Research paper

An Interaction Effect of Visitor Moral Emotions and Perceived Defensible Space on Flower Picking in National Forest Recreation Areas

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【Summary】

The purpose of this study was to explore the interaction effects of visitors' moral emotions and their perception of defensible space on flower picking in national forest recreation areas. Moral emotions consist of guilt, embarrassment, and shame. Perceived defensible space is composed of perceived environmental image, traces of occupancy, and symbolic barriers. Self-reported data were collected from 237 visitors to the Kenting National Forest Recreation Area and 266 visitors to the Tengjhih National Forest Recreation Area through a questionnaire on moral emotions, perceived defensible space, and flower picking. Data were analyzed using a multiple regression analysis and slope analysis of the response functions. The results indicated an interference interaction effect of moral emotions and perceived defensible space on flower picking. Specifically, the results pointed out that visitors' moral emotions were not significantly related to flower picking if they perceived the defensible space of the area as more obvious, but their moral emotions significantly influenced flower picking if they perceived the defensible space of the area as less obvious. Perceived defensible space was not significantly related to flower picking among visitors with higher moral emotions, but the perceived defensible space significantly influenced flower picking among visitors with lower moral emotions. Implications of the results are further discussed in the study.

Key words: guilt, embarrassment, shame, environmental image, traces of occupancy, symbolic barriers.

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研究報告

森林遊樂區遊客道德情緒與防衛空間知覺交互作用對於攀折花木之影響

張樑治[1)] 陳朝圳[2,3)]

摘 要

本研究旨在探討森林遊樂區遊客道德情緒與防衛空間知覺交互作用對於攀折花木之影響。遊客道德情緒包括罪惡感、尷尬感與羞恥感；防衛空間知覺為環境形象知覺、員工出現跡象知覺與象徵性阻礙知覺。本研究使用道德情緒、防衛空間知覺與攀折花木問卷作為研究工具；採用立意取樣針對237位墾丁國家森林遊樂區遊客與266位藤枝國家森林遊樂區遊客進行問卷調查；採取多元迴歸分析與迴歸作用機制圖解析問卷資料。分析結果顯示，遊客道德情緒與防衛空間知覺將產生干擾型交互作用而影響攀折花木。本研究試圖進一步針對干擾型交互作用結果之意涵進行深入探討。

關鍵詞：罪惡感、尷尬感、羞恥感、環境形象、員工出現跡象、象徵性阻礙。

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INTRODUCTION

Managers in national forest recreation areas must regularly address the problem of visitors picking flowers and other parts of plants. While not regarded as a serious offense, this inappropriate behavior is detrimental. It damages the plants and the visual esthetics of the national forest recreation area and incurs additional expenses for the management of the area, as substantial funding must be diverted from other programs to pay for maintaining and replacing plants. Finding a successful strategy to deter this problematic behavior would decrease unnecessary expenses and improve the operational efficiency, ecological health, and visual esthetics of the area (Chang and Chen 2008). Therefore, we attempted to explore the causes of flower picking in order to design a successful prevention strategy.

Outdoor recreation research takes 2 different perspectives when studying visitors' behaviors. One subculture of cognitive psychologists advances knowledge by examining behaviors as a function of visitors' internal processes, whereas the subculture of environmental psychologists advances knowledge by studying behaviors as a function of external factors (Chang and Sung 2003). Since each of the 2 perspectives can only provide 1 side of the causes of the behaviors, we tried to integrate the 2 perspectives on visitor flower picking in order to more-comprehensively identify its causes.

A perspective of moral emotion theory

Moral emotion theory has been suggested as being a useful framework for explaining the function of internal processes regarding causes of various inappropriate behaviors. This theory holds that failing to live up to social values causes negative emotions in a person (Vélez García and Ostrosky-Solís 2006), and these negative emotions are

generally thought to inhibit the expression of morally unacceptable impulses, most notably in the areas of vandalism, aggression, and sex (Tangney et al. 1992). The relevant area for this study is vandalism, as picking flowers in a protected area is a type of vandalism (Chang and Chen 2008).

