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SUBJECTIVE WELL-BEING *VERSUS* SELF-ACTUALIZATION: USING THE FLOW-SIMPLEX TO PROMOTE A CONCEPTUAL CLARIFICATION OF SUBJECTIVE QUALITY OF LIFE

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ABSTRACT. The purpose of the present study was to articulate an important difference between subjective well-being (SWB) and self-actualization. Although self-actualization reflects a substantial aspect of human existence, the article argues that the concept is not accounted for by ordinary assessment of SWB. In this paper, openness to experience (OE) is taken as an indicator of self-actualization, and overall satisfaction with life, frequency of positive affect and frequency of negative affect were utilized as indicators of SWB. Two methods were offered to investigate the assumed independence of SWB and OE, both of which comprised questionnaire data from 264 students attending the Norwegian folk high school system (mean age 19 years, 63% females). First, a structural equation model revealed only a small and nonsignificant association between SWB and OE. Second, by means of a flow-simplex it was shown that SWB and OE relate to different dimensions of experience. SWB was associated with pleasantness, while OE correlated with interestingness and challenge. It was concluded that traditional measurements of SWB are insensitive to important aspects of human lives, and that the concept misses important aspects of psychological well-being.

INTRODUCTION

The term "quality of life" refers to both objective and subjective dimensions of human existence (e.g., Cummins, 1997; Fernández-Ballesteros, 1998; Lane, 2000). While the objective axis incorporates norm-referenced measures of objective well-being (such as freedom, justice, medical care, standard of housing, etc.), the subjective dimension reflects perceived or subjectively experienced well-being. Subjective well-being (SWB) comprises people's evaluative responses to their lives. These global evaluations refer to cognitive responses, usually denoted "satisfaction", as well as



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emotional responses. The latter are normally referred to as a balance between positive affect and negative affect. For general reviews of the concept of subjective well-being, see Argyle, 2001; Kahneman et al., 1999; Veenhoven, 2000. In this article, a slightly different point of view will be proposed. I shall argue that the study of subjective well-being will be further advanced by discriminating among different kinds of positive affect. Contrary to common practice, I shall say that the discrepancy between positive and negative affect is of less importance for the understanding of our subject matter than are distinctions among the positive affects themselves. Moreover, a methodological approach will be proposed that efficiently discriminates among the positive affects. The method is dubbed the "flow-simplex" and has evolved from a schema theory which integrates aspects of emotion, cognition and motivation (Eckblad, 1981).

Subjective Well-Being and Self-Actualization

The famous dictum, "I'd rather be Socrates dissatisfied than a fool satisfied" indicates that there is more to quality of life than just happiness. Carl Rogers, for example, found it both surprising and difficult to understand when he first discovered that those individuals who made real progress towards what he considered "a good life" would typically not regard themselves as happy or contented (Rogers, 1961). After years of therapeutic practice, he summed up his experiences regarding happiness in the following way: "The good life is a *process*, not a state of being" (p. 186, emphasis in original). As many scholars before him, Rogers underscored the important distinction between happiness as a state of mind and happiness as a process. It would not take much imagination to guess that this dichotomy is traceable to the philosophers of ancient Greece. The Stoics, for instance, claimed that happiness is a state of mind which tends to make the whole of life harmonious. Aristotle, on the other hand, insisted that happiness is an activity, namely the "activity of the soul in accordance with virtue" (in McGill, 1967, p. 17). One could perhaps argue that the Stoic view comprises a combination of the "Epicurean ideal" and "Utilitarism". According to von Wright (1963), Epicurean happiness results from having, as opposed to doing, certain things that give one pleasure, and has

largely been regarded as the prototype of all pleasures whatsoever. Utilitarians, on the other hand, claim that happiness is a function of getting as many of one's needs and desires met as possible (Shin and Johnson, 1978). In contrast to these "happiness as a state of having" theories, the idea of Eudaemonism (from *eu* = good and *daemon* = spirit) underscores the role of activity, or more precisely, living in accordance with the right spirit of one's true self. According to Shin and Johnson (1978), the eudaemonia claim is that happiness comes from the fulfillment of ones' capacity to do what one is keen on (p. 479).

In psychological well-being literature, a distinction similar to the "being" or "doing" approaches just presented is made in theories about telic and autotelic experiences (e.g., Diener, 1984; Omodei and Wearing, 1990) in the distinction between "Personal Expressiveness" and "Hedonic Enjoyment" (Waterman, 1993) or in theories on "Subjective Well-Being" and "Personal Growth" (Compton et al., 1996). With regard to the tripartite formulation of SWB, there is strong evidence that a general SWB factor influences the three subcomponents of the concept (Abbey and Andrews, 1986; Campbell et al., 1976; Liang, 1985; McNeill et al., 1986; Stones and Kozma, 1985; Vittersø and Nilsen, 2002). I shall argue that this overall SWB factor relates to the "being" dimension of happiness and that it constitutes a general tendency for evaluation or appraisal of things in terms of goodness and badness. Evaluation is probably the most pervasive dimension in human thought and language (Cacioppo et al., 1996; Lazarus, 1991; Osgood, 1976), and according to Lazarus, this appraisal tendency is really a human universal which constantly affects emotional experiences in our everyday lives. "The fundamental premise is that in order to survive and flourish, animals (humans particularly) are constructed biologically to be constantly evaluating (appraising) their relationships with the environment with respect to significance for well-being" (Lazarus, 1991, p. 825). Moreover, Goldberg argues that a general tendency to perceive the environment in certain ways reflect the uppermost trait of human personalities (Goldberg, 1995). The point to be made in this article is that overall good *versus* bad evaluation affects the "being" aspects or subjective well-being of a human life but not the "doing" or self-actualization part of it. For

example, Compton et al. (1996) provide evidence on how measures of typical SWB constructs such as satisfaction with life, positive affect and negative affect relate to a factor different from that of personal growth constructs such as "Maturity", "Self-actualization", "Hardiness" and "Openness to experience". Furthermore, openness to experience is found to be significantly related to a newly invented "life richness scale", which is a 160-item activity checklist. Extraversion, neuroticism, conscientiousness and agreeableness failed to correlate with that scale (Hyland and Sodergren, 1997). McGregor and Little (1998) found that orthogonal happiness and meaning factors emerged from factor analyses of diverse well-being measures. Goal efficacy was associated with happiness and goal integrity was associated with meaning, and the authors consider self-actualization as an aspect of the meaning dimension (p. 505).

