VOLUNTEER INVOLVEMENT AT KENTING NATIONAL PARK: EXPLORING FACTORS AND METHODOLOGICAL INNOVATION

A Dissertation in
Recreation, Park, and Tourism Management

by

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ABSTRACT

As the number of tourists has increased, many national parks have introduced volunteer programs to expand their capacity in providing services. Though the volunteers are unpaid, the cost of training and operating the program is still a considerable investment for national parks. To avoid the huge expenses, it is important for the national parks to know how to improve volunteer involvement and retain active volunteers. Therefore, semi-structured interviews were conducted at Kenting National Park in Taiwan to investigate the potential factors associated with variables related to volunteer involvement. The transcripts of interviews were coded and analyzed with the NVivo software program. The results of interviews are discussed and two new methodological instruments are introduced in this study.

The results show that the initial motivations to be volunteers usually differ from the current motivations to continue volunteering. Though volunteering can be serious leisure, some constraints to volunteering are unique compared to leisure constraints because of the specific circumstances of providing services. Moreover, some negotiation strategies to overcome volunteering constraints also differ from those for leisure activities. The strategies themselves can be alternative forms of involvement rather than treated as different variables. The volunteers tend to perceive environmental changes through the awareness of unusual phenomena that are typically connected to indigenous knowledge and long-term experience in the local area. The services of volunteering can be categorized into direct and indirect contributions and both of them should be counted to avoid underestimating volunteer involvement.

To provide an improved approach in designing quantitative scales for measuring volunteer involvement, the concepts of Likert-type scales, ipsative approaches, and level of measurement
are reviewed and a new algorithm, the S-score, is proposed. Rather than absolute scores, the S-score carries the relative strength, which is better to deliver accurate messages and reduce response biases of each item responded to by individuals. Hypothetical data are used to show how S-scores could better explain the results of raw scores in measurement scales. Even if the scales in different studies are not the same, the S-score approach can transform the raw scores into standardized unitless scores to make the results comparable across destinations, cultures, or eras. The features of S-scores and suggestions for questionnaire design for future research are also discussed.

Since the results of interviews revealed that volunteer motivations change over time, the Boston Consulting Group (BCG) matrix in management science were adapted to develop the Volunteer Motivation-Change Evaluation matrix to examine the strengths and weaknesses of the volunteer program through analyzing the dynamic motivation shifts. The results show that the strengths of the volunteer program of Kenting National Park involve keeping volunteers through social interaction and environmental education motivations. The program attracted volunteers with motivations of gaining knowledge, which declined in importance over time, while motivations related to escape increased. Volunteers with self-esteem motivations might be lost as results indicated the weaknesses of gaining self-esteem in the program. The investigation through Volunteer Motivation-Change Evaluation matrix can inform national park managers’ understanding of how to maximize the effectiveness of volunteer programs.
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Thank you to all my friends in Happy Valley and in Taiwan. I am lucky to have you in parts of my journey. You are always there to give me big smiles and listen to me. Though some of you have been heading to the corners of the world, hope we will have a chance to meet somewhere in the future.

Lastly, a huge thank you to my family for always believing in me to explore the world. It was a long way in academic pursuing and I would not accomplish this degree without your support. This dissertation is for you, my dear family!
CHAPTER 1
Introduction

Over the last century, as concern for the long-term viability of the natural environment has increased, numerous national parks and other protected areas have been established around the world. In order to heighten public awareness, tourism or ecotourism has been utilized as a management strategy supporting conservation (Mcneely & Miller, 1984; Boo, 1990; Lindberg, 2001; Cochrane, 2006). Each year millions of people visit national parks throughout the world. After visiting a national park, some visitors might devote themselves to be volunteers at national parks because they enjoyed the experience and believe that they should do something for the environment. Furthermore, due to the limitation of budgets, many national parks do not employ enough full-time staff to provide services for a large number of visitors. Thus, national parks recruit volunteers to support their administration and volunteers become substantial human resources for environmental interpretation in national parks.

Nevertheless, national parks might still struggle to attract enough people to become volunteers. Since volunteer training programs typically cost a lot, it is also important to know how to keep existing volunteers and increase their involvement. Therefore, this study examines variables that affect volunteer participation in national parks and attempts to develop proper analytic instruments to evaluate the variables. It is expected that the results will provide practical suggestions to improve administration of national parks.

Kenting National Park, the first among nine national parks in Taiwan, was established in 1984. According to data provided by park headquarters, more than six million tourists visited the park in 2011. The most important resources to be conserved in Kenting are natural resources both in land and in marine areas of the park. Therefore, the environmental issues in Kenting National
Park are typical challenges to deal with. For providing services to visitors, Kenting National Park recruits new volunteers almost every year. The volunteers in the park typically take responsibility for trail-guiding with interpreting environmental knowledge or providing information at tourist information centers. To date, about 1,000 volunteer interpreters have been trained and qualified in volunteering. However, according to park records, only 80 returning volunteers provided their services in Kenting National Park in 2011. This means that more than 90% of the qualified volunteers did not return and provide services. Because of the significant loss in volunteer participation and the potential environmental issues in the park, Kenting National Park was selected to be investigated for the topics of concern.

**Potential Variables**

**Motivation**

To understand volunteer participation, volunteers’ motives for becoming involved in conservation efforts were investigated. Researchers have assessed volunteers’ motivations (McEwin & Jacobsen-D’Arcy, 2002; Esmond & Dunlop, 2004) as well as why volunteers quit volunteering (Cnaan & Goldberg-Glen, 1991; Clary et al., 1992). In the beginning of exploring volunteers’ motivations, the motives related to tourism and leisure activities were reviewed because both leisure and volunteering are activities that people do during free time so these activities may have similar motives and behavior patterns. Researchers classified tourism motivations in different categories. Dann (1981) proposed that motivations could be pull-push forces, which lead to a tourist’s behaviors. He claimed that tourism motivations could result from personal desires and offerings of the destination. Iso-Ahola (1989) defined four dimensions of tourism motivation, which were influenced by the components of personal-interpersonal and seeking-escape. Iso-Ahola (1989) also proposed that extrinsic motives could affect individual
leisure activities in addition to intrinsic motives. Jamel and Lee (2003) classified tourist motivations with micro-macro theory. They claimed that micro factors are internal psychological forces and macro factors are from social forces. Snepenger et al. (2006) demonstrated that motivations are associated with vacation decision-making, behavior, and assessing satisfaction.

Many scales have been developed to measure tourism motivations but some were created to focus on specific issues. For instance, the Recreation Experience Preference (REP) scales were typically used to measure the motivation for participation in outdoor recreation activities (Manfredo et al., 1996). Though the REP scales have been widely utilized in studies on varied leisure activities, bias can exist when the researchers select items or domains to form their own measuring scales. Furthermore, the scales used in measuring tourism participation are not necessarily suitable in measuring volunteer participation. Stebbins (1992) claimed that the systematic pursuing of voluntary activities could be defined as serious leisure. However, the nature of leisure activities between casual tourism and volunteering could be different. The measurement of tourism might not work in assessing volunteering even if all these leisure activities were voluntary and serious. Therefore, studies were conducted to focus on the motivations for volunteering activities. Brown (2005) proposed four motivators for why people spend their vacations in volunteering. His findings indicated that interacting with other people and enhancing one’s relationship in society were the primary purposes of volunteering. Clary et al. (1992) identified 30 possible reasons for individuals volunteering and created the Volunteer Functions Inventory (VFI), which included 6 functions with 5 reasons each in the scale. McEwin and Jacobsen-D’Arcy (2002) created the Volunteer Motivation Inventory (VMI) with 41 items in 11 categories. Esmond and Dunlop (2004) combined the VFI and VMI to develop the Improved Volunteer Motivation Inventory (IVMI), which included 44 items in 10 categories.
Those scales provided efficient ways to understand the motivations for volunteering; however, though the items and categories were expanded in the later scales, the selection of these items and categories were still subject to the researchers’ viewpoints. Therefore, to develop a sound scale for measuring volunteer motivations, more methodologies should be considered to reduce the possibilities of missing any potential motives. Moreover, since the differences across parks, countries, cultures, and time would exist, the new methodologies should be adequate to include potential motivations and make it comparable. Practically, the results analyzed by new methodologies could better inform national park managers to improve their volunteer programs.

**Constraints and Constraint Negotiation**

Many studies have focused on how constraints affect individual motivations and behaviors in leisure activities (Crawford & Godbey, 1987; Crawford et al., 1991). The correlations among constraints, motivations, and leisure participation have been proposed in different aspects of leisure research (Losier et al., 1993; Mannell & Iso-Ahola, 1987). Early on researchers theorized that constraints decreased participation in leisure activities. Carroll and Alexandris (1997), however, demonstrated that strength of motivation is negatively associated with the perception of constraints. Crawford and Godbey (1987) classified leisure constraints into three domains: a) Intrapersonal, b) Interpersonal, and c) Structural, which were applied in many studies. Intrapersonal constraints are internal psychological factors that prevent individuals from engaging in leisure activities. The subjective evaluation of appropriateness or personal emotion, such as anxiety or stress, can result in intrapersonal leisure constraints. Interpersonal constraints are usually derived from the interaction with other people in society. An example of interpersonal constraints is that some leisure activities, such as mountain climbing, require a partner for participation. Structural constraints are external barriers that prevent people from leisure
participation. Transportation, convenience of infrastructure, or financial limitations can be examples of structural constraints. The hierarchical model of leisure constraints (Crawford et al., 1991), revised from Crawford and Godbey’s leisure constraints classification, was developed as a framework to guide the development of a scale, which included the nature, operation, and sources of constraints, to measure constraints that prevent individuals from leisure participation.

Early research on leisure constraints assumed that when people encounter constraints, they would stop their participation in certain leisure activities (Jackson et al., 1993). Later, researchers found that many people adopt strategies to deal with perceived constraints; they will try to find a balance between constraints and motivations (Jackson et al., 1993). In recent decades, researchers have tried to use different models to examine the negotiation strategies that individuals use to overcome leisure constraints (Jackson & Rucks, 1995). Jackson et al. (1993) proposed that negotiation strategies could be classified as behavioral strategies and cognitive strategies. Jackson and Rucks (1995) extended the negotiation strategies into four activity-based variations, including problem encountered, cognitive vs. behavioral strategy, modification of leisure or non-leisure, and type of strategy adopted. Hubbard and Mannell (2001) created the constraint-effects-mitigation model by examining the interconnection among constraints, negotiation, and motivation. Through applying the models of negotiation strategies, it has been demonstrated that motivations can be mediated by constraint negotiation in predicting leisure participation (Son et al., 2008). However, the theories of constraints and constraints negotiation have not been fully applied to volunteer engagement. Since volunteering at national parks could be a form of serious leisure (Stebbins, 1992), constraints and constraints negotiation in leisure activities are included as relevant variables for this research.
Perception of Environmental Changes

Since Kenting National Park is famous for its environmental resources, how volunteers recognize the threat of environmental changes may be another factor affecting their involvement. Vitousek (1992) noted that components of global environmental change include change in the composition of atmosphere, climate change, decreased ozone concentrations, land use change, loss of biological diversity, biological invasions, and changes in atmospheric chemistry. Some of these issues are happening in Kenting National Park. For instance, the invasion of White Popinac has become a critical problem in threatening the vegetation of domestic plants in Kenting. Also, how to reduce the loss of coral in marine areas of Kenting has been discussed for many years because the environmental issues and diving activities of tourists cause massive damage to the coral. It is broadly accepted that humans’ activities generate greenhouse gas to the atmosphere and cause environmental changes (Dodman, 2009; Vitousek et al., 1997). Scott et al. (2008) indicated that tourism is a significant contributor to greenhouse gas emissions, primarily from the use of transportation. In contrast, tourism is also likely to be a victim of environmental changes. Research has documented the threats of global environmental changes, such as rising sea levels and coastal erosion, on destinations (IPCC, 2007). Elsasser and Buerki (2002) also asserted that only 44% of existing Swiss ski resorts will remain viable within a few decades. These studies demonstrate the close connection between tourism and environmental issues.

Further research tried to connect leisure behaviors and perceived environmental issues (Cottrell & Graefe, 1997; Kontogianni et al., 2014). Cottrell and Graefe (1997) demonstrated that knowledge of environment-related issues could be a predictor of people’s responsible behavior that in turn causes influences on the environment. Their results documented an association between perception of environmental issues and individuals’ behaviors in a nature-based
destination. Kontogianni et al. (2014) also examined the environment-friendly behaviors of visitors who pursued different leisure activities in Greece. Moreover, some scales had been used to investigate perceived environmental changes. Cottrell and Graefe (1997) modified the scales from Maloney et al. (1975) and proposed the dimensions of environmental concern, verbal commitment, and knowledge of ecology as variables of general environmental issues, as well as specific-issue environmental variables with dimensions of awareness of consequences, knowledge of issues, and personal commitment. Semenza and his colleagues (2008) demonstrated that the measurement of perceived environmental changes should include awareness, concern, and behavior change. However, the connection between perception of environment changes and volunteer engagement at natural-based destinations has not been carefully examined.

**Preliminary Conceptual Framework**

Based on the earlier literature, a preliminary conceptual framework for investigating volunteer involvement was created (Figure 1.1). However, some relationships between the variables were not clear or had not been fully examined. Before quantitative methods are utilized to verify the framework, it should be taken into consideration if any missed factor had not been discovered and should be included in the variables. Therefore, qualitative interviews were conducted in this study to explore the factors that influence the measurement of volunteer involvement in a national park.
Figure 1.1. Preliminary Conceptual Framework.

Study Methods: Semi-structured Interviews

Sampling

The ideal sample size for a qualitative study is a frequently debated question. One perspective is that the extent of sampling needed is based on data saturation (Bernald & Ryan, 2009; Mason, 2010). However, the question is how to affirm that no new things will emerge, i.e. the meaning of saturation. Guest, Bunce, and Johnson (2006) claimed that six to twelve interviews are enough to get basic elements, but they also recommended that careful selection in purposive sampling is necessary. Discussions of sample size can be found in many articles, but none of them reaches a universal guideline because the number of cases can vary due to research topics, target respondents, or approaches used in the research (Sandelowski, 1995; Coyne, 1997; Mason, 2010; O’Reilly & Parker, 2012). Mason (2010) searched more than half a million
abstracts accepted by educational institutions in Great Britain and analyzed the abstracts in which qualitative approaches were mentioned. He created a table showing the sample size can range from 1 to 95 depending on what different qualitative categories and methodological approaches were used. Sandelowski (1995) also compared the numbers of samples in different kinds of qualitative research methods, but only drew the conclusion that different research approaches and intent require different adequate sample sizes. In fact, among the literature that compared the sample sizes in qualitative research, some essential elements were rarely taken into consideration. For instance, how many questions were in each interview, how many concepts were included in the sets of questions, and how much average time would be required for each interview are important factors for research design but often neglected in the comparisons. These factors are difficult to dig out from the narrative in abstracts or journal articles because of space limitations; however, resources, such as money or time, instead of sample adequacy, considerably affect how many subjects are recruited (Green & Thorogood, 2013).

While agreement regarding adequate sampling size could not be found in the literature, it remained necessary to make a decision on how many volunteers would be recruited in this study. Some criteria were borrowed to determine the sample size. This research is exploratory and tries to identify further potential factors. Although five major concepts, motivation, perceived environmental change, constraints, constraints negotiation, and involvement, were brought up as potential variables in the framework, the purpose of the interviews was to probe the hidden factors that researchers might have missed in the past. In-depth interviews were conducted to get the first-hand experiences of volunteers in their services at Kenting National Park and investigate their understanding of the issues or phenomena related to the park. From the responses of volunteers, the preliminary conceptual framework can be reviewed and hypotheses can be
induced through the processes of the grounded theory method (Glaser & Strauss, 1967; Fernández, 2004; Bernard & Ryan, 2009). Therefore, the sampling of this study was based on the literature using grounded theory. Mason’s (2010) searches indicated that samples in grounded theory based studies ranged from 4 to 87 with a median of 30. Morse (1994; 2000) suggested the sample size of grounded theory research might be 20 to 30 participants.

According to the information provided by the headquarters of Kenting National Park, there were roughly one thousand qualified volunteers since the volunteer program was initiated in 1984. However, because the contact information of volunteers was not properly kept in files, particularly for those who volunteered before the computer era in the late 1990’s, only 209 volunteers were in the recently updated directory. Considering 15 main questions and more than 30 minutes estimated for each interview, this study sought to reach at least 20 volunteers, which was about 10% of the volunteers in the directory. Theoretical sampling, a suggested process in grounded theory, was implemented in the recruitment to find more ideas from the responses (Sandelowski, 1995; Coyne, 1997).

**Recruiting**

To explore potential factors of volunteer involvement, the participants in interviews should be recruited using reasonable criteria to maximize variation. A typical kind of purposeful sampling is recruiting by interviewees’ demographic characteristics (Sandelowski, 1995). Since the goal of this study was to investigate what variables could influence the engagement of volunteers, the first variation of sampling that should be considered was their involvement.

In the regulations of the volunteer program, the volunteers were asked to provide services at least 40 hours to retain their privileges. However, this was not seriously enforced because the
manpower of volunteers was not sufficient for the park. According to the volunteer service hours recorded by the Interpretation Division, in recent years, only about 70 to 80 volunteers provided services each year. Among the active volunteers each year, typically only one-third to one half of them reached the forty-hour requirement. Thus, in designing the purposeful sampling, the volunteers were initially selected from the following four classifications.

- **New volunteers**: Volunteers who are undergoing a training program.
- **Active volunteers with high involvement in volunteering**: Volunteers who provided services for 40 hours or more in each year for the last three years.
- **Active volunteers with low involvement in volunteering**: Volunteers who provided services in the last three years but did not reach 40 hours each year.
- **Inactive volunteers**: Individuals who had volunteered previously but did not provide any service in the last three years.

The volunteers were classified to each sub-group according to the service records from Kenting National Park and the interviewees in each sub-group were systematically selected from the directory. The purpose of theoretical sampling in grounded theory is to reach a broad and representative coverage of potential factors (Sandelowski, 1995); therefore, the same backgrounds of volunteers were avoided as far as possible in the sampling. In the directory, some characteristics of volunteers can be known before recruiting. These characteristics include gender, occupation, residency, academic major, and other information that they felt comfortable reporting. Therefore, the potential participants were randomly selected initially, but would be skipped if the individual characteristics were too similar to the participants who had been interviewed. The potential participants were inquired for their willingness to be interviewed and were informed the total estimated time for an interview. If the volunteers agreed to participate in the interviews, a proper time and place were scheduled for their convenience. After five
volunteers were interviewed in each sub-group, the characteristics were reviewed to see if more participants were needed. One more volunteer was recruited for both low involvement and high involvement sub-groups to increase diversity. Therefore, eventually, 22 volunteers were interviewed -- five participants in both sub-groups of new and inactive; six participants in both sub-groups of high and low involvement. The detailed characteristics of all participants will be discussed in the results.

Interview Arrangement

A face-to-face interview on-site at Kenting National Park was the first choice when arranging the interviews. However, if face-to-face interviews were not convenient for some volunteers, particularly for the inactive volunteers, off-site interviews or phone interviews were substituted. Among the 22 participants, 13 volunteers were face-to-face interviewed on-site at Kenting, 4 volunteers were face-to-face interviewed off-site, and 5 volunteers were phone interviewed.

The semi-structured interviews were conducted in July and August in 2011 and January in 2012. In the beginning of each interview, the consent form (Appendix A) was translated into Chinese, verbally informed, and taped. All participants were notified that their responses will be kept confidential, no personal data will be linked to any response, only the coded and compiled results will be published, and no specific names will be published in this research.