Moral emotions, as identified by Tangney et al. (1996) and Chang et al. (2008), consist of guilt, embarrassment, and shame. These emotions provide the framework for our study into the interplay between internal and external deterrents to vandalism in national parks and how park managers can most effectively utilize the visitors' own moral emotions as internal deterrents to vandalism in the form of flower picking.

In the context of this research, guilt is understood as a private experience, involving pangs from one's conscience (Tangney et al. 1996). Embarrassment and shame, however, arise primarily from a social context. A person feels embarrassed when perceiving his or her own behavior as awkward and attracting the notice of others (Parrot and Smith 1991). Shame is a deeper feeling of low self-worth, stemming from the exposure, or fear of exposure, of some transgression or shortcoming. Specifically, shame involves feelings of self-loathing prompted by fears of real or imagined criticism from others (Lutwak and Ferrari 1996). These painful, critical emotions result in direct and indirect threats to a person's sense of self-worth. In order to escape the discomfort of guilt, embarrassment, and shame and keep their self-worth intact, people tend to avoid doing morally and socially unacceptable things that elicit these emotions. It is thought, therefore, that a person's moral emotions significantly deter behaviors deemed morally and socially unacceptable.

Results of moral emotion studies have been applied to the area of outdoor recreation research, and researchers have consistently concluded that visitors' moral emotions strongly restrain vandalism (Heywood and Aas 1999, Heywood 2002, Heywood and Murdock 2002). Most recently, Chang and Chen (2008) further confirmed that visitors' moral emotions significantly affected their flower picking in a regression model. Namely, the higher the visitors' moral emotions, the lower the likelihood there is that they will break off parts of plants.

A perspective of defensible space theory

Newman (1972) proposed the defensible space theory, which is seen as a useful framework for clearly identifying the relationship between the physical environment and crime (Macdonald and Gifford 1989, Shaw and Gifford 1994, Ham-Rowbottom et al. 1999). According to the theory, the property of the physical environment is seen as less vulnerable to crime when criminals perceive the environmental features as indicative of occupants who are more likely to defend their territory. Therefore, if the features are designed well, such as acting out territorial displays and indicating occupancy, crime will be effectively deterred (Newman 1996).

Chang and Sung (2003) introduced this crime prevention approach through the design of defensible space in the area of outdoor recreation research, suggesting that visitors' perceived defensible space significantly influenced the kinds of vandalism they perpetrate. Chen (2007) confirmed that visitors' perception of defensible space was significantly related to the behavior of damaging picnic tables. Chang et al. (2008) also found that the perceived environmental image, traces of occupancy, and symbolic barriers significantly affected littering, as demonstrated in a regression model. Accordingly, it is assumed that the perceptions of these defensible space

factors might also influence flower picking in similar ways.

First, there may be a relationship between the perception of the environmental image and vandalism. Specifically, if people perceive that a setting is messy, they will more likely vandalize the area because the messy setting provides people with a false premise, namely that it is acceptable to take parts of plants, to throw trash, and to leave graffiti in the area. Based on ecological psychology, Wicker (1972) and Willems (1974) also suggested that the bad environmental image of a setting would encourage littering. Cialdini et al. (1990) further indicated that people more likely littered in an already littered setting than in a clean setting. Thus, it was inferred that the worse the visitors' perception of the environmental image is, the more likely they are to pick flowers in the environment.

The second environmental factor is perceived traces of occupancy (Newman 1972, Brown 1985). Ham-Rowbottom et al. (1999) found that an environmental cue indicating the presence or absence of occupants significantly influenced burglary. For example, dwellings that appear unoccupied would be hypothesized to increase the perceived safety of access for burglars, and burglars would therefore target dwellings that appear unoccupied. Chang et al. (2008) empirically confirmed that visitors would less likely litter if they perceived that staff members frequently walked the trails of the national forest recreation area. Based on this perspective, we assumed that perceived traces of staff presence would significantly affect flower picking.

