

MASTER'S THESIS IN HEALTH SCIENCE

## **Subjective Well-Being in a Norwegian Setting**

**ARTICLE I:** Unravelling Happiness – A Conceptual and Methodological Approach  
to Subjective Well-Being

**ARTICLE II:** Searching for Norwegian Happiness – A Validation Study of Subjective  
Well-Being Questionnaires in a Norwegian Sample

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## **Paper 1:**

# **«Unravelling Happiness - A Conceptual and Methodological Approach to Subjective Well-Being»**

1<sup>st</sup> Paper of Master Thesis in Health Science

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## **Abstract**

Subjective well-being (SWB) is an upcoming concept that has caught the attention of the scientific community and society in general. Although much has been learned about the nature of “happiness” both the definition and measurements are still a work in progress. The current paper aimed to examine how global subjective well-being best can be measured based in the current theoretical understanding of the definition and assessment methods. SWB is by Diener (2009) considered to have three main components: positive affect, negative affect and life satisfaction. The concept is complex with many interconnecting dimensions and correlates. The choice of SWB measurement method or instrument should be based on an understanding of the nature of SWB in addition to the study’s design and purpose. Self-report measures are the most utilized and generally shows good psychometric properties. This paper primarily recommends using the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen & Griffin 1985) combined with Scale of Positive And Negative Experience (SPANE; Diener et al. 2009) to measure SWB.

**Keywords:** Subjective well-being ~ Happiness ~ Assessment



## Introduction

The search for the good life has occupied human kind since the beginning of time. Philosophers throughout history have considered happiness to be among the highest good and a top characteristic of good quality of life. Even though for the longest time psychologists focused on mental pathology and the bad things in life – human suffering, weakness, and disorder – the focus has shifted into also including the emerging science of positive psychology: the study of positive emotions, positive character and traits, and positive institutions.

One of the few things philosophers and scientists alike seem to agree upon is that happiness is a complex concept that is not easily defined. Looking at how happiness has been viewed in various ways by poets, writers, philosophers and the like through history, the essence of the word is ambiguous at best (Kesebir & Diener 2008). Is it experiencing joy? Is it to be spared of troubles? Is it to achieve certain virtues such as wisdom? Or will happiness come with a good marriage, the birth of your child or that high-paying job? These were questions that scientists after a few decades of research are starting to get good answers to. The term *subjective well-being* (SWB) was introduced as the scientific counterpart to the colloquial phrasing “happiness” (Diener 1984; Seligman 2002; Diener 2009). Within this term is the key notion that the best one to judge whether or not a life is good, is the one living it. Low correlations have rather consistently been found between well-being and external variables such as demographics (Diener 1984; Diener 2009). The appraisal therefore comes from people’s *own* evaluations of their lives. SWB consists of both emotional components (frequent positive and infrequent negative affect) and cognitive components (evaluation of life satisfaction) (Diener 1984; Diener, Suh, Lucas & Smith 1999; Diener 2009). SWB is also placed under the *salutogenic umbrella* as one of many salutary concepts contributing to the explanations of quality of life and health (Eriksson & Lindström 2008).

There are several reasons why SWB has become such an important scientific field (Diener, Scollon & Lucas 2004). First, people all over the world think that SWB is important. Asking over 7000 students from 17 countries revealed that happiness and

life satisfaction was considered very important and that the students thought about it often. 69% reported happiness at the top of the importance scale (Diener 2000; Suh, Diener, Oishi & Triandis 1998). Second, with increasing levels of SWB come effects beneficial for both the individual and society around. SWB can lead to interpersonal trust and warmth, sociability, cooperation, volunteerism and community involvement (Tov & Diener 2008). Investing in interventions and programs aiming to increase overall SWB levels among subgroups and nation populations might therefore prove valuable. Third, SWB is increasingly used as an outcome variable in research done on target groups such as the elderly and is an important indicator of functioning and quality of life in old age (George 1986). Fourth, SWB shows major potential as a supplement to economic and social indicators such as GNP and levels of education, health, unemployment and crime as an indicator of quality of life, and captures aspects of nation's conditions unavailable to other indicators thus providing a richer base for evaluation of a society (George 1986; Diener, Scollon & Lucas 2004; Diener 2000).

Although much has been learned of SWB, both the definition and the measurement of the concept are still a work in progress. Working out clear definitions and operationalizations is essential to a successful knowledge accumulation.

Assessment and measurement is also a key element in SWB research as in all the behavioural sciences, and the understanding of a phenomenon can be argued to advance parallel with the development and refinement of measures.

This paper will look closer at SWB primarily anchored in the teachings of Ed Diener as he today is a recognized researcher and one of the leading authors of reviews and articles in the field after having worked with SWB for three decades. Literature for this paper is mainly based on Diener's work or work referred to or mentioned in Diener's work. Concepts related to but distinct from SWB, such as salutogenesis (Antonovsky 1979), (health related) quality of life, psychological well-being (Ryff & Singer 1996), social well-being (Keyes 1998), and the self-determination theory (Ryan & Deci 2000) put forth by psychologists will not be examined closer here.

### ***Aim of the paper***

The aim of this paper is to examine how global subjective well-being best can be

measured with base in today's understanding of subjective well-being's definition and constituent elements.

I have addressed this in the following three sections:

1. What are the leading definitions of subjective well-being? What are the constituent elements? In section one the complex concept of subjective well-being and its main characterisations are examined.
2. How should subjective well-being be measured? In section two measurement considerations are discussed and SWB's operational definition is examined.
3. What instruments can suitably be combined in order to measure global subjective well-being? In section three I present several SWB measurements and discuss how these can be used combined in order to measure global subjective well-being.

## **Review of theoretical aspects**

### ***The structure and components of subjective well-being***

Ed Diener set in his 1984 article three hallmarks in the area of SWB. First and foremost it is subjective, as the name indicates, meaning that it is the subject's own judgement of whether his or her life is desirable, pleasant and good, that is in focus. Hence, the subject himself is free to put weight on the aspect or aspects of his life that he sees important to his well-being. Second, SWB includes positive measures and not just negative ones, as is the main idea in positive psychology. Third, SWB measures typically make a point of globally assessing all aspects of a person's life. An integrated measure of the person's life is usually emphasized also when assessing parts of SWB or SWB in certain domains (Diener 2009).

Several constituent elements have been identified while working with SWB, which cohere in understandable and quite consistent ways. Andrews & Withey (1976) were the first to identify three main components of SWB. These components include positive affect (prevalence of positive emotions and moods), negative affect (prevalence of unpleasant emotions and moods) and life satisfaction (a global judgement of one's life). Ed Diener operates with the same components, but occasionally also includes a fourth: Satisfaction with important life domains (such as one's work, health, marriage etc.) (Diener, Scollon, Lucas, 2004). These four components give SWB more specificity and a more precise understanding of SWB's constitution. Within each of these components accordingly there are smaller, finer components.

The inclusion of the fourth list item is in general not necessary because people tend to show coherencies between their subjective well-being in their different life domains (Campbell et al. in Diener 2009). Veenhoven (1984) agrees that two components are used by people when they evaluate their lives: an affect component and a cognitive component. He views SWB as "the degree to which an individual judges the overall quality of her or his life in a favourable way. In other words, subjective well-being is how well the person likes the life he or she leads" (p.22).

Diener (2009) gives the following extensive definition based in a theory on the appraisals we make of our lives. As humans we appraise life events and circumstances on a continually basis, on a universal good-bad scale. Following the theory of Lazarus (1991), these appraisals lead to pleasant or unpleasant emotional reactions, the pleasant ones being both desirable and valuable. People with high SWB are those that in sum have more positive appraisals of their life events and circumstances. One definition of SWB is:

“Subjective well-being refers to the global experience of positive reactions to one's life, and includes all of the lower-order components such as life satisfaction and hedonic level. Life satisfaction refers to a conscious global judgement of one's life. Hedonic level or balance refers to the pleasantness minus unpleasantness of one's emotional life” (Diener 1994 p. 29).

The concept of SWB would not hold much substance if we did not also have an idea of how quickly these happiness experiences changed. Trying to assess something that fluctuates substantially during the course of an average hour or week does not sit well with the fundamental bases of what most people consider happiness to be. Volatile happiness is not true happiness. Meant to measure the actual conditions in a person's life, the SWB variables are expected to respond to meaningful changes in life circumstances as well as to be somewhat stable over time considering the general degree of stability in these conditions. Several studies have given us considerable evidence that there is some consistency in the way people rate themselves across both situations and over time. There is some temporal stability both in peoples' life satisfaction and in their moods and emotions, although the later somewhat less than the first. Some of the stability is probably connected with the way SWB constructs are influenced by stable personality factors. The SWB construct also shows sensitivity to changing life circumstances, as expected. These findings have been confirmed using alternative methods of assessment, and both measurement artefacts and a stable self-concept in the subject have been excluded as considerable explanation factors (Diener & Larsen 1984; Diener 1994; Diener, Scollon & Lucas 2004). Given these stabilities, studying long-term SWB is proven defensible. Further it makes it possible to make a distinction between “happy” and

“unhappy” people since people differ from one another in a somewhat consistent way when it comes to the rating of their well-being.

## **Life satisfaction**

Life satisfaction refers to the judgement made when individuals presumably examine the conditions of their own life and evaluate how desirable they find it, scaling it somewhere between satisfied and dissatisfied. In other words, life satisfaction is the cognitive part of the SWB equation, accounting for the conscious, global judgement people make when considering their life as a whole. The criteria people use to evaluate this appear to differ both between cultures, individuals and even situational circumstances. People are free to emphasize the different domains of their life as they see best fit, according to their personal preference. For instance for some people their family life is the most important and the appraisal of this domain will naturally be more emphasized when global life satisfaction is assessed. Another information source is the individual's relation to the comparative standard they use. Is their life good compared to that of ones parents, ones neighbour, or to the life of someone in a distant country? Is it better than what it was as a teenager, or what is expected or hoped for in the future? The evaluation of ones life can appear quite extensive. Years of research on how these judgements are made has shown that a variety of shortcuts are used to simplify the process. For instance can elements such as finding a dime, or the weather of the day of judgement, influence the outcome of the evaluation. Such discoveries may be used to argue against life satisfaction as a reliable and valid measure. Despite shortcuts and potential measurement artefacts, in general people's life satisfaction judgements show substantial temporal stability. People may at times include irrelevant information in their evaluations, but on average research shows that most of the information that is used, is chronically accessible and, presumably, important to the individual (Diener, Scollon & Lucas 2004).

## **Domain satisfaction**

Domain satisfaction reflects the evaluation a person makes about specific domains in



his or her life, such as work, family life, love life, health etc. As we have already seen, the ways the various domains are emphasized may vary when aggregated into the evaluation of global life satisfaction. An individual's judgement of different domains may reveal things about the way global well-being judgments are constructed, the person's attitude and outlook as well as about the «objective condition» of the domains in question. The use of domain evaluations can also be useful for research studies where the effects on well-being within specific areas are of interest. For example, research on cancer patients may benefit from recording evaluations on overall health, or, within a work place job satisfaction judgements may provide sensitive measures of effect (Diener, Scollon & Lucas 2004).