According to these findings, what typically would be regarded as important aspects of "a good life", such as growth, openness and self-actualization, have escaped the traditional assessment of subjective well-being commonly debated in the literature. Although self-actualization is hard to conceptualize, one plausible indicator of the concept seems to be openness to experience, even if it covers only a part of the concept. Rogers (1961), for example, adds "existential living" and "trust in one's organismic experiences" to his self-actualization concept, although experiential openness was important to him indeed: "Thus, one aspect of this process which I am naming "the good life" appears to be a movement away from the pole of defensiveness towards the pole of openness to experience" (Rogers, 1961, p. 188). Furthermore, in a recent study, Schmutte and Ryff (1997) found that personal growth was linked to openness to experience. Although the openness to experience concept is still contaminated by ambiguous definitions and different usage, the basic quality of the trait can be summarized as follows: "What all these elements share is an interest in varied experience for its own sake" (McCrae, 1987, p. 1259). Such a statement points to a possible link between feelings associated with an open attitude and phenomena such as the psychological B-state (Koch, 1956), peak experience (Maslow, 1964), intrinsic motivation (Deci and Ryan, 1985, 2000), and flow experiences (Csikszentmihalyi, 1975, 1997).

The Flow-Simplex

Flow. Launched by Csikszentmihalyi in the early 1970s, the concept of flow has become widespread. Csikszentmihalyi (e.g., 1975) conducted extensive theoretical and empirical work to grasp the nature of optimal experiences. He denoted such affects for flow after the description his informants sometimes gave him for such optimal feeling states. Flow was taken to be the affective counterpart of an interplay between the challenges offered in a situation and the degree of skills in the person. The concept is operationalized by means of the so-called Challenge-Skill Ratio. Originally, Csikszentmihalyi claimed that whenever a person's skills were on the same level as the challenges offered in the situation, that person would be in a state of flow. Some additional prerequisites are suggested by Csikszentmihalyi (see for example Csikszentmihalyi, 1988, pp. 32–35), although his empirical definition of flow is restricted to the Challenge-Skill Ratio. In numerous investigations, Csikszentmihalyi and co-workers have been measuring levels of skills and challenges as subjectively reported in concrete situations (the procedure is known as the Experience Sampling Method; e.g. Larson and Csikszentmihalyi, 1983) and they conclude that people are *bored* whenever their levels of skills exceed the level of challenges in the situation and that they are *anxious* if the challenge level exceeds the skill level. When the level of skills and level of challenges are matched, the advocates of flow theory conclude that the person is in *flow*.

However, further investigations of the flow model have been somewhat disappointing. For example, only a very small portion of the variance in indicators of positive affects is explained by the Challenge-Skill Ratio (Voelkl, 1990). Even for the reformulated flow model, in which flow is characterized by a match between challenge and skills only when both of them exceed the mean level of challenges and skills (for a particular individual), the skill-challenge ratio is still a poor estimator of positive affect (Ellis et al., 1994).

More advanced explanations of the flow experience do exist, as in the *Communicative theory of emotions* (Oatley, 1992; Oatley and Johnson-Laird, 1987). Oatley suggests that, generally, happiness is the feeling that occurs when goals and subgoals are being achieved. It signals encouragement to the self to continue the current

action. The principle behind happiness and other basic emotions is understood within a self-regulation framework, which states that human behavior is a continual process of moving towards various kinds of mental goal representations. When movements are towards goals, discrepancy-reducing feedback is transmitted in the cognitive system. When movements lead away from a goal, an increase in discrepancy is signaled. Positive emotions are triggered by events that make achievement more likely, and their effect is to prompt continuation. With events that imply loss or damage to a goal, emotions are negative and they interrupt the current plan.

Apart from the pleasant feeling state that accompanies goal achievements, Oatley believes that a more intense feeling of happiness is closely related to creativity and wholeheartedly being occupied with what one is doing. Oatley is close to the idea of flow in his view, and is therefore of particular interest to the issues addressed in this article. He argues that intense happiness is related to situations in which the activity itself is the goal (i.e., autotelic behavior). The ecstatic feeling accompanying a joyful situation is due to experiencing "... the perceptual structure of the event prompted by a similar sensory experience in the present and reflecting at the very same moment on its meanings, including its context and subsequent significance" (Oatley, 1992, p. 352). Thus, in the Communicative theory of emotions, peak experiences are not explained by a simple ratio of skills and challenges but with reference to a match between a cognitive structure and the perception of an event or a situation.

A related and extended explanation of flow is provided by Eckblad in her Scheme theory (Eckblad, 1981). Basically, the Scheme theory argues that affective responses are natural and integrated parts of the adaptation process as it is described by Piaget (e.g., Piaget, 1952). As is known from general psychology, Piaget believed that in order for a person to interact with an external environment, the world needs to be assimilated into an existing structure of cognitive schemas.[1] However, due to the dynamic nature of all man-environment interactions, pure assimilation does not exist, and every event will be somewhat impeded in terms of assimilation. Based on these assumptions, Eckblad proposes that the quality of a feeling state will be determined by the ease of assimilation. She has introduced the notion of assimilation resist-

ance (AR) to denote this phenomenon. The term refers roughly to the amount of discrepancy between an individual's cognitive "map" and his or her perception of the situational "landscape". The size of this discrepancy influences the quality of the affective response to the situation in question. The subjective experience advances from easy at very low levels of AR toward pleasant as the AR becomes somewhat larger. With increasing AR, these experiences fade and are replaced by affects such as interest and challenge. At high AR levels, interest and challenge are felt less strongly, while feelings such as difficulty, irritation and frustration increase. As the situation becomes more complex, the amount of AR will increase until a point is reached at which the person feels unable to conceive what is going on. The affective response to such situations is negative affect. Boredom, on the other hand, is the result of very low levels of AR, which can also be experienced with a negative valence.

As is the case for Oatley, the Scheme theory also holds that flow appears in situations in which the activity becomes a goal in itself. In such situations means and goals are not represented as separate entities in awareness, and attention will therefore not be divided between them. The defining characteristic of such a state is that the operating schemas are "spontaneously active". Since the self-schemas tend to be integrated in the cognitive representation of the goals, there is no awareness of the self in a pure state of intrinsic motivation. This explains why there can be situations in which one experiences complete involvement with the activity. The activity itself becomes the goal. In such conditions the person is intrinsically motivated, which is another way of stating that the motivation is autotelic.

Contrary to the importance placed on the Challenge-Skill Ratio by Csikszentmihalyi, Eckblad underscores the importance of attention and its role in the process.

> An intrinsically motivating activity *captures* the attention of the individual, and *this is why it is intrinsically motivating*. It catches attention because there is the right kind and degree of match between the situation and one of this person's schemes, one that is capable of becoming spontaneously active (Eckblad, 1981, p. 55).

