# CAPTURING THE HIKE EXPERIENCE ON VIDEO: A NEW METHODOLOGY FOR STUDYING HUMAN TRANSACTIONS WITH NATURE

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## Abstract

A video methodology was developed to study nature experience in a real-world setting. Members of an outdoors club were recruited for a 5-mile hike along the Appalachian Trail in New York's Sterling Forest State Park. Separate hikes were conducted with six pairs of hike partners. One partner wore a forehead-mounted microvideo camera to record the hike from beginning to end. Participants were instructed to talk about environmental features they noticed during the hike; their conversations were recorded with a shotgun and wireless microphone. A questionnaire was administered immediately after each hike and follow-up interviews were later conducted to review excerpts from the videotapes. The HIKEN™ notation system was developed for visual analysis of the videotape data. Research findings confirm the need for new field methods to deepen our understanding of the human response to nature. Preliminary recommendations are made for enhancing nature experience through improved trail design.

## 1.0 The Study of Nature Experience: What's Missing?

What exactly is nature experience? Has it been adequately defined or operationalized in the literature? What research methods have been used to study how people experience nature? Has the complexity of this experience been captured with existing research methods or has its gestalt been lost through use of reductionist techniques?

Most empirical studies on human response to nature have been conducted through the lens of landscape perception. Research has traditionally been conducted in laboratory settings with photographs or slides as surrogates for natural environments. Questionnaires, rating scales, and physiological indicators have been used to evaluate subject response to these stimuli, with emphasis on aesthetic preference and landscape assessment (see Sell, Taylor, & Zube 1984). Although the ecological validity of simulations has undoubtedly improved in recent years with use of video, computer-generated simulations and virtual reality (see Orland 1993, Bishop, Ye, & Karadaglis 2001), the underlying theoretical paradigm has been slow to change. The predominant paradigm continues to conceptualize nature as a visual landscape and one which is usually static and unchanged over time. This paradigm also conceptualizes the perceiver as a passive, visual observer rather than an embodied percipient who actively interacts with the environment.

As I reviewed the landscape perception literature, I began to wonder whether the prevailing theories and concepts would remain valid when applied to nature experience in a real-world setting. Moreover, I was not convinced that existing methodologies could accurately reflect how people perceive nature in the real world. Ultimately, I decided to develop an innovative research technique which would capture perceptual encounters in the field. I chose Ittelson's (1973) "environment perception" framework to replace the traditional theoretical paradigm. Within this framework, the environment would be re-conceptualized as having multisensory information rather than just visual information (i.e., as a "multisensory environment"). Further, the landscape would be re-conceptualized as dynamic rather than static, vis-a-vis both time and movement. The perceiver would be re-conceptualized as multimodal rather than just visual, and as embodied, moving in and through the environment. Based on the assumption that perception is a process which occurs over time and not a series of discrete events, human-nature transactions would be examined within a temporal framework.

## 2.0 Research Design: Capturing the Hike Experience on Video

I chose to study hiking as an activity which fosters perceptual encounters with nature. Members of an outdoors club were recruited for a 5-mile hike on the Appalachian Trail in New York's Sterling Forest State

Park. This was a linear hike, following the same 2 ½ mile trail section into and out of Sterling Forest. Six separate hikes were conducted in the autumn of 1999, each with a different pair of hike partners.

I purchased a 2-inch square microvideo camera with plastic housing unit and battery holder, all for less than $200. I then purchased a miniature headlamp with adjustable headstrap, detached the headlamp from its back plate, and screwed the microvideo camera onto the back plate in its place. The camera was mounted on one hiker's forehead and attached by cable to a Hi-8 camcorder placed in a backpack worn by the same hiker. The camcorder was turned on at the beginning of each hike and, with the exception of the lunch break, remained on for its entire 4-plus hour duration.
The most significant problem with this video technique was determining how to position the camera on each person's forehead. If the camera was aimed too low, the videotape showed excessive footage of the ground; if aimed too high, it omitted features of interest to the hikers. I eventually re-connected the camera to the headlamp's back plate with a hinge, making it possible to adjust the camera's angle to accommodate each person's height and upright posture on a flat surface. Further adjustment was made to account for a (universal) estimate of the hiker's forward-bending position while climbing uphill.

