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FLOW VERSUS LIFE SATISFACTION: A PROJECTIVE USE OF CARTOONS TO ILLUSTRATE THE DIFFERENCE BETWEEN THE EVALUATION APPROACH AND THE INTRINSIC MOTIVATION APPROACH TO SUBJECTIVE QUALITY OF LIFE

(Received 1 February 2001; Accepted 27 February 2001)

ABSTRACT. In this paper, differences between life satisfaction and intrinsic motivation (flow) are addressed. Theories are presented on evaluation, flow and openness to experience. Data from a Norwegian panel study are analyzed by means of structural equation modeling. Young adults ($n = 264$) participated in a projective study with cartoon frames showing Donald Duck in challenging situations. Measures of satisfaction with life and the personality trait of openness to experience were added to the analysis. Subjects scoring high on openness rated Donald Duck's feelings as positive. A slightly opposing tendency was found for persons scoring high on satisfaction with life. The results are discussed with reference to the philosophical distinction between hedonism and eudaemonia.

KEY WORDS: happiness, satisfaction with life, evaluation, flow, intrinsic motivation, openness to experience, projective tests, eudaemonia.

In contemporary accounts of the concept, subjective well-being (SWB) is regarded as the summation of evaluative reactions that occur when an individual encounters stimuli in the world. The process and outcome of evaluating life in terms of goodness or badness is basic to a broad range of theories and measurements of SWB. Indeed, Diener and Lucas (2000) have proposed that a theory of evaluation provides a good explanation for what is currently known about SWB. Their *evaluation theory* seeks to account for the process by which information from a person's surroundings is understood and evaluated. From a somewhat different perspective, Csikszentmihalyi (1999) argues that happiness depends on whether a person is able to derive *flow* from whatever he or she does. Flow is considered to be an autotelic and optimal experience, characterized by high involvement, deep concentration, intrinsic motivation and the perception of high challenges matched by adequate personal skills.

However, as theoretical constructs, the process of evaluation and the mechanism of flow are not entirely overlapping and both perspectives owe much to various understandings of happiness. The difference



Journal of Happiness Studies **4:** 141–167, 2003.
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between the evaluation view and the flow position can roughly be considered to follow the distinction made in the philosophical traditions of hedonism and eudaemonia. (Compton et al., 1996; Haybron, 2000; McGill, 1967; Ryan and Deci, 2001; Vittersø, 1999; Waterman, 1993; Wright, 1963). In brief, the concept of eudaemonia refers to the fulfilment of our potential as human beings, with a focus on autotelic activities. (If something we want to do is not wanted for the sake of anything else, the act or activity can be called an autotelic activity.) Hedonism refers to activities undertaken for the sake of either attaining some pleasure or avoiding something unpleasant. Activities of these sorts are deemed to be satisfying. Therefore, they correspond approximately to the notion of evaluation presented above. For example, Daniel Kahneman refers to the hedonic component as a good–bad dimension rather than to evaluation, to avoid the overly intellectual connotation of the commonly used term "evaluation" (Kahneman, 1999, p. 4). Nevertheless, the good–bad dimension is strongly related to what most researcher would name evaluation (e.g. Fiske and Taylor, 1991; Tesser and Martin, 1996). Hence, as opposed to the eudaemonic approach, the hedonic approach broadly overlaps with the evaluation theory proposed by Diener and Lucas (2000). For a thorough presentation of the hedonic approach, see Kahneman (2000). For a detailed discussion of the difference between eudaemonia and hedonism, see Ryan and Deci (2001).

In this article, I argue that the evaluation approach is insensitive to those important areas of life which are characterized by flow activities. Flow activities are not necessarily evaluated in retrospect as good, even if they were felt as intensely positive as long as they lasted. In other words, the evaluation perspective and the flow perspective are concerned with essential but non-overlapping aspects of a good life. I contend that we are unlikely to understand the subjective side of the quality of human lives unless we pay attention to both these aspects.

1. SUBJECTIVE QUALITY OF LIFE

A scientific concept of quality of life is hard to establish, but gradually an agreement seems to develop that quality of life refers to both objective and subjective components (Cowen, 1991; Cummins, 2000; Diener and Suh, 1997; 1999; Fernández-Ballesteros, 1998; Haybron, 2000;

Kammann et al., 1984; Lerner, 1997; Olson and Schober, 1993; Raphael, 1996; Ringen, 1995; Schwarz and Strack, 2000; Veenhoven, 2000; Watten et al., 1995; WHOQOL and group, 1998). Only the subjective part of the concept will be considered in what follows, basically after the formula suggested by Lane (1996). Lane considers quality of life to be properly defined by the relation between two subjective-based elements and a set of objective circumstances. He believes a trinity of (a) SWB, (b) human development and (c) justice is necessary to account properly for the overall quality of life concept (Lane, 2000, p. 6); (a) and (b) refer to subjective quality of life, whereas (c) refers to an objective quality of life.

The distinction between a SWB component and a human development component is in line with the main argument of the present article. Following the separation made between hedonism and eudaemonism above, I argue that the concept of SWB cannot fully account for the whole range of subjective quality of life (see Diener, 1984; 1994; 2000, for exhaustive descriptions of SWB). Hence, we need the broader term 'Subjective Quality of Life'. As argued by Diener and Lucas (2000) the evaluation theory basically accounts for the SWB concept. However, the evaluation theory does not account for human development, which, according to Ryan and Deci (2001) is covered by the eudaemonia approach. Although representing distinct domains, both hedonism (including the evaluation theory) and eudaemonia (including the flow concept) are captured by the notion of 'Subjective Quality of Life'.

