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Congruence Between Recreational Mode and Actual Behavior—A Prerequisite for Optimal Experiences?

Joar Vittersø
University of Tromsø, Norway
Marit Vorkinn
Eastern Norway Research Institute, Norway
Odd Inge Vistad
Norwegian Institute for Nature Research, Norway

The paper presents a theoretical framework and empirical research. It intends to broaden understanding of the dynamics of emotions and subjective experiences as they develop during a recreational event. The hypothesis is that a congruence between recreational mode and actual behavior facilitates the optimal recreational experience. Data sets from two Norwegian studies, comprising sport fishers, canoeists, and hikers, were examined against this hypothesis. In the first study, 346 participants completed questionnaires measuring place attachment, activity goals and affective responses during their recent fishing trip. In Study 2, outdoor recreationists (n = 305) were approached in the field and asked to describe their recreational mode and to report on their affective responses during an active and a resting phase of the trip, respectively. Analyses were undertaken by means of the so-called flow-simplex, revealing that optimal experiences typically develop if the recreational mode is congruent with the present recreational event. The two studies suggest that it is not possible to understand the dynamics of a recreational experience unless the issue of cognitive representations is considered.

KEYWORDS: *Emotions, optimal experience, flow, simplex, recreational mode*

Introduction

As a new century begins, attention to affect and emotion has been recognized as an essential aspect of any study of humankind (Lewis & Haviland-Jones, 2000). In the social sciences ever more books and articles address the issue, and this growing interest has spread to the field of leisure. For example, searching the *Journal of Leisure Research* archives on the Internet reveals that in the period from 1970 to 1979 only four articles were published with "affect" as a key word. From 1980 to 1989 eight were published. However, between 1990 and 1999 the figure was 19. Similarly, combining the keywords "affect" and "leisure" in the database *PsycLIT* produces ten hits for

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Address correspondence to: Joar Vitterso, Department of Psychology, University of Tromso, N-9037 Tromso, Norway. Tel: + 47 77 64 63 69 (Voice), + 47 77 64 52 91 (Fax); E-mail: joarv@psyk.uit.no

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the period from 1970 to 1983 but 48 hits for the period from 1994 to 2000. Following Hull (1990), who argued that moods and emotions are significant, prevalent and relevant products of leisure activities, this paper presents a theoretical framework, supported by empirical research, intended to broaden understanding of the dynamics of emotions and experiences as they develop during a recreational event. Because recreation is mainly accompanied by pleasant affect (though not always, e.g., Kelly, 1987; Tinsley & Tinsley, 1986; Weissinger, Caldwell, & Bandalos, 1992) our primary focus will be on positive affect (Seligman & Csikszentmihalyi, 2000).

This article draws heavily on psychological theories. Thus, certain technical terms need to be explained in some detail. Besides the notion of optimal experiences, the following concepts play a central role in the presentation: (1) the Wundt curve, (2) cognitive representations, and (3) correlation matrices defined as a simplex structure.

The Wundt Curve and Modes of Experience

The development of a systematic understanding of optimal experiences goes back at least to Wilhelm Wundt (see for example Berlyne, 1974), who offered a general formulation of positive affects which is now known as the "Wundt curve." In the Wundt curve, as the intensity of the perceived stimulus increases, so does the extent to which the perceiver finds the perception pleasant. However, the pleasantness increases only up to a point. Thereafter pleasantness decreases again.

Since Wundt's time, the inverted U curve has been assumed to apply to different kinds of independent variables relevant to pleasantness, such as arousal, novelty, uncertainty, discrepancy from adaptation level, informativeness and complexity (e.g., Teigen, 1987). For stimulus complexity, a prediction can be made about the capacity to process information: While very simple stimuli contain little information and are therefore boring, and extremely complex stimuli are so informative as to be difficult to comprehend and appreciate, an intermediate level of complexity is both comprehensible and challenging (Moles, 1966). In relating this paradigm to the domain of leisure, it is important to note that recreation events involve several sources of stimuli, rather than a single stimulus source. For example, Knopf (1987) and Williams (1988) believe there are at least three sources of stimulation or "modes" individuals attend to in the out-of-doors: the place, the activity and the social environment. In this article, we will address the place and the activity modes and how they relate to the dynamics of optimal experiences. What we propose is that a match between a recreationist's preferred mode of experience and the actual recreational event determines, to some extent, the quality of the subjective experience felt by the person during the event. The mechanism governing the matching process is mediated by cognitive representations.

Representations, Goals and Plans: The Piagetian Schema

With very few exceptions (notably Husserl, 1929, and Gibson, 1966), cognitive scientists believe that stimuli are not directly perceived, but rather mediated through a cognitive representation. A stimulus has no meaning unless the mind is able to integrate the stimulus into an existing cognitive structure. Here we take the schema as the unit of mental representation, using the concept basically in the Piagetian sense. The concept of schema is important because, in the Piagetian sense, it refers to (a) a generalized *representation* (e.g., what a particular lake looks like), (b) a *goal* for an activity (e.g., to catch fish), and (c) a *plan* for the execution of behavior (e.g., how to get to the lake and start fishing once you got there). We will argue that these three elements of a schema are essential components in the production of an emotion. We are, of course, aware that numerous other conceptualizations of the term "schema" exist (e.g., Bem, 1981; D'Andrade, 1992; Fiske & Taylor, 1991; Mandler, 1984; Markus, 1977; Schank & Abelson, 1995; Wyer & Carlston, 1994), and that these conceptualizations are different from Piaget's original formulation.

The Piagetian notion of a schema has been criticized for its vagueness (Neisser, 1994), but it is nevertheless employed here because of its explanatory power. The Piagetian schema enables an understanding of optimal experiences as a critical unification of the interplay among representations, goals and plans, as explained below.

Piaget's ideas about circular reactions are also relevant to present purposes. In its most basic form, and understood in simple but sufficient terms, a circular reaction may be described as a perceptual cycle (Neisser, 1976). In the cycle, a schema directs a person's perceptual exploration, and the activity of exploration samples relevant information from the environment. This information, in turn, modifies the schema. As an example, consider Tuan's view of how a perceived unity of the geographical environment evolves into a place. "What begins as undifferentiated space becomes place as we *get to know it better* (italics added) and endow it with value" (Tuan, 1977, p. 6). By itself the place cannot change the experience, but experience can change the place. Obviously a space becomes a meaningful place only when a fairly sophisticated cognitive representation of it has developed. The perceptual cycle offers a defensible explanation for how such a knowledge structure unfolds. The perceptual cycle emphasizes the interplay among schemas as they direct attention toward specific elements in the actual world, elements which then further develop and broaden the initial schema.

Optimal Experiences

To account for optimal experiences in a Piagetian tradition, Eckblad (1981) has developed a distinction between the *present activity* and the *present totality*. The former term denotes what a person is doing just now (thinking, fishing, canoeing, hiking, etc.). The present totality refers to the goal for the present activity, and it is in fact not unlike the notion of modes of experience. Consider the following. A person's primary goal is to enjoy a particular place. To get there, however, he or she needs to walk into the area, and during the hike the present totality and the present activity will necessarily not be identical. Later on, after finally getting there, the totality and the activity would be identical as the person starts to explore the place. That is, the means and goals for the current activity are not represented as separate entities in awareness. Attention is therefore not divided between the two.

Undivided attention is a core characteristic of optimal experiences. For example, consider the description given by the famous early American landscape architect Frederick L. Olmsted, in portraying the way a perfect natural experience stands out for him:

> ": . . . the attention is aroused and the *mind occupied without purpose* (italics added), without a continuation of the common process of relating the present action, thought or perception to some future end."
>
> (Olmsted, 1872, cited in Sax, 1980, p. 20).