During spontaneous activation, the schemas are probably growing. Eckblad uses the formulation of a "moving edge of assimilation"

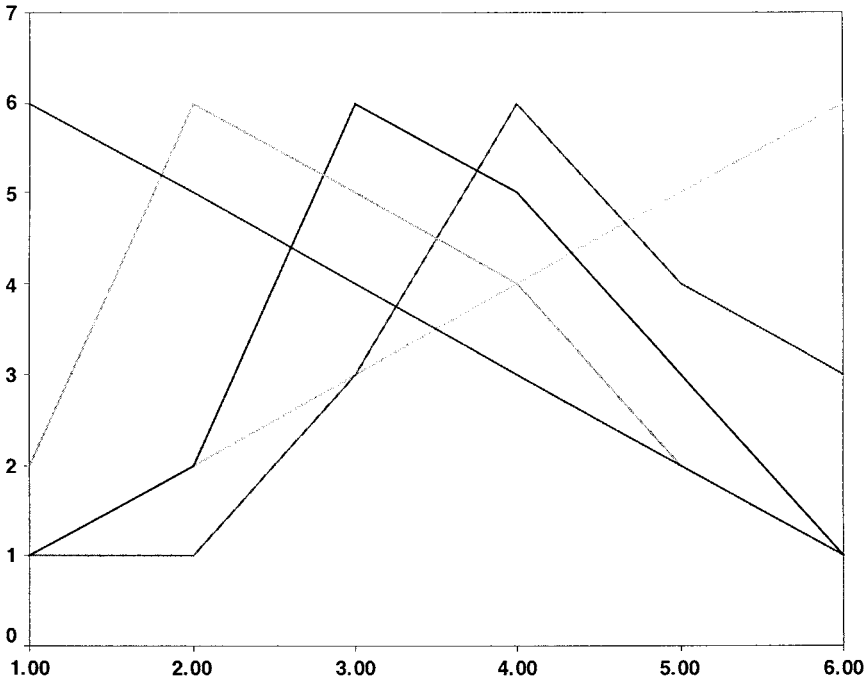


Figure 1. Easiness (decreasing line), pleasantness (first peak), interestingness (second peak), challenge (third peak) and difficultness (increasing line) as a function of assimilation resistance (AR). The X-axis refers to AR, while the Y-axis represent a rating scale for optimal sensitivity to AR (Hypothetical data).

to illustrate the kind of process involved. Intrinsic motivation leads the individual to explore and became acquainted with ever new parts of the world. Obviously, such processes are relevant to self-actualization and learning. Although little is known about the exact relationship between intrinsic motivation and self-actualization, it seems reasonable to suggest a kinship between it and the processes involved in eudaemonia.

To further the understanding of a relationship between assimilation resistance and affective responses, consider the semi-peaked trace lines portrayed in Figure 1. According to the figure, the relationship between affective experience and assimilation resistance appears as a set of single-peaked functions reaching their maximum intensity at gradually higher levels of AR.

At this point in the presentation, it is appropriate to introduce the notion of a *flow-simplex*. The flow-simplex draws heavily on the Scheme theory, for instance in the assumption that ease and pleas-

antness are felt most strongly at low levels of AR and are replaced by feelings of interesting and challenge as the level of AR increases. There is, in other words, a rank order of optimum "ease", "pleasantness", "interest", "challenge", and "difficulty", such that $E < P < I < C < D$ in terms of assimilation resistance. However, since the rank order is curvilinearly related to AR, most statistical methods will fail to reproduce the true structure of these data, simply because of the linear aritmethics inherent in these methods. Fortunately, in some circumstances a principal component analysis (PCA) may successfully be used in the analysis of such data, and that is if the data conform to the pattern of a simplex.

Simplex. In 1954, Louis Guttman proposed a theory of ordered factors as an alternative to the better-known theories of common factors. The terms "simplex" and "circumplex" are the two basic building blocks in the theory of ordered factors. 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 refers to a simple order of complexity (among variables of the same kind), and its pictorial representation is a straight line. 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 an 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 comer. Furthermore, the column totals would be approximately curvilinear, with the lowest values at the extremes of the table and the maximum at the middle of the table. For a fuller description of the simplex, see Guttman's original writings (e.g., Guttman, 1954, 1955).

In 1977, Mark Davison provided evidence that a PCA may be useful in the analyses of simplex structure if the variables in question conform to the theory of unfolding data (Coombs, 1964). Fortunately, the relationship depicted in Figure 1 is an example of a set of unfolded data, which make the flow-simplex suitable for Davison's

propositions (see Vittersø, 1998 for details). According to Davison (1977), a set of variables conforms to the unfolding theory if:

1. The stimulus × stimulus correlation matrix will display a simplex-like structure.
2. If stimulus k is intermediate to stimuli j and l in the ordering and if the product of stimulus correlations $r_{jk}r_{kl}$ is negative, then the partial correlation $r_{jl\cdot k}$ must be negative. If stimulus k is not intermediate to j and l and if $r_{jk}r_{kl}$ is positive, then $r_{jl\cdot k}$ must be positive.
3. Principal component analysis of the stimulus × stimulus 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 might be a useful tool in understanding the relationships among variables that have curvilinear relationships to a single causal dimension. To facilitate these principles, the data from Figure 1 will be used as an empirical illustration.

The hypothetical relation between affects and AR presented in Figure 1 was analysed by means of a PCA in such a way that Easy, Pleasant, Interesting, Challenging and Difficult represented the columns (affect variables) in the data matrix, and level of AR represented the rows. Data were entered for each affect variable according to their values on the Y-axis at each of the six levels of AR marked along the X-axis. These data are provided in the Appendix. The correlation matrix from these data is presented in Table I.

As 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 comer. Furthermore, the column totals are approximately curvilinear, with the lowest values at the extremes of the table and the maximum at the middle of the table (cf. Davison's first proposition). The product correlation for the anchor variables (i.e., Easy and Difficult) was negative, as were the partial correlations for all intermediate variables (cf. Davidson's second proposition). Finally, a semicircular, two-factor structure in which the variables are ordered along the semicircle according to their position on the AR dimension was confirmed (cf. Davison's third proposition). The semicircular structure is shown in Figure 2.

