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The Relation Between Well-being, Sleep, Benevolence, and Personality

by

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## ABSTRACT

Higher sleep quality and increased benevolence have been empirically associated with enhanced well-being including happiness. The present study examined the relations between these three variables (i.e., sleep, benevolence, and well-being) and whether these relations are mediated by personality. In particular, the relation between agreeableness (which has been linked to benevolence) assessed with a personality inventory (the NEO-FFI) and the Oxford Happiness Questionnaire (OHQ) was examined. The sample consisted of 445 undergraduates (300 females and 145 males). After accounting for personality, sleep quality and benevolence were predictors of well-being. Well-being did not predict sleep quality, but benevolence did. The OHQ can help researchers assess benevolence. Findings from the present study may be of interest to people with sleep disorders and depressed mood.

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### The Relation Between Well-being, Sleep, Benevolence, and Personality

Until recently, psychological research has mostly focused on negative and problematic conditions, such as depression and anxiety. Leaving out positive emotions and desirable traits has led to a skewed view of interest on human mental processes. Fredrickson (1998) reports that positive emotions have been marginalized for three reasons: 1) positive emotions, are fewer in number than negative emotions and tend to blend together, 2) research tends to focus on problems and how to solve them, and there is no health problem associated with experiencing positive emotions, and 3) models are primarily built on negative emotions such as anger and fear that have had the most attention in explaining actions and tendencies.

The term positive psychology is a categorical term referring to psychological dimensions that could be considered positive. These overlapping dimensions include well-being, quality of life, resilience, life satisfaction, positive affect, and happiness. Literature has recently begun to tease apart each of these terms in order to study their individual contributions to an overall positive psyche, and how these components are related to other factors such as health, age, and personality.

Starting in the 1980's interest in positive psychology began to grow, and more studies reported on aspects of positive psychology (Myers & Diener, 1995). Many articles have been published reporting that people around the world want to feel happier (Diener, 2000; Diener, Suh, Smith, & Shao, 1995) which helps justify the increased research to enhance peoples' happiness. In light of this, positive psychology is quickly becoming an area of intense interest that offers many promising outcomes (Seligman, Steen, Park, & Peterson, 2005). For example, Gray and Watson (2002) reported that positive emotions help counteract the undesirable effects of negative

emotions. The current study aims to further positive psychology by examining the interrelations between three correlates of happiness: personality, sleep, and benevolence.

### *Happiness*

In the 1960's Warner Wilson described a happy person as a, "young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, job morale, modest aspirations, of either sex and of a wide range of intelligence" (Wilson, 1967 p. 294; as cited in Diener, Suh, Lucas, & Smith, 1999). Since the 1960's research has advanced the views of well-being, breaking it down into multiple components instead of one variable on its own. Diener et al. (1999) describe subjective well-being (SWB) as, "...a broad category of phenomena that includes people's responses, domain satisfactions, and global judgements of life satisfaction." (p. 277). One component of SWB is subjective happiness, which Lyubomirsky and Lepper (1999) describe as, "...a global, subjective assessment of whether one is a happy or unhappy person" (p. 139), and may be influenced by cultural and self expectations, and achievements one has made in life.

Early research developed two processes to explain SWB: the bottom-up and top-down approaches. The bottom-up process explained SWB by way of external factors, such as Wilson's description of a happy person. The top-down process explained SWB by way of internal factors such as personality. Studies on the bottom-up process repeatedly reported small effect sizes for explaining SWB (Diener et al., 1999); however, the top-down process was able to account for more variance (Myers & Diener, 1995; as cited in Doyle & Yoon, 2000). For example, personality has been reported to account for a large proportion of variance (e.g., 32 - 56%) and be the most consistent variable for explaining SWB (Hayes & Joseph, 2003; DeNeve & Cooper,

1998). Furthermore, as new models for personality were implemented, the amount of variance accounted for by personality remained constant with strong effect sizes. An example of this is the Five Factor Model (FFM) which shows people who rate high in extraversion and low in neuroticism report being happier.

While internal factors have explained more of the variance of SWB, it should be noted that external factors can still have significant, but perhaps brief, effects on happiness. This is explained by the hedonic treadmill theory, which explains that when a situation which alters happiness levels is encountered, over time subjective happiness levels return to a baseline (Brickman, Coates, & Janoff-Bulman, 1978; as cited in Diener, Lucas, & Scullon, 2006). For example, winning the lottery will elevate happiness levels, but over time happiness will return to similar ratings before winning the lottery. Even people involved in accidents that leave them paraplegic or quadriplegic, over time report happiness levels similar to levels prior to the debilitating accident.

### *Benevolence*

Benevolence has been studied using items that assess agreeableness from the NEO-Five Factor Model (NEO-FFI). Saucier (1998) found that agreeableness could be broken down into two subcomponents: antiantagonistic and prosocial. The *prosocial* subcomponent is defined with keywords such as: friendliness, pleasantness, kindness, consideration, and helpfulness. These words may be used to describe a person with a genuine care for others' well-being, and a desire to do selfless acts to promote well-being in others (i.e., benevolence). Benevolence has been measured in the literature using agreeableness or congruent personal values of benevolence (Poulin & Silver, 2008; Roccas, Sagiv, Schwartz, & Knafo, 2002; McCullough & Hoyt, 2002;

Oishi, Diener, Suh, & Lucas, 1999). Hayes and Joseph (2003) point out that the Oxford Happiness Questionnaire may also identify benevolence values with questions such as, “I am intensely interested in other people”, and “I always have a cheerful effect on others”.

### *Benevolence and Happiness*

Recent literature has shown that benevolence is positively correlated with happiness (Post, 2005); people who perform acts of kindness are reported to have increased feelings of happiness. These acts of kindness include volunteering, forgiveness, and doing favors for others. The increased happiness may be attributed to belonging to an association or group (Thoits & Hewitt, 2001). Additionally, people may feel happier as a result of the volunteer work itself. Benevolent acts may help people prepare for life by giving them experience and insight to a chosen career field, allowing them to meet new social groups, raising self-esteem, feeling wanted by others, and helping to establish identity roles. Furthermore, people who are happier devote more time to volunteering, fostering a positive psychological cycle. Recently, Poulin and Silver (2008) investigated the link between world benevolence beliefs and well-being in a longitudinal study of participants who ranged in age from 18 to 101 years old. They found people who believed others, in general, were more benevolent (more good and caring than bad and uncaring) reported higher levels of well-being and this correlation increased with age, and showed increasing benevolence values during the course of the study.

### *Benevolence and Health*

The research surrounding benevolence and its health benefits has had little focus (Lawler, Younger, Piferi, Jobe, Edmondson, & Jones, 2005). In addition, the benefits for sleep (in particular sleep quality) have not been assessed. Post (2005), conducted a review of literature on

the benefits of altruism, happiness, and health and found a number of studies that supported the contention that all three are associated. Many studies have related altruism with better mental and physical health, both of which influence sleep (Norlander, Johansson, & Bood, 2005; Hamilton, Gallagher, Preacher, Stevens, Nelson, Karlson, & McCurdy, 2007; Luo & Inoue, 2000). In general, more positive emotions (e.g., self-esteem, feelings of self-worth, and friendliness) and fewer negative emotions (e.g., stress, anxiety, and depression) were reported, following altruistic behavior. Moreover, fewer negative emotions were linked with better physical health. Post (2005) concluded that mortality rate decreased in the elderly who volunteered, diseased patients were more likely to live longer if they helped others suffering from disease, and over their life time mothers who were more benevolent were less likely to suffer from major illness. While none of the studies examined sleep, they provide evidence that physical health does benefit from being kind, therefore, sleep may benefit as well.

Negative emotions such as anger, fear, guilt, and dwelling on negative issues can result in sleep disturbances such as delay in falling asleep (Norlander et al., 2005). Furthermore, benevolence correlates with decreased negative feelings that could interfere with sleep (Post; 2005; Post 2005; Thoits & Hewitt, 2001). Therefore, perhaps people who report being more benevolent are less likely to suffer sleep difficulties due to decreased negative emotions. A relation between benevolence and sleep quality might suggest that maintaining and increasing happiness levels either immediately or over a long term, may be beneficial.

