

UNDERSTANDING QUALITY OF LIFE IN OLDER ADULTS

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I analyzed the 2004 and 2006 Health and Retirement Study data to test structural equation models of the quality of life (QOL) construct. The participants ($N = 1352$) were non-institutionalized individuals aged 42 and older ($M = 65.70$, $SD = 10.88$), with an average education of 12.73 years ($SD = 2.96$) and of varied ethnicities. The results indicated that physical functioning, affective experience, life satisfaction and social support could serve as indicators for a second order QOL factor. Furthermore, the developed QOL model explained 96% of the variance of the CASP-19 (Control, Autonomy, Self-realization and Pleasure), a QOL measure that reflects fulfillment of psychological needs. The results also indicated that Depression and Life Satisfaction are related through reciprocal causation and that Physical Functioning is more likely to cause a change in Depression than the reverse. The results suggest that QOL is a complex, multidimensional concept that should be studied at different levels of analysis.

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TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
LIST OF ILLUSTRATIONS	v
INTRODUCTION	1
What is QOL?	
Distinguishing between Different Aspects of QOL	
Formal Definitions of QOL	
Subjective and Objective Components of QOL	
Modeling Studies of QOL	
Measuring the Multidimensional Concept of QOL	
Control, Autonomy, Self-Realization and Pleasure-CASP-19	
Satisfaction with Life	
Social Functioning	
Affective Experience/Style	
Financial Status	
Physical Functioning	
Cognition	
Spirituality	
Predictors of Quality of Life	
The Relationship between Depression, Physical Functioning and QOL	
Demographic Factor	
Trends in QOL Research	
METHOD	46
Design and Participants	
Measures	
QOL-Physical Functioning Impairment	
QOL-Life Satisfaction	

QOL-Social Support	
Measure of Quality of Life (QOL)-Psychosocial Needs.	
Cognition	
QOL-Financial Strain	
Spirituality	
Demographics	
RESULTS	64
Hypothesis 1 (2004)	
Research Question 1 (2004)	
Hypothesis 2 (2004-2006)	
Hypothesis 3 (2004-2006)	
Research Questions 2 and 3 (2004-2006)	
Research Hypotheses 4 and 5 (2004-2006)	
Correlations	
Direct Paths	
Significant Total and Indirect Effects of the Exogenous Variables on	
Depression 2006	
More on Mediating Effects	
DISCUSSION	74
Limitations and Future Directions	
APPENDIX	110
REFERENCES	128

LIST OF TABLES

Table	Page
1. Missing Data Analysis	86
2. Variables' Means and Standard Deviations	87
3. Estimated Covariance and Correlation Matrix for the Latent Variables Represented in Figure 15	88
4. Estimated Covariance and Correlation Matrix for the Latent Variables Represented in Figure 9	89

LIST OF ILLUSTRATIONS

Figure	Page
1. Predicted second order factorial structure based on the study’s main hypothesis (H1)	63
2. Standardized Results of a Just Identified Confirmatory Factor Analysis of Physical Functioning, 2004	90
3. Standardized Results of a Just Identified Confirmatory Factor Analysis of Physical Functioning, 2006	91
4. Construct Stability of Physical Functioning	92
5. Standardized Results of a Just Identified Confirmatory Factor Analysis of Depression, 2004	93
6. Standardized Results of a Just Identified Confirmatory Factor Analysis of Depression, 2006	94
7. Construct Stability of Depression	95
8. Standardized Results of a Just Identified Confirmatory Factor Analysis of Life Satisfaction, 2004 and 2006	96
9. Construct Stability of Life Satisfaction	97
10. Standardized Results of a Confirmatory Factor Analysis of Social Support, 2004	98
11. Standardized Results of a Confirmatory Factor Analysis of the CASP-19, 2004.....	99
12. Standardized Results of a Just Identified Confirmatory Factor Analysis of cognition, 2004	100

13. Second Order Factor Analysis of QOL	101
14. Second Order Factor Analysis of QOL without Financial Satisfaction as a Factor	102
15. Second Order Factor Analysis of QOL with Cognitive Functioning as a Factor	103
16. The Relationship Between the Developed QOL Model and CASP-19	104
17. Longitudinal Cross-lagged Panel of Depression and Physical Functioning	105
18. Longitudinal Cross-lagged Panel of Depression and Life Satisfaction	106
19. 2004 QOL as a Predictor of 2006 Depression	107
20. 2004 CAS-19 Predicting 2006 Depression	108
21. Predicting CASP-19 and Life Satisfaction, 2004-2006	109

INTRODUCTION

What is Quality of Life?

We live in an aging society with a long life expectancy (CDC, 2003), which makes quality of life (QOL) a central part of healthy aging (Wetle, 1997). In fact, some people believe that it is more important to increase QOL than to increase years of life (Kerschner & Pegues, 1998).

Researchers who want to study QOL face a major challenge, attempting to define QOL (Hickey et al., 2005). This challenge stems from the fact that QOL refers to a very large research area involving a broad set of constructs (Katschnig, 2006) that cover topics such as “life satisfaction, functioning, morbidity, social relationships, work performance and [or] adverse effects of treatment” (Gladis et al., 1999, p. 321). Therefore, researchers engaged in QOL research must take into consideration that QOL is a multidimensional concept, and that the specific domain of QOL under investigation can vary depending on the instrument used to measure it (Katschnig, 2006) and, the target population. Nevertheless, QOL researchers are willing to deal with the challenges of defining this multifarious construct because the QOL debate has “enormous practical implications. How we define well-being [or QOL] influences our practices of government, teaching, therapy, parenting, and preaching, as all such endeavors aim to change humans for the better, and thus require some vision of what ‘the better’ is” (Ryan & Deci, 2001, p. 142).

Currently, there are only a few agreed on aspects of the QOL definition. Overall, researchers agree that the QOL definition should include subjectivity (i.e., the individual’s perspective of QOL), and multidimensionality. Also important is that health

related quality of life (HR-QOL) and QOL, more generally, should be defined separately (Hickey et al., 2005). The subjectivity component is typified by measures of individuals' judgment of their QOL, such as the Satisfaction with Life Scale (Pavot and Diener, 1993). Multidimensionality is a core aspect of the QOL construct and can be seen in instruments such as the World Health QOL (WHOQOL) scale, which measures QOL in terms of four primary dimensions (Physical, Psychological, and Social Functioning, and aspects of the Living Environment), as well as a general rating of overall QOL and health (World Health Organization, 1998). Empirical support for the separation of QOL and HR-QOL comes from a meta-analysis by Smith et al. (1999), who found that HR-QOL and QOL are different constructs in the patient's eyes. It is important to highlight that HR-QOL usually refers to individuals' QOL in response to a medical or psychiatric condition and focuses on health related symptoms. For instance, the participants included in Smith et al.'s (1999) meta-analysis suffered from heart problems, cancer, schizophrenia, diabetes or were HIV positive.

Conceptualization of QOL is further complicated by theoretical and statistical issues. That is, one of the basic assumptions of factor analysis is that latent variables (constructs) "cause" the variation of individual items or indicators as well as the correlations among such indicators (e.g., the latent syndrome of depression causes individuals to feel sad, cry and have disturbances in sleep). These types of items are called effect indicators. However, this assumption is not true for many of the items on various measures of QOL, especially those on health-related quality of life (HR-QOL) scales. Specifically, HR-QOL measures usually contain what Fayer and colleagues (1997) called cause indicators, such as symptoms of disease or treatment side effects,

which are thought to “cause” changes in general (latent) QOL. In other words, a change in general QOL will not necessarily produce a change in various cause indicators (disease-related symptoms), but should, by definition, produce changes in various effect indicators (e.g., heart disease is not necessarily caused by a negative change in general QOL, but a change in QOL is likely to be caused by a change in heart disease). In addition, cause indicators are frequently uncorrelated, unlike the effect indicators in traditional factor analysis. Therefore, when using factor analytic procedures in QOL research, investigators need to identify any cause indicators, which frequently pertain to symptoms or side effects of physical factors such as ulcers and hair loss in patients undergoing chemotherapy (Fayers & Hand, 1997). Thus, researchers should evaluate their measures at the item level before conducting traditional factor analysis with QOL measures. Fayers and Hand (1997) showed that traditional factor analysis cannot be used to model cause indicators, which can only be analyzed by using more advanced latent variable techniques (e.g., structural equation modeling-structural equation modeling) in which factors can be specified as having either or both cause and effect indicators.

The distinction between these two types of indicators can be further understood graphically. Those items identified as effect indicators have arrows pointing from the latent variable to the items (indicators), while those items identified as cause indicators have the arrows pointing from them to the latent variable. Fayers and Hand (1997) also highlighted that even though items in factor analysis are called effect indicators, they do not imply a strict causal relationship between the latent variable and the items. Instead, effect indicators should be viewed more so as manifestations (or indicators) of

(underlying) latent variables. Furthermore, true cause indicators can only be identified through a true experiment or longitudinal design studies (Kazdin, 1998).

The relationship between QOL and items that reflect psychological functioning such as anxiety and depression is less clear. Nevertheless, people with poor QOL are expected to have higher levels of depression and anxiety; therefore, depression and anxiety can be classified as effect indicators of QOL. However, classifying anxiety and depression as effect indicators does not mean that they are strictly caused by (poor) QOL but that they are manifestations of problems in QOL and more complex relationships could be going on between QOL and diverse psychological phenomenon. For example, a reciprocal relationship could exist between negative psychological states and QOL (e.g., low QOL causing anxiety, and increased anxiety causing a drop in QOL). Nevertheless, it is reasonable to continue to regard such items as effect indicators, at least in cross-sectional models. Finally, the discussion of cause and effect indicators also highlights that researchers should not attempt to aggregate items unless they regard all of the items as effect indicators. Similarly, use of a single summary score of QOL assumes that QOL is a unidimensional construct, which is also very unlikely (Fayers & Hand, 1997). Nevertheless, it is often the case that investigators use an overall or general rating of QOL to see how such broad ratings are linked with the individual factors (e.g., Psychological, Physical, Social Functioning) of QOL.

Distinguishing between Different Aspects of QOL

Empirical research has helped to demonstrate that quality of life (QOL) and HR-QOL are different (but related) constructs (Huang et al., 2006; Smith et al., 1999). For instance, Smith et al. (1999) used a meta-analytic approach to examine how self-

reported measures of mental, physical and social functioning predicted (general) QOL and perceived health status (HR-QOL). Their first model suggested that QOL and HR-QOL are related (.72) but separate constructs and that the predictors in the model have differential effects on QOL and HR-QOL. In this model, Mental Health was a stronger predictor of QOL (.47) than of HR-QOL (.31) while Physical Functioning was a stronger predictor of HR-QOL (.41) than of QOL (.28). Social Functioning was a modest predictor of both QOL (.14) and HR-QOL (.11). The predictors in this model also shared adequate correlations to each other (.44-.61).

Smiths et al.'s (1999) second model suggested that only Mental Health (.34) and HR-QOL (.41) were significant predictors of QOL and that Physical Functioning affected QOL through its effect on Mental Health and HR-QOL while Social Functioning affected QOL through its effect on HR-QOL. However, this study had several limitations. Smith et al. (1999) only included a few predictors and the assumption of homogeneity of variance was not met. Moreover, Smith et al.'s meta-analysis was based on 12 chronic disease studies, which relied upon instruments strongly related to HR-QOL (e.g., Rand-36 Short-form, SF-36) thus limiting its generalizability to QOL in general population samples. As such, these results must be interpreted with caution.

Huang and colleagues (2006) also provided support for the distinction between HR-QOL and QOL by analyzing data from the SF-36 and the WHOQOL instruments in a representative sample of the Taiwanese population. They found that the two measures loaded on two distinct factors, which were not strongly related to each other (< .3). Furthermore, the SF-36 (or HR-QOL) factor showed greater discrimination for Health Status and the WHOQOL (or general QOL) factor showed greater discrimination

for Overall QOL. Taken together, both studies highlight the distinction between general QOL and HR-QOL and the importance of measuring these two constructs with this distinction in mind.

Formal Definitions of QOL

Several authors have offered definitions of quality of life (QOL) that capture the current status of the field. Quite some time ago, Lawton (1983, p. 1) offered a comprehensive, accurate, and surprisingly contemporary, but somewhat too general, definition of QOL. He called it the “good life” and stated that it was composed of “behavior competence, psychological well-being, perceived quality of life, and [the] objective environment.” Katschnig (1997, p. 6) was more specific than Lawton, he stated that QOL is “a loosely related body of work on psychological well-being, social and emotional functioning, health status, functional performance, life satisfaction, social support, and standard of living, whereby normative, objective, and subjective indicators of physical, social and emotional functioning are all used.” Erickson and Patrick (1993, p. 22) described QOL as “the value assigned to the duration of life as modified by the impairments, functional states, perceptions and social opportunities that are influenced by disease, injury, treatment or policy.”

Harper and Power (1998) offered a more theoretically oriented definition, which is used by the World Health Organization (WHO). They stated that “Quality of life is the individual's perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns” (Harper & Power, 1998, p. 551). All of these definitions provide researchers with a general understanding of what QOL is; however, they do not explain how the various

factors mentioned within the QOL definition relate to each other to form a blueprint in which the term QOL can be understood and manipulated. Moreover, as the various definitions above illustrate, the field does not have a consensus QOL definition. Thus, it is not surprising that some researchers have avoided trying to define QOL as evidenced by a review conducted by Gill and Feinstein (1994), in which they randomly selected QOL articles and found that only 15% of the reviewed articles defined QOL.

