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Effects of Movement When Using Visual Media to Determine Encounter Standards[1a]

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휴양지역의 조우 평가기준 설정을 위한 시각매체의 활용시 움직임의 효과[1a]

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요 약

휴양지역의 평가기준 설정을 위한 다양한 시각매체의 활용가능성에 대한 관심이 높다. 그러나 기준평가를 위한 시각 매체의 유용성은 시각매체가 얼마나 정확하게 현장 상태를 반영하는가에 달려있다. 본 연구는 정적 이미지와 동적 이미지를 이용하여 산정된 조우기준을 비교함으로써 움직임의 효과를 평가하였다. 연구대상지는 무등산도립공원 내 중머리 지역이었다. 총 50명의 대학생이 실험실 조사에 참여하였으며 Photoshop과 Flash 컴퓨터 프로그램을 이용하여 제작된 정적이미지와 동적 이미지의 허용도를 평가하였다. 조사결과, 정적 이미지와 동적 이미지 간에 최대허용수에 차이가 없는 것으로 분석되었으며 전반적 조우규범측정곡선도 거의 동일한 것으로 나타났다. 이미지 노출 순서와 움직이는 사람의 비율에 따른 조우기준도 조사되었다. 그러나 본 지역과 같은 특정 상황에서 조우기준을 개발하기 위하여 정적 이미지 대신 보다 복잡한 방법을 요구하는 동적 이미지를 이용함으로써 얻는 이점은 없다고 판단된다. 보다 정교한 매체이용에 따른 장단점에 대하여 토의하였으며 다른 자원환경 평가에 움직임 또는 소리와 같은 요소들이 조우규범에 미치는 영향에 대한 보다 많은 연구가 요구된다.

주요어 : 규범기준, 정적 이미지, 동적 이미지, 도립공원

ABSTRACT

The usefulness of media representations for assessing normative standards depends in part on how accurately media reflect "on-the-ground" resource conditions. This study compared encounter standards based on still and moving pictures to assess movement effects. The study location was the Jungmoeri area of Mudeungsan Provincial Park (MPP) in Korea. A total of 50 college students participated in a laboratory experiment where they evaluated still and moving pictures constructed using Photoshop and Flash computer programs. For the maximum acceptable number (MAN), however, there was no significant difference of ratings between still and moving pictures, and the overall encounter norm curves were nearly identical. There were some "method findings" for ordering effects and percent of people moving, but for a resource manager developing standards there was no advantage to the more complex logistics of using moving pictures to assess this particular impact.

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The trade-offs of using more sophisticated media are discussed, and more research is needed to further explore factors such as movement of sound in evaluation of other resource conditions.

KEY WORDS : NORMATIVE STANDARDS, STILL AND MOVING PICTURES, PROVINCIAL PARK

INTRODUTION

Developing standards is an important component of management and planning frameworks (C-CAP: Shelby and Heberlein, 1986; LAC: Stankey et al., 1985; VIM: Graefe et al., 1986; VERP: Manning and Lime, 1996). Standards are used as a "yardstick" to evaluate conditions as acceptable or unacceptable. If conditions are worse than standards, management actions may be needed.

The normative approach is a useful tool to help develop standards, and it has received considerable attention from researchers and managers in the last 20 years. Such efforts have brought advancements in theoretical understanding as well as technical applications in outdoor recreation settings.

Questions remain about how to collect the highest quality data in the most efficient way. Several recent studies have focused on the use of visual media for representing different impact levels in natural resource settings (Manning et al., 1999; Inglis et al., 1999; Manning et al., 2002; Kim and Shelby, 2005). Compared to traditional written methods, the visual approach may provide respondents with more realistic situations to evaluate, and require less effort (resulting in decreased response burden).

The usefulness of the visual approach depends to some extent on how well it reflects real conditions. Many normative studies using visual approaches have utilized still graphics or photographs, thereby excluding movement often found in the real environment. Still photographs work well for evaluating landscape quality or ecological impacts (e.g., bare ground, vegetation, or trail deterioration) where movement is not important. However, for developing encounter standards for different numbers of people, movement may be an issue. This study compares encounter norms between still and moving photographs to see if the different approaches would suggest different standards.

NORMATIVE STANDARDS

Resource users often have personal norms that evaluate recreation behaviors and conditions as acceptable or unacceptable (Vaske et al., 1986; Shelby and Heberlein, 1986; Shelby and Vaske, 1991). In the normative approach, respondents are asked to evaluate the acceptability of or tolerance for different levels of impacts. These data can be organized graphically to provide "norm curves" or "impact evaluation curves," and they are useful for setting standards such as the range of acceptable conditions, optimal conditions, maximum acceptable condition, minimum acceptable condition, and level of agreement. Such information is particularly helpful for making evaluative judgments (Shelby et al., 1996).