Interviewing and Questions

The questions of the interview were designed to acquire volunteers’ responses related to the concepts which might influence their involvement. As the criteria of semi-structured interviews, the volunteers were asked a series of questions for each potential variable (Bernard & Ryan,
Semi-structured interviews were applied for several reasons. First, because the current involvement of each volunteer was different, the questions should be adapted to different individuals. For instance, some questions for active and inactive volunteers could be slightly reworded or skipped. Semi-structured interviews provided the flexibility for these necessary adjustments. Second, semi-structured interviews could yield some controls to the volunteers. Since the purpose of the interviews was to search for something unknown, the respondents were not restricted and could express opinions in any way they felt comfortable. Some probing methods suggested by Bernard & Ryan (2009) were applied in these interviews to expand the possibility of getting diverse responses. Therefore, though the basic sequence of questions was arranged as shown in Appendix B, it was open for interviewees to jump to different questions as long as they showed enthusiasm in answering related topics, which might be helpful to enrich responses. Table 1.1 shows the categories of questions.

Table 1.1. The Categories of Questions in Semi-structured Interviews.

| Background | 1. Where are you living? How much time does it take you to get to Kenting National Park?  
3. Could you briefly describe your volunteer experiences, including at Kenting National Park, and with other organizations? |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Motivations| 4. Why do you volunteer at Kenting National Park?  
4(a). Is there anything in particular you want to do for Kenting National Park?  
4(b). Do you expect to receive anything from volunteering at Kenting National Park?  
4(c). What did you get from your volunteering experiences at Kenting National Park?  
4(d). How does volunteering at Kenting National Park help you, if at all? |
| Constraints| 5A(a). If any thing, what prevents you from volunteering at Kenting National Park as often as you would like? (for active volunteers)  
5B. Why did you quit volunteering at Kenting National Park? (for inactive volunteers) |
Table 1.1. (continued). The Categories of Questions in Semi-structured Interviews.

<table>
<thead>
<tr>
<th>Constraint Negotiation</th>
<th>6A. Assuming that some things prevent you from volunteering at Kenting National Park as often as you would like, what changes are you considering making (or have recently made) to increase the time you spend volunteering at Kenting National Park? (for active volunteers)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6B. If anything, in what ways have you tried to do something for Kenting National Park after you quit volunteering? (for inactive volunteers)</td>
</tr>
<tr>
<td></td>
<td>6B(a). Do you plan to volunteer at Kenting National Park in the future? (for inactive volunteers)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perception of Environmental Changes</th>
<th>Global issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. To your knowledge, what is global environmental change?</td>
<td>8(a). What are the phenomena related to global environmental change?</td>
</tr>
<tr>
<td>10. Do you believe global environmental change is an important issue facing human beings?</td>
<td>11. Do you think your personal activities/behaviors have an effect on global environmental change? If yes, why? If not, why not?</td>
</tr>
<tr>
<td>11(a). If anything, what have you done (or actually doing) in your daily life to mitigate the impacts of global environmental change?</td>
<td>11(b). What will you do in your daily life to mitigate the impacts of global environmental change?</td>
</tr>
<tr>
<td>11(c). What would cause you to change your behaviors in future?</td>
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</tr>
</tbody>
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<table>
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<tr>
<th>Local issues</th>
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<tbody>
<tr>
<td>12. To your knowledge, what are the phenomena at Kenting National Park related to global environmental change?</td>
</tr>
<tr>
<td>13. Why do you believe these phenomena at Kenting National Park are caused by global environmental change?</td>
</tr>
<tr>
<td>14. If anything, what do you think you could do to mitigate the impacts of global environmental change when you are/were volunteering at Kenting National Park?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information Sources</th>
<th>9. How did you learn about issues related to global environmental change?</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Involvement of Volunteering</th>
<th>2. When did you start volunteering at Kenting National Park?</th>
</tr>
</thead>
<tbody>
<tr>
<td>3(a). Could you briefly describe the frequency and seasons you volunteered at Kenting National Park?</td>
<td>3(b). What specific tasks did you do when volunteering for Kenting National Park?</td>
</tr>
<tr>
<td>15. Do you think your recognition of global environmental change influences your participation in volunteering at Kenting National Park? If yes, how so? If not, why not?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>KTNP Specific Issues</th>
<th>7. In your opinion, what are the important issues facing Kenting National Park?</th>
</tr>
</thead>
<tbody>
<tr>
<td>7(a). In your opinion, what should be done to deal with these issues at Kenting National Park?</td>
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</table>

The participants answered the questions in Chinese or Taiwanese. The length of each interview was between 25 and 65 minutes. Compared with the individuals in other sub-groups, the volunteers classified as high involvement obviously showed a positive attitude to answer all
of the questions. It took more than 45 minutes to go through each interview for 5 high involvement volunteers, including 2 who spent more than an hour, out of 6 volunteers in that sub-group. It was also observed that high involvement volunteers were more willing to share their thoughts beyond the questions and had more active interactions with the interviewer.

Transcribing

All the taped interviews were transcribed for further analysis. The transcripts were made in Chinese but not translated into English. It was considered better to process coding and analyzing in the original language because the translation could alter the meanings of responses. The definitions of some words are probably not the same in different languages. This is not to say the definitions are totally different. In some cases, the ranges that the specific word indicates can be slightly distinct. For instance, the word "community" in English can broadly represent people sharing the same values or experiences. The Penn State Community sometimes refers to the whole group including students, faculty, local residents, and alumni. However, the "community" in Chinese basically refers to the people living in a particular area or place. For example, the "Sheding Community" only refers to a small village located in the middle of the Kenting area. It does not make sense saying "Kenting Community" to the people because they may be confused with whether there is a small village also called Kenting.

Another reason for not translating the transcripts is that not each Chinese word can correspond to one and only one exact English word, and vice versa. For example, the Chinese word "休閒" (Xiu Xian) can be translated to either "leisure" or "recreation" in English. There are no exact Chinese words to distinguish the differences between leisure and recreation. The inaccurate translation could lead to misinterpretation of results; therefore, the data coding and analyzing were implemented in Chinese and the results were then translated into English for
further discussion.

Though the participants mostly answered the questions in the Chinese language, some volunteers used the Taiwanese language, which is one of the major languages used in Taiwan, in their responses. However, Taiwanese is a language without consistent sets of characters, in either Chinese-writing characters or Orthographies. For convenience, the responses in Taiwanese language were directly translated into Chinese when transcribing.

Coding

The coding of transcription was processed in two phases. In the first phase, the transcripts were coded manually and organized with Microsoft Excel software. The purpose of this phase was to get a big picture of all the responses and roughly create the codes to facilitate the coding process in the next phase. Some typos in the transcripts were revised as well in this stage. After the transcripts were coded, three transcripts were randomly selected and sent back to the participants to confirm the accuracy of transcribing and agreement of coding. In the second phase, the NVivo software was utilized for in-depth analysis. The transcripts were imported, coded, and analyzed with the NVivo program. Aside from its powerful functions, NVivo was selected as a coding tool because it can handle Chinese characters. The codes categorized through NVivo were named "nodes." Figure 1.2 shows the first two layers of the nodes tree. The nodes tree could be extended to more layers when making detailed classifications.
Figure 1.2. Nodes Tree of Transcription Coding.

- Background
  - Age
  - Residency
  - Distance from KTNP
  - Year of becoming a volunteer at KTNP
  - Education and Major
  - Occupation
  - Other volunteering experiences

- Volunteering at KTNP
  - Jobs
  - Frequency and/or periods

- Experiences at KTNP
  - Unforgettable experiences
  - Specific visitors
  - Likes volunteering or not?

- Motivation
  - For self
  - For KTNP

- Obtainment from volunteering

- Intention of future volunteering

- Constraints
  - Intrapersonal
  - Interpersonal
  - Structural
  - Negotiation

- KTNP issues
  - General issues
  - Solutions

- Environmental change (EC)
  - Believe or not? Why?
    - Global EC definition
    - Global EC causes
    - Global EC phenomena
    - Global EC solutions
    - KTNP EC causes
    - KTNP EC phenomena
    - KTNP EC solutions
  - Information sources

- Behavior for environment
  - Personal influential behaviors
  - Personal mitigation behaviors
  - Behavior tendency
  - External factors
  - Volunteer could do

- Connection between perceived EC & volunteering
To make it convenient for specific quotations in the discussion, the volunteers in four sub-groups were also respectively coded from A to D followed by numbers.

- New volunteers (code: A-n)
- Active volunteers with high involvement (code: B-n)
- Active volunteers with low involvement (code: C-n)
- Inactive volunteers (code: D-n)

**Dissertation Structure**

This study will investigate the following questions.

- Is the preliminary conceptual framework (Figure 1.1) adequate to examine volunteer involvement at national parks?
- What factors were missed and should be included in the variables?
- Are the existing instruments sufficient to measure the variables related to volunteer involvement?
- What methods can be utilized to make the existing measurements better?

In order to develop sound measurement scales for examining volunteer involvement, this research will integrate the interview results with interdisciplinary theories to propose better methodologies. Three individual but related chapters form the structure of this dissertation.

Chapter 2 discusses the findings of interviews with volunteers and addresses the first and second questions above. The results of semi-structured qualitative interviews are utilized to discover some potential factors missed in previous scales of primary variables for measuring volunteer involvement. Suggestions for future scales are provided and some specific responses resulting from cultural differences are brought up as well. This article is being prepared for the
Inspired by the results of Chapter 2, the limitation of classic quantitative scales of measurement are discussed in Chapter 3. Therefore, this chapter will provide solutions for the third and fourth questions above. The primary concern is how to make the quantitative scores convey accurate messages of individuals’ responses. The popular Likert scale and ipsative approach are reviewed and their defects are highlighted. A new perspective for analyzing quantitative data is developed to improve the validity of interpretation and a new algorithm, "S-score," is created for further research. This methodological article will be submitted to the International Journal of Social Research Methodology.

The discussion in Chapter 4 focuses on the motivation shifts from the beginning phase to the continuing phase of volunteering. The issues related to the first and fourth questions above are discussed in this chapter. The differences between volunteers’ expectations and gains are compared and discussed from the results of interviews. The Boston Consulting Group (BCG) matrix (Henderson, 1979) was adjusted to a new matrix for evaluating the volunteer program through analyzing the changes of motivation. Practical suggestions to the national park and potential quantitative application in future studies are addressed in this chapter. The manuscript from this chapter is heading to the journal Society and Natural Resources.

The final chapter, Chapter 5, synthesizes the results of each chapter and provides outlooks for expanding investigation in the future. Suggestions for improving volunteer programs in environmental institutions or protected areas are included in the summary.
REFERENCES


Esmond, J., & Dunlop, P. (2004). *Developing the volunteer motivation inventory to assess the underlying motivational drives of volunteers in Western Australia.* Australia: CLAN WA Inc.


CHAPTER 2
Exploring Factors Associated with Constraints, Constraints Negotiation, Perceived Environmental Changes, and Involvement in Measuring Volunteer Participation

Abstract
Semi-structured interviews were conducted at Kenting National Park in Taiwan to explore the potential factors associated with variables related to measuring volunteer involvement. The results and analysis show new perspectives on some independent and dependent variables, including constraints, constraints negotiation, perceived environmental changes, and involvement, which were commonly used in investigating volunteer engagement. The results revealed that some constraints of volunteering are unique compared to leisure constraints because of the specific circumstances of volunteering. The negotiation strategies used to overcome volunteering constraints also slightly differ from those for leisure activities and the strategies themselves could be alternative forms of involvement. Volunteers’ major perception of environmental changes is the awareness of unusual environmental phenomena that are typically linked to indigenous knowledge and long-term experience and in turn prompt the volunteers to get involved. The services of volunteering can be classified into direct and indirect contributions and both of them should be counted as volunteers’ engagement to avoid underestimating involvement. Suggestions for creating scales in measuring volunteer involvement are provided and discussed for future studies.

Introduction
Many environmental groups, including parks, conservancies, or non-governmental organizations, recruit volunteers to deliver services because it is more cost-effective than hiring full-time staff (Brudney & Duncombe, 1992). However, the cost of a volunteer program is still
an important investment for these organizations. In addition to the direct expenses for those volunteers, substantial indirect expenses also occur when introducing a volunteer program into an organization. For instance, the paid staff has to spend considerable time to operate the volunteer program in planning, recruiting, training, and maintaining (Tacticos & Gardner, 2005). Therefore, how to increase and encourage the involvement of volunteers becomes a crucial element to determine the efficacy of volunteer programs.

The involvement of volunteers can vary on account of different variables. Though motivation has been a popular variable discussed in previous studies, this study concentrates on other reasons that might affect volunteer involvement. Researchers have focused on how constraints and negotiation strategies influence individuals’ leisure participation but have not fully applied them in volunteering. Though volunteers provide service in national parks, the connections between perceived environmental change and volunteer engagement at nature-based destinations have not been carefully examined. Many measurement scales of the variables mentioned above have been created but they were not perfect. Some of the scales were still subject to the researcher’s viewpoints. For instance, researchers may only select some items or domains that fit their studies from existing scales (Kyle et al., 2004; Raadik et al., 2010). Furthermore, since this study was conducted in an East Asian country, cultural differences may occur, making existing scales inadequate in explaining the phenomena.

In order to develop sound scales for investigating volunteer involvement, qualitative instruments should be utilized in advance to reduce the possibility of missing factors. The term “factors” in this study indicates the items that might be included or adapted in the scales to measure certain variables, including constraints, constraints negotiation, perceived environmental changes, and volunteer involvement. Qualitative instruments were implemented...
not only to explore concepts or phenomena (Creswell, 2009; Tashakkori & Teddlie, 2010), but also to seek potential items that should be considered in examining variables. That is to say, the results of exploratory approaches can be transformed to specific factors to improve the existing scales. Therefore, semi-structured interviews with Kenting National Park volunteers were conducted and analyzed to explore factors associated with those variables and to provide suggestions for creating future measurement scales.

**Literature Review**

Constraints, in opposition to the positive force of motivation, could be a negative force preventing individuals from volunteering. Carroll and Alexandris (1997) demonstrated that strength of motivation is negatively associated with the perception of constraints. Many researchers have investigated the correlations among constraints, motivations, and leisure participation (Crawford & Godbey, 1987; Mannell & Iso-Ahola, 1987; Losier et al., 1993). Three domains, including intrapersonal, interpersonal, and structural, were claimed by Crawford and Godbey (1987) to classify leisure constraints. Furthermore, though it was assumed in earlier research that people would stop their participation in certain leisure activities when encountering constraints, it was subsequently widely accepted that individuals would try to balance the constraints and motivations (Jackson et al., 1993). Therefore, constraints negotiation models were developed to investigate leisure participation. Jackson et al. (1993) classified negotiation strategies into behavioral and cognitive strategies and Jackson and Rucks (1995) proposed four categories for the negotiation strategies. Son et al. (2008) demonstrated that motivations could be mediated by constraint negotiation in predicting leisure participation. Though researchers have justified the relationship of constraints, constraints negotiation, and leisure participation, the differences between leisure engagement and volunteer involvement in constraints as well as
constraints negotiation strategies were rarely addressed. Therefore, in this study the factors associated with constraints and constraints negotiation in volunteering will be explored and discussed from the results of interviews.

Another variable concerned in this research is volunteers’ perception of environmental changes. The relationship between environmental issues and tourist activities has been identified in many studies (Elsasser & Buerki, 2002; IPCC, 2007; Scott et al., 2008). The environment-friendly behaviors of different visitors who pursued leisure activities in Greece were examined by Kontogianni et al. (2014). Cottrell and Graefe (1997) also demonstrated that knowledge of environment-related issues could lead to people’s responsible behavior that in turn causes influences on the environment. However, the connection between perceived environmental changes and volunteer participation at natural-based destinations has not been carefully examined. Moreover, since volunteering happens in national parks, volunteers are expected to have a greater sense of environmental issues. Though volunteers in national parks are usually asked to participate in training courses related to the environmental resources in order to provide correct knowledge to visitors, their perception of environmental changes have rarely been systematically investigated. Researchers have claimed that global environmental changes can affect the environmental changes locally and regional changes can influence the global changes as well (Byg & Salick, 2009; Wilbanks & Kates, 1999). However, they have also mentioned the concerns that environmental issues observed and perceived by local residents could be significantly different form the global environmental issues emphasized in research (Byg & Salick, 2009; Van Aalst, Cannon, & Burton 2008). The importance of distinguishing the environmental changes between different spatial or temporal scales has been emphasized in earlier studies (Cash et al., 2006; Cash & Moser, 2000; Turner et al., 1990). Specifically,
Ericksen (2008) proposed that understanding the environmental changes in different scales could help decision-making of managers to secure the food system. Therefore, in examining the perceived environmental changes of volunteers, the questions in interviews were divided into global and local scales.

Aside from the potential independent variables discussed above, how to measure volunteer involvement, the dependent variable, is also one of the concerns in this study. For further quantitative analysis, it is necessary to convert the volunteers’ level of involvement into numeric data. According to Davis et al. (2003), the straightforward method is to count the participation hours of typical time periods. Hager and Brudney (2004) claimed that the number of volunteers could be combined with service hours to evaluate the contribution to an organization. Farmer and Fedor (2004) believed that the amount of participation in certain events could show the level of involvement. Nevertheless, the contributions of volunteering are not necessarily limited to the official hours on site. Other efforts to support national parks should also be counted as contributions. The alternative methods to keep volunteers involved will be probed by interviewing park volunteers.

Research Methods

Sampling and Profiles of Interviewees

Since 1984, when the volunteer program was initiated, there have been roughly 1000 qualified volunteers according to information provided by Kenting National Park. However, only 209 volunteers were listed in the recently updated directory.

Sampling in this study was based on previous studies that have used grounded theory. Mason (2010) searched more than half a million abstracts accepted by educational institutions in
Great Britain and indicated that studies using grounded theory reported sample sizes ranging from 4 to 87 with a median of 30. Morse (1994; 2000) recommended that sample sizes in studies using grounded theory range from 20 to 30 participants. In this study, considering the number of questions and the more than 30 minutes estimated for each interview, it was concluded that 20 volunteers (about 10% of the volunteers listed in the directory) would be recruited to participate in interviews.

To maximize the diversity of responses, the respondents were purposively sampled. The volunteers at Kenting National Park were asked to provide services at least 40 hours per year to retain their privileges according to the volunteer program regulations. Thus, the volunteers were initially selected from the following four sub-groups based on their frequency of recent volunteering. Furthermore, to make it convenient for specific quotations and protect the privacy of participants, the volunteers were respectively coded from A to D followed by numbers.

- **New volunteers (code: A-n):** Volunteers who are undergoing a training program.
- **Active volunteers with high involvement (code: B-n):** Volunteers who provided services for 40 hours or more in each year for the last 3 years.
- **Active volunteers with low involvement (code: C-n):** Volunteers who provided services in the last 3 years but did not reach 40 hours each year.
- **Inactive volunteers (code: D-n):** Individuals who had volunteered previously but did not provide any service in the last 3 years.

Five volunteers in each sub-group were systematically selected from the directory. Later, one more volunteer was recruited for both low involvement and high involvement sub-groups to increase diversity after the characteristics were reviewed to see if more participants were needed. Therefore, a total of 22 volunteers with various backgrounds and volunteer experiences participated in the interviews. Table 2.1 shows the profile of volunteers who were interviewed.
Table 2.1. Profile of Participants in Interviews.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Specifics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male: 9</td>
</tr>
<tr>
<td></td>
<td>Female: 13</td>
</tr>
<tr>
<td>Age</td>
<td>20~29: 8</td>
</tr>
<tr>
<td></td>
<td>30~39: 8</td>
</tr>
<tr>
<td></td>
<td>40~49: 4</td>
</tr>
<tr>
<td></td>
<td>50~59: 1</td>
</tr>
<tr>
<td></td>
<td>60 or above: 1</td>
</tr>
<tr>
<td>Education</td>
<td>Vocational school: 4</td>
</tr>
<tr>
<td></td>
<td>College: 12</td>
</tr>
<tr>
<td></td>
<td>Postgraduate: 6</td>
</tr>
<tr>
<td>Related Major</td>
<td>Yes: 10</td>
</tr>
<tr>
<td></td>
<td>No: 12</td>
</tr>
<tr>
<td>Other Volunteer Experiences</td>
<td>Yes: 15</td>
</tr>
<tr>
<td></td>
<td>No: 7</td>
</tr>
<tr>
<td>Training Group Enrolled</td>
<td>Student: 13</td>
</tr>
<tr>
<td></td>
<td>Non-Student: 9</td>
</tr>
<tr>
<td>Current Occupation</td>
<td>Student; Teacher; Staff member of environmental organization; Insurance agent; Restaurant owner; Doctor; Personnel of technology company; Flight attendant; Personnel of Travel agency; Salesman of engineering company; Retiree</td>
</tr>
</tbody>
</table>

The volunteer jobs in Kenting National Park are typically physically demanding, such as trail-guiding or supporting events, so the age of volunteers was mostly under 60 years old. However, elder volunteers can be assigned to some easy jobs, such as providing information to visitors at gathering spots or visitor centers. The oldest volunteer interviewed in this research was 73 years old. He still showed great enthusiasm for volunteering. He stated,

"If I am allowed to provide services and my physical conditions are permitted, I won't give up."