In future studies, a clinometer might be useful for measuring changes in the line of sight as captured on video. Since this instrument is designed to measure slope, by focusing on a stationary background object it could provide accurate readings to guide re-adjustment of the camera's angle for each hiker. Ideally, a technique would also be devised whereby the camera's angle would shift automatically and continuously throughout the hike to accommodate the perceiver's ever-changing body position.

External microphones were used to capture environmental sounds and conversation between the hikers. A shotgun microphone was mounted on the external frame backpack which held the Hi-8 camcorder, and a wireless microphone was attached to the other hiker's daypack. The shotgun mike was chosen to capture environmental sounds as well as conversations between the partners, and the wireless mike was needed to capture individual comments and conversations which occurred when hikers were not walking side by side. Technical adjustments were made to eliminate any interference in audio reception between the two microphones. The most significant problem with external microphones was their vulnerability when hikers fell, bumped into trees, etc. Although the shotgun mike remained firmly attached to the backpack, the wireless microphone -- both receiver and transmitter-- got knocked off on occasion.

I was a participant-observer in this study, as I followed behind each pair of hikers while remaining outside their range of sight and sound. This allowed me to change the (120-minute) Hi-8 tape and batteries (for microvideo camera and wireless microphone) mid-way through each hike. I was also available in case of technical difficulties or medical emergencies. My presence on the hike had two additional advantages: 1) it strengthened my rapport with research participants, encouraging them to be more open during the hikes and in the follow-up interviews; and 2) my personal experience of the trail strengthened my ability to understand hikers' reactions to this environment.

At the trailhead, participants were instructed to talk to one another just as they normally did when hiking together. They were also encouraged to talk about anything along the trail which caught their attention "in a special way", especially "anything which captivates your senses". I did not ask participants to evaluate or explain these spontaneous reactions during the hike, since this would have interrupted the experience. Instead, I administered a brief questionnaire immediately afterwards and conducted follow-up interviews 2 weeks later. On the questionnaire I asked people to describe highlights of the hike as well as their perceptions of the hike's beginning and ending. I also asked participants to describe the trail in terms of "discrete segments" to guide my selection of video excerpts to be used in the follow-up interviews.

For every hike, I created a 30-minute sampling tape with approximately 35 video excerpts, each lasting from 10 seconds to 1 minute. Sampling tapes were designed to

track the entire length of each hike and to focus on the most important aspects of the experience for each pair of hike partners. Excerpts were selected to show participant-identified trail segments as mentioned above. Whenever possible, excerpts for these trail segments included highlights and beginning and ending points listed by participants on their questionnaires. Video excerpts were also selected according to researcher-defined "baseline" segments which reflected changes in the trail's topography and vegetation. (Many researcher-defined segments overlapped with those identified by participants.) By using video excerpts, I was able to reduce over 4 hours of videotaped hiking to a manageable length for review in 1 ½- to 2-hour interviews.

The interviews were conducted jointly with both hike partners. One person held the remote control and paused the VCR when either party began to comment on features or scenes of interest, or to discuss other recollections spurred by the videotapes. The interviews were audiotaped with permission, and written notes were taken to record the timecodes from video excerpts being referenced in participant comments.

This interview format proved extremely effective. Although the microvideo camera primarily recorded perceptual encounters of the person wearing this equipment, the video seemed able to re-create the experience for both partners. While reviewing the sampling tape, participants were able to move back and forth between immersion and reflection. They explained comments made during the hike and captured on video, and also explored new revelations about what they had encountered on the hike. Indeed, some excerpts were able to trigger recollections of features, attributes, or scenes which did not even appear on the video being reviewed. Although there was a 2-week gap between each hike and follow-up interview, recall was extremely high.

## 3.0 Data Analysis

Transcription was primarily limited to those data of direct relevance to perceptual encounters with nature or to the overall hike experience. Data preparation was very complex, however, as videotapes were transcribed for both lexical and non-lexical vocalization as well as head and whole body movement. Ideally, audio transcription should be done directly from the videotapes rather than from dubbed audiotapes, since there is much room for error when deciphering conversations which are spontaneous and stream-of-consciousness. Moreover, articulation can be unclear when people move as they speak, further challenging the researcher's ability to transcribe accurately.