Furthermore, none of articles distinguished between QOL and HR-QOL.

Subjective and Objective Components of QOL

Researchers work hard to define and measure their constructs in order to clearly identify the phenomenon of interest and its characteristics. In quality of life (QOL) research, researchers define objective measures as those scales that contain items that can be measured by someone other than the research participant. Objective measures refer to variables like income, objective features of physical functioning, and number of social relationships. In contrast, researchers define subjective measures as those scales that contain items that refer to cognitive judgments such as satisfaction with different areas of life. These kinds of items can only be answered by the participant (Zissi & Barry, 2006).

The term QOL was first used in medicine as an attempt to look beyond the patients' disease. Medicine focused on HR-QOL, which, as discussed previously, usually relates to the effects of disease and treatment (Ware, 2003) such as somatic symptoms, but ignores how other key factors such as freedom, social support and economic resources affect QOL. Moreover, current research suggests that QOL is more related to a personal sense of happiness and subjective life satisfaction than to

objective problems such as physical functioning. This trend has made self-ratings of QOL essential, which is consistent with Diener et al.'s (1999, p. 277) statement: "People react differently to the same circumstances, and they evaluate conditions based on their unique expectations, values, and previous experiences." Support for the subjective measurement of QOL comes from Power et al. (1999, p. 504), who reported that QOL as measured by the WHOQOL "appears to exist in the subjective perception of the respondents, independent of their situation." This conclusion was based on the finding that the factorial structure of the WHOQOL was relatively invariant across 15 countries with diverse cultural and economic backgrounds.

Well-being is a closely related, and likely integral subjective component of QOL (Ring et al., 2007). As with many other psychological concepts, well-being has several definitions. A well accepted definition is that well-being is formed by eudaimonic and hedonic well-being (Ryan & Deci., 2001). Eudaimonic or psychological well-being refers to the realization of one's true potential and the responsibility of finding meaning in one's existence, even in the face of negative experiences. Psychological well-being is composed of self-acceptance, purpose in life, personal growth, positive relationships with others, environmental mastery and autonomy. In contrast, hedonic or subjective well-being focuses on pleasure, happiness and the satisfaction of human appetites. Notably, the definition of psychological well-being does not contain positive affect; however, positive affect is usually expected as a "byproduct of eudaimonic living" (Ryan and Deci, 2001, p. 151; Ryff, 2004). While this statement has not been validated empirically, it is nonetheless beyond the scope of the current study. However, another research question that still remains and that will be addressed in the current study is the

degree of association between specific factors of the well-being concept, also known as QOL.

Clearly, based on the proposed defining features of QOL, subjectivity is important. Nevertheless, given the multi-faceted nature of the QOL construct, some authors have suggested that much can be gained by examining how objective measures, such as social and material resources, relate to QOL (Katschnig, 2006; Zhan, 1992). However, objective measures of QOL have shown to be poor predictors of QOL. This point was highlighted in a literature review conducted by Hass (1999) who stated that when QOL research started to emerge as a popular topic during the 1960s, QOL was usually measured with objective indicators such as socioeconomic status, education and housing, which accounted for only 15% of the variance in QOL compared to 50% of the variance accounted by subjective indicators such as happiness and life satisfaction (Haas, 1999). Furthermore, there seems to be a weak relationship between objective and subjective indicators. These two factors (the weak relationship between objective indicators and subjective indicators of QOL as well as the small amount of explained variance by objective indicators) seem to indicate that demographic factors and objective indicators are not strong predictors of QOL and that people's perceptions are what matters.

Modeling Studies of QOL

Given the close conceptual correspondence between quality of life (QOL) and the psychological well-being and subjective well-being concepts, several studies have attempted to articulate useful models of the later two concepts. Comptom et al. (1996) explored the relationship between Subjective Well-being and Psychological Well-

being and found that they are separate but related constructs. The authors (Comptom et al., 1996) looked at 18 scales intended to measure subjective well-being, psychological well-being, personality and demographic characteristics. They found four components using principal components analysis. The first component was Subjective Well-being, which accounted for 40% of the summated variances, and the second component was Personal Growth or Psychological Well-being, which accounted for 10% of the summated variance. The third component was formed by age, gender and a tendency to have a Positive Self-view. This third component accounted for 6% of the summated variance. In addition, Self-enhancing tendencies were also part of the first and second component. The fourth and last component was formed by education level and Personality Integration. Personality Integration is thought to be highly related to openness to experience and it refers to a person's ability to "integrate data into a congruent self-system," which includes factors like the cognitive, interpersonal, and affective subsystems (Comptom et al., 1996, p. 408). This last component also accounted for 6% of the summated variance (Comptom et al., 1996). A study conducted by McGregor and Little (1998) also found Psychological Well-being and Subjective Well-being components after analyzing 14 well-being scales. These initial studies suggested the need to use both psychological well-being and subjective well-being to understand the concept of well-being, as well as their association with the broader and more general QOL construct.

Keyes and colleagues (2002) also hypothesized that psychological well-being and subjective well-being are related but distinct constructs. In addition, they hypothesized that these are aspects of QOL that are shaped by demographic factors

and personality characteristics. These authors tested their hypothesis in a large U.S sample and used Life Satisfaction, Positive and Negative Affect as measures of Subjective Well-being. In addition, the authors used Self-acceptance, Positive Relations with Others, Environmental Mastery, Autonomy, Purpose in Life and Personal Growth as measures of Psychological Well-being. Exploratory factor analysis suggested a two-factor solution. An oblique rotation indicated that none of the measures of Subjective Well-being loaded on the Psychological Well-being factor while Self-acceptance and Environmental Mastery loaded on both factors. Therefore, the data suggested that the two factors are correlated and that Self-acceptance and Environmental Mastery are manifestations of both latent factors.

In additional model analyses by these authors, a model that did not allow Self-Acceptance and Environmental Mastery to load on Subjective Well-being (Model 4) showed a correlation of .84 between the Subjective Well-being and Psychological Well-being factors. The model that allowed Self-acceptance and Environmental Mastery to load on both factors (Model 6) showed better fit and a correlation of .70 between the two factors, suggesting some important overlap between Subjective Well-being and Psychological Well-being.

Keyes et al.'s (2002) hypotheses about the relationship between well-being, education and age were not supported by their findings. The bivariate correlations between Well-being and demographic variables ranged from .13 to .00. In regards to their hypotheses about personality characteristics, the authors found that people with low levels of Subjective Well-being and Psychological Well-being tended to have high levels of Neuroticism and low levels of Extraversion and Conscientiousness. The

opposite was true for people with high levels of Subjective Well-being and Psychological Well-being (Keyes et al., 2002).

The results of this study suggest that subjective well-being and psychological well-being are highly related constructs, and that they both likely tap into the psychological functioning component of QOL. However, subjective well-being and psychological well-being differ significantly in terms of theory (e.g., one focuses on the here-and-now while the other is more linked to a general evaluation of one's life over a period of time). Therefore, both factors could perhaps be used to provide a deeper understanding of the QOL construct. Furthermore, additional research based on the Keyes et al.'s (2002) Model 6 factorial structure could be conducted to assess self-acceptance and environmental mastery as key variables for understanding the relationship between subjective well-being and psychological well-being. The relationship between mastery, self-acceptance, psychological well-being and subjective well-being might be a good starting point to study whether or not subjective well-being is a byproduct of psychological well-being.

Low and Molzahn (2007, p. 1) also developed and tested a model of QOL. They selected items from the WHOQOL-Old, which is an extension of the WHOQOL designed for older adults, in order to replicate their finding from an earlier study. They found that "financial resources, health, and meaning in life directly and positively influenced overall QOL," as measured by the question how would you rate your QOL? "Health, emotional support, and the physical environment indirectly affected QOL through purpose in life ... explaining 50.5% of the variance in [overall] QOL." The significance of this study lays in the level of detail of the model, which can assist

researchers in organizing theory and testing specific hypothesis about overall QOL. The results also provide the opportunity to design interventions to potentially produce changes in the subjective perception of overall QOL in older adults. Most importantly, the results of this study are consistent with the previously discussed definitions of QOL to the extent that they highlight specific variable domains which contribute to the prediction of overall QOL, and thus likely represent important components of the QOL construct.

Ring et al. (2007) embarked on an exploration of the QOL construct and its different measures. The authors adopted the idea of measuring QOL using subjective well-being and psychological well-being from Ryff and Singer (2002). They (Ring et al., 2007) also used an individualized measure of QOL, by asking individuals to decide what QOL is (IQOL). The IQOL required participants to report five important areas of their lives by specifying that, when those areas are going well, participants feel happy, but when those areas are not going well, participants start worrying or being unhappy. After the participants specified those areas, the researchers weighted each area based on the participant's answers.

The results of this study supported the Keyes et al.'s (2002) model (Model 6), which suggested that Subjective Well-being and Psychological Well-being are different but overlapping concepts with Environmental Mastery and Self-acceptance loading on both factors. Ring et al. (2007) built on Keyes et al.'s (2002) findings by adding an (individualized) overall measure of QOL, IQOL, and loading Psychological Well-being and Subjective Well-being onto IQOL. Based on the results, Ring et al. (2007) concluded that Subjective Well-being and Psychological Well-being account for 41% of

the variance in IQOL and that Subjective Well-being mediated the relationship between Psychological Well-being and IQOL. However, the generalizability of this study (Ring et al., 2007) is limited by its small sample ($N = 136$) of undergraduate students.

In an attempt to gain a better understanding of Psychological Well-being (based on the review of studies in this thesis, the 'subjective well-being' factor as described by the authors that follow is more properly viewed as psychological well-being. This is due to the fact that the factor is formed by purpose in life, environmental mastery and self acceptance), Feist et al. (1995) compared two structural equation models: Bottom-up and top-down processing models. The bottom-up model implies that reports of objective circumstances like Physical Health, and Daily Hassles, as well as Subjective World Assumptions, and Constructive Thinking are predictors of Psychological Well-being. In contrast, the top-down model implies that people have a tendency to interpret experiences as good or bad and that the mind filters information seeking congruence with held beliefs and attitudes. The data used to test these two models were based on questionnaires, which were given at four different times in one-month intervals to 160 undergraduate students, 80% of which were female. Latent variables defined as antecedents were collected at Time 1 while latent variables hypothesized to be caused by the antecedents were measures at Time 2. The models were replicated with data collected at Times 3 and 4.

The results of the study indicated that both models had an equally good fit. Therefore, Feist et al. (1995) concluded that the modeling results suggested bidirectional causal paths between the bottom-up and to-down models. A weakness of this study is that objective circumstances were measured through self-reports, which

are subjective after all. Nevertheless, the value of this study is in the authors' insightful hypothesis about the effect of cognitive processing on Psychological Well-being as well as the use of longitudinal latent variable modeling.

In addition to individual investigators, those working with the World Health Organization (WHO) have also provided a number of well-developed QOL models based on the WHOQOL, a multidimensional measure of QOL with sound theoretical background. The WHOQOL has been cross-culturally validated (Skevington et al., 2004), and its factorial structure is invariant across cultures (Power et al., 1999) and across people suffering from pulmonary disease, hypertension, peptic ulcers, sinusitis and liver disease (Yao & Wu, 2005). Lee et al. (2005) analyzed several QOL models using this measure.

The first basic model looked at the relationships between four QOL factors (Physical Health, Psychological Health, Social Relationships and the Environment) that represent a broad QOL construct as measured by the WHOQOL. The results revealed that the factors shared adequate to strong correlations (.44-.82). Their second model looked at the 'causal' relationships between four (exogenous) first-order latent QOL factors (Physical Health, Psychological Health, Social Relationships and the Environment) and a (endogenous) second order latent factor that reflected an overall judgment of QOL. The causal paths between the first order factors and the second order factor were in the weak to moderate range (.13-.46), with the Environment factor having the weakest predictive effect on (overall ratings of) QOL (.13), followed by the Social Relationships (.21), Psychological Health (.23) and Physical Health (.46) factors. Nevertheless, the factors explained the majority of the variance in the overall QOL

variable/factor (.92). Notably, another study also concluded that the WHOQOL model explained most of the variance in the overall QOL factor (51%-75%, Power et al., 1999).

In their third and final model, Lee et al. (2005) included an item about overall health and treated it as another indicator of the second order QOL factor. Lee et al.'s (2005) third model showed a slight change in the predicted effects between the first order factors the second order factor, indicating that only the Physical (.68) and Psychological factors (.27) had strong and direct causal paths to the newly formed second order factor, while Social Relationships and the Environment factors only had indirect effects on QOL.

In general, Lee et al.'s (2005) second and third models are consistent with current thinking on the nature of QOL, and the practical implications of the models are similar—i.e., the Physical and Psychological factors appear to be more closely related to (overall) QOL ratings, compared to the Social Relationships and the Environment factors. At the same time, the significance of this study is that Physical health, Psychological Health, Social Relationships and aspects of the Environment all work together to represent the broader construct of QOL, consistent with the other studies discussed previously.