He believed that he was still healthy enough to volunteer in the park. The only concern for him was whether the insurance provider would accept volunteers age 75 or above because insurance,
paid by the national park, was required to protect volunteers.

All the interviewees had a vocational school education or higher, but less than half of them completed majors directly related to their volunteer work (e.g., recreation, geography, ocean resources, or bio-related majors). Instead, some volunteers majored in business, liberal arts, engineering, politics, psychology, or sociology. The volunteer recruitment policy of Kenting National Park is to welcome any person who is interested in volunteering. The training programs provide the necessary resources to build the knowledge needed to be an effective volunteer, even if the recruits did not have related majors.

When volunteers enroll in the volunteer program, they are placed into student or non-student groups, which vary based on the training procedure. The training program typically starts in the beginning of the summer and lasts approximately 10 days. After completing the course, new recruits in the student group must practice volunteering on site for four to six weeks, depending on the budget of the program. Since the recruits in the non-student group may have other jobs and cannot stay in the park for a long period of time, they can schedule the practical volunteering at their convenience but need to reach the minimum hours requirement before the end of that year. After passing the requirements and being evaluated, the new recruits become official volunteers of the national park.

Interviewing, Transcribing, and Coding

Semi-structured interviews were conducted during 2011 and 2012. Among the 22 participants, 13 volunteers were interviewed face-to-face on-site at Kenting National Park, 4 volunteers were interviewed face-to-face off-site, and 5 volunteers were interviewed by phone. Each interview lasted between 25 and 65 minutes. It was also observed that high-involvement volunteers were more willing to share their thoughts beyond the questions and interact with the
interviewer. The following questions (Table 2.2) were asked during the interviews to investigate volunteers’ constraints and how they dealt with constraints, their perception of environmental changes, and types of their involvement.

The interviews were transcribed in Chinese but not translated into English because translation could alter the meanings of responses. The transcripts were initially coded manually and organized with Microsoft Excel software. To avoid bias, three transcripts were randomly selected and sent back and forth to those respondents to get agreement on coding. Their feedback was used to improve coding in the next step. Then, all transcripts were imported, coded, and analyzed using NVivo.
Table 2.2. The Questions in Semi-structured Interviews.

Constraints and Constraint Negotiation

- If anything, what prevents you from volunteering at Kenting National Park as often as you would like? (for active volunteers)
- Why did you quit volunteering at Kenting National Park? (for inactive volunteers)
- Assuming that some things prevent you from volunteering at Kenting National Park as often as you would like, what changes are you considering making (or have recently made) to increase the time you spend volunteering at Kenting National Park? (for active volunteers)
- If anything, in what ways have you tried to do something for Kenting National Park after you quit volunteering? (for inactive volunteers)
- Do you plan to volunteer at Kenting National Park in the future? (for inactive volunteers)

Perception of Environmental Changes

Global issues

- To your knowledge, what is global environmental change?
- What are the phenomena related to global environmental change?
- Do you believe global environmental change is an important issue facing human beings?
- Do you think your personal activities/behaviors have an effect on global environmental change? If yes, why? If not, why not?
- If anything, what have you done (or actually doing) in your daily life to mitigate the impacts of global environmental change?
- What will you do in your daily life to mitigate the impacts of global environmental change?
- What would cause you to change your behaviors in future?

Local issues

- To your knowledge, what are the phenomena at Kenting National Park related to global environmental change?
- Why do you believe these phenomena at Kenting National Park are caused by global environmental change?
- If anything, what do you think you could do to mitigate the impacts of global environmental change when you are/were volunteering at Kenting National Park?

Involvement

- When did you start volunteering at Kenting National Park?
- Could you briefly describe the frequency and seasons you volunteered at Kenting National Park?
- What specific tasks did you do when volunteering for Kenting National Park?
- Do you think your recognition of global environmental change influences your participation in volunteering at Kenting National Park? If yes, how so? If not, why not?

Results

Constraints

The results revealed that most of the constraints reported in interviews fit the leisure activity constraints categories claimed by Crawford and Godbey (1987). Table 2.3 shows the constraints
identified through the interviews and sorted into Crawford and Godbey’s a priori categories—intrapersonal, interpersonal, and structural constraints. It is not surprising that most answers are similar to leisure constraints since studies have demonstrated that volunteering could be one kind of serious leisure (Stebbins, 1992). However, some responses were unique and different from typical leisure constraints such as family support and pet concerns.

Table 2.3. Classification of Frequently Reported Constraints.

<table>
<thead>
<tr>
<th>Category</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrapersonal</td>
<td>- Health issues</td>
</tr>
<tr>
<td></td>
<td>- My age is too old</td>
</tr>
<tr>
<td></td>
<td>- I have no more interest in volunteering at Kenting</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>- Family responsibilities</td>
</tr>
<tr>
<td></td>
<td>- My family does not support</td>
</tr>
<tr>
<td></td>
<td>- Lack of companions</td>
</tr>
<tr>
<td></td>
<td>- Spending vacation with family/friends</td>
</tr>
<tr>
<td>Structural</td>
<td>- Do not have time because of work</td>
</tr>
<tr>
<td></td>
<td>- Do not have time because of examination preparation</td>
</tr>
<tr>
<td></td>
<td>- Kenting is too far away</td>
</tr>
<tr>
<td></td>
<td>- Lack of transportation to Kenting</td>
</tr>
<tr>
<td></td>
<td>- Lack of money</td>
</tr>
<tr>
<td></td>
<td>- Weather conditions</td>
</tr>
<tr>
<td></td>
<td>- Do not have time because of school classes</td>
</tr>
<tr>
<td></td>
<td>- Lack of local transportation at Kenting</td>
</tr>
</tbody>
</table>

Some volunteers mentioned that their family did not support them volunteering at Kenting National Park. This finding is different from the constraint of family responsibilities. An older volunteer, for example, mentioned that his family had safety concerns and asked him to rest rather than do something demanding during his free time. His family viewed volunteering as not only a leisure activity but also as a job. If the family cannot totally accept and understand the
volunteers’ contribution in Kenting, it could be an important constraint affecting volunteers from providing service.

Other than the frequently reported constraints, some unique responses are also notable and should be considered. For instance, a volunteer reported that taking care of his pets negatively impacted the frequency of going to Kenting. Pets are generally not considered a serious problem in regular leisure activities because typically people can arrange the length of their vacation or bring pets with them to places where pets are welcome. However, it is not a good choice to bring pets when volunteering. Volunteers cannot provide service and take care of their pets at the same time. Moreover, because it takes many hours for most volunteers to get to Kenting National Park, they prefer to schedule their service for several consecutive days. If the pets cannot be left alone at home or the volunteer cannot find someone else to take care of the pets, it is reasonable that volunteers will make a decision to stay with their pets. Though not many volunteers mentioned the same concern, there is no doubt that pets could be a constraint to volunteering. That existing scales do not include this constraint does not mean that it does not exist. On the contrary, when it comes to volunteers, pets might be a much more important constraint than other frequently cited constraints.

The results showed that there are various reasons keeping volunteers from volunteering, and some of the reasons extend beyond the traditional list of constraints. Thus, it could be a problem if fixed scales in questionnaires are used to measure the constraints. The scales in earlier research typically only included a limited number of constraint items. Some researchers have tried to use qualitative instruments such as free listing to enrich the items of constraints in leisure activities (Chick et al., 2015). In this study I also tried to look for as many volunteer constraints as possible. However, the results do not guarantee that all constraints were uncovered. Therefore, it
is important to consider how to include all possible volunteer constraints if quantitative approaches are utilized for further investigation.

Constraints Negotiation

Volunteers may attempt to increase their involvement despite encountering constraints that keep them from volunteering. Researchers have developed constraint negotiation scales to investigate how people overcome leisure constraints (Jackson et al., 1993; Jackson & Rucks, 1995; Hubbard & Mannell, 2001; Metcalf et al., 2013). Some of the scales could be applied to this study but did not entirely fit all the negotiation strategies adopted by volunteers.

Table 2.4 shows the negotiation strategies that were frequently reported in the interviews. As discussed in the earlier section, some volunteer constraints were different from typical leisure constraints; thus, it is expected the constraint negotiation strategies would be different as well. For instance, a volunteer mentioned a special job when she did not have time to volunteer on site,

"...they [the park] were going to make some educational booklets......I wondered if I can join it, and I did participate in part of editing and layout designing..." --- Volunteer C-1

She selected another way to support the national park even though it was not counted as her volunteer hours. It was a strategy to overcome constraints but also a different kind of involvement. Another volunteer had a similar response,

"There was a series of books [issued by KTNP] about activity designing......[I] helped them to promote the educational activities in many schools..." --- Volunteer C-1
### Table 2.4. Frequently Reported Volunteer Constraint Negotiation Strategies.

<table>
<thead>
<tr>
<th>Constraint Negotiation Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>- I ask the administration staff to arrange duties that I prefer.</td>
</tr>
<tr>
<td>- I select specific events that fit my interests.</td>
</tr>
<tr>
<td>- I try to improve my knowledge and skills of volunteering.</td>
</tr>
<tr>
<td>- I select volunteer assignments that fit my physical condition.</td>
</tr>
<tr>
<td>- I arrange vacations at Kenting with family/friends to coordinate my volunteer schedule.</td>
</tr>
<tr>
<td>- I carpool with other volunteers when going to Kenting.</td>
</tr>
<tr>
<td>- I try to find other volunteers to go volunteering with me.</td>
</tr>
<tr>
<td>- I arrange tours to Kenting with my family and introduce volunteer works to gain their support.</td>
</tr>
<tr>
<td>- I volunteer with volunteers in my age group.</td>
</tr>
<tr>
<td>- I arrange my volunteering in long vacations.</td>
</tr>
<tr>
<td>- I drive my own car/motorcycle/bicycle for local transportation at Kenting.</td>
</tr>
<tr>
<td>- I ask someone else to take care of my regular responsibilities when I am volunteering.</td>
</tr>
<tr>
<td>- I volunteer in specific season(s).</td>
</tr>
<tr>
<td>- I support the off-site events of Kenting that are held close to where I reside.</td>
</tr>
<tr>
<td>- I try to plan ahead so that I can have time to volunteer.</td>
</tr>
<tr>
<td>- I save up money/budget my expenses to go volunteering.</td>
</tr>
</tbody>
</table>

Some specific constraint negotiation strategies related to volunteering were also mentioned. For example, volunteers reported that they asked the administrative staff to arrange duties that they prefer. Some volunteers also mentioned that they arranged tours to Kenting National Park with family and introduced volunteer work to gain their support.

Negotiation strategies typically focus on how to deal with constraints. However, different from leisure constraints negotiation, the volunteer constraints negotiation itself could be an alternative way to get involved in volunteering (Figure 2.1.). In leisure constraints negotiation, the negotiation strategies theoretically change the degree of involvement in specific leisure activities. However, the meanings of volunteer engagement involve providing any service for the national park so volunteering on site is not the only option. There are multiple choices for
substitution as long as volunteers can provide contributions to the national park. As was mentioned previously, older volunteers can ask to arrange physically easy responsibilities as a negotiation strategy, which could be counted as involvement as well, if they were not able to do other physically demanding jobs. As a result, other types of service should be taken into consideration when determining engagement in volunteering. The measurement of volunteer involvement will be discussed in a later section.

Figure 2.1. Adjusted Conceptual Framework of Constraints and Constraints Negotiation.

Perception of Environmental Changes

Since earlier researchers (Cottrell & Graefe, 1997; Elsasser & Buerki, 2002; Kontogianni et al., 2014; Scott et al., 2008) have demonstrated the relationship between environmental issues and leisure activities, this study will extend the literature by investigating the extent to which volunteers perceived environmental changes and whether the perception of environmental changes affected their volunteer participation. Researchers have recognized the importance of utilizing different spatial, temporal, jurisdictional, and other scales when addressing the issues of environmental changes (Adger, Arnell, & Tompkins, 2005; Cash et al., 2006; Gibson et al., 2000; Wilbanks & Kates, 1999). Therefore, to examine volunteers’ perception of environmental
changes, they were asked a series of questions about what they know, what they think, and what they do with respect to both global and local environmental issues (Table 2.2). It was observed that when the first question, "What is global environmental change?" was introduced during the interviews, the first reaction from most volunteers was hesitation. It was difficult for them to define global environmental change. They did not know what "global" meant and how it was different from local environmental issues. Most of them could not clearly tell the difference between "environmental change" and "climate change" because to them the phenomena are similar. However, some volunteers did use simple sentences to explain global environmental change.

"...through the activities by humans and after people exploit environmental [resources], [it] results in the huge changes of environment..." --- Volunteer B-3

Volunteer B-1’s and B-6’s explanations of global environmental change were similar to volunteer B-3’s response. They emphasized that human factors altered the normal phenomena of nature. Interestingly, all these volunteers were classified in the high involvement sub-group. The rich experiences in volunteering might be their reason for increasing their understanding of environmental issues.

Although not every volunteer could clearly define global environmental change, all volunteers had heard terms associated with global environment change from various sources and knew that they referred to environmental issues. Figure 2.2 highlights volunteers’ responses toward environmental change. The numbers in parentheses indicate how many specific references were coded as certain nodes. The results indicated that volunteers’ major perception of environmental change was awareness of the changing phenomena in either the local or global environment. Though the questions were designed to ask about definitions, phenomena, causes,
and solutions of environmental changes, respectively, volunteers often developed answers from the phenomena they experienced or learned. If they did not exactly know how to explain what environmental change is, they might just mention the phenomena or causes instead of answering the definition. Sometimes, they mixed up the phenomena and causes of environmental changes, but that might be due to the mutual influences among the environmental issues. The causes of environmental phenomena can be complicated and difficult to identify. Furthermore, some environmental issues are controversial and can vary in space or time. Volunteers’ failure to clearly distinguish between global and local environmental issues might be because the mechanisms of environmental change are complicated. Therefore, when answering the questions about environment-related issues, they tended to combine all the issues together in a big concept of environmental changes.

Table 2.5 shows the frequency of responses related to global and local environmental issues. The volunteers knew of all these environmental issues, but they had greater ability to explain local rather than global environmental change phenomena. This might result from the courses provided in the training program because some volunteers said that the training courses were one of their information resources. To build volunteers’ interpretation abilities on site, the contents of the training program concentrate on the local resources so volunteers can easily bring up some examples when doing environmental interpretation. In contrast, the volunteers need to get the information by themselves through other resources if they want to know more about global environmental change phenomena. This might be an important consideration for the national park to balance the weights of environmental materials between global and local issues in the training program. For examining the perception of environmental change, volunteers’ responses in this study could provide an initial criterion to create measurement scales.
The volunteers participating in this study were also asked if their recognition of global environmental changes influenced their participation in volunteering in Kenting National Park. Only 10 out of the 22 interviewees admitted that perceived environmental changes did affect their participation. This fairly weak connection between perceived environmental changes and volunteer involvement may be because this result is only based on self-reports in a qualitative
study. Nevertheless, four out of the six high-involved volunteers said yes to this question. They expressed a strong willingness to provide information and educate visitors on how to protect the environment. One of them even used the term “convince” to describe his eagerness to conduct environmental education.

Table 2.5. Responses about Global and Local Environmental Phenomena.

<table>
<thead>
<tr>
<th>Category</th>
<th>Environmental Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Environmental Change Phenomena</td>
<td>- Sea level rise&lt;br&gt;- Biological invasions&lt;br&gt;- Loss of biological diversity&lt;br&gt;- Decreased stratospheric ozone concentrations&lt;br&gt;- Ocean acidification&lt;br&gt;- Land use change&lt;br&gt;- Climate change</td>
</tr>
<tr>
<td>Local Environmental Change Phenomena</td>
<td>- Biological invasions of White Popinac&lt;br&gt;- Coral bleaching/reduction in the marine area&lt;br&gt;- Visitors’ carrying capacity&lt;br&gt;- Coastal change resulting from construction&lt;br&gt;- Migratory bird population reduction&lt;br&gt;- Pollution by human activities&lt;br&gt;- Crab population reduction&lt;br&gt;- Extreme weather&lt;br&gt;- Land use change resulting from cultivation/construction</td>
</tr>
</tbody>
</table>

Indigenous Knowledge and Perceived Environmental Changes

Although not all the volunteers could completely explain the academic terms used to describe environmental changes, the interview results revealed that they connect the unusual phenomena of the environment with indigenous knowledge. According to the interview responses from volunteers, it was found that they prefer to link the environmental issues to their experiences in life. For instance, a volunteer mentioned,
"...we have Twenty-four Solar Terms, our traditional Chinese people was following the Twenty-four Solar Terms to do [agricultural] things, ......many [agricultural] things match fixed Solar Terms, it's the experiences accumulated for thousands of years, ......now it cannot be predicted, cannot be judged by common sense..." --- Volunteer B-5

Twenty-four Solar Terms (Table 2.6.), a traditional East Asian calendar synchronized with climate conditions, is an important rule for farmers in cultivation. It was believed to originate in the Shang dynasty (1600 B.C. - 1046 B.C.) with four Solar Terms, and then was extended to twenty-four Solar Terms in the beginning of the Qing dynasty about 1645. Residents around the Yellow River watershed in middle mainland China developed the Solar Terms from the observation of weather conditions and agricultural activities (Central Weather Bureau, 2015). For instance, the Solar Term "Awakening Insects" means that thunderstorms will start to happen and wake up the hibernating insects. It indicates the weather will be getting warmer and it is about time for farmers to begin rice cultivation.

Another volunteer mentioned that weather was now aberrant from the Solar Terms and affected agrarian activities. When he was asked whether he believes global environmental changes are important issues facing human beings, he connected this traditional knowledge and the phenomena of extreme weather and said that was the reason why he was convinced that environmental changes were happening. Awareness is one of the important factors in measuring perceived environmental changes (Semenza et al., 2008). The findings in Kenting National Park indicated that indigenous knowledge is an important way to help people understand environmental change issues.
In another example, a crucial weather phenomenon mentioned by some volunteers in Heng-Chun, where Kenting National Park is located, is strong Downhill Wind, which results from the northeast monsoon and unique terrain in southern Taiwan. The speed of Downhill Wind can reach 22.5~38.25 mph during winter but recently the duration of the wind seems to be decreasing and was not as strong as before, according to the responses by volunteers. A volunteer said,

"...the temperature in Heng-Chun is getting higher and higher; ......the Downhill Wind is blowing less in winter..." --- Volunteer B-4

She added how Downhill Wind affected local crops,

"...our Onion is delicious because of the Downhill Wind. The Downhill Wind snaps the stems of Onion so the moisture can be kept in the bulbs, which makes the Onion delicious..." --- Volunteer B-4

The connection between Downhill Wind and local crops was also discussed in earlier research (Hu, 2000). Downhill Wind has significant influences on local cash crops including Sisal Agave, Onion, and Gang-Kou Tea, also known as the "Three treasures of Heng-Chun."
Weak Downhill Wind could lower the quality of these crops. Volunteers blamed the changes of harvest on environmental changes and claimed that weak Downhill Wind was potentially caused by construction and landscape changes as well.