1.1. Evaluation

Broadly considered, evaluations refer to what is captured by people's responses on dimensions such as good–bad or like–dislike (Tesser and Martin, 1996). Evaluation is probably the most pervasive dimension in human thought and language (Cacioppo et al., 1997; Fiske and Taylor, 1991; Lazarus, 1991; Osgood, 1976) and according to Lazarus (1991), such an appraisal tendency is a human universal which constantly affects emotional experiences in our everyday lives. Recently, Kahneman (1999) has argued that the brain constructs a running affective commentary which evaluates the current state of experience on a good–bad dimension. Although Kahneman explicitly avoids the term 'evaluation' because of its overly intellectual connotations, his good–bad dimension obviously corresponds to a subjective and favorable or

unfavorable state of being, and that state of being clearly relates to happiness and life satisfaction.

According to Diener and Lucas (2000), these evaluative reactions originated in the human evolutionary past to aid survival and reproduction. Guiding ancestral people in their environment in adaptive ways, positive evaluations could impel individuals toward suitable environments and behaviors. Negative evaluations signaled danger and could prompt caution, attack or withdrawal. In accordance with the distinction between positive and negative evaluation, various theorists have posited the existence of at least two evaluative channels, processing information in parallel. One channel operates on threat-related (i.e. negative) information. A second channel handles safety and appetitive (i.e. positive) information (e.g. Cacioppo et al., 1999; Lang et al., 1990; Watson and Clark, 1992).

1.2. Flow

To lead a happy life, Csikszentmihalyi (1999) says, it is necessary to find flow[1] in activities that are complex: activities that provide a potential for growth over an entire lifespan, that allow for the emergence of new opportunities for action, and that stimulate the development of new skills (p. 826). In Csikszentmihalyi's work, flow is viewed as an ideal condition midway between boredom and anxiety, typically described in terms such as the following: "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). On the basis of a systemic view that takes into account the organism's complexity and capacity 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) the provision of clear and unambiguous feedback, and (5) an "autotelic" nature, which means that the flow experience appears to need no goals or reward external to itself.

Csikszentmihalyi argues that creating conditions that make flow experiences possible is one aspect of that "pursuit of happiness" for which the social and political community should be responsible (Csikszentmihalyi, 1999, p. 826). Additionally, he considers individuals who are able to confront life with the involvement and enthusiasm described above to be autotelic personalities. More concretely, autotelic personality characterizes individuals who generally

do things for their own sake, rather than to achieve some later external goals (Csikszentmihalyi, 1997, p. 117).

1.3. Some Differences between Evaluation and Flow

Interestingly, when data from on-line measurement of experiences during a whole week are analyzed for autotelic and non-autotelic persons, the autotelic individuals show more concentration, enjoyment, and self-esteem than non-autotelic persons (Csikszentmihalyi, 1997). However, the only variable on which there is no difference between the two groups is the self-reported happiness variable. That is, people who tend to do things for their own sake do not report themselves to be happier than people without this tendency. Moreover, studies reported in Csikszentmihalyi (1999) suggest that children from the most affluent families find it more difficult to be in flow than do teenagers whose families are less well off. Rich children tend to be more bored, less involved, less enthusiastic and less excited. From other sources we know that reported well-being and happiness among the very wealthy are slightly but significantly higher than among people less well off (Diener et al., 1985).

This picture aligns with an observation made by the psychotherapist Carl Rogers, who many years ago observed that people who made real progress toward what he considered "a good life" would typically not regard themselves as happy or contented (Rogers, 1961). After years of therapeutic practice, Rogers 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).

There are several explanations for this discrepancy between SWB as an evaluation on the one hand and life-involvement following flow activities on the other. For example, the "hidden" costs of reward have been known as a threat to intrinsic motivations for more than two decades (Lepper and Greene, 1978). Note, however, that it is not only extrinsic reward but also overall *evaluation* of the activity in question which will disrupt the process of flow (Runco and Sakamoto, 1999, pp. 75–76). Merely paying attention to the result of an activity and judging whether it is good or bad seems enough to destroy flow. A plausible explanation relates to the process of attention. If attention switches away from the task at hand toward a judgment about whether the task is a good or bad thing to do, the "magic" of flow will normally be interrupted. Thus, Csikszentmihalyi asserts that the relationship between

flow and happiness is not self-evident and that people are not necessarily happy during the flow experience "... because they are too involved in the task to have the luxury to reflect on their subjective states. Being happy would be a distraction, an interruption of the flow" (Csikszentmihalyi, 1999, p. 825).

Another explanation for why evaluation might interfere with the flow experience is that flow tends to occur when a person's skills are challenged by the environment. Often, challenging situations will result in an individual's committing more errors than he or she would in situations with less complexity and challenge. For example, in a problem-solving study Eckblad (1981a) found that when subjects struggled with tasks of intermediate difficulty, they reported feelings of interest. When the tasks at hand were easier to solve, the subjects reported being in a pleasant mood. However, when subjects felt interest, they also made more errors than they did in the task that produced pleasant feelings. If a person was judging the situation in terms of good and bad, it is not unlikely the pleasant situation would be evaluated as better than the interesting part of the study, even if on-the-spot feeling was more intense and optimal during the interesting phase.