The normative approach has been used to address a variety of recreation issues. These include standards for encounters (Vaske, 1977; Shelby, 1981; Vaske et al., 1986; Heberlein et al., 1986; Whittaker and Shelby, 1988; Patterson and Hammitt, 1990; Williams et. al., 1991; Shelby and Vaske, 1991; Martinson and Shelby, 1992; Manning and Lime, 1996; Freimund et al., 2002; Needham and Rollins, 2005), instream flows (Whittaker and Shelby, 2002), and trade-offs between various measurement techniques (Shelby and Harris, 1985; Manning et al., 1996; Manning et al., 1999; Freimund et al., 2002; Hall and Roggenbuck, 2002; Manning and Freimund, 2004; Needham and Rollins, 2005; Kim and Shelby, 2005).

VISUAL APPROACH TO DEVELOPING NORMATIVE STANDARDS

The visual approach was used for developing normative standards by Shelby and Harris as early as 1985, and many other visual studies have been conducted over the past 20 years (Shelby and Shindler, 1992; Manning and Lime, 1996; Manning et al., 1999; Inglis et al., 1999; Needham and Rollins, 2005). The visual approach is likely to be used even more in the future due to the development of technically advanced computer based visual media (e.g., graphic, photograph, slide, video, GIS, animation, virtual

reality etc).

Many previous studies conclude that visual media are a good substitute for real field conditions (Shafer and Richards, 1974; Zube et al., 1975; Daniel and Boster, 1976; Shuttleworth, 1980; Kellomäki and Savolainen, 1984; Shelby and Harris, 1985; Stamps, 1990; Bateson and Hui, 1992; Daniel and Meitner, 2001). Based on this, many studies of encounter norms use visual media (generally still photographs or slides) to depict field conditions (Manning and Lime, 1996; Inglis et al., 1999; Manning et al., 1999; Needham and Rollins, 2005). However, Manning and Lime (1996) in their Arches National Park study found that maximum acceptable number of encounters developed from the visual approach (a survey-based evaluation of conditions depicted in photographs) was greater than results from a more traditional survey where respondents were asked to write the highest acceptable number of encounters. Manning and Lime (1996) speculate that this difference may be due to characteristics of encounters shown in the photographs (such as type of group, group size, other visitors' behaviors, or alikeness). It is also possible that movement of visitors, which is not represented in still photos, may be another reason for dif ferences in acceptable numbers of encounters. Hetherington et al. (1993) also indicated the limitations of the still images in fully representing dynamic factors such as movement and sound. For assessing impacts where movement is important, the usefulness of visual media may depend on their ability to represent that movement. This study examines the effects of movement on encounter standards using image capture technology.

METHODS

The original photograph used for the study was taken in the Jungmoeri area of Mudeungsan Provincial Park (MPP) in Korea, a nature park (the area is 30.230Km^2) where managers estimate over 10million visitors per year. High use has resulted in crowding problems and deterioration of trails and vegetation. The Jungmoeri area selected for the original photograph is one of the highest use places in the Park. Located at approximately 580m in altitude, it is a "hub" area where several trails meet.