Another special connection to the perceived environmental changes was the traditional place name of the town. Heng-Chun, which means "forever spring" in Chinese, was named after its comfortable and spring-like weather in four seasons. However, volunteers also remarked that extreme weather in recent decades has changed the living experiences in this area. A volunteer explained why he believed the environmental changes were real,

"...in the past, Heng-Chun, according to the report [to Qing dynasty emperor] by [official] Shen Pao-chen, was like spring all the year round. But, last year, I felt four distinct seasons. It was warm in spring, hot in summer, cold in fall, and even having hail in winter. Those [phenomena] were big warnings on weather. The local old residents even said that it never happened in Heng-Chun...... I really feel that the weather is totally different here. It does happen in our surroundings, how can’t we believe it?"
--- Volunteer B-5

Additionally, it is clear that extreme weather phenomena were effective in reminding people of changes in the environment.

"What I see is the concentrated rainfall in recent years..." --- Volunteer B-1

"...the annual rainfall in Taiwan is getting higher almost every year.....in the August-8th typhoon disaster, village Siao-Lin got 2,000~3,000 mm rainfall within only three days. The [weather] changes as that is getting serious in recent years. I believe that [the phenomena] have connection with environmental changes." --- Volunteer D-1

The results indicate that indigenous knowledge and life experiences can enhance the perception of environmental changes. Volunteers commented that immediate experiences are
better than providing monotonous data when addressing environmental issues to visitors in natural interpretation. Researchers using scales to measure perceived environmental change should give careful consideration to including indigenous knowledge factors. However, indigenous knowledge varies in different countries and cultures. How to integrate indigenous knowledge into quantitative data and make the scales comparable across cultures could be a challenge in designing questionnaires.

**Volunteer Involvement**

In this study, volunteer involvement was defined as how much an individual contributes to Kenting National Park. It was not difficult to get the official records of volunteer hours from the headquarters of Kenting National Park. However, it was not clear whether the records accurately represented the involvement. In the interview responses, a volunteer answered,

“...I did what I like to do, and didn’t care how many hours I get in a year......It’s not convenient [going back to office] to register the hours…”

--- Volunteer B-6

After volunteering at the park, volunteers are required to go back to the headquarters office and fill out a document so their hours can be recorded. It takes more than an hour to travel from some spots to the office. If no special situations need to be reported to the office and the volunteers do not care whether or not the service hours are recorded, some volunteers leave without recording their hours. Therefore, the involvement of volunteers would be underestimated if solely collected from the official records.

Since the official records may not correctly reflect the contribution of volunteers, other alternative methods should be considered. A volunteer said,

“...[I would be] more concerned about ecological and environmental issues [of KTNP] ......have more ‘environmental awareness’......and [I]
mentioned them in my teaching…" --- Volunteer D-5

For Kenting National Park, the contribution of volunteers is not limited to the real hours they work at places in the park. Therefore, in this research, involvement is not limited to the visible data only. In fact, many of the interviewees mentioned various ways of expressing their concerns to Kenting National Park. Table 2.7 shows the frequency of answers of their alternative contributions.

It needs to be clarified that "introducing" did not mean that only tourism information was provided. Based on their experiences with Kenting National Park, these volunteers usually combined environmental knowledge with information in the talk. As the response quoted above illustrates, the volunteer who is a high school teacher mentioned environmental issues concerning Kenting National Park in class. It could be an alternative way for him to support the national park.

The Kenting National Park volunteers established an association for sharing information and holding events with other volunteer groups including both domestic and international associations. Being staff members in the volunteer association is not counted in the official service hours but cannot be ignored in rating their involvement. Moreover, some volunteers had opportunities to participate in public forums related to environmental topics and brought up examples in Kenting National Park. The administration occasionally encouraged volunteers to provide their photographs or paintings in the publications of Kenting National Park. All these activities made volunteers engaged and should be included in the contribution of volunteers.
Table 2.7. Frequent Responses of Alternative Contributions.

<table>
<thead>
<tr>
<th>Alternative types of contributions</th>
<th>Volunteers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce information about KTNP to friends/family</td>
<td>A-3, B-6, C-5, D-2, D-3</td>
</tr>
<tr>
<td>Introduce KTNP in other organizations/workplace</td>
<td>B-4, C-2, C-5, C-6, D-1, D-3, D-5</td>
</tr>
<tr>
<td>Support events of KTNP Volunteer Association</td>
<td>B-3, D-2, D-3</td>
</tr>
<tr>
<td>Provide opinions for KTNP-related issues in events/media</td>
<td>B-4, D-4, D-5</td>
</tr>
<tr>
<td>Join in/promote KTNP publications</td>
<td>C-1, C-6</td>
</tr>
</tbody>
</table>

In addition to the service hours at Kenting National Park, the preparation and follow-up services could be considered as part of volunteers’ contributions. Some volunteers mentioned that they prepared and reviewed interpretation materials before volunteering in order to provide better services. Several volunteers said that they sometimes maintained interaction with visitors met while volunteering. A volunteer answered in the interview,

"... some visitors inquired after the [guided] tour; some visitors sent me email later for inquiry and I replied to them..." --- Volunteer A-2

The interaction included email, letters, and even becoming a friend afterward. These contributions also increase volunteers’ involvement and should be counted in the scales.

*Direct and Indirect Contributions*

As discussed previously, constraints negotiation itself could be an alternative way to get involved in volunteering. Both the jobs and constraints negotiation strategies reported by volunteers were reviewed and classified into direct contributions and indirect contributions. The direct contributions were defined as the volunteers’ activities that are assigned by the
administration of Kenting National Park and for which the service hours can be officially recorded. According to the answers by volunteers, these direct contributions typically included being trail guides, providing services at certain locations or visitor centers, being tour guides on a bus, and supporting Kenting National Park events either on-site or off-site.

The indirect contributions were defined as the volunteers’ activities that are not officially assigned and recorded by Kenting National Park but still support the core values of the national park. Another meaning of the indirect contributions was that the activities could be alternatives for volunteers who encounter constraints to keep them from volunteering at Kenting National Park. Since constraints negotiation was investigated in this study, these alternative contributions could be good indicators of how volunteers made effort to be engaged in supporting the national park. Different kinds of reported volunteer involvement are listed in Table 2.8.
Table 2.8. The Classification of Volunteer Contributions.

<table>
<thead>
<tr>
<th>Contribution</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>- I did trail-guiding at Kenting National Park.</td>
</tr>
<tr>
<td></td>
<td>- I interpreted or provided tourism information at spots/visitor centers of</td>
</tr>
<tr>
<td></td>
<td>Kenting National Park.</td>
</tr>
<tr>
<td></td>
<td>- I supported events of Kenting National Park that were held on-site.</td>
</tr>
<tr>
<td></td>
<td>- I volunteered as a tour guide on a bus at Kenting National Park.</td>
</tr>
<tr>
<td></td>
<td>- I supported events of Kenting National Park that are held off-site.</td>
</tr>
<tr>
<td>Indirect</td>
<td>- I introduced information about Kenting National Park to my family or</td>
</tr>
<tr>
<td></td>
<td>friends.</td>
</tr>
<tr>
<td></td>
<td>- I introduced information about Kenting National Park in other organizations or work places.</td>
</tr>
<tr>
<td></td>
<td>- I supported events of the Kenting National Park Volunteer Association.</td>
</tr>
<tr>
<td></td>
<td>- I provided my opinions for related issues of Kenting National Park in events or public media.</td>
</tr>
<tr>
<td></td>
<td>- I participated in editing or promoting publications of Kenting National Park.</td>
</tr>
<tr>
<td></td>
<td>- I prepared materials before volunteering.</td>
</tr>
<tr>
<td></td>
<td>- I answered inquiries from tourists even after volunteer hours.</td>
</tr>
</tbody>
</table>

Summary

Interviews were conducted at Kenting National Park in Taiwan and analyzed qualitatively to investigate the potential factors of independent and dependent variables related to volunteer participation. The interviews were transcribed and coded and the results were analyzed to discover missing items that should be included in measurement scales.

Though most constraints of volunteering were similar to leisure constraints, other constraints were discovered because of the unique circumstances of volunteering. The volunteer constraints negotiation strategies were also slightly different from the leisure constraints negotiation strategies reported in the literature. The negotiation strategies of volunteering were not only to overcome constraints; sometimes these strategies themselves could be alternative forms of involvement.
The earlier studies measuring constraints typically developed scales with fixed items. However, the interviews revealed that constraints could be fairly diverse across the volunteers. The fixed-item scales have limitations for examining all possible factors. It would be a challenge to consider how to include all the potential factors in measuring scales and make the scales still feasible to be analyzed.

The volunteers’ major perception of environmental changes is the awareness of environmental phenomena. Though sometimes volunteers might be confused about the relationships among the environmental changes at different spatial scales or time spans, they were able to bring up environmental issues and make explanations to visitors in the national park. Furthermore, indigenous knowledge could enhance the perception of environmental changes. The environmental issues were linked to and compared with long-term experiences with the environment, which could be important indicators of perceived environmental changes.

The volunteer involvement not only included the direct services to the national park on site. Different methods to support the national park were mentioned by the volunteers and these contributions, both direct and indirect, could keep the volunteers engaged.

Limitations and Future Research

Some new perspectives evolved from the analysis of the qualitative data from interviewing volunteers in the national park. The challenge in future studies is how to convert these ideas to quantitative scales. The scales of constraints need to be open to any possible factor. Indigenous knowledge should be included in the scale, but it must consider how to make the scales comparable across different parks, countries, or cultures. Volunteers have various choices and ways to get involved, but the weights of these alternative involvements might be different.
Traditional statistical methodologies might not be enough to solve the complicated issues mentioned above. To accomplish the analysis of volunteer involvement, new quantitative procedures or tools need to be developed in the future.
REFERENCES


CHAPTER 3

The S-score: Bridging the Gap between Likert-type and Ipsative Scales

Abstract

A new algorithm, S-score, is proposed to provide an improved approach in designing quantitative scales and analyzing data. The concepts of Likert-type scales, ipsative approaches, and level of measurement are reviewed and discussed. To reduce the response biases and the defects caused by violating mathematical principles in dealing with quantitative data, the S-score approach was created by merging the advantages of Likert scales and ipsative approaches. Rather than absolute scores, the S-score carries the relative strength, which is better for delivering accurate messages regarding each response item. Instead of researcher-created scales, the scales created to fit the S-score approach are flexible to allow respondents to skip or add items but without creating difficulties in data analysis. Even if the scales in different studies are not the same, the S-score approach can transform the raw scores into standardized unitless scores to make the results comparable across people, destinations, cultures, or eras. Hypothetical data are used to show how S-scores can better explain the results of raw scores in scales. Suggestions for questionnaire design are also provided to make the scales more suitable for further S-score analysis.

Introduction

This study was inspired by data collected through interviews with individuals volunteering at Kenting National Park in Taiwan. When designing a questionnaire from the results of the interviews, it was found that existing scales did not address all phenomena. Therefore, some popular quantitative instruments will be reviewed in this article to create a better and more universal, culturally sensitive approach.
To interpret social science phenomena, such as motivations for or constraints encountered in recreation activities, researchers have tried to convert qualitative messages into quantitative measurements so that large amounts of data can be easily collected and analyzed. One of the popular approaches to making this transformation is Likert-type questions and scales (Likert, 1932). The original Likert Scale had a set of statements designed to measure individual attitudes. Later, researchers adapted the Likert Scale to develop an instrument to measure different concepts. Examples of these scales include the Leisure Motivation Scale (Beard & Ragheb, 1983) and the Volunteer Functions Inventory (Clary et al., 1992). Typically, Likert-type scales include several items with scores assigned on the bipolar continuum (i.e., agreement/disagreement or important/unimportant). Respondents are asked to rate the degree to which the statements fit their thoughts and select a score for each item. The Likert-type scores are then analyzed using statistical tools.

There is no doubt that Likert-type scales provide ready tools to facilitate data analysis (Blaikie, 2003); however, criticisms have been raised regarding the inappropriate use of Likert-type scales (Jamieson, 2004; Norman, 2010). For example, some researchers have addressed the defects of Likert-type scales and tried to develop alternative methodologies for reducing the influences of those drawbacks (Snell, 1964; Wu, 2007). One alternative proposed by Cattell (1944) is the ipsative measurement. Although Cattell did not directly focus on Likert’s technique, he was the first person to differentiate the normative approach, which analysis of Likert-type scores was typically based on. Researchers followed Cattell’s idea to develop ipsative scales with rank-ordered or forced-choice items such as the Kuder Preference Record or the Rokeach Value Survey (Bauernfeind, 1962; Kuder, 1938; Rokeach, 1973).

Ipsative scales can solve some concerns in using Likert-type scales that have been brought
up in later articles, but, unfortunately, the studies that tried to utilize both approaches failed to consider the nature of those scores. Thus, this article will reexamine Likert-type and ipsative scales and then reconnect them for broader use in social science research.

**Limitations of Existing Scales**

Semi-structured interviews were conducted at Kenting National Park of Taiwan in 2011 and 2012. The purpose of the interviews was to look for the contents of several potential variables, i.e. motivations, constraints, constraint negotiation, and perceived environmental changes, which could affect volunteer participation at the national park. Twenty-two participants with diverse backgrounds and volunteer experiences were interviewed. When trying to design questionnaires from the results of the interviews, some issues were encountered and needed to be resolved.

For example, when the motivation scales were created, some existing scales, the Volunteer Functions Inventory (VFI) (Clary et al., 1992); Volunteer Motivation Inventory (VMI) (McEwin & Jacobsen-D’Arcy, 2002); and Improved Volunteer Motivation Inventory (IVMI) (Esmond & Dunlop, 2004) were considered for inclusion in the questionnaire. The VFI contained 30 items in 6 categories and the VMI had 41 items in 11 categories. Esmond and Dunlop (2004) combined these two scales into a 70-item inventory, dropping one identical item. They then removed some items through statistical analysis to form the IVMI, which included 44 items in 10 categories. Adding new motivation items derived from the interviews to the IVMI could become a monster questionnaire. Moreover, the big scales tried to cover all possible motives that respondents might have, but not every individual had all these motives behind their rationale for becoming a volunteer. For instance, in the VMI and IVMI scales, respondents were asked to rate the importance of “volunteering will help me to find out about employment opportunities.” However, this might not be the reason for retirees to be volunteers. Hence, it was questionable to
urge respondents to answer the items that never came to their mind. Even though respondents could give those irrelevant items lower evaluation in their responses, the low scores of these items might distort the meanings of categories if the scores were summed and averaged.

Another problem in creating constraint scales was that some reasons might be unique for an individual attempting to reduce the frequency of volunteering. As one volunteer mentioned in the interview:

"I have pets to be fed, and cannot ask someone to take care of them. [Q: What kind of pets?] I have dogs, cats, snakes, and rabbits." --- Volunteer C-4

It was not a common constraint for all volunteers, but was the most important constraint for this individual. If this constraint was included in the scale, most of the other respondents would be urged to answer an irrelevant item. The item probably would get quite low scores and then be dropped from further statistical analysis. However, if the unique constraint in the quote above was not included in the scale, that volunteer would have no chance to express how important this major constraint was for him.

Obviously, existing scales are limited in their ability to explain all social phenomena. Most scales are designed with fixed items so that further statistical tests can be easily conducted. Nevertheless, for social science issues, open-ended scales with flexible items would be better to reflect respondents’ opinions correctly. The problem becomes how to make open-ended scales good for advanced statistical analysis. To address this problem, the fundamental principles of popular scale formats will first be reviewed and new ideas for analyzing scores will then be developed.
Debates about Likert-type Scales

Likert-type scales have been widely used but also questioned. One of the debates has been that the data in Likert-type scales are ordinal, not interval or ratio level data (Jamieson, 2004). However, primarily for the convenience of further quantitative analysis, researchers often treat the scores of Likert-type scales as interval data (Blaikie, 2003). The assumption is that the distances between adjacent scores are equal. In many cases, however, no matter if the Likert-type scale is based on 5-points, 7-points, or 10-points, it is not convincing that the value between score 3 and 5 is double to the value between score 3 and 4. For instance, if the score 3 to 5 is assigned to descriptions of "somewhat agree," "agree," and "extremely agree" respectively, it is not necessary to infer that the differences between levels of agreement are the same. Some exceptions such as a score of "how many days a week did you go to a park?" on a 7-point Likert-type scale could fit the interval assumption; nevertheless, most Likert-type scales are used to measure attitude, motivation, and other abstract concepts which are difficult to illustrate with a simple number.

Actually, it is not a problem if the scores of Likert-type scales are only used to produce some descriptive statistics results like frequency, median, or mode, which are appropriate for the ordinal level of measurement (Stevens, 1946). However, the Likert-type scales are presumed good enough to fit the interval level of measurement because researchers try to put these numbers into advanced statistical analysis (Blaikie, 2003). The advanced analysis might produce some fancy results to make the conclusions rich, but researchers ignore, or intentionally overlook, fundamental statistical principles.

Aside from the arguments about measurement levels, response biases in Likert-type scales have been discussed as well. At least three biases, including central tendency, social desirability,
and acquiescence bias, have been alluded to in questions about the accuracy of Likert-type scores (Bardo & Yeager, 1982; Joinson, 1999; Welkenhuysen-Gybels et al., 2003). For example, respondents might avoid answering extreme options in surveys, which leads to central tendency bias. The common views of society would result in social desirability bias, which makes respondents select options that conform to social expectation. Acquiescence bias would make respondents tend to agree or disagree with all the items in the scales. Certain methods, such as reversed wording items, have often been utilized to reduce the influences of biases, though the validity of these methods is still controversial (Wong et al., 2003; Swain et al., 2008). All these biases reflect the same concern -- variety among individuals.

Specifically, individual differences mean that the same Likert-type score does not necessarily have the same meaning to all respondents. That is to say, the meaning of respondent A’s score of 4 in a Likert-type question might differ from that of respondent B’s score of 4 in the same question even though this number was assigned a specific description such as "somewhat agree." In this case, no one can assure that respondent A’s feeling of "somewhat" is equal to respondent B’s feeling of "somewhat" if no specific and clear definition is established. But, why does it matter? It is similar to the level of measurement issues. It makes sense if only descriptive statistical interpretation is made as to "how many people answered ‘somewhat agree’ to this question?" However, as seen in numerous studies, while these scores have been employed in further parametric tests, such as regression, factor analysis, and so on, the question remains whether or not all the processes of treating the Likert-type scores are mathematically legitimate.

Some common uses of Likert-type scores include summarizing scores and calculating mean scores for advanced analysis in addressing hypotheses or making comparisons across individuals or groups. Before doing those actions, researchers should consider this: With what restrictions
can we summarize the numbers? For instance, one stone weighs 2 pounds, and another stone weighs 2 kilograms. What is the total weight if these two stones are added together? It is common sense that no one, as long as he or she had attended elementary school, would call the total 4 by simply adding the numbers 2 and 2 because these numbers are followed by different units. This logic can be extended to people: Can we summarize the scores of Likert scales responded to by different individuals?

As was mentioned earlier, if Likert-type scores refer to a specific unit like "how many days in a week," it would be fine to summarize the scores numerically. However, in the measurement of abstract concepts, if the same score answered by different individuals cannot be guaranteed to represent the same level, those scores should not be summarized because this step would be mathematically illegitimate. It is easy to explain through the stone example, if the numbers showed on scales are the same for two stones but we still cannot add the numbers together because those numbers have different units. Even though different respondents answer the same score referring to a specific description as "somewhat agree," each individual has his or her own standards to evaluate what "somewhat" means. Moreover, Lee et al. (2002) demonstrated that cultural differences would affect responses to Likert-type questions. Since the social desirability bias exists, the meaning of scores could be different across societies as well. In short, the "unit" of Likert scores is based on each respondent’s own rule.