The third environmental factor refers to perceived symbolic barriers. Newman (1972) stated that symbolic barriers are attached characteristics of a house, such as ornamentation and nameplates, which show personal property and that the owner cares about and is willing to defend it. Chang et al. (2008) further defined one of the most important symbolic barriers in national forest recreation areas as a sign which points out that the property should not be vandalized. Winter et al. (1998) and Winter et al. (2000) confirmed that signs can effectively decrease some kinds of depreciative behaviors. In other words, visitors will significantly reduce their flower picking if they see signs in the area.

In sum, visitors' moral emotions and their perception of defensible space might significantly influence flower picking. In addition, since there are, in general, interaction functions between internal processes and external factors to people's behaviors (Aronson et al. 1995), we attempted to explore whether the interaction of visitor moral emotions and perceived defensible space significantly affected flower picking behavior in order to more-comprehensively identify the causes of flower picking.

MATERIALS AND METHODS

Empirical methods were carried out in the Kenting and Tengjhih National Forest Recreation Areas in Taiwan. Details are as follows.

Study areas

The Kenting and Tengjhih National Forest Recreation Areas were selected as the study areas for 3 reasons: (1) we have good relationships with the managers in these 2 national forest recreation areas, and they and their subordinates agreed to help us with data collection; (2) signs which indicate that picking flowers is forbidden are already set up in these 2 national forest recreation areas, but a few visitors still pick flowers here (Chang and Chen 2008); and (3) a wide variety of flowers are planted in the 2 areas, some of which will

be blooming at some time during the year. This allows visitors to see flowers year round and likewise provides the opportunity for vandals to pick flowers all year long. Thus, the 2 areas should be good places to study visitor flower picking behavior.

The Kenting National Forest Recreation Area

The natural attractions of particular interest in the Kenting National Forest Recreation Area include uplifted coral reefs, stalactite-containing caves, more than 1000 types of plants, and a variety of wildlife. In addition, many species of migratory birds from northern Asia come through the area at certain times of the year. Because of these uniquely beautiful features and resources, many people like to visit the area. There were 279,557 visitors to the Kenting National Forest Recreation Area in 2006 (Forestry Bureau 2007, Tourism Bureau 2007).

The Tengjhih National Forest Recreation Area

The major attractions of the Tengjhih National Forest Recreation Area are the vast forests of planted Taiwan *Cryptomeria* and mixed stands of common *Cryptomeria* and natural broadleaf species. This forest serves as a habitat for an array of plant and wildlife species. It is also a popular birding destination and the endemic Taiwan Tit's favorite habitat. A pleasure to the eyes, the birds can frequently be sighted here. There were 119,717 visitors to the Tengjhih National Forest Recreation Area in 2006 (Forestry Bureau 2007, Tourism Bureau 2007).

Respondents

Since visitors generally dislike being interrupted while they are enjoying their trip in a national park, we only asked visitors to respond to our self-reported questionnaire when they took a break in the visitor center in order to enhance their response willingness. We went to the Kenting and Tengjhih National Forest Recreation Areas 3 times each to collect questionnaire data from December 2007 to March 2008. The data came from the questionnaire responses of 503 visitors. The respondents consisted of 274 men (54.5%) and 229 women (45.5%) with a mean age of 35.18 years (SD = 12.98). Forty-one (8.2%) had finished primary school, 105 (20.9%) of them had finished high school, 311 (61.8%) had a university degree, and 46 (9.1%) had a graduate degree. The demographic characteristics of the respondents were similar to those of respondents in Chang et al.'s (2008) study.