A description like this is explained in Eckblad's theory with reference to a schema that functions simultaneously as totality (goal) and activity (executing a plan), thereby excluding from awareness external goals or other processes that normally distract its attention. The phenomenon is exemplified in Olmsted's description of optimal experiences and is abundantly attested elsewhere. During an optimal experience, the beholder's attention must be totally absorbed by the current activity. As the activity proceeds, the goal of the activity and the execution of plans to reach the goal are not represented as separate entities in awareness. According to Eckblad (1981), the merging of goals with their plans will *capture* the attention of the individual, and the captured attention is precisely the reason why the state is felt to be so absorbing and intense. In Eckblad's terminology, this is what happens when a schema becomes spontaneously active. The integration of plans, goals and representations into a dynamic theory of optimal experiences is the reason why the term "schema" is offered as our basic explanatory concept in this article.

Although Eckblad's explanation provides a comprehensive understanding of optimal experiences, other conceptualizations of the phenomenon are better known. For example, within the recreation literature, Csikszentmihalyi's theory of flow is widespread (e.g., Csikszentmihalyi, 1975; Csikszentmihalyi, 1981; Csikszentmihalyi & Csikszentmihalyi, 1988; Csikszentmihalyi, Kleiber, & Driver, 1992; Kleiber, Larson, & Csikszentmihalyi, 1986). In Csikszentmihalyi's work, flow is viewed as an ideal condition midway between boredom and anxiety, typically described in terms such as these: "Your concentration is very complete, your mind isn't wandering, you are not thinking of something else; you are totally involved in what you are doing" (Csikszentmihalyi, 1975, p. 39). Based on a systemic view that takes into account the organism's complexity and capability for self-reflection, Csikszentmihalyi

(1975) found the following characteristics of flow experience: (1) a merging of action and awareness, (2) a centering of attention on a limited stimulus field, (3) self-forgetfulness, (4) provision of clear and unambiguous feedback, and (5) an "autotelic" nature; which means the flow experience appears to need no goals or reward external to itself. Particularly in his early writing, Csikszentmihalyi underlined the importance of harmony between the present totality and the present activity. "Perhaps the clearest sign of flow is the merging of action and awareness," said Csikszentmihalyi in 1975 (p. 38). This notion is perhaps more elegantly expressed by the poet William Butler Yeats, "How can we tell the dancer from the dance?"

One reason why we prefer a schema-theoretical account of optimal experiences over the flow theory is clarified by Wicklund (1986). He argues that although Csikszentmihalyi has gone a long way toward characterizing the psychological qualities of human experiences, it remains unclear how the human arrives at a dynamic fit between skills and challenges with respect to any given aspect of the environment. Wicklund grants that the problem has been duly recognized by Eckblad. Wicklund then refers to the suggestion that there must be a schema—a backlog of personal capabilities and/or experiences—that would enable the person to undertake spontaneous activity in the environment in question for optimal experiences to occur (Wicklund, 1986, p. 66). Furthermore, Eckblad's contribution towards integrating optimal experiences into a broader psychological framework is acknowledged by Csikszentmihalyi himself (Csikszentmihalyi, 1988, p. 10).

Schemas and the Wundt Curve

The congruence between present totality and present activity is only half the story of Eckblad's theory of optimal experience. Generally, she proposes, the quality of a feeling state will be determined by the level of so-called *Assimilation Resistance* (AR) a person encounters during an activity. Following ideas from Piaget, Eckblad assumes information which is not congruent with the expectations built into a schema will resist assimilation. Assimilation refers to the integration of new contents (objects, events) into an existing system of schemas, and assimilation resistance refers roughly to amount of discrepancy between expectation and outcome experienced by a particular subject in relation to a particular object event. With small amounts of assimilation resistance, typically a feeling of easiness and relaxation accompanies the situation. If assimilation resistance is somewhat higher, the experience is pleasantness and satisfaction. At even higher levels of assimilation resistance, a feeling of interest is the typical reaction. At still higher levels of AR, affects such as feeling challenged are produced. Finally, if the AR becomes very large, affects such as difficulty, irritation and frustration will be the dominant experience. The relation between the affect variables is such that *easy* < *pleasant* < *interesting* < *challenging* < *difficult* in terms of assimilation resistance. This formula suggests, in contrast to Wundt and the idea of a single curvilinear relationship between stimulus intensity and hedonic experience, that pleasantness is one among several distinguishable positive affects related to the processing of information from a stimulus. Feelings of both interest and challenge are hypothesized to show a nonmonotonic function of assimilation resistance, with their unique peaks at increasingly higher levels of AR. The principle is graphically demonstrated in Figure 1.

In contrast to the term "stimulus intensity," the concept of assimilation resistance implies that the affective response to an event is a function of a subjective interpretation of the situation and not of the "objective" stimulus as such. To state, as Wundt did, a direct relation between stimulus intensity and hedonic experience is thus an oversimplification. Actually, evidence suggests that people's interests and knowledge are more fundamental to their preferences than complexity as an objective item (Martindale, Moore, & Borkum, 1990). The idea that people's interest and knowledge play a major role in determining the perceived complexity of the situation is important. It implies that the overall goal for a specific event will determine the kind of schemas to be activated. In turn, this fact directs the perceptual process toward certain aspects of the surroundings. According to Bruner (1951), perceptual readiness reflects both goal pursuit and the learned occurrence of events in everyday life. Hence, goals are predispositions that produce a readiness to respond to certain types of goal-relevant stimuli.

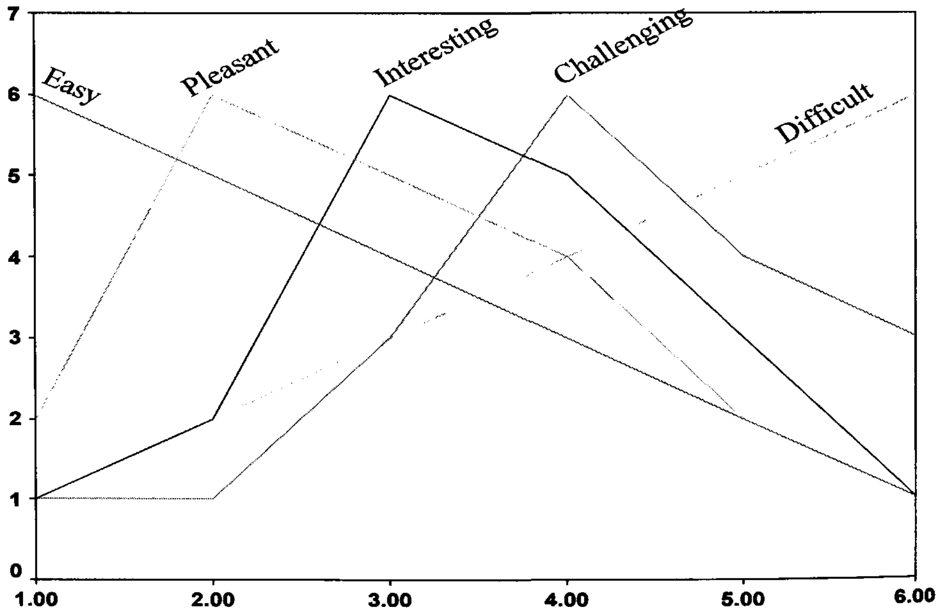

Figure 1. Illustration of the curvilinear relations between AR (along the x-axis) and a set of affective responses, the intensity of which are illustrated by increasing values on the y-axis. Note that each of the affects peaks at a particular amount of AR and taper off with both increasing or decreasing levels. (Hypothetical data).