The simulated still pictures, as shown in Figure 1, were

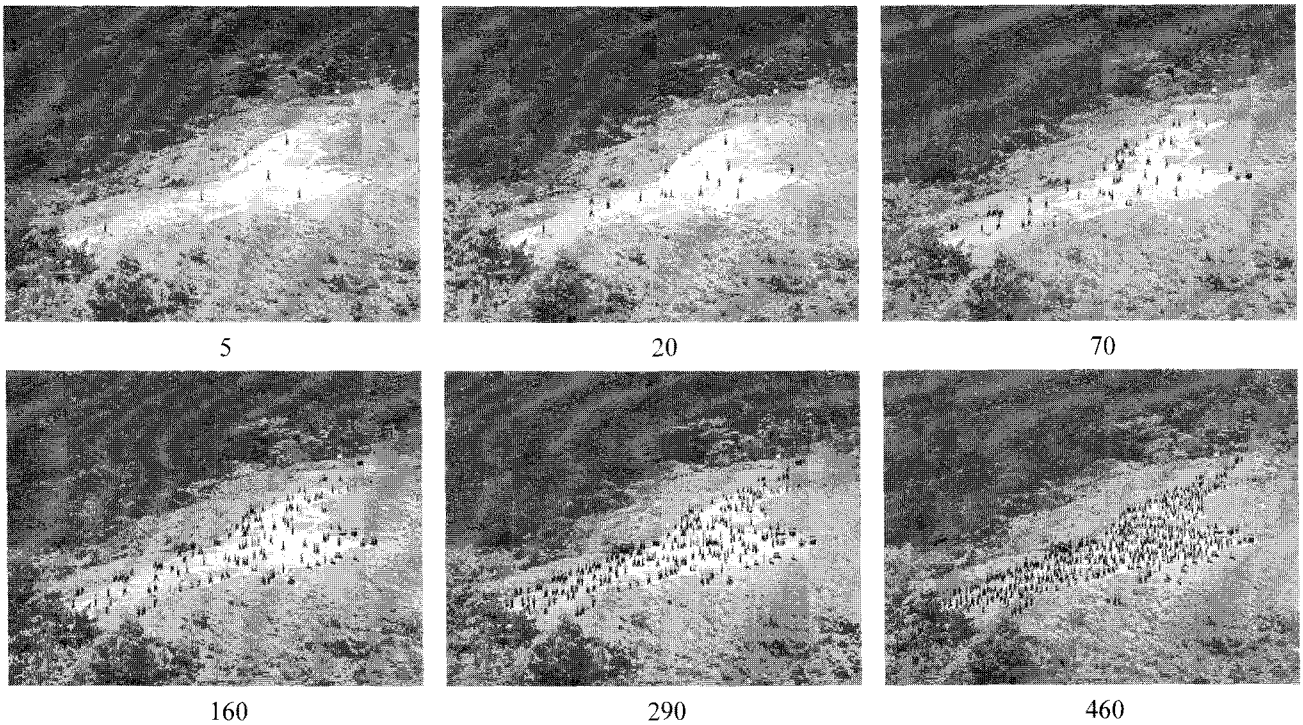


Figure 1. Six of the 12 pictures of showing different numbers of hikers

produced by increasing the number of users (from 0 to 460: 0, 5, 10, 20, 40, 70, 110, 160, 220, 290, 370, 460) in the original photograph, using Photoshop 9.0 and Macromedia Flash MX (ver. 6.0) software programs. Moving pictures were the same as the still pictures in terms of surrounding area, clothing colors (all people were uniformly in gray shirts and black trousers), size of people, and number of people; the only difference was movement. The movement of people in the pictures was based on field observations of user traffic patterns and behaviors. Each still picture was a captured scene from the starting point of each of the moving picture segments.

Data were collected from 50 college students from Chonnam National University, who were shown the series of pictures with still and moving hikers. Survey groups met in a laboratory with a projector and screen (2.00 x 2.35m) set up. No more than 8 persons at a time participated in the survey, and they all sat 5m from the screen to eliminate the possible influence of distance. Respondents were asked to imagine themselves as hikers in the study area shown on the screen.

Respondents were exposed to the series of 12 pictures (from 0 to 460 persons) in increasing order (Figure 1). Each screen was shown for 10 seconds to allow respondents to evaluate the number of people. A nine-point Likert-type response scale (from "totally acceptable" to "totally unacceptable" with "marginal" as the mid-point) was used for both measurements. The maximum acceptable numbers (MAN) for the group were means or medians calculated from all individual MAN (the point where the individual's impact evaluation curve crossed the "neutral line"). Impact evaluation curves were plotted through the mean evaluation for each impact level (number of people, or percent of people moving). Norm agreement was measured by standard deviation (Shelby, 1981; Shelby and Vaske, 1991). To check for an ordering effect, half the respondents viewed all the still pictures first, and half viewed the moving pictures first.