Questionnaire

Chang et al. (2008) indicated that visitors are less willing to respond to multiple-item sub-questionnaires than single-item sub-questionnaires because the former requires more time to complete. Also, the scores of single-item sub-questionnaires are very significantly related to those of multiple-item sub-questionnaires. Therefore, Chang and Chen's (2008) single-item sub-questionnaire based on Heywood's (2002) and Heywood and Murdock's (2002) guilt, embarrassment, and shame measurement was used to collect moral emotion data regarding flower picking. The moral emotion sub-questionnaire asked visitors to evaluate the emotions they would anticipate feeling in the context of 3 hypothetical scenarios. Generally, in a national forest recreation area, (1) I will feel guilty if I pick flowers or other parts of plants; (2) I will feel embarrassed if others see me picking flowers or other parts of plants; and (3) I will feel ashamed if I pick flowers or other parts of plants when others do not. The respondents of these 3 items were asked to evaluate the

intensity of each anticipated emotion on a 5-point scale as follows: "I will hardly feel it" (coded 1), "I will feel it a little" (coded 2), "I will definitely feel it" (coded 3), "I will strongly feel it" (coded 4), or "I will overwhelmingly feel it" (coded 5). Chang and Chen pointed out that the first item was to measure the intensity of visitors' pangs of conscience if they picked flowers or other parts of plants, the second item was to reflect how embarrassed or awkward they would feel if other people saw them picking flowers or other parts of plants, and the final item was to inquire about the degree to which they felt flower picking publicly exposed a shortcoming in their character. The sub-questionnaire had an acceptable alpha reliability coefficient of 0.84.

Chang et al.'s (2008) self-reported sub-questionnaire based on Newman's (1972) defensible space theory was used to collect perceived defensible space data. The sub-questionnaire on the perception of defensible space asked visitors to evaluate their perceptions regarding the Kenting or Tengjhih National Forest Recreation Area. The sub-questionnaire consisted of 3 items: (1) how clean is this national forest recreation area; (2) how often do staff members walk the trails of this national forest recreation area; and (3) how many signs are set up in this national forest recreation area? Respondents to these 3 items were asked to evaluate the degree of their response to each question on a 5-point scale as follows: not very (coded 1), somewhat (coded 2), quite (coded 3), very (coded 4), or extremely (coded 5). Chang et al. indicated that the first item was to measure visitors' perception of the environmental image. The second item was meant to inquire about the frequency with which they felt the staff members might show up. The final item was designed to reflect the number of signs they perceived. The sub-questionnaire had an acceptable alpha reliability coefficient of 0.83.

Flower picking was measured using Chang and Chen's (2008) self-reported sub-questionnaire according to a modification of Heywood's (2002) and Heywood and Murdock's (2002) littering item. The respondents were asked "In the future, how likely are you to pick flowers or other parts of plants in this national forest recreation area?" Answers of "hardly likely" (coded 5), "a little likely" (coded 4), "quite likely" (coded 3), "very likely" (coded 2), and "extremely likely" (coded 1) were entered on an answer sheet, which the interviewer did not see, in an attempt to minimize the social desirability bias. This measurement utilizes the concept of the behavioral intention from Ajzen's (1991) work. Ajzen indicated that people's behavioral intention was significantly related to their actual behavior, although there might be a difference between them. Grasmick et al. (1991) further pointed out that the intention measurement should be one of the better measurement approaches for vandalism studies because it might avoid the present threat effects of guilt, embarrassment, and shame. Chang and Chen (2008) supported Grasmick et al.'s perspective. Based on these previous studies, we tended to inquire about visitors' behavioral intention instead of actual behavior.

Data analysis

Since our questionnaire data came from visitors traveling to the Kenting or Tengjhih National Forest Recreation Area, we first tested the homogeneities of the variances for these 2 datasets of moral emotions, perceived defensible space, and flower picking from the 2 different national forest recreation areas in order to determine whether or not the 2 datasets should be integrated before we analyzed the interaction effects of moral emotions and

perceived defensible space on flower picking.

Multiple regression analysis has been advocated as the method of choice for testing interaction effects when independent variables are continuous (Neter et al. 1990, Aiken and West 1991). Since visitors' moral emotions, perceived defensible space, and flower picking were all defined as continuous variables in our study, we used a multiple regression analysis to examine the interaction effects of moral emotions and perceived defensible space on flower picking.