If the "unit" of Likert-type scores differs from individual to individual, does it mean that parametric analysis cannot be utilized? Fortunately, this is not the case because if the scores with "units" can be mathematically converted to unitless scores, this restriction can be lifted and further analysis is possible. The ipsative approach proposed by Cattell (1944) opens the window for this score transformation.
Development of the Ipsative Approach

To distinguish his approach from normative measurements, the category in which Likert-type scales fall (Greer & Dunlap, 1997; Parks & Guay, 2009), Cattell (1944) created the term "ipsative" for a new approach that deals with response scores. Rather than comparing individual scores with other people within groups through the normative approach, the ipsative approach emphasizes comparison within the individual (Cattell, 1944; Bauernfeind, 1962). Cattell (1944) stated that the standard of measurements should be the same for all respondents, but also mentioned that respondents might be confused about the dimensions for answering those questions in the survey. Therefore, Cattell agreed with Stephenson’s (1936) and Burt’s (1937) viewpoint that only the respondent himself can rank his own experiences. Though Cattell did not demonstrate his viewpoint via mathematical principles, his ideas were consistent with the discussion mentioned in the last section that the "unit" of response scores only exists in each individual’s mind.

Cattell (1944) addressed two important concepts in the analysis of scores. The first one was giving standardized scores to each individual’s responses, rather than the raw scores of respondents. Another one was that scores could be ipsatively converted and then normative analysis tools could be utilized. According to Cattell, the ipsative approach is not entirely independent from the normative approach; on the contrary, the ipsative approach serves as a treatment to raw response scores in normative scales so that the ipsative scores can carry accurate information into further analysis. Cattell (1944) introduced the ipsative approach but did not engage in systematic procedures.

Researchers have cited Cattell’s article and used the ipsative concept to develop new
quantitative instruments, such as the Kuder Preference Record, the Allport-Vernon Study of Values, and so on (Bauernfeind, 1962). However, many researchers have only focused on the self-comparison aspect of the ipsative concept in designing the formats of questions but distorted Cattell’s ideas to create different scale formats. Some popular ipsative-related instruments like rank-ordered scales and forced-choice scales have been widely used (Chan & Bentler, 1993; Meade, 2004). For instance, the Kuder Preference Record, a forced-choice scale, is an inventory with 168 three-choice items designed to assess participants’ suitability for 10 fields of employment (Kuder, 1938; Zytowski, 2014). Respondents are asked to select one of the three choices for each item and the examiner then evaluates their relative levels of interest in different occupations. The Rokeach Value Survey is a rank-ordered scale used to examine instrumental and terminal values (Beatty, Kahle, Homer, & Misra, 1985; Rokeach, 1973). Respondents have to rank two sets of 18 items in the order of importance when taking the survey.

Those instruments seemingly followed the idea of "ipsative" but were fundamentally different from Cattell’s (1944) original concept. The instruments in the those studies urged respondents to make decisions in either rank-ordered or forced-choice scales; nevertheless, Cattell’s viewpoint left freedom for respondents to evaluate the items and researchers to transform the raw scores later. Actually, the two different decision-making formats of instruments have different meanings in statistics. The rank-ordered or forced-choice actions mean that respondents have to evaluate a certain option based on comparing other options. Therefore, the components of other options could affect an individual’s answer for the target option. All the options are mutually related and non-independent. On the other hand, free evaluation makes each item seem to be an independent event and the same score for different items is allowed.
Forced-choice formats of ipsative scales have been used because of advantages such as reducing the biases of Likert-type scales (Baron, 1996). However, forced-choice scales have also been criticized because some standard analytical procedures might not be entirely suitable for the scales (Closs, 1996; Dunlap & Cornwell, 1994; Hicks, 1970). Obviously, a sound and systematic method of analyzing response scores is still in the air. Therefore, after reviewing the theorems of Likert-type and ipsative scales, this study proposes a new algorithm for quantitative analysis of self-reported scores.

A New Algorithm: The S-score

First, in the proposed new algorithm, the Likert-type scale will be preserved because it is a comprehensible format for both researchers and respondents. However, the raw scores from the Likert-type questions are "meaningless" and cannot be compared across individuals because the self-reported scores of each respondent are not based on the same standard (Cattell, 1944). Thus, the second step is to introduce the ipsative concept to place the scores on the same “unit.” Bartram (1996) claimed that ipsative scores could be retrieved by subtracting the mean scores of all items but this method has two problems: a) the intervals between the ipsative scores are not equal so the concerns of measurement level still exist, and b) mathematically, subtraction cannot remove the "unit" so the individual standard differences still exist. Thus, an alternative method should be employed to deal with the transformation of scores.

While the central tendency bias can distort the results of Likert-type scales, it is also possible that strong evaluations are given to certain items by respondents if extreme scores are used. In other words, the more distance between the raw score and measures of central tendency (i.e. mean score), the more importance/unimportance individuals feel for the items. Absher and Vaske (2004) employed the idea of central tendency in their research. They used the standard
deviation of individuals’ ipsative scores to investigate the norm crystallization toward wildland fire policy. However, their results only represented the central tendency of persons responding behavior but did not locate individuals’ answers on the evaluation continuum.

To reflect the differences of strength mentioned above, standardized scores, also known as z-scores, can be an effective statistical instrument. The standard score represents both the distance and direction between the raw score and mean score of all items divided by the standard deviation (Marx & Larsen, 1986). The raw score is larger than the mean score if the standard score is positive, and a negative standard score means that the raw score is below the mean score. The absolute value of the standard score reflects how much the raw score deviates from the mean score; meanwhile, the meaning of the absolute value of the standard score is how many times the strength of standard deviation and the value can fit the interval level of measurement. Through the standard score, each item of scales can be located on the evaluation continuum with strength and direction. Furthermore, the standard score is a dimensionless quantity, which means the score is unitless. The transformation could make the absolute scores become ratio scores. Therefore, further parametric analysis can be applied to the scores across individuals without concerns of mathematically illegitimate procedures.

The last consideration is that the raw scores of different concepts cannot be standardized together even though the concepts are evaluated by the same Likert-type scales. Cattell (1944) indicated that different concepts have to be located on separate continua unless they have similar characters to be evaluated on the same stage. For instance, if the motivations and perceived environmental changes were set to be independent variables to volunteer participation, the raw scores of scales of these two variables should be standardized respectively because respondents would not have the same rule to assess concepts with nothing in common.
Since ipsative scores are widely used to indicate the scores of rank-ordered or forced-choice scales and z-scores are also widely utilized in advanced parametric analysis, and if the two concepts are to be combined to address the problems discussed earlier, a new term is needed to distinguish the transformed scores from these existing terms. Thus, the scores resulting from transforming Likert-type raw scores through the procedures described above will be called "S-scores," which represent "Standardized scores based on Self-comparison toward the Specific concepts." The general equation for the S-score is identical to the general equation for the Z-score and is

\[ S\text{-score} = \frac{x - \mu}{\sigma} \]

Where: \( x \) is the raw score of each item in a Likert-type scale responded by an individual,
\( \mu \) is the mean of raw scores of all items in a Likert-type scale responded by an individual,
\( \sigma \) is the standard deviation of raw scores of all items in a Likert-type scale responded by an individual.

Though the equation of S-scores comes from the equation of Z-scores, the meaning of S-scores is different from that of the Z-score. S-scores are standardized scores of responses within an individual, while Z-scores are usually used to represent standardized scores across individuals in a group. Therefore, the S-score highlights the ideas of “Self-comparison” and “Specific concepts.” For instance, the raw scores of motivations and constraints should be standardized separately because they are different concepts without the same standard.

The procedure of applying S-scores is shown in Figure 3.1. Because the raw scores of Likert-type scales cannot carry accurate messages from respondents and be operated on mathematically without violating fundamental principles, the S-score approach is introduced to deal with the raw scores before proceeding to further mathematical and statistical instruments.
Figure 3.1. Concept of S-Scores.

Questionnaire Design for the S-score

Traditionally, quantitative scales created by researchers are subject to the researchers’ own viewpoints. For instance, a researcher may only select some items or domains that fit their studies from existing scales (Kyle et al., 2004; Raadik et al., 2010). As mentioned earlier, researchers will not be able to anticipate all potential items unless they interview the full population. Furthermore, it does not make sense for researchers to presume that volunteers would encounter all the potential constraints and urge them to give each item an evaluation score. Therefore, the core idea in developing the S-score is to return the rights of creating scales back to respondents. The S-score is a tool to make flexible scales feasible and reasonable for analysis.

Because the core concept of the S-score is self-comparison, it is strongly suggested that specific descriptions are not assigned to each option of the item in Likert-type questions. The specific descriptions like "somewhat important," "occasionally," and "strongly disagree" are vague for respondents and researchers cannot exactly define the extent to which these descriptions mean (Figure 3.2). Therefore, why not let respondents set their standards to evaluate the items? Researchers only need to indicate the meanings of extreme options such as 1 equal to
"extremely disagree" and 7 equal to "extremely agree," and let respondents be free to create their own criteria (Figure 3.3).

With the open-ended and flexible scales, missing data will not be problematic. Vaske (2008) proposed four potential reasons for missing data to occur and claimed seven methods to deal with missing data. However, researchers can never know whether the missing data were intentionally made by respondents. If the respondents intentionally left the options blank, it probably meant that the items never came to the individuals’ mind. If so, the missing data did mean something rather than nothing. Moreover, some solutions for dealing with missing data are also questionable. For instance, both the sample means solution and group means solution replace the missing data with the means of available data. This action would overestimate the group values if the respondents actually deemed the items were not applicable for them. With the S-score approach employed, only the raw scores of answered items will be transformed. Therefore, it is suggested that a "not applicable" option should be provided to the items of scales unless the items are attitudinal with more or less degrees. The results could be distorted if the respondents are urged to give scores to the items that are never suitable for them. And of course, extra spaces are also suggested to be provided to let respondents add and rate any item applicable for them but missed in the scales (Figure 3.3). Similar designs could be seen in some existing questionnaires, for instance, the Visual Analogue Scale used in measuring patients’ pain intensity (Kliger et al., 2015) or the severity of dental fluorosis (Vieira et al., 2005). However, the S-score approach will provide new perspectives on analyzing those data.
Figure 3.2. Classic Likert-type Question Design

<table>
<thead>
<tr>
<th>Extremely Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Agree</th>
<th>Extremely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

I volunteer because volunteering provides a way for me to make new friends.

Figure 3.3. Likert-type Question Design for S-score

<table>
<thead>
<tr>
<th>Disagree</th>
<th>&lt;-------------</th>
<th>Agree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Other (please specify)

________________________

1 2 3 4 5 6 7

Application of the S-score

The purpose of creating the S-score is not only to make the parametric tests strictly obey mathematical and statistical laws, but also to make open-ended scales possible and analyzable as discussed earlier. The following hypothetical data based on reported constraints in volunteer interviews will show why S-scores are better than raw scores to explain respondents’ real reflections.

In scenarios using hypothetical data, it is assumed that respondents were asked to evaluate their constraints to being volunteers with a scale of 7-point Likert-type items, where 1 was "Extremely Unimportant" and 7 was "Extremely Important." Some frequently reported constraints from interviews with volunteers at Kenting National Park, shown in Table 3.1, are used to create the hypothetical scenarios to explain the application of S-scores.
The data in Table 3.2 show the first scenario with hypothetical scores. Raw scores are assigned to three categories, Intrapersonal, Interpersonal, and Structural constraints, with 3, 4, and 1 items, respectively. The sum and mean scores of each category are shown as well. Furthermore, S-scores are calculated through the means and standard deviation of all raw scores; meanwhile, the S-score sums and S-score means of each category are listed. For instance, the S-score of “Health issues” is -1.7554, which is calculated from the raw score of 2 subtracted from the mean of 4.25 for all raw scores and then divided by the standard deviation of 1.28. In Table 3.3, one more item, “Distance to Kenting,” with the same raw score of the existing item is added to the category of structural constraints. All the sums and means of raw scores and S-scores are re-calculated as shown.

Table 3.1. The Classification of Frequently Reported Constraints.

<table>
<thead>
<tr>
<th>Category</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrapersonal</td>
<td>- Health issues</td>
</tr>
<tr>
<td></td>
<td>- Age</td>
</tr>
<tr>
<td></td>
<td>- Lack of interest</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>- Family responsibilities</td>
</tr>
<tr>
<td></td>
<td>- Lack of family support</td>
</tr>
<tr>
<td></td>
<td>- Lack of companions</td>
</tr>
<tr>
<td></td>
<td>- Desire to spend vacation with family/friends</td>
</tr>
<tr>
<td>Structural</td>
<td>- Lack of time because of work</td>
</tr>
<tr>
<td></td>
<td>- Lack of time because of examination preparation</td>
</tr>
<tr>
<td></td>
<td>- Distance to Kenting</td>
</tr>
<tr>
<td></td>
<td>- Lack of transportation to Kenting</td>
</tr>
<tr>
<td></td>
<td>- Lack of money</td>
</tr>
<tr>
<td></td>
<td>- Weather conditions</td>
</tr>
<tr>
<td></td>
<td>- Lack of time because of school classes</td>
</tr>
<tr>
<td></td>
<td>- Lack of local transportation at Kenting</td>
</tr>
</tbody>
</table>
### Table 3.2. Scenario 1 of Hypothetical Volunteer Constraints Data.

<table>
<thead>
<tr>
<th>Items</th>
<th>Raw score</th>
<th>Raw group sum</th>
<th>Raw group mean</th>
<th>S-score</th>
<th>S-score group sum</th>
<th>S-score group mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health issues</td>
<td>2</td>
<td>11</td>
<td>3.667</td>
<td>-1.7554</td>
<td>-1.3653</td>
<td>-0.4551</td>
</tr>
<tr>
<td>Age</td>
<td>4</td>
<td>18</td>
<td>4.5</td>
<td>0.5851</td>
<td>0.5851</td>
<td>0.5851</td>
</tr>
<tr>
<td>Lack of interest</td>
<td>5</td>
<td>11</td>
<td>3.667</td>
<td>0.5851</td>
<td>0.5851</td>
<td>0.5851</td>
</tr>
<tr>
<td>Lack of time because of work</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0.5851</td>
<td>0.5851</td>
<td>0.5851</td>
</tr>
<tr>
<td>Mean</td>
<td>4.25</td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1.28</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3.3. Scenario 2 of Hypothetical Volunteer Constraints Data.

<table>
<thead>
<tr>
<th>Items</th>
<th>Raw score</th>
<th>Raw group sum</th>
<th>Raw group mean</th>
<th>S-score</th>
<th>S-score group sum</th>
<th>S-score group mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health issues</td>
<td>2</td>
<td>11</td>
<td>3.667</td>
<td>-1.9052</td>
<td>-1.6330</td>
<td>-0.5443</td>
</tr>
<tr>
<td>Age</td>
<td>4</td>
<td>18</td>
<td>4.5</td>
<td>0.5443</td>
<td>0.5443</td>
<td>0.1361</td>
</tr>
<tr>
<td>Lack of interest</td>
<td>5</td>
<td>11</td>
<td>3.667</td>
<td>0.5443</td>
<td>0.5443</td>
<td>0.1361</td>
</tr>
<tr>
<td>Lack of time because of work</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>0.5443</td>
<td>1.0887</td>
<td>0.5443</td>
</tr>
<tr>
<td>Mean</td>
<td>4.33</td>
<td>0</td>
<td></td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1.23</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The new item “Distance to Kenting” has a score of 5, which is greater than the original mean of all scores. The meaning of this addition could be a new constraint that is more important than the average of the original ones that are part of the individual’s evaluation lists. Also, this new item, when categorized as a structural constraint based on the researcher’s viewpoints or statistical tests, could raise the importance of the dimension because its score is above average and it increases the number of items in the dimension. What kind of scores can really reflect the changes?

Means are usually used to indicate the strength of group items. However, both raw means of category “Structural” constraints in Table 3.3 stay at 5 in Table 3.2, which obviously cannot reflect the items and importance increase in different scenarios. The raw sums probably could explain the increase since the sums go up from 5 to 10. However, this leaves two questions. First, the importance of structural constraints has increased, which implies that the importance of intrapersonal constraints or interpersonal constraints has relatively decreased. Nevertheless, the raw sums of category “Intrapersonal” or “Interpersonal” constraints themselves cannot show the shifts. Second, it is questionable whether the strength of motivation would be doubled if the number of constraints doubled. As a new constraint having similar factors with existing constraints emerges, the marginal effects of this new motive could be less than the previous constraints because they already have some characteristic in common. In the example of scenario 2, the remote distance to volunteering sites could also be one of the reasons causing “Lack of time.” The idea of marginal utility in economics could be employed in the scenarios. When the number of constraints keeps increasing, the strength of each constraint would not necessarily increase with arithmetic progression. The law of diminishing marginal utility suggests that the marginal utility would decrease as the supply of particular items increases (McConnell et al.,
Therefore, the raw sums might not be the best choice to explain the differences. However, the S-scores could provide the solution.

S-scores were developed through the concept of ipsative, or so-called self-comparison. Thus, rather than absolute raw scores, S-scores are relative scores within an individual that are able to reflect the relationships among the items in scales. As the new item “Distance to Kenting” is added to the scenario in Table 3.3, the S-scores of all items are changed accordingly. The S-score sums of category “Intrapersonal” or “Interpersonal” constraints decrease since the importance is relatively increased in the category “Structural” constraints. Moreover, the S-score sum of structural constraints also increases to reflect the addition of an above average raw score and the increased number of items in the category; even so, the S-score sum goes up from 0.5851 to 1.0887 but is not doubled. To tell the diminishing marginal effects, an additional item “Lack of transportation to Kenting” with the same raw scores as “Lack of time because of work” and “Distance to Kenting” is added in Table 3.4. The increased difference of S-score sums of structural constraints between scenario 1 and 2 is 0.5026, while the increased difference between scenario 2 and 3 is cut to 0.4448. In the case where plenty of items are classified into the same category, an extreme scenario is shown in Table 3.5, where 10 items with the same score are added to structural constraints. The S-score sums go up significantly but not ten times the S-score sum of scenario 1. The increasing of group effects slows down when more items are added to the specific category. Therefore, S-score sums will better explain the phenomena of diminishing marginal utility.
### Table 3.4. Scenario 3 of Hypothetical Volunteer Constraints Data.

<table>
<thead>
<tr>
<th>Items</th>
<th>Raw score</th>
<th>Raw group sum</th>
<th>Raw group mean</th>
<th>S-score group sum</th>
<th>S-score group mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health issues</td>
<td>2</td>
<td></td>
<td></td>
<td>-2.0447</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>4</td>
<td></td>
<td></td>
<td>-0.3408</td>
<td></td>
</tr>
<tr>
<td>Lack of interest</td>
<td>5</td>
<td>11</td>
<td>3.667</td>
<td>0.5112</td>
<td>-1.8743</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.6248</td>
</tr>
<tr>
<td>Family responsibilities</td>
<td>3</td>
<td></td>
<td></td>
<td>-1.1927</td>
<td></td>
</tr>
<tr>
<td>Lack of family support</td>
<td>4</td>
<td></td>
<td></td>
<td>-0.3408</td>
<td></td>
</tr>
<tr>
<td>Lack of companions</td>
<td>6</td>
<td></td>
<td></td>
<td>1.3631</td>
<td></td>
</tr>
<tr>
<td>Desire to spend vacation with family/friends</td>
<td>5</td>
<td>18</td>
<td>4.5</td>
<td>0.5112</td>
<td>0.3408</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0852</td>
</tr>
<tr>
<td>Lack of time because of work</td>
<td>5</td>
<td></td>
<td></td>
<td>0.5112</td>
<td></td>
</tr>
<tr>
<td>Distance to Kenting</td>
<td>5</td>
<td></td>
<td></td>
<td>0.5112</td>
<td></td>
</tr>
<tr>
<td>Lack of transportation to Kenting</td>
<td>5</td>
<td>15</td>
<td>5</td>
<td>0.5112</td>
<td>1.5335</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.5112</td>
</tr>
</tbody>
</table>

| Mean                                 | 4.4       | 0             | 1.5335         | 0.5112            |                    |

| SD                                   | 1.17      | 1             |                |                   |                    |

As mentioned earlier, raw means of group items are widely utilized in parametric analysis but are not adequate to tell the increase of items and importance in a category. But how about the S-score means? Interestingly, the S-score means also cannot tell the changes of strength among groups. When the above average same-score items are gradually added as shown in Tables 3.2, 3.3, and 3.4, the S-score means of structural constraints go down. Actually, it is observed that all the S-score means of three constraints categories decrease at the same time. It does not make sense since an above-average item is added to the scale. The key point is the defects of calculating mean scores. Mathematically, the step of averaging scores is to get a single indicator to represent a specific group; however, this action also would make the weight of the number of items be overlooked. If the categories are fixed and include the same number of items, the mean score of each category would be a fair comparison. However, if the number of items in each
category is uneven, the mean scores become highly questionable comparisons. This not only happens in S-score means, but the raw means have the same drawbacks. In the hypothetical data shown in Tables 3.2 to 3.5, no matter how many same-score items are added to structural constraints, the raw means of all constraints categories are fixed and cannot reflect the weights of increasing items. Those results are not consistent with experiential circumstances. Therefore, it requires careful interpretation when the averaging procedure is used in parametric analysis.