### **Positive and negative affect**

Affect and emotion are systems that in an evolutionary perspective have helped us humans survive and adapt to our environment, according to Darwin's teachings. Positive and negative feelings are reflections on how we experience things in our everyday lives, and so many hold affect to be a prime contributor to SWB. Our moods and emotions is the base of our affective evaluations. Through studies of our different affective reactions, researchers can gain understanding of how people evaluate the conditions and events of their lives. With affect being an influential component to the SWB equation, discoveries and research done by behavioural psychologists can help in understanding how affect, emotions and moods influence SWB. One example is Bradburn's studies of affect in the 1960s. They showed that negative and positive affect scales were virtually uncorrelated with each other, and that both scales showed independent and incremental correlations with a global well-being item (Beiser 1974, Bradburn 1969, Moriwaki 1974 in Diener 1984). Negative and positive affect have appeared on two independent or close to-independent scales when analyzing data in numerous studies done since. These same findings appear using a range of different methodology. This suggests that positive affect and negative affect are two independent components of SWB, and thus needs to be measured separately.

The origin, function and interplay of our emotions are complex and still a subject of investigation. The many components and dimensions of affect make both conceptualization and assessment challenging. Several theories on how the affective

systems work are being discussed and tested. Many of these focus on how the structure of emotions and moods works. Some have faith that there are a handful of basic emotions that can form the root of other emotions, with the criteria of characterisation of these basic emotions still being defined. An alternative approach is the dimensional approach. Here scientists have discovered that certain moods and emotions correlate within persons over time as well as between individuals, and are therefore looking for basic dimensions that underlie the covariation among all the feelings people experience. Identifying these dimensions would simplify the progressing research for what causes these emotions and what they do to people. The different theoretical structures will be refined as researchers make new discoveries, adding to the debate. For the time being, SWB scientists should continue to assess positive and negative affect separately (Diener, Scollon & Lucas 2004).

### **Frequency and intensity of affect**

Another issue concerning the assessment of affect is the «frequency versus intensity» question, a.k.a. what element of the emotional experience it is we want to measure (or end up measuring). The frequency in question is how much of his or her time a person experiences a particular emotion or mood, while the intensity factor tells us of how strongly a person experiences particular moods or emotions. Where early affect research did not differentiate between these aspects, it is now clear that frequency is not the same as intensity and that they have distinct implications for well-being (Diener, Scollon & Lucas 2004).

Diener, Sandvik & Pavot (1991) discussed the two emotional experiences role in the affect equation in their article. They argued that the frequency was more important for a person's overall well-being than was intensity, giving both theoretical and empirical reasons for this focus: People who experience positive emotions strongly also have a tendency to experience negative emotions intensely, so that these intense experiences overall tend to level out each other. Another of their arguments is that intense feelings are relatively rare, and that these rare occasions have a small impact on overall well-being. Lastly, the good psychometric properties of frequency-based measures are emphasized. For example, it is quite easy to determine if you are experiencing a particular feeling or not, and for how long. But how do you assess just

how intensely you feel angry or happy? How does intensity travel across its spectrum? And, how can one person's intensity assessment be compared to someone else? Frequency seem to have more validity and be more desirable as a measure, than is intensity, and to determine peoples overall well-being, a general main focus on frequency is recommended (Diener, Sandvik & Pavot 1991).

### **Convergent and discriminant validity**

The different components presented above all conceptually represent distinct ways of evaluating a life. Positive and negative affect reflect the continuous reactions to the diverse events and conditions in one's life, and even originate in a separate part of the brain from where the cognitive evaluations and reflections are done on specific aspects of one's life or on one's life as a whole. Research supports that these components are not only theoretically distinct but also separable empirically. One example is Lucas et al.'s (1996) study where the convergent and discriminant validity of positive affect, negative affect and life satisfaction was examined. A construct tended to converge despite different methods of measuring, and measures of the same construct usually had stronger correlations across methods than measures of different constructs (Lucas et al. 1996, in Diener, Scollon & Lucas, 2004).

### ***Measuring subjective well-being***

Theory and measurement often advance together. A good theoretical understanding of SWB is a premise to a good assessment of the phenomenon, at the same time as studies done can reveal new insight into the workings of SWB (Diener 2009). As we have seen the variety of assessment choices is extensive. Selecting suitably might prove challenging, whether it is choosing the measurement approach or finding the right questionnaire. A rather unique over-abundance of instruments has been an issue within the field as practically every well-being researcher developed his own measure (Fordyce 1988). Our early choices might affect our later results, so to make conscious decisions both during the design phase and during the interpretation of data will be well worth the effort. Here follows some of the main considerations for the intricate study of SWB. Two of these, time framing used in the assessment and cultural differences in SWB's components, have been given extra attention.

## **SWB measurement methods of approach**

The conventional and most utilized method of approach in the SWB field is the self-report measures. With roots back to the early days of SWB studies, the essence of the approach is to ask people directly about their happiness and their appraisal of SWB-related issues like life satisfaction, emotions and moods. This approach shows strong links to the subjective side of the SWB construct.

The simplest of the self-report tests, the single-item measures, can ask respondents to rate how happy they are with their life and scale the answer from e.g. “extremely unhappy” to “extremely happy”. Examples of such scales are Fordyce' Happiness Measures (1988) and Andrews and Witheys' D-T Scale (1976). These short and quick measures, even though having some methodological shortcomings, do show considerable degree of both reliability, and convergent- and discriminant validity, and are suited for when more elaborate measures are unpractical (Diener, Scollon & Lucas 2004; Diener 1984). For more comprehensive needs a number of multi-item measures are available, and these vary greatly in both application and extensity.

The self-report measures can assess one or several of the constituent elements of SWB (e.g. just the affective side of SWB), they can be created to target specific social groups (e.g. geriatric populations) or to be used in specific situations (e.g. with interventions). For example, life satisfaction scales may ask respondents to rate how much they agree with statements such as “The conditions of my life are excellent” (Diener 1985). Scales measuring positive and negative affect may ask about how frequent the subject experience emotions such as “anger”, “contentment”, “excitement” or “bitterness”. SWB self-report measures generally show good or adequate psychometric qualities, including validity, reliability, factor invariance and sensitivity to changes. They also correlate with a number of other methods measuring the same concepts and correlate appropriately with theoretically related variables (Diener 1994; Sandvik, Diener & Siedlitz 1993; Diener, Scollon & Lucas 2004).

Even though the self-report measures are the method of choice for many scientists, additional types of measures other than the self-report measures have also been implemented in the field. Examples here are the experience sampling methods

(ESM) that let the respondents report their mood several times over a period of time using for instance a handheld computer. By using this method respondent can give their on-line emotional status without having to recall and judge their feelings in retrospect. The informant approach uses significant others like friends or family to estimate and rapport a person's well-being. The expert-rater can use coding and registration of facial expressions and vocal tones during interviews. Some researchers have measured psychosomatic responses connected with emotional triggers, using for example heart rate acceleration, blood pressure and perspiration. Brain area activation measured through MRI or similar devices have been measured in the search for more «objective» measures of SWB. Most non-self-reports show moderate convergence with the self-report measures, and furthermore, the non-self-reports converge with each other (Diener 1994; Diener, Scollon & Lucas 2004). Since self-report measures have shown satisfactory psychometric qualities and converge with non-self-report measures they are in many research settings an adequate choice.

### **General measurement issues and artefacts**

Because of the SWB field's emphasis on the subjective aspect of well-being it is sometimes assumed that the self-report measures are the ideal measure of the construct. But strong face validity is not enough to secure the validity of the method, and there are some measurement issues and artefacts to take into consideration.

The influence of momentary mood on the measurement is one example. Schwarz & Clore found in their 1983 study that momentary affective moods, like those caused by weather or season, influenced respondents' judgements of SWB (Schwarz & Clore 1983, in Diener 1984). Respondent can have conscious distortions, reluctance to reveal their appraisals to the researcher or tend to recall past events that are congruent with how they are feeling during the assessment (Diener 1984; Diener & Lucas 2008), and all of these factors could affect the true variance in SWB. According to some cognitive theories, people might not have the cognitive capacity to evaluate their experiences over a longer period of time (Robinson & Clore 2002, Schwarz & Strack 1999 in Diener & Lucas 2008).

The understanding and measurement techniques of emotions within psychology have advanced in recent years, providing experience that is useful also in assessing and

defining the affect elements in SWB. Most self-reports rely strongly on so-called cognitive labelling of emotions, missing remaining components of the emotion system. Modern theory on emotion states that affect includes facial, physiological, motivational, behavioral and cognitive components, and that the responses of emotions vary on several dimensions such as for instance intensity. These advances in theory of emotion suggest that a large part of today's SWB measures lack the ability to capture the richer and more complete picture of emotion and thereby also SWB (Diener 1994).

### **The time frame in question**

As mentioned above SWB is likely to consist of both changeable and stable components. It is believed that on shorter time periods our SWB level is more influenced by changeable and unstable elements such as our chores for the day, our mood after an unexpected call from our mum or the prospects of beating rush hour traffic, while elements such as goal reaching, having supportive social networks or leading the lives we aspire to is not as influential on our everyday well-being (Diener & Larsen 1984; Shimmack, Diener & Oishi 2002). If asked about the well-being experience of this moment or of today the subjects are likely to base their evaluation differently than if they were asked to rate the latest year or their entire life. Shorter time frames are more influenced by on-line mood experiences, and a higher degree of cognitive, reconstructive and judgemental processes influences the rating of longer time periods. Furthermore, both the causes and the consequences of the SWB measured are likely to differ based on how the time frame in questionnaires is phrased. The different time frames can all produce interesting results. This means that "there are no time frames which are 'correct'" (Diener 1994 p. 50), but awareness of the time frame phrasing will be helpful in making valid analyses and conclusions (Diener, Scollon & Lucas 2004).

Another element concerning the time framing is when studies operate with their own defined time frame it makes comparative analyses of findings as well as both the development of the method in question and the development of the understanding of the SWB concept, difficult. Sticking to one of the handful most used time frames is therefore advised.