RESULTS

The results of the Levene test indicated that the homogeneities of the variances for moral emotion, perceived defensible space, and flower picking data from visitors to the Kenting or Tengjhih National Forest Recreation Area did not significantly differ at α = 0.05 (Table 1). Thus, we determined to integrate these 2 sets of data from visitors to one of the 2 national forest recreation areas.

After integrating the 2 sets of data, we found that the average scores of the moral emotions and decreasing likelihood of flower picking were high, but the average score of perceived defensible space was low, as shown by the overall mean of 12.66 for moral emotions (ranging from 3 to 15), 8.92 for perceived defensible space (ranging from 3 to 15), and 4.67 for flower picking (ranging from 1 to 5), respectively (Table 1).

The results of the multiple regression analysis indicated that visitors' moral emotions and their perception of defensible space significantly affected flower picking. Namely, the stronger the visitors' moral emotions were, the less likely they were to pick flowers, and the less obvious their perception of defensible space was, the more likely they were to pick flowers (Table 2). The results further showed that the interaction, a cross-product term of moral emotions and perceived defensible space, significantly influenced flower picking. There are 2 types of interactions, an interference effect and a reinforcement effect, which have different meanings. The interference interaction effect in this study means that visitors' flower picking will change if either moral emotions or the perceived defensible space changes while the other one remains at the same level. The reinforcement interaction effect refers to the fact that flower picking changes only when both moral emotions and perceived defensible space simultaneously change. Therefore, we attempted to further

Table 1. Testing the homogeneities of the variances for questionnaire data from 2 national forest recreation areas

Variable	*n*	M	SD	Levene test	*p* value
Moral emotions	503	12.66	2.49	0.73	0.39
Kenting	237	12.67	2.57		
Tengjhih	266	12.65	2.42		
Defensible space	503	8.92	1.73	0.25	0.62
Kenting	237	8.83	1.74		
Tengjhih	266	9.01	1.72		
Flower picking	503	4.67	0.72	2.01	0.16
Kenting	237	4.69	0.68		
Tengjhih	266	4.65	0.76		

n, size of the sample; M, mean; SD, standard deviation.

Table 2. Multiple regression analysis results of decreasing likelihood of flower picking

Variable	*n*	*F* ratio	R^2	B	*t*-value	*p* value
The model	503	75.15	0.31			
Constant				-1.58	-2.50	0.01
Moral emotions (A)				0.40	7.99	0.00
Defensible space (B)				0.56	7.84	0.00
Interaction (A×B)				-0.03	-5.93	0.00

n, size of the sample; R^2, coefficient of determination; B, regression coefficient.

analyze the type of this interaction in Table 2 to understand its function more exactly.

Based on the results of Table 2, which suggest that moral emotions (A), perceived defensible space (B), and the interaction (A×B) significantly influenced flower picking (Y), we generated equation 1. We then analyzed the response function E{Y} as a function of perceived defensible space B on lower moral emotions ($A_L = M_A - SD_A = 12.66 - 2.49 = 10.17$), medium moral emotions ($A_M = M_A = 12.66$), and higher moral emotions ($A_H = M_A + SD_A = 15.15$) in light of equation 1 in order to identify the type of the interaction.

$$E\{Y\} = -1.58 + 0.40A + 0.56B - 0.03A \times B \quad \text{.....(1)}$$

When A = 10.17, the intercept and slope of the response function were 2.49 (-1.58 + 0.40 ×10.17 = 2.49) and 0.25 (0.56 – 0.03×10.17 = 0.25); when A = 12.66, the intercept and slope were 3.48 (-1.58 + 0.40×12.66 = 3.48) and 0.18 (0.56 – 0.03×12.66 = 0.18); and when A = 15.15, the intercept and slope were 4.48 (-1.58 + 0.40×15.15 = 3.48) and 0.11 (0.56 – 0.03×15.15 = 0.11).