Summary

The focus of the current thesis proposal is to study QOL in older adults. This was deemed important because of the fast growing pace of this population and because the role changes that come with aging create the need of focusing on specific predictors of QOL in order to help individuals find a new fulfilling place in society. Nevertheless, two of the models reviewed were developed with undergraduates (Ring et al., 2007; Feist et

al., 1995) and only the Keyes et al.'s (2002) study reported the effect of age on the model variables. Noteworthy was that Keyes et al. (2002) reported age was only slightly related to Subjective Well-being (.13) and Psychological Well-being (.20).

Taken together, it seems reasonable to propose that additional research is necessary to establish whether or not age influences the nature of the QOL construct. The Keyes et al.'s (2002) results suggest that QOL might be a comprehensive construct that remains constant throughout a person's life. This hypothesis is partially supported by Power et al. (1999) and Yao and Wu (2005), who indicated that QOL as measured by the WHOQOL was invariant across cultures and across people suffering from a variety of health problems. Finally, Keyes and colleagues (2002) also found no relationship between race, psychological well-being and subjective well-being, though the other reviewed modeling articles failed to take ethnicity into account.

Overall, the reviewed modeling research suggests that QOL is likely to be formed by Psychological Well-being, Subjective Well-being, Perceived Financial Resources, Physical and Psychological Functioning, as well as features of the Living Environment (e.g., transposition, leisure activities, housing). These models also suggest that Subjective well-being and Psychological well-being are separate but highly related constructs that contribute to the subjective aspects of the QOL construct. In addition, Subjective Well-being seems to mediate the relationship between Psychological Well-being and QOL and Psychological and Physical functioning seemed to be more closely related to QOL than Social Support and the Environment.

The goal of the next section is to review specific measures that can be used to assess QOL. The measures described below are intended to be more specific to the

purpose of the current study, compared to the ones reviewed previously. In addition, a discussion of the longitudinal relations between different aspects of QOL will be provided below. In this way, the results of the current study may be able to demonstrate how change in particular QOL-related factors are likely to produce change in overall QOL.

Measuring the Multidimensional Concept of QOL

Control, Autonomy, Self-Realization and Pleasure-CASP-19

The CASP-19 is a theoretically based measure of quality of life (QOL) developed for older adults and it is based on the assumption that humans have universal needs such as food, shelter, autonomy and self-realization as proposed by Maslow, Doyal and Gough (Higgs et al., 2003). According to Higgs et al. (2003, p. 243), the CASP-19 measures QOL “as the degree that human needs are satisfied” and those needs can be classified in four domains: Control, autonomy, self-realization and pleasure. The development of this measure was based in part on the assumption that the QOL construct remains under-theorized and ill-defined (Hyde et al., 2003; Higgs et al., 2003), particularly for those in early-older adulthood.

Control is defined as “the ability to actively intervene in one’s own environment” and autonomy is defined as being “free from unwanted interference from others” (Higgs et al., 2003, p. 244). The authors (Higgs et al., 2003) also stated that individuals need to use their sense of autonomy and control to pursue self-realization through enjoyable activities. Thus, the CASP-19 is congruent with the well-being literature, which focuses on self-realization (psychological well-being) and happiness (subjective well-being). Based on Ryff (2004), it can be suggested that the CASP-19’s self-realization is

consistent with eudaimonic well-being (psychological well-being) or the realization of one's true potential as well as the responsibility of finding meaning in one's existence. It can also be proposed that the CASP-19's "pleasure" scale refers to hedonic well-being (subjective well-being) or the focus on pleasure, happiness and the satisfaction of human appetites (Ryff, 2004).

Unlike most QOL scales, the CASP-19 intends to measure QOL without equating it to cause indicators like physical symptoms (Grewal et al., 2006; Hyde et al., 2003). However, its ability to relate to other QOL measures remains somewhat unexplored. Nevertheless, available research indicates that the CASP-19 is positively related with Social Support and negatively related with perceived Economic Hardship, Depression and Physical Impairment (Netuveli et al., 2006; Wiggins et al., 2006)

Satisfaction with Life

Indicators of life satisfaction have been used to measure hedonic or subjective well-being (Ryff, 2004; Diener, 1984). Life satisfaction is defined as a "conscious cognitive judgment of one's life in which the criteria for judgment are up to the person" (Pavot and Diener., 1993, p. 164). Life satisfaction is commonly measured with the Satisfaction with Life Scale, developed by Diener, Emmons, Larsen, and Griffin (1985), which is a narrowly focused 5-item measure which asks about a person's happiness with his or her own life (Diener et al., 1985).

According to Diener et al. (1998a), life satisfaction is believed to arise from feelings of mastery (or control and autonomy in CASP-19 terminology) of one's own life and self-realization (also named self-realization in the CASP-19). Individuals' satisfaction with life is further accomplished by engaging in pleasurable activities

(pleasure in the CASP-19). Given Pavot and Diener's (1993) definition of life satisfaction and given that the CASP-19 measures QOL as the degree in which needs are met in regards to four domains (control, autonomy, pleasure and self-realization), life satisfaction can be hypothesized to be an overall judgment of QOL which is based on experiences tied to the four CASP-19 domains. It can also be suggested that subjective well-being is closely related to or perhaps is a byproduct of psychological well-being (Diener et al., 1998b, Ryan and Deci, 2001; Ryff, 2004), and which is partially formed by mastery and autonomy (Ryan and Deci, 2001). Furthermore, if Diener's hypothesis is true, and life satisfaction arises from feelings of mastery of one's life and self-realization and it is indeed accomplished through one's personality, positive social interactions and by engaging in pleasurable activities, then life satisfaction should be highly related to control, autonomy, self-realization and pleasure as defined by the CASP-19 as well as being highly related to measures of social support and some aspects of personality such as openness to experience and neuroticism (Charles et al., 2001; Ketes et al., 2002; Mroczek et al., 1998; Griffin, Mroczek & Spiro, 2006).

Social Functioning

Social support is another important construct in a multidimensional conceptualization of *quality of life* (QOL). In fact, some researchers believe that relationships are basic human needs, which are essential for well-being (Baumeister & Leary, 1995; Deci & Ryan, 2001). The definition of social support varies from study to study, however, researchers agree that social support should be studied using both objective and subjective measures. Objective measures of social support seek to identify the structure of social ties and include factors like size, frequency of contact

and length of the relationships. On the other hand, subjective measures of social support explore the individual's judgments about relationships such as perceived quality of the relationships (McNally et al., 1999; Pearson, 1986). Research shows that both quantitative and qualitative measures of social support are related to adjustment. However, qualitative or subjective measures of social support seem to offer greater protection against psychological distress than simple counts of social support (Wilcox, 1981) and measures of subjective social support have been found to be more closely related to health and well-being than objective measures (McNally et al., 1999). Social support, especially perceived social support, seems to be an important predictor of QOL because of its links with depression (Demura et al., 2003, Newsom et al., 1996), life satisfaction (Aquino et al., 1996) physical and psychological health (Berkman, 1995; Bosworth et al., 2000; Pearson, 1986) as well as physical functioning (Stuck et al., 1999). In addition to the main effect social support has on well-being, social support seems to have a buffering effect. In other words, social support decreases the negative effect that stress and psychological symptomatology has on well-being (Cohen et al., 1985).

The current study used several items related to relationship quality and frequency of contact. These questions have good psychometric properties (reviewed in the methods section) but they are not part of a specific measure.

Affective Experience/Style

Affect is another construct that has been linked to the quality of life (QOL) construct. It refers to the "experience of feeling or emotion" (APA, 2006, p. 26) and can be tied to the hedonic or subjective well-being (subjective well-being) construct,

which is divided into positive affect, negative affect and life satisfaction (Ryff, 2004). Physiological and behavioral focused research suggest that positive and negative affect should be studied separately because they do not seem to be two sides of the same coin but rather two separate processes (Cacioppo & Berntson, 1999). In fact, personal experiences of positive and negative affect seem to be independent and not negatively related to each other (Diener & Emmons, 1985). Without deemphasizing the importance of positive affect, it should be highlighted that the study of negative affect is especially important in older adults because major depression affects 4.4% of women and 2.7% of men aged 60 to 100 (Steffens et al., 2000) and Depression in older adults is associated with worst health outcomes and poor recovery from several medical conditions (Mossey et al., 1990; Penninx et al., 2001) as well as higher health care cost and higher use of medical services (Unützer et al., 1997). Affect seems to be an undisputable part of the QOL definition because it is a key concept in subjective well-being and it is likely to permeate judgments of subjective well-being and psychological well-being as well as have a direct impact on behavior. The current study used an abbreviated form of the CESD, which measures Depression by looking at increased negative affect and decreased positive affect. A measure of positive affect is not included, however, the pleasure domain on the CASP-19 partially account for positive affect by measuring enjoyment and happiness.

Financial Status

The concept of financial status is also linked to *quality of life (QOL)*. As with most concepts, financial status can be measured objectively by looking at total assets or subjectively by looking at a person's judgment of the adequacy of their

economic circumstances. However, subjective indicators seem to be more closely related to QOL than objective indicators as evidenced by Netiveli et al. (2006), who found that subjective indicators of Financial Status are 3 times stronger predictors of QOL than objective indicators.

In general, older adults and professionals agree that financial security is an essential part of QOL (Richard et al., 2005). Furthermore, a psycho-social perspective of social inequality and psychological stress holds that stress is unevenly distributed in society and that such stress causes mental and physical illness (Elstad, 1998). One piece of evidence for the psychosocial perspective of social inequality is that people with high socio-economic status can expect to live longer and with fewer disabilities than people from lower socio-economic backgrounds (Melzer, 2000). This suggests that financial status is likely to have a significant impact in the way people evaluate the quality of their lives. In addition, Financial Status appears to be positively related to QOL (Low et al., 2007) and Life Satisfaction (Wiggins et al., 2004) and negatively related to Depression (Perling et al., 1981). The current study will measure financial status with three questions about perceived financial circumstances. These questions do not form part of a scale. Nevertheless, the questions have high inter-item reliability and face validity (Method section).

Physical Functioning

Another aspect of quality of life (QOL) is physical functioning. It refers to a person's capacity to move and accomplish activities needed to live independently. Evaluating physical functioning in older adults is imperative because decreased physical functioning is related to a higher likelihood of moving into a nursing home (Freedman et

al., 1994; Greene et al., 1990; Speare et al., 1991), being admitted to a hospital (Harris et al., 1989; Spector et al., 1987), having poor Mental Health (Bowling et al., 1997) and an increased mortality rate (Gurlanik et al., 1991; Harris et al., 1989; Spector et al., 1987). Physical Functioning decline is also related to Cognitive Impairment, Depression, comorbidity, high or low weight, low Social Support, and smoking (Stuck et al., 1999).

When studying general aspects of QOL, measuring physical functioning might be better than measuring specific illnesses because physical functioning has a greater impact on QOL than the mere presence of physical illness (Blane et al., 2004; Netuveli et al., 2006). Furthermore, health seems to be related to subjective well-being only when it is measured subjectively (Okun & George, 1984; Watten et al., 1997; Wilson, 1967). As discussed above, there are also important distinctions between QOL in general and HR-QOL specifically. The HR-QOL construct focuses on the symptoms of medical conditions while QOL in general is a comprehensive concept that appears to be formed by a person's evaluation of important life aspects like subjective well-being and psychological well-being. Based on these distinctions, physical functioning in general seems to be more related to QOL than to HR-QOL; general physical features such as mobility and strength are likely to affect most aspects of life and general physical functioning limitations in older adults might or might not be related to disease.

Cognition

Lawton and colleagues (1982) proposed that data on cognition should be collected as part of a multilevel assessment of the good life (QOL) in older adults. During a study, they (Lawton et al., 1982) measured cognition using the MMSE and cognitive symptoms like memory problems, disorientation, and confusion as part of the

Philadelphia Geriatric Center Multilevel Assessment Inventory (MAI). The authors reported that the Cognitive domain had good internal consistence as well as test retest reliability but they failed to provide data supporting the use of cognitive assessment as it relates to the good life (Heywood et al., 2005). Furthermore, a latter study conducted by Lawton and colleagues (2001) found that Cognition and quality of life (QOL) are not significantly related.

Seymour et al. (2008) conducted an interesting study with a sample of 96 healthy octogenarians from Scotland who completed an IQ test when they were 11 years old and whose cognitive abilities were tested again in 2003 and 2004 using Raven's Matrices, Digit substitution, Use of Common Objects and the MMSE. The authors found a non-significant correlation between current Cognitive Functioning and QOL. They also found that Cognitive Functioning at 2003 did not predict 2004 QOL (SEIQoL-DW). Bain et al. (2003) analyzed data from the same sample, however his final sample size ($N = 88$) was lower than Seymour's sample. Bain et al. (2003) conducted the study in order to analyze the relationship between childhood IQ and QOL as defined by each individual (SEIQoL). The researchers also measure current Cognitive Functioning using Raven's Progressive Matrices and the MMSE. They found that the relationships between the Raven's Progressive Matrices and SEIQoL was not significant, the same was true for the relationship between the MMSE and the SEIQoL. However, the SEIQoL shared a significant relationship with IQ at age 11 ($r = .37$).