Table 3.5. Scenario 4 of Hypothetical Volunteer Constraints Data.

<table>
<thead>
<tr>
<th>Items</th>
<th>Raw score</th>
<th>Raw group sum</th>
<th>Raw group mean</th>
<th>S-score</th>
<th>S-score group sum</th>
<th>S-score group mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health issues</td>
<td>2</td>
<td></td>
<td></td>
<td>-2.8418</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>4</td>
<td></td>
<td></td>
<td>-0.6947</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of interest</td>
<td>5</td>
<td>11</td>
<td>3.667</td>
<td>0.3789</td>
<td>-3.1575</td>
<td>-1.0525</td>
</tr>
<tr>
<td>Family responsibilities</td>
<td>3</td>
<td></td>
<td></td>
<td>-1.7682</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of family support</td>
<td>4</td>
<td></td>
<td></td>
<td>-0.6947</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of companions</td>
<td>6</td>
<td></td>
<td></td>
<td>1.4525</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desire to spend vacation with</td>
<td>5</td>
<td>18</td>
<td>4.5</td>
<td>0.3789</td>
<td>-0.6315</td>
<td>-0.1579</td>
</tr>
<tr>
<td>family/friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of time because of work</td>
<td>5</td>
<td></td>
<td></td>
<td>0.3789</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance to Kenting</td>
<td>5</td>
<td></td>
<td></td>
<td>0.3789</td>
<td></td>
<td></td>
</tr>
<tr>
<td>...... (7 more items)</td>
<td></td>
<td></td>
<td></td>
<td>......</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather conditions</td>
<td>5</td>
<td>50</td>
<td>5</td>
<td>0.3789</td>
<td>3.7891</td>
<td>0.3789</td>
</tr>
<tr>
<td>Mean</td>
<td>4.65</td>
<td>50</td>
<td>5</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>0.93</td>
<td></td>
<td></td>
<td>1</td>
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</tr>
</tbody>
</table>

After the raw scores and S-scores with their sums and means are examined, the S-score sums will be the best method to explain the changes among categories in scales. Particularly if the scales are designed as open-ended formats with flexible items, the S-score will be the
optimum instrument to be applied for further parametric analysis. S-score sums will better represent group values instead of other indicators if the items are categorized into several subgroups.

**Features of the S-score Approach**

When quantitative questionnaires are designed and S-scores are expected to be utilized for further analysis, some features of S-score scales should be understood to make sure the results are interpreted correctly.

The S-score attempts to make the Likert-type scores carry accurate messages, which is the baseline of converting qualitative results into quantitative measurements. Furthermore, none of the message will be lost through S-score scales even though some items may have to be dropped for statistical convenience. In scenario 1 (Table 3.2), structural constraints would probably be removed from the model in further parametric analysis because only a single item is included. The items in other categories might also be deleted if the Cronbach’s Alpha Reliability Coefficients need to be improved. In classic quantitative tools, removing items means that the messages carried in the scores would be deleted as well. However, S-scores carry messages of relative strength. For instance, even though a unique and strong item is dropped, the S-scores of remaining items will still maintain the messages that their strengths are relatively lower than the removed item.

Applied to the Likert-type questions, the S-scores are standardized scores of each individual’s own responses so most scales are comparable regardless of the attribute differences. For instance, the number of options dependent on researchers’ decisions in Likert-type questions might vary even when the same scales are used in different studies. Specifically, 5-point, 6-point,
or 7-point Likert-type questions can be utilized in the same VFI motivation scale (Clary et al., 1992), but, obviously, the same score of 4 has different meanings in those questions with different numbers of options. The standardized scores through the S-score approach can convert the raw scores to express the relative strength of each response and put different scale formats on the same stage.

Furthermore, the S-score approach can be utilized with scales at different times. In the interviews with volunteers, the sources that made volunteers perceive environmental changes was one of the factors considered. In addition to personal experiences, many interviewees reported that various media were important information sources. It is not surprising that newspapers, magazines, TV programs, e-newsletters, and Internet networks were popular responses to that question. However, if longitudinal studies were conducted, the media types in scales of information resources could be quite different. For instance, social media would not be an option if the research was conducted 20 years ago. Paper-based newspapers and magazines may no longer exist 20 years from now. Since TV is a long-lasting popular medium, an individual participating in the longitudinal research might report the same high score on TV programs for information sources over time. In this case, the raw score cannot reflect the changes of media types in certain eras and it is difficult to tell if the importance of TV programs is really unchanged. However, the S-scores on TV programs can indicate its relative strength among other information sources for an individual regardless of how many or what media types existed in those eras. Therefore, S-scores will make cross-destination, cross-culture, or cross-era scales comparable even though the items of scales are not all the same.

Because the S-score represents the relative strength of evaluation, researchers should be careful when interpreting the meanings of results. They should always keep the following notes
in mind:

- Unless explicit units are assigned to the options of items, Likert-type raw scores theoretically should not be compared across individuals because the standards of evaluation are different from person to person.

- An S-score is not equal to an ipsative score; the S-score approach only uses the concept of the ipsative approach to deal with the Likert-type raw scores;

- The S-score approach is not a stand-alone scale format. S-scores are typically transformed from the Likert-type raw scores;

- The S-score shows how strong the item is among all the items answered in the scale, but is not an absolute measure of strength.

Summary and Future Research

In the development of leisure research, it was found that the many existing scales had become too large for respondents to comfortably fill out. Moreover, since the responses of each individual could vary, it was not reasonable to urge respondents to answer something irrelevant to them or lose opportunities for expressing something important for them in fixed scales created by researchers. Thus, this study tried to enable respondents to answer only the items that are important for them; in other words, respondents can create their own scales. Nevertheless, how to analyze open-ended scales and make sure the scores of scales carry accurate messages is challenging. The popular scale formats of Likert-type and ipsative approaches were reviewed to determine weaknesses of those approaches and to see if an algorithm that eliminated those weaknesses could be created.
A new standardized score – the S-score – which carries accurate messages and preserves the format of Likert-type scales and the concept of the ipsative approach was developed to transform raw Likert-type scores into new indicators based on self-comparison toward specific concepts. The S-score indicates the relative strength of all items in the scale and solves the disputation associated with further parametric analysis.

Hypothetical data were used to express how S-scores could explain the results of scales. The S-score sums are the best indicators for representing the differences and changes among categories of scales over raw values and S-score means. Not only the evaluation of each item but also the number of items in a category can be weighted by the S-score sums. Therefore, the S-score makes flexible open-ended scales possible and analyzable.

The features of S-scores summarize the merits of this new idea of score transformation: respondent-oriented scales are possible, no messages are lost if items are dropped, results are not distorted by missing data, better indicators are available for categories with uneven items, and comparison among different scales is feasible. Some suggestions for questionnaire design and free-listing options were also provided.

Though it is strongly suggested that researchers should create scales that are suitable for the S-score approach, it is also recommended that they should re-analyze the data of existing scales by S-scores because the effects of biases produced by Likert-type scales could be reduced by transforming individuals’ raw scores into standardized S-scores. Note that the S-score approach will not totally substitute for traditional data analysis instruments but can be a complementary tool to make results more complete. Comparing the effectiveness between classical and S-score approaches should be pursued in future studies.
REFERENCES


Esmond, J., & Dunlop, P. (2004). *Developing the volunteer motivation inventory to assess the underlying motivational drives of volunteers in Western Australia.* Australia: CLAN WA Inc.


CHAPTER 4

The Shifts of National Park Volunteer Motivation: A Dynamic Evaluation Matrix

Abstract

Responses to semi-structured interviews conducted at Kenting National Park in Taiwan revealed that volunteer motivations change over time. The initial motivations important for individuals to participate in the volunteer program differed from current motivations as reasons for volunteers to stay involved. The concepts of the Boston Consulting Group matrix in management science were adapted to develop a Volunteer Motivation-Change Evaluation matrix to examine the dynamic shifts of volunteers’ motives. The results showed that the strengths of the volunteer program at Kenting National Park focus on keeping volunteers through protection, social interaction, and reciprocity factors. The program was attractive to volunteers based on their motivations to learn, which declined in importance over time, while their motivation to escape increased. Moreover, volunteers who were motivated by self-esteem might be lost because the results indicated that this was not an outcome of the program. Through the analysis of volunteer motivation changes, the strengths and weaknesses of the volunteer program can be evaluated and improved. The evaluation matrix could be a useful instrument for national parks to review their volunteer programs and then allocate their resources to maximize the performance of programs.

Introduction

As the numbers of tourists increase, many national parks have introduced volunteer programs to expand their capacity to provide services. People who are willing to engage in the legacy of protecting parks have the opportunity to support them. For the sake of dealing with budget cuts, volunteer programs offer a cost-effective alternative for the parks (Brudney &
Duncombe, 1992). However, to maintain high quality services, volunteers need to be trained before their jobs are assigned. The cost of a volunteer training program is a considerable investment for national parks. Even when the volunteers are on duty, the parks still need to invest resources in operating and maintaining the volunteer program (Tacticos & Gardner, 2005). Therefore, to avoid the huge expenses entailed in recruiting and training, it is important for national park managers to know how to encourage their current volunteers to stay engaged in the volunteer program.

One of the variables to examine regarding volunteers’ involvement is their motivation for providing services. Qualitative interviews were conducted at a national park in Taiwan to investigate why volunteers participated in the volunteer program. It was found that their experiences in the volunteer program led to changes in motivations. Moreover, their motives for volunteering could be different between the beginning of their service and the present time.

Therefore, in this study I examine the results of interviews with volunteers and discuss changes in motivation. Furthermore, an instrument from business management was modified to develop a method for administrative offices of national parks to use in evaluating their volunteer programs. The strengths and weakness of the volunteer program would be revealed through investigating volunteers’ motivation changes. It is expected that the results of this study will help national parks enhance their volunteer programs in an effort to retain high quality volunteers to support the national parks’ missions.

**Literature Review**

For a long time researchers have investigated individuals’ motivation for doing non-work activities. To understand the forces of motivation, researchers have tried to classify motives into
different kinds of categories. Dann (1981) argued that tourists could be driven by pull-push motivations, including individual desires and offerings of the destination. Iso-Ahola (1979) explained the differences between intrinsic and extrinsic motivation and then defined personal-interpersonal and seeking-escape dimensions of tourism motivation in his later research (Iso-Ahola, 1989). Jamal and Lee (2003) proposed a micro-macro theory with internal psychological forces and social forces toward tourist motivations. Brown (2005) focused on vacation volunteering and developed four motivators to explain the participation purposes. Many scales were developed to measure the motivations for activities pursued in individuals’ spare time. Beard and Ragheb (1983) utilized a Likert-type scale with 48 items to evaluate psychological and sociological motives for participating in leisure activities. Recreation Experience Preference (REP) scales were used to measure the motivations for outdoor recreation activities (Manfredo et al., 1996). Molanorouzi et al. (2014) created the 40-item Physical Activity and Leisure Motivation Scale to investigate the motivations for sports and physical activity participation for adolescents and adults. These motivation scales associated with participation in leisure, recreation, or tourism activities were frequently adapted to examine volunteer participation since Stebbins (1992) proposed that the systematic pursuing of voluntary activities could be defined as serious leisure.

The volunteer motivation scales varied depending on the volunteer programs considered or research purposes. Clary et al. (1992) proposed the 30-item Volunteer Functions Inventory. Based on the Volunteer Functions Inventory, McEwin and Jacobsen-D’Arcy (2002) created the 41-item Volunteer Motivation Inventory that was extended to the 44-item Improved Volunteer Motivation Inventory by Esmond and Dunlop (2004). For specific research purposes, Farrell et al. (1998) demonstrated the Special Event Volunteer Motivation Scale with 28 items. Monga
(2006) developed another 26-item scale to measure volunteer motivations for special events. Typically, all the items in these scales were reduced into several dimensions labeled social interaction, values, escaping, career development, understanding, self-esteem, personal growth, and so on. However, most studies examining volunteer motivation only made the scales for a single point in time. That is, respondents answered the questionnaires based on their impression at that time rather than reflecting on their motivations over time.

Some longitudinal studies were conducted to investigate attitude or benefit changes of volunteer participation. Omoto and Snyder (2002) examined AIDS volunteers and found that active volunteers possessed more knowledge about safe sex, had fewer stereotypes, and were more comfortable with AIDS-related issues than potential volunteers who had not been trained. Wilson and Musick (1999) used secondary data to demonstrate the benefits of physical and mental health for volunteers in different eras. They echoed the results of previous studies (Musick, Herzog, & House, 1999; Oman, Thoresen, & McMahon, 1999) that volunteer engagement could lower mortality rates and support social interaction. Nevertheless, researchers have typically focused on the consequences of volunteering, not the shifts in volunteers’ motivation. Differences between motivations that initially influenced individuals to volunteer and the motivations these same individuals cite presently could be important information for organizations establishing strategies for recruiting and retaining volunteers.

Given that volunteer programs have been implemented in national parks, instruments in management science could be applied to help national parks in developing strategies for volunteer program operation. The Boston Consulting Group (BCG) matrix, also known as the growth–share matrix, was developed for industries to determine strategies for inputting resources for different products (Henderson, 1979). This matrix was also utilized in some studies related to
tourism or recreation. Decelle (2004) mentioned the example of Air France and suggested that
the tourism industry should use the BCG matrix to create strategies in product innovation.
Djurica (2010) claimed that a tourism destination’s portfolio should be carefully reviewed
through a BCG matrix so that the resources of marketing management could be effectively
distributed. Though the volunteer programs of national parks are not industries in tourism, the
specific motives for being volunteers could be seen as the "products" of the program. To improve
the involvement of volunteer programs, national parks should review the strength of each
motivation to understand why these motives attract volunteers or keep individuals volunteering.
In other words, the motives reported by volunteers could be useful indicators for assessing the
performance of the programs and providing information to national parks for necessary
adjustment. Therefore, the results of interviews with volunteers will be discussed below and then
integrated with the concepts of the BCG approach to create a model for evaluating the shifts of
volunteer motivation.

**BCG Matrix**

The original BCG chart was a 2x2 matrix with two axes of relative market shares and
market growth rate (Figure 4.1). The chart was divided into four quadrants based on the high or
low rate of market growth as well as high or low market share. The different products of a
company are placed in the matrix so that the company can document products trends and
determine what resources, if any, should be invested in the products. Henderson (1979) named
the four quadrants to make them more understandable:

1. Products with high growth rates and high market shares are called "Stars." Because
these products are expected to bring in revenue in the future, the company will likely
invest more resources in their star products.
2. "Cash Cows" are products with low growth rates and high market shares. These products bring in stable revenue from mature markets but may not keep growing in the future. So, the company generally makes limited investments in these products.

3. "Question Marks" include products with high growth rates and low market shares. These products do not bring in a lot of revenue because the market share is low, but their high market growth could deserve more investment. If the market shares go up in the future, these "Question Marks" products could become "Stars." However, the company has to take the risk that if the market growth rate goes down before the market shares increase, the product would become "Dogs" and reduce revenues.

4. "Dogs" are products with low growth rates and low market shares. These products cannot bring in much revenue and probably have reached the end of their life cycle. To prevent these products from depleting resources, the company often considers eliminating the products from its line.

Figure 4.1. Boston Consulting Group (BCG) Matrix.
**Sampling and Data Collection**

During 2011 and 2012, semi-structured interviews were conducted at Kenting National Park in Taiwan. According to the information provided by Kenting National Park, roughly 1,000 individuals have served as volunteers since the volunteer program was initiated in 1984. However, only 209 volunteers have provided contact information in the recent directory.

According to the guideline of grounded theory research, which is the qualitative method used in this research, Morse (1994; 2000) suggested that a sample size of 20 to 30 participants is acceptable. Therefore, I sought to interview at least 20 volunteers, which was about 10% of the volunteers in the directory.

According to the regulations of the volunteer program, individuals are required to volunteer at least 40 hours per year to retain their privileges. These individuals are referred to as “active volunteers.” To maximize the diversity of respondents, volunteers were purposively selected from the following four classifications based on their frequency of recent volunteering. To protect the privacy of participants and allow for specific quotations in the discussion, the volunteers were coded from A to D followed by numbers.

- New volunteers: Volunteers who are undergoing a training program. (code: A-n)
- Active volunteers with high involvement: Volunteers who provided services for 40 hours or more in each year for the last three years. (code: B-n)
- Active volunteers with low involvement: Volunteers who provided services in the last three years but did not reach 40 hours each year. (code: C-n)
- Inactive volunteers: Individuals who had volunteered previously but did not provide any service in the last three years. (code: D-n)

Five volunteers in each sub-group were systematically selected.
After 20 volunteers were interviewed, their characteristics were reviewed to see if more participants were needed to present a balanced, yet diverse set of interviewees. One more volunteer was recruited for both low involvement and high involvement sub-groups to increase diversity. Therefore, a total of 22 volunteers with various backgrounds and volunteer experiences were interviewed. The interviews were arranged for participants’ convenience. Thirteen volunteers were interviewed face-to-face on-site at Kenting National Park, 4 volunteers were interviewed face-to-face off-site, and 5 volunteers interviewed by phone. Interviews lasted between 25 and 65 minutes. The profiles of participants are shown in Table 4.1.

### Table 4.1. Profiles of Participants in Interviews.

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Specifics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male: 9 Female: 13</td>
</tr>
<tr>
<td>Age</td>
<td>20<del>29: 8 30</del>39: 8 40<del>49: 4 50</del>59: 1 60 or above: 1</td>
</tr>
<tr>
<td>Education</td>
<td>Vocational school: 4 College: 12 Postgraduate: 6</td>
</tr>
<tr>
<td>Current Occupation</td>
<td>Student; Teacher; Staff member of environmental organization; Insurance agent; Restaurant owner; Doctor; Personnel of technology company; Flight attendant; Personnel of Travel agency; Salesman of engineering company; Retiree</td>
</tr>
</tbody>
</table>

**Data Analysis**

The taped interviews were transcribed in Chinese and then coded using a two-phase process to avoid biases. In the first phase, the transcripts were coded manually and organized with
Microsoft Excel software. Three participants were randomly selected and their transcripts were exchanged to obtain agreement on coding. Their feedback was utilized to improve coding during the second phase, and then the transcripts were imported, coded, and analyzed with the NVivo qualitative software program.

The questions listed below were asked during the interviews to investigate volunteers’ motives and the benefit they receive from volunteering. However, because the interviews were designed to probe other variables related to volunteer involvement, the participants might also mention some things related to motivation in other questions. Those responses were coded as motivation themes and included in the discussion as well.