TABLE I

Correlation matrix for hypothetical flow-simplex data

	1	2	3	4	5	$r_{jk}r_{kl}$	$r_{jl\cdot k}$
1. Easy	1.000	0.489	–0.051	–0.620	–1.000		
2. Pleasant	0.489	1.000	0.533	–0.107	–0.489	–0.239	–1.000
3. Interesting	–0.051	0.533	1.000	0.603	–0.051	–0.003	–1.000
4. Challenging	–0.620	–0.107	0.603	1.000	0.620	–0.384	–1.000
5. Difficult	–1.000	–0.489	0.051	0.620	1.000		
SUM	**–0.18**	**1.43**	**2.14**	**1.50**	**0.18**		

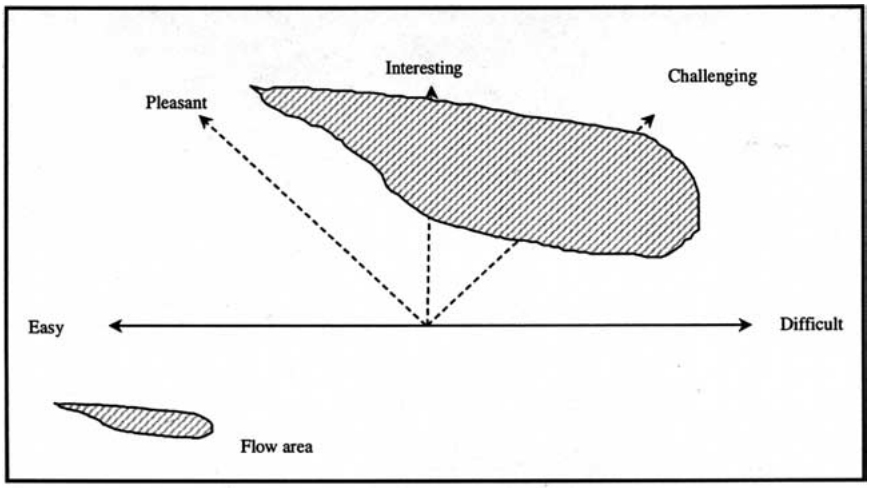


Figure 2. Graphical illustration of the Flow-Simplex. Principal component solution based on the function of affects on AR as illustrated in Figure 1. Hatched area indicates the location of flow experiences.

In the plot, the component loadings from the PCA serve as the coordinates in the two-dimensional Cartesian space.

The figure shows that the affect variables follow each other along the circumference of a half-circle, in accordance with their maximal sensitivity to the underlying dimension of assimilation resistance. 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 artefact due to the linear arithmetic underlying PCA analyses. In Figure 2, the flow area is indicated by the hatched area.

In the current state of the model nothing much is known about the exact demarcations of flow *versus* not-flow. The borders are elusive, and until more empirical data have been gathered, only approximate locations of flow experiences can be provided. However, as intensity is recognised in the configuration as the length of the vectors in the plot, flow experiences will always be located at some distance from the origin. Moreover, flow is restricted to (approximately) the area between Pleasant and Challenge.

To recapitulate thus far, it has been illustrated that principal component analysis is a useful tool for locating the order of a set of variables that are curvilinear as related to a simplex dimension within a two-dimensional Cartesian space. In the case of a flow-simplex, both the X-axis and the Y-axis represent the underlying dimensions of assimilation resistance. Given a balanced representation of items along the dimension, both axes will have a meaningful interpretation. According to Coombs and Kao (1960, p. 221), the first dimension of a PCA conducted on unfolding data will represent the original dimension (which, in our case, is AR), while the second component will be the vector of the median variable on this dimension (for the flow-simplex, the median represents affects with an optimal AR sensitivity somewhere between Pleasant and Interesting). Additionally, a second dimension is reflected in the flow-simplex as intensity of affect. Intensity is interpreted as the distance from the origin (i.e., the length of a vector as calculated from its factor loadings). See also Daly et al. (1983) and Reisenzein (1994) for a discussion of affect intensity interpreted as the length of vectors.

The Present Study

The goal of the study reported here was to investigate the structure of subjective life quality. It was hypothesized that self-avowals of both satisfaction ("cognition") and overall judgments of positive and negative affects ("emotions") will be highly contaminated by a general "good *versus* bad" evaluation factor. However, this good-bad dimension was not expected to be sensitive to aspects of human life that are related to self-actualization. Prior research has demonstrated that the associations between traditional measurements of subjective well-being and self-actualization are relatively weak.

A second aim of the study was to present a methodological approach to clarify the differences between global satisfaction and self-actualization. Openness to experience was used as an indicator of self-actualization. Although the latter refers to a wider concept than what is measured by an openness to experience inventory, scholars usually consider openness to experience to be an important component of self-actualization.

The following hypotheses were proposed for the study. (1) Satisfaction with life, positive affect and negative affect can be adequately accounted for by a second-order subjective well-being factor (i.e., a general evaluation factor). (2) There is only a trivial association between subjective well-being and openness to experience. (3) Subjective well-being and openness will relate to different dimensions of experience when analyzed by means of a flow-simplex.

METHOD

Participants

Data for the study were collected from 264 students attending a Norwegian folk high school[2] from August 1995 to May 1996. Their mean age was 19 years, with a range of 16 to 25 years and a standard deviation of 1.1. Four folk high schools were included in the study, and for each school, all students enrolled in outdoor recreation or the music specialization were invited to participate in the study. They were briefed on the study and informed about their right to withdraw from the investigation at any time. Additionally, all students signed a declaration stating their agreement to participate. Anonymity and confidentiality regarding the information gathered from the study were guaranteed. All students agreed to participate.

Measures

Subjective Well-being. Satisfaction with life was assessed by means of a five-item inventory developed by Diener and coworkers, named the Satisfaction With Life Scale (SWLS – Pavot and Diener, 1993). The items in this inventory are: *In most ways my life is close to my ideal* (SWLS-1); *The conditions of my life are excellent* (SWLS-

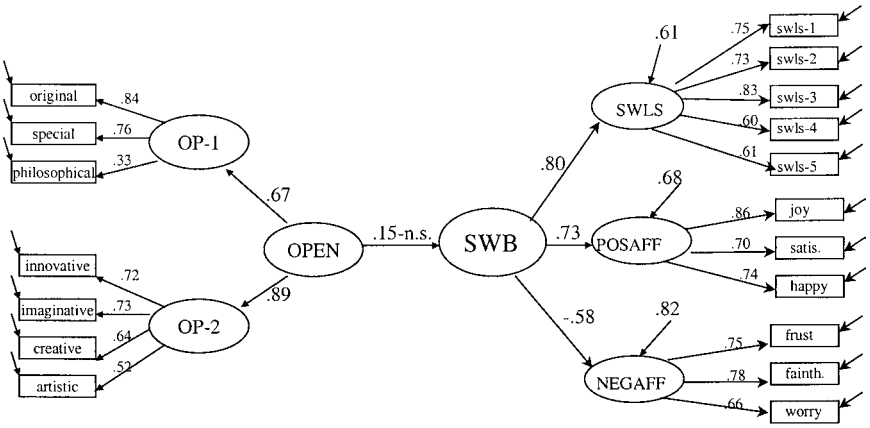


Figure 3. Structural equation model of openness to experience and subjective well-being.