The discrepancy between flow and evaluation might also be explained by the theory of neural computation proposed by Shizgal (1999). According to the logic of this model, information is processed in parallel in three different channels, namely perceptual processing, an interval timer, and finally an evaluative channel. The perceptual channel deals with the "what, where and how much" features of a stimulus, whereas the evaluation channel is constructed not to report objective properties of stimuli but rather to return a subjective estimate of the current significance of these properties. According to this view, the perceptual channel informs the mind what and where the stimulus is, while the evaluative channel returns the instantaneous utility.

Cognitive-inspired theories of intrinsic motivation state that it is precisely the dynamics of such a perceptual channel that are responsible for the flow experience. For example, Eckblad (1981b, 1982) describes intrinsic motivation, or flow, as a specific psychological state in which attention is involuntary and strongly concentrated on the activity. In the words of Eckblad, "a match between competence and challenge as defined by Csikszentmihalyi is not enough to ensure flow" (Eckblad, 1981b, p. 55). Her answer to the problem is the suggestion that there must be a schema – a background of personal capabilities and/or experiences that would enable the person to undertake spontaneous activity

in the environment. A spontaneously active schema will dominate the attention of the subject and exclude awareness of other processes (see Eckblad, 1981b for details). In line with current theories of cognitive schemas, the kind of activity described by Eckblad is typically what will be operated on by the perceptual channel, as described for instance in Gaver and Mandler (1987) and Mandler (1984).

Further support for a distinction between evaluation and the work of organizing incoming stimuli is found in Ito and Cacioppo (1999). These authors propose an evolutionary model of evaluation in which a stimulus may vary in the strength of positive and negative evaluative activity that it evokes. Besides finding evidence for a bipolar evaluation model (with a positivity offset mechanism separable from a negativity bias mechanism), these authors show how cognitive computations are performed by neural sources that are at least partly independent of those underlying discriminative appraisals. Their results have shown that rare stimuli evoke a larger event-related brain potential (ERP) than do frequent stimuli. This finding is the opposite of what has been established for the so-called "exposure effect" (e.g. Zajonc, 1968). However, the exposure effect relates to a dimension of evaluations, whereas Ito and Cacioppo (1999) refer to information processing related to rare stimuli as non-evaluative. A similar discrimination has been made in studies of brain lateralization. Revealed right lateralization has been found among subjects performing an evaluative appraisal but not among those performing a non-evaluative one (cited in Ito and Cacioppo, 1999, p. 474).

Different neural modes of information processing are indicated by other studies as well. Miller (1996) suggests that ERP activity in the range Ito and Cacioppo (1999) report to be activated by rare stimuli actually seems to occur whenever there is a violation of expectancy. A violation of expectancy occurs when novelty is introduced into the field of stimuli. Here again there are close connections with theories of being interested and intrinsically motivated (e.g. Berlyne, 1960; Hunt, 1965; Izard, 1977; Ortony and Turner, 1990; Runco and Sakamoto, 1999; Tomkins, 1995; White, 1959).

At yet higher levels of operationalization, the discrepancy between flow and evaluation is convincingly demonstrated by Dweck (2000). She articulates a social-cognitive theory of self in which the difference between a so-called performance orientation and a mastery orientation plays an important role. The former term denotes a focus on the performance, an evaluation of the activity. Mastery orientation, on the

other hand, is what happens when people focus on the task itself, concentrating on the opportunity to perform a particular behavior and to learn from it. In an impressively extended series of studies, Dweck and her coworkers have demonstrated serious consequences deriving from either one of the two belief-systems, with indirect relevance for the study of happiness. For purposes of this article, however, it will suffice to mention two points. First, even at the level of social-cognitive self-theories we do find an important difference between engaging in an activity and the process of evaluating this activity. Second, when the evaluation aspect of behavior is tuned down, there is an enhancement of the typical personal growth aspects of human development.

For a final set of arguments, a series of independent studies have uncovered discrepancies between the evaluation component of well-being and other appreciable aspects of life. 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, 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, which is at least tentatively in accord with the main argument of this paper.

Waterman (1993) reported further evidence for separation between a hedonic dimension and a eudaemonic dimension of happiness. The two domains are related but distinguishable, and Waterman argues that personal expressiveness, but not hedonic enjoyment, is a signifier of success in the process of self-realization. More specifically, in a study of the different dimensions in affective space, and using a so-called flow-simplex, Vittersø (1998) found that the traditional measures of SWB clustered in the area of pleasantness, while the personality trait of openness to experience was accompanied by interestingness and challenge. The pleasantness dimension was only slightly correlated with the dimension of interestingness.

2. OPENNESS AND WELL-BEING

As one of the five "big" personality traits (e.g. Goldberg, 1992; John, 1990), openness to experience accounts for individual differences in

originality, sophistication in the arts and a concern for aesthetics. Moreover, openness to experience corresponds with an interest in varied experience for its own sake, and McCrae and Costa (1985) argue that rather than merely tolerating experience, open individuals actively seek it out and engage in 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). Although not overlapping completely with Csikszentmihalyi's account of the autotelic personality, openness is clearly the dimension in the five-factor model (FFM) most apparently akin to the characteristic of eudaemonia. For example, Schmutte and Ryff (1997) found that openness to experience was linked to personal growth, and the trait was significantly related to a newly invented "life richness scale," which is a 160-item activity checklist. Neither extraversion, neuroticism, conscientiousness, nor agreeableness correlates significantly with the scale (Hyland and Sodergren, 1997). Moreover, openness to experience is supposed to be a key characteristic of the fully functioning person (e.g. Ryff, 1989).