## **Cultural differences in SWB**

While feeling good is a universal experience among people through time and throughout the globe, the correlates might not be. SWB is influenced in different ways by societal and cultural factors. A person's culture will influence their values and goals, and so the culture affects the correlates of SWB. The organization and resources of a society can more or less provide means affecting SWB, whether it is access to clean water, personal freedom and autonomy or good social support systems. Different cultures also have their own understanding of what happiness and leading a well life are (Uchida, Norasakkunkit & Kitayama 2004; Diener 2000). Some cross-cultural studies have shown a difference in the correlation between affect and cognition, from about  $r=0.5$  in individualist cultures to as low as  $r=0.2$  in collectivist cultures, where the state of others as well as yourself is fundamental for well-being (Suh, Diener, Oishi & Triandis 1998). Even though there are some virtues that have been identified as universal (Peterson & Seligman 2004), other virtues are valued differently between cultures and over time. Questionnaires like for instance the PANAS, which are based on specific moods and emotions, can face trouble when used on groups of respondents where the items in the scale don't reflect the cultural understanding of what happiness is. The degree of factorial invariance of the scales might vary, suggesting that items do not have the same level of coherence everywhere. Translating questionnaires from one language or social context to the next might prove troublesome and there is always a concern how the translation affects the responses, even more so when the use and understanding of an item can differ between the researcher and his respondents. Being excited or alert might mean different things to different people. And what is a good translation of «excited» from English to German, Norwegian or Chinese? Finally, social desirability is another socially influenced element and a common artefact in many social sciences' studies. In what degree is it normative to act or to be (dis)satisfied with life? Diener argues however that controlling SWB scales for individual differences in social desirability using traditional social desirability instruments may not increase the data's validity because both well-being and social desirability scores have common correlates (Diener 1994).

## **Recognized SWB measures**

Within the happiness research field a multitude of instruments has been used and researchers face an over-abundance of measurement possibilities. Few measures have stood out as reference-points for further studies, making both orientation and selection difficult. However, the last two decades this trend seems to have been somewhat broken, as reviews and comparative studies test the instruments' stamina. Despite this, it still appears difficult to find a single instrument that tries to include all of the different SWB components in one test.

In the following text I will make compact presentations of the more recognized and well-tested self-report questionnaires in use today. Thereafter I will discuss what SWB components they appear to cover and how a selection of these tests together can yield an index covering the full SWB concept.

Criteria of evaluation:

- Instrument characteristics in accordance to SWB concept theory
- Reliable assessment of one or more of the SWB components
- Severely explored and approved psychometric properties
- Adaptability to different study settings

## **“Happiness Measures”**

The Happiness Measures (HM) was introduced by Fordyce in his 1988 review article along with 18 years of research experience using it. The questionnaire is a quite simple, self-report measurement that consists of two items measuring emotional well-being. It captures both the intensity and the frequency of happiness affect, considered by many to be important and complementing aspects of well-being (Diener 1984; 2009). The questionnaire can be scored in several ways but the more commonly used *combination score* is the strongest regarding reliability and validity. Fordyce points out that the time frame covered by the questions can be altered from the general “on the average” way to more specific time periods as is best suited. Looking at Fordyce’s review, one can see how extensive the testing of this



questionnaire has been. Experience with the scale shows adequate levels of both temporal stability and sensitivity to changes. Its convergent validity has been demonstrated as consistent and strong in correlations with over two dozen other instruments of relevance. Fordyce also presents extensive accumulating data validating both good discriminative validity and construct validity. The HM's structure prevents certain validity tests such as for example internal consistency.

### **“Positive and Negative Affect Schedule – PANAS”**

The PANAS questionnaire was originally introduced by Watson, Clark and Tellegen in 1988, and as the title implies it is designed to measure both positive and negative affect. The questionnaire consists of ten items (positive adjectives) assessing positive affect and ten (negative adjectives) assessing negative affect, letting respondents report on a five point Likert scale to what extent they have experienced the given feelings. The time period in question can be altered to the researcher's preference choosing from seven time periods given in the introductory article. Positive and negative affect is measured on separate scales in accordance with the finding that positive (PA) and negative affect (NA) consistently emerges as two independent factors or dimensions in studies. Good psychometric properties have been reported both from Watson, Clark and Tellegen's original paper as well as for several studies and review articles published since (Crawford & Henry 2004; Tuccitto, Giacobbi & Leite 2010; Hillerås, Jorm, Herlitz & Winblad 1998). The stability level is significant in every time frame, and also the time frame doesn't affect the reliability of the scales. Both the scale and item validities are high, and the scale intercorrelations and internal consistency reliabilities are all acceptably high. The PANAS has been tested vividly on a wide range of populations including different clinical groups, and is one of the most used questionnaires measuring affect worldwide today. Alternative versions on the PANAS have also emerged, like the PANAS-X Expanded Form (Watson & Clark 1994), the PANAS Short Form (Kercher 1992) which was followed by the International PANAS Short Form (I-PANAS-SF; Thompson 2007).

### **“Scale of Positive and Negative Experience - SPANE”**

This relatively new measure was presented by Diener, Wirtz, Biswas-Diener, Tov, Kim-Prieto, Choi & Oishi in 2009. It consists of a 12-item scale, with six of the items targeting *positive* feelings and experience and the other six focusing on *negative* ones. The scale has three scores, the two experience scales (SPANE-*P* and SPANE-*N*) and a *balance* scale combining the first two (SPANE-*B*). The theoretical background of the measure lies in Diener et al.'s arguments that feelings might be assessed more accurately when the items used represent a broad spectrum of the definition of positive and negative feelings, as is argued to be lacking with other alternative measures. To present such broad without omitting relevant feelings, the measure consist of broad desirable and undesirable words – “good/ bad”, “positive/ negative” and “pleasant/ unpleasant” – on the positive and negative experience scale, respectively. The measure also includes “a number of positive and negative emotions that are central to the experience of well-being” (Diener et al. 2009 p. 250). The scale is base on the frequency of feelings, during the last month by default although other time frames can be used. Initial testing of the scale showed satisfactory reliability, internal consistency, temporal stability and convergent validity with eight other well-being related measures.

### **“Satisfaction with Life Scale”**

The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen & Griffin 1985) is a five-item questionnaire designed to assess a person's global judgement of life satisfaction as a component of subjective well-being. It was developed with intentions of being applicable on the majority of population groups and to be narrowly focused on the concept of subjective global life satisfaction. Items include «The conditions of my life are excellent» and «I am satisfied with my life», letting respondents grade each statement on a seven-point Likert scale from «strongly disagree» to «strongly agree». Extensive arguments for the scales' validation was presented both in the Diener et al.'s 1985 introductory report and in a Pavot and Diener review article on the SWLS in 2009. Based on over two dozen studies on a wide range of populations the scales' psychometric properties and validation are satisfactory.

## **“Subjective Happiness Scale”**

Lyubomirsky and Lepper, the authors behind the Subjective Happiness Scale (SHS; 1999) describe a lack of *global* assessment, «a measure of overall «subjective happiness»» (Lyubomirsky & Lepper 1999 p. 139) from other current measures assessing either affect or cognition. Based on this, the SHS is a four-item scale measuring a person’s global subjective happiness. Two items ask how happy a person the respondents consider themselves to be, both in an absolute rating and in a rating relative to their peers. The remaining two describes happy and unhappy people, respectively, and ask the respondent in what degree they identify themselves with the description. 14 samples have been collected at various times and locations and with different demographic groups as respondents, and with these samples the scale appears to have been tested extensively. Both the internal consistency, the convergent and discriminant validity, the stability coefficient and the coherence between the self-report approach and self-other reports approach (collateral data collected from significant others) proved to be satisfactory.

## How can global SWB be measured?

The main objective of this paper was to examine how overall subjective well-being can be adequately measured. In order to successfully assess a phenomenon it is essential to have a thorough understanding of its nature. Today's leading comprehensions of subjective well-being state a complex and not fully chartered concept.

Based on the present literature review the following understanding of subjective well-being has been chosen for this paper. SWB is made up of three main constituent components. These components are positive affect, negative affect and life satisfaction. Affect is our moods and emotions, the pleasantness and unpleasantness of our emotional life. Life satisfaction refers to the conscious cognitive judgement of our life combined. All three constituent elements are essential in the assessment of the global SWB concept. One can argue that subjective well-being refers to a person's subjective and composite judgement of the global experience of the positive and negative reactions to his or her life. The subjective approach is fundamental to SWB, under the notion that the only one that truly can evaluate a life is the one living it.

In addition to the constituent components of SWB there are several other elements that influence SWB. One example of this is that SWB is considered to be assessed based on both stable and more fluctuating elements, and has therefore a degree of temporal stability as well as sensitivity to change. Another example is the measuring of short-term SWB contra long-term SWB where the dynamics of affect variables differs as the time frame changes. When selecting a time frame for a study one should consider not only the apparent preferences of time frame but also what the main influences of the subject's evaluation are. The question of frequency and intensity of affect is also important to be aware of. It can be argued that how often one experience positive emotions is more important for SWB than how strongly one experience them, and that the frequency or duration of an emotion can be more accurately assessed than the intensity. Finally, the influence of the cultural surroundings and values of a person, which will systematically influence what individuals emphasize when assessing their SWB. These kinds of elements within

the SWB concept can alter what is actually being measured, and so they should be taken into consideration to ensure validity in general and specifically good construct validity.

When designing a study that includes SWB, the choice of assessment method will always deal with the cost and benefit in terms of the study's purposes. For the picking of an assessment tool there is an arsenal of scales and measures to select from. Although more sophisticated assessment methodology (that might provide a richer picture of a person's SWB) is becoming more and more available, the self-report measures are today still the most utilized approach to measuring SWB. Among its advantages is the large number of studies that attests to its adequate psychometric qualities. Another advantage is the self-report's brevity and easy administration. Data from a large number of participants can be collected using relatively few questions which makes it easy to administer and only takes a few minutes of the participants' time. This data can despite its easy collection show satisfactory reliability, validity, factor invariance as well as sensitivity to changes when using acknowledged questionnaires. Self-report questionnaires are a natural choice for mapping large groups of people.

Several questionnaires are today recognized and frequently used in the assessment of SWB or SWB components. The question now is how such a questionnaire or a selection of questionnaires best can measure SWB covering all its subcomponents.

A number of questionnaires report measuring the affective components of SWB: Positive affect and negative affect. In the present paper PANAS (Watson, Clark & Tellegen 1985), Happiness Measures (HM; Fordyce 1988) and SPANE (Diener et al. 2009) have been examined. Out of these, PANAS is probably the questionnaire that has been included in most studies worldwide as it is often the instrument of choice for measuring positive and negative affect. It has been used with a variety of different samples, and has thus a wide data norm and comparative bases as well as thoroughly tested psychometric properties. This is an advantage for studies where a large data pool for comparison is central or a well explored psychometry gives desired predictability.

The PANAS has however been criticized. Validation studies of the scale have found some of the items to be largely redundant, which indicates that certain items can be eliminated without reducing the scales psychometric quality (Crawford & Henry 2004; Kercher 1992; Thompson 2007). The 20 items of the scale seem to make it one of the longer instruments within SWB measuring. Based on the assumption of redundancy, Kercher (1992) developed a short-form of PANAS, as did Thompson (2007). Both short forms comprise of two 5-item scales. In Kercher's form, excessive covariance between some of the items was revealed in subsequent factor analyses, indicating that redundancy still was an issue. Thompson's version, the International PANAS Short Form I-PANAS-SF, set to address the redundancy issues while also deriving a measure that was more cross-culturally valid. Items with ambiguous meaning such as *excited* are excluded from this version. A PANAS short form is an alternative to the original version in studies where brevity is of importance, and where the comparative possibility that the original PANAS has is less important.