2); *I am satisfied with my life* (SWLS-3); *So far I have gotten the important things I want in life* (SWLS-4) and *If I could live my life over, I would change almost nothing* (SWLS-5). The abbreviations are used for item identification in Figure 3. Global affect was measured with questions about how often, in percentage of their waking time, the subjects felt the following affective states: *happiness, joy, satisfaction, frustration, faintheartedness* and *frustration*. The SWLS was measured on a scale range from 1 ("strongly disagree") to 7 ("strongly agree"), while the affect scales varied from 0 ("zero per cent of waking time") to 10 ("hundred per cent of waking time").

Personality. To assess personality traits, the Norwegian Big Five Inventory (Engvik, 1993) was administered. This measure contains scales on the five personality dimensions of extraversion, neuroticism, openness to experience, conscientiousness and agreeableness. The items were presented as seven-point bipolar adjective scales. Seven items tapping into the openness to experience dimension will be reported on in the present study.

Flow-simplex Items. Five bipolar semantic differential scales were used as base items in the flow-simplex (FS). The FS scales were *easy-difficult*; *pleasant-unpleasant*; *interesting-uninteresting*; *challenging-tame*; *dramatic-undramatic*. The subjects responded

using the digits 1 to 7, which were listed between the two adjectives defining each scale. The left-right position of the desirable terms was varied randomly across the five scales. The bipolar format was chosen to keep the model in line with Eckblad's initial work on the idea of a flow-simplex, although unipolar scales have proven to conform to the notion of a flow-simplex as well (Vittersø, 1997; Vittersø et al., 2001). However, due to recent developments in the research on affect responses (e.g., Barrett and Russell, 1998; Cacioppo et al., 1999; Green and Salovey, 1999; Larsen et al., 2001; Tellegen et al., 1999), bipolarity on such adjective scales ought no longer to be taken for granted, and the antonym anchors of the scales are not interpreted. In other words, only the first adjective in each pair of semantic differentials will be interpreted in the current study. The FS items were presented twice. First, the subjects were to rate their experience of ease, pleasantness, interest, challenge, and drama in their life as a whole. Later in the questionnaire, the same adjective scales were presented for the subjects to describe a favorite experience related to either outdoor recreation or music performance.

Procedure

The data were gathered by means of a questionnaire, distributed and responded to in a classroom context within the first week of the school year. The procedure was part of a longitudinal study, but only the first wave of data collection will be reported presently (for further details, see Vittersø, 1998).

RESULTS

Initial Analyses

Univariate Exploration. The amount of missing data did not exceed one per cent for any of the 35 variables included in this study, and subjects with missing data were simply excluded from subsequent analyses (i.e., listwise deletion). None of the variables depart substantially from normality, defined as skewness in the range of –2 to +2 and kurtosis in the interval between –7 and +7 (see West et al. (1995) for a discussion of these figures).

Subjective Well-being. According to several scholars, the term SWB is likely to reflect a higher-order construct with an influence on the three affect indicators, namely satisfaction with life (SWLS), positive affect (PA) and negative affect (NA) (e.g., Diener, 1994). Hence, a higher-order factor model was investigated, in which SWB was considered to be the higher-order construct and SWLS, PA and NA were taken to be first-order factors. To gather empirical support for this model, a confirmatory factor analysis was undertaken in accordance with the structure shown on the right-hand side of Figure 3. The second-order SWB model fits the data fairly well, although not splendidly: χ^2 (41, N = 254) = 84.7, $p < 0.001$, CFI = 0.959, RMSEA = 0.065 (confidence interval for RMSEA: 0.046–0.084). As seen in Figure 3, all three first-order factors reveal high loadings on the second-order factor, although the loading is somewhat smaller for the negative affect factor. However, factor loadings in the range of 0.58 to 0.80 for the latent negative affect variable are still a reasonably good indication of a common source of influence among all three first-order factors. Hence, I argue that for general purposes the three components of SWLS, PA and NA are sufficiently accounted for by a higher-order dimension. In line with that conclusion, a single SWB variable was computed according to the following procedure. First, equally weighted sumscores were computed as mean scores of the five SWLS items, the three PA items and the three NA items respectively. Next, an exploratory factor analysis (extracted by maximum likelihood) was conducted with these three sumscore variables as input and scores were saved for the single factor that was retained. The factor-score variable was dubbed the SWB variable. Finally, the SWB variable was split at the median to yield a high SWB group and a low SWB group.

Openness to Experience. The items comprising the Norwegian Five Factor Model are presented in Engvik (1993). However, in the Engvik study only seven out of ten original openness items reached a satisfactory loading on the openness factor. Only these seven items are included in the current investigation. From an initially exploratory factor analysis, two correlated factors seem to reproduce the data best. The two-factor model was further tested by a second-order "confirmatory" factor analysis, reaching acceptable fit: χ^2 (13, N =

263) = 29.1, p = 0.006, CFI = 0.965, RMSEA = 0.069 (0.035–0.102). The openness model is presented on the left-hand side of Figure 3. An openness to experience variable was calculated from the scores in an exploratory factor analysis (maximum likelihood) and transformed to a high and low group variable by a procedure similar to the one described for SWB.

The Flow-Simplex. A chain-P technique was utilized in the analysis of the flow-simplex (e.g., Cattell, 1973). With regard to the identical sets of bipolar FS adjective scales, each subject was given two entries in the chain-P data matrix. The first row contained responses to the "life in general" context and the second row comprised responses from the favorite experience context. Thus, the new data matrix to be factored yielded six columns and 528 rows (see Michela, 1990 for further detail on these procedures). The advantage of such an approach, is to clarify the relative differences in life-in-general experiences as compared with favorite experiences. If both situations had been analyzed separately, they would both have clustered around the origin. By both situations being included in the same factor analysis, the relative difference between life-in-general and favorite experiences will be revealed. An obvious disadvantage to this approach is that the matrix is composed of both within-subject and between-subject variance. However, the underlying structure of the flow-simplex structure has repeatedly turned out to be very stable (Eckblad, 1980, 1981; Kroonenberg and Snyder, 1989; Vittersø, 1997, 1998; Vittersø et al., 2000, 2001) which indicates that the perils of including both within- and between-subject variance are limited.