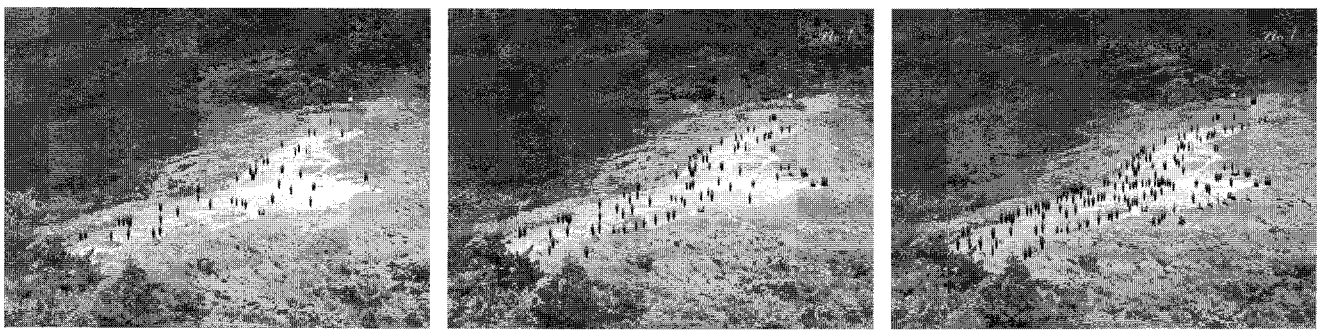
To further explore the effects of moving people, another experiment was designed. With total number of people set at 50, 100, or 200, the percent of people moving was increased from 0% to 80% by increments of 10%. Respondents were asked to rate the acceptability of the number of people in each picture (Figure 2).

RESULTS

Are standards different for still and moving pictures?

Encounter evaluation curves for all respondents are shown in Figure 3. As the curves show, differences in evaluations were generally small for still versus moving pictures at each encounter level (curves were not significantly different based on Wilcoxon sign rank test). Acceptability ratings increased from zero through 10-20 people, which is the optimum encounter level. Acceptability ratings then decreased, crossing the "marginal" line at about 87 (moving picture) to 95 (still picture) people. Higher numbers were rated lower still, with 290-460 people rated near the lowest point on the rating scale.

The averages for maximum acceptable number (MAN) are shown in Table 1. For still pictures the average MAN is about 116. For moving pictures the average is slightly lower at about 105, although the difference is not statisti-



5 100 200

Figure 2. "Base" pictures (50, 100, and 200 people) for "the proportion of people moving" treatments

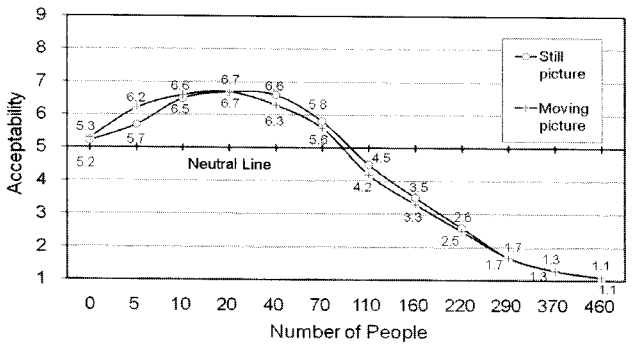


Figure 3. Encounter norm curves based on still and moving pictures

cally significant.

Table 1. Comparison of Maximum Acceptable Numbers (MAN) between Still and Moving Pictures

Treatment	MAN			Wilcoxon sign rank test	
	Mean	SD	Median	*Z*	*P*
Still Picture (N=50)	116	81	100	-1.104	0.270
Moving Picture (N=50)	105	69	93		

Is there a "still first" vs. "moving first" order effect?

Average values for maximum acceptable numbers are shown in Table 2. For evaluations of still pictures, MAN was 109 for the "still first" group and 123 for the "moving first" group, but this difference was not statistically significant. For evaluations of moving pictures, MAN was 128 for the "still first" group and 80 for the "moving first" group ($Z = -2.74$, $p < .006$).

Table 2. Comparison of Maximum Acceptable Numbers (MAN) for "still first" and "moving first" groups

Treatment		MAN		Mann-Whitney's U test	
	Statistic	Still first	Moving first	Z	P
Still Picture (N=25)	Mean	109	123	-1.130	0.258
	Median	70	110	-	-
	SD	88	75		
Moving Picture (N=25)	Mean	128	80	-2.742	0.006
	Median	135	60	-	-
	SD	66	65		

Does proportion of people moving have an effect?

The average evaluations for different proportions of people moving are shown in Figure 4. The three curves for "base numbers" of people follow the overall evaluations, with 50 people generally rated "acceptable," 100 people around the marginal line, and 200 people generally unacceptable. All three curves show a slight decline in ratings from none of the people moving to 80% of the people moving. Significant statistical differences were found in acceptability ratings between 0% and 80% moving people for all three cases (50, 100, 200 people; Table 3).