Expectancies associated with the learned probabilities of occurrence involve hypotheses about what to look for, and stimulus information is checked to test the hypotheses (Bruner, 1951, cited in Higgins, 1996, p. 136). For example, a visitor in a highly focused place mode might closely examine the natural environment. "Stones are picked up, balsam needles smelled, berries eaten and birds identified, making intimate knowledge of the place and its inhabitants central to the recreation experience" (Jacob & Schreyer, 1980, p. 375). A schema-theoretical interpretation of this description is that the person will feel the situation as interesting, or maybe challenging, because the objects under inspection are not completely understood (otherwise it would not be necessary to inspect them more closely), which is to say that perceptions of the objects does not proceed without some resistance offered by the activated schemas.

This point may be illustrated with other examples. Consider a fishing trip with the overall goal of catching a kind of fish that is hard to get. Your schemas in this scenario will not only lead you through the act of fishing but probably also steer you toward actions at the outer edge of your abilities. Just as stones are picked up and investigated in a place mode, thoughtful strategies and techniques of observation will be explored during the activity mode of a fishing trip. In such a mode your skills will necessarily be challenged by the requirements of the situation (otherwise the fish would not be considered hard to catch) and your operating schemas will be working close to the limits of their capabilities. In the language of schema theory, the fishing activity will resist smooth assimilation and, due to the complexity perceived in the situation, generate a feeling of interest or challenge.

This perspective is informed by a study conducted by Vittersø (1997), who demonstrated that when asked to describe a perfect fishing experience, highly specialized anglers reported that their dominant feeling was one of interest and challenge. The less specialized anglers in the study reported their dominant feelings to be ease and pleasantness. Since the study participants were asked about their *perfect* experiences, we may infer that low-specialization anglers had actively searched out (and found) an event in which the level of AR was low or moderate, whereas the specialists had looked for events with higher degrees of AR.

This reasoning fits nicely with Ittelson, Franck, and O'Hanlon (1976) and their account of an environmental experience. According to these authors the most salient characteristic of an environmental experience is that individuals actively utilize their resources in order to create a situation in which they can carry out their activity with a maximum of satisfaction. Consequently, different kinds of positive affects will be sought by recreationists who differ in their recreational modes.

According to Kruglanski (1996), little systematic research exists on how goal orientation effects thought activation, although some evidence supports the view that complexity is sought when present activity and present totality are in harmony. If we accept intrinsically motivated experiences as one kind of optimal experiences, Harter (1978) becomes relevant to the discussion.

Harter suggests that what lies beneath intrinsic motivation is curiosity for novel stimuli and a preference for challenging or demanding tasks. In accordance with this view, Pittman, Emery, & Bohhiano (1982) found that, compared with subjects in an extrinsically motivated orientation, subjects involved in activities that were approached as ends in themselves sought novelty, complexity and the opportunity to experience mastery.

In the work reported in this article we assume that different recreational goals activate different representations of the recreational event, and in doing so they predispose the individual with a readiness to respond to certain types of mode-relevant stimuli. Following the writings of Eckblad (1981) and Ittelson et al. (1976), we expect that events in which there is a match between the present activity (i.e., the recreational event) and present totality (i.e., the recreational mode), a readiness to perceive greater complexity will be dominant. In turn, this readiness will produce optimal experiences.

Measuring Positive Affect—the Flow-simplex

The assumption made in Eckblad's theory that $E < P < I < C < D$ in terms of assimilation resistance is empirically testable. The good news about the empirical test is that graphically presented, it enables a parsimonious description of the relations among the variables, and of their relation to any independent variable of interest. The bad news is that the methodological logic is somewhat sophisticated. First and foremost, since the variables (namely pleasantness, interest and challenge) are curvilinearly related to AR, most statistical methods will fail to reproduce the true structure of the data, simply because of the linear assumptions inherent in these methods. Fortunately, under some circumstances a principal component analysis (PCA) may be successfully used in the analysis of such data. The proper conditions for PCA occur whenever the correlation matrix generated from the data conform to the pattern of a so-called *simplex.*

The term "simplex" was coined by Guttman (1954) as one of the components in his theory of ordered factors. (The theory of ordered factors was suggested as an alternative to the better-known theory of common factors (Thurstone, 1947)). In principle, the idea of a simplex is straightforward. It refers to a difference in *degree* among a set of variables belonging to a single, hierarchically organized dimension. The name "simplex" refers to a *sim*ple order of com*plex*ity among variables of the same kind. It is important to be aware that this hierarchical structure of a *single* dimension will not be reproduced by common factor or principal component analysis. The simplex structure may, however, be detected by inspection of the correlation matrix produced by the simplex variables. Briefly, the simplex structure is recognized in a correlation matrix if there exists a permutation of the rows and the columns such that the entries taper off from the highest values along the diagonal to the lowest values in the lower left corner. Furthermore, the column totals would be approximately curvilinear, with the lowest values at the extremes of the table and the maximum in the middle of the table.

In 1977, Mark Davison provided evidence that a PCA may be useful in the analysis of a simplex structure, if a set of variables conforms to the following conditions (slightly simplified[1]):

1. The correlation matrix will display a simplex-like structure.
2. If variable k is intermediate to variable j and l in the ordering and if the product of correlations $r_{jk}r_{kl}$ is negative, then the partial correlation $r_{jl \cdot k}$ must be negative.
3. Principal component analysis of the correlation matrix will yield a semicircular, two-factor structure. Along the semicircle, variables will be ordered by their positions on the stimulus dimension.

(Davison, 1977, pp. 523-524).

In other words, given that these assumptions are met, a principal component analysis is a useful tool in revealing relationships among variables that are related to a single causal dimension in a curvilinear fashion. The relationship depicted in Figure 1 is an example of a set of unfolded data demonstrating Davison's propositions (see Vittersø, 1998 for details).

The hypothetical relation between affects and AR presented in Figure 1 is analysed by means of a PCA in such a way that *easy, pleasant, interesting, challenging* and *difficult* are represented in the columns (variables) of the data matrix and level of AR is represented in the rows (units). Data are entered for each variable according to their values on the Y-axis at each of the six levels of AR marked along the X-axis. The correlation matrix from these data is presented in Table 1.

As can be seen in the table, the matrix clearly reveals a simplex-like structure, in that the entries taper off from highest values along the diagonal to lowest values in the lower left corner. Furthermore, the column totals are approximately curvilinear, with the lowest values at the extremes of the table and the maximum in the middle of the table (cf. Davison's first proposition).

TABLE 1
Correlation Matrix for Hypothetical Flow-Simplex Data

	1	2	3	4	5	$r_{jk}r_{kl}$	$r_{jl \cdot k}$
1. Easy	1.000	.489	−.51	−.620	−1.000		
2. Pleasant	.489	1.000	.533	−.107	−.489	−.239	−1.000
3.Interesting	−.51	.533	1.000	.603	−.51	−.3	−1.000
4. Challenging	−.620	−.107	.603	1.000	.620	−.384	−1.000
5. Difficult	−1.000	−.489	.51	.620	1.000		
SUM	**−.18**	**.143**	**.214**	**.150**	**.18**		

[1]Actually, Davison refers to Coombs' notion of unfolding data in his explanation (Coombs, 1964). In the interest of simplicity, Coombs theory is not included in the current presentation. Please notify, however, that the flow-simplex is developed in accordance with Coombs theory.

Regarding Davison's second proposition, the product correlation for the anchor variables (i.e., *easy* and *difficult,* equivalent to variables *j* and *l* in Davison's formula) is negative, as are the partial correlations for all intermediate variables (referring to a set of *k* variables in proposition 2). Finally, a semicircular, two-factor structure in which the variables are ordered along the semicircle according to their position on the AR dimension is confirmed (cf. Davison's third proposition). The semicircular structure is manifest in Figure 2. In the plot, the component loadings from the PCA serve as the coordinates in the two-dimensional Cartesian space.