The correlation matrix derived from the chain-P matrix revealed a simplex-like pattern, in that there is a clear tendency for the correlations to taper off from the highest values along the diagonal to the lowest values in the left bottom comer in the matrices (cf. Table II). Moreover, the column totals showed curvilinearity in that the lowest values reside at the extremes of the table and the maximum values in the middle of the table. With regard to the second criterion proposed by Davison (1977), the product of the stimulus correlations $r_{jk}r_{kl}$ was negative and the partial correlation $r_{jk\cdot k}$ was negative for all intermediate variables. In these analyses, j symbolizes the easy item and l symbolizes the dramatic item. The $r_{jl\cdot k}$ were

TABLE II

Correlation matrix for the flow-simplex

	1	2	3	4	5	$r_{jk}r_{kl}$	$r_{jl\cdot k}$
1. Easy	1.000	0.32	–0.18	–0.34	–0.26		
2. Pleasant	0.32	1.000	0.26	0.15	–0.12	–0.049	–0.23
3. Interesting	–0.18	0.26	1.000	0.53	0.22	–0.004	–0.22
4. Challenging	–0.34	–0.15	0.53	1.000	0.26	–0.09	–0.19
5. Dramatic	–0.26	–0.12	0.22	0.26	1.000		
SUM	**0.6**	**1.6**	**1.8**	**1.6**	**1.1**		

–0.23, –0.22, and –0.19 when *k* represents Pleasant, Interesting and Challenging respectively. Finally, the semicircular two-factor structure, in which the variables are ordered according to their positions on the assimilation resistance dimension, is revealed in Figure 4. The PCA also showed that a two-component solution explains 66 percent of the total variance of all five items. Thus, according to the above analysis, it seems that the flow-simplex model reflects an unfolding data structure and that one single dimension is able to explain the relationship among the variables in the two-dimensional PCA configuration.

Well-Being and Openness

Previous investigations reported in the literature have indicated a small or nonexisting relationship between openness to experience and subjective well-being (Buss, 2000; DeNeve and Cooper, 1998; Bid and Diener, 1999; Fredrickson, 2000; Headey and Veenhoven, 1989; Magnus et al., 1993; McCrae and Costa, 1991; Schmutte and Ryff, 1997; Steel and Ones, 2002; Watson, 2000). In this study it was assumed that a trivial association would be found between SWB and openness, and the hypothesis was tested in a regression analysis with latent variables. Based on the two second-order models described above, a structural equation model was tested in which openness to experience was hypothesized to have an influence on subjective well-being (i.e., it was a bottom-up approach). A nonsignificant regression estimate from openness to SWB was obtained in that

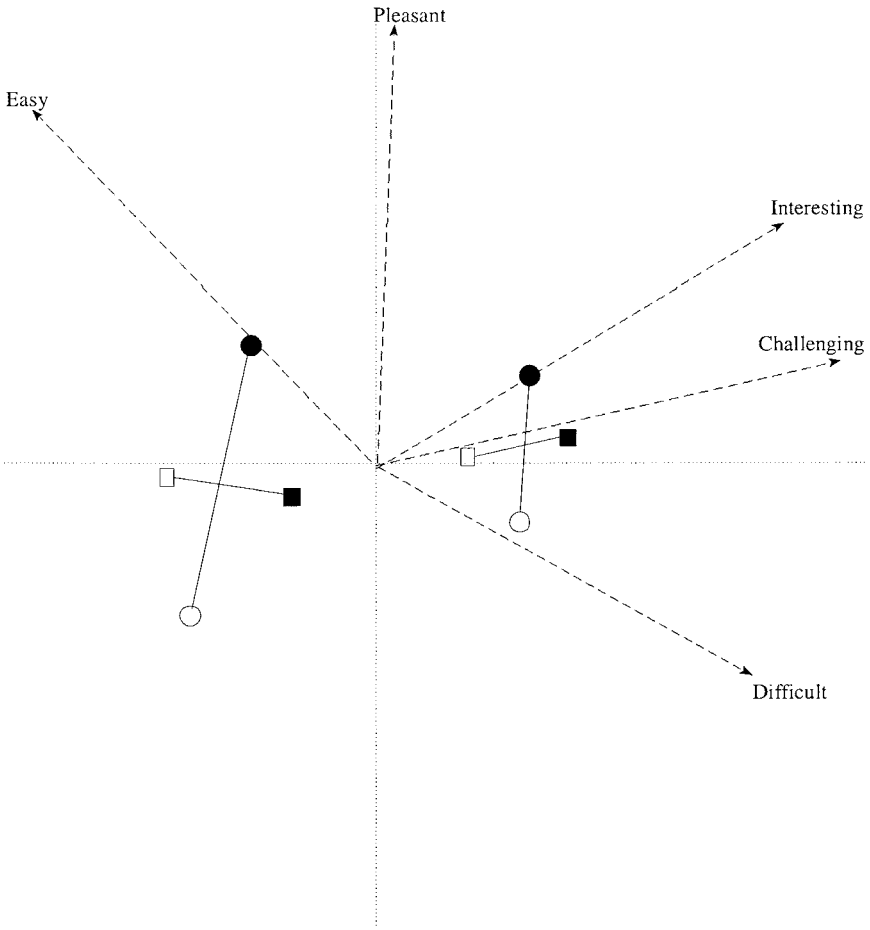


Figure 4. The flow-simplex related to the contexts of *life in general experience* (located at the left-hand side of the plot) and *favorite experience* (located at the right-hand side of the plot) for groups high on SWB (filled circles); low on SWB (open circles); high on openness (filled squares) and low on openness (open squares). In both situations the SWB groups differed significantly on Component 2 ($p < 0.000$) but not on Component 1. The Openness groups differed significantly on Component 1 ($p < 0.01$), but not on Component 2 in both situations.

analysis, supporting the hypothesis of a trivial relationship between SWB and openness to experience. The model fit was acceptable, with χ^2 (145, $N = 253$) = 204.6, $p < 0.001$, CFI = 0.960, RMSEA = 0.041 (0.026 to 0.053). The complete model is depicted in Figure 3.