Banarjee et al. (2009) reviewed a series of articles about health related QOL in people with dementia and found that the association between level of Cognitive Impairment and dementia is usually low and non-significant; however, this lack of

relationship between QOL and cognition does not seem to be true for all populations, which is evident in Savilla et al' (2008) study. They looked at the effect of Cognition, Positive and Negative Symptoms on the QOL of 57 outpatients diagnosed with schizophrenia. Cognition was measured with the Brief Assessment of Cognition in Schizophrenia, which looks at Verbal Memory, Working Memory, Motor Functioning, Attention and Speed of Information Processing, and Executive Functioning. The researchers found that there was a significant relationship between QOL and Cognitive Functioning (0.44, $p < 0.01$). In sum, several very different studies suggest an association between cognition and QOL, though it might be a relatively moderate one.

Spirituality

As with quality of life (QOL), spirituality lacks one well-accepted definition; nonetheless, scientists seem to define spirituality as a personal search of the sacred, however this might be defined by the spiritual person. Furthermore, being spiritual does not imply religiosity, which has been defined as an “organized system of beliefs, practices, rituals, and symbols designed to facilitate a relationship to and understanding of a deity as well as to promote understanding and harmony of a person’s relationship to oneself and others” (p. 32, Larson, Swyers, & McCullough, 1997 and Thoresen, 1998 as cited in Rippentrop et al., 2006). Spirituality and religiosity are two different but highly related constructs. Scientific research is likely to benefit from using both constructs and from a clear distinction between the concepts of spirituality and religiosity (Rippentrop et al., 2006).

Spirituality and religiosity seem to be important components of QOL and data support the inclusion of this domain in particular when measuring QOL in people with

physical illnesses such as cancer or heart problems. Whitford et al. (2008), Brady et al. (1999) and Rippentrop et al. (2006) found similar results when studying the correlation between QOL and Spirituality in cancer patients. Whitford et al. (2008) found that Spirituality was significantly correlated to other areas of Well-being: Physical (.24), Social/Family (.43), Emotional (.46) and Functional (.55). Moreover, using hierarchical regression and 1-item as dependent variable (I am content with my QOL right now), Whitford and colleagues (2008) found that adding Spirituality to Physical, Social and Emotional Well-being increased the variance accounted for from 37% to 49%. Similarly, Brady et al. (1999) found that Spirituality (.48) is as associated to a general QOL questions (I'm content with the quality of my life) as well as other firmly established domains of QOL: Physical Well-being (.47), Emotional Well-being (.47), Social Well-being (.34). In addition, Spirituality was correlated to a summated QOL score (.58) from a measure that looks at "physical, functional, social and emotional aspects of well-being" (p. 420). Spirituality was also a significant predictor (Cohen's $d = .5$) of "contentment with QOL" (p. 422) when added as the last step of a logistic regression that included Physical, Emotional, and Social Well-being. The authors also found that people who scored high on Spirituality were more likely to enjoy life than people with a low level of Spirituality regardless of physical symptom. Finally, Rippentrop et al. (2006) found a correlation of .72 between Spirituality and QOL (Physical, Functional, Social and Emotional Well-being) and a correlation of .38 between Religiosity and QOL. A study with a sample of people diagnosed with chronic obstructive pulmonary disease also found that Spirituality is inversely correlated with Stress (-.30) and directly correlated with HR-QOL (.29, Delgado, 2007).

Further evidence of the relationship between QOL and spirituality was provided by the WHOWOL spirituality, religion and personal beliefs (SRPB) group that collected data from 5,087 people in 18 different countries. The sample had a mean age of 41.3 ($SD = 15.3$) and a varied distribution of health status: “A total of 45.1% reported that they were unwell, with a broad distribution of illness, including heart problems (14.8%), high blood pressure (13%), arthritis (8.6%), depression (9.4%), cancer (6.6%) and HIV-AIDS (4%)” (p. 1490). The WHOWOL- SRPB group found that Spirituality was correlated to all the QOL domains: Physical (.16), Psychological (.46), Independence (.17), Social support (.37), and Environment (.35). In addition, a stepwise multiple regression with general QOL as the dependent variable indicated that all the domains contributed to QOL and explained 65% of its variance. However, when data from people who reported low levels of health was analyzed, 4 domains explained 51% of the variance: Psychological (std beta .45), Environmental (std beta .22), Physical (std beta .11), and SRPB (std beta .11). The results suggest that spirituality assumes greater importance when people are ill. Thus, assessment of this domain might not be necessary when studying QOL in the general population. Similarly, “Older people reported greater faith, inner peace, inner strength, wholeness and integration and spiritual connection” (WHOWOL-SRPB, 2006, p. 1494) than younger people, suggesting that spirituality might be an important component of QOL in this population, in individuals who are after all more likely suffer from illness and who are dealing more closely with issues related to death and dying (Dalby, 2006).

Summary

Overall, researchers need to look at key areas of QOL and analyze how those areas are associated to help clarify how they might impact the lives of older adults. Decades of research on Psychological and Subjective Well-being highlight the importance of factors such as Autonomy, Mastery, Self-realization, Pleasure, Social Support, Affective Experience, Spirituality, Financial Stability and Physical Functioning. The reviewed research indicates that perceptions of Social Support, Economic Circumstances, Spirituality, Affect, Happiness, Self-mastery, Control and Life Satisfaction work together to represent an overall judgment of QOL. However, this multidimensional model of QOL needs further validation, particularly in older adults, to help better understand how these various factors contribute to global or overall QOL. Partial support for the existence of an overall QOL factor, formed by the associations of the lower-order QOL domains, is provided by Lee et al.'s (2005) second model.

Predictors of Quality of Life

It is important to highlight that a great deal of the `quality of life (QOL)` research that will be reviewed in this section has two major shortcomings. The first one is that some researchers have simply relied upon a single summary score of QOL, which assumes that QOL is a unidimensional construct (Fayers & Hand, 1997). The second one is circular logic, by which researchers use some aspects of QOL to predict other aspects of QOL, and thus do not consider the possibility of bidirectional effects among the factors that are thought to comprise the multidimensional QOL construct. These two major shortcomings can be addressed by using structural equation modeling because this statistical technique allows simultaneous specification of multiple factors

and also allows researcher to analyze more complex relationships between latent variables across time.

Several studies using the CASP-19 will be reviewed because these results could aid in clarifying the nature of the QOL construct. The CASP-19 was developed in Great Britain (Higgs et al., 2003) and it has been used in the English Longitudinal Study of Aging (Netuveli et al., 2006) and the Health and Retirement Study (Clark et al., 2007), each designed to collect epidemiological data in Europe and U.S., respectively.

Wiggins et al. (2004) used the CASP-19 as an outcome variable (e.g., single aggregate score) and included demographics, House-hold hazards (e.g., living in a polluted area), Health, Financial Status, Pension Adequacy, Neighborhood Satisfaction, Social Networks (quality, frequency, density) and Stressful Major Life Events as independent variables. Results of a stepwise multiple regression indicated that QOL was increased by the density ($\beta = .28$) and quality ($\beta = .13$) of Social Networks and that it was reduced by Recent Life Events ($\beta = -.026$), perceived poor Pension Adequacy ($\beta = -.21$), not owning the place where you reside ($\beta = -.16$), being older than 70 ($\beta = -.16$) and by perceiving your neighborhood as deprived ($\beta = -.16$). The resulting model accounted for 40% of the variance in CASP-19 QOL. Another interesting finding was that Frequency of Contact with family and friends was negatively related with perceived Quality of the Relationships and with social network density. One of the limitations of this study is that the authors failed to include affect in the regression. As is well known, absence of key variables in a regression equation can result in biased regression results.

Netuveli et al. (2006) also used the CASP-19 as an outcome measure and found that Demographics, Socioeconomic variables, Social Relationships, as well as Physical and Mental Health accounted for about .47% of its variance. Depression ($\beta = -.26$) was negatively related to CASP-19 QOL and it had the highest negative impact on QOL in a multiple regression analysis. In contrast, having Economic Resources ($\beta = .034-.15$), living in a good neighborhood ($\beta = .10$), and having trusting Relationships ($\beta = .07-.10$) were all found to improve QOL. Also, the relationship between QOL and perceived Financial Situation ($\beta = .15$) was much stronger than the relationship between the CASP-19 and objective measures of Financial Status ($\beta = .034-.06$). Physical Illness was also found to decrease QOL ($\beta = -.11$) and QOL was reduced four times more by physical illness with physical impairment than by physical illness without physical impairment. This finding was supported by Blane et al. (2004), who concluded that physical health problems needed to be serious, cause impairment in functioning or require medical attention in order to significantly decrease QOL.

Asakawa et al. (2000) conducted a 2-year longitudinal study with a Japanese sample in order to test the relationship between Physical Functioning and QOL. They used Life Satisfaction, Depression and Social Networks as indicators of QOL and level of Physical Functioning at follow-up as grouping variable. Based on the results, Assakawa and colleagues (2000) concluded that decreased Physical Functioning was accompanied by a decrease in Social Contact and Life Satisfaction and an increased on Depression. Noteworthy, this study is consistent with the many others that highlight that depression has a significant impact on QOL.

Chan et al. (2006) conducted a study in Hong Kong with a sample of community dwelling elderly. They measured QOL with the brief version of the Hong Kong Chinese World Health Organization Quality of Life Scale (WHOQOLS). Their findings indicated that better Physical Functioning was positively related to the total QOL score (.46-.47). However, these results may be upwardly biased because there seemed to be significant item overlap between the physical functioning measures and the Physical Health domain of the WHOQOLS. The authors also concluded that overall QOL is negatively related to Depression (-.50) and number of Physical Illness (-.23). Regression analysis indicated that Physical Health, Depression and IADLs accounted for 51.3% of the variance of (WHO)QOL.

A positive relationship between financial situation and QOL has also been supported by several studies. Low et al. (2007, p. 141) stated that “financial resources, health, and meaning in life directly and positively influenced QOL.” Using stepwise multiple regression, Wiggins et al. (2004) found that Perceived Pension Inadequacy had a negative impact in Life Satisfaction ($\beta = -.21$) and using path analysis, Perling et al. (1981) found that changes in Economic Strain were related to higher levels of Depression as well as a decline in Self-esteem and Mastery. This change in Self-esteem and Mastery also had a negative impact on Depression.

In a study conducted in Hong Kong, Cheng et al. (2002) found that Subjective Economic condition predicted Somatic Complaints ($\beta = .317$, $R^2 = 0.132$), Physical Functioning ($\beta = .288$, $R^2 = 0.091$), Self-rated Health ($\beta = .274$, $R^2 = 0.098$), and Mental Health Status ($\beta = .319$, $R^2 = 0.141$) after controlling for demographic variables. In addition, Blane et al. (2004) found that QOL in older adults was positively related to

current Economic Status and negatively related to Limiting long-standing Illness. They (Blane et al., 2004) also concluded that past Socio-economic characteristics did not have a direct effect on QOL.

Nevertheless, additional research indicates that wealth per se has a trivial effect on Life Satisfaction even when extremely wealthy individuals are studied (Diener et al., 1999) and that wealth is not related to Subjective Well-being when compared within countries. However, people in rich countries report being happier than people in poor countries. This finding is not likely to be a function of wealth but an indication of people's ability to meet their basic needs (Diener & Biswas-Diener, 2002). Furthermore, people who strongly desire wealth are less happy than those people who do not (Diener & Biswas-Diener, 2002, Ryan et al., 1999).

Overall, research does not indicate a lack of relationship between QOL and financial status, but rather suggests that subjective well-being is not the path through which financial status affects QOL. Instead, socio-economic status has been shown to have an effect on health status (Adler et al., 1994; Anderson & Armstead, 1995) and subjective measures of Socio Economic status (SES, $\beta = -.11 - .24$) have been shown to be a better predictor of health status than objective measures of SES ($\beta = -.06$, Singh-Manoux, Marmot, & Adler, 2005).

Social Relationships are also an important feature of components of QOL, and therefore used in prediction models. A Japanese study found that community dwelling elders that have more friends have lower levels of Depression (males $R_p = .21-.23$; females $R_p = .73$; these correlations are positive because higher scores on the depression measure indicate lower levels of depression, Demura et al., 2003). In

addition, Social Support has been found to be an important factor in maintaining good Physical and Psychological health (Pearson, 1986). In a small study conducted in England, older adults considered that social support was as important as health in determining QOL as defined by the participants (Farquhar, 1995). Research conducted in the same country concluded that increased contact with friends and family decreased perceived QOL while positive Social Support ($\beta = .13$) and Network Density ($\beta = .28$) increased QOL, as measured by the CASP-19, after controlling for age and economic characteristics (Wiggins et al., 2004). The results suggest that the nature and quality of the social network is more important than the amount of contact. Also, Chan et al. (2006) found that the Density of the social networks (-.07) has a weaker relationship with the overall QOL items in the WHOQOL than Satisfaction with those Relationships (.34).

Other studies also highlight that social support is a significant predictor of components of QOL. These studies indicate that low levels of Social Support are associated with decreased Life Satisfaction (.57, Aquino et al., 1996) and increased Depression (Newsom et al., 1996) and that Social Support is positively related to HR-QOL (Berkman, 1995; Bosworth et al., 2000). In addition, Physical Functioning tends to decline when older adults have low levels of Social Support (Stuck et al., 1999). Nonetheless, a study by Smith et al. (1999) found that Social Functioning has a small direct effect on QOL (.09) after taking Mental Health, Physical Health and Physical Functioning into account.