A good instrument for the affective components in SWB should cover the full span of affect. It is unclear how well the PANAS does this and how well the scale's items represent feelings that are important to subjective well-being (Diener et al. 2009). One potential problem is that the scale contains more feelings of high intensity or arousal than low. Some of the items in PANAS can be argued to be states that aren't normally considered to be feelings, such as "active", "alert" and "determined" from the Positive Affect scale. One can be all of these things while also feeling vengeful or appreciative. This is however something that was taken greater consideration to when the SPANE was created. It was designed to represent a broad spectrum of the definition of positive and negative feelings and to better assess ongoing feelings of well-being. With the use of items such as *good/bad* and *pleasant/unpleasant* the respondents themselves are more free to define their feelings as positive or negative. It is worth noting that the positive and negative scales of SPANE had a covariation of  $-.54$  in the introductory article's factor analysis, a moderate to strong correlation. This is in contrast to the general understanding of the two affect dimensions to be independent of each other. Diener et al. (2009) explains this by SPANE's placement in the emotion circumplex and the time format used in the questionnaire. The scale is also quite new and has a lack of empirical experience and explored psychometric properties in diverse samples. SPANE appears to have potential as a measure for

affect as a component of SWB, although more empirical experience is needed to test its adaptability to study settings and its psychometric properties.

Another questionnaire set to measure the affective components of SWB is the Happiness Measures (HM). HM makes a point of aiming to capture both the intensity and the frequency of affect, which is in accordance with the SWB concept theory. In Fordyce (1988) introduction of the scale only the affective measurement elements are emphasized. Diener (1984) argued however that it reflects both life satisfaction and affect. When examining the semantics of the HM's first item – "(...) how *happy* or *unhappy* [emphasis added] do you usually feel? (...)" (Fordyce 1988 p. 376) – the question arises what element(s) of SWB are the ones being assessed, affect, cognition or both. Also, HM along with PANAS and SPANE all have phrasings in their questionnaires that make it ambiguous whether the scales measure frequency or intensity of affect or a combination of the two. Fordyce (1988) presents extensive accumulated data and adequate psychometrics on the instrument. Its two items makes it short and quick to administer but also makes it prone to some of the psychometric liabilities of scales with very few items. Even if both PANAS and SPANE appear to be more thorough and valid measures of the affect components, use of HM can be interesting when the question of frequency versus intensity of affect is relevant.

Measuring the cognitive component of SWB can be done by using questionnaires like the Satisfaction With Life Scale (SWLS; Diener et al. 1985). SWLS was designed to measure global life satisfaction as a component of SWB and has instrument characteristics in accordance with SWB's concept theory. By assessing satisfaction with life as a whole it is up to the respondents to evaluate the domains of life after their individual standards of "success", hence emphasizing the subjective perspective of SWB. The scale has been empirically explored and found to have good psychometry and to be adaptable to different samples and study settings. One potential predicament is item four, "So far I have gotten the important things I want in life". It has semantics that might lead young adults to systematically rate themselves to agree less with the claim than older adults since a 20 year old has life ambitions that they haven't put out to life yet whereas a 60 year old have had more time to do so. This suspicion needs to be tested in order to be certain. Overall, SWLS can be

recommended as a tool for measuring life satisfaction, and for complementing scales measuring emotional well-being.

Some measures aim to measure global SWB without measuring the constituent components separately. The Subjective Happiness Scale (SHS; Lyubomirsky & Lepper 1999) proclaims to measure global subjective happiness, using a brief four item questionnaire with broadly stated items. The semantic of the items makes it capture happiness both in the respondent's own standards and compared to that of its peers. The criteria of what standards happiness should be compared to are an interesting question. Studies with SHS have been done worldwide in different demographic and cultural groups, which is a testament to its diversity. The scale shows good psychometric properties with substantial convergent validity with other measures of happiness as well as constructs associated with SWB such as self-esteem and optimism.



## Conclusion

Finding a distinct definition of the complex concept of subjective well-being is a work in progress; however the most common approach today is viewing SWB as constituent of positive affect, negative affect and a cognitive component of life satisfaction. Even though asking a subject a simple question of “How happy do you feel?” would give an answer with relatively outstanding validity and accuracy there are multiple advantages to using more comprehensive schedules and to measure the constituent elements of SWB separately. Although there today are instruments measuring SWB globally like the SHS, emphasizing brevity, the author is unaware of any single test that are designed and validated for measuring the three components independently. Instead a common approach is to combine measures of affect for example by the use of SPANE or PANAS with a measure focusing on the evaluation of life satisfaction where SWLS is frequently used. If the possibility to compare findings with numerous previous studies or using an instrument employed in various settings for over 20 years is fundamental, PANAS might be the likely choice. If on the other hand a scale is preferred that is designed especially for measuring affect as a component of SWB and to eliminate some of PANAS more criticized sides, SPANE might be an appealing alternative. Complementing with a scale such as the Happiness Measures could emphasize the distinction between frequency and intensity of affect, which could contribute to a more comprehensive picture of SWB.

When designing an SWB study or interpreting previous findings one should be observant of in what degree more stabile elements of SWB has been measured or if the study is designed to be more sensitive to change. Also things like the time framing used in the scale, the respondent’s momentary mood and culturally sensitive questions can have implications for the data outcome.

More research is needed before more concise recommendations can be issued.

Future research should continue refining our comprehension of the nature of SWB and its measurements. For example to what degree PANAS are measuring intensity or frequency of emotions should be examined closer, and whether SPANE’s greater focus on frequency of affect gives a more valid test. Also greater use of non survey methods and the investigation of the mechanisms behind SWB would further

strengthen the concept. Conclusively several factors have been identified that requires attention in the assembling or evaluation of a SWB study, and the choice of measures must deal with cost and benefit in terms of the aims of the study.

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## **Paper 2:**

# **«Searching for Norwegian Happiness - A Validation Study of Subjective Well-Being Questionnaires in a Norwegian Sample»**

2<sup>nd</sup> Paper of Master Thesis in Health Science

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## Abstract

The interest and knowledge of subjective well-being (SWB) and its applicability has the latest decades grown both socially and scientifically. Assessment instruments validated for different languages and cultures can assist in the further development of the SWB concept as well as provide a base for monitoring communities' fluctuations in SWB levels and operate as a social indicator index. **Objective:** The following study aimed at translating and validating four acknowledged SWB instruments on a Norwegian sample. **Participants:** Self-completion questionnaires were administered to convenience samples of senior citizens and university students in Trondheim, Norway.  $n = 254$ , 154 females, age 19-96. **Design:** Psychometric properties such as internal consistency, normative data, factorial structure and convergence validity were examined using independent sample t-tests and principal component factor analyses. **Results and conclusions:** The findings were overall consistent with previous findings. Overall no major divergences from the scales established psychometric standards were found which suggests that the questionnaires are fit for use on Norwegian samples. Furthermore, the study supports the scales as having good psychometric properties.

**Key words:** Subjective well-being ~ measurement ~ Norway ~ Happiness Measures ~ PANAS Short Form ~ Satisfaction with Life Scale ~ Subjective Happiness Scale



## Introduction

“Subjective well-being is the field in the behavioural sciences in which people's evaluations of their lives are studied” (Diener, Scollon & Lucas 2004 p. 67). As discussed in paper 1 of this thesis, subjective well-being (SWB) is a complex phenomenon which has unstable elements that can influence the way it is understood and interpreted. When dealing with such phenomena it is vital to have a good understanding of how it is best assessed and how to best adjust the study to the research question in hand, to the research design and to the respondents. Although the idea of human happiness probably is as old as the humanity itself, it has only been a comprehensive object of the scientific community for some decades. Science's deep grounding in the field and emphasis on observation and recording are the main aspects that separate it from other approaches to knowledge such as philosophy. The development of SWB assessment has come a long way. A head start was given when well-used methodology from psychology and proximate areas was modified and developed further. The most prominent of the SWB measures today is unquestionably the self-report measures, known for their brevity potential and accuracy.

As studies have accumulated, revealing more of the nature of SWB it has become clear how much more it is than “just that warm feeling inside”. Happy people are more than just happy; they also tend to be more productive, more cooperative, more charitable, be less frequently sick and have shorter duration when they do get sick, and live longer lives. This is knowledge that is not only helpful for individuals but that also can be used by communities looking to improve the social, physical, medical and juridical environment of its inhabitants. By assessing the levels of subjective well-being among peoples or subgroups of people decision makers can monitor how the organizing of a community appear to influence the well being of its inhabitants. The work of developing national index assessment tools are already begun in several countries world wide, such as France, Great Britain and Canada. The topic was also addressed in the Norwegian parliament in May 2009.

As argued in paper 1 of this thesis, continuous work on making assessment of SWB more sophisticated, accurate and understandable is important for multiple reasons. One reason is that SWB is a psychosocial concept under cultural influence, and there have been found differences in the interpretation and emphasis in different part of the world. Assessment instruments will probably benefit from being tailored to best fit different cultures and different languages. One of the countries lacking adapted and validated SWB instruments is Norway. To the author's knowledge, previous work done in Norway relevant to SWB is scattered, conducted with happiness or life satisfaction as one of several broadly defined variables, not primarily meant as scientific studies but rather reports or evaluations of local projects. On that note, there are several examples of small scale projects nationwide that are based on the notion of promoting well-being. But because of the nature of these works' origin, most of the findings are unsuited for comparison and analyzes. The current study was therefore designed to test whether a selection of theoretically sound and validated instruments would show similar psychometric properties as in previous findings when translated into Norwegian and tested on Norwegian samples, thus enabling the assessment and monitoring of SWB among Norwegians or subgroups and contribute to the further understanding of the SWB concept. Ideally the instruments selected for this study would comply with the findings of article I. However due to practical issues the data collection for this study had to begin while the theoretical article was still in its early stages.

### ***Aim of the paper***

The primary purpose of this study is to examine how global subjective well-being can be measured on a Norwegian sample using validated questionnaires. Two main aims are outlined to guide the present investigation:

1. To what degree does a selection of translated SWB instruments assess SWB in a Norwegian test sample? The psychometric characteristics of four recognized SWB instruments are examined for use on Norwegian samples, including reliability measures, internal consistency, normative data, factorial structure, and consistency with earlier international findings.
2. How can a combination of selected items from the above instruments be used to

measure global SWB? The construct of SWB is tested by examining the underlying factorial structure. Convergent and discriminant validity of the instruments is examined using factor analysis. The results are discussed along with construct validity.

## Methods and Materials

The current study was designed to examine and validate four recognized questionnaires measuring different assets of subjective well-being in a Norwegian setting.