The flow-simplex was utilized to investigate further the discrepancy between SWB and openness to experience. Concretely, group means of the two FS-component scores were compared for subjects high and low on the SWB variable and for open *versus* closed individuals. Comparisons were made for the life-in-general situation as well as for favorite experiences. Figure 4 encapsulates a graphical illustration of the deviation between SWB and openness to experience. The SWB and openness variables were integrated in this FS-configuration by using the mean scores on the first FS-component for high and low groups (on SWB and openness respectively) as the entry on the x-axis. The mean scores on the second component provide the values on the y-axis. Recall that the FS-configuration itself is calculated by using the two components from the PCA as coordinates in the diagram (cf. Figure 2).

As can be seen in Figure 4, subjects with high scores on openness to experience conceived both their overall lives and their favorite experience as more challenging and interesting compared with closed subjects. The two openness to experience groups had the opposite pattern of significance, in that they differed only on Component 1 ($p < 0.01$), not on Component 2. High-SWB subjects, on the other hand, consider their lives primarily as pleasant, while the low-SWB group is located in the opposite direction (i.e., as more unpleasant). The two SWB groups differed significantly ($p < 0.001$) on Component 2 in both situations, but not on Component 1. This pattern is obvious for both life-in-general and favorite experience. Note that taken altogether, the favorite situation is clearly more interesting and challenging as compared with the life-in-general situation. Interestingly, the axis that separates the SWB variable from the openness variable resides almost orthogonally to each of them, reflecting the independence between these two constructs. However, the low association between SWB and openness does not imply that the latter are unrelated affective experiences. On the contrary, openness relates to a very salient kind of positive experience, namely experiences characterized as interesting and challenging. Subjective well-being, on the other hand, is related to the dimension of pleasantness.

Clearly, the present data indicate that openness to experience and subjective well-being relate to different dimensions of experience.

These findings nicely support earlier results claiming a multidimensional understanding of the subjective aspects of quality of life. Such a claim is expressed, for example, in terms of a discrepancy between hedonic enjoyment and eudaemonia (Waterman, 1993) or between SWB and personal growth (Compton et al., 1996; Schmutte and Ryff, 1997).

DISCUSSION

Several important findings emerged from this study. First, support was provided for the notion of an underlying and organizing structure among the three indicators of subjective well-being. A second-order SWB model conformed to the present data and exposed a strong relationship between latent representations of global life satisfaction, the presence of positive affect and the absence of negative affect. Note that the fit statistics reveal nothing about the strength of the hierarchy for the model in question, for the reason that a model with only three first-order factors constitutes a just identifiable second-order structure (Rindskopf and Rose, 1988). A model with three correlated first-order factors would yield identical fit (i.e., would represent an equivalent model). However, the size of the factor loadings gives an indication of the usefulness of a higher-order concept. As reported above, the loadings found in this study are acceptably high (all three of them within the range of 0.58 to 0.80). Thus, the *importance* of the second-order factor is acceptably high. The importance is computed as the sum of squared factor loadings on the higher-order factor (see Weeks, 1980), and in this case it amounts to 1.51. By dividing the importance by the number of first-order factors, an estimate of the proportion of first-order factor variance explained by the second-order construct is provided. For the current SWB model, about 50% of the variance in the satisfaction and affect factors is explained by the second-order SWB factor. The finding fits with earlier studies of hierarchical well-being models (Abbey and Andrews, 1986; Liang, 1985; McNeill et al., 1986; Stones and Kozma, 1985; Vittersø and Nilsen, 2002), and suggests that a general factor bears a large and causal influence on all three subcomponents of the SWB construct. Diener (1994) has suggested that such an overall SWB component could be identical

to an overall and generic "good *versus* bad" evaluation. In other words, the self-reported life satisfaction and frequency of affects (both positive and negative) basically reflect a generic tendency for appraisals of things in terms of goodness and badness. As reported elsewhere (Vittersø, 1998), such a personal appraisal disposition accounts for about 80 per cent of the variance in the second-order SWB construct. This is, of course, not to say that all the variance in SWB measurements relates to a personal tendency for appraisals of things to be in terms of goodness or badness. However, a very significant amount of it reflects such a personal disposition.

Although the higher-order concept explains a relatively large proportion of the common variance among the SWB indicators, the residual variance in the model should not be overlooked. Taken together, the residual variance amounts to about 50 percent. However, the residual factor is much larger (in terms of variance) for the negative affect factor as compared with the other two. The variance unexplained by the higher-order SWB factor is 37%, 46% and 67% for the SWLS, PA and NA factors respectively. Thus, it seems that a larger proportion of the variance in negative affect is unrelated to overall well-being. This is an interesting phenomenon with regard to the discussion of the role of the negative in psychological well-being. For decades, scholars have argued that some amount of negative experiences may help people to gain insight and strength. Moreover, traumatic experiences may in some instances help humans to achieve a deeper meaning and a greater appreciation for life (for a recent review of these issues, see Vittersø, 2003). Unfortunately, we do not know much about the positive impact of negative affect on quality of life, but the relation is an area ripe for future research. It is also necessary to note that the second-order SWB model is one among several equivalent models; i.e., models which fit the data equally well. Hence, other conceptualizations of these variables might be appropriate. For instance, in a recent article, Suh et al. (1998) suggested a model in which satisfaction with life is assumed to be the effect of positive and negative affect (see Breckler, 1990 for a good discussion of equivalent models).

Second, the relationship between subjective well-being and openness to experience was found to be insignificant. The two constructs were analyzed in a higher-order structural equation model, which,

among other things, implies that random errors are removed from the variables. Since random error attenuates the relationship among items, the current analysis provides an even stronger argument for the unrelatedness between SWB and openness to experience, compared with previous studies. Some researchers suggest that the low association between openness and SWB is due to the stronger intensity open people feel with regard to both positive and negative affect (e.g., (McCrae, 1983; McCrae and Costa, 1991). With similar findings Headey and Wearing (1989) raised the question of whether openness rather should be considered to be a disposition of affective intensity. These authors also found that open people reported a higher frequency of both positive and negative events, a finding that was replicated by Magnus et al. (1993) (see also Diener, 1996). It might be that open people do feel more intensely than others and that they have a higher frequency of both positive and negative life events.