A study conducted by Stenzelius et al. (2005), found that communication (80.9%), mobility (66.6%) and psychosocial problems (61%) were the three top concerns for older adults in Sweden. The authors also found that women had more

physical complaints, illnesses, mobility and psychological difficulties than men. In general, women reported lower Physical HR-QOL and individuals requiring help with activities of daily living reported lower HR-QOL as measured by the SF-12 Health Survey. After demographic characteristics were taken into account, mobility problems were the strongest predictor for low Physical HR-QOL and psychological problems were the strongest predictor for low Mental HR-QOL. The finding that males have higher Physical Functioning than females is supported by several studies (Wray et al., 2001; Wood et al., 2005; Stenzelius et al., 2005).

Summary

The articles reviewed in this section seem to be in line with the reviewed research on QOL models. Research supports that general QOL is affected by Depression, Social Support, economic circumstances and physical illness. However, the studies reviewed above also highlight that Depression and Physical Functioning in particular may represent critical areas that are linked with overall QOL, and as such, will be reviewed below with this focus in mind.

The Relationship between Depression, Physical Functioning and QOL

Depression affects 4.4% of women and 2.7% of men aged 60 to 100 (Steffens et al., 2000). In older adults, depression is associated with worst health outcomes and poor recovery from several medical conditions (Mossey et al., 1990; Penninx et al., 2001) as well as higher use of medical services (Unützer et al., 1997). However, little is known about the causal path between depression and overall quality of life (QOL). At times, depression and QOL have been conceptualized as a bipolar phenomenon in which QOL represents the positive side of well-being and depression

represents the negative side of well-being. They have also been viewed as QOL causing a change in depression and as depression causing a change in QOL and other models have looked at depression as a manifestation of QOL (Moore et al., 2005).

Furthermore, classifying depression as an effect indicator of QOL does not mean that (poor) QOL necessarily always causes symptoms of depression. Instead, more complex relationships between these two broad variables may occur, such as QOL causing depression, and depression causing QOL—i.e., a case of reciprocal causation or a feedback loop could be going on (Fayers & Hand, 1997). Thus, the potential for a causal relationship between depression and QOL remains an open area of research.

A small study ($N = 20$) found that people suffering from mood and anxiety disorders have lower Psychological Well-being as defined by Ryff's Psychological Well-being Scale (Rafanelli et al., 2000). Also, Hart et al. (2005) found that changes in the BDI scores predicted post-treatment scores for Ryff's (1989) Psychological Well-being Scale; treating depression increased Environmental Mastery or the ability to shape one's environment ($R^2 = .13$, $p < .001$), Positive Relations with Others ($R^2 = .08$, $p < .001$), Purpose in Life ($R^2 = .16$, $p < .001$), and Self-acceptance ($R^2 = .26$, $p < .001$). However, changes in the BDI did not predicted post-treatment scores on the Autonomy ($p = .34$) and Personal Growth scales ($p = .11$).

In contrast, Rafanelli et al. (2000) found that treating depression increased all aspect of Well-being as defined by Ryff's Psychological Well-being Scale (1989) and that the Environmental Mastery and Self-acceptance factors showed the greatest increase after psychotherapeutic treatment of residual symptoms of depression.

Likewise, a study by Badger (2001) found that older adults living in the community that

suffered from severe depression had lower levels of Mastery, lower Health Perceptions and lower Life Satisfaction than participants with mild depression. However, there were no significant differences between the groups on Social Support and Physical Functioning. Finally, providing some evidence for a bidirectional effect, Thunedborg, Black and Bech (1995) found that several measures of QOL predict the recurrence of depression.

In addition to finding that treating depression has a positive impact on four of the six aspects of psychological well-being proposed by Ryff (1989), Hart et al. (2005) found that treating Depression in patients with multiple sclerosis (MS) has a positive impact on HR-QOL after controlling for MS symptoms and baseline QOL. QOL was measured with the MSQOL-54, a version of the SF-36 (HR-QOL), but specific to this patient group. Also, changes in the Beck Depression Inventory (BDI) significantly predicted post-treatment HR-QOL as measured by the MSQOL-54 ($R^2 = 0.19-.55$, $p < .001$) after controlling for baseline HR-QOL and MS symptoms. In addition, Oslin et al. (2000) found that improvements in Depression were accompanied by improvements in Instrumental Activities of Daily Living (IADLs) and Herrman et al. (2002) found that depressed individuals in six different countries had worst Health, lower Functional Status, higher use of health services and lower QOL as measured by the WHOQOL-Brief.

Looking at the relationship between depression and HR-QOL as measured by the SF-36, Doraiswamy et al. (2002) found that depressed individuals had lower HR-QOL on five of the eight domains of the SF-36 and Schonfeld et al. (1997) found that depressed individuals had lower HR-QOL in all the domains. That is, depressed

individuals had lower General Health Perception, higher levels of depression and anxiety symptoms, more difficulties with work and other daily activities due to emotional difficulties, more interference with social activities due to emotional or physical difficulties, lower energy levels (Doraiswamy et al., 2002; Schonfeld et al., 1997), lower physical functioning and higher levels of limitations caused by bodily pain (Schonfeld et al., 1997). However, Depression accounted for less than 10% of the variance on the SF-36 (Doraiswamy et al., 2002). This latter study is somewhat inconsistent with previous studies that have found Depression is strongly negatively correlated to QOL (Chan et al., 2006; Netuveli et al., 2006), that Economic Strain is related to higher levels of Depression (Perling et al., 1981) and that low levels of Social Support are associated with increased Depression (Newsom et al., 1996). In sum, the reviews studies suggest a complex relationship between depression and QOL.

The same complexity is apparent for the relationship between depression and physical functioning. Consequently, more research needs to be done to explore the apparent reciprocal relationship between depression and physical functioning (Kennedy et al., 2005), which ultimately, will have implications for how these components of QOL affect individuals' overall sense of QOL. For instance, some studies have suggested various causal paths for the depression-physical functioning relationship. Kennedy et al. (1990) and Asakawa et al. (2000) found that increasing disability and declining health preceded the emergence of depressive symptoms as well as a decline in Social Support and Life Satisfaction (Asakawa et al., 2000). On the other hand, Callahan (2005), Coulehan et al. (1997), and Oslin et al. (2000) concluded that Physical Functioning tends to increase after depression is treated. Cronin-Stubbs et al. (2000) found that

even mild depressive symptoms are associated with an increased likelihood of losing Physical Functioning and a decreased likelihood of recovering from illness. In addition, Stuck et al. (1999) concluded that Depression is one of the strongest risk factors for Physical Functioning decline and Ormel et al. (1994) found that Depression accounts for a decrease in Physical Functioning above and beyond the negative effects of having a medical illness. Wada and colleagues (2005) found that Depression was related to lower Physical Functioning and lower QOL as measured by a subjective sense of health, relationships with family and friends, financial status, and subjective happiness. Hays et al. (1995) reported that patients diagnosed with depression showed less increase in Physical Functioning than patients treated for a general medical condition after a two-year period. Taking a bidirectional perspective, Lenze et al. (2001) stated that not only Depression is a risk factor for a decline in Physical Functioning but that a decline in Physical Functioning is a risk factor for Depression.

Summary

Overall, research findings suggest that depression and physical functioning are related through reciprocal processes and that both of these constructs are linked to general QOL and HR-QOL. It is also worth noting that the identification of reciprocal causation depends on use of longitudinal methodology, which was lacking in some of the studies reviewed above, making longitudinal studies essential to clarify the casual paths between depression, physical functioning and QOL. Therefore, further exploration of the longitudinal relations between depression, physical functioning and other components of QOL will be an important focus of the current proposal.

Within the QOL research, demographic characteristics seem to be minimally related to QOL (Keyes et al., 2002), but at the same time, demographics are closely related to physical functioning and depression, which appear to be important components of the QOL construct. In this sense, the relationship between QOL and demographic characteristics seem to be largely ignored by researchers. This literature will be reviewed in the next section.

Demographic Factors

A study by Boswroth and colleagues (2000) reported that increased age was related to a decrease on basic Physical Functioning, better Mental Health, and more Vitality. They also reported that females had lower HR-QOL scores as measured by the SF-36 than males and that ethnic minorities had lower HR-QOL scores than Caucasians. In addition, Boswroth et al. (2000) concluded that those individuals with less than 12 years of education had lower levels of Physical Functioning and General Health as well as higher levels of Bodily Pain and more problems with Daily Activities as a result of emotional problems. Furthermore, poor Social Support was related to lower HR-QOL and people with more than 12 years of education had higher levels of social support and higher HR-QOL (Boswroth et al., 2000). The relationship between education and *quality of life* (QOL) does not seem to be constrained to HR-QOL, given that a small but significant relationship has also been found between education and Subjective Well-being (Diener et al., 1999).

A study by Guralnik and colleagues (1993) found that 65-year-old African American males have lower life expectancy and lower amount of years without disability than 65-year-old Caucasian males. This study also supported that females tend to

outlive males and that life expectancy for Caucasians and African Americans females is about the same. However, for adults aged 75 and older, African Americans have a higher life expectancy and more years without disability than Caucasians. They also found that education has a greater impact in longevity and years lived without disability than does race and gender, with people with 12 or more years of education having an average of 2.4-3.9 more years of life without disability than people with less than 12 years of education. The relationship between education and QOL was supported by Keyes et al. (2002), who found that Psychological and Subjective Well-being increased with age and education.

In regards to age, Netuveli et al. (2006) concluded that QOL as measured by the CASP-19 improved for people aged 50 to 65 and that it started declining only for people beyond the age of 85. Using HR-QOL, Rustoen et al. (2005) found that older adults aged 60 to 81 reported higher QOL compared to middle aged adults aged 40 to 59. In contrast, Wiggins et al. (2004) found that QOL, as measured by the CASP-19, decreased with age. However, Wiggins's sample ($N = 286$) was much smaller than Netuveli's ($N = 9,300$). Both studies also found discrepant results about the relationship between QOL and gender. Netuveli et al. (2006) found that QOL was significantly higher for women than men while Wiggins et al. (2004) found no gender differences. In addition, Netuveli et al. (2006) found that domestic labor and increased contact with children and family decreased QOL for females while living alone and having economic resources increased it. For males, QOL decreased after retirement. However, these two studies should be interpreted with caution because they are based on cross-sectional research.

In another cross-sectional study, Mroczek et al. (1998) found that Positive Affect shows a slight increase with age (.10) while Negative Affect shows a slight decrease with age (-.11). Inverse relationship between age and negative affect was also reported by Gross et al. (1997). Barrick et al. (1989) reported that there were no differences in positive reactions between undergraduate students and older adults but that older adults had slightly less intense negative emotions. In contrast, other studies did not find an association between age and Negative Affect (Malatesta & Kalnok, 1984) after controlling for demographic factors, Personality, Health and Cognitive Functioning (Isaacowitz & Smith, 2003).

The relationship between age and affect has also been analyzed in longitudinal research. Charles, Reynolds, and Gatz (2001) followed participants for 23 years and found that Negative Affect decreased with age while Positive Affect remained stable and decreased slightly for people aged 55 and over. However, a 10-year longitudinal study with healthy male veterans found that both Positive (-.11) and Negative Affect decreased with age (-.13, Griffin, Mroczek & Spiro, 2006).

Seymore et al. (2008) conducted an interesting study with a sample of 96 octogenarians (57 men and 37 women) from Scotland who completed an IQ test when they were 11-years-old. They used the SEIQoL-DW, a quality of life measure that looks at individualized and weighted QOL scores as the dependent variable and other measures of QOL as predictors. The results of this study indicated that for men, the SEIQoL-DW score decreased significantly in a year (from 83.8 to 71.5). This same trend was not observed for women (from 77.7 to 74.6). Only 3 out of the 19 cross-sectional bivariate correlations completed in the study were significant. Those correlations were

between QOL and the SF-36 Mental Composite Summary .38 ($p < 0.001$), SF-36 Physical Composite summary .23 ($p = 0.027$) and Depression -.29 ($p = 0.005$). Non-significant correlations between QOL and the other variables included Cognitive Functioning, Anxiety, Activities of Daily Living and objective physical activity measurements. Most notably, the only significant 1-year longitudinal predictor of SEIQoL-DW was the Physical Component Summary of the SF-36.

In general, cross-sectional and longitudinal research about the relationship between age and affect has yield mixed results. However, research findings seem to indicate that age has a small effect on affect and that negative affect declines slightly with age. Findings about the relationship between positive affect and age are less clear (Griffin, Mroczek & Spiro, 2006).

Of all demographic characteristics, marriage is the one that seems to consistently increase subjective well-being (Diener et al., 1998b; Glenn, 1975; Mroczek et al., 1998; Wood, Rhodes, & Whelan, 1989). Nevertheless, demographic characteristics, in general, do not seem to affect subjective well-being to a large extent, accounting for only 8-20% of the variance in subjective well-being (Diener et al., 1999). Research also supports that women report slightly higher levels of Happiness and Life Satisfaction than men (Wood, Rhodes, & Whelan, 1989) as well as greater levels of Depression (Nolen-Hoeksema, 1987), which may only indicate that women experience greater emotionality and that they are more reactive to life events (Wood, Rhodes, & Whelan, 1989). In addition, gender differences in Subjective Well-being seem to disappear when other demographic variables are controlled (Diener et al., 1999).