- Why do you volunteer at Kenting National Park?
- Is there anything in particular you want to do for Kenting National Park?
- Do you expect to receive anything from volunteering at Kenting National Park?
- What did you get from your volunteering experiences at Kenting National Park?
- What is your most memorable experience from volunteering at Kenting National Park?
- How does volunteering at Kenting National Park help you, if at all?

The questions were solely planned to inquire about individual motivations for being volunteers. Interestingly, although volunteers were not directly asked about changes over time, the responses revealed differences in motivation between the time they joined the volunteer program and the time of the interview.

**Changes of Volunteer Motivation**

The interviews revealed that volunteer experiences might determine whether the individual will continue volunteering. The feedback and interaction with visitors were repeatedly reported
when describing these memorable experiences. Some specific experiences were also mentioned in response to other questions. Here are two examples of volunteers’ responses:

“…we met visitors from Hong Kong and Macao......they inquired about particular spots and food so we brought them to visit around after hours......[we] still keep in touch...” --- Volunteer C-2

“...if they (visitors) see the list of events leaders including my name or they knew that I will participate in certain events, they will join as well......that’s the biggest encouragement for me......” --- Volunteer B-4

Volunteers also mentioned specific groups when describing these memories. Most unforgettable experiences were positive and the volunteers admitted that these experiences were strong reasons to push them to provide services. A volunteer mentioned,

“I prefer to lead [groups with] children......they are easier to influence. I mean that when telling them concepts of environmental protection, they are easier to be affected and have immediate responses. Especially [when] leading family groups, you might even notice that sometimes they would correct their parents.” --- Volunteer B-6

Especially among new recruits, an oft-repeated concern was their first-time volunteering experience. No matter whether the first-time experiences were positive or negative, volunteers said it was important in urging them to keep improving. One volunteer said,

“...[my] first location of volunteering was at Eluanbi, and I told them (visitors) that it was my first service here. I thought my interpretation was so bad because some content related to history was even corrected by visitors. But they still encouraged me a lot and gave me a big applause [at the end]. I really appreciated that they gave me big confidence in my first volunteering.” --- Volunteer A-4

In addition to providing service at Kenting National Park, volunteers’ experience in other organizations was another factor that arose in several interviews. Some volunteers mentioned
that they were volunteering in other environment-related organizations and the knowledge of environmental issues could be complementary. On the other hand, spending time volunteering for other organizations might reduce their involvement at Kenting National Park.

The motives noted above and most other motives for being a volunteer reported by the participants can be classified into categories proposed by earlier researchers. For instance, both the Volunteer Functions Inventory (Clary et al., 1992) and the Improved Volunteer Motivation Inventory (Esmond & Dunlop, 2004) included the motivation of social interaction. Respondents in this study cited a similar motivation:

"Two senior classmates in our department have been volunteers at Kenting National Park and they told me about this opportunity [to be a volunteer]......they said it was a good experience there..." --- Volunteer A-4; and D-1 had similar responses.

"I can get some different friends..." --- Volunteer C-5

"I can know some people who have same interests, and have fun together......I hope that I can be one of this team..." --- Volunteer D-3

Many volunteers also mentioned gaining knowledge, a common element of volunteer motivation scales, as a motive for being a volunteer:

"I want to improve my eloquence......[and] get more knowledge..." --- Volunteer A-1

"...[my] primary purpose is learning. Because my major is biotechnology, I want to learn more about ecology"--- Volunteer A-4

"I can attend many different courses and gain a lot of knowledge about ecology..." --- Volunteer D-5

It is not difficult to locate other statements that match categories found in existing scales. However, a noteworthy finding that emerged from the interviews was the change in volunteers’
motivation over time. Some participants mentioned that their current motivations to volunteer were different from their initial motivations. For instance, a volunteer directly queried the meaning of the question when she asked,

"What did you mean in that [motivation] question? Beginning or present?..."
--- Volunteer C-5

This issue was not anticipated during initial question design. Therefore, to understand the motivations at different times, the responses were coded as initial and current motivations in subsequent coding procedures. A participant addressed her motivation in the beginning:

"... originally I did not know what this [volunteer] program could bring to me, so I just learned everything that I could ..." --- Volunteer A-2

In response to later questions, she mentioned,

"After doing the [volunteer] jobs, I think... in the future, I may reserve part of my life for here..." --- Volunteer A-2

In fact, she knew little about volunteering before joining the volunteer program. She mentioned two reasons that originally brought her to the park. One was that a friend had been a volunteer in Kenting National Park who suggested that she volunteer; another was that the volunteer program was somewhat related to her major. However, she did not have specific expectations because she had no idea about the details of the volunteer program. After volunteering, she expressed strong words and thought that Kenting meant so much to her that she was willing to continue devoting herself to the park. Additional responses from her further reflect the changes:

"Before I came here, I did not like biology, [and] I did not want to understand the details of animals. But now I feel they are so cute whenever I see them." --- Volunteer A-2

She also talked about how her impression of Kenting had changed and said,
"I want to let other people know that Kenting does not only have those activities. I found that Kenting has many more things than I thought..." --- Volunteer A-2

The new motives, obviously different from the initial ones, had become the reasons for her to volunteer in the future.

Volunteer A-2 was not the only respondent who felt bewildered when joining the volunteer program. Another volunteer had similar thoughts at the beginning of participation:

"Actually I did not know what I would do, or what I could do." --- Volunteer C-1

Later, volunteer C-1 also observed some differences after volunteering:

"I had no specific expectation in the beginning, but I discovered some interesting inspiration when listening to the interpretation by other colleagues." --- Volunteer C-1

Volunteer A-2 and C-1 were not the minority indicating changes over time. Many other respondents reported their new motives after engaging in the volunteer program:

"I want to share the beauty of the land, [and] introduce it to my friend, to the tourists. It is the greatest fun for me. I feel that sharing is the most important thing." --- Volunteer B-4

"I have got much, got a lot [from volunteering]. And I wish to continue..." --- Volunteer A-3

"After [taking] the training courses, you may feel that it is a mission for you to tell tourists how to protect the environment here and make it sustainable." --- Volunteer C-5

However, the volunteering experiences were not always positive. Negative experiences were also mentioned:

"...I expected to understand more about Kenting and national parks......[but]"
"only got surface information, not how a national park operates..." --- Volunteer A-5

His disappointment with volunteering because it did not fit his expectations might become a reason for him to quit. However, he also mentioned positive reasons that did not arise in his initial expectations, which might become new motivations for him to continue volunteering. For instance, he highlighted a benefit from volunteering:

"Perhaps volunteer certification will be useful for me in applying to graduate school..." --- Volunteer A-5

As in the previous case, some motivation changes probably resulted from the fact that actual experiences in the volunteer program did not match the heightened expectations before participation. A respondent addressed the gaps:

"Originally I thought the [training] courses would be special and strict: however, I felt it is just so-so..... That is something different from my expectation." --- Volunteer A-4

But, he still mentioned his intention to continue volunteering:

"I have learned more about this land...... [I want] to let people know more about the environment. They will not damage [the environment] after they really know it." --- Volunteer A-4

In one last motive that emerged after volunteering, a retiree, volunteer B-2, reported that his original motivation for volunteering was to provide service and bring happiness to the tourists instead of staying at home and doing nothing. Nevertheless, he had developed another reason because the government had a policy to reward volunteers providing service of 3000 hours. He had almost reached that goal so, despite his advanced age, he said he would not stop volunteering until he received this honor.
The sentiments cited above revealed that the reasons for involvement in volunteering can change after actual participation. Therefore, instead of a simple relationship between motivation and involvement, the framework of volunteer motivation was extended, as shown in Figure 4.2. As noted, initial motivation only affects recruitment or involvement in the early period, and the real experiences could change volunteers’ motives, which in turn influences their current involvement and their willingness to continue volunteering. To examine volunteers’ motivations comprehensively, measurement scales should be designed to clearly distinguish motivations in the beginning and current phases of volunteering.

Figure 4.2. Conceptual Framework of Volunteer Motivation Changes.
Volunteer Motivation-Change Evaluation Matrix

To analyze the motivation changes of volunteers, the BCG matrix was adapted and some concepts were revised to interpret the differences. In the Volunteer Motivation-Change Evaluation matrix (Figure 4.3), the two axes are set to represent the relative strength of motivation and time periods. The relative strength of motivation reflects the extent to which the respondents indicated that motivations drove them to participate in or continue volunteering. The distinction between high and low motivation strength varies depending on the volunteer programs and research projects. Moreover, the relative motivation strength could be evaluated through either qualitative or quantitative methods. For instance, in quantitative approaches, the motivation strength might be calculated from Likert-type scales (Likert, 1932) or ipsative scales (Cattell, 1944). In qualitative approaches, the frequency and references coded for specific motives could determine the strength of motivation. The time periods in the matrix are separated into the initial and current motivations. The initial motivations were the reasons that drove individuals to participate in the volunteer program in the beginning. The current motivations were defined as why existing volunteers are still willing to provide services in the national park.

![Figure 4.3. Volunteer Motivation-Change Evaluation Matrix.](image)

<table>
<thead>
<tr>
<th>Relative Strength of Motivation</th>
<th>Initial</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Stars</td>
<td>Camels</td>
</tr>
<tr>
<td>Low</td>
<td>Question Marks</td>
<td>Twilight</td>
</tr>
</tbody>
</table>

Time Periods
The names of the four quadrants in BCG matrix and their definitions were slightly revised to explain the positioning of volunteers’ motivation: "Stars" represent initial motivations with relatively high strength. Typically, these motivations are the priority outcomes that potential volunteers expected to get from the program. Theoretically, to recruit new volunteers, national parks should keep their eyes on these motivations and invest resources accordingly to attract volunteers. "Question Marks" are initial motivations with relatively low strength. The motives located in this quadrant are not popular reasons for individuals to become volunteers. However, national parks have to determine if these motives should be important values of the volunteer program. If yes, it means that the national parks did not emphasize these features so potential volunteers with these motivations might not be attracted to apply. The current motivations with relatively high strength were named "Camels" instead of "Cash Cows" as in the original BCG matrix because cash flow is not a concern of the volunteer program. After engaging in volunteering, these volunteers have a greater sense of how the program runs and what they can expect from it. Therefore, these motives could drive current volunteers to continue involvement in the program and could provide national parks with long-term manpower. The term "Camels" is used because the motivations could be durable reasons for volunteers to stay with the program.

Although “Dogs” was used in the BCG matrix to indicate the decline of specific products, that term cannot properly describe the negative trend of motivation changes. Therefore, the term “Twilight” replaces “Dogs” to represent current motivations with relatively low strength. The motivations in this quadrant are no longer major reasons for volunteers to keep engaging. The administration should review these motivations for volunteering in the park to see if they are consistent with the values of the programs as well as the parks. If most of the motivations,
corresponding to park values fall into the "Twilight" category, the national parks should adjust their allocation of resources to improve the volunteer programs. Otherwise, the programs could consume resources without effective returns.

**Analysis of Motivation Changes**

The interview results were analyzed through the Volunteer Motivation-Change Evaluation matrix. The standard of differentiating between relatively high and low motivation strength was determined by the maximum frequency of specific responses. Ten out of the 22 participants reported that their original motives for volunteering were gaining knowledge of the park or environment. This is similar to the category "understanding," which has been identified in previous studies (Clary et al., 1992; McEwin & Jacobsen-D’Arcy, 2002). Moreover, nine out of the 22 participants mentioned that their friends or colleagues had been volunteers in Kenting, which encouraged them to participate in volunteering. This is similar to the "social" (Clary et al., 1992) or "social interaction" (Esmond & Dunlop, 2004) categories previously identified. The two motivations above were participants’ most frequently cited initial motivations. Therefore, the line between relatively high and low motivation strength was drawn based on half of the maximum response frequency (10), which therefore is a response frequency of five in this research.

Ten participants mentioned that learning was one of their original reasons to volunteer, but only eight participants indicated that they gained the knowledge they expected or would register in advanced training courses provided by the national park. This may be because, one interviewee reported, the training courses did not meet his expectation.

On the volunteer motivation evaluation matrix, the "learning knowledge" factor moved from quadrant "Stars" to "Camels," as the shift was a negative slope (Figure 4.4). The results
revealed that gaining knowledge of the park or environment was one of the primary reasons for individuals to initially volunteer and still had high influence on maintaining volunteers’ involvement. However, it seems that the design of the training courses and the program did not fulfill this motivation for some current volunteers so the strength dropped somewhat. The national park might have to review and improve the courses to prevent the "learning knowledge" motivation from dropping to the "Twilight" quadrant and keeping volunteers away.

Figure 4.4. Gaining Knowledge and Escape Motivations on Volunteer Motivation-Change Evaluation Matrix.

Another motivation, "escape," has been included in many existing motivation assessment scales. Some individuals would like to escape a boring life and forget bad feelings so they volunteer (Clary et al., 1992; McEwin & Jacobsen-D’Arcy, 2002). Only two participants reported that one of their initial motives to volunteer was leaving their routine work. However, six volunteers mentioned that volunteering in Kenting could make them feel relaxed and find balance in their life. Thus, the "escape" motivation moved from quadrant "Question Marks" to "Camels" on the evaluation matrix (Figure 4.4). Obviously, the volunteer program in Kenting can provide the environment for volunteers to find something interesting outside their regular work.
This could be an important motivation to encourage individuals to come back and volunteer for
the national park.

Two motivations related to "social interaction" are discussed separately. Friends’ previous
volunteer experiences in Kenting were important reasons for potential volunteers to know about
the program. Typically, those experiences were positive so individuals were encouraged to
volunteer. Nevertheless, word-of-mouth advertising was rarely a reason for continuing
participation. On the evaluation matrix, it was not surprising that word-of-mouth dropped from
quadrant "Stars" to "Twilight" (Figure 4.5). The national park might not need to worry about
these changes. Nevertheless, if the volunteer program could be designed for providing long-term
benefits to high involvement volunteers, the positive feedback from senior volunteers might
provide good reasons to keep junior volunteers engaged.

![Figure 4.5. Social-related Motivations on Volunteer Motivation-Change Evaluation Matrix.](image)

Another frequently reported motivation related to "social interaction" was making friends in
the volunteer program. Four participants stated that making more friends was among their
motives to join the program in the beginning. Six interviewees mentioned that they did make
good friends in the volunteer program and some particularly indicated that they prefer to volunteer with those familiar colleagues. The motivation of making friends was a slightly positive slope moving from quadrant "Question Marks" to "Camels" (Figure 4.5). It revealed that the volunteer program in Kenting provided a good atmosphere for working together but there is still room for growth.

In the Volunteer Motivation Inventory (McEwin & Jacobsen-D’Arcy, 2002) and Improved Volunteer Motivation Inventory (Esmond & Dunlop, 2004), researchers made a "reciprocity" category for volunteer motivations focused on providing services because individuals believe that they should contribute back to their community. These altruistic motivations were also reported in the interviews. Five participants mentioned that one of their initial motivations for volunteering was educating the visitors on how to protect the environment. Nine interviewees showed their intention for environmental education after engaging in volunteering. The "environmental education" motivation shifted from quadrant "Stars" to "Camels" with a positive slope on the evaluation matrix (Figure 4.6). Apparently, the volunteer program in Kenting National Park has a strong image as an environmental education organization that encourages individuals concerned about the environment to join the team. The experiences of involvement in the volunteer program also strengthened the motivations of "environmental education." This was a good message for the park since these motivations correspond to the missions of national parks.

The "self-esteem" motivation for volunteering was one of the important factors in many scales. Individuals may participate in volunteering to make themselves feel important, get a feeling of accomplishment, and receive positive feedback (Clary et al., 1992; McEwin & Jacobsen-D’Arcy, 2002; Esmond & Dunlop, 2004). However, the responses of interviews in Kenting did not reflect a strong motivation of seeking self-esteem. Only one interviewee
mentioned that looking for a sense of achievement was his initial motivation to participate in volunteering. After engaging in volunteering, three respondents reported that positive feedback from visitors or colleagues made them feel needed and delighted, which could be why they have stayed in the program. Despite the fact that three interviewees indicated self-esteem was one of their current volunteer motivations, it is still located in the quadrant of relatively low strength. On the evaluation matrix, "self-esteem" shifted from quadrant "Question Marks" to "Twilight" (Figure 4.6). This may be because the volunteer program does not invest enough resources to provide opportunities to volunteers pursuing a sense of achievement, both in the beginning and at present. Therefore, the national park might find it difficult to attract new volunteers and retain some existing volunteers who were seeking self-esteem in the volunteer program.

![Figure 4.6. Environmental Education and Self-esteem Motivations on Volunteer Motivation-Change Evaluation Matrix.](image)

The frequently reported motivations in semi-structured interviews were analyzed by the Volunteer Motivation-Change Evaluation matrix. Through the changes of volunteer motivation, the strengths and weaknesses of the program could be evaluated. According to the results, the
Kenting National Park’s volunteer program did a good job of providing volunteers with opportunities to escape, interact socially, and engage in environmental education. Therefore, the volunteers with these motivations may be more likely to continue volunteering for the Park. The program strength in providing opportunities for gaining knowledge was good, but may need to be improved because of the downward trend. Attracting and keeping volunteers seeking self-esteem was a weaknesses of the volunteer program.

The results from the Volunteer Motivation-Change Evaluation matrix can inform the national parks’ strategies, but do not take the place of national parks setting their own objectives. The specific goals of Taiwan’s national parks are likely diverse in light of their natural or cultural treasures; likewise, their volunteer programs can vary. Because of their limited resources, administrators may not be able to modify their volunteer programs to match all possible motivations. The Volunteer Motivation-Change Evaluation matrix developed in this study is therefore intended to help the national parks understand the performance of their volunteer programs so they can make strategic decisions about allocating resources to maximize the effectiveness of their programs.

**Theoretical Implications**

Motivation is a popular variable in investigating the involvement of volunteer participation. Researchers have demonstrated that different demographic characteristics have an effect on volunteers’ motivations (Burns et al., 2008; Pauline & Pauline, 2009; Shye, 2010). Even more studies have been conducted to identify the motivations that influence volunteer involvement (Farrell et al., 1998; Hallmann & Harms, 2012; Monga, 2006; Ryan et al., 2001). However, changes in volunteers’ motivation have rarely been examined. This study provides evidence of changes in motivations over time through the interviews with volunteers in Kenting National
The results extend the conceptual framework to distinguish the effects between initial motivations and current motivations on volunteer involvement. The results also indicate that, rather than solely investigating the motivations that drive individuals to volunteer initially, researchers should pay attention to the ongoing motivations of volunteers, which are crucial for national parks to maintain volunteers and reduce training costs.

**Practical Implications**

The initial motivations represent the expectations of potential volunteers in getting benefits from volunteer programs at national parks. Those expectations may affect whether individuals choose to volunteer at national parks. Nevertheless, after volunteering, volunteers have a truer sense of the merits and what they could attain from the volunteer program. Therefore, volunteers’ motivations at present might better reflect the real outcomes of the volunteer program. To investigate the shifts in motivations, the BCG matrix in management science was adapted in this study to a Volunteer Motivation-Change Evaluation matrix to address the circumstances of volunteer motivations. The strengths and weaknesses of volunteer programs to keep volunteers with specific motivations can be revealed by using the Volunteer Motivation-Change Evaluation matrix to analyze changes in motivations.

**Limitations and Future Research**

The original design of questions did not clearly differentiate initial and present volunteer motivations. The motivation differences were observed and distinguished by the coding of themes. Therefore, some vague responses that cannot be classified to initial and current motivations were eliminated from the results. If the motivations over time could be clarified in the interview questions, the results would better represent the strengths and weaknesses of the program and be easier to analyze. Moreover, this study only focuses on the motivations in the
beginning and at the present, but motivation changes could be dynamic over different periods. Further research can be conducted to track motivation changes over time.