Figure 2 shows that the variables follow each other along the circumference of a half-circle, in accordance with their maximal sensitivity to the underlying dimension of assimilation resistance. In accordance with geometrical convention (e.g., Wickens, 1995), the distance between two variables in a Cartesian space is interpreted as the strength of the association between them (because correlation coefficients equal the cosines of the angle between them). Thus, two variables correlating perfectly are presented in such a plot as completely overlapping, with 0 degrees between them (the cosine to an angle of 0 is 1.0). Zero-correlated variables are presented with an angle of 90 degrees between them; and so on.

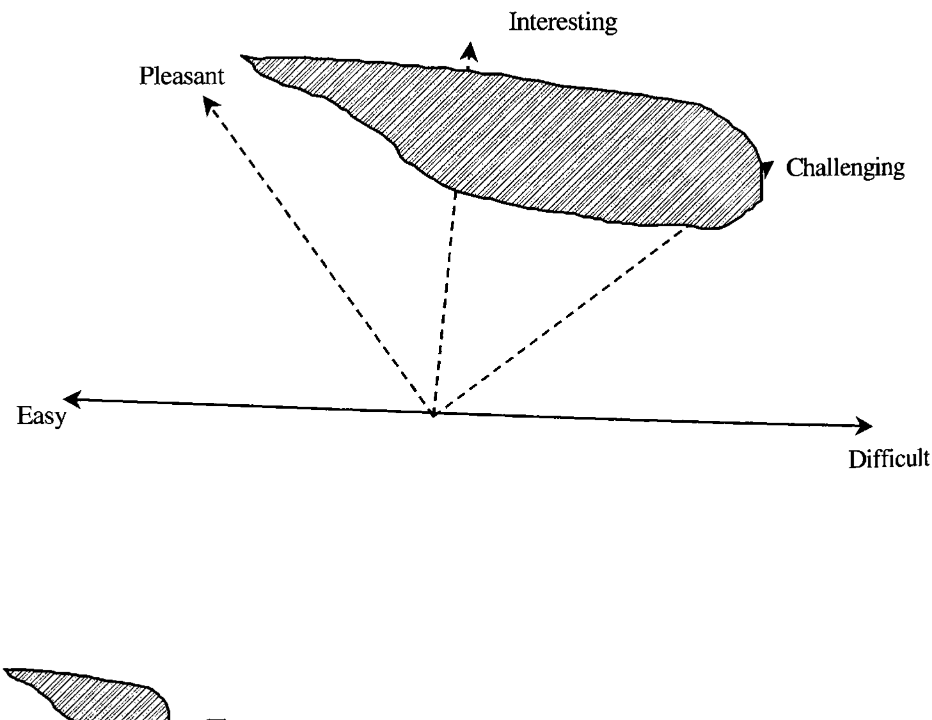

Figure 2. Graphical illustration of idealized flow-simplex. Principal component solution based on the function of affect on AR as illustrated in Figure 1.

Again, it should be underscored that the second component, the Y-axis, is not to be interpreted as an independent factor but as a mathematical artifact due to the linear arithmetic underlying PCA analysis (Coombs & Kao, 1960; Spector, Van Katwyk, Brannick, & Chen, 1997; van Schuur & Kiers, 1994).

In Figure 2, hatching covers part of the graph. This is the so-called flow area of the model, named after Csikszentmihalyi's concept of flow, which also gives its name to the whole configuration of the *flow-simplex*. Admittedly, a more precise term would be "optimal experience simplex" (with an "optimal experience area"), but the terms "flow-simplex" and "flow area" are chosen for concision. In this paper "flow" and "optimal experience" are used interchangeably.

In the current state of the model, little is known about the exact demarcation of optimal experiences. The borders of optimal experiences in the schema theoretical framework are elusive, and until more empirical data have been gathered, only approximate locations of optimal experiences can be provided. However, given that intensity is normally recognized in configurations like the flow-simplex as the length of the vectors in the plot (Daly, Lancee, & Polivy, 1983; Reisenzein, 1994), optimal experiences will always be located at some distance from the origin. Moreover, optimal experiences are restricted to the area between pleasant and challenge.

To recapitulate the discussion to this point, it has been illustrated that principal component analysis (PCA) is a useful tool for determining the order of a set of variables when that set of variables is curvilinear in relation to common cause, given that this cause reveals a simple order of complexity. In the case of a flow-simplex, all variables along the half-circle represent the same underlying dimensions of assimilation resistance. (In other words, their interrelationships are not explained by reference to two different factors, as would be the proper interpretation of a PCA based on a normal correlation matrix rather than a simplex matrix.) Level of assimilation resistance increases clockwise along the semicircle, starting at the *easy* variable and moving toward the *difficult* variable. Variables located close to each other are highly and positively correlated.

In addition to this dimension of AR, a second dimension is reflected in the flow-simplex as intensity of affect. Intensity is interpreted as distance from the origin.

Aim of the Two Studies

To explore the relationship between recreational modes and optimal experiences, people with different goals were asked to report their subjective feelings during a recreational event. In Study 1, described below, we assumed that during a fishing event, unification of the present totality and the present activity would be more pronounced among subjects expressing high involvement in the fishing event itself (the *activity goal* group). This would not be the case for subjects expressing close attachment to the area in which they fish (the *place attachment* group). Despite the fact that the activity was the same for both groups, we speculated that the disparity between place mode and activity mode would result in different emotional reactions. Since optimal experiences are hypothesized to occur when goal and action merge, subjects reporting high activity involvement should have more optimal experiences during their fishing event.

In Study 1 the concept of recreational mode was approached only indirectly. Thus a second study was designed to obtain greater sensitivity to recreational modes. The subjects in Study 2 were approached in the field and asked about their primary goals for the particular event and their affective responses to it during two separate periods of the trip. The first phase was one of activity, the next one of rest. We hypothesized that subjects who emphasized landscape and scenery goals would be most able to concentrate their attentional resources on the landscape during a resting period (defined by themselves as "good"), with an increased likelihood that they would have optimal experiences during non-activity phases of the trip. During the activity phase, we assumed their experiences would be similar to those of the place-attached subjects in Study 1. Moreover, we assumed hikers and canoeists with a pronounced activity goal would manifest greater congruence between present activity and present totality during the activity phases of the trip. Hence, we hypothesized that they would have optimal experiences during activity phases. No hypotheses covered these subjects during their resting phase.

Study 1
Method

Participants

The data for this study were extracted from a questionnaire mailed to 748 Norwegian sport fishers and self-administered. Names and addresses for the subjects were randomly collected from a list of buyers of fishing licences for northern districts of Norway. Follow-up procedures included two reminders mailed to non-responders approximately 14 days and 30 days after the initial mailing, respectively. In total, 401 properly filled-out questionnaires were returned, yielding a response rate of 64%. Among the respondents, 346 had some experience with fishing in northern Norway. Because of our investigation of place attachment to areas in northern Norway, only these 346 subjects were selected for the analyses reported in this study.

Measures

Measures were obtained for each subject's affective responses during a typical fishing experience (i.e., responses to the flow-simplex adjectives), for involvement in sport fishing, and for place attachment.

Affects. Affective experiences were assessed by asking the subjects to recall a typical sport fishing experience and to describe it in terms of the following adjectives: *Interesting, Difficult, Pleasant, Challenging, Easy,* and *Joyful.* Each item was followed by a rating scale ranging from 1 (does not conform with the experience at all) to 7 (conforms perfectly with the experience). Only scaling endpoints were labeled. The items were assessed as unipolar constructs. Their psychometric qualities were evaluated according to the principles outlined above.

Activity goal. The following three items were used to measure activity goal: '*Fishing is the most important activity in my life,*' '*To fish—the activity in itself—is important to me*' and '*If I didn't fish, the meaning of life would essentially be lost*'. Only the rating scale endpoints were labeled, according to the formula 1 = disagree completely, and 7 = agree completely. Cronbach's alpha for the scale was .79.