The relationship between SWB and openness to experience is modest to moderate. For example, McCrae and Costa (1991) found correlations in the area between zero and 0.15 for openness scores and scores on a series of affect measures. Similar results are reported by Headey and Wearing (1989), Vittersø (1998) and DeNeve and Cooper (1998). Somewhat stronger correlations are reported by Magnus et al. (1993) in a study on life events and personality. These authors found that openness correlated 0.28 with positive events and 0.36 with negative events. Finally, in an extensive review of the literature Watson (2000) concludes that openness to experience is generally unrelated to either positive or negative affect.

Common accounts of the weak relationship between openness and SWB are of two kinds. The more widespread runs as follows. Because open individuals frequently and abundantly experience both positive and negative affect, the effects of the two kinds of experience tend to balance each other out. "Openness scores are positively correlated with both positive and negative affect scores and thus are unrelated to their difference, overall well-being" (McCrae and Costa, 1991, p. 228). Another explanation is offered by Watson (2000), who claims that the factors in the FFM are strongly related to affect, the only exception being openness to experience, which consistently displays little relation to emotional experience. "In light of these unimpressive results, the most parsimonious conclusion is that individual differences in openness

are unrelated to affective experience" (Watson, 2000, p. 197). Seidlitz (1993) has suggested that the low correlation found between openness and SWB reflects the fact that they are formed by reward in the environment rather than by biological reactivity *per se* (cited in Diener and Lucas, 1999).

In contrast to these views, the current paper claims that openness to experience is indeed related to affect, but through flow experiences and not as an evaluation along a pleasant (good)–unpleasant (bad) dimension. In other words, it contests the idea that the weak relationship between openness and well-being is due to a balancing-out of pleasant and unpleasant affect. Rather to the contrary, it claims that since the correlation between flow and traditional happiness measures is low, the important role of openness and the relationship of openness with flow have not been captured in the traditional literature.

3. THE CURRENT STUDY

3.1. Aim

The scientific measurement of SWB presents enduring difficulties. Although solid progress has been made, the domain still needs conceptual and methodological refinements. The intention of this study is to contribute both.

In the first place, studies of self-reported well-being have advanced the state of reliable knowledge in the field. However, self-assessments represent a limited methodological resource. To transcend some of these limitations, a projective technique has been utilized in the current work. Basically, projective methods involve the presentation of ambiguous stimuli to respondents, who interpret them in a way that theoretically reveals something about their inner characteristics. The fundamental assumption of these tests is that the responses subjects give will bear the stamp of their personality style. In essence, a subject is said to project onto the stimulus his or her own "emotional attitudes" and ideas about life. For instance, McClelland et al. (1989) has pointed out that projective measures of motives yield information different from the output of self-report measures of motives. The former have been better at predicting spontaneous behavior, whereas the latter have been better at predicting performance in situations where explicit incentives elicit striving for normative goals.

Unfortunately, projective tests are difficult to interpret and there are problems with reliability and validity. For example, projective measures typically do not correlate highly with questionnaire measures (e.g. Spangler (1992) but see also Emmons and McAdams (1991)). Some scholars suggest, though, that the apparently low correlations between projective techniques and questionnaire data are mostly an artifact of instructions (e.g. Winter et al., 1998). Consequently, this study integrates quantification with the projective responses given by subjects (cf. the methods section). Moreover, the technique of structural equation modeling (SEM) is applied to enhance the reliability and validity of the measures (Bollen, 1989).

Second, the relationship between life satisfaction and flow remains unclear. Hence, the main aim of this study is to contribute to a differentiation between the two concepts.

3.2. Hypotheses

The following hypotheses are proposed. *Hypothesis 1:* SWB and openness to experience are only modestly correlated. *Hypothesis 2:* Flow experience and the global evaluation of life in terms of goodness and badness are distinct components of a good life. Subjects with high scores on self-reported life satisfaction will thus not necessarily recognize flow in other persons (i.e. in the present case, cartoon character Donald Duck) as something "good" (pleasant). People with high scores on openness to experience, on the other hand, will acknowledge the joy of challenging situations. As a consequence, open individuals will indicate high levels of positive affect when asked to judge affective experience in other persons.

4. METHOD

4.1. Participants

A panel survey produced questionnaire data collected at two different times. At Time 1 (T1, August 1995) the data were from 264 students attending a Norwegian folk high school. In the follow-up at Time 2 (T2, May 1996), 225 of the subjects were still participating in the study. A folk high school offers two-semester courses in which students enjoy freedom to work on whatever topics and questions they and the staff choose. There is no set curriculum in the system, and there are no formal

examinations. The schools are open to everyone, although usually the minimum age for admission is 17 years. The mean age of the students in the current study was 19 years, with a range of 16–25 years and a standard deviation of 1.1.