### *Benevolence and Personality*

Benevolence is linked to two personality traits: agreeableness and neuroticism (Roccas, et al., 2002; McCullough & Hoyt, 2002). People with high agreeableness tend to be more forgiving,

are less likely to confront conflict, show more empathy towards others, and desire social harmony. That is, people who rate high in agreeableness are more caring and concerned for the well-being of other people (Costa & McCrae, 1992; as cited in McCullough & Hoyt, 2002). Theoretically, people who are more benevolent value the well-being of others, and are more likely to perform acts of kindness such as forgiveness (McCullough & Hoyt, 2002) and volunteer work (Thoits & Hewitt, 2001). These types of actions have lead to reports of increased well-being (Post 2005; Thoits & Hewitt, 2001). Neuroticism, on the other hand, is negatively correlated with benevolence (Roccas, et al., 2002). In particular, people with low scores on neuroticism show more characteristics of benevolence (e.g., acts of kindness, forgiveness, and gratitude), while people with high scores of neuroticism show more concern over negative life events and tend to ruminate over misfortune and transgressions. Not surprisingly, neurotics also report lower quality health and decreased marital satisfaction (Karney & Bradbury, 1997; as cited in McCullough & Hoyt, 2002).

Not all studies on personality and benevolence show consistent results. Aluja and Garcia (2004) studied Spanish university students and found no correlation between neuroticism and benevolence. Nonetheless, McCullough and Hoyt (2002) report that neurotics are less forgiving (a form of benevolence) because they show avoidance of situations that they find threatening, and tend to dwell on negative mood states. Also, neurotics tend to be more anxious, depressed, angry, and insecure, and specific components of neuroticism (anger, hostility, and impulsivity) are negatively correlated with benevolence (Roccas, et al., 2002). Also of interest, positive affect correlates with all the Big Five personality traits except for agreeableness, which is the one personality trait that positively correlates with benevolence – a reliable predictor of happiness. In

order to further examine this issue the current study will look at SWB and how (or if) it changes for people who rate higher on benevolence.

### *Happiness and Sleep*

Performing acts of kindness and positive emotions have been linked to better sleep, while negative emotions are associated with sleep irregularities (Norlander et al., 2005). Happier people have more stable circadian rhythms and better quality of sleep, while neurotics have more unstable circadian rhythms and, therefore, poorer sleep quality. Furthermore, people suffering from emotional disorders, such as depression, reported poorer sleep quality. Also, the effects of napping during the day have been shown to elevate happiness levels following wakefulness (Luo & Inoue, 2000). Past research by Friedmann, Globus, Huntley, Mullaney, Naitoh, and Johnson (1977) demonstrated that at the beginning of a two-year gradual sleep reduction study, happiness levels decreased but returned to baseline during a follow-up study one year later.

In contrast, insomnia has been linked with diminished quality of life, and physical and mental illness (Hamilton et al., 2007). In fact, insomnia was the second strongest predictor of well-being (negatively correlated), second only to emotional disorders. However, the causal relations between insomnia and emotional disorders are not known. These findings could be useful in clinical settings, in that, people who suffer from sleep disorders may benefit by increasing levels of happiness. Also, people who suffer from emotional disorders may benefit from trying to maintain healthy sleep patterns.

### *Personality and Sleep*

Big Five personality traits have been linked to sleep (Gray & Watson, 2002). For example, high levels of neuroticism, low levels of extraversion, and low levels of

conscientiousness are associated with poor quality of sleep. Additionally, high levels of positive affect are associated with increased sleep quality. Furthermore, Randler (2008) found that conscientiousness was associated with more stable sleeping patterns. Specifically, retiring times for sleep and rising times in the morning throughout the week were similar to weekend retiring and rising times. In comparison, there were greater differences between weekday and weekend sleep patterns for people high in extraversion. This can be explained by extraverts generally having a more active night-life than those with other personality traits, and this is especially seen on weekends. Agreeableness and openness to experience are not correlated with quality of sleep (Gray & Watson, 2002). However, Randler (2008) did find that agreeableness was positively correlated with early rising time (morningness) and a consistent sleep pattern.

Given that neuroticism is associated with negative views and rumination over mishaps of life, and negative health effects (Norlander, et al., 2005; Gray & Watson, 2002; Aluja & Garcia, 2004; McCullough & Hoyt, 2002; Roccas, et al., 2002), it is not surprising that people who score high on neuroticism have trouble sleeping. Neuroticism has been positively correlated with subjective insomnia (i.e., the belief that one suffers from insomnia). Subjective insomniacs may have poor awareness of the internal-self, and although they believe they suffer from insomnia, clinically they are actually healthy (Dorsey & Bootzin, 1997). Objective insomniacs, those who have been clinically diagnosed with insomnia, tend to be more introverted than healthy individuals and subjective insomniacs. Perhaps introverts focus more on problems at night while trying to fall asleep which impairs the ability to fall asleep. This problem is then compounded, because when there are problems falling asleep one night, the problem carries over to the next day where the inability to sleep persists and may be magnified. In addition, poor sleep quality

may also encourage neuroticism because the body is unable to fully recuperate at the end of the day, eventually leading to possible physical ailments.

However, Norlander et al. (2005) reported that having a high positive affect personality trumps negative affect (whether it is high or low). Perhaps those with high optimism, outlook on life and well-being are better able to cope with stressful events and other such factors that might impair sleep. Past research has supported this claim, demonstrating that positive affect makes significant incremental contributions to prediction of sleep quality (Gray & Watson, 2002).

Research on sleep and happiness, has provided evidence that specific personality traits have links to different components of sleep. However, the research that links personality and sleep is complex and lacking (Gray & Watson, 2002). Therefore, the research linking personality, sleep, and happiness limited. Furthermore, whether certain external factors such as acts of kindness are correlated with personality, sleep, and happiness has yet to be investigated.

### *Happiness and Personality*

Happiness has been strongly linked to certain personality traits, and the Big Five have repeatedly been shown to reliably predict happiness (Diener & Seligman, 2002; Hayes & Joseph, 2003; Gray & Watson, 2002; Roccas, et al., 2002). Research reports that personality accounts for 32-56% of the variance of SWB. The combination of high extraversion and low neuroticism is the most predictable pair of Big Five personalities that represent happy people (Diener & Seligman, 2002; Hayes and Joseph, 2003; Roccas et al., 2002). In terms of life satisfaction, neuroticism and conscientiousness are the best predictors, and agreeableness was slightly correlated with high scores on Depression-Happiness Scale (Hayes & Joseph, 2003).

Furthermore, Diener and Seligman (2002), suggest that the happiest people also scored high on

agreeableness. This finding coincides with the current investigation of agreeableness leading to higher SWB. The difference being that the current study will study whether benevolence (a subcomponent of agreeableness) may be associated with happiness, by promoting better sleep quality. For the purposes of this study, subjective happiness and satisfaction with life will be used as the measure of well-being. Due to happiness being a latent trait variable, it is necessary and justified to use multiple measures of happiness in order to get a more accurate measurement. Overall, personality accounts for a large amount of variance for happiness, therefore, including personality in the present research is deemed necessary.

### *Current Study*

Though individual studies have examined bivariate relations between well-being, sleep, benevolence, and personality, all the variables have not been examined in a single study. Furthermore, the correlation between sleep and benevolence has yet to be tested. The current study will examine whether participants who are rated as more benevolent will report overall better sleep quality and higher levels of well-being. While not providing a relation of cause and effect between benevolence and sleep quality, this study will investigate if a correlation exists that could lead to future longitudinal and experimental studies. Also, the effectiveness of the OHQ as a measure for benevolence, based on the pro-social subcomponent of agreeableness from the NEO-FFI, will be examined. Finally, the current study examines how well sleep and benevolence predict well-being before and after controlling for personality.

Implications for this study will help to guide future research involving happiness, and are as follows: 1) to be the first to investigate the relationship between sleep and benevolence, 2) to provide support for a possible new step in clinical interventions for insomnia (e.g., acts of

kindness), 3) to better understand the correlation between personality (Big 5) and sleep and provide further evidence of the impact personality has on sleep, 4) to establish the OHQ as a possible measure for benevolence in future research, and 5) to expand positive psychology by investigating a possible link between sleep, benevolence, and well-being.

## Methods

### *Participants*

477 undergraduates were solicited from psychology courses at the University of British Columbia Okanagan. In total, 32 participants were dropped (7% of initial sample) from the study, because they did not complete the minimum 50% of the questionnaires. This resulted in a sample of 445 participants, consisting of 300 females and 134 males, with age ranging from 17 to 47 ( $M = 20$ ,  $SD = 3.44$ ).