Place attachment. Three items were utilized in the assessment of place attachment: '*I feel attached to this place,*' '*I belong to this place,*' and '*This place is almost a part of myself.*' Only the rating scale endpoints were labeled, according to the formula 1 = disagree completely, and 7 = agree completely. Cronbach's alpha for the place attachment scale was .92.

Results

Exploring the Flow-simplex

As has already been explained, the prediction of a flow-simplex can be made from a Principal Components Analysis (PCA) according to the three propositions asserted by (Davison, 1977). For the data considered here, all three criteria for a simplex-like correlation structure were basically fulfilled. The first criterion was fulfilled because the correlations taper off from highest values along the diagonal to lowest values in the lower left-hand corner in the correlation matrix. Furthermore, the column totals in the matrix are curvilinear, with the lowest values at the extremes of the table and the maximum values in the middle of the table (Table 2). The decreasing correlation coefficients as one departs from the matrix diagonal, and the curvilinear tendency across column totals, are both basic characteristics of a simplex structure (Guttman, 1954).

TABLE 2
Correlation Matrix for the Flow-Simplex in Study 1

	1	2	3	4	5	6	$r_{jk}r_{kl}$	$r_{jl \cdot k}$
1. Easy	1.00	0.27	0.12	0.1	0.09	−0.25		
2. Pleasant	0.27	1.00	0.38	0.44	0.43	0	0	−0.25
3. Joyful	0.12	0.38	1.00	0.47	0.44	0.11	0.01	−0.27
4. Interesting	0.1	0.44	0.47	1.00	0.62	0.22	0.02	−0.28
5. Challenging	0.09	0.43	0.44	0.62	1.00	0.25	0.02	−0.28
6. Difficult	−0.25	0	0.11	0.22	0.25	1.00		
SUM	**1.31**	**2.51**	**2.53**	**2.86**	**2.83**	**1.3**		

Note. N = 319.

About the second criterion, the product of the stimulus correlations $r_{jk}r_{kl}$ is negative when k represents *pleasant* but not when k represents *joyful, interesting* or *challenging.* However, in these latter three cases the product of the stimulus correlation was extremely small (.01 for all three), and when these correlations are essentially zero the result is not inconsistent with the claim of a flow-simplex, although it does not provide strong support for it (M. L. Davison, personal communication, June 23, 1997). The partial correlations $r_{jl \cdot k}$ were negative for all intermediate variables (the $r_{jl \cdot k}$ were −.27; −.29; −.30; −.30 when k represents *pleasant, joyful, interesting* and *challenging* respectively). In the equation, j represents *easy* and l refers to *difficult* in all equations (cf. Table 2). Also, the semicircular two-factor structure, in which variables are ordered by their positions on the assimilation resistance dimension, is revealed in Figure 3. Finally, the Principal Component Analysis (PCA) showed that a two-component solution explains a large part of the variance, 65%, and for all variables the magnitude of communalities was .60 or above.

By this analysis, then, it seems that the basic criterion for the flow-simplex are met, and that a single dimension is able to explain relationships among the variables with the two-dimensional factor structure depicted in Figure 3.

Affective Response

In Figure 3, the affect items are located in the configuration according to their factor loadings from the PCA just reported. The figure also reveals

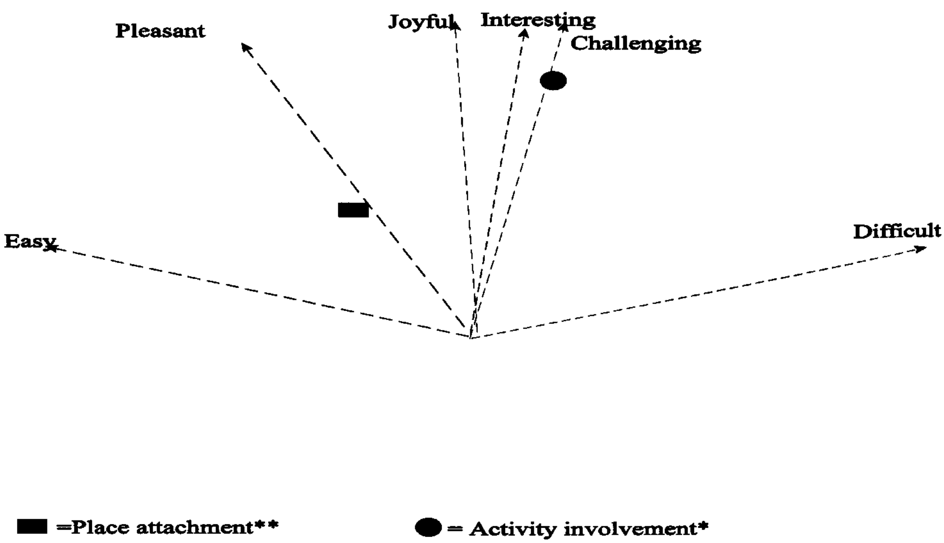

Figure 3. The flow simplex related to Commitment (circle) and Place Attachment (square). * = Significantly correlated with Factor 2. ** = Significantly correlated with Factor1 and Factor 2. N = 319.

the spatial location of activity involvement, which resides in the area of *interest* and *challenge.* The activity goal variable correlates at .10 with Factor 1 (n.s.) and .47 with Factor 2 ($p < .001$). The correlation coefficients are used as entries in the figure, such that the activity variable has a value of 0.1 on the X-axis and a value of 0.5 on the Y-axis in the XY plane. Finally, the place attachment variable correlates at −.12 ($p < .05$) with the first factor and .22 ($p < .001$) with the second factor. As shown in Figure 3, place attachment is located in the *pleasant* area of the flow-simplex. Note that the correlations reported are partial coefficients, a fact which implies that when the correlations between the factors and activity involvement were calculated, place attachment was controlled for, and vice versa.

Discussion

The aims of Study 1 were twofold. First, we wanted to replicate the flow-simplex structure from previous investigations that have addressed the relationship between cognition and affective experiences (see Vittersø, 1997; Vittersø, 1998; Vittersø, Vorkinn, Vistad, & Vaagland, 2000). Second, we wanted to test the hypothesis that subjective feeling states vary during a fishing event according to the degree of congruence between present activity and present totality. It was predicted that subjects revealing high activity goals would have a readiness to perceive greater complexity in the situation, and hence they would report interest and challenge as their most dominant feelings. By contrast, it was anticipated that high place-attachment subjects would be less inclined to search for complexity in the situation, and consequently they would report feelings of pleasantness rather than interest and challenge.

Generally, a flow-simplex structure was confirmed in the study. The correlation matrix produced by the affect items corresponded to a simplex structure, and in terms of Assimilation Resistance (AR) it met the assumption that *easy* < *pleasant* < *interesting* < *challenging* < *difficult.* For the sake of exploration, *joyful* was included in the PCA and was found to reside between *pleasant* and *interesting* in terms of AR. However, the product correlations for several affect items were without exception, although marginally, positive (Table 2, column 8), and geometrically, the spacing between *interesting* and *challenging* was smaller than anticipated (Figure 3). It is unclear whether this outcome is due to the subject of evaluation (a typical fishing experience) or the unipolar presentation of the items (as opposed to the original bipolar presentation of the flow-simplex items). As an example of the complexities, consider that in view of the fact that these terms are supposed to be true bipolar concepts (and one notes that the theoretical correlation for a pair of true bipolar items is not −1.00 but −.467; see Russell & Carroll, 1999), the actual correlation found between *easy* and *difficult* has a surprisingly small coefficient of −.24. Although debate continues (cf. Feldman Barrett & Russell, 1998, for a recent overview), it has repeatedly been shown that methodological artifacts such as acquiescence and random measurement errors may cause bipolar constructs to appear to be independent of each other

(Bentler, 1969; Green, Goldman, & Salovey, 1993). In other words, the low correlation found between *easy* and *difficult* in this study might be attenuated simply because of a methodological artifact.