According to the results of calculating these 3 intercepts and slopes, we drew the conditional effect plot of lower, medium, and higher perceptions of defensible space on flower picking in Fig. 1. It revealed that there was an interference interaction effect of moral emotions and perceived defensible space

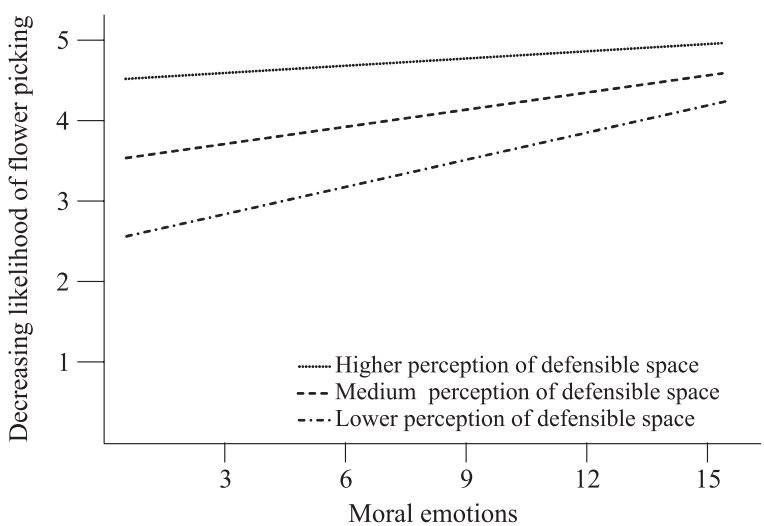

Fig. 1. Effects of moral emotions on flower picking on different levels of perceived defensible space.

on flower picking. Namely, visitors with a higher perception of defensible space were less likely to pick flowers than visitors with a medium-range perception of defensible space, and visitors with a medium-range perception of defensible space were less likely to pick flowers than visitors with a lower perception of defensible space. Also, regardless of how low visitors' moral emotions were, they were hardly likely to pick flowers when they perceived the defensible space to be higher. On the other hand, although visitors were likely to pick flowers when they perceived the defensible space to be lower, they would gradually decrease the intention of flower picking as their moral emotions gradually increased. However, if visitors had a higher perception of defensible space, their moral emotions were not related to flower picking.

DISCUSSION

This study confirmed that visitors' moral emotions significantly influenced flower picking, consistent with Grasmick et al.'s (1991), Chang and Chen's (2008), and Chang et al.'s (2008) moral research which suggested that moral emotions can deter inappropriate behaviors. The empirical results indicating that the perceived defensible space significantly affected flower picking were also consistent with Samdahl and Christensen's (1985), Ham-Rowbottom et al.'s (1999), and Chen's (2007) studies which showed that constructing a defensible space can decrease vandalism and crime. Thus, visitors' moral emotions and perceived defensible space are 2 key factors affecting flower picking.

We not only examined the relationships of visitors' moral emotions and perceived defensible space to flower picking, but also further explored the interaction effect of moral emotions and the perceived defensible space on flower picking in order to more-comprehensively identify the causes of flower picking.

The interaction between moral emotions and the perceived defensible space

Guagnano et al. (1995), Cheng (2004), and Chang et al. (2008) explored the combined effects of people's internal processes and external factors on their behaviors, although there is little reference literature showing the effects of internal processes and external factors together. They ultimately revealed that both types of influences together could more-exactly predict recycling, environmental actions, and littering than each type of influence separately.

In appearance, Guagnano et al.'s (1995), Cheng's (2004), and Chang et al.'s (2008) results seem reasonable because using 2 independent variables can more-accurately forecast a given dependent variable than any single one of them according to a perspective of regression analysis (Neter et al. 1990). However, the results do not simultaneously explain why, as cognitive psychologists state, moral emotions can significantly deter inappropriate behaviors (Tangney et al. 1992), and why, as environmental psychologists point out, vandalism and crime can almost completely be decreased by constructing defensible spaces (Newman 1996). These disparities imply that a reasonable answer has not yet been discovered.