In order to analyze the hike experience in relation to perceptual encounters, I had to determine precisely where participants were located at any given point in their hike. To make this possible, I had to identify closely-spaced locations along the trail. To conduct cross-hike analysis, these locations or "trail markers" would have to be identifiable on all six hike videos.

This task was especially difficult in a rustic setting such as Sterling Forest, with few human-made landmarks. I sought to identify environmental features or groups of features on the videotapes, using them as geographic placement markers. When features were not readily identifiable across all videotapes, I identified trail blazes instead. Selection of trail markers was accomplished through repetitive review of the videotapes. GPS, used in conjunction with videotape review, could perhaps make this task more manageable. For example, a GPS unit could be linked to the camcorder to coordinate recording of time, and track points could be converted into waypoints to be used as trail markers. This procedure would work best in areas without significant leaf cover, where GPS accuracy is optimized.

My objective in conducting the data analysis was to examine theory and concepts from the existing literature in the context of real-world experience. Data analysis proceeded in two phases. In the initial phase, I extracted data from the videotape and interview transcripts which seemed relevant to questions addressed by work in the areas of environment perception, environmental experience, trail-building, and of course, landscape perception. In the second phase of analysis data were reorganized using a "grounded theory" approach (Glaser & Strauss 1967). This resulted in new categories which more closely reflected real-world experience: They

were less reductionistic and adopted a "transactional" rather than a deterministic stance toward the person-environment relationship (see Altman & Rogoff 1987).

Although manual data sorting was satisfactory for the exploratory thematic analysis conducted in this study, use of qualitative analysis software would be preferable for more detailed analysis and for work with larger data sets. Specifically, I would recommend software such as ATLAS.ti which permits analytical synthesis of video and textual data.

Following this thematic analysis, I developed a graphic notation to facilitate visual analysis of the video data. Notation was needed to condense and organize the enormous amount of information captured on videotape. Inspired by Appleyard, Lynch, and Myer's (1964) notation for the automobile passenger's "view from the road", the Hiker's Experiential Notation System (HIKEN™) was designed to reflect the hiker's subjective, lived experience rather than a literal, objective recitation of the trail's physical features. Appearing much like a dance or musical score, the notation had one staff for the environment and another for the hiker. In this way it could reveal the relationship between person and environment i.e., between the hiker's experience and the natural features and attributes noticed along the trail. I created many new symbols for this notation and borrowed or adapted others from the sport of orienteering (see International Orienteering Federation 2000).

Ultimately, HIKEN™ was not used for extensive visual analysis of the hike experience in this study. However, significant conceptual insights were gleaned in the process of creating and categorizing the symbols, and while using these symbols to code and score sample trail sections from two different hikes. Further research is needed to evaluate the validity and inter-rater reliability of this notation system.

## 4.0 Research Findings: Did the Ends Justify the Means?

This new video technique proved effective for three important purposes: capturing multisensory environmental information; collecting data about the perceiver's movement in and through the environment; and capturing movement of natural features. This form of videography was also unique in its ability to capture temporal dimensions of the hike experience. Moreover, it retained the gestalt of the experience vis-a-vis hikers' thoughts, actions, and emotions in relation to the physical environment. Both the questionnaire and follow-up interview were sources of rich secondary data needed to validate interpretations of the video data. Furthermore, data collected from the questionnaire and interviews provided important new insights into the hike experience.

Despite their effectiveness for data collection, the question remains as to whether these new techniques are worth the considerable effort involved. Given that data analysis exposed significant weaknesses in the traditional approach to this area of inquiry, I would contend that this research successfully demonstrated that the ends did justify the means.

Consistent with the underlying concept of nature-as-visual landscape, previous studies have emphasized the visual world and neglected its extra-visual attributes. In contrast, as might be expected, in this study the trail consistently afforded hikers with a combination of visual, auditory, olfactory, and tactile information. Importantly, extra-visual attributes such as the soft feel of moss or the sound of trickling seep water were often considered highlights of the hike experience.

The prevailing concept of nature as static landscape also proved problematic when applied to a real-world setting. Most research has focused on permanent environmental features, those which remain relatively constant from season to season, day to day, and moment to moment. Fleeting features or *ephemerals*, such as clouds, shadows, or the changing qualities of light, have received short shrift in this literature. Unlike more permanent features, ephemerals can change noticeably over time and are often in motion.