### *Instruments*

The test consisted of 17 questionnaires, but for the current study, only eight of those questionnaires were used. All other questionnaires were for information irrelevant to the scope of this study. The questionnaires used in this study were: The Pittsburgh Sleep Quality Index (Buysse, et al., 1989), The Oxford Happiness Questionnaire (Hills & Argyle, 2002), Satisfaction With Life Scale (Diener, Emmons, Larson, & Griffin, 1985), Subjective Happiness Scale (Lyubomirsky & Lepper, 1999), Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988), and NEO-Five Factor Inventory, a revised version of the NEO-PI (Costa & McCrae, 1989). In addition, demographics of the participants were also collected.

### *The Pittsburgh Sleep Quality Index*

The Pittsburgh Sleep Quality Index (PSQI) consists of 15 multiple choice, and 4 write-in items. The test was designed to measure subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. An example of a question used is, “During the past month, what time have you usually gone to bed at night?” in which the participant replies with a write in answer. In a psychometric analysis (Backhaus, Junghanns, Broocks, Riemann, and Hohagen, 2002), the PSQI had an alpha level of 0.83 globally (taking into account all the components listed above), and a test-retest reliability of 0.85 globally (N=148). Patients who suffer from clinical disorders associated with sleep disturbance have been reported to score significantly higher than healthy (control) patients (Rush, Pincus, First, Blacker, Endicott, Keith, Phillips, Ryan, Smith Jr., Tsuang, Widiger, & Zarin, 2000). Specifically, the PSQI produced a sensitivity of 89.6% and specificity of 86.5% comparing patients to the control group. For the purposes of this study, the final multiple choice questions (i.e., 10a-e), were omitted, because they pertain to a bed partner or roommate’s judgement of the participant’s sleep quality. This study is examining subjective sleep quality and not objective sleep quality based on a bed partner or roommate’s judgement. The PSQI produces seven scores, on a 0 to 3 ranking, which correspond to each of the components above, and are added together to produce a global score. If the global score is greater than five, sleep disturbances are considered to be present.

### *The Oxford Happiness Questionnaire*

The Oxford Happiness Questionnaire (OHQ) is a 29-item multiple choice questionnaire, on a 6-point likert-type scale (1 = “strongly disagree”, to 6 = “strongly agree”). Revised from the Oxford Happiness Inventory, the OHQ is used to provide a general measure of happiness. Psychometric analysis shows a Cronbach’s alpha of 0.92, with all items making a significant (P

< 0.001) contribution to measuring happiness (Hills & Argyle, 2002). An example of an item used is, “I feel that life is very rewarding” in which the participant replies by choosing between one and six on the 6-point likert-type scale. Hayes and Joseph (2003) pointed out that the Oxford Happiness Inventory (OHI) may also be able assess participant’s benevolence levels with questions such as, “I am intensely interested in other people”, and “I always have a cheerful effect on others”. The OHQ is derived from the OHI, and those two questions remain the same in the OHQ so it will be assumed that Hayes and Joseph’s assumption would carry across from the OHI to the OHQ.

#### *The Satisfaction With Life Scale*

The Satisfaction With Life Scale (SWLS) asks five Likert-type questions with strongly disagree anchoring at one end, and strongly agree anchoring at the other end. The scale is used to assess the satisfaction of the participant’s life as a whole. This scale asks general questions about life satisfaction, allowing participants to take into account whatever values they consider makes them happy in life and rate those values on the Likert-type scale. An example of an item used in the SWLS is, “In most ways my life is close to my ideal”. Psychometric analysis using 176 undergraduate students shows, favourably, a Cronbach’s alpha of 0.87, and a test-retest reliability of 0.82 (with 2-month duration between testing times). In addition, to its credibility, the SWLS has been chosen in multiple studies over the last couple decades as a measure of happiness (Oishi, et al., 1999; Diener & Seligman, 2002; Hayes & Joseph, 2002; Hayes & Joseph, 2003; Poulin & Silver, 2008).

#### *Subjective Happiness Scale*

The Subjective Happiness Scale (SHS) uses four questions on a 7-point, Likert-type scale to measure global subjective happiness. It contains three questions based on happiness, and one opposing question related to unhappiness. An example of an item from the scale is, “Compared to most of my peers, I consider myself”, where the participant replies on the scale from “less happy” to “more happy”. Psychometric analysis was conducted using 2,732 participants (1754 women, 962 men, and 16 unknown) from high school, university, and the general public, with ages ranging from 14-28 years in the high school and college sample, and 20-94 years in the general public sample (Lyubomirsky & Lepper, 1999). The analysis showed a Cronbach’s alpha of 0.86, and a test-retest reliability of 0.72 (time between tests ranged from three weeks to one year).

#### *Positive and Negative Affect Schedule*

The Positive and Negative Affect Schedule (PANAS), is used to investigate both negative and positive affect using two 10-item mood scales, one for positive and one for negative. Ten words are listed in two separate columns and using a 5-point Likert-type scale, with “very slightly or not at all” anchoring on one end and “extremely” anchoring the other end. Participants are asked to rate how well each word describes them. Researchers can choose the time frame for which they are looking for (e.g., moment, within the past few days, past few months etc.). An example of an item for the positive scale is, “strong”, and for the negative scale, “distressed”. The participant is required to place a number beside each word that best describes him or herself to that word (1 = slightly or not at all, to 5 = extremely). Psychometric analysis shows good reliability for the negative and positive scales, 0.87 and 0.86 respectively, and the scales had a correlation of -0.09 with each other, providing evidence that they are systematically different from one another.

### *NEO-Five Factor Inventory*

The NEO-Five Factor Inventory (NEO-FFI) is used to measure personality traits based Costa and McCrae's (1989) Five Factor Model (FFM), which measures extraversion, openness to experience, neuroticism, agreeableness, and conscientiousness. The NEO-FFI is a shortened version of the NEO-Personality Inventory Revised, and is used because it provides a general measure for each of the five traits, while maintaining reliability and validity, and has been deemed suitable for use over the internet (Buchanan, Johnson, & Goldberg, 2005). This questionnaire uses 60 items that tap into each of the five traits based on the FFM. Furthermore, Holden and Fekken (1994) validated the NEO-FFI for use on university samples. An example of an item used in the inventory is, "I am not a worrier", in which the participant places a number beside the statement based on how accurately it describes him or her (1 = strongly disagree, to 5 = strong agree).

### *Procedure*

Data were collected using a battery of questionnaires uploaded onto the online survey database "Survey monkey". Psychology students were registered on the experiment management system, known as *Sona*, through the university, and signed in with a username and password. From *Sona*, a website link took them to the questionnaires on the Survey Monkey website. Participants were able to access the study at anytime, and took approximately 2 hours to complete it. At the beginning of the survey, participants were asked to create a password, and along with student identification, upon completion of the survey, e-mail the information to a secure e-mail address created by the researcher. While this negates anonymity, it was necessary in order for the participants to receive their 2% bonus for completing the survey. However,

confidentiality was maintained by the researchers using a secure e-mail address that was only accessible to researchers of the study.

### *Data Analyses*

Pearson Product moment correlations were used to examine the relationship between well-being (i.e., satisfaction with life, subjective happiness, and positive affect), sleep quality (i.e., trouble sleep, subjective sleep quality, use of medication, enthusiasm, and daily drowsiness), benevolence (prosocial values), and personality (openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism). Hierarchical regressions were also conducted using each variable interchangeably as criterion and predictor variables, with the exception of personality, because based on literature personality remains relatively constant throughout life. Alpha levels of 0.05 were used as a cut-off for Pearson correlations, and appropriate Bonferroni adjustments were made to the hierarchical models based on the number of predictors used. For example, if model one had five personality traits that were used to predict the criterion variable, then the cut off was calculated to be  $p = 0.1$  (i.e.,  $.05 / 5 = .01$ ). This adjustment was made to reduce the probability of a Type I error.

### *Data Cleaning*

Data were first examined to ensure that all participants had completed the questionnaires used for the current study. Descriptive statistics were used to examine the normality of the distribution for each variable. Skewness and Kurtosis were used as indicators of normality, and the raw data for each variable showed the best normality distribution, after attempting square root, logarithmic, and inverse transformations. Univariate outliers were identified as Z-score values of higher than +3.50 and lower than -3.50. If values were close to +3.50 or -3.50 (e.g.,

+3.55 or -3.55) the values were capped with the next highest Z-score value that fell below the cut-off. If values were inflated well beyond the cut-off they were excluded from subsequent analyses. The latter option was used where participants chose the same answer consistently (e.g., choosing “1” for every response). In addition, multivariate outliers were identified during regression analyses using Mahalanobi’s Distance. The cut-off was determined based on the degrees of freedom in the analyses and the appropriate cut-off value based on the number of degrees of freedom. Subsequent to identifying outliers, another 11 participants were excluded from further analyses (2.5% of sample). It was determined that excluding these participants would not impact the power of the study, because they made up less than 5% of the total sample ( $N = 445$ ). The final sample size used for analyses was  $N = 434$ .