4.2. Measures

Satisfaction With Life. Satisfaction with life was assessed by means of a five-item inventory developed by Diener and coworkers, the Satisfaction With Life Scale (SWLS – see Pavot and Diener, 1993). Examples of the items in this inventory are: *In most ways my life is close to my ideal* and *I am satisfied with my life*. The SWLS was measured on a rating scale ranging from 1 ('strongly disagree') to 7 ('strongly agree'). To estimate the stability of the inventory, T2 data were regressed on T1 data (autoregression). Estimation was undertaken by means of the latent variables. The standardized autoregression coefficient for the SWLS inventory was 0.70 ($p < 0.001$).

Openness to Experience. A 60-item Norwegian Big Five Inventory (Engvik, 1993) was administered. This inventory measures the five personality dimensions of extraversion, emotional stability, openness to experience, conscientiousness and agreeableness. Only the openness dimension is analyzed here. The personality items were presented as bipolar adjective scales, each scale having a seven-point rating. Polar opposite adjectives were alternately presented at the lowest and highest ends of the scale. The openness inventory consists of 12 adjective scales, such as, in the author's translation from Norwegian, *Original–Not original*, *Curious–Not curious* and *Creative–Not creative*. The standardized autoregression coefficient for the openness to experience inventory was 0.88 ($p < 0.001$). A complete list of openness items is provided in the Appendix.

Donald Duck Affects (DDA). Since the test was intended to be a projective one, subjects were asked to give their own opinions of how Donald Duck should feel in three different situations. The situations were selected frames from several Donald Duck cartoon magazines. The author chose them as allowing somewhat ambiguous interpretations of scenes showing Donald Duck engaged in challenging activities. In the first frame, Donald is chasing something (not revealed in the cartoon) with a bag net, and he is jumping over a log in the woods.

In the second frame, Donald is represented as being indoors and equipped with a pen and a lot of paper: he is carrying out some mathematical calculations. In the third frame, Donald is a co-pilot in an airplane, pointing enthusiastically at a spot on a map. For each frame, subjects were asked to indicate to what extent they believed Donald was feeling *joy*, *satisfaction* and *happiness* (the three positive affect items) and *frustration*, *faintheartedness* and *worry* (the three negative affect items). Subjects gave their opinions by rating each item on a scale ranging from 1 ('Donald is definitely not feeling like this') to 7 ('Donald is definitely feeling like this'). Each of the six items was summarized across responses to the three cartoon situations, yielding a total set of three positive and three negative DDA variables. For example, the three joy items were collapsed into a single joy variable and the three frustration items were collapsed into a single frustration variable. The standardized autoregression coefficient of T1 and T2 measures for the DDA (as latent variables) was 0.65 ($p < 0.001$).

4.3. Procedure

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. Confidentiality regarding the information gathered from the study was guaranteed. All students agreed to participate in the first self-administered questionnaire. With drop-out during the school year and some students refusing to complete the questionnaire during the second round of data gathering in May 1996, the number of participants was reduced to 225, or 85%, at T2. For further details on the data-gathering procedure, see Vittersø (1998).

4.4. Statistical Analyses

Several SEMs were derived with EQS 5.7 (Bentler, 1995), and the use of maximum likelihood estimates. Basic to SEM is a desire to explain interrelations among variables with a model and then to test this model statistically. Commonly, both factor analyses and regression analyses are examined within a SEM framework. In keeping with the hypothesis-testing approach enabled by SEM, the factor analyses provided are referred to as Confirmatory Factor Analyses (CFA), and when factors

(latent variables) are related to each other, the models are often referred to as a regression model or a full structural model. A critical question is how to determine whether a specified model fits the data, and, if competing models exist, which one to deem better than the others.

One issue relates to the judgment of what is to be regarded as good fit. Although tests of statistical significance and fit indexes exist, there is always a degree of subjectivity in the selection of adequate models. Thus, in addition to the chi-square test statistic (which should yield non-significant chi-square values for good models), this study emphasizes the Comparative Fit Index (CFI), the Adjusted Goodness of Fit index (AGFI) and the Root Mean Square Error of Approximation (RMSEA) to evaluate goodness of fit. Although there are no precise standards for the values indexes such as these need to exhibit for an acceptable fit, typical guidelines are that the CFI should be greater than 0.95, the AGFI should be greater than 0.90 and the RMSEA should be less than 0.05 (Hu and Bentler, 1999; MacCallum et al., 1996; Marsh et al., 1996).

Another potential concern relates to the use of standardized inventories which are developed without the guidance of CFA. Quite often such inventories, especially if they hold many items, do not meet the assumption of homogeneity. If researchers would like to utilize such inventories for SEM purposes, they are forced either to modify the inventory or to accept that the traditional and often commonly used model does not meet the standard currently demanded of acceptable models (see Marsh et al. (1998) for a good discussion). In the present investigation, five CFA models were tested (Figures 1 and 2). The first

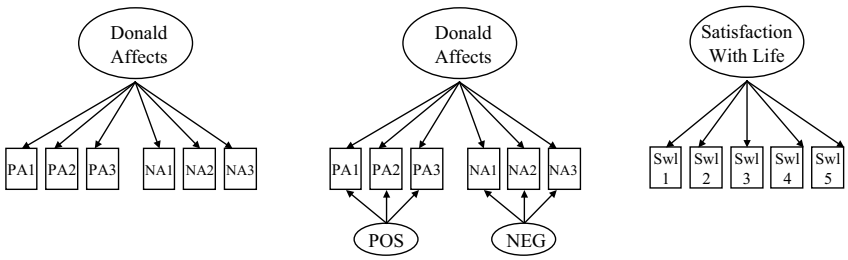


Figure 1. The tested models of DDA and SWLS. POS = nested factor of positive affect items. NEG = nested factor of negative affect items. PA = positive affect items, NA = negative affect items, Swl = Satisfaction with life items. For sake of clarity, uniqueness is not shown.