### ***Participants***

My data was collected in a self-report survey, in two rounds from two different demographic groups (senior citizens and students). In the first sample (*the senior sample*) data was collected among senior citizens participating in cultural activities that were arranged by a team of community workers and offered senior citizens throughout the municipality of Trondheim, Norway.  $N = 70$  (48 women, 7 did not specify gender), ranging from 57.46 to 95.97 years of age (mean = 74.89, 0 did not specify age). The second sample (*the student sample*) comprised data from students attending undergraduate course lectures at NTNU,  $n = 184$  (106 women, 3 did not specify gender), ranging from 19 to 46 years of age (mode = 20, 3 did not specify age).

### ***Administration***

The data collection among the seniors in sample 1 was carried out by the author as part of a project at the Research Centre for Health Promotion and Resources, NTNU/HiST (see Jaastad 2011 for more information on this project). The questionnaire that was used provided data for the current study as well as pilot data for the above mentioned project. Convenience samples were used as the questionnaires were handed out on location of the cultural activities (primarily concert-like settings). The participants were given a short introduction in plenum to the content of the questionnaire and the over-all purpose of the project. The participants were given the choice to fill the questionnaire out on the spot or at home, returning them using an addressed prepaid envelope they were offered. Practically everyone chose to fill them out at home. The student data in sample 2 was gathered at three different undergraduate course lectures at NTNU, convenience samples selected for their sizes, location on campus and approval of the head lecturer. The questionnaires were handed out among the students after a short introduction in plenum midst of a

lecture. The majority filled out the form on the spot and handed them in, and 5% - 10% delivered them in a post box at the campus post office later the same week. The data was collected during July and September of 2010, respectively.

### ***Sampling procedures***

Both questionnaire formats for the two groups started with basic demographic questions (gender, age, household composition etc.) in addition to the following instruments: Happiness Measures, PANAS Short Form, Satisfaction with Life Scale and the Subjective Happiness Scale (Fordyce 1988; Kercher 1992; Diener, Emmons, Larsen & Griffin 1985; Lyubomirsky & Lepper 1999). The instruments were placed ahead of additional items to minimize response bias. The additional items were required by the above mentioned project. Exclusion criteria were non-adequate understanding of the Norwegian language, or not having the cognitive capacity to understand the questionnaire. Participation was voluntary and without any rewards such as prizes or special treatment.

### ***Ethical considerations***

The Regional Committee for Medical and Health Research Ethics (REC) was consulted prior to execution of the study, and they judged that no permission was needed from them to proceed. Passive consent from the participants was practiced because no person identification data was collected.

### ***Translation of the instruments***

All of the four questionnaires used in the survey were originally in English and had to be translated into Norwegian. This was done independently by two separate translators. Any discrepancies in the translation were addressed and discussed. An exception was made in the translation of the affect items of PANAS Short Form; here an earlier translation of PANAS used in *Helseundersøkelsen i Hordaland 1997-1999* (1999) formed the base for the Norwegian version of the text in the current study. Both questionnaires used can be found in appendix 1 (sample 1) and appendix 2

(sample 2).

## ***The Instruments***

The instruments used in the current study were selected in an attempt to cover the global SWB concept as it is discussed in paper 1 of this thesis. The selection was however done in the early stages of the study, prior to the investigation of SWB's theoretical base and may therefore be suboptimized. Examples of the instruments' items are "*I am completely satisfied with my life*" (responses from *strongly disagree* to *strongly agree*) and "*Compared to most of my peers, I consider myself...*" (responses ranging from *less happy* to *more happy*). Below follows descriptions of each questionnaire, arranged in the order they were presented to the participants.

### **"Happiness Measures"**

The Happiness Measures (HM; Fordyce, 1988) consists of two items measuring emotional well-being, capturing intensity and frequency of affect. The first item is a question of how happy or unhappy the respondent is in general on an 11-point scale ranging from *extremely happy* to *extremely unhappy*. The second item asks how many percent of the time the respondent feels happy, unhappy or neutral. The scale's different scoring alternatives have somewhat different theoretical anchoring and interactions with other factors. The *combination score* is the more commonly used and have according to Fordyce stronger reliability and validity. The time lap covered in the HM can be altered from the general *on the average* way to more specific time-periods like *this year*, *latest month* or *today*.

Concerning the validity of the scale, Fordyce's review (1988) shows a strong and consistent convergent validity with numerous other recognized instruments measuring happiness, well-being and emotion. Fordyce also present extensive accumulated data validating good construct validity and discriminative validity, and found both to be good.

The test-retest coefficient (of the combination score) drops as the time period in question increases, and is reported to be ranging from .98 for a two day period to .59 - .67 for a four month period ( $p < 0.001$  in each case) (Fordyce 1987; Larson et al.



1985). No traditional reliability tests were suitable in the current study considering the nature of the scales' items and since data was collected at a single point in time.

### **“PANAS Short Form”**

The Positive and Negative Affect Schedule Short Form (PANAS-SF; Kercher, 1992) measures subjective affect in a given time period: here, over the last few weeks. The schedule is a compressed version of the original PANAS by Watson, Clark and Tellegen (1988). Similar to the original the PANAS-SF consists of two near-independent scales: The positive affect (PA) and the negative affect (NA) scales. Unlike the original there are only ten items, five for each of the two scales. The respondents are asked to rate on a five point Likert scale to what extent they have felt e.g. *scared, alert or inspired*.

The original PANAS is widely used and well tested, and good psychometric properties have been reported (Watson, Clark & Tellegen, 1988; Crawford & Henry 2004; Tuccitto, Giacobbi & Leite 2010). The PANAS-SF was developed when Kercher (1992) tested the assessment qualities of PANAS on an elderly sample, and found five plus five of the items to be redundant while still maintaining the independent two factor structure. Kercher's findings were replicated in a Swedish study of the elderly by Hillerås, Jorm, Herlitz and Winblad (1998). The PANAS-SF generalizability was tested by Mackinnon et al (1999), and their study revealed the schedule to be robust to differences in demographic variables. Mackinnon et al.'s testings showed high reliability with a Cronbach's alpha of .78 for PA and .87 for NA for the whole sample, each age group differing little from the mean.

In the current study, the Cronbach's alpha coefficients were .73 for PA, and .75 for NA.

### **“Satisfaction with Life Scale”**

The Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen & Griffin 1985) is designed to assess a person's global judgement of life satisfaction as a component of subjective well-being. The questionnaire has five items formed as statements, like “In most ways my life is close to my ideal”, where the respondent answers how much

they agree or disagree. The SWLS was designed and partially validated through three studies in Diener et al.'s 1985 introductory report. Factor analyses in the first study showed good construct validity with a single factor accounting for 66% of the variance. Similar findings were reported in Pavot, Diener, Colvin and Sandvik (1991) as well as in translation in Dutch (Arrindell, Meeuwesen & Huyse 1991) and in French (Blais, Vallerand, Pelletier & Briere 1989). In a review article on the SWLS (1993), Pavot & Diener give an account of both good reliability and sensitivity of the questionnaire. The coefficient alpha from six studies is reported to range from .79 to .89, giving a moderate to high internal consistency.

In the current study the SWLS has a Cronbach's Alpha of .88 for the two test samples combined, which is in accordance with earlier findings.

### **“Subjective Happiness Scale”**

The Subjective Happiness Scale (SHS; Lyubomirsky & Lepper 1999) aims to measure global subjective well-being, combining both the affect and cognition sides of the SWB concept. The two initial items ask for the respondents' evaluation of how happy a person they consider themselves to be, and the final two items give brief descriptions of a happy and unhappy person, respectively, and ask the respondents to which degree they identify themselves with the description. Lyubomirsky and Lepper base their study on 14 different samples: Discriminant and convergent validity testing was done, as well as testing of the self-report approach. Test-retest reliability was demonstrated with five of the samples with in-between-tests time lag from 3 weeks to 1 year, giving a stability coefficient range from 0.55 to 0.90 ( $M=0.72$ ). The sample's Cronbach's alpha ranged from 0.79 to 0.94 ( $M=0.86$ ).

In the current study, the alpha was .82.

### ***Statistical Data Analyses***

All analyses were carried out using the Statistical Package for Social Sciences SPSS version 18.0.0 (SPSS Inc., Chicago, IL).

Reliability testing is performed to reveal Cronbach's alpha. Since the instruments all consists of less than ten items with exception of PANAS Short Form, the mean inter-

item correlation value is also tested using Spearman's rho. The incoherent item structure of the Happiness Measure makes it unsuitable for traditional reliability tests, except test-retest which is unavailable in this study.

Independent-sample t-tests are conducted to test for statistically significant mean differences both between the samples and between sexes as part of evaluating external validation of the instruments. Sample t-test also have the purpose of testing the homogeneity of the samples in order to operate with combined single samples in further scale analyses where appropriate.

Diverse descriptive and exploratory analysis was calculated, primarily on the questionnaire's separate scores. These include score means, 5% trimmed score means, standard deviation, score range, skewness and kurtosis. The missing response rate of the four instruments and their items was determined. Normative data are presented in order to discuss consistencies with earlier international findings.

The items of each scale will be subjected to a principal component factor analysis (PCA) as part of the validation process. Prior to the PCA the suitability of the data for factor analysis will be assessed using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO), recommending a value of .6 or above (Kaiser 1970; 1974), and Bartlett's test of sphericity (Bartlett 1954) which requires significance ( $p = .000$ ) to recommend factorability. The inter-item correlations in the scales are also examined, looking for correlation coefficients above .3. The sample size of  $n = 254$  is considered sufficient for the PCA's of this study. Subsequently to approving the suitability PCA is executed. To examine the component outcome Kaiser's criterion (retaining components with an eigenvalue of 1.0 or more), Catell's (1966) scree test (plotting the components eigenvalues and determining where "the elbow" where the curve changes direction) and Horn's (1965) parallel analysis (comparing the size of the eigenvalues with the eigenvalues obtained in a same size data set that is randomly generated) is conducted. Where needed a confirmatory factor analysis follows to further determine a suspected number of factors. To aid interpretation of the factors they are in the end rotated either with an oblimin rotation, or a varimax rotation if the components are expected to have a weak or absent correlation.

Finally a PCA is conducted on the combined item pool of the scales, with exception of the items of HM which are unsuitable for this analysis. This final PCA is done to

examine convergence validity of the scales.

# Results

## *Happiness Measures*

An independent-sample t-test was conducted searching for statistically significant differences between the samples (student and senior sample) and between the sexes. No statistically significant difference was found comparing item responses and mean *combination scores* (comparing the samples  $t(238) = .08, p = .94$  (two-tailed); comparing the sexes  $t(228) = -.36, p = .72$  (two-tailed)). All further analyses on the HM were therefore conducted with the two samples combined.

The formula for the combination score is *combination score* = (*Item 1 score* x 10 + *happy percentage*) / 2. An exclusion from scoring was made for respondents with missing value on the initial item “In general, how happy or unhappy do you usually feel?” and/or a percentage sum  $\neq 100$ . The initial item ranged from 10 *extremely happy* to 0 *extremely unhappy*, giving a combination score range from 5 to 105.