Summary

Research has documented that there are small but significant relationships between physical functioning, gender, socioeconomic status, health, ethnicity and years of education. Findings also seem to support that negative affect decreases with age, that marriage increases subjective well-being and that females have higher positive and negative emotionality than males. Nevertheless, most research has ignored the effect of ethnicity on the broader construct of QOL. This is evident in that modeling studies of QOL do not look at the results separately by ethnicity. However, Power et al. (1999) stated that QOL seems to be invariant across cultures. As such, it is reasonable to expect that there are likely small but significant effects of demographic characteristics on QOL in general, though not big enough to include in modeling research on QOL.

Trends in QOL Research

“The next steps in the evolution of the field are to comprehend the interaction of psychological factors with life circumstances in producing subjective well-being [and QOL], to understand the causal pathways leading to happiness, understand the processes underlying adaptation to events, and develop theories that explain why certain variables differentially influence the different components of subjective well-being [life satisfaction, pleasant affect, and unpleasant affect]” (Diener et al., 1999, p. 276) as well as other aspects of *quality of life* (QOL). This statement is congruent with Fayers and Hand (1997), who suggested that the causal relationships between the components of QOL should be studied with sophisticated methods such as longitudinal path analysis and structural equation modeling in order to gain a deeper understanding of how the concept of QOL is represented by the associations of factors

like social support, financial circumstances, affect and physical functioning. It also seems important to test models with large and varied samples in order to test whether QOL models are similar across older and younger adults as well as for people of diverse ethnic backgrounds because these findings could have enormous practical implications.

Using advanced quantitative methods to study the complex relationship between QOL related factors could also be an effective way of summarizing research findings. Following this trend and in an effort to gain a deeper understanding of QOL, this study examined the relationships between several constructs that have been used to study QOL, which have the potential to work together to inform a multidimensional and empirically based QOL definition. Specifically, this study focused on QOL as defined by the fulfillment of human needs (CASP-19: Control, self-realization, pleasure and autonomy), life satisfaction, physical functioning, cognition, depression, social support and financial situation. The goal is to propose and validate a mathematical model describing the relationships between these constructs in older adults and how they work together to form the broader concept of QOL. Having an empirical understanding of QOL will facilitate the development of sound theories and increase the likelihood of developing effective interventions to increase QOL in older adults.

METHOD

Design and Participants

The present study involves secondary analysis of Health and Retirement Study (HRS) data, a database developed for “researchers, policy analysts, and program planners who are making major policy decisions that affect retirement, health insurance, saving, and economic well-being” (Willis, 2005, p. 1). The primary respondents of the Health and Retirement Study were randomly selected using stratified sampling in order to represent the U.S population. Minorities and people from the state of Florida were oversampled. Individuals living in the selected households that met the age requirement (>50) were enrolled as well as their spouses or partners regardless of their age (HRS, 2007).

The preferred method of data collection was telephone interviews; however, face-to-face interviews were given when participants had an illness that would make the phone interview difficult or when there was not a telephone in the participants’ household. Face-to-face interviews were also preferred when participants were answering their first set of questionnaires or when participants were 80-years-old or older (HRS, 2007).

The depression, physical functioning impairment and cognition items that were used in the current study are part of the Health and Retirement Study core measures, which were given to all the participants every two years. All other measures (or items) used in this study came from the psychosocial questionnaires. In 2004, two versions of psychosocial questionnaire were given to a random sample of about 3000 non-institutionalized participants who completed a face-to-face interview. However, only

68.3% of those participants mailed the questionnaires back. In 2006, a revised psychosocial questionnaire was given to half of the Health and Retirement Study sample. The other half of the sample received the questionnaire in 2008 (G. Fisher, personal communication, June 23, 2007); 74% of the participants mailed the questionnaire back in 2006 (Clark et al., 2007). Although, people under the age of 75 were targeted, a few people older than 75 were given the questionnaire by mistake (Health and Retirement Study, 2006). In addition, only data from the primary respondents and not their spouses was used in the current study to avoid non-independent, correlated data.

Data from a sample of 1352 non-institutionalized individuals aged 42 and older were analyzed in this study. Nonetheless, the number of cases with listwise data varied per statistical analysis. Missing data analysis was conducted in order to identify the nature of data loss. First, I conducted a t-test comparing people with complete data on all the variables to people with missing data for each of the 32 study's variables or composites. Cohen's *d* was also used to analyze significant differences. As shown on Table 1, the results of both tests indicated that people with higher scores (thus, higher impairment) on the Strength and Movement 2004, Negative Mood 2004, Negative Mood 2006, and Somatic 2006 composites tended to have more missing data points. Similarly, people with lower scores on the CASP-Autonomy 2004 composite (thus, lower levels of autonomy) tended to have more missing data points than people with higher scores on this composite. Nonetheless, the mean differences between people with complete data and people with missing data points were small, and likely the result of a large sample size. Thus, despite the differences in these 5 variables, there were no

differences in the majority of the variables used in the current study and it is reasonable to suggest that the data were missing at random. This statement is also supported by the lack of differences in the modeling results (see below) between the listwise models and the imputed models, which was true for all the cases except once. Furthermore, most people seemed to be missing a small amount of variables and none of the models used all the variables making 468 the smallest listwise sample size.

When appropriate, statistical analyses were conducted using both listwise and imputed data. We used maximum likelihood analysis to impute data, which is the most used imputation method in structural equation modeling (SEM) and it is an appropriate choice for this study because this technique was designed to be used with missing at random normal data (Muthen, 2002). Maximum likelihood works by estimating all the parameters at once and it imputes data by maximizing the likelihood of imputing data that represents the observed sample (Kline, 2004). When analyzing slightly skewed or kurtotic data, robust analyses were used. As it turned out, the results obtained from listwise, robust and imputed analyses were generally equivalent.

While reading this manuscript, please keep in mind that all the data were recorded to indicate higher levels of the variables as scores increase. For example, someone with high levels depression had a higher score on that variable than someone with low levels of depression. Similarly, someone with high levels of life satisfaction had higher scores on that variable than someone with low levels of life satisfaction.

The structural equation models used to test the hypothesis were conducted using the statistical program Mplus and the results were explained in terms of standardized loadings, direct effects, indirect effects, mediation effects and total effects. Loadings or

effect indicators “represent the presumed casual effect of the factor on the observed indicator.” Direct effects indicate the magnitude of the effect of one variable over another when there are no mediating/moderating variables. “Direct effects are also called paths, and statistical estimates of direct effects are path coefficients. Path coefficients are interpreted as regression coefficients in multiple regression, which means that they control for correlations among multiple presumed causes of the same variable” (Kline, 2004, p. 68). “Indirect effects involve one or more intervening variables presumed to ‘transmit’ some of the causal effects of prior variables onto subsequent variables” (Kline, 2004, p. 68). For example, take the hypothetical relationship between X, Y and Z. X has a direct effect on Y ($X \Rightarrow Y$); X has a direct effect on Z ($X \Rightarrow Z$); Y has a direct effect on Z ($Y \Rightarrow Z$). By definition X does not only has a direct effect Z, it also has an indirect effect on Z through Y. In the current study, the term mediation is only used when “the strongest demonstration for a mediation effect” is presents. That is when “statistically significant indirect effects but no direct effects” exist between two variables. For example, all the possible bivariate correlations between X, Y and Z are significant; however, when X, Y and Z are analyzed at the same time X has a direct effect on Y ($X \Rightarrow Y$); Y has a direct effect on Z ($Y \Rightarrow Z$) but X does not have a direct effect on Z. Then, it can be concluded that Y is mediating the effect between X and Z. Finally, “total effects are (defined as) the sum of all direct effects and indirect effects of one variable over another” (Kline, 2004, p. 129-130).

Measures

QOL-Physical Functioning Impairment

General physical functioning (Strength and Movement), Activities of Daily Living (ADLs) and Instrumental Activities of daily living (IADLs) were used as measures of Physical Functioning. The items intended to measure general physical functioning, such as strength and movement, consist of modified questions from Rosow and Breslau (1966) and Nagi (1969, 1976). These items inquire about the ability to carry weight, ascend and descend stairs, walk, stoop, bend, or kneel, reach, and use hands and fingers. Activities of daily living (ADLs) is a widely used measure of physical functioning, it has been used in clinical settings for diagnostic purposes, in epidemiologic research as risk factors for disability, and in policy research as tools for assessing people's needs for health services (Fonda et al., 2004). The ADL measure that was used in this study is a modified version of a scale developed by Katz and associates (1963) to understand the course of decline in basic functioning. It covers topics like bathing, dressing, going to the toilet, transferring in and out of chairs, continence, and feeding. The IADLs scale that was used in this study is also a modified version of a scale developed by Lawton and Brody (1969) and it evaluates tasks that require more complex cognitive abilities such as using the phone, shopping, preparing food, cleaning the house, doing laundry, using transportation, taking medications, and handling finances (Fonda et al., 2004).

SPSS 15 was used to conduct the initial data analysis, which included the reliability analysis for the 2004 and 2006 data. The first reliability analysis was conducted for the 2004 sample. It consisted of 7-items related to general physical functioning and ADLs ($\alpha = .69$, mean inter-item correlation = $.27$). Afterwards, the

reliability analysis was conducted for the four strength and movement items (alpha = .77, mean inter-item correlation = .46) and the three ADLs items (alpha = .71, mean inter-item correlation = .45) separately. Reliability analysis was also conducted for four IADL items (alpha = .63, mean inter-item correlation = .31). Based on these results, the Strength and Movement (S&M), the ADLs and IADLs composites were formed ($r = .38-.45$; S&M skewness = .96, S&M kurtosis = 4.39; ADLs skewness = 2.34, ADLs kurtosis = 4.66, IADLs skewness = 3.15, IADLs kurtosis = 10.70). See Appendix A.

Analyses for the 2006 data were conducted for the same questions analyzed in 2004. Thus, it was conducted for seven items related to general physical functioning and ADLs (alpha = .69, mean inter-item correlation = .24), the four Strength and Movement items (alpha = .78, mean inter-item correlation = .48), the three ADLs items (alpha = .65, mean inter-item correlation = .38), and four IADLs items (alpha = .67, mean inter-item correlation = .35). Based on these results, the Strength and Movement, ADLs and IADLs composites were formed ($r = .38-.60$; S&M skewness = .81, S&M kurtosis = -.76; ADLs skewness = 7.87, ADLs kurtosis = 2.58; IADLs skewness = 2.89, IADLs kurtosis = 8.78).

The Strength and Movement, ADLs and IADLs composites were loaded into a Physical Functioning factor with data from 2004 and 2006 separately. Mplus indicated the following loadings for the 2004 data: Strength and Movement (.61), ADLs (.60) and IADLs (.67). See Figure 2. The 2006 loadings were as follow: Strength and Movement (.55), ADLs (.71) and IADLs (.77), See Figure 3. Similar results were obtained from the listwise and robust analysis ($N_{04} = 727$, $N_{06} = 681$) as well as the analysis using maximum likelihood estimation ($N_{04} = 1352$, $N_{06} = 1255$).

Further analyses of the Health and Retirement Study data suggested that the latent construct of Physical Functioning Impairment has high stability within a two year period as shown by the structural path between Physical Functioning Impairment 2004 and Physical Functioning Impairment 2006 (.80) and by the amount of variance of the Physical Functioning Impairment factor 2006 ($r^2 = .63$) explained by Physical Functioning 2004. See Figure 4.

QOL-Depression

Depression was measured with an abbreviated form of the widely used Center for Epidemiologic Studies Depression scale (CESD) with *yes* and *no* as possible answers. The original CESD has 20-items, while the abbreviated measure used in this study has 8-items. The abbreviated 8-item measure (Appendix B) is based in the CESD-10, a 10-item version developed to be used in the Established Populations for Epidemiologic Study of the Elderly (EPESE, Steffick, 2000). It is also worth mentioning that the CESD-10 is a reliable measure but that it has problems regarding missing data-points because individuals who do not answer some of the questions are likely to be women, have lower self reported health, lower functional status and more symptoms of depression (Kimberlin et al., 1998).

Some authors argue that the 20-item CESD has four factors: Depressed Affect, Positive Affect, Somatic Complaints, and Interpersonal Problems (Kohout et al., 1993) and that the 8-item CESD only reproduced two of the original factors in an older adult population (Turvey et al., 1999). The two factors reproduced by the 8-item CESD are Depressed Affect and Somatic Complaints. However, there is evidence that both the short and long version of the CESD have a single higher order factor (Carpenter et al.,

1998). A study conducted in Hong Kong by Cheng and colleagues (2006) compared the one, two (Positive and Negative Affect) and three factor solution for the short version of the CESD and found that the three factor solution was the best fitting model with all the factors tapping in an underlying construct, Depression. The authors indicated that Positive Affect had a loading of 0.51, Negative Affect had a loading of 0.88 and the Somatic factor had a loading of 0.92 on the higher order factor.

Analysis of the Health and Retirement Study data supports that the 8-item CESD has good Cronbach's alpha (.78-.83, Steffick, 2000,) and Turvey and colleagues (1999) stated that it has good construct validity. Further analysis for the current study's 2004 data (alpha = .80, mean inter-item correlation = .35) suggested a one factor solution. For the purpose of this study, items were grouped into three composites ($r = .41-.55$). Those composites are: Reverse coded positive affect or Not Happy (alpha = .71, mean inter-item correlation = .57, skewness = 2.29, kurtosis = 3.94), Negative Affect (alpha = .73, mean inter-item correlation = .47, skewness = 1.5, kurtosis = .94) and Somatic complaints (alpha = .59, mean inter-item correlation = .33, skewness = 1, kurtosis = -.17). The decision to form three composites was based on the mentioned research supporting the model with three first order factors and a second order factor as well as for practical reasons.