Although the analysis in this study was qualitative, quantitative tools could be utilized with the Volunteer Motivation-Change Evaluation matrix in the future. Further, the measurement scales which incorporate Likert-type or ipsative approaches are expected to provide more information on volunteer motivation changes. In addition, the differentiation of initial and current motivations should be included in the questionnaire design so respondents can provide more complete messages for analysis in future research.
REFERENCES


CHAPTER 5

Summary, Conclusions, and Implications

This study started with the purpose of investigating the variables that affect volunteer involvement in a national park. The preliminary conceptual framework was composed of potential independent variables including motivations, constraints, constraints negotiation, and perceived environmental changes as well as the dependent variable, volunteer involvement. After relevant literatures were reviewed, semi-structured interviews with volunteers were conducted at Kenting National Park in Taiwan. The results of interviews were transcribed, coded, and analyzed through NVivo software.

Responses to the interviews were quite diverse and the existing measurement scales were not inclusive. For example, the findings related to constraints, constraints negotiation, perceived environmental changes, and volunteer involvement were discussed in Chapter 2. To solve the problem of including potential factors associated with certain variables, the popular formats of Likert-type and ipsative scales were reviewed and criticized for violating basic principles in mathematics and statistics. A new approach, the S-score, was proposed to carry correct messages in quantitative responses and make open-ended scales possible and comparable. The features of the S-score and suggestions for its application were discussed in Chapter 3.

It was found that volunteer motivations changed between the beginning and current engagement in volunteering. These changes can be used as indicators to evaluate the performance of volunteer programs. The concepts of the BCG matrix in management science were adapted to create a Volunteer Motivation-Change Evaluation matrix for analyzing the strengths and weaknesses of volunteer programs. The practical uses and future applications of the evaluation matrix were discussed in Chapter 4.
Theoretical Implications

Diverse Factors for Volunteer Involvement

Compared to positive forces such as motivations for volunteering, constraints are forces that keep volunteers from engaging (Carroll & Alexandris, 1997). The majority of constraints reported in this study fit the categories claimed by Crawford and Godbey (1987). However, some new constraints, such as family supports and pets concerns, were mentioned as concerns for on-site volunteering. These particular constraints should be considered in future measurement scales. Moreover, volunteers develop constraint negotiation strategies to overcome the constraints when they are willing to continue volunteering. Though studies have previously classified negotiation strategies (Jackson et al., 1993; Jackson & Rucks, 1995), they have also demonstrated that negotiation strategies can be mediators between motivation and participation (Son et al., 2008). The responses in this study showed that negotiation strategies were used for more than overcoming constraints. Volunteers’ negotiation strategies can be counted as alternative forms of involvement because volunteering for the national park was not limited to personally serving on-site.

Interview participants’ responses indicated that it was difficult for them to clearly explain the relationships between global and local environmental issues because the mechanisms of environmental changes can be complicated. The awareness of environmental phenomena was the major perception of environmental changes and volunteers tended to interpret environmental changes by connecting their indigenous knowledge to extreme weather phenomena. Some volunteers also mentioned their commitment to support environmental conservation, which demonstrated the connection between perceived environmental changes and behavior shown in past studies (Cottrell & Graefe, 1997; Kontogianni et al., 2014; Scott et al., 2008).
The interviewees’ responses revealed that the methods used in previous studies (Davis et al., 2003; Farmer & Fedor, 2004; Hager & Brudney, 2004) underestimated the actual involvements of volunteers. As a dependent variable, volunteer involvement did not only refer to the hours recorded by the national park. Volunteers sought other ways to provide services for the national park even though the participation was not officially counted. The types of support reported by volunteers can be classified into direct and indirect contributions, respectively, based on whether or not the activities are assigned and officially recorded by Kenting National Park. Therefore, for measuring volunteer involvement, both direct and indirect contributions should be included when creating measurement scales to ensure that it will not be underestimated.

Some new factors, such as the items included in the measurement scales, associated with variables related to measuring volunteer involvement were discovered from volunteers’ responses. The results also revealed that the factors influencing volunteer involvement could be diverse in different individuals, parks, countries, or cultures.

**S-score Makes Scales Flexible**

Although this study was based wholly on qualitative data and analysis, quantitative scales will and should be used in future studies. Nevertheless, how to design scales that are universal or, at least, comparable among different groups will be challenging. To meet this challenge, a new method to handle and analyze quantitative data was presented in Chapter 3. To create this new approach, the concepts of Likert-type scales (Likert, 1932), ipsative approaches (Cattell, 1944), and level of measurement (Stevens, 1946) were reviewed and discussed. The defects of popular Likert-type scales have long been debated (Bardo & Yeager, 1982; Jamieson, 2004; Joinson, 1999; Welkenhuysen-Gybel et al., 2003). The response biases and mathematically illegitimate processes make Likert-type scale results questionable. Cattell’s (1944) ipsative approach could
provide a method to mitigate the response biases in Likert-type scales but has not been properly utilized. In this study, therefore, synthesizing the advantages of Likert scales and ipsative approaches, the S-score was created as a "Standardized score based on self-comparison toward the specific concepts."

Similar to the Z-score upon which it is based, the S-score is a standard score of distance between the Likert-type raw score and mean score of all items divided by the standard deviation of raw scores responded by each individual. The analysis of hypothetical data showed that S-score sums would be the best method to explain the changes among categories in scales. The S-score approach includes the following features: a) the S-score carries the relative strength of each item among all the items responded to by an individual; b) the S-scores are standardized scores within an individual so adding or dropping items in the scales is acceptable.; and c) the S-score approach transforms the raw scores into unitless scores so cross-destination or cross-cultural scales will be comparable.

With the use of S-scores, Likert-type questions can be used but labelling specific descriptions to each option of the item is not suggested so individuals can set their own standards when evaluating items. Moreover, the Likert-type questions should be designed to let respondents have the freedom to skip or add any item in the scales. Because the S-score approach makes Likert-type scales flexible and delivers the accurate messages of respondents, it has the potential to alter the methods of analyzing quantitative data and to be widely utilized in different disciplines.

**Evaluating Volunteer Programs with Motivation Changes**

Volunteers’ responses during their interviews revealed that most motivations of volunteers
in the national park are similar to those identified in existing scales (Brown, 2005; Clary et al., 1992; Esmond & Dunlop, 2004; Manfredo et al., 1996; McEwin & Jacobsen-D’Arcy, 2002). However, earlier studies did not concentrate on the dynamic changes of motivations, which were found in this study. Shifts of volunteer motivation have rarely been focused on in the past despite the fact that some studies have been conducted to investigate the attitudes towards or benefits of changes in volunteer participation (Omoto & Snyder, 2002; Wilson & Musick, 1999). Based on volunteers’ reports, the individuals’ motives for volunteering in the beginning often differ from motivations after engaging in volunteering. Though the exact factors of motivation shifts were not clearly described in the interviews, memorable experiences encountered during volunteering unmistakably lead to changes. Additionally, personal preferences and volunteer experiences in other organizations contribute to volunteers’ decision to maintain their participation in volunteer programs. In essence, these results suggest that researchers move their focus from reasons for quitting volunteering to current motivations that better predict volunteers’ intention to stay engaged.

The Volunteer Motivation-Change Evaluation matrix was developed based on the BCG matrix (Henderson, 1979) introduced in management science. This matrix was used with responses of volunteers’ interviews to evaluate the strengths and weaknesses of the volunteer program of Kenting National Park. The results revealed that the volunteer program had strengths in providing opportunities for volunteers with motivations of escape, social interaction, and engaging in environmental education. The strength in attracting volunteers with knowledge-acquisition motivation was good but showed a downward trend for keeping volunteers over time. The volunteers with self-esteem motivations might be lost because the results indicated weaknesses of gaining self-esteem in the volunteer program.
In sum, the initial motivations for volunteering reflected the image projected by the volunteer program, which helped determine whether individuals were willing to join the team. After engaging in volunteering, the volunteers had a better understanding of what they could get from the program and new motivations to continue volunteering often emerged. Therefore, the dynamic changes of volunteer motivation might better represent the composition of the volunteer program than a static model. The results of this study indicated that, instead of only investigating individuals’ initial motivations to volunteer, researchers should distinguish motivations over time, particularly paying attention to the current motivations of volunteers, which are important to retaining the volunteers of national parks.

**Practical Implications**

National parks recruit volunteers to provide environmental interpretation and support administrative jobs in the parks. However, limited budgets make it difficult to attract and keep volunteers. This study is aimed at helping the national parks operate their volunteer programs more efficiently. The results indicate that diverse factors might influence volunteer involvement at individual parks. Moreover, organizational cultures could vary in volunteer programs across different national parks. Nonetheless, the flexibility of the theoretical tools, Volunteer Motivation-Change Evaluation matrix, and S-score approach developed in this study can be used to help facilitate the understanding of volunteer programs so diverse national parks can develop strategies to allocate their limited resources to improve volunteer programs and create programs with distinguishing characteristics.

**Limitations and Future Research**

This study started with qualitative approaches and then shifted to methodology
development. The results of qualitative interviews showed the limitations of utilizing existing quantitative scales to address motivations for volunteering. Therefore, a new approach for handling quantitative data for convincing analysis, the S-score, was developed.

Based on the results of interviews with volunteers, new formats of quantitative questionnaires will hopefully be created and the S-score approach will be introduced to investigate volunteer involvement at national parks in different parks or countries. Aside from the new scales, it is also possible to re-analyze the data of existing scales by S-scores or to adapt existing scales to fit the S-score approach and then compare the effectiveness between the classical and S-score functions.

A purpose of the S-score approach is to reduce the number of items within scales. Hence, only common items listed in the initial scales should be included on questionnaires and spaces should be left to allow respondents to add whatever items they feel are important. The selection of common items should not merely be subject to researchers’ opinions. These common items can play a role to inspire respondents adding more items in the open scales. However, though the S-score approach can solve the problem of analyzing open-scale data, determining what items should be included in the initial scales remains a crucial task requiring careful consideration in future research.

Another issue for future research regarding the S-score approach is how many items in a scale will be enough to execute the analysis. Since the S-score scales allow respondents to answer “not applicable” for those items that are not suitable for them, how to avoid too many non-answered items, which can damage the reliability of resultant scales, would also be an important consideration for further investigation.
Though the Volunteer Motivation-Change Evaluation matrix was discussed through the qualitative results in this study, the matrix could also be used with quantitative data. The measurement scales should be designed to collect more information via questionnaires in subsequent studies. The concept of S-scores should be included in questionnaires designed to improve the interpretation of the evaluation matrix. Since one of the dimensions in the Volunteer Motivation-Change Evaluation matrix is the relative strength of motivation, the S-score approach offers improved results because it focuses on the relative strength of scores rather than the absolute raw scores. Even if the motivations are not all the same in different time periods or the same raw scores are answered for both initial and current motivations, the S-scores can extract the tiny shifts of the relative strength of motivations. Therefore, the S-score approach provides a better instrument for analyzing the motivation data and mapping them on the Volunteer Motivation-Change Evaluation matrix.

In summary, this study discovered potential factors that should be included in future studies of volunteer involvement. It also introduced two new methodologies, the S-score approach and Volunteer Motivation-Change Evaluation matrix, to provide new perspectives on creating measurement scales and dealing with data. Further justification is still needed to improve the tools so they can be utilized to solve more problems in research as well as in real life.
REFERENCES


APPENDIX A

Consent Form
Informed Consent Form for Social Science Research
The Pennsylvania State University

Title of Project: Involvement of volunteering in Kenting National Park: Influence of perceived global environmental change and constraint negotiation

Principal Investigator: Chen-Wei Cheng
801 Ford Building, University Park, PA 16802.
cxc714@psu.edu, 814-321-7263

Other Investigator(s): Alan R. Graefe, Dr.

IRB #: 37445

1. **Purpose of the Study:** The purpose of this research is to investigate how perception of global environmental change and constraints influence involvement of volunteering at Kenting National Park.

2. **Procedures to be followed:** You will be asked to answer set of questions about your volunteer experiences and opinions regarding global environmental change. Your responses will be taped. If you do not feel comfortable to be taped, your responses will be written down instead.

3. **Duration/Time:** Completing the interview will take about 30 minutes.

4. **Statement of Confidentiality:** Your participation in this research is confidential. The questions do not ask for any information that would identify who the responses belong to. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared because your name is in no way linked to your responses.

5. **Right to Ask Questions:** This study is being conducted by Chen-Wei Cheng and Alan R. Graefe in the Department of Recreation, Park and Tourism Management at Penn State University. If you have questions or want to know more about the study, please contact Chen-Wei Cheng at (814) 321-7263.

6. **Voluntary Participation:** Your participation in this study is completely voluntary; you may choose not to participate, or you may quit at any time. You do not have to answer any questions you do not want to answer.
You must be 18 years of age or older to consent to take part in this research study. If you have read the information outlined above and agree to take part in this research study, please express your consent in taping or sign your name and indicate the date below. You will be given a copy of this consent form for your records.

______________________________  _____________________
Participant Signature         Date

______________________________  _____________________
Person Obtaining Consent       Date
APPENDIX B

Interview Questions

(English Version)

1. Where are you living? How much time does it take you to get to Kenting National Park?

2. When did you start volunteering at Kenting National Park?

3. Could you briefly describe your volunteer experiences, including at Kenting National Park, and with other organizations?
   3(a). Could you briefly describe the frequency and seasons you volunteered at Kenting National Park?
   3(b). What specific tasks did you do when volunteering for Kenting National Park?
   3(c). What is your most memorable experience from volunteering at Kenting National Park?
   3(d). Do you enjoy volunteering at Kenting National Park?

4. Why do you volunteer at Kenting National Park?
   4(a). Is there anything in particular you want to do for Kenting National Park?
   4(b). Do you expect to receive anything from volunteering at Kenting National Park?
   4(c). What did you get from your volunteering experiences at Kenting National Park?
   4(d). How does volunteering at Kenting National Park help you, if at all?

5A. Do you intent to increase, keep the same, or reduce the time of volunteering at Kenting National Park in the future? (for active volunteers)
   5A(a). If anything, what prevents you from volunteering at Kenting National Park as often as you would like? (for active volunteers)

5B. Why did you quit volunteering at Kenting National Park? (for inactive volunteers)

6A. Assuming that some things prevent you from volunteering at Kenting National Park as often as you would like, what changes are you considering making (or have recently made) to increase the time you spend volunteering at Kenting National Park? (for active volunteers)

6B. If anything, in what ways have you tried to do something for Kenting National Park after you quit volunteering? (for inactive volunteers)
   6B(a). Do you plan to volunteer at Kenting National Park in the future? (for inactive volunteers)

7. In your opinion, what are the important issues facing at Kenting National Park?
   7(a). In your opinion, what should be done to deal with these issues at Kenting National Park?

8. To your knowledge, what is global environmental change?
8(a). What are the phenomena related to global environmental change?

9. How did you learn about issues related to global environmental change?

10. Do you believe global environmental change is an important issue facing human beings?

11. Do you think your personal activities/behaviors have an effect on global environmental change? If yes, why? If not, why not?

11(a). If anything, what have you done (or are actually doing) in your daily life to mitigate the impacts of global environmental change?

11(b). In the future, do you intend to increase, keep the same, or reduce what you do in your daily life to mitigate the impacts of global environmental change?

11(c). What would cause you to change your behaviors in future?

12. To your knowledge, what are the phenomena at Kenting National Park related to global environmental change?

13. Why do you believe these phenomena at Kenting National Park are caused by global environmental change?

14. If anything, what do you think you could do to mitigate the impacts of global environmental change when you are/were volunteering at Kenting National Park?

15. Do you think your recognition of global environmental change influences your participation in volunteering at Kenting National Park? If yes, how so? If not, why not?

(Chinese Version)

1. 請問你家住在哪個地區? 前往墾丁國家公園大約需要多少時間?

2. 請問你從何時開始擔任墾丁國家公園的解說志工?

3. 請簡單敘述一下你的志工經歷，包括在墾丁國家公園以及其他單位。
   3(a). 請你敘述一下你到墾丁國家公園服勤的頻率以及常來服勤的季節或時間。
   3(b). 當你在墾丁國家公園服勤時，曾經做過哪些工作？
   3(c). 到現在為止，你在墾丁國家公園服勤，最難忘的解說經歷是什麼？
   3(d). 你喜愛參與墾丁國家公園的志工解說工作嗎？

4. 你參與墾丁國家公園的原因是什麼？
   4(a). 有沒有什麼是你特別想為墾丁國家公園做的事？
   4(b). 你是否期待從墾丁國家公園的志工解說工作中得到什麼？
   4(c). 如果有的話，你已經從墾丁國家公園解說志工的經驗中獲得什麼？
   4(d). 如果有的話，在墾丁國家公園擔任解說志工的經驗是否幫助你什麼？

5A. 在將來你是否要增加、減少，或保持大約相同在墾丁國家公園擔任解說志工的服勤時間？(for active volunteers)
5A(a). 有沒有任何原因讓你無法在墾丁國家公園服勤到你想達到的時數？(for active volunteers)

5B. 有什麼原因讓你停止在墾丁國家公園擔任解說志工？(for inactive volunteers)

6A. 若是有任何原因讓你無法在墾丁國家公園服勤到你想達到的時數，你打算嘗試、或是曾經作任何改變來增加你的服勤時數嗎？(for active volunteers)

6B. 在你停止擔任墾丁國家公園解說志工之後，你是否曾用何種方式給墾丁國家公園幫助或為它做過什麼事？(for inactive volunteers)

6B(a). 你是否打算將來重新回到墾丁國家公園擔任解說志工？

7. 你認為在墾丁國家公園最重要的問題或爭議是什麼？

7(a). 你認為應該採取哪些工作或手段來解決這些問題或爭議？

8. 就你所知，什麼是全球環境變遷？

8(a). 你認為有哪些現象和全球環境變遷相關？

9. 你從哪裡知道跟全球環境變遷相關的議題？

10. 你相信全球環境變遷是現在人類面對的重要議題嗎？為什麼？

11. 你認為你個人的活動或行為會對全球環境變遷造成影響嗎？如果會，為什麼？如果不會，又是為什麼？

11(a). 你曾經在日常生活中做過任何事（或現在正在做）來減緩全球環境變遷的衝擊嗎？

11(b). 在將來你是否願意在日常生活中增加、減少、或保持大約相同的行為，來減緩全球環境變遷的衝擊？為什麼？

11(c). 有哪些原因可能會改變你將來的行為或決定？

12. 就你所知，在墾丁國家公園有哪些現象和全球環境變遷相關？

13. 你為什麼會認為在墾丁國家公園發生的這些現象或議題是由全球環境變遷所造成？

14. 你認為在擔任墾丁國家公園的解說志工時，有什麼是你可以做的，來減緩全球環境變遷的衝擊？為什麼？

15. 你是否認為你對全球環境變遷的認知會影響你參與墾丁國家公園的志工解說工作？為什麼？
APPENDIX C

Approval Letter of Kenting National Park
July 25, 2011

Chen-Wei Cheng
Pennsylvania State University
801 Ford Building
University Park, PA 16802

Dear Mr. Cheng:

Please accept this letter as acknowledgement and full authorization of your research surrounding involvement of volunteering within Kenting National Park. We view your work as a vital component to our efforts in volunteer management of Interpretation Division.

Your preliminary review of existing practices has been extremely helpful in laying a foundation for the dynamic and collaborative relationship we seek to establish with our community supporters. And, your research of volunteer motivation will provide the additional resources we need to advance our efforts regarding volunteer engagement and retention.

Thank you again for your interest and effort in assisting us. Please not hesitate to contact me at +886-8-8861321 with any and all question and concerns.

Sincerely,

Tien-Ting Tseng, Director
Interpretation Division
Curriculum Vitae

Chen-Wei Cheng

Education

2016 Ph.D., Recreation, Park, and Tourism Management
The Pennsylvania State University

2002 M.S., International Business Administration
Chinese Culture University

1999 B.S., Mechanical Engineering
National Taiwan University

Research Presentations