As hypothesized, high activity goals were found to create interesting and challenging experiences in the subjects holding them. On the other hand, pleasantness was the typical feeling for people whose leisure goals were oriented toward the place itself. For the high activity goal subjects, our data indirectly support the notion that a match between present totality and present activity elicits a desire to explore novel stimuli and to attempt demanding tasks. According to Eckblad's schema theory, exploration will then give rise to the kind of feelings indicated by the activity goal variable in Figure 3.

The same argument might be just as useful in explaining the circumstance that place attachment was related to feelings of pleasantness. Rather than instigate a search for complex stimulation, subjects placing more value on the surroundings than on the activity would concentrate attention on the familiar and easily assimilated parts of the environment. Thus they would not get intensely involved with demanding behaviors.

Although our interpretation fits nicely with the theoretical assumptions presented earlier, the obvious shortcoming of Study 1 lies in our reasoning about the relationship between the present totality and the present activity. Although highly plausible, it does not follow as a consequence of a high score on activity goals that attention was undivided during the event retrospectively reported in our questionnaire. Neither does it follow that subjects high on place attachment have divided attention during the fishing event. The study simply does not offer a direct test of this assumption. Thus, a more controlled examination of the supposed relation between attention and affective responses is desirable, and it will be provided next.

Study 2
Method

Participants

Data were collected in the field in a recreational area of southern Norway called Fjorda. The study area is characterized by numerous lakes with complicated shapes, set in a forested landscape. The dominant recreational activity is canoeing (accounting for 85% of the participants in this study) and the canoeists usually sleep overnight in tents at primitive campsites. Questionnaires were handed out at the campsites, while both interviewer and subjects were canoeing, or in the parking area at the conclusion of an outing, and collected again immediately afterwards. Data collection stretched from mid-July to mid-August 1998, mostly on weekends. The interviewer approached every adult engaged in canoeing and encouraged him/her to fill in the questionnaire. Subjects completed 305 questionnaires.

Measures

Affects. The following pairs of bipolar adjectives (semantic differentials) were presented to the subjects as descriptors of their affective responses to the event: *Uninteresting—Interesting*, Difficult—Easy, Pleasant—Unpleasant*, Challenging—Tame*, Fun—Boring*, Frustrating—Not Frustrating**. Within each item, a rating scale from 1 (does not conform at all with the experience) to 7 (conforms perfectly with the experience) was located. Only scale endpoints were labeled. The items marked above with an asterix were reversed, to make increasing scores in accordance with the concepts of interestingness, pleasantness, challenge, fun and frustration. Affective experiences were assessed twice. First it was by asking the subjects to recall some event which was a highlight of the trip. It was specified that the event should have occurred during *an active period of the hike,* not during a resting phase. A similar procedure was followed immediately after subjects had responded with the first set of adjectives, but this time they were asked to remember some highlight from *a period of rest,* such as in a campsite or when they were beside a fire.

Activity mode. One item was designed to measure the degree of activity mode. It asked for a response to the statement: *"During this particular visit, my primary aim was to undertake a specific outdoor recreation activity."* The response format ranged from "Fits very poorly" (1) to "Fits very well" (7). The scale midpoint was labeled "Medium fit" (4).

Place mode. Again, a single item was designed to measure the degree of place mode. The subject was invited to consider the statement *"During this particular visit, my primary aim was to experience the area itself, and the landscape."* The response format extended from 1 ("Fits very poorly") to 7 ("Fits very well"). The scale midpoint (4) was labeled "Medium fit."

Results

Exploring the Flow-simplex

For the data in Study 2, all three criteria for a simplex-like correlation structure were fulfilled. The correlations taper off from the highest values along the diagonal to the lowest values in the lower left-hand corner in the correlation matrix, and the column totals in the matrix are curvilinear, with the lowest values at the extremes of the tables and the maximum in the middle of the table (Table 3). Moreover, the product of the stimulus correlations $r_{jk}r_{kl}$ were negative for all k's (i.e., when k represents *pleasant, fun, interesting* or *challenging*). The partial correlations $r_{jl\cdot k}$ were negative for all intermediate variables (the $r_{jl\cdot k}$ were −.29; −.41; −.41; and −.37 when k represents *pleasant, fun, interesting* and *challenging* respectively. Furthermore, j represents *easy* and l refers to *frustrating* in all calculations). Finally, the semicircular two-factor structure, in which the variables are ordered by their positions on the assimilation resistance dimension, is revealed in Figure 4.

TABLE 3
Correlation Matrix for the Flow-Simplex in Study 2

	1	2	3	4	5	6	$r_{jk}r_{kl}$	$r_{jl \cdot k}$
1. Easy	1.00	0.49	0.08	0.04	−0.34	−0.41		
2. Pleasant	0.49	1.00	0.28	0.16	−0.21	−0.36	−0.18	−0.29
3. Fun	0.08	0.28	1.00	0.4	0.25	−0.15	0	−0.41
4. Interesting	0.04	0.16	0.4	1.00	0.34	0	0	−0.41
5. Challenging	−0.34	−0.21	0.25	0.34	1.00	0.2	−0.1	−0.37
6. Frustrating	−0.41	−0.36	−0.15	0	0.2	1.00		
SUM	**0.87**	**1.38**	**1.86**	**1.93**	**1.23**	**0.25**		

Note. N = 205.

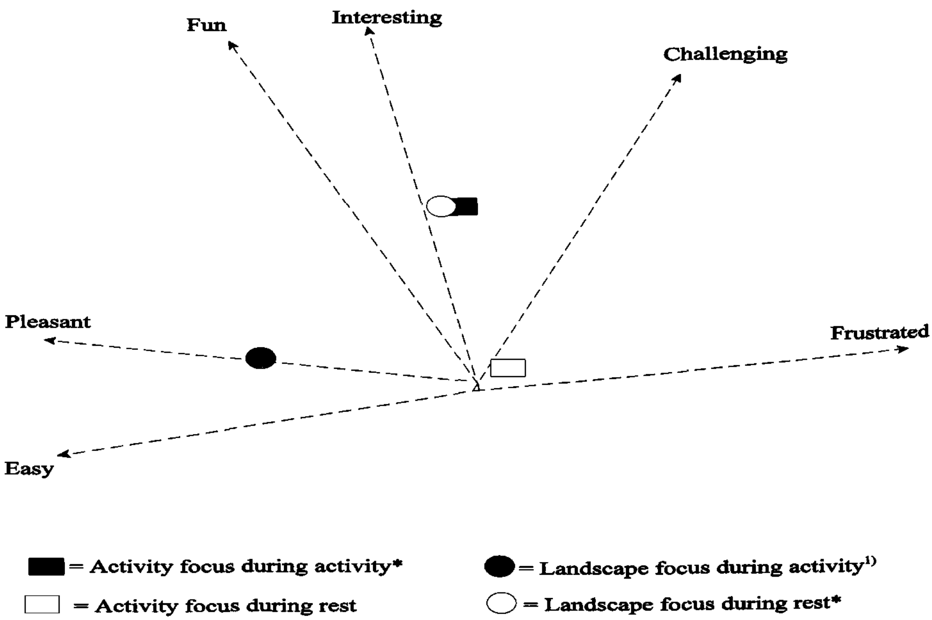

Figure 4. The flow simplex related to goals being participating in an outdoor activity during a period of activity (filled square) and a period of rest (open squares), and to goals being experiencing the landscape during a period of activity (filled circle) and a period of rest (open circles). * = Significantly correlated with Factor 2. [1)] p = .06 on Factor 1. N = 205.