Normative means and standard deviations from the current study are presented in table 1 together with data presented in Fordyce (1988) from a sample of 3050 community college students with a wide variety of ages and backgrounds. The current study’s combination score had a 5% trimmed mean of 65.21, a skewness of -.748 and kurtosis of .105.

TABLE 1	Missing responses in current study	Means		Standard Deviations	
		Current study	Fordyce 1988	Current study	Fordyce 1988
Combination score	16 (6,3 %)	64.39	61.66	17.26	17.84
Item 1 (Scale) score	2 (0,7 %)	7.46	6.92	1.42	1.75
Happy % estimate	15 (5,9 %)	53.90%	54.13%	24.06	21.52
Unhappy % estimate	15 (5,9 %)	11.67%	20.44%	11.51	14.69
Neutral % estimate	15 (5,9 %)	34.43%	25.43%	20.80	16.52

Table 1: Normative data for Happiness Measures

## *PANAS Short Form*

Using independent-sample t-tests, statistically significant differences was found

between the student and the senior sample in both the positive (PA) and negative affect (NA) scales of the PANAS-SF. The PA composite score ( $t(224) = -4.922, p = .000$  (two-tailed)) has an effect size (eta squared) of .097, which according to Cohen's (1988) guidelines shows a moderate effect where 9.7% of the variance on the PA scale is explained by the sample. After cross tabulating the samples with the sexes, statistically significant differences were found in the composite score both between the student and senior males and the student and senior females. In the female comparison, all items in the PA scale except for the item "Alert" had significant differences in the mean scores. The same occurred for the items "Excited" and "Enthusiastic" in the male comparison. When examining the NA scale the composite score  $t(234) = -2.840, p = .005$  (two-tailed) also had significant differences in the means of each sample. The NA composite score's effect size is eta squared = .033, which gives a small effect. Cross tabulating the samples with the sexes found significant differences both in the male and the female comparisons. On the item mean scores "Afraid" and "Nervous" showed significant difference in both comparisons. The item "Upset" showed significant difference only in the female comparison, the item "Scared" did the same only in the male comparison. The above comparisons included 39 senior versus 102 student females, and 13 senior versus 74 student males.

There were no statistically significant differences found between the sexes in either the PA or the NA composite score, as well as in none of the items. Cross tabulating revealed the item "Afraid" to have a significant difference in the t-test between the senior sexes ( $t(49.943) = 2.522, p = .015$  (two-tailed) (equal variance not assumed)), with an effect size (eta squared) of .113, mean scores of 1.46 and 1.08 and  $n = 39$  and  $n = 13$  for females and males respectively.

The two scales making up the PANAS-SF, PA and NA, are both scored independently by adding together the values of the items of the scale. Based on a 5-point Likert scale, this gives a score range from 5 (less affect) to 25 (more affect). The normative data from all items and the scale's composite scores are presented in table 2.

TABLE 2			Positive Affect	Negative Affect
			Composite score	Composite score
<b>Senior Sample</b>	N	Valid	51	57
		Missing	19	13
		Mean	12.69	7.63
		Std. Deviation	3.397	2.690
		Skewness	-.401	1.150
		Kurtosis	-.667	.628
<b>Student Sample</b>	N	Valid	175	179
		Missing	9	5
		Mean	15.27	8.98
		Std. Deviation	3.268	3.239
		Skewness	-.373	1.098
		Kurtosis	.355	.567

**Table 2:** Normative data for PANAS Short Form

The ten items had a missing response percentage between 3.1% and 7.1% (mean = 5.2%). The senior sample had on this scale a high number of missing counting both relative and absolute, comparing to the student sample and to the other scales. Given as a valid/missing ratio, the senior had a 51/19 on the PA scale and 57/13 on the NA scale, having 8-14 missing on each item. The student sample had a valid/missing ratio of 175/9 on the PA scale and 179/5 on the NA scale, having a missing range of 0-6.

After the finding of significant difference between the senior and student sample, the possibility of factor analyzing the samples independently was explored. When assessing the suitability of conducting factor analysis, two main concerns stand out to be considered: The sample size and the inter-correlation of the items involved (Pallant 2007). According to Tabachnick and Fidell's recommendations factor analysis may not be appropriate if few of the item coefficients are greater than .3 (Tabachnick & Fidell 2007, in Pallant 2007). Factor analyzing the senior and student samples independently revealed 29 and 30 correlations of 45 possible (two thirds) to be below .3. Additional tests are Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of Sphericity. The Bartlett's test was significant in both cases ( $p = .000$ ). The KMO value was .676 for the senior analysis and .717 for the student

analysis, within the minimum recommendation of .6. Concerning the sample size, the general recommendation is: larger is better. Nunnally (1978) recommend a 10 to 1 ratio of subjects to items for a factor analysis to be suitable. The senior sample consists of about 70 subjects. In order to increase the suitability of the data set for factor analysis, further factor analyses was done using the senior and student sample combined.

To examine the PANAS-SF underlying component structure, a principal component analysis was conducted. Three components appeared with an eigenvalue greater than 1 (e.g. 2.62, 2.46 and 1.001) accounting for 26.2%, 24.6% and 10.01% of the variance, respectively, cumulated accounting for 60.8%. Cantell's (1966) scree test showed a clear break after the second component in the scree plot, also a slight break after the fourth component. In a parallel analysis, only the two first components of a randomly created data had a lesser eigenvalue than the corresponding criterion value, suggesting a mere two-factor structure. The items loading above .3 on the third component after using an oblimin rotation are *afraid*, *distressed*, *upset* (NA scale items) and *alert* (PA scale item), loading -.31, .34, .60 and .40, respectively. The five NA scale items load between .60 and .80 on component 1 and between -.07 and .20 on component 2. The five PA items load .61 - .75 on component 2 and -.02 - -.30 on component 1. Strong loadings of the items on component 1 and 2, and fewer, weaker loadings on component 3 suggests a better suitability for a two-component structure.

In order to further determine the two-factor structure suggested from most of the prior tests and from previous research, a confirmatory factor analysis was conducted. Because of the expected none-to-weak correlation between the PA and the NA component, an orthogonal varimax rotation was performed in addition to an oblimin rotation. The two rotations showed minimum difference and so only the oblimin rotation is reported here. The rotated solution showed a structure where components explained a total of 50.8% of the variance, and where items systematically load strongly on one of the components and weakly on the other. In table 3 the figures from the oblimin rotation is presented.



TABLE 3 Items	Pattern Coefficients <sup>a</sup>		Structure Coefficients	
	Component 1	Component 2	Component 1	Component 2
# 6: Afraid	<b>.812</b>	.013	<b>.812</b>	.014
# 9: Scared	<b>.749</b>	.073	<b>.749</b>	.074
# 4: Nervous	<b>.728</b>	.056	<b>.728</b>	.057
# 10: Distressed	<b>.669</b>	-.188	<b>.669</b>	-.187
# 2: Upset	<b>.612</b>	.037	<b>.612</b>	.037
# 8: Enthusiastic	-.023	<b>.767</b>	-.022	<b>.767</b>
# 3: Inspired	-.173	<b>.758</b>	-.173	<b>.758</b>
# 7: Excited	.099	<b>.699</b>	.100	<b>.699</b>
# 1: Determined	-.010	<b>.621</b>	-.010	<b>.621</b>
# 5: Alert	.087	<b>.616</b>	.087	<b>.616</b>

**Table 3:** Pattern and Structure Matrix for PCA with Oblimin Rotation of Two Factor Solution of PANAS Short Form items

a. Rotation converged in 3 iterations.

Note: major loadings for each item are bolded.

As table 3 shows the items *afraid*, *scared*, *nervous*, *distressed* and *upset* form the main loadings on component 1, which are the five items selected by Kercher (1992) to comprise the Negative Affect (NA) scale. The items Kercher used to make up the Positive Affect (PA) scale – *enthusiastic*, *inspired*, *excited*, *determined* and *alert* – all load strongly on component 2 and weakly on component 1, indicating the PA component.

### **Satisfaction with Life Scale**

Initially, a t-test was conducted to look for differences between the samples. An independent-samples t-test comparing the mean scores of each item and the composite score of the scale showed no significant difference between the samples. The exception was the fourth item “So far I have gotten the important things I want in life” ( $t(130.575) = 4.15, p = .000$  (two-tailed), Levene’s test showed unequal variance ( $p = .01$ )) The magnitude of the difference in the means was eta squared = .053 which is a small to moderate effect size according to Cohen’s (1988) guidelines. To further examine the difference found, the respondents were split into male and female groups before comparing the samples within each sex group, e.g. comparing senior men to student men and senior women to student women. By splitting before a

second t-test, the same above mentioned item only appeared with significant differences between samples in the male group ( $t(26.599) = 4.587, p = .000$  (two-tailed), Levene's test showed unequal variance ( $p = .024$ ); eta squared = .104 which is a moderate to large effect size). This last finding is based on the comparison of 13 male seniors versus 75 male students. With no significant difference between the samples concerning the scale's composite score, the samples are treated as a single sample.

No significant differences was found between the sexes, except for the first item "In most ways my life is close to my ideal" ( $t(232) = 2.12, p = .035$  (two-tailed); effect size eta squared = .019). Further examination by t-testing sex differences within each sample revealed the above mentioned first item only to have significant differences in the student sample ( $t(177) = 2.41, p = .017$  (two-tailed); effect size eta squared = .032). Another item, "So far I have gotten the important things I want in life", also showed significant differences between the males and females in the student sample ( $t(178) = 2.05, p = .042$  (two-tailed); effect size eta squared = .023). Otherwise no significant difference between the sexes was found among the items or the composite score. Table 4 shows the means and standard deviations of the respondents groups by sex and sample.

TABLE 4	Men	Women	Total
Student sample	21.85 (SD 7.21)	23.77 (SD 6.89)	22.98 (SD 7.06)
Senior sample	25.55 (SD 7.74)	24.63 (SD 7.54)	24.85 (SD 7.69)

Table 4: Normative means of the scales' composite score

The SWLS' items are all scored on a 7-point Likert scale, giving a sum score range from 5 (low satisfaction) to 35 (high satisfaction). An extensive collection of normative data for the Satisfaction with Life Scale is presented in Pavot and Diener's (1993) review article table 1. Data from the current study is presented in table 5 below. The five items had a missing response percentage between 2.4% and 3.9% (mean = 3.4%). The composite score had a 5% trimmed mean of 23.66, skewness of -.459 and kurtosis of -.621.

<b>TABLE 5</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Missing</b>
# 1: In most ways my life is close to my ideal.	4.68	1.72	10
# 2: The conditions of my life are excellent.	5.37	1.60	9
# 3: I am satisfied with my life.	4.93	1.76	6
# 4: So far I have gotten the important things I want in life.	4.74	1.82	10
# 5: If I could live my life over, I would change almost nothing.	3.87	1.96	9
<b>Composite Score</b>	23.44	7.25	16

**Table 5:** Normative data for SWLS

A principal components analysis was conducted, revealing a single factor with an eigenvalue over 1 (e.g. 3.38), explaining 67.5% of the variance. Cantell's (1966) scree plot test showed a clear break after the first component, supporting a single factor structure, as did the results of the Parallel Analysis comparisons. Items 1 to 5 loaded on .889, .816, .869, .817 and .706, respectively, on this single component. In Pavot and Diener's (1993) review article on the scale, the authors refers to five previous studies all concluding a single-factor structure and reported factor loadings close to the findings of the current study.