We found a significant interference interaction effect of moral emotions and perceived defensible space on flower picking. Namely, either moral emotions or perceived defensible space could independently restrain flower picking. The finding is not only consistent with our previous hypothesis from a literature review (Chang and Sung 2003), but also further explains why both cognitive

psychologists' and environmental psychologists' standpoints are correct although seemingly in conflict. Since the finding more-exactly elaborates the causes of flower picking than previous studies, it should be more reliable.

The finding also suggests that managers in national forest recreation areas only need to design either moral persuasion or defensible space strategies to deter flower picking from the perspective of cost management. The 2 suggestions the managers can adopt are described here.

Using moral emotions as deterrents

Since visitors' moral emotions, which consist of guilt, embarrassment, and shame, significantly influence flower picking, facilitating these 3 moral emotions is important in deterring flower picking. In the case of guilt, embarrassment, and shame, the actors themselves are the sources of their own punishment through the psychological discomfort of experiencing these emotions (Tangney et al. 1992). For example, guilt may cause people to feel disgusted with themselves, embarrassment can lead to feelings of humiliation, and shame will depreciate their sense of self-worth. When people violate norms they have internalized, they risk prompting the negative effects of these moral emotions. Thus, if park managers want to reduce flower picking, they should make visitors aware that the normative behavior is not to pick flowers. Awareness of this expectation will prompt a negative experience of moral emotions in visitors who knowingly violate the norm.

In practice, park managers must tell visitors that picking flowers is a type of vandalism which damages plants, that the staff dislikes vandals who break off parts of the plants, and that visitors with environmental etiquette will not take any parts of plants. These 3 kinds of admonitions might evoke potential vandals' concern to avoid guilt, embarrassment, and shame because they would also like their behavior to be fine, not to be disgusting, and to be at least equal to that of others who have environmental etiquette.

Deterring flower picking by constructing defensible spaces

Visitors' perceived defensible space in national forest recreation areas, which is composed of perceptions of the environmental image, traces of occupancy, and signs, significantly influences flower picking. That is, visitors will be more likely to pick flowers if they feel the national forest recreation area is already messy. Their flower picking intention will become more obvious if staff members rarely walk the trails. They will be more likely to pick flowers if they hardly see signs which indicate that picking flowers is forbidden. In other words, if the managers want to deter visitor flower picking, they must first increase the indications of a defensible space of the national forest recreation area by cleaning up the environment, encouraging staff members to more frequently walk the trails, and setting up signs which indicate that picking flowers is not allowed.

However, more studies are still needed in terms of further exploring how clean the environment must be, how frequently staff members must walk the trails, and how many signs must be posted to completely deter flower picking.

Study limitations

Although empirical data showed that there was a significant interference interaction effect of moral emotions and perceived defensible space on flower picking among visitors to the Kenting or Tengjhih National Forest Recreation Area, caution is warranted in

interpreting the results generally as representing the causes of flower picking in national forest recreation areas. Generalization of the results is limited by the fact that sampling was not random and the actual behavior of flower picking was not measured. Notwithstanding these limitations, however, if one accepts the underlying premise of the study, if the survey questionnaire is validated, and if the demographic characteristics of the respondents are similar to those of respondents in Chang et al.'s (2008) study, the results will be valuable, indicating that in the present context, the interaction of moral emotions and perceived defensible space may significantly influence flower picking.

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Questionnaire

Moral emotion section

1. Generally, in a national forest recreation area, I will feel guilty if I pick flowers or other parts of plants.
2. I will feel embarrassed if others see me picking flowers or other parts of plants.
3. I will feel ashamed if I pick flowers or other parts of plants when others do not.

Perceived defensible space section

4. How clean is this national forest recreation area?
5. How often do staff members walk the trails of this national forest recreation area?
6. How many signs are set up in this national forest recreation area?

Flower picking section

7. In the future, how likely are you to pick flowers or other parts of plants in this national forest recreation area?