The PCA also showed that a two-component solution explains a large part of the variance (63%), and for all variables except frustration the communalities exceeded .64. The communality for frustration was .49. It seems safe to conclude that the affect items used in Study 2 reflect a flow-simplex. Hence a single dimension is able to explain the relationship among the variables in the two-dimensional factor configuration revealed in Figure 4. Note that Factor 1 in Figure 4 is reversed (flip-flopped) to be in accordance with the X-axis in Figures 2 and 3 (see Gorsuch, 1983, p. 61, for flip-flopping procedures in factor analysis).

Affective Experiences

Figure 4 shows that people in an activity mode report experiences in the area between *interesting* and *challenging*, in a manner similar to the activity involvement variable in Study 1. The activity mode variable correlates at −.01 with Factor 1 (n.s.) and .16 with Factor 2 ($p < .05$) during a highlight event related to an active phase of the trip. The activity mode variable also correlates at .03 with Factor 1 (n.s.), and .01 with Factor 2 (n.s.) for a highlight event that occurred during a phase of rest. In other words, subjects with a strong focus on the activity did report their affects to be flow-like during an active phase of the trip, whereas they reported a state of neutral feelings during rest. Subjects with high scores on the place mode variable, on the other hand, experienced the activity highlights as pleasant (a result similar to that for the place attachment variable in Study 1) and the resting highlights as flow-like. At rest, for subjects high on place mode, the place mode variable correlated at −.02 with Factor 1 (n.s.) and .16 with Factor 2 ($p <$ .05). During activity the place mode variable correlated at −.12 with Factor 1 ($p = .06$) and .04 with Factor 2 (n.s.). As for Study 1, the correlations reported are partial correlations, controlling for activity mode and place mode respectively in the two analyses.

Discussion

Study 2 set out to search for the underlying structure of a flow-simplex as measured by bipolar adjectives, and such a model was verified by the data. Study 2 also aimed to confirm the relationship between present totality / present activity harmonies and affective responses according to the theories presented initially.

During periods of activity, persons who undertook a trip for reasons primarily related to the activity itself showed affective responses resembling those involved in activity mode from Study 1, i.e., in the flow area of our model. Moreover, for subjects whose primary concerns were landscape and scenery, affective responses resided in the pleasantness area (i.e., in the same area as the place attachment variable was located in Study 1). This finding supports our hypothesis that when goals and actions are not separated in awareness, the intrinsic allocation of attentional resources will be toward complex and demanding stimulation, providing feelings of interest and challenge. However, when the setting was changed from an activity phase of the trip to a period of rest, the picture changed substantially. During a highly valued rest, the affective responses for subjects in a place mode switched from pleasantness to flow. On the other hand, subjects high on the activity mode went from flow to neutrality as the situation itself switched from activity to rest.

General Discussion

The two studies described in this article promote a focus on emotional aspects of leisure and recreation. We have shown that subjects with high scores on activity mode do report optimal experiences during a highly appreciated period of the relevant activity. Subjects in place mode feel pleasantness rather than flow during an active phase of the recreational event. For these subjects, the experiences become more flow-like when they are in a satisfying period of rest in the same area. The mental interplay between one's cognitive representations and activity (in a broad, Piagetian sense, including perception as well as physical activities) is suggested as an explanation for what determines the affective quality in different recreational situations. It is important to note that the affects reported here reflect responses to special and highly favorable episodes during a recreational event, not random or average experience. Thus we do not argue that recreation produces a constant stream of optimal experiences or pleasantness.

Our studies suggest that we are unable to understand the dynamics of recreational experiences unless the issue of cognitive representation is considered. Optimal experiences will occur if the overall recreational goal (present totality) and the recreational event (present activity) are in such harmony that attention will not be divided between the two.

Although the two studies presented have gone a long way toward characterizing essential qualities in the recreation experience, some important issues remain unclear. Certainly there is a difference between a lasting orientation such as place attachment or activity involvement and the mode of experience during a particular recreational event. The question of which schemas are activated during which events can probably not find strict answers in questionnaire studies, specifically not when the self-reported details are remembered retrospectively. Thus, in particular for Study 1, we can only *assume* a harmony between the present activity and the present totality, even if the results support the theoretical predictions made in schema theory. Our statements definitely have more validity for Study 2, which might then be considered to be a cross-validation of the more indefinite results from our first study. The cross-validation increases confidence in the results reported above, but more refined research is still needed. Future studies could, for example, provide better measurement of the subjects' actual knowledge structures and schema activation combined with on-site measurements of emotions.

In addition, all self-reports are restricted to our semantic frames. After all, when one is discussing emotions, it is important to make a distinction between the emotion itself, as a mental state, and the word referring to that emotion. Of course, the only information available from questionnaires is words referring to emotions. From research on emotions, however, we know that the physiological responses and verbal evaluations of such responses often correlate quite modestly (e.g., Lang, 1995) and that this pattern diverges cross-culturally (Levenson, Ekman, Heider, & Friesen, 1992). Exact knowledge on what such discrepancies mean does not seem to exist, and researchers should restrain themselves from making resolute conclusions about emotions. Careful interpretation is thus needed for self-reports on emotional experiences.

Despite the above limitations, this paper has documented a differentiated and dynamic pattern typical of outdoor recreational experiences. We have offered a theoretical explanation for the observed variations, and we have argued, with evidence, that the hypothesis of interplay among such cognitive structures as representation, goals and plans is necessary if social scientists are to understand why recreational activity produces such a variety of subjective experiences.

References

Bem, S. L. (1981). Gender scheme theory: A cognitive account of sex-typing. *Psychologucal Review, 88,* 354-64.

Bentler, P. (1969). Semantic space is (approximately) bipolar. *The Journal of Psychology, 71,* 33-40.

Berlyne, D. E. (1974). The new experimental aesthetics. In D. E. Berlyne (Ed.), *Studies in the New Experimental Aesthetics: Steps Toward an Objective Psychology of Aesthetic Appreciation* (pp. 1-25). New York: John Wiley.

Bruner, J. S. (1951). Personality dynamics and the process of perceiving. In R. R. Blake & G. V. Ramsey (Eds.), *Perception: An Approach to Personality.* New York: Ronald Press.

Coombs, C. H. (1964). *A Theory of Data.* London: John Wiley.

Coombs, C. H., & Kao, R. C. (1960). On a connection between factor analysis and multidimensional unfolding. *Psychometrika, 25,* 219-231.

Csikszentmihalyi, M. (1975). *Beyond Boredom and Anxiety.* San Francisco: Jossey-Bass.

Csikszentmihalyi, M. (1981). Leisure and socialization. *Social Forces, 60,* 332-340.

Csikszentmihalyi, M. (1988). Introduction. In Csikszentmihalyi, M. & Csikszentmihalyi, I. S. (Eds.). *Optimal Experience. Psychological Studies of Flow in Consciousness.* Cambridge: Cambridge University Press.

Csikszentmihalyi, M., & Csikszentmihalyi, I. S. (Eds.). (1988). *Optimal Experience. Psychological Studies of Flow in Consciousness.* Cambridge: Cambridge University Press.

Csikszentmihalyi, M., Kleiber, A. B. K., & Driver, B. L. (1992). Leisure and self-actualization. In B. L. Driver, P. J. Brown, & G. L. Peterson (Eds.), *Benefits of Leisure* (pp. 91-102). State College, PA: Venture Publishing.

Daly, E. M., Lancee, W. J., & Polivy, J. (1983). A conical model for the taxonomy of emotional experience. *Journal of Personality and Social Psychology, 45,* 443-457.