## *Results*

### *Correlations*

Pearson product moment correlations were used to ensure correlations between variables were consistent with the relations reported in the literature (e.g., well-being measures were positively correlated with each other and extraversion). A correlation matrix showed there was no multicollinearity between questionnaires (see Appendix A, Table 1), meaning none measured the same construct and each could be used to measure a separate construct of a variable. In addition, all relations (with the exception of sleep quality and benevolence, and neuroticism and benevolence) were significant at an alpha level of  $p < 0.001$ . Consistent with the literature, measures of positive well-being were positively correlated with one another, and measures of negative well-being (e.g., negative affect and neuroticism) were positively correlated with one another. Furthermore, measures of positive well-being were negatively correlated with measures

of negative well-being. Also, sleep quality and benevolence scores were positively correlated with measures of positive well-being, and negatively correlated with measures of negative well-being. Sleep quality and benevolence scores showed no significant correlation with one another. The highest correlation was between scores on the personality trait extraversion and subjective happiness scores,  $r = .684, p < 0.001$ . However, this value fell below the 0.90 cut-off for multicollinearity, and the measure of extraversion was to determine a personality trait, while subjective happiness was used to assess a component of well-being. Both measures were crucial for the goals of the study; thus, both measures were included in the study. In addition, Pearson Product moment correlations were conducted on item two, “I have very warm feelings towards almost everyone” and item four, “I am intensely interested in other people” of the Oxford Happiness Questionnaire, with benevolence scores. Item two showed a moderate correlation with benevolence ( $r = .292, p < .001$ ) and item four showed a slight correlation with benevolence ( $r = .191, p < .001$ ).

#### *Bivariate Regression analyses*

Linear bivariate regression analyses of each of the variables were conducted to assess the strength of the relations between each variable. Table 2 (Appendix A) shows a summary of the bivariate regressions with beta values and unique variance accounted for by each predictor ( $sr^2$ ).

Sleep quality accounted for 18% of the variance of subjective happiness,  $F(1, 433) = 95.69, p < 0.001$ . Neuroticism accounted for 40% of the variance in subjective happiness,  $F(1, 433) = 232.09, p < .001$ . Extraversion accounted for 46.8% of the variance for subjective happiness,  $F(1, 433) = 379.83, p < 0.001$ . Agreeableness accounted for 7% of the variance for subjective happiness,  $F(1, 433) = 32.27, p < 0.001$ . Interestingly, agreeableness predicted a

decrease in well-being scores,  $\beta = -.349$  ( $SE = .075$ ) for satisfaction with life, and  $\beta = -0.083$  ( $SE = .015$ ) for subjective happiness. Benevolence accounted for 4.1% of the variance in subjective happiness,  $F(1, 433) = 18.42, p < 0.001$ .

Sleep quality accounted for 14% of the variance of satisfaction with life,  $F(1, 433) = 71.39, p < 0.001$ , neuroticism accounted for 32.6% of the variance in satisfaction with life  $F(1, 433) = 208.63, p < .001$ , extraversion accounted for 18.3% of the variance in satisfaction with life  $F(1, 433) = 96.92, p < 0.001$ , agreeableness accounted for 4.7% of the variance for satisfaction with life,  $F(1, 433) = 21.35, p < 0.001$ , and benevolence accounted for 2.4% of the variance in satisfaction with life,  $F(1, 433) = 10.62, p = 0.001$ . Benevolence was a predictor of SWL in females,  $F(1, 299) = 10.33, p = 0.001$ , and not in males,  $F(1, 133) = 1.75, p = 0.188$ .

Sleep quality accounted for 14.5% of the variance of positive affect  $F(1, 433) = 73.09, p < 0.001$ , and benevolence accounted for 7.1% of the variance of positive affect  $F(1, 433) = 33.12, p < .001$ , and satisfaction with life and subjective happiness accounted for 41.8% of the variance of positive affect,  $F(2, 433) = 157.78, p < 0.001$ .

Sleep quality was not a predictor of benevolence  $F(1, 433) = 0.04, p > .05$ , neuroticism accounted of 1.4% of the variance for benevolence,  $F(1, 433) = 6.12, p = .007$ , extraversion accounted for 6.6% of the variance of benevolence  $F(1, 433) = 30.44, p < 0.001$ , agreeableness accounted for 10.8% of the variance of benevolence,  $F(1, 433) = 52.43, p < 0.001$ , and well-being (i.e., satisfaction with life, subjective happiness, and positive affect) accounted for 4.2% of the variance of benevolence  $F(2, 433) = 9.41, p < 0.001$ .

Neuroticism accounted for 25% of the variance of sleep quality,  $F(1, 434) = 144.69, p < 0.001$ , extraversion accounted for 8% of variance of sleep quality  $F(1, 433) = 37.38, p < 0.001$ ,

well-being accounted for 19.8% of the variance of sleep quality,  $F(2, 433) = 53.33$ ,  $p < 0.001$ , and benevolence was not a significant predictor of sleep quality,  $F(1, 433) = 0.04$ ,  $p = .841$ .

### *Hierarchical Regression*

Hierarchical regressions were conducted to control for personality traits. The first models were used with all personality traits included (i.e., openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism), subsequent models excluded specific personalities if they did not contribute significantly to the criterion variable based on the first model. This was done to maximize the efficiency of the model; in that, the decrease in  $R^2$  was minimal, or there was an increase in  $R^2$ . All hierarchical regression results are presented in Table 3 (Appendix A).

A hierarchical regression was used to investigate if sleep quality significantly predicted satisfaction with life and subjective happiness above and beyond personality. Model one included all five personality traits and sleep quality, and accounted for 37.9% of the variance in satisfaction with life  $F(6, 428) = 43.38$ ,  $p < .001$ . However, sleep quality, agreeableness, conscientiousness, and openness did not contribute significantly to satisfaction with life ( $p > .05$ ). Removing agreeableness, conscientiousness, and openness, model two reduced  $R^2$  to 36.1% (-1.8% from previous model),  $F(3, 430) = 80.88$ ,  $p < .001$ , and sleep quality became a significant predictor of satisfaction with life contributing 1% of unique variance. Looking at subjective happiness, model one accounted for 59.4% of the variance of subjective happiness,  $F(6, 427) = 104.23$ ,  $p < .001$ , and sleep quality significantly accounted for 1% of unique variance. Again, agreeableness, conscientiousness, and openness were not significant predictors to the model ( $p > .05$ ) so they were excluded. The modified model included extraversion, neuroticism, and

sleep quality, and accounted for 59% of the variance,  $F(3, 430) = 206.53, p < .001$ , with  $\Delta R^2$  less than 1%. Sleep quality contributed 1.2% of unique variance to subjective happiness.

Next, a hierarchical regression for how much well-being accounts for sleep quality above and beyond personality was examined. The five personality traits and well-being accounted for 30.7% of sleep quality,  $F(7, 426) = 26.99, p < .001$ , however, neither SWL nor subjective happiness were significant contributors to the model ( $p > .05$ ). Conscientiousness and neuroticism were the only significant predictors of sleep quality. A second model consisting of just neuroticism, conscientiousness, and well-being accounted for 29.7% of the variance of sleep quality  $F(4, 429) = 45.39, p < .001$ . Again, well-being did not predict sleep quality above and beyond personality traits, specifically conscientiousness and neuroticism.

Interestingly, while bivariate regression and the correlation matrix showed no significant relation between sleep quality and benevolence, a model consisting of personality and benevolence accounted for 30.6% of the variance in sleep quality,  $F(6, 427) = 31.35, p < .001$ , with benevolence accounting for 1.69% of the unique variance for sleep quality ( $p = .001$ ). Benevolence predicted a decrease in sleep quality,  $\beta = -.322 (SE = .10)$ . Agreeableness, extraversion, and openness were not significant contributors to the model ( $p > .05$ ). A model consisting of neuroticism, conscientiousness, and benevolence, still accounted for 29.9% of the variance ( $\Delta R^2 = -0.7\%$ ) in sleep quality,  $F(3, 430) = 61.01, p < .001$ . Benevolence accounted for 1.35% of the unique variance in this model ( $p = .004$ ).