Aside from the methodological obstacles, perhaps there has been little interest in studying ephemerals because it is difficult, if not impossible, to control for these features when managing the landscape. Yet hiker reactions in this

study suggest that ephemerals were an essential part of their experience. People relished the soft lighting during late afternoon hours; enjoyed the colorful reflections in Little Dam Lake; and were mesmerized by clouds floating across the sky. Ephemerals may well be part of nature's phenomenological "essence" (Kockelmans 1971), that which distinguishes the natural from the non-natural world.

In using photographs or slides as simulations, traditional research methods also reflect the assumption that perception can be captured as a frozen moment in time. In contrast, findings from this study reveal how temporal dimensions can be fundamental to the hike experience. Along these lines, the sequence of features or scenes had significant impact on how people reacted to the trail environment. Additionally, most participants were able to conceptualize the hike as a sequence of events with distinct beginning, middle, and ending.

Traditional conceptualization of the perceiver as a passive observer also proved problematic when examined in a real-world context. Importantly, extant research has not considered how the individual's attention impacts what is perceived and, in turn, how those perceptions impact the experience of nature. Instead, (visual) attention has been artificially controlled through the researcher's selection of stimuli. Moreover, previous studies have ignored the likelihood that experience or learning may alter the focus of attention over time (see E. J. Gibson 1991). Findings from this study of the hike experience confirm that attention is far more than visual: It is a multi-dimensional phenomenon exhibited through a variety of actions across different perceptual modalities. In the tactile modality, for instance, attention might range from "obliviousness" to "heightened awareness" (Seamon 1979, p. 103) as revealed in actions such as grabbing, leaning, or rubbing.

Extant research has also failed to consider the many ways in which our bodies impact how we experience nature. Findings from this study indicate that both inner body state (e.g., temperature, energy level, hunger, thirst) and external body movement are extremely important to the hike experience. For example, changes of inner body state frequently led to changes in pace which, in turn, altered perception of the environment. Moreover, challenges involved in moving through the trail environment had significant impact on perceptual encounters with nature. Hikers moved slowly and examined the treadway carefully to avoid slipping on wet leaves; they exerted great effort in hoisting themselves over large boulders to climb the rock scramble. Importantly, climbing over the boulders was a highlight of the hike for many people, as increased physical contact caused them to feel a close emotional connection to nature.

## 5.0 Recommendations: Designing Trails to Enhance Nature Experience

As discussed above, many concepts and theories from the existing literature on human response to nature proved problematic when examined in the context of real-world experience. Furthermore, the techniques used in this study revealed dimensions of nature experience which have not been explored through conventional methodologies. Although it was not my intention to explain participants' specific reactions to features, attributes or scenes on the Appalachian Trail section used for the research hikes, some theoretical and conceptual findings did have practical implications. The preliminary recommendations which follow encapsulate those implications.

Both hiker safety and ecological conditions must be primary considerations when designing and maintaining trails. Although the degree of landscape management will vary tremendously from manicured to more rustic settings, trail design and maintenance can have significant impact on how people experience nature in any setting. Respecting safety and environmental constraints, there may still be numerous alternatives which have the potential to expand dimensions of nature experience afforded to the hiker. While the five recommendations which follow are by no means radical, they do reflect a significant paradigmatic shift from the current norm.

1. Reveal Nature in its Multisensory Abundance

Whenever possible, take advantage of the full range of visual and extra-visual attributes of natural features along the trail. One technique for uncovering multisensory attributes is to examine the landscape in terms of dialectics or dualities (see Paterson 1992). Visual

dualities might include light/dark, monotone/colorful, or distant/close-up; auditory dualities might include loud/soft; and tactile dualities might include soft/hard, rough/smooth, or wet/dry. It is also possible to consider dualities related to person-environment transactions, such as inside/outside, near/far, or high/low. Additional design alternatives might be revealed through pairing of sensory dialectics with dialectics for person-environment transactions. For example, high/low and dark/light can be recombined into high/light and low/dark. In sum, to create trails which afford diverse nature experience, it is critical to move beyond the traditional focus on the visual world.