D'Andrade, R. G. (1992). Schemas and motivation. In R. G. D'Andrade & C. Strauss (Eds.), *Human Motives and Cultural Models* (pp. 23-44). Cambridge: Cambridge University Press.

Davison, M. L. (1977). On a metric, unidimensional unfolding model for attitudinal and developmental data. *Psychometrika, 42,* 523-548.

Eckblad, G. (1981). *Scheme Theory. A Conceptual Framework for Cognitive-Motivational Processes.* London: Academic Press.

Feldman Barrett, L. F., & Russell, J. A. (1998). Independence and bipolarity in the structure of current affect. *Journal of Personality and Social Psychology, 74,* 967-984.

Fiske, S. T., & Taylor, S. E. (1991). *Social Cognition* (Second ed.). New York: McGraw-Hill.

Gibson, J. J. (1966). *The Senses Considered as Perceptual Systems.* Boston: Houghton Miffin.

Gorsuch, R. L. (1983). *Factor Analysis* (Second ed.). Hillsdale, N.J: Lawrence Erlbaum.

Green, D. P., Goldman, S. L., & Salovey, P. (1993). Measurement error masks bipolarity in affect ratings. *Journal of Personality and Social Psychology, 64,* 1029-1041.

Guttman, L. (1954). A new approach to factor analysis: The radex. In P. F. Lazarsfeld (Ed.), *Mathematical Thinking in the Social Sciences* (pp. 258-348). Glencoe, Ill.: The Free Press.

Harter, S. (1978). Effectance motivation reconsidered. Toward a developmental model. *Human Development, 21,* 34-64.

Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social Psychology. Handbook of Basic Principles* (pp. 133-168). London: The Guilford Press.

Hull, R. B. (1990). Mood as a product of leisure: Causes and consequences. *Journal of Leisure Research, 22,* 99-111.

Husserl, E. (1929). Phenomenology, *Encyclopedia Britannica* (14th ed.).

Ittelson, W. H., Franck, K. A., & O'Hanlon, T. J. (1976). The nature of environmental experience. In S. Wapner, S. B. Cohen, & B. Kaplan (Eds.), *Experiencing the Environment* (pp. 187-206). New York: Plenum Press.

Jacob, G. R., & Schreyer, R. (1980). Conflict in outdoor recreation: A theoretical perspective. *Journal of Leisure Research, 12,* 368-380.

Kelly, J. R. (1987). *Freedom to Be: Toward a New Sociology of Leisure.* New York: MacMillan.

Kleiber, D., Larson, R., & Csikszentmihalyi, M. (1986). The experience of leisure in adolescence. *Journal of Leisure Research, 18,* 169-176.

Knopf, R. C. (1987). Human behavior, cognition and affect in the natural environment. In D. Stokols & I. Altman (Eds.), *Handbook of Environmental Psychology* (pp. 783-825). New York: Wiley.

Kruglanski, A. W. (1996). Motivated social cognition: Principles of the interface. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social Psychology. Handbook of Basic Principles* (pp. 493-520). London: The Guilford Press.

Lang, P. L. (1995). The emotion probe. Studies of motivation and attention. *American Psychologist, 50,* 372-385.

Levenson, R. W., Ekman, P., Heider, K., & Friesen, W. V. (1992). Emotion and automatic nervous system activity in the Minangkabau of West Suamtra. *Journal of Personality and Social Psychology, 62,* 972-988.

Lewis, M., & Haviland-Jones, J. M. (Eds.). (2000). *Handbook of Emotions.* London: The Guilford Press.

Mandler, J. (1984). *Stories, Scripts, and Scenes: Aspects of Schema Theory.* Hillsdale, N.J: Lawrence Erlbaum.

Markus, H. (1977). Self-schemata and processing information about the self. *Journal of Personality and Social Psychology, 35,* 63-78.

Martindale, C., Moore, K., & Borkum, J. (1990). Aesthetic preference: Anomalous findings for Berlyne's psychobiological theory. *American Journal of Psychology, 103,* 53-80.

Moles, A. (1966). *Information Theory and Esthetic Perception.* Urbana: University of Illinois Press.

Neisser, U. (1976). *Cognition and Reality.* San Francisco: W.H. Freeman.

Neisser, U. (1994). Multiple Systems: A new approach to cognitive theory. *European Journal of Cognitive Psychology, 6,* 225-241.

Pittman, T. S., Emery, J., & Bohhiano, A. K. (1982). Intrinsic and extrinsic motivational orientations: Reward-induced changes in preference for complexity. *Journal of Personality and Social Psychology, 42,* 789-797.

Reisenzein, R. (1994). Pleasure-arousal theory and the intensity of emotions. *Journal of Personality and Social Psychology, 67,* 525-539.

Russell, J. A., & Carroll, J. M. (1999). On the bipolarity of positive and negative affect. *Psychological Bulletin, 125,* 3-30.

Sax, J. L. (1980). *Mountains Without Handrails. Reflections on the National Parks.* Ann Arbor: The University of Michigan Press.

Schank, R. C., & Abelson, R. P. (1995). Knowledge and memory: The real story. In R. S. Jr. Wyer (Ed.), *Knowledge and Memory: The Real Story* (pp. 1-85). Hillsdale, New Jersey: Lawrence Erlbaum.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55,* 5-14.

Spector, P. E., Van Katwyk, P. T., Brannick, M., & Chen, P. Y. (1997). When two factors don't reflect two constructs: How item characteristics can produce artifactual factors. *Journal of Management, 23,* 659-677.

Teigen, K. H. (1987). Intrinsic interest and the novelty-familiarity interaction. *Scandinavian Journal of Psychology, 28,* 199-210.

Thurstone, L. L. (1947). *Multiple-Factor Analysis. A Development and Expansion of The Vectors of Mind.* Chicago: The University of Chicago Press.

Tinsley, H., & Tinsley, D. (1986). A theory of the attributes, benefits, and causes of the leisure experience. *Leisure Sciences, 8,* 1-45.

Tuan, Y. (1977). *Space and Place. The Perspective of Experience.* Englewood Cliffs, NJ: Prentice-Hall.

van Schuur, W. H., & Kiers, H. A. (1994). Why factor analysis often is the incorrect model for analyzing bipolar concepts, and what model to use instead. *Applied Psychological Measurement, 18,* 97-110.

Vittersø, J. (1997). Cognitive schemes and affective experience: The case of angler specialization. *Human Dimensions of Wildlife, 2,* 10-21.

Vittersø, J. (1998). *Happy People and Wonderful Experiences. Structure and Predictors of Subjective Well-Being.* Unpublished doctoral dissertation, University of Oslo, Norway.

Vittersø, J., Vorkinn, M., Vistad, O. I., & Vaagland, J. (2000). Tourist experiences and attractions. *Annals of Tourism Research, 27,* 432-450.

Weissinger, E., Caldwell, L. L., & Bandalos, D. L. (1992). Relationship between intrinsic motivation and boredom in leisure time. *Leisure Sciences, 14,* 317-325.

Wickens, T. D. (1995). *The Geometry of Multivariate Statistics.* Hillsdale, NJ: Lawrence Erlbaum.

Wicklund, R. A. (1986). Orientation to the environment versus preoccupation with human potential. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of Motivation and Cognition. Foundations of Social Behavior* (Vol. 1, pp. 64-95). London: Guilford Press.

Williams, D. R. (1988). Measuring perceived similarity among outdoor recreation activities: A comparison of visual and verbal stimulus presentations. *Leisure Sciences, 17,* 351-370.

Wyer, R. S. Jr., & Carlston, D. E. (1994). The cognitive representation of persons and events. In R. S. Jr. Wyer & T. K. Srull (Eds.), *Handbook of Social Cognition* (Vol. 1. Basic Processes, pp. 41-98). Hillsdale, N.J.: Lawrence Erlbaum.