The reciprocal relation for sleep quality predicting benevolence, again showed that sleep did not significantly predict sleep. However, personality and sleep quality together accounted for 31.4% of the variance for benevolence,  $F(6, 427) = 32.57, p < .001$ . Controlling for personality,

sleep contributed 1.7% of unique variance to benevolence, ( $p = .001$ ), with  $\Delta R^2$  of .017.

Neuroticism and openness were not significant contributors to the model so were dropped to maximize efficiency of the model. Model two, having dropped neuroticism and openness, accounted for 30.3% of the variance in benevolence ( $\Delta R^2 = 1.1\%$ ),  $F(4, 429) = 46.55, p < .001$ . Sleep was still a significant predictor of benevolence, accounting for 1.1% of unique variance ( $p = 0.006$ ).

Finally, a hierarchical regression was used to determine if benevolence predicted well-being above and beyond personality traits. Personality and benevolence accounted for 58.5% of the variance in subjective happiness,  $F(6, 427) = 100.23, p < .001$ , but benevolence, as well as conscientiousness, agreeableness, and openness, were not significant predictors of subjective happiness ( $p > .05$ ). Excluding conscientiousness, agreeableness, and openness, but keeping benevolence,  $\Delta R^2 = -.6\%$ , and benevolence was still not a significant predictor of subjective happiness ( $p > .05$ ). Again, benevolence was not a significant predictor of satisfaction with life above and beyond personality traits ( $p > .05$ ), but the model consisting of personality traits and benevolence accounted for 37.2% of the variance,  $F(6, 427) = 42.23, p < .001$ .

### *Discussion*

The current study investigated the relation between sleep, well-being (including satisfaction with life, subjective happiness and positive affect), benevolence, and personality traits based on Costa and McCrea's Five Factor Model. Past research has investigated the bivariate relations between each of these variables, with the exception of subjective sleep quality and benevolence. In the present study, the bivariate relations between these variables were examined while controlling for personality traits. Additionally, the correlation between

benevolence scores based on the NEO-FFI and items two and four from the OHQ were investigated to determine if the OHQ questions could be used as a measure of benevolence.

### *Sleep, Personality and Well-being*

The relation between sleep, personality, and well-being is complex. Supporting past research, personality traits were related to sleep quality and well-being. Neuroticism, conscientiousness, and extraversion were predictors of sleep quality, while extraversion and neuroticism were strong predictors of positive and negative well-being respectively. Sleep quality was positively correlated with well-being.

Literature suggests that sleep quality predicts well-being (Hamilton, et al. 2007) and vice versa (Norlander et al., 2005). Lou and Inoue (2000) reported that napping can raise positive emotions. Sleep gives the body a chance to relax and recuperate from the day, whether it is from physical or mental exertion caused by a variety of daily events. The current study is consistent with the extant literature in that sleep quality was an indicator of well-being. However, this is only true when personality is not accounted for. That is, above and beyond personality, sleep is not a significant predictor of well-being. Once neuroticism and extraversion are controlled for, sleep makes a small contribution to satisfaction with life and subjective happiness, accounting for a small proportion of the well-being (i.e., 1% and 1.2% respectively). This finding may indicate that people with specific personality traits may benefit from developing and maintaining a proper sleep pattern by retiring and waking at regular times throughout the week (e.g., people who score high on conscientiousness). Luo and Inoue (2000) provided evidence that napping throughout the day can help to elevate positive mood levels. Healthy sleep habits may also help to alleviate stress that causes a decrease in well-being. Extraversion and neuroticism levels may

trump the effects of sleep quality on certain dimensions of well-being (i.e., satisfaction with life and subjective happiness), because they account for such a large proportion of well-being (i.e., 59%).

High neuroticism is a predictor of decreased sleep quality, in that, people who are more anxious, depressed, hostile, self-conscious, and vulnerable to stress are more likely to suffer from disrupted sleep patterns and report lower quality of sleep (Norlander et al., 2005; Gray & Watson, 2002). These conditions can lead to a person having problems falling asleep at night, report not feeling refreshed in the morning, having their sleep disrupted, and feeling a lack of enthusiasm and energy the following day. Furthermore, Dorsey and Bootzin (1997) report that neurotics are more likely to report that they suffer from sleep problems, even though clinical diagnosis shows otherwise. It is proposed that neurotics are more sensitive to cues that indicate sleep problems and have a higher tendency to report suffering, than people who are clinically diagnosed with sleep problems.

Conscientious people may be more cautious of their health and more likely to follow routines that benefit physical and mental well-being, such as those that increase sleep quality (Gray & Watson, 2002; Luo & Inoue, 2000). Randler (2008) provided evidence that high scores of conscientiousness positively correlated with regular sleep patterns, specifically when comparing between weekday and weekend sleep schedules. Maintaining a sleep schedule allows the body to adapt to times of retiring to bed and waking in the morning, putting less stress on the body compared to fluctuating sleep schedules, which stress the body to adapt to a temporary new sleep schedule. When the body has to readjust to its original sleep schedule (e.g., the next day or at the end of the weekend) the stress may become exacerbated, having detrimental effects on one's well-being. Also, even one night of poor sleep can have detrimental effects on body and

mind function the following day. Being aware of this, conscientious people may be more driven to achieve and/or maintain better quality sleep.

Correlations of the present study suggest extraversion is positively correlated with sleep quality, contrasting research by Randler (2008) suggesting that social facets of extraversion negatively impact sleep patterns between weekdays and weekends, therefore decreasing constructs of sleep quality. Social attitudes of extraversion may lead to later nights out and later waking times over the weekend when one is not committed to start work or school in the morning. Inconsistent sleep patterns are a sign of decreased sleep quality; however, affecting only one construct of sleep quality does not necessarily lead to a decrease in overall sleep quality. The current study showed that extraversion was not a significant predictor of sleep quality when including conscientiousness and neuroticism. However, this may be due to the differing affects of the social facets of extraversion, in that extraversion may cause problems with consistent sleep patterns but influence sleep quality by promoting well-being. A plethora of research, including the current study, suggests extraversion is positively correlated with well-being and social attitudes (Hayes & Joseph, 2003; DeNeve & Cooper, 1998; Tkach & Lyubomirsky, 2006).

The reciprocal relationship showed that well-being was not a significant predictor of sleep quality above what personality accounts for. This finding may be due to the large effect that personality has on both sleep quality and well-being. Correlations show a positive relationship between the two; however, the results point out that personality traits such as conscientiousness and neuroticism play a large role in the effects of well-being on sleep quality. It is most likely that people who score high in conscientiousness and low in neuroticism are more likely to benefit from the positive correlation between well-being and sleep quality.

Well-being is associated with positive emotions, recall of more positive events and fewer negative events, optimism, and lower levels of anxiety, pessimism, and depression (Myers & Diener, 1995; Norlander, Johansson, & Bood, 2005). Understandably, people who are optimistic about life and recall positive events that occurred will have an easier time falling asleep at night, than people who are pessimistic and ruminate on negative events that have occurred.

In light of this, benevolence may be one more way of recalling positive events from the day. Reflecting on benevolent acts such as helping someone in need, committing a random act of kindness, or volunteering time for community service may provide feelings of greater self-worth and relaxation at night while retiring to bed.

#### *Benevolence, Sleep, and Well-being*

Though further research on sleep and benevolence is required to further explain their relation, the present study initially found that there is no direct correlation between benevolence and sleep. Interestingly, once personality is accounted for, the relation between benevolence and sleep becomes significant. Benevolence accounts for a small proportion of sleep quality (1.7%). This finding may be that, independent of one's personality traits, the actual desire and act of caring for another person's well-being may help one sleep better. There are a couple reasons for this finding. First, people who care for others and do good in the world through acts of kindness, are better able to sleep at night because they can reflect on the idea that they made a positive difference in someone's life. Recall of positive life events is associated with increased well-being and may make it easier to sleep at night and feeling more refreshed the next day. Second, based on personality, different traits may affect how one perceives the notion of benevolence. For example, in the current study, neuroticism is one of the strongest predictors of well-being and is

the strongest predictor of sleep quality; therefore, different traits may alter the effects of benevolence on sleep.