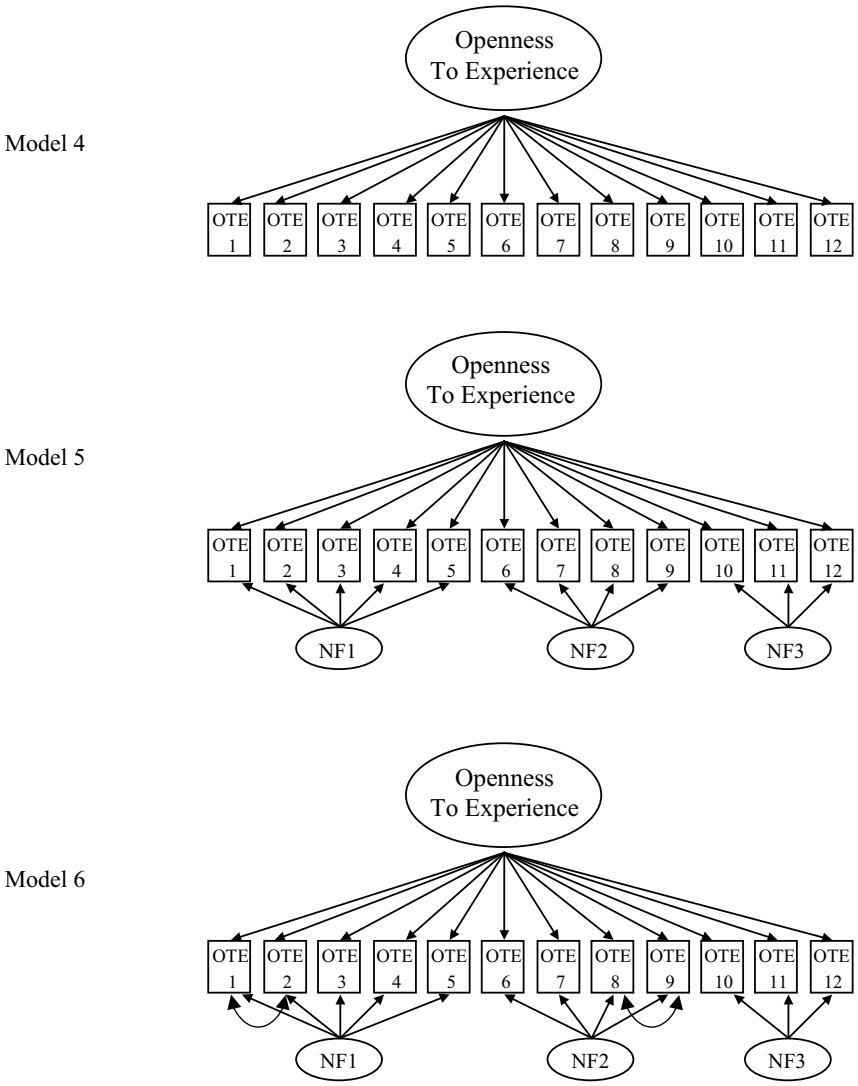


Figure 2. The tested models of openness to experience. NF1 = Nested factor 1. NF2 = Nested factor 2. NF3 = Nested factor 3. OTE = openness to experience items. Uniqueness not shown.

model is a plain unidimensional model of DDA, under the assumption that a single latent variable is able to explain the covariance among all six items. Model 2 reflects an *a priori* assumption that all DDA items have something in common that is captured in a general affect factor. Additionally, items reflecting only positive valence have something in common with each other, something they do not share with

items reflecting the negative valence. Thus, two additional factors are assumed in Model 2. These are nested factors (Gustafsson and Balke, 1993).

Model 3 represents a unidimensional version of the SWLS. Based on earlier analyses of the scale, one factor is expected to provide a sufficient explanation of the relationship among these five items (Vittersø, Røysamb and Diener, 2002). Model 4 is a plain one-dimensional model of the 12 openness-to-experience items. Model 5 is an *ad hoc* modification of this data structure, based on an exploratory factor analysis of the data from the T1 questionnaire. In addition to the general openness factor, the three nested factors are established in the model, based on the exploratory factor solution. Note that this approach violates the confirmatory assumption conveyed by the philosophy of SEM. In Model 6, two sets of correlated error are included in the model. These additions are derived from a Lagrange multiplier test provided by the EQS software. The strategy of letting errors correlate with each other also violates basic SEM assumptions and is not considered to give a good solution. However, since these models are cross-validated with the data from T2, error correlation was judged acceptable as an *ad hoc* strategy for an inventory with poor initial fit.

Finally, the full model is depicted in Figure 3. It reveals that the latent construct of openness to experience should have some influence on the latent constructs of both satisfaction with life and the DDA. The latent SWLS factor is supposed to have some influence on the DDA factor.