### ***Subjective Happiness Scale***

An independent-sample t-test was conducted comparing the two samples. No significant differences was found on either of the items or the composite score, except for the fourth item of the scale – “Some people are generally not very happy [...]” –  $t(245) = 2.12, p = .035$  (two-tailed). Effect size calculations showed an eta squared of .018 (mean difference .487), which according to the guidelines proposed by Cohen (1988) is a small effect size. By testing the samples within each sex, no significant differences are found between the student males and the senior males. A significant difference is found among the student females and the senior females on item 2 ( $t(149) = 2.48, p = .014$  (two-tailed); eta squared = .0395) and item 4 ( $t(148) = -2.12, p = .035$  (two-tailed); eta squared = .0295). Testing the difference between the sexes within each sample reveals no significant difference in the mean scores. With such small effect sizes on items where significant differences were found explaining less than 2-4% of the respective variance one can argue that this difference between the samples probably is incidental, and that the two samples therefore can be further treated as a single sample.

The Subjective Happiness Scale uses a composite score consisting of the average response on the four items, the fourth one reverse-coded. This gives a score range from 1.0 (lesser happiness) to 7.0 (greater happiness). The score had a 5% trimmed mean of 4.84, a skewness of -.495 and kurtosis of .075. The four items had a missing response percentage between 1.6% and 2.8% (mean = 2.1%). A collection of normative data for the Subjective Happiness Scale is presented in table 1 of Lyubomirsky and Lepper's introductory 1999 article.

<b>TABLE 6</b>	Mean	Standard Deviation	Missing
# 1: In general, I consider myself:	5.17	1.24	5
# 2: Compared to most of my peers, I consider myself:	4.70	1.21	4
# 3: Some people are generally very happy. [...] To what extent does this apply to you?	4.45	1.46	5
# 4: Some people are generally not very happy. [...] To what extent does this apply to you?	3.08	1.59	7
<b>Composite score</b>	4.81	1.12	7

**Table 6:** Normative data for Subjective Happiness Scale

A principal components analysis revealed a single factor with eigenvalue over 1 (e.g. 2.70), explaining 67.6% of the variance. Using Cantell's (1966) scree test, an inspection of the scree plot revealed a break at the second component. The results of Parallel Analysis showed a single component in a randomly created data matrix of the same size with an eigenvalue lower than the corresponding criterion value. Both the scree test and the parallel analysis support a one-factor structure of the SHS. This corresponds with Lyubomirsky and Leppers (1999) original findings.

### ***Convergence validity of the scales combined***

To assess the convergent validity a factor analysis was conducted to search for the underlying structures and to look for excess items or instruments. A principal component analysis was conducted on the combined item pool of the questionnaires discussed in the current study, with an exception of the two items from Happiness

Measures which are unsuited for factor analysis. This gave a total of 19 items. Prior to performing the PCA, the data's suitability was assessed. Bartlett's test (Bartlett 1954) reached significance ( $p = .000$ ), and the KMO value was .876, exceeding the recommended value of .6 (Kaiser 1970; 1974). The correlation matrix showed 102 out of 170 item correlations below the recommended value of .3, these were primarily among the items of the PANAS Short Form.

The analysis revealed three components passing Kaiser's criterion of eigenvalue, with eigenvalues of 6.29 (component 1), 2.57 (component 2) and 1.73 (component 3) which each explains 33.1%, 13.5% and 9.1% of the variance, respectively, in sum 55.7%. Inspecting the scree plot a break can be seen at the fourth component. Using Cantell's scree test (1966) three components was retained. This was further supported by the results of Parallel Analysis, showing three components whose eigenvalues exceeded the corresponding criterion values in a randomly generated data matrix of the same size. Component 1 correlates -.313 with component 2 and -.285 with component 3. Component 2 and 3 correlates .029 to each other.

In the further interpretation of the components an oblimin rotation was performed. The oblimin rotation was selected as a frequently used oblique rotation which allows components to be correlated. In table 7 the pattern matrix, structure matrix and communalities are presented.

TABLE 7	Pattern Coefficients <sup>a</sup>			Structure Coefficients			Communalities
	Component	Component	Component	Component	Component	Component	
	1	2	3	1	2	3	
PANAS-SF # 1: Determined	.027	.034	<b>-.577</b>	.181	.009	<b>-.584</b>	.342
PANAS-SF # 2: Upset	<b>-.156</b>	<b>.524</b>	-.121	<b>-.285</b>	<b>.569</b>	-.062	.350
PANAS-SF # 3: Inspired	.138	-.062	<b>-.650</b>	<b>.343</b>	-.124	<b>-.691</b>	.505
PANAS-SF # 4: Nervous	-.065	<b>.716</b>	-.059	<b>-.272</b>	<b>.734</b>	-.020	.544
PANAS-SF # 5: Alert	-.089	.056	<b>-.661</b>	.082	.065	<b>-.634</b>	.415
PANAS-SF # 6: Afraid	.132	<b>.871</b>	.046	<b>-.153</b>	<b>.831</b>	.033	.704
PANAS-SF # 7: Excited	-.180	.050	<b>-.756</b>	.020	.085	<b>-.703</b>	.532
PANAS-SF # 8: Enthusiastic	.253	.109	<b>-.671</b>	<b>.410</b>	.011	<b>-.740</b>	.601
PANAS-SF # 9: Scared	.173	<b>.832</b>	-.007	<b>-.086</b>	<b>.778</b>	-.032	.633
PANAS-SF # 10: Distressed	<b>-.319</b>	<b>.522</b>	.058	<b>-.499</b>	<b>.624</b>	.164	.494
SWLS # 1: In most ways my life is close to my ideal.	<b>.874</b>	.019	-.001	<b>.868</b>	-.254	-.249	.754
SWLS # 2: The conditions of my life are excellent.	<b>.804</b>	.052	.069	<b>.768</b>	-.198	-.158	.597
SWLS # 3: I am satisfied with my life.	<b>.823</b>	-.086	-.040	<b>.861</b>	<b>-.344</b>	<b>-.277</b>	.750
SWLS # 4: So far I have gotten the important things I want in life.	<b>.795</b>	-.031	.085	<b>.780</b>	-.277	-.143	.617
SWLS # 5: If I could live my life over, I would change almost nothing.	<b>.712</b>	.037	.116	<b>.667</b>	-.182	-.086	.459
SHS # 1: In general, I consider myself:	<b>.651</b>	-.120	<b>-.339</b>	<b>.785</b>	<b>-.333</b>	<b>-.528</b>	.729
SHS # 2: Compared to most of my peers, I consider myself:	<b>.645</b>	-.015	-.240	<b>.718</b>	-.223	<b>-.425</b>	.568
SHS # 3: Some people are generally very happy. [...] To what extent does this apply to you?	<b>.576</b>	-.070	<b>-.303</b>	<b>.685</b>	-.259	<b>-.469</b>	.555
SHS # 4: Some people are generally not very happy. [...] To what extent does this apply to you?	.162	-.289	<b>-.492</b>	<b>.393</b>	<b>-.354</b>	<b>-.546</b>	.435

**Table 7:** Pattern and Structure Coefficients for PCA with Oblimin Rotation, of combined item pool

a. Rotation converged in 8 iterations.

Note: major loadings for each item are bolded.

## Discussion

### *Psychometric Properties of the Scales*

#### Happiness Measures

Happiness Measures is a scale that because of its structure is unsuited for factor analysis and other validation tests available through the current data set. Evaluating the validity of the current study's version of HM was therefore partially inconclusive.

This study's finding of no statistically significant sex or age difference is consistent with Fordyce's conclusion that there apparently is little or none discrimination due to sex, age or race (1988). As for the normative data, the figures for the Norwegian sample do not appear to differ extensively from the figures from Fordyce (1988) community college sample. Compared to Fordyce' study, the current study found slightly elevated *combination scores*, which appears to originate in a higher mean score on *Item 1* "In general, how happy or unhappy do you usually feel?" The *Unhappy* and *Neutral* percentage estimates' means and standard deviations seem to diverge somewhat between the samples. The missing response rate of *Item 1* is the lowest of all items of the instruments included in the current study. This might be partly due to the items early appearance on the front page of the handed-out questionnaire form, but might also be a testament to the item's wording. As for the second item, the percentage estimate, there were 15 participants that failed to either answer one or more of the estimates or that had a sum score that did not equal 100. Bearing in mind that the item includes three separate estimates, calculations, and a relatively long instruction, this missing response rate can not be considered high. 2/3 of the missing responses on the percentage estimates were among the senior participants although the student sample was three times its size. The elevated missing response rate among seniors should be taken into consideration when administering the test to senior citizens.

## **PANAS Short Form**

Although the PANAS is one of the more used questionnaires within its field, Kercher's PANAS Short Form version has had little empirically testing. Therefore psychometric references for the PANAS-SF are few and might benefit from looking at the more used PANAS.

The current study's finding of a significant difference between the senior and student sample showed that 9.7% of the PA scale and 3.3% of the NA scale variance was explained by the sample, effects that can be considered small to moderate at best. As age is the probable greatest difference between the samples one might say that this is a difference between age groups. Mackinnon et al. (1999) reported similar evidence of differential effects on items as a function of demographic variables such as age, but concluded that the magnitude of the effects generally is small. They also discuss how the variances in the scale scores can be found to reflect not item response differences but rather differences in where within the construct scale the subgroups are located.

The composite scores of the subscales in the current sample were higher for the student sample than for the senior sample on both the PA and the NA scale. This can be seen as a consistency with the general finding that some demographic variables have a small effect on the affect levels of population subgroups. Kercher's (1992) 72+ years of age-sample of 804 seniors showed a PA score of 16.01 (combining PA items in Kercher's table 1), which is somewhat higher than the current study's senior score of 12.69. The pattern is the same with the NA scale – Kercher's sample score of 8.49 versus the current study's senior score of 7.63. Similar differences can be found when comparing to Mackinnon et al. (1999). Their 65 and above-age group had PA scores of 15.79 and NA scores of 8.82. Within Mackinnon et al.'s four age groups both the PA and NA scores decrease as the ages increase, similar to the current study's findings. The higher mean score findings of Kercher and Mackinnon et al. can be due to the time frame used in the questionnaire – where these studies were conducted asking for the extent of the respondents experiences the last year and in general, respectively, the current study used the time frame the last few weeks. Increasing the time frame will also increase the chance of the respondents having felt e.g. nervous or determined within that time frame. How much of the mean



score differences can be explained by the time frame is uncertain, as actual differences in the affect levels of the samples of Trondheim versus Canberra (Mackinnon et al. 1999) and Florida (Kercher 1992), artificial differences caused by the linguistic and cultural translation of the questionnaire and the noticeable proportion of missing senior respondents representing a possible systematic assessment error are all plausible contributing elements.