Benevolent people also tend to report being happier in the current study, coinciding with past literature. Many studies have shown that acts of kindness are correlated with higher ratings of well-being (Post, 2005; Post, 2005; Thoits & Hewitt, 2001; Lawler et al., 2005; Oishi, Diener, Suh, & Lucas; 1999). Reasons for this may be that acts of kindness such as volunteer work and forgiveness, have been correlated with what is known as the “helper’s high” (Luks, 1988; as cited in Post, 2005). People who volunteer their time to help others are known to feel more energetic, stronger, calmer, less depressed, greater self-worth, and fewer aches and pains. These benefits may also contribute to the correlation between benevolence and sleep quality once personality is controlled for. A possible explanation for the benefits in well-being for caring about others, comes from Oishi et al. (1999) who suggested that people who value benevolence benefit from the action, because they believe in their actions. That is to say, people who do not value benevolence (score low) but still do volunteer work and other acts of kindness may not benefit from their actions. However, that would also depend on what the person hopes to gain from the action, assuming it is not the genuine desire to help another person. For example, students in university may only volunteer their time at community organizations because they know when applying for graduate schools or medical schools, the panel will look to see what community service the applicant has been involved in. Thus, the actions are more for self-gain than the concern about others’ welfare.

### *Personality and Benevolence*

Agreeing with past literature, agreeableness was positively correlated with benevolence. Saucier's key-items to describe *prosocial* (i.e., friendly, kind-hearted, pleasant, kind, considerate, helpful, and warm-hearted), were used to define benevolence in the current study. Agreeableness is composed of multiple subcomponents such as altruism, and Roccas et al. (2002) describe people who score high on benevolence as good-natured, compliant, gentle, and cooperative, while those who score low are described with words such as irritable and ruthless. People scoring high on agreeableness, therefore, seem to be more concerned about the welfare of others and have a genuine concern for others' well-being (benevolence).

### *Benevolence and Sleep*

A primary focus was to determine if benevolence was a significant predictor of sleep quality. Bivariate correlations suggest that there is no relation between the two. This could be that there are many extraneous variables that can affect sleep. Physical health, for example, can affect sleep quality, even if it is for a short period (a few days to a week). An illness or chronic pain can lead to a decline in sleep quality. Daily events can also have an impact on sleep quality on a day to day basis.

### *Oxford Happiness Questionnaire and Benevolence*

The OHQ was significantly correlated with benevolence based on items chosen from agreeableness items on the NEO-FFI. These items were chosen by Saucier to describe a subcomponent of agreeableness – *prosocial*. Item two, “I am intensely interested in other people”, and item four, “I have very warm feelings towards almost everyone”, may describe a person who scores high on benevolence. Item four showed a higher correlation ( $r = .29$ ) with benevolence scores, possibly because it pertains to being friendly, kind, and warm-hearted to

others, which are characteristics of the *prosocial* subcomponent. Item two describes a person that may have a genuine care and concern for that other person, but may emphasize sociability slightly more than benevolence, resulting in a lower correlation ( $r = .19$ ). Regardless, it is suggested that both items can help researchers assess components of benevolence.

### *Limitations*

Future studies may take into account age groups, with Erikson's Theory of Psychosocial Development (Hoyer & Roodin, 2003; pp. 379-384). According to Erikson's theory, during the age of the current sample, one has moved into what is known as the conflict of Intimacy vs. Isolation and Career Consolidation. Also, prior to these stages is the conflict of Role Identity vs. Role Confusion. These stages (or conflicts) of development all center around one developing oneself as a member in society, searching for a significant other to begin a family, and trying to establish oneself in a career setting. These are all very self-focused stages of life development, whereas, valuing benevolence is a stage that is noted later in the lifespan (i.e., Generativity vs. Desparity). It may only be a natural development that university students are less focused on benevolence and the affects one can have on other people. It may be of interest to see how benevolence influences well-being or sleep quality of participants. Another suggestion for future research is to provide a study for eudaimonic and hedonic happiness based on acts of kindness. To know whether one has compassion and caring for another's well-being, or is doing the action for self-gain, may have an impact on benevolence being a predictor of well-being and sleep quality. In addition, using an equal ratio of males to females may provide a better representation of the population when it comes to gender and differences that may be found between them. Finally, based on findings by Aluja and Garcia (2004) of personality and benevolence, a cross

cultural study may provide better understanding of the relation between well-being, sleep, benevolence, and personality.

### *Conclusion*

Current findings suggest that the relation between sleep, benevolence, and well-being can change when accounting for personality traits. While certain personality traits (A) may be positively correlated and predict one of the variables of interest (B), which in turn, is a predictor of another variable of interest (C), there is no direct relation or may even perhaps be a negative correlation between (A) and (C). These findings emphasize the complexity of relation between these variables. Overall, sleep quality is a predictor of well-being and vice versa, benevolence is a predictor of well-being and vice versa, benevolence is a modest predictor of sleep quality, and personality strongly predicts all three variables. This study has also provided a start to investigating the relationship between sleep and benevolence, and how they relate to well-being, while controlling for personality traits based on the NEO-FFI.

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## Appendix A

## Tables produced from data analyses in study

Table 1.

*Correlation Matrix of Benevolence, Well-being, Personality, Affect, and Sleep Quality*  
*Descriptive Statistics (N = 434)*

Variables		1	2	3	4	5	6	7	8
1. Benevolence	Pearson Correlation	-							
2. SWLS	Pearson Correlation	.16**	-						
3. SHS	Pearson Correlation	.20**	.65**	-					
4. Neuroticism	Pearson Correlation	-.12*	-.57**	-.64**	-				
5. Extraversion	Pearson Correlation	.26**	.43**	.68**	-.51**	-			
6. Negative affect	Pearson Correlation	-.15**	-.46**	-.52**	.65**	-.41**	-		
7. Positive affect	Pearson Correlation	.27**	.48**	.64**	-.54**	.62**	-.36**	-	
8. Sleep Quality	Pearson Correlation	-0.01	.38**	.43**	-.50**	.28**	-.44**	.38**	-

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Table 1. Correlation matrix of the variables used in the current study. Alpha level of 0.05 was used. All variables pertaining to positive well-being were positive correlated. All variables pertaining to negative well-being were positively correlated. Variables of negative and positive well-being were negatively correlated with one another. Sleep quality and benevolence were positive correlated with positive well-being variables, and negatively correlated with negative well-being variables. Sleep quality and benevolence were the only variables not significantly correlated at the 0.05 alpha level.**

Table 2.

*Standard regression coefficients ( $\beta$ ) and semi-partial ( $sr^2$ ) results for Well-being, Sleep Quality, Benevolence, and Personality Traits*

Criterion	Predictor	$\beta$	$sr^2$
Subjective Happiness	Sleep quality	0.43**	0.18
	Benevolence	0.2**	0.04
	Extraversion	0.68**	0.47
	Neuroticism	-0.64**	0.41
	Agreeableness	-0.26**	0.07
Satisfaction with Life	Sleep Quality	0.38**	0.14
	Benevolence	0.16**	0.026
	Extraversion	0.43**	0.18
	Neuroticism	-0.57**	0.33
	Agreeableness	-0.22**	0.047
Benevolence	Sleep Quality	-0.01	0.0001
	Extraversion	0.26**	0.066
	Agreeableness	0.33**	0.11
	Satisfaction with Life	0.16**	0.026
	Subjective Happiness	0.18**	0.032
	Neuroticism	-0.12*	0.014
Positive Affect	Sleep Quality	0.38**	0.15
	Extraversion	0.62**	0.38
	Neuroticism	-0.54**	0.29
	Satisfaction with Life	0.48**	0.23
	Subjective Happiness	0.57**	0.19
	Benevolence	0.27**	0.071
Sleep Quality	Extraversion	0.28**	0.08
	Benevolence	-0.01	0.0001
	Neuroticism	-0.5**	0.25
	Subjective Happiness	0.43**	0.19
	Satisfaction with Life	0.38**	0.14
	Conscientiousnes	0.36**	0.13

\*  $p < .05$

\*\*  $p < .01$

**Table 2.** Bivariate regressions using dimensions of well-being, benevolence, and sleep quality as criteria. All but the regression of sleep and benevolence were significant at an alpha level  $p < .05$

Table 3.