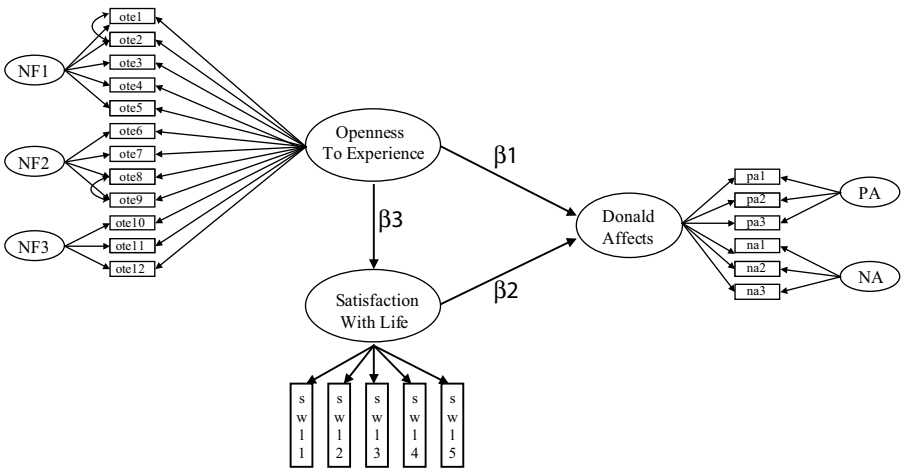


Figure 3. The full structural equation model. Uniqueness not shown.

5. RESULTS

5.1. Factor Structure

Goodness of fit was evaluated for the factor structures for each model. Table I reveals that support was provided for the *a priori* specified DDA inventory with nested factors (Model 2) and for the SWLS (Model 3). Success in separating the positively loaded from the negatively loaded items in Model 2 is consistent with earlier findings (e.g. Marsh, 1996; Tomás and Olover, 1999), showing that overall fit for an inventory containing both positively and negatively loaded items is often inadequate until the method effect of the valence (i.e. the nested factors) is considered.

To reach a non-significant goodness of fit for the openness to experience inventory, two steps of *post hoc* modification were needed. First, three nested factors were included in the model (Model 5). These factors

TABLE I

Goodness of fit for Donald Duck Affects (DDA), Satisfaction With Life (SWLS) and Openness To Experience (OTE) factor models and for the full structural equation model at T1 and T2

Model	χ^2		df		CFI		AGFI		RMSEA	
	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
DDA-A (Model 1)	93.1	102.3	9	9	0.90	0.83	0.72	0.64	0.19	0.22
DDA-B (Model 2)	7.89	5.4	4[a]	4[a]	0.97	1.00	0.95	0.96	0.06	0.04
SWLS (Model 3)	3.8	10.1	5	5	1.00	0.99	0.98	0.95	0.00	0.07
OTE-A (Model 4)	192.0**	182.6**	54	54	0.72	0.75	0.83	0.81	0.10	0.10
OTE-B (Model 5)	72.7**	73.1**	42	42	0.95	0.94	0.92	0.90	0.05	0.06
OTE-C (Model 7)	50.2	57.1*	40	40	0.98	0.97	0.94	0.92	0.03	0.04
The full model (Model 7)	247.4	295.0*	243[a]	242	1.00	0.96	0.91	0.89	0.01	0.03

Note: $N = 252$ (T1) and 223 (T2). Model number refers to the models depicted in Figures 1 and 2. $^*p < 0.05$. $^{**}p < 0.01$. [a]df increased by 1 because the variance of an uniqueness factors was restricted to be zero. χ^2 = Chi-square, df = Degrees of freedom, CFI = Comparative Fit Index, AGFI = Adjusted Goodness of Fit Index, RMSEA = Root Mean Square Error of Approximation.

TABLE II
Standardized parameter estimates for the full model (Model 7)

	$\beta 1$	$\beta 2$	$\beta 3$
T1	0.28*	−0.22*	0.16*
T2	0.23*	−0.11	0.25*

Note: $^{*}p < 0.05$.

were based on the factor structure obtained with an exploratory factor analysis. (The result of the exploratory factor analyses of the openness items is not reported here.) Second, two pairs of unique factors were allowed to correlate, as suggested by the Lagrange multiplier test (Model 6).

Cross-validation for the *post hoc* models was provided by the T2 data, showing a slightly significant, though fairly adequate, goodness of fit in terms of the fit indexes for Models 2 and 6.

5.2. The Full Model

Goodness of fit for the full model was excellent for the T1 data and good for the T2 data, as revealed in the last row of Table I. Results from estimating the regression parameters in Model 7 indicate that the effect from openness to DDA is moderate and positive. The standardized structural coefficients (β's) were 0.28 and 0.23 ($p < 0.05$) for T1 and T2 data, respectively (Table II). The paths from SWLS to DDA were −0.22 and −0.11 ($p < 0.05$ and n.s.) for T1 and T2, respectively. The influence of openness on satisfaction was 0.16 and 0.25 ($p < 0.05$).

6. DISCUSSION

An important goal of this study has been to illustrate an assumed difference between flow and self-reported life-satisfaction, an assumption that was supported in the following manner. When confronted with a projective method in which subjects evaluated cartoons showing Donald Duck in challenging situations, open individuals described Donald Duck's experience as being more positive than closed individuals did. The SWLS variable, on the other hand, did not relate significantly with DDA variables at T2, while it showed a slightly

negative association at T1. The data also revealed that openness to experience had a moderate influence on the satisfaction with life measure.