Analysis of the 2006 CESD data (alpha = .81, mean inter-item correlation = .34) also suggested a one factor solution. As with the 2004 CESD, items were grouped into three composites ($r = .40-.57$). That is reverse coded positive affect or Not Happy (alpha = .70, mean inter-item correlation = .55, skewness = 2.33, kurtosis = 4.16) Negative Affect (alpha = .75, mean inter-item correlation = .50, skewness = 1.7, kurtosis

= 1.53) and Somatic complaints (alpha = .59, mean inter-item correlation = .33, skewness = 1.11, kurtosis = .12).

Factor analyses of the 2004 data revealed the following loadings on the Depression factor: Negative Mood (.83), Not Happy (.67) and Somatic (.61). Another CFA was conducted using only the Negative Mood and Not Happy composites in order to avoid using somatic complaints as a measure of depression given that older adults are likely to have somatic complaints unrelated to depression. The results of the confirmatory factor analysis (CFA) with equally constrained loadings (to create a just identified model), were as follow: Negative Mood (.71), Not Happy (.78). See Figure 5.

CFA of the 2006 data revealed the following loadings for the three composites: Negative Mood (.89), Not Happy (.68) and Somatic (.59). The loadings for the model with two composites were Negative Mood (.74), and Not Happy (.82). See Figure 6.

Analyses of data indicated that Depression was highly stable within a two-year period when measured with three or two composites as suggested by the structural path between 2004 and 2006 depression (.58-.62). This is also supported by the amount of the 2006 Depression variance ($r^2 = .34-.63$) explained by 2004 Depression. See Figure 7.

QOL-Life Satisfaction

Life satisfaction was measured using the 5-item Satisfaction with Life Scale (SWLS) developed by Diener, Emmons, Larsen and Griffin (1985). The SWLS is a 7-point Likert-type scale and it was developed with undergraduate students (Cronback's alpha = .87, item-total-correlations = .57-.75). It has good test re-test reliability after 2-months (.82). All items load into one factor (.61 - .84), which explains 66% of the total

variance. The scale was also validated with a small sample of older adults ($N = 53$); the SWLS mean score for this sample was 25.8 compared with 23.5 for undergraduate students. The scale showed high item-total-correlations (.61 - .81) with these populations (Diener et al., 1985). In subsequent studies, the scale demonstrated good internal reliability (.80-.89) when used with several populations including older adults (.85) and good test-retest reliability at two weeks (.83), one month (.84), two months (.82-83), ten weeks (.50) and 4 years (.54). In addition, Vitaliano et al. (1991) reported that life changes were related to changes in life satisfaction scores while other measures such as anxiety and depression remain relatively unchanged.

Studies suggest that the SWLS has good convergent and divergent validity with several measures (Pavot & Diener, 1993). It is highly correlated (.81) with the Life Satisfaction Index- form A (LSIA), which looks at responsibility, self-realization and meaning in life (Wallace et al., 2002) and it has an adequate correlation with the Philadelphia Geriatric Morale Scale (.61), a measure that focuses on anxiety, attitude toward aging and perceived satisfaction with the amount of social interaction received (Lawton, 1975). Also, the SWLS filled out by participants had an adequate correlation with a SWLS (.54) and a LSI-A (.51) filled out by the participants' peers (Pavot et al., 1991).

Analysis of the Satisfaction with Life Scale (SWLS, Appendix C) for this study's sample data, 2004, indicated that the SWLS is a unidimensional scale (Cronbach's $\alpha = .89$, mean inter-item correlation = .63). Two composites were formed by randomly distributing the items. The composites were highly correlated and normally distributed ($r = .84$; skewness₁ = -.80, kurtosis₁ = -.02; skewness₂ = -1, kurtosis₂ =

.54); CFA indicated the following equally constrained loadings for the 2004 data: Composite 1 (.91), Composite 2 (.92). See Figure 8.

The SWLS questionnaires given in 2006 differed from those given in 2004 in that the 2006 questions were asked in a 6-point-likert type scale and the 2004 questions were asked in a 7-point-likert type scale. Reliability analysis of 2006 data indicated that the SWLS is a unidimensional measure (Cronbach's alpha = .89, mean inter-item correlation = .62). Similarly, two composites were formed by randomly distributing the items. The composites were highly correlated and normally distributed ($r = .82$; skewness₁ = -.55, kurtosis₁ = -.57; skewness₂ = -.83, kurtosis₂ = -.07). CFA indicated the following equally constrained loadings for the 2006 data: Composite 1 (.91), composite 2 (.90). See figure 8.

Life Satisfaction also seemed to have high stability within a two year period as suggested by the structural path between 2004 and 2006 Life Satisfaction (.68) and by the amount of the 2006 Life Satisfaction variance ($r^2 = .46$) explained by 2004 Life Satisfaction. See Figure 9.

QOL-Social Support

Social support was measured with questions related to the quality of relationships (5 points Likert-type scale) and quantity of social support (6 point Likert-type scale) also referred as social network density. The questions about the quality of relationships within the Health and Retirement Study archival data set do not seem to come from any previously developed scale but they have adequate internal consistency within the Health and Retirement Study sample (.61-.80, Health and Retirement Study, personal communication, June 26, 2007). Social networks were measured as frequency

of social contact and perceived closeness of social relationships. The idea of measuring social networks as the frequency of social contact and perceived closeness of social relationships appeared to come from the Lubben's Social Network Scale (Lubben, 1988). However, the items on frequency of social contact had low internal consistency (.52-.61, Health and Retirement Study, personal communication, June 26, 2007). The questions about the quality of social support and social network density have also been used in the Midlife in the United States Study (MIDUS I, 2004) and the English Longitudinal Study of Aging (ELSA, Wave 2 documentation).

Three separate reliability analyses were conducted. The first analysis looked at 24 quality of relationship items, 12 of those items were selected based on inter-items correlations (Cronbach's alpha = .82, mean inter-item correlation = .28). The second analysis looked at 8 frequency of contact items, 5-items were selected (Cronbach's alpha = 0.71, mean inter-item correlation = .33). The final reliability analysis was conducted with 6-items about network size; however, the results indicated that the items were not related to one another. Thus, network size was not included in the current study. SPSS was used to conduct exploratory factor analysis with all the selected items (Appendix D). The analysis yielded 5 factors, which explained 52.52% of the shared variance. The first factor was Family Positive Social Support (Cronbach's alpha = .87, mean inter-item correlation = .69, skewness = -.68, kurtosis = -.45), the second factor was Children's Positive Social Support (Cronbach's alpha = .81, mean inter-item correlation = .60, skewness = -1.15, kurtosis = .80), the third factor was Negative Social Support (Cronbach's alpha = .71, mean inter-item correlation = .38, skewness = -.68, kurtosis = -.10), the fourth factor was Frequency of Contact (Cronbach's alpha = .71,

mean inter-item correlation = .33, skewness = -.64, kurtosis = .33), and the final factor was Friends' Positive Social Support (Cronbach's alpha = .74, mean inter-item correlation = .59, skewness = -.62, kurtosis = .32). Five composites were formed based on these analyses.

All five composites were tested via CFA in Mplus. However, the results indicated less than desirable fitness of the data. EFA suggested that Negative Social Support did not load on the second order Social Support factor. Thus, another CFA was conducted using all of the social support composites except for negative social support. The results indicated that the model had excellent fit (CFI = 1, TLI = .99, RMSEA = .025) and the following loading: Family positive social support (.68), Children's positive social support (.62), Frequency of contact (.46) and Friends' Positive Social Support (.58). See Figure 10.

Measure of Quality of Life (QOL)-Psychosocial Needs.

The CASP-19 was used to measure quality of life (QOL). It is a four-point Likert-type scale developed to measure quality of life in older adults and it is formed by four first order factors: Control, Autonomy, Self-realization, and Pleasure. The researchers that developed the measure reported that each of the factors has acceptable internal consistency (.59-.77) and most important, good factor loadings on the second order factor (.71-.88) when used with older adults. The Control domain is formed by 5-items (.59), the Self-realization domain is formed by 4-items (0.77), the Pleasure domain is formed by 4-items (.74) and the Autonomy domain is formed by 5-items (0.69). The correlations between the domains ranged from .35 to .67 (Hyde et al., 2003).

The CASP-19 also shares an adequate correlation with the Life Satisfaction Index-Well-being (LSI-W; $r = .63, p = .01$, Hyde et al., 2003), which is one of the most used measures of well-being (Wallace et al., 2002) and seems to have factors that overlap in terms of both psychological and subjective well-being. The LSI-W was selected to test construct validity because it looks at acceptance and commitment with life, which makes it conceptually related to the CASP-19 (Hyde et al., 2003). In addition, Blane et al. (2004) found that they could replicate their findings by replacing the CASP-19 with the LSI-W. They also noted that the CASP-19 was more sensitive to health status and life course characteristics than the LSI-W.

As mentioned before, SPSS was used to conduct the initial data analysis. Analysis of the 2004 data indicated that the Control composite has 4-items (Cronbach's $\alpha = .65$, mean inter-item correlation = $.31$), the Pleasure factor has 5-items (Cronbach's $\alpha = .81$, mean inter-item correlation = $.47$) and the Self-Realization factor has 5-items (Cronbach's $\alpha = .83$, mean inter-item correlation = $.50$). Originally, the Autonomy factor was conceptualized as having 5-items (Cronbach's $\alpha = .61$, mean inter-item correlation = $.25$) as suggested by the developers of the measure (Hyde et al., 2003). However, reliability analysis was repeated after removing the item that had lowest inter-item correlation ($.23$). The second reliability analysis indicated that another item needed to be removed because it had a low squared multiple correlation after taking into account the other three items ($.10$) and because it overlapped significantly with the financial satisfaction items reviewed latter in the Method section. The remaining 3-items were selected to form the Autonomy composite (Cronbach's $\alpha = .62$, mean inter-item correlation = $.38$). See Appendix E.

Composites were formed for all factors. The composites shared adequate correlations (.47 – .69) and were normally distributed (skewness = -.58– -1.75, kurtosis = -.12– 3.3). Mplus was used to conduct confirmatory factor Analysis (CFA). The model was confirmed after entering the composites (CFI = .94, TLI = .83, RMSEA = .23). The loadings were as followed: Control (.72), Autonomy (.73), Pleasure (.74) and Self-realization (.88, Figure 11)

Cognition

Cognition was measured with three composites as suggested by the data managers of the Health and Retirement Study project (Ofstedal et al., 2005). The first composite, Total Recall, summarized the number of correct immediate and delayed recalled words. This variable ranged from 0 to 20 with a mean of 10.13 ($SD = 3.18$, skewness = -.06, kurtosis = -.13) correct words. The second composite, Serial 7s, summarized the correct number of responses in which the participant subtracted 7 from 100, and then continued subtracting by 7 for a total of 5 trials. The score for Serial 7s ranged from 0 to 5 with a mean of 3.88 ($SD = 1.42$, skewness = -1.18, kurtosis = .35) correct subtractions. The third composite was named MMSE and it was formed by correct identification of the date, by being able to name a common plant after listening to its description and by correctly identifying the current president and vice-president of the U.S. The MMSE variable ranged from 2 to 7 with a mean of 6.50 ($SD = .83$, skewness = -2.05, kurtosis = 5.05; Appendix F). CFA conducted using Mplus indicated the following loadings: Total recall (.57), Serial 7s (.45), and MMSE (.69). See Figure 12.

QOL-Financial Strain

The measure of financial strain is formed by three questions that inquire about a person's perceived financial situation. The questions (Cronbach's alpha = .85, mean inter-item correlation = .65) are asked in a 5-point Likert-type scale and they are normally distributed (skewness₁ = -.20, kurtosis₁ = -.44; skewness₂ = -.61, kurtosis₂ = -.12; skewness₃ = .35, kurtosis₃ = -.90). One of the questions came from Pearlin, Menaghan, Liberman and Muller's (1981), another question came from House (1995) and the last question came from the CASP-19. See Appendix G.

Spirituality

I intended to model spirituality as a dimension of quality of life (QOL); however, data on spirituality was not available within the Health and Retirement Study.

Demographics

Four questions about demographic characteristics were taken into account. Those were age ($M = 65.70$, $SD = 10.88$), education ($M = 12.73$, $SD = 2.96$), ethnicity (Caucasian = 1041, African American = 155, Hispanic = 123, other = 33) and gender (Men = 520, Women = 832).

Hypotheses

Hypothesis 1 (2004)

Perceived financial status, social support, physical functioning, depression, life satisfaction and CASP-19 (psychosocial needs) represent a multidimensional model of quality of life (QOL). A supplemental analysis will be conducted to test whether cognition is another core dimension of QOL.

Research Question 1 (2004)

This research question was developed from the results of the first hypothesis:
How much of the CASP-19 variance is explained by the QOL factor developed to answer the first hypothesis?

Hypothesis 2 (2004-2006)

Depression and physical functioning are related through reciprocal causation.

Hypothesis 3 (2004-2006)

Depression and life satisfaction are related through reciprocal causation.

Research Question 2 (2004-2006)

Is the developed QOL model a good predictor of depression two years later?

