of adventure activities and

the generalizability of the results should therefore be considered with prudence. Future studies could obtain samples from other types of activity to augment the generalizability of the results. Secondly, although care was taken in the collection of data for the study, there remains the possibility of response error from factors such as social desirability and common method variance. Since the questionnaire involved a satisfaction survey, the responses obtained may have been affected by bias toward operator expectations. It is therefore proposed that future studies include social desirability variables to examine whether or not there is bias in the results, as well as use multiple data sources to reduce the problem of common method variance. Thirdly, this study rationalized the model of challenge perception as a linear network based on past theory. However, this model potentially exists in non-linear relationships. Future research can adopt non-linear analysis to test the model of challenge perception from a different perspective. Finally, future studies can extend the theoretical model of this study to further investigate the formative elements of challenge and the other outcomes of challenge perception. Such studies would have significant benefits for theoretical development in the field of adventure recreation.

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