*Hierarchical Regression (HR) of Well-being, Sleep Quality, Benevolence, and Personality*

Criterion	HR Step	Predictors	$\beta$	$sr^2$	$R^2$	$\Delta R^2$
Satisfaction with Life	1	Personality			.372	.372
		Neuroticism	-.435	.0124*		
		Extraversion	0.155	.02*		
		Openness	0.091	.008		
		Agreeableness	-0.004	.000		
		Conscientiousness	0.12	.012*		
Satisfaction with Life	2	Sleep Quality	0.1	.01	.379	.007
Subjective Happiness	1	Personality			.351	.351
		Neuroticism	-.476	.167*		
		Extraversion	.185	.025*		
		Sleep Quality	.115	.01*	.361	.01*
	2	Sleep Quality			.585	.585
Subjective Happiness	1	Personality				
		Neuroticism	-.363	.09*		
		Extraversion	.469	.154*		
		Openness	.029	.000		
		Agreeableness	.003	.000		
		Conscientiousness	.08	.001		
Subjective Happiness	2	Sleep Quality	.117	.01*	.594	.01*
Sleep Quality	1	Personality			.578	.578
		Neuroticism	-.387	.11*		
		Extraversion	.487	.175*		
		Sleep Quality	.127	.012*	.590	.012
	2	Sleep Quality			.590	.012
Sleep Quality	1	Personality			.289	.289
		Neuroticism	-.436	.125*		
		Extraversion	-.007	.000		
		Openness	-.062	.003		
		Agreeableness	.009	.000		
		Conscientiousness	.205	.034*		
	2	Well-being			.307	.018*
		Satisfaction With Life	.172	.01		
		Subjective Happiness	.055	.001		
		Sleep Quality			.285	.285
Sleep Quality	1	Personality				
		Neuroticism	-.425	.154*		
		Conscientiousness	0.2	.034*		
		Sleep Quality			.297	.012
	2	Sleep Quality			.297	.012
Sleep Quality	1	Personality			.289	.289
		Neuroticism	-.436	.125*		
		Extraversion	-.007	.000		
		Openness	-.062	.003		
		Agreeableness	.009	.000		
		Conscientiousness	.205	.034*		
Sleep Quality	2	Benevolence	.155	.017*	.306	.017*
Sleep Quality	1	Personality			.285	.285
		Neuroticism	-.425	.154*		
		Conscientiousness	.200	.043*		
Sleep Quality	2	Benevolence	.120	.014*	.299	.014*

  

Criterion	HR Step	Predictors	$\beta$	$sr^2$	$R^2$	$\Delta R^2$
Benevolence	1	Personality			.297	.297
		Neuroticism	-.036	.000		
		Extraversion	.275	.012*		
		Openness	.077	.006		
		Agreeableness	.464	.186*		
		Conscientiousness	.235	.05*		
Benevolence	2	Sleep Quality	.153	.017*	.314	.017*
Benevolence	1	Personality			.290	.290
		Extraversion	.293	.192*		
		Agreeableness	.458	.052*		
		Conscientiousness	.247	.071*		
	2	Sleep Quality	.121	.012*	.303	.013*
Subjective Happiness	1	Personality			.585	.585
		Neuroticism	-.363	.086*		
		Extraversion	.468	.154*		
		Openness	.029	.000		
		Agreeableness	.003	.000		
		Conscientiousness	.08	.005		
Subjective Happiness	2	Benevolence	.02	.000	.585	0
Subjective Happiness	1	Personality			.578	.578
		Neuroticism	-.387	.110		
		Extraversion	.487	.175		
		Sleep Quality			.579	.001
	2	Benevolence	.034	.001	.579	.001
Satisfaction with Life	1	Personality			.372	.372
		Neuroticism	-.435	.124*		
		Extraversion	.155	.017*		
		Openness	.091	.01		
		Agreeableness	-.004	.000		
		Conscientiousness	.120	.012*		
Satisfaction with Life	2	Benevolence	.033	.001	.372	.000
Satisfaction with Life	1	Personality			.363	.363
		Neuroticism	-.443	.136*		
		Extraversion	.157	.017*		
		Conscientiousness	.124	.013*		
	2	Benevolence	.033	.001	.364	.001

\*  $p < .01$ \*  $p < .01$

## Appendix B

Questionnaires used in the study including the Oxford Happiness Questionnaire, Pittsburgh Sleep Quality Index, NEO-Five Factor Inventory, Satisfaction With Life Scale, Subjective Happiness Scale, and Positive and Negative Affect Schedule.

### The Oxford Happiness Questionnaire

INSTRUCTIONS: Below are a number of statements about happiness. Would you please indicate how much you agree or disagree with each by entering a number alongside it according to the following code:

**1 = strongly disagree;      2 = moderately disagree;      3 = slightly disagree;**  
**4 = slightly agree;      5 = moderately agree;      6 = strongly agree.**

You will need to read the statements carefully because some are phrased positively and others negatively. Don't take too long over individual questions; there are no 'right' or 'wrong' answers and no trick questions. The first answer that comes into your head is probably the right one for you. If you find some of the questions difficult, please give the answer that is true for you in general or for most of the time.

- |  |             |
|--|-------------|
| 1. I don't feel particularly pleased with the way I am | 1 2 3 4 5 6 |
| 2. I am intensely interested in other people           | 1 2 3 4 5 6 |
| 3. I feel that life is very rewarding                  | 1 2 3 4 5 6 |
| 4. I have very warm feelings towards almost everyone   | 1 2 3 4 5 6 |
| 5. I rarely wake up feeling rested                     | 1 2 3 4 5 6 |
| 6. I am not particularly optimistic about the future   | 1 2 3 4 5 6 |
| 7. I find most things amusing                          | 1 2 3 4 5 6 |
| 8. I am always committed and involved                  | 1 2 3 4 5 6 |
| 9. Life is good  | 1 2 3 4 5 6 |
| 10. I do not think that the world is a good place      | 1 2 3 4 5 6 |
| 11. I laugh a lot                                      | 1 2 3 4 5 6 |
| 12. I am well satisfied about everything in my life    | 1 2 3 4 5 6 |

- |   |             |
|---|-------------|
| 13. I don't think I look attractive                                     | 1 2 3 4 5 6 |
| 14. There is a gap between what I would like to do and what I have done | 1 2 3 4 5 6 |
| 15. I am very happy   | 1 2 3 4 5 6 |
| 16. I find beauty in some things  | 1 2 3 4 5 6 |
| 17. I always have a cheerful effect on others                           | 1 2 3 4 5 6 |
| 18. I can fit in everything I want to                                   | 1 2 3 4 5 6 |
| 19. I feel that I am not especially in control of my life               | 1 2 3 4 5 6 |
| 20. I feel able to take anything on                                     | 1 2 3 4 5 6 |
| 21. I feel fully mentally alert   | 1 2 3 4 5 6 |
| 22. I often experience joy and elation                                  | 1 2 3 4 5 6 |
| 23. I do not find it easy to make decisions                             | 1 2 3 4 5 6 |
| 24. I do not have a particular sense of meaning and purpose in my life  | 1 2 3 4 5 6 |
| 25. I feel I have a great deal of energy                                | 1 2 3 4 5 6 |
| 26. I usually have a good influence on events                           | 1 2 3 4 5 6 |
| 27. I do not have fun with other people                                 | 1 2 3 4 5 6 |
| 28. I don't feel particularly healthy                                   | 1 2 3 4 5 6 |
| 29. I do not have particularly happy memories of the past               | 1 2 3 4 5 6 |

### Satisfaction With Life Scale

Below are five statements which which you may agree or disagree.

Using the 1-7 scale below indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding. The 7 – point scale is as follows:

**1 = strongly disagree**

**2 = disagree**

**3 = slightly disagree**

**4 = neither agree nor disagree**

**5 = slightly agree**

**6 = agree**

**7 = strongly agree**

- |   |               |
|---|---------------|
| _____ 1. In most ways my life is close to my ideal.                   | 1 2 3 4 5 6 7 |
| _____ 2. The conditions of my life are excellent.                     | 1 2 3 4 5 6 7 |
| _____ 3. I am satisfied with my life.                                 | 1 2 3 4 5 6 7 |
| _____ 4. So far I have gotten the important<br>things I want in life. | 1 2 3 4 5 6 7 |
| _____ 5. If I could live my life over, I would change almost nothing  | 1 2 3 4 5 6 7 |

### The Positive And Negative Affect Schedule

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you generally feel this way, that is, how you feel on the average.

Use the following scale to record your answers.

<b>1</b> very slightly or not at all	<b>2</b> a little	<b>3</b> moderately	<b>4</b> quite a bit	<b>5</b> extremely
	_____	interested	_____	irritable
	_____	distressed	_____	alert
	_____	excited	_____	ashamed
	_____	upset	_____	inspired
	_____	strong	_____	nervous
	_____	guilty	_____	determined
	_____	scared	_____	attentive
	_____	hostile	_____	Jittery
	_____	enthusiastic	_____	active
	_____	proud	_____	afraid

**Subjective Happiness Scale (SHS)**

For each of the following statements and/or questions, please fill in the circle on the scale that you feel is most appropriate in describing you.