The underlying factor structure of the PANAS Short Form has in previous research shown to compose of two factors, the positive affect (PA) and the negative affect (NA) components, in keeping with the original PANAS structure.

In the current study, a third factor was indicated in an exploratory factor analysis. Horn's (1965) parallel analysis has won ground in the social science field as the most accurate technique of identifying the number of factors where Kaiser's criterion and Catell's scree test tends to overestimate (Hubbard & Allen 1987; Zwick & Velicer 1986, in Pallant 2007). Hence, the parallel analysis dismisses here the three factor structure indicated by other techniques. The indication of a third factor might be the result of poor linearity in the variable correlations and a violation of multivariate normality. The factors correlating mentionably with the third component are from both the PA and the NA scale and shows pattern that only could be revealed through more thoroughly investigation. Several arguments comprise a dismissal of the indicated third factor, the finding should however be kept in mind in future research using the scale in Norway.

Using a confirmatory factor analysis forcing two components, as expected from previous research and indicated most likely in the current study, the factor loadings on the components in the current study are similar to that of previous findings with the instrument. All items as selected by Kercher to make up the PA scale (1992) load strongly on one component and weakly on the other, and vice versa with the NA scale items. Loadings on the "correct" scale range from .61 to .81, and on the opposite scale ranging from -.01 to -.19. When comparing the item factor loadings of the current study with those of Mackinnon et al.'s (1999) study, Kercher (1992) and the items in question from Watson, Clark and Tellegen's (1988) study, they appear to be quite convergent. On the PA scale all items of the current study differed only between .01 and .12 from the mean of these four studies, and between .02 and .13

on the NA scale. All factor loadings in the current study were within or close to the range of factor loading findings across the studies.

### **Satisfaction with Life Scale**

The normative differences found in the composite scores between demographic groupings were found not to have any significant variance explained by neither the sex nor the sample belonging of the respondent. This is a finding in accordance with previous findings on SWLS. One finding in the current study not reported in previous studies was the significant difference found between the men in the senior sample and the men in the student sample on item 4. 10.4% of the variance in the item “So far I have gotten the important things I want in life” was explained by the sample among the men. This could be caused by a low number of male respondents (13 seniors/75 students), but can also be a consequence of the semantics of the item: some degree of difference could be expected between senior citizens and young students at the beginning of their adult life.

The current study’s mean composite scores appear to be in their expected range, when comparing them to previous findings presented in Pavot and Diener’s (1993) review article. In their table 1 studies done on American student samples range from 23.0 to 25.2 (SD 5.8 – 6.4), which is close to the figures from the current study. A study done using French-Canadian college students (Blais et al. 1989, in Pavot & Diener 1993) show the men with  $M= 23.8$  and the women with  $M= 24.8$ . Similar to this study the current study also found the student females’ mean score to be a little higher than the student males. The same Blais et al. study also present figures for older French-Canadian adults, where the men have  $M= 27.9$  and the women have  $M= 26.2$ . Here we see the senior men having a slightly higher mean score than the senior women, as was the finding in the current study. The current study’s findings appear to follow the same normative patterns as previous findings.

The underlying component structure of the SWLS appears as quite similar to the structure found in previous studies. In their introductory article, Diener et al. (1985) found a single factor structure using a principal- axis factor analysis and scree plot of

eigenvalues inspection. This single factor accounted for 66% of the variance, while the current study's single factor accounted for 67.5%.

When comparing the item factor loadings and item-total correlations for the current study with those of four independent studies presented in Pavot and Diener's (1993) review article on the SWLS, the figures are similar and comparable. The item factor loadings for the current study differ at most -.082 from the mean of the other studies (item 4) and as little as .002 at the smallest difference (item 5). Items 2 to 5 all had differences from the mean within the range of the other studies' differences. Item 1 was the only item with greater difference from the mean than the other studies' quite homogenous factor loadings. All factor loadings of the current study were within the range of the other studies. Also the total-item correlations of the current study are within the range of the other studies, and lie close to the mean of the other studies results. The exception is item 5 which with a correlation of .499 is .111 lower than this mean. The results of the factor analyses hence do show great similarity and consistency with previous studies done with the SWLS. The fact that the above mentioned studies represent translated versions of the scale into both Dutch and French as well as two original English versions together with the current findings suggests a scale that is internationally consistent and uni-dimensional.

### **Subjective Happiness Scale**

The norms for the current study's sample are comparable with findings from studies presented in Lyubomirsky and Lepper (1999). The normative mean and its standard deviation for the current study are midst the range compared to the equivalent in Lyubomirsky and Lepper's table 1. The same is the case for Cronbach's alpha as the current findings corresponds with that of the prior findings. The internal reliability findings of all studies are above what is considered the conventional acceptable level. The homogeneity of these findings strengthens the validity of the Norwegian version of the scale. The cross-cultural validity of the scale appears so far to be promising considering the invariant findings between samples from different cultural backgrounds, bearing in mind that two of the 14 samples referred to in Lyubomirsky and Lepper were recruited in Russia. Also seemingly corresponding with previous findings is the lack of significant differences between the sexes and between age

groups. Lyubomirsky and Lepper report that “No significant sex or age differences were observed for the Subjective Happiness Scale” (p. 143). The few significant differences found in items in the current study would have a very small practical implication and can be argued to be coincidental.

Concerning the underlying structure of the scale a mere single-factor structure is consistency the finding, indicating that the object of assessment is the same across samples. Based on the current analyses of the SHS one can argue that the scale appears to have psychometric properties in correspondence with previous findings, and that these properties are good and adequate within the field.

## ***Validity analysis***

### **Convergent validity of the scales combined**

Whether the scales capture the same underlying structures was examined using an exploratory principal component factor analysis on a collected item pool. Happiness Measures was excluded because it is unsuited for this analysis. The three remaining instruments cover the width of the SWB concept theoretically: The PANAS Short Form assesses positive and negative affect, the Satisfaction with Life Scale assesses cognitive life satisfaction and the Subjective Happiness Scale assesses global subjective well-being which would include all three constituent components. Based on the item loadings presented in table 7 the following interpretation of the components is proposed: Component 1 characterizes cognitive life satisfaction (*LS*), component 2 is negative affect (*NA*) and component 3 is positive affect (*PA*). The items of the SWLS scale loaded as expected strongly on component LS and weakly on the others. The PA and NA items of PANAS Short Form did the same on their respective components. The loadings of the items of SHS have not such a simple structure. Three of the four items load strongest on component LS, two of these also has a second significant loading on component PA. The fourth item loads strongest on PA. The structure matrix shows strong correlations between the SHS items and the LS and the PA component, but are almost absent on the NA component. These findings suggest that the SHS scale primarily measure life satisfaction and positive affect but fails to capture negative affect.

The strength of the relationships between the components appears to be weak.

Component NA and PA have a correlation of .029, compared to the .001 correlation found in the confirmatory factor analysis of the PANAS Short Form. This is a weak-to-none correlation, corresponding with previous findings and in support of the notion of negative affect and positive affect as two separate dimensions. Component LS has weak correlations to the other two, indicating that it is close to independent from the affect components but still do share some variance. The communality values of all items are at acceptable levels and there is no indication of items being redundant. Overall the convergent and discriminate validities replicate the findings of earlier studies.

### **Construct validity**

The three factor structure found in the exploratory factor analysis by PCA corresponds with the theoretical understanding of the SWB concept. The clear and simple structure with appropriate and expected factor loadings on the positive affect, negative affect and life satisfaction factors further strengthens the construct validity. These findings also suggest that PANAS together with SWLS embraces global subjective well-being and can be used combined in future studies. However, there is always the possibility that a circular argumentation causes the impression of a stronger validity than is actually the case. Even if for example PANAS and PANAS Short Form consistently meet the validity terms of a questionnaire and exhibit good psychometric properties there are elements that could be questioned. The items used in PANAS were partially selected to load strongly on one affect component and unnoticeably on the other. This focus on the independency of the factors might have undermined the range of the affect spectrum and hence the theoretical anchoring. PANAS is also evasive on the elements of frequency and intensity of affect. An alternative can be to use SPANE which was developed specifically to measure positive and negative affect as components in SWB, and that emphasize frequency of affect which has been proposed to have a greater influence on affect than intensity (Diener, Sandvik & Pavot, 1991).

Using the PANAS and SWLS scales appears to capture global subjective well-being when used combined. This would seem to make scales like SHS obsolete despite

relatively good validity and reliability. Inconclusive findings such as those in the exploratory factor analysis of SHS can question the validity of the underlying construct. The unitary structured scales make it challenging to ensure that all the SWB components are captured, and might oversimplify the SWB concept. The question arises of what, if any, the minimum requirements of a SWB measure should be. In the end the choice of measurement boils down to the purposes and resources of one's study. Where SWB is one of many outcome variables, or when the questionnaire response time must be kept to a minimum, unitary structured scales such as SHS can be considered. However because SWB's components are advised to be assessed separately whenever possible, a combination of component oriented scales such as SWLS and PANAS Short Form is recommended.

## Conclusion

The current study has examined the psychometric properties of four recognized subjective well-being (SWB) measures that was translated into Norwegian and tested on a Norwegian test sample. The study was based on an operational definition of SWB as being constituent of three components: Life satisfaction, positive affect and negative affect. The instruments that were examined were Happiness Measures, PANAS Short Form, Satisfaction With Life Scale and Subjective Happiness Scale. The validity and reliability results of the current study were overall in accordance with findings from previous international research, and also add to the accumulating results of promising validity and psychometry for these scales. All the examined instruments were found sound and valid for use in Norwegian and on two Norwegian populations. The Subjective Happiness Scale measuring global SWB showed corresponding psychometric properties, but its unitary underlying structure might give an oversimplified picture as it deviates from the established three component constituent structure of SWB. Happiness Measures' brief questionnaire captures both intensity and frequency of affect but its two items make it prone to some of the psychometric liabilities of scales with few items. These two instruments can be used in study settings where brevity is essential. A combination of PANAS Short Form and Satisfaction With Life Scale has been found to measure the full concept of SWB as defined in this paper. Since their psychometric properties were found to be good, and an exploratory factor analysis suggested a three component structure that corresponding to theory with good convergent and discriminant validity they can be recommended for measuring SWB combined in Norwegian settings. My recommendation is that Scale of Positive and Negative Experience (SPANE) is translated and validated for consideration in Norwegian studies, since this instrument could have advantages over PANAS Short Form as a measure of affect in SWB. This has been further discussed in article 1 of this thesis, where also the International PANAS Short Form (I-PANAS-SF) was presented as a potentially stronger alternative than PANAS Short Form. The current study endeavoured to serve as a contributor and a pilot study for further SWB research in Norway, and to inspire the use of subjective well-being as a variable outcome in research as well as a social indicator.

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