Research Question 3 (2004-2006)

Is the CASP-19 a good predictor of depression two years later?

Hypothesis 4 (2004-2006)

Perceived financial status, social support, physical functioning and depression are significant predictors of the CASP-19.

Hypothesis 5 (2004-2006)

The CASP-19 significantly predicts life satisfaction.

Research Question 4 (2004)

Do the developed models of QOL vary with age, gender, ethnicity and education?

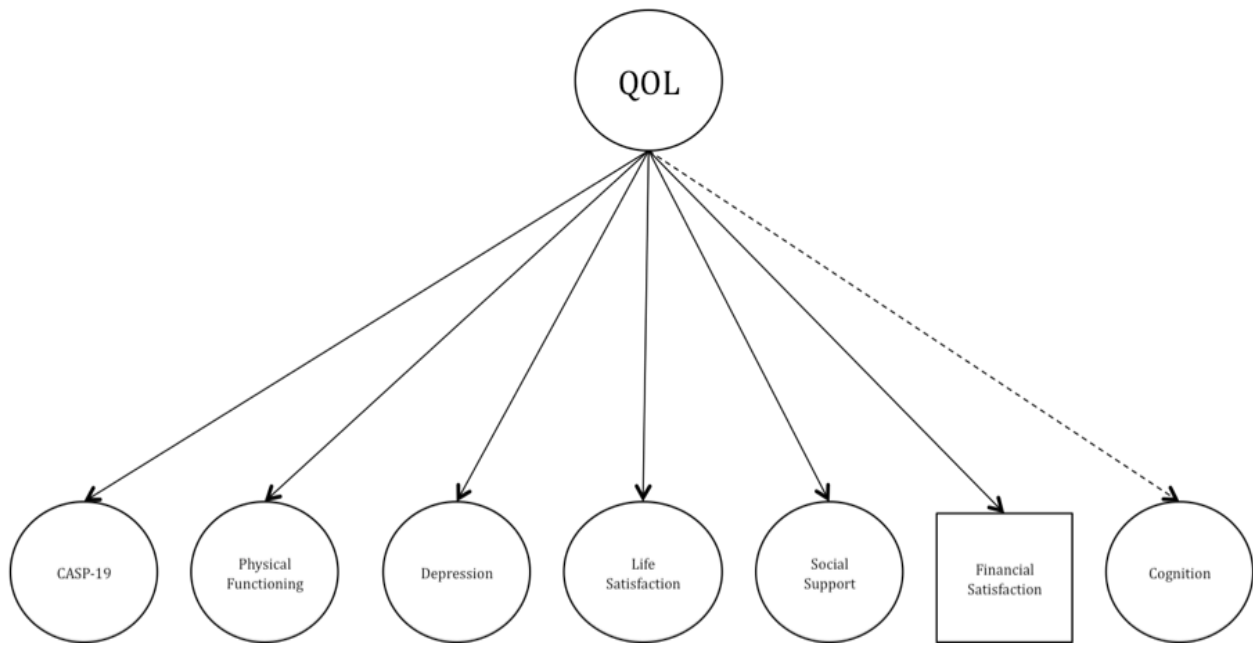


Figure 1. Predicted second order factorial structure based on the study's main hypothesis (H1). The circles represent factors and the square represents a composite. The dashed line indicates a supplemental hypothesis.

RESULTS

The present study included the analysis of 29 composites and 4 demographic variables (Table 2). All the composites, except Financial Satisfaction and the demographic variables, were used to create 10 different factors or latent variables (Tables 3 and 4). Note that all the reported statistical values presented on this section are based on standardized values.

A multiple analysis of variance (MANOVA) was used to analyze the main effects and interaction effects of the four demographic variables. I used age, education, ethnicity and gender as independent variables and a summary score (aggregated across composites for each factor) for Physical Functioning Impairment, Depression, Life Satisfaction and CASP-19 as dependent variables. The results indicated the following main effects: Age had a significant effect on the CASP-19 ($F(1) = 7.95, p = .005, \eta^2 = 0.013$), and on Life Satisfaction 2004 ($F(1) = 10.7, p = .001, \eta^2 = 0.017$); education had a significant effect on the CASP-19 ($F(4) = 2.88, p = .022, \eta^2 = 0.01$) and Depression ($F(4) = 2.95, p = .022, \eta^2 = 0.019$); and gender had an effect on Depression ($F(1) = 8.39, p = .004, \eta^2 = 0.014$). Further analysis of the MANOVA results indicated the following significant interactions: Age * Ethnicity for the Depression dependent variable ($p = .001, \eta^2 = .027$); Age * Education for Depression ($p = .038, \eta^2 = .016$); Ethnicity * Education for Physical Functioning Impairment ($p = .011, \eta^2 = .041$); Age * Gender for Depression ($p = .017, \eta^2 = .009$); Ethnicity * Gender for Life Satisfaction ($p = .009, \eta^2 = .019$) and CASP-19 ($p = .034, \eta^2 = .014$); and Age*Education*Gender for Depression ($p = .046, \eta^2 = .016$). As shown by the reported effect sizes, the results seem to be significant due to the large sample size;

however, the main effects and interactions explain less than 1% of the variance of each respective depended variable. Moreover, the lack of large significant interactions indicated that the models tested with this data have good generalizability across people with diverse age, education, ethnicity and gender.

Hypothesis 1 (2004)

I conducted three second ordered factor analyses to test whether Physical Functioning Impairment, Depression, Life Satisfaction, Social Support and Financial Satisfaction were components of a multidimensional model of *quality of life* (QOL) as suggested by the literature review. The first model fell short of good fit (CFI = .89, TLI = .87, RMSA = 0.08). It involved loading the first order factors of Physical Functioning Impairment, Depression, Life Satisfaction and Social Support, as well as the Financial Satisfaction composite, into a second order factor named QOL using listwise data. The resulting model indicated that all of the first order factors had adequate to good loadings into QOL, except for the Financial Satisfaction composite, which had a loading of .019 (Figure 13). A second model was tested based on the results of the first model. The second model had the same first order factors as the first model except for the Financial Satisfaction composite, which was not included in the analysis. Also, the second model was conducted with both listwise and imputed data with similar results. The results of the imputed model indicated excellent model fit (CFI = .97, TLI = .96, RMSA = 0.045) and the following loadings into QOL: Physical Functioning Impairment (.40), Depression (.64), Life Satisfaction (-.87) and Social Support (-.47, Figure 14). The results indicated that the first order factors significantly loaded onto a higher order QOL construct, and that Life Satisfactions was the best

indicator at differentiating between people with high and low quality of life. In addition, the second-order QOL factor accounted for more variance on the Life Satisfaction factor ($R^2 = .76$) compared to the other factors. The second factor with greatest variance accounted for by the QOL factor was Depression ($R^2 = .41$), followed by Social Support ($R^2 = .22$) and Physical Functioning Impairment ($R^2 = .16$). Finally, a third supplemental model was conducted to test if Cognition reflects another core dimension of QOL. Therefore, the third model had the same first order factors as the second model in addition to Cognition. The resulting model had good fit (CFI = .93, TLI = .91, RMSA = 0.057) though not as good as the second model and resulted in the following loadings onto QOL: Physical Functioning Impairment (.46), Depression (.69), Life Satisfaction (-.80), Social Support (-.44), and Cognition (-.23). This supplemental model suggested that Cognitive functioning did not load strongly into QOL; however, this may be due to the fact that the measures of cognition used in the Health and Retirement Study (HRS) were rather narrow and different results might be obtained if a full cognitive assessment had been conducted. The low loading of Cognition onto the second-order QOL factor might also be explained by the relatively healthy sample formed by non-institutionalized older adults. Nonetheless, adding cognition to the model changed the initial loadings in all the factors suggesting that cognition played a meaningful role in the covariance matrix (Figure 15).

Research Question 1 (2004)

As stated in the proposed data analyzes section, I planned to load the previously mentioned first order factors, except for Cognition, and the CASP-19 onto a second order quality of life (QOL) factor. However, this model was not viable because

QOL and the CASP-19 seem to represent the same underlying factor (i.e., the CASP-19 factor loaded at greater than 1.0 on the second order QOL factor). Therefore, an additional research question was generated to examine how well the second order QOL factor could explain the CASP-19 factor. The model resulted in adequate fit (CFI = .92, TLI = .91, RMSA = .06) and revealed a strong structural path between QOL and CASP-19 (-.98) with QOL explaining 96% of the variance on the CASP-19 (Figure 16).

Hypothesis 2 (2004-2006)

A longitudinal (2004-2006) cross-lagged panel design between Physical Functioning Impairment and Depression was conducted to test for reciprocal causation. The model had good fit (CFI = .97, TLI = .95, RMSA = 0.055). The results indicated that Depression 2004 and Physical Functioning Impairment 2004 were highly correlated (.46), this association did not decrease by much (.30) after taking into account the structural path between Depression 2004 and Depression 2006 (.55), Physical Functioning Impairment 2004 and Physical Functioning Impairment 2006 (.85) as well as the cross-lagged effects of Depression 2004 on Physical Functioning Impairment 2006 ($p > .05$) and Physical Functioning Impairment 2004 on Depression 2006 (.16). Based on the results, the investigator concluded that it is unlikely that Depression and Physical Functioning Impairment are related through reciprocal causation. Instead, it was concluded that Physical Functioning Impairment was a stronger predictor of Depression compared to the predictive power of Depression on Physical Functioning Impairment (Figure 17).

Hypothesis 3 (2004-2006)

I also conducted a longitudinal (2004-2006) cross-lagged panel design between Life Satisfaction and Depression to test for reciprocal causation. The model showed good fit (CFI = .98, TLI = .97, RMSA = 0.048). The results suggested that Life Satisfaction 2004 and Depression 2004 were highly correlated (-.57) and this association decrease considerably (-.16) after taking into account the structural path between Depression 2004 and Depression 2006 (.47), Life Satisfaction 2004 and Life Satisfaction 2006 (.60) as well as the cross-lagged effects of Depression 2004 on Life Satisfaction 2006 (-.14) and Life Satisfaction 2004 on Depression 2006 (-.25). As evidenced by the results, I concluded that Life Satisfaction and Depression are related through reciprocal causation with Life Satisfaction having twice the impact on Depression compared to the impact of Depression on Life Satisfaction (Figure 18).

Research Questions 2 and 3 (2004-2006)

The following two longitudinal models used *quality of life* (QOL, 2004) and CASP-19 (2004) separately to predict Depression (2006). These two models allowed further comparison between the second order QOL model and the CASP-19 model. The first model (CFI = .94, TLI = .92, RMSA = 0.061; Figure 19) shows a significant structural path from the second order QOL factor to Depression (-.77, $R^2 = .60$) suggesting that a multidimensional model of QOL is a good predictor of later depression. However, the path from the second order QOL factor to Depression (2006) might be an overestimation because the second-order QOL factor included Depression (2004) as an effect indicator. Therefore, an additional analysis was conducted to remove Depression 2004 from the model. The second order QOL factor did not converge without depression as an indicator. As an alternative analysis, the first order

factors of Physical Functioning, Life Satisfaction and Social Support were used to predict Depression 2006. The resulting model accounted for 31% of the Depression 2006 variance. The second model (CFI = .95, TLI = .90, RMSA = 0.13; Figure 20), which used the CASP-19 to predict Depression 2006 (-.58, $R^2 = .34$) accounted for similar variance compared to the variance accounted for the by the three dimensions of QOL mentioned earlier. It was previously stated that the second order QOL model was highly related to the CASP-19 (-.98). The strong relationship between the second-order QOL model and the CASP-19 as well as their similar ability to predict depression supported that there is a strong overlap between these two latent constructs indicating that the second order QOL model and the CASP-19 seem to reflect slightly different areas of the umbrella construct, QOL.

Research Hypotheses 4 and 5 (2004-2006)

Correlations

A final model was tested to explore how different dimensions of quality of life (QOL) relate to each other (CFI = .92, TLI = .90, RMSA = 0.068; Figure 21). Social Support 2004, Physical Functioning Impairment 2004 and Depression 2004 were used as exogenous variables. Life Satisfaction 2004 and CASP-19 2004 were used as mediator/moderators between the exogenous variables and Life Satisfaction 2006 and Depression 2006. The results indicated the following significant correlations: Social Support 2004 and Depression 2004 (-.25), Physical Functioning Impairment 2004 and Depression 2004 (.41), and Life Satisfaction 2004 and CASP-19 (.68). The correlation between Social Support 2004 and Physical Functioning Impairment 2004 as well as the correlation between Depression 2006 and Life Satisfaction 2006 were not significant

after taking into account the relationships between the other factors in the model. The absence of a significant correlation between Depression 2006 and Life Satisfaction 2006 is rather notable, given that these two factors in isolation were significantly correlated. Nevertheless, the results indicated that as more factors were entered into the model, the factors were able to finally account for the correlation between Depression 2006 and Life satisfaction 2006.

Direct Paths

Social Support (.34, .29), Physical Functioning Impairment (-.16, -.45) and Depression (-.40, -.37) had significant direct paths to Life Satisfaction 2004 and CASP-19 2004 respectively. Life Satisfaction 2004 (.71), Physical Functioning Impairment 2004 (-.21) and Depression 2004 (-.11, $p = .058$) had significant direct paths to Life Satisfaction 2