2. Expand Opportunities for Challenge

In hiking guidebooks, challenge is generally determined by environmental conditions: slope, mileage, and to a lesser extent, treadway surface. This study of the hike experience revealed a much broader range of factors which impact perceptions of challenge. Some hiker-related factors salient to research participants were physical strength and stamina; body-size in relation to scale of rock steps; coordination; and balance. By incorporating these and other factors in trail design, it may be possible to intensify the hike's challenge even for trails which are shorter and have few climbs. For example, a trail could be designed to require use of many different body movements, such as turning, squeezing through a narrow opening (i.e., the "lemon squeezer"), and stooping. Trails could also be designed to include difficult footing which would slow the hiker's pace and encourage increased concentration; easier footing could also be included to afford the satisfaction of moving quickly and covering more mileage. Additionally, stopping points could be sited to provide hikers with the opportunity to see where they have come from and acknowledge challenges which have been encountered.

Wayfinding represents yet another dimension of challenge. Hikers must be extra vigilant when trail blazes are not readily apparent: They must scan the environment for blazes, while simultaneously scanning the ground for visual cues to confirm that they are still on the treadway. This dimension of challenge can be diminished when there are too many blazes. While respecting the recommended guidelines for placement of blazes (Birchard & Proudman 1981), perhaps it would be possible to vary their distance from time to time in order to heighten the level of challenge on a given trail. When the challenge of wayfinding is absent, people may become over-dependent on trail markers and begin hiking "blaze-to-blaze", allowing their minds to wander as they pay less attention to the immediate surroundings.

3. Lengthen the Hike Experience

Findings from this study indicate that the hike can be experienced as a sequence of events with beginning, middle, and ending. The experience begins when signs of the built world recede from awareness. People pass through an invisible door, like Alice in Wonderland stepping through the Looking Glass, as they enter into or move "inside" the experience. Passage through this portal represents a transition from being in the everyday world to being-in-nature. Once inside the hike experience, participants in this study had increased awareness of the natural features surrounding them.

When signs of the built world are evident beyond the trailhead, the hike's beginning may be delayed. If at all possible, therefore, trails should be designed to quickly remove people from the sights and sounds of civilization e.g., automobile traffic and built structures. In some instances, vegetation and slope can be used to create a buffer between the built and natural worlds. For participants in this study, the shift in body state which occurred while climbing the initial ascent (i.e., increased heart rate and change in body temperature), served as an important indicator that the hike had begun.

Once people are "inside" the hike, this experience can be extended by minimizing interruptions or intrusions and by delaying the transition back to the everyday world. Whereas reminders of civilization should quickly recede after leaving the trailhead at the beginning of the hike, signs of the built world should remain concealed until hikers are about to leave the trail. It is important to recognize that the hike experience can end long before people reach the trail's physical endpoint. Ideally, the trail should be designed to retain the hiker's focus on immediate perceptual encounters until they actually leave

the natural environment. One way to accomplish this might be to incorporate elements of challenge up to the end, or to site the trail's endpoint near features which can function as highlights and attract significant interest.

4. Minimize Intrusions and Interruptions

An effective way to maintain continuity of the hike experience i.e., to retain the feeling of "insideness", is to require that human-made artifacts be perceptually compatible with their natural surroundings (see Built Environment Image Guide 2001). Perceptual compatibility or "fittingness" (Wohlwill & Harris 1980) may be relevant to extra-visual attributes such as texture and sound, as well as visual attributes such as color, size and shape.

Findings from this study indicate that on occasion, inferred meaning may override lack of perceptual compatibility. This can occur when human-made artifacts are positively associated with the hiker's experience of that natural setting. For example, a memorial plaque for a trail maintainer enhanced participants' appreciation for work done on the trail, and a plastic water jug left for an Appalachian Trail thru-hiker, fostered a sense of connection with the Trail's esteemed history.

Both inadequate blazing and excessive blazing can also interrupt the hike experience. Too many blazes can distract from perceptual encounters with nature, ever-reminding people that they are on a human-made path. Paint drips, metal markers, or written signs may have a similar effect. Conversely, inadequate marking can detract from the experience by causing people to stop frequently in order to check their trail map. Clearly, a proper balance is needed–neither too few nor too many blazes–to maintain continuity of the hike experience.