Table 3. Comparison of acceptability ratings between 0% vs. 80% of moving people

Total No. of People	Proportion (%)	Acceptability		Wilcoxon sign rank test	
		Mean	SD	Z	P
50	0	7.1	1.6	-2.513	0.012
	80	6.3	2.0		
100	0	5.4	1.8	-4.583	0.000
	80	4.0	2.0		
200	0	3.5	1.7	-4.027	0.000
	80	2.4	1.8		

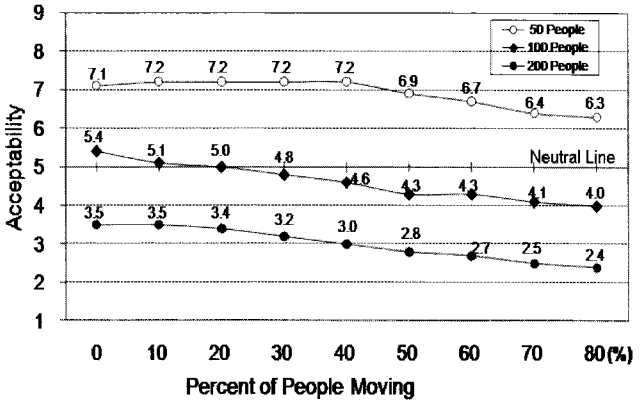


Figure 4. Impact evaluation curves for different proportions of people moving

DISCUSSION

Are standards different for still and moving pictures?

For this particular impact, evaluations are essentially the same. The impact evaluation curves for still and moving pictures (Figure 3) are quite similar, and mean values for MAN are not significantly different. A resource manager choosing a standard for the optimal condition (about 10-40 people) or the highest MAN (about 85-95 people) would make a similar choice from either data set.

Hetherington et al. (1993) argued that evaluations of landscapes may be affected by dynamic factors such as motion, and Whittaker and Shelby (2002) argue that motion and sound are more important for evaluating stream flows for waterfalls than for slow moving rivers. In both cases this is an "intuitive" judgement of researchers based on "reasoning" rather than data. This conclusion still makes sense, but more studies would help sort out the effects.

For example, the pictures used in the present study were taken from relatively far away, from an elevated "oblique" point of view. It would be interesting to know whether moving pictures make a bigger difference if they are taken from closer distance and/or from eye-level.

As an aside, it is interesting that in the present study low numbers of people (10-40) are evaluated more positively than zero or five people. In studies of backcountry of wilderness settings, the lowest numbers of encounters usually receive the highest evaluations (Vaske et al., 1986). It appears that the high use and impact levels of this park in general and the Jungmoeri "hub" trail intersection area in particular make this a place where seeing some other people is not only tolerable, but is actually desirable. This fits with other studies of "frontcountry" areas (Vaske et al., 1996).

What about ordering effects or proportion of people moving?

Ordering had no significant effect for evaluations of still pictures. For evaluations of moving pictures, those who saw the still pictures first had a higher MAN than those who saw the moving pictures first (128 versus 80). This is a "methods issue" rather than a "substantive issue" given the results discussed above, but further studies could help resolve it.

Proportion of people moving had a significant effect when comparing the extremes of 0% versus 80%. But as Figure 4 shows, the incremental changes in evaluations (e.g. from 10% to 20% or from 60% to 70% moving) are small. In addition, resource managers are unlikely to "control" this variable, so these findings are primarily of academic interest. The differences between the three curves (50 people generally rated "acceptable," 100 people "marginal," and 200 people "unacceptable") fit with or "confirm" the substantive findings from the overall encounter norm curves in Figure 3.

CONCLUSION

The question of what media accurately represent natural resource conditions is important for managers and researchers interested in evaluations of those conditions. Early studies (e.g. Shelby and Harris, 1985) indicated that visual media (still photos) produced evaluations similar to those obtained on-site. As more sophisticated media (e.g. video or computer-based images) become available, it is important to consider their benefits and costs.

The biggest increment in benefit comes from being able to obtain evaluations off-site. From this point of view, any mechanisms that reasonably "convey" or "represent" resource conditions to the minds of evaluators (even including the written descriptions tested by Shelby and Harris, 1985, but certainly the still photos used in many studies) help greatly with the logistics of such research. Beyond this, however, increasingly sophisticated technologies have the potential to increase the accuracy of representations, so it is important to assess the trade-offs.

The logic of this assessment remains the same: if a more sophisticated representation of conditions more accurately conveys resource information which is important to the evaluation, then the "benefits" of that technique are more likely to be worth the "costs." For the encounter standards studied here moving pictures made little difference, so they offer no improvement over easier-to-use still pictures. But more studies would help to further refine conclusions about movement, as well as other variables such as sounds or smells.

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