However, as argued by McCrae and Costa (1985) openness is not just a passive, uncritical stance in which experiences are simply allowed to happen. "Rather than merely tolerating experience, open individuals actively seek it out and engage it. Closed individuals are not so much resistant to new ideas and feelings as they are *uninterested*" (McCrae and Costa, 1985, p. 161 – emphasis added). Such statements point to a significant phenomenon, which is revealed as the third important result in the current investigation, namely the disparity of affective experience found among people high on subjective well-being as compared with subjects high on openness to experiences. Within the framework of a flow-simplex, the SWB dimension was found to relate primarily to a pleasantness axis, while the openness trait relates to an interest/challenge axis. If openness is taken as an aspect of self-actualization, and if it is related to the old discussion of differences between hedonism and eudaemonia, the inclusion of an independent interest/challenge dimension in quality of life research represents a step towards a more sophisticated view of the subjective quality of life concept. As shown in several studies, humans seem to like what is typical, but what is typical is not interesting (see Gaver and Mandler, 1987, p. 271). It could be that the traditional SWB measures tap into what is pleasant and typical about life but not into what is interesting and challenging. If so, we

may start to include a separate axis of interest/challenge in addition to the pleasantness axis of positive affect typically comprised in measures of the subjective dimension of quality of life. Again, reference is made to the concept of eudaemonia, which has more to do with the realization of one's true potential as a human being than with happiness and satisfaction as these concepts traditionally are measured. The current findings are compatible with a range of recent research indicating that elements of leading a life of purpose and possessing a sense of self-actualization are distinct from the traditionally defined indicators of subjective well-being (Compton et al., 1996; McGregor and Little, 1998; Nix et al., 1999; Ryff and Singer, 1998; Vittersø, 2003a, b; Waterman, 1993). By two different situations being included in the flow-simplex, the relative difference between overall life experiences and favorite experiences becomes evident. In the favorite context, people are clearly experiencing more interesting and challenging affects. Although this may seem intuitive at first glance, it is important to note that, theoretically, the difference could have been in another direction in the configuration of the flow-simplex. For example, favorite situations could have been characterized as more pleasant, or even as easier, compared with life-in-general experiences. This was not the case in the current study, and it is particularly important to be aware that favorite experiences differ from overall experiences along a dimension that is poorly captured by ordinary SWB measurements. Future research will have to ask whether it really is the case that items tapping into issues such as overall happiness and satisfaction are insensitive to favorite experiences. More data are needed on the relationship between ordinary subjective well-being and these kinds of challenging and interesting experiences. Interestingly, Csikszentmihalyi (1997) now argues that flow is something different from happiness (p. 32), a view he did not make explicit in earlier work. Rather to the contrary, flow was used synonymously with happiness, as evident in the title and the text of his 1992 book ("Flow, the psychology of happiness").

We also need more knowledge about the exact measurement of flow. By definition, the component scores in a flow-simplex have zero means, which has at least two important implications. First, on both components, negative scores indicate a value below mean

and not necessarily a negative affect. Thus, all positions in the flow-simplex are relative to the context under study. Second, since the mean in both components amounts to zero, it is impossible to get a whole sample of subjects located in the flow area. Even if they all did actually have a flow experience, this fact would not have been captured in the configuration of the flow-simplex. A similar tendency, although not as strong, is present when group means are used as entries in the flow-simplex. With large groups one would virtually never see component mean scores stationed out in the flow area. As a result, none of the groups from Figure 4 actually satisfies the criteria of a flow experience as they were presented above. Hence, an important task for future research would be to elaborate upon a more refined representation of peak experiences. One possible avenue for further investigation might be to split the sample into more differentiated subgroups. Another possibility would be to look into the experiences of a single subject and register how they change according to situational and personal characteristics.

Despite the apparent strength of the structural equation modeling approach, it is important to recognize some limitations to the current investigation. The structure of openness to experience is, for example, not fully researched as yet. We need more basic knowledge about the meaning and content of the trait and we need further confirmation of its structural relationship, both among the items making up the trait and between the openness trait and other salient personality dispositions. Since the openness to experience model presented here was strongly inspired by an exploratory factor analysis conducted on the same data, the presented fit measures may rest, at least to some extent, on capitalization on chance. A more stringent confirmatory investigation is needed to confirm the results. Nevertheless, the evaluation of model fit in the area of personality traits should not be undertaken too rigidly. Although the Big Five structure enjoys a rejuvenation in psychological literature (e.g., Goldberg, 1992; John, 1990; McCrae and Costa, 1987), only fragmentary support has been provided as yet in the framework of confirmatory factor analysis (Borkenau and Ostendorf, 1990; Church and Burke, 1994; McCrae et al., 1996). More work is obviously needed to elevate our understanding of the structural relationships among personality traits. Thus, one should not expect

premature personality models to fit the data perfectly, and more confirmatory analyses seem necessary in our current understanding of trait psychology.

Moreover, the results from this study are based on a sample of young Norwegian adults. Naturally, one ought to be careful about generalizing to other cohorts or to the population in general, not to speak of the differences one might find in populations of other cultures. Cultural differences need not pertain only to different populations of university students. Students in big cities all over the world are perhaps more similar to each other than to other groups in their respective countries. Thus, the real challenge of cross-cultural generalizations relates not to comparisons among student populations but to capturing cultural pluralism and diversity in populations less influenced by the processes of global modernization.

Finally, all self-reports are restricted to our semantic frames. After all, when discussing affects, it is important to make a distinction between the affect itself (as a mental state) and the word referring to that affect. Of course, the only available information from questionnaires is words referring to affects. From research on emotion, 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 et al., 1992). Exact knowledge does not seem to exist on what such discrepancies mean, and researchers should restrain themselves from making resolute conclusions about affects. Careful interpretation is needed for self-reports as well as physiological data. Similarly, with questionnaire data (or interviews) it is difficult to escape the strategies of impression management undertaken by the subjects. As a matter of fact, such strategies contaminate almost every investigation of human conduct. Hence, the result of quality of life investigations reported in this and similar studies should not be interpreted too literally. We ought to pay respect to the fact that quality of life and subjective well-being are difficult to conceptualize, and that, strictly speaking, the relation between relevant items is far from understood. As researchers, we should not pretend to have a proper understanding of these issues yet.

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APPENDIX

Data matrix for an idealized flow-simplex with hypothetical data (cf. Figure 1, Figure 2 and Table I).

Easy	Pleasant	Interesting	Challenging	Difficult
6.00	2.00	1.00	1.00	1.00
5.00	6.00	2.00	1.00	2.00
4.00	5.00	6.00	3.00	3.00
3.00	4.00	5.00	6.00	4.00
2.00	2.00	3.00	4.00	5.00
1.00	1.00	1.00	3.00	6.00

NOTES

[1] The complementary process of accommodation (i.e., the tendency to change one's cognitive structure to environmental demands) will not be treated here, but see Ginsburg and Opper (1969) for a good overview.

[2] Briefly, the folk high schools offer two-semester courses to their students in which they enjoy the freedom to work with topics and questions staff and students feel relevant to study. There is no set curriculum and there are no formal examinations in the system. The schools are open to everyone. Usually the minimum age for admission is 17 years.

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