5. Encourage Public Participation in Trail Design

Landscape perception research has embraced the theory that evolution drives human response to nature (see Kellert & Wilson 1993). It has been assumed that our instinctual survival needs–for shelter, food, and safety from harm–supersede the impact of personality, culture, or past experience on how we relate to nature. As a result, these studies have sought to uncover commonalities in how people perceive and thus experience nature. Since this approach implies that experts and laypersons would perceive the environment in the same way and share a common experience of nature, it is not surprising that this research model has done little to encourage user input in trail design. Indeed, most trails have been designed by experts with little, if any, input from users.

However, there exists empirical evidence which challenges the assumption that experts and non-experts respond to nature in the same way (e.g., Murray & Aspinall 2001), and only limited evidence to support this assumption (e.g. Craik 1972). Therefore, it seems reasonable to conclude that increased public participation could result in improved trail design. In contrast with the current emphasis on a single, ideal landscape to satisfy all users under most circumstances, findings from this study highlight the need to maximize opportunities for diverse nature experience in order to accommodate the varied needs and preferences of different users under changing circumstances.

Public participation could be used to determine which features, attributes, or combinations thereof are considered highlights by users, since their reactions may differ from those of trail design professionals. These data could be especially useful for transforming underutilized areas into ones which attract greater numbers of people by providing more satisfying nature experience. Specifically, user studies might uncover ways to design linear trails which are regarded more favorably, rather than being seen as redundant and thus inferior to circular trails.

New techniques may be needed to facilitate the type of public participation recommended. Videography could be used as a research tool for studying hikers' spontaneous reactions to an existing trail. It could also be used by hikers to deliberately record features of interest as they assist in designing new trails or evaluating existing ones. Perhaps a simplified version of the HIKEN™ notation system could facilitate public participation as well. This notation could be used in tandem with GPS

and GIS, tracking features of interest along with hikers' reactions to those features.

## 6.0 Concluding Remarks

As technological advances increase the availability and quality of equipment needed to conduct field studies, research no longer need be confined to the laboratory setting. Based on the findings from this study, I would submit that field studies are essential in order to gain a better understanding of nature experience. Microvideo cameras can provide unobtrusive and inexpensive means of capturing dynamic, multisensory information over a significant period of time. Follow-up techniques can be devised to validate and expand upon data collected in the field.

Clearly, this approach to research is more time-consuming (and thus more costly) than many laboratory techniques. Although large-scale use of the microvideo technique described in this paper may not be realistic or even desirable, this methodology could provide a powerful means of generating new theory and concepts. This technique could also be useful for pre-testing, e.g., for guiding selection and composition of simulations, and for hypothesis-testing about reactions to specific trail sections, features, or attributes.

Findings from this research exposed many weaknesses in the traditional approach to studying human response to nature, challenging many assumptions implicit in the extant literature. Moreover, this research has demonstrated that many theories and concepts which retain their relevance in a real-world context, will need to be adapted in order to deepen our understanding of human transactions with nature. Findings from this study also suggest that the current research agenda has been unduly constrained by limitations in the existing methodology. This is not surprising, given that theory and method are mutually reinforcing. As explained by Sommer and Sommer (1980/2002), "Research shapes a theory by bringing it into accord with the observable world. . . . Theories suggest additional questions to be examined and answered, which leads to further research and subsequent refinement of the underlying theory" (p. 3).

A methodological shift is under way in studies of human response to nature, capitalizing on new computer technologies to create more ecologically valid simulations which can replace static, two-dimensional stimuli. I would argue, however, that this shift will yield only limited results unless accompanied by a concomitant change in the underlying theoretical paradigm. Without a change in paradigm, advanced technological techniques will inevitably be used to address the same research questions albeit in new ways, and important dimensions of nature experience will remain unexamined. Ittelson's (1973) environment perception framework can serve as a guidepost for shaping a new research agenda to deepen our understanding of human-nature transactions. In embracing the tenets of Ittelson's framework, this exploratory study of the hike experience represents a tentative yet viable step forward. Moreover, the many conceptual and practical implications of this study are testament to the critical link between method and theory.

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