1. In general, I consider myself:

1	2	3	4	5	6	7
Not a very				A very		
happy person				happy person		

2. Compared to most of my peers, I consider myself:

1	2	3	4	5	6	7
Less happy				More happy		

3. Some people are generally very happy. They enjoy life regardless of what is going on, getting the most out of everything. To what extent does this characterization describe you?

1	2	3	4	5	6	7
Not at all				A great deal		

4. Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be. To what extent does this characterization describe you?

1	2	3	4	5	6	7
Not at all				A great deal		

### NEO-Five Factor Inventory

The following pages contain statements that can be used to describe personality characteristics, attitudes, feelings and behaviors. Do not be concerned if a few statements seem unusual--they are included to describe a wide variety of people. Try to be as honest and serious as you can in your responses. Using the 1-5 scale below, please rate the accuracy each statement by placing the appropriate number on the dash beside each statement.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>strongly</b>	<b>disagree</b>	<b>neutral</b>	<b>agree</b>	<b>strongly</b>
<b>disagree</b>				<b>agree</b>

- \_\_\_\_ (1) I am not a worrier.
- \_\_\_\_ (2) I like to have a lot of people around me.
- \_\_\_\_ (3) I don't like to waste my time daydreaming.
- \_\_\_\_ (4) I try to be courteous to everyone I meet.
- \_\_\_\_ (5) I keep my belongings clean and neat.
- \_\_\_\_ (6) I often feel inferior to others.
- \_\_\_\_ (7) I laugh easily.
- \_\_\_\_ (8) Once I find the right way to do something, I stick to it.
- \_\_\_\_ (9) I often get into arguments with my family and co-workers.
- \_\_\_\_ (10) I'm pretty good about pacing myself so that I get things done on time.
- \_\_\_\_ (11) When I'm under a great deal of stress, sometimes I feel like I'm going to pieces.
- \_\_\_\_ (12) I don't consider myself especially "lighthearted".
- \_\_\_\_ (13) I am intrigued by the patterns I find in art and nature.
- \_\_\_\_ (14) Some people think I'm selfish and egotistical.
- \_\_\_\_ (15) I am not a very methodical person.
- \_\_\_\_ (16) I rarely feel lonely or blue.
- \_\_\_\_ (17) I really enjoy talking to people.
- \_\_\_\_ (18) I believe letting students listen to controversial speakers can only confuse and mislead them.
- \_\_\_\_ (19) I would rather cooperate with others than compete with them.
- \_\_\_\_ (20) I try to perform all the tasks assigned to me conscientiously.
- \_\_\_\_ (21) I often feel tense and jittery.
- \_\_\_\_ (22) I like to be where the action is.
- \_\_\_\_ (23) Poetry has little or no effect on me.
- \_\_\_\_ (24) I tend to be cynical and skeptical of others' intentions.
- \_\_\_\_ (25) I have a clear set of goals and work toward them in an orderly fashion.
- \_\_\_\_ (26) Sometimes I feel completely worthless.
- \_\_\_\_ (27) I usually prefer to do things alone.
- \_\_\_\_ (28) I often try new and foreign foods.
- \_\_\_\_ (29) I believe most people will take advantage of you if you let them.

- \_\_\_ (30) I waste a lot of time before setting down to work.
- \_\_\_ (31) I rarely feel fearful or anxious.
- \_\_\_ (32) I often feel as if I'm bursting with energy.
- \_\_\_ (33) I seldom notice the moods or feelings that different environments produce.
- \_\_\_ (34) Most people I know like me.
- \_\_\_ (35) I work hard to accomplish my goals.
- \_\_\_ (36) I often get angry at the way people treat me.
- \_\_\_ (37) I am a cheerful, high-spirited person.
- \_\_\_ (38) I believe we should look to our religious authorities for decisions on moral issues.
- \_\_\_ (39) Some people think of me as cold and calculating.
- \_\_\_ (40) When I make a commitment, I can always be counted on to follow through.
- \_\_\_ (41) Too often when things go wrong, I get discouraged and feel like giving up.
- \_\_\_ (42) I am not a cheerful optimist.
- \_\_\_ (43) Sometimes when I am reading poetry or looking at a work of art, I feel a chill or a wave of excitement.
- \_\_\_ (44) I'm hardheaded and tough-minded in my attitudes.
- \_\_\_ (45) Sometimes I'm not as dependable or reliable as I should be.
- \_\_\_ (46) I am very seldom sad or depressed.
- \_\_\_ (47) My life is fast-paced.
- \_\_\_ (48) I have little interest in speculating on the nature of the universe or the human condition.
- \_\_\_ (49) I generally try to be thoughtful and considerate.
- \_\_\_ (50) I am a productive person who always gets the job done.
- \_\_\_ (51) I often feel helpless and want someone else to solve my problems for me.
- \_\_\_ (52) I am a very active person.
- \_\_\_ (53) I have a lot of intellectual curiosity.
- \_\_\_ (54) If I don't like people, I let them know it.
- \_\_\_ (55) I never seem to be able to get organized.
- \_\_\_ (56) At times I have been so ashamed I just wanted to hide.
- \_\_\_ (57) I would rather go my own way than be a leader of others.
- \_\_\_ (58) I often enjoy playing with theories or abstract ideas.
- \_\_\_ (59) If necessary, I am willing to manipulate people to get what I want.
- \_\_\_ (60) I strive for excellence in everything I do.

## PITTSBURGH SLEEP QUALITY INDEX (PSQI)

### Instructions:

*The following questions relate to your usual sleep habits during the past month ONLY. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.*

**1. During the past month, when have you usually gone to bed at night?**

USUAL BED TIME \_\_\_\_\_

**2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?**

NUMBER OF MINUTES \_\_\_\_\_

**3. During the past month, when have you usually gotten up in the morning?**

USUAL GETTING UP TIME \_\_\_\_\_

**4. During the past month, how many hours of *actual sleep* did you get at night? (This may be different than the number of hours you spend in bed.)**

HOURS OF SLEEP PER NIGHT \_\_\_\_\_

For each of the remaining questions, check the one best response. Please answer *all* questions.

**5. During the past month, how often have you had trouble sleeping because you.....**

**(a) cannot get to sleep within 30 minutes**

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

**(b) Wake up in the middle of the night or early morning**

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

**(c) Have to get up to use the bathroom.**

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

**(d) Cannot breathe comfortably.**

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

**(e) Cough or snore loudly.**

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

**(f) Feel too cold.**

Not during the past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

**(g) Feel too hot.**

Not during the Past month \_\_\_\_\_ Less than once a week \_\_\_\_\_ Once or twice a week \_\_\_\_\_ Three or more times a week \_\_\_\_\_

**(h) Had bad dreams.**

Not during the \_\_\_\_\_ Less than \_\_\_\_\_ Once or \_\_\_\_\_ Three or more  
 Past month \_\_\_\_\_ once a week \_\_\_\_\_ twice a week \_\_\_\_\_ times a week \_\_\_\_\_

**(i) Have pain.**

Not during the \_\_\_\_\_ Less than \_\_\_\_\_ Once or \_\_\_\_\_ Three or more  
 Past month \_\_\_\_\_ once a week \_\_\_\_\_ twice a week \_\_\_\_\_ times a week \_\_\_\_\_

**(j) Other reason(s), please describe \_\_\_\_\_****How often during the past month have you had trouble sleeping because of this?**

Not during the \_\_\_\_\_ Less than \_\_\_\_\_ Once or \_\_\_\_\_ Three or more  
 Past month \_\_\_\_\_ once a week \_\_\_\_\_ twice a week \_\_\_\_\_ times a week \_\_\_\_\_

**6. During the past month, how would you rate your sleep quality overall?**

Very good \_\_\_\_\_  
 Fairly good \_\_\_\_\_  
 Fairly bad \_\_\_\_\_  
 Very bad \_\_\_\_\_

**7. During the past month, how often have you taken medicine (Prescribed or "over the counter") to help you sleep?**

Not during the \_\_\_\_\_ Less than \_\_\_\_\_ Once or \_\_\_\_\_ Three or more  
 Past month \_\_\_\_\_ once a week \_\_\_\_\_ twice a week \_\_\_\_\_ times a week \_\_\_\_\_

**8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?**

Not during the \_\_\_\_\_ Less than \_\_\_\_\_ Once or \_\_\_\_\_ Three or more  
 Past month \_\_\_\_\_ once a week \_\_\_\_\_ twice a week \_\_\_\_\_ times a week \_\_\_\_\_

**9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?**

No problem at all \_\_\_\_\_  
 Only a very slight problem \_\_\_\_\_  
 Somewhat of a problem \_\_\_\_\_  
 A very big problem \_\_\_\_\_