These results support the idea that the concept of life satisfaction does not cover the full meaning of subjective quality of life. For example, arguing that quality of life is defined as a *relation* between quality of conditions (QC) and quality of persons (QP), Lane (1996) claims that the quality of a person comprises both (1) a sense of SWB and (2) personal development, learning and growth (DLG). Lane makes this distinction between SWB and DLG because QP is something much larger than capacity for enjoying life. SWB does not include development of the qualities of the person that give quality of life much of its value. As argued convincingly by, for instance, Csikszentmihalyi and Rathunde (1998) and Eckblad (1981b), flow and DLG are closely related phenomena, while, as attested by the study reported in this article, flow and SWB need to be treated as distinct phenomena. By relating these concepts to the distinction between hedonism and eudaemonia, the present study seems to provide further support for the argument that life satisfaction is only one element in eudaemonia (see also Haybron, 2000).

Veenhoven (2000) has articulated the various meanings of 'the good life', 'well-being,' 'happiness' and similar terms. He orders the relevant concepts along two dichotomous dimensions implying four qualities of life: (1) livability of the environment, (2) life-ability of the individual, (3) external utility of life, (4) inner appreciation of life. While life satisfaction clearly belongs within the latter category, the localization of flow is more troublesome. Obviously, flow is a positive subjective experience and should therefore be located in the same quadrant as life satisfaction. However, the characteristics of flow also relate to the process of dealing with an environment, in accordance with Veenhoven's description of throughput in system theory. And throughput, according to Veenhoven, is analogous to 'life-ability' of a person. In our current state of knowledge, it is difficult to locate flow in the grid, although 'appreciation' probably stands out as the quadrant best able to account for the phenomenon.

Definitely, more conceptual work is needed to clarify quality of life theory in relation to this issue. More work is also needed if we are to have a better understanding of the role of human growth and development in subjective quality of life. For example, the Nobel prizewinner in economics Amartya Sen conceives a *capability approach* as the proper

way to comprehend human development (Sen, 2000). However, from a psychological point of view the concept of capabilities has not yet been fully developed. Future well-being research should seek a more precise meaning for it.

Several caveats apply to the current study. One relates to the linkage between openness and flow. Contrary to Csikszentmihalyi's concept of autotelic personalities, openness is not directly connected with flow and intrinsic motivation. However, both conceptually and empirically it seems reasonable to assume some sort of a connection between them. For example, openness was an important construct for Carl Rogers, who stated that: ". . . one aspect of this process which I am naming 'the good life' appears to be a movement away from the pole of defensiveness toward the pole of openness to experience" (Rogers, 1961, p. 188). Furthermore, using an experience sampling method (or "ecological momentary assessment," as it is also being called (Stone et al., 1999), Vittersø (1998) found that subjects high on openness also experience more here-and-now situations as interesting and challenging than do subjects low on this trait.

Another source of uncertainty in the data reported in this paper concerns the use of projective measurements. First, we do not know whether the test really capture flow experiences. That is an assumption made by the author, and conceptual replications is needed before strong conclusions can be drawn. Second, the ambiguity of projective tests is both their advantage and their drawback. In particular, in the present study we do not know precisely what it was about these cartoons that appealed to the open individuals. Presumably it was the challenge and possibility for exploration. However, since it was the researcher who chose the cartoons, the presented data are more subjectively biased than usual in survey research. Despite the replication done with the T2 data, more studies are needed for cross-validation before strong conclusions can be drawn from this line of research.

7. CONCLUSIONS

Satisfaction with life certainly is an important part of psychological well-being. So are optimal experiences such as flow and related affects rising from intrinsically motivated behavior. However, since evaluative processes play a major role in the judgment of life satisfaction whereas

non-evaluative processes are involved in flow activities, theoretical and empirical work should pay attention to this rather subtle distinction. Researchers should be careful not to generalize too broadly to inner life quality from studies based on measurement of life satisfaction. Similarly, observations of flow experiences should not be interpreted as a valid measurement of appreciation of life.

Finally, the traditional interpretation of low correlations between life satisfaction and openness to experience appeals to a balancing-out of pleasant and unpleasant affects. As an alternative, this paper suggests that openness relates to a different dimension of well-being. While satisfaction with life relates to a pleasant–unpleasant dimension, openness to experience relates to a separate, but still affective, dimension of intellectual challenges and life richness.

ACKNOWLEDGEMENTS

This research was funded with grants from the Norwegian Research Council. I thank the "Serieforlaget" publishing company in Oslo for allowing me to use frames from the Donald Duck cartoon magazine in my research. An earlier version of this paper was presented to the XXVII International Congress of Psychology, Stockholm, Sweden in July 2000. I am grateful to Gudrun Fleischer Eckblad, Espen Røysamb and Raymond Chipeniuk for helpful remarks on the draft version.

NOTES

[1] Although the literature on flow is not identical with the literature on intrinsic motivation, "flow" and "intrinsic motivation" are used interchangeably in the current presentation.

APPENDIX

The 12 openness to experience items were:

OTE1 = Original
OTE2 = Creative
OTE3 = Artistic

OTE4 = Special
OTE5 = Complicated
OTE6 = Curious
OTE7 = Imaginative
OTE8 = Farsighted
OTE9 = Inventive
OTE10 = Independent
OTE11 = Philosophical
OTE12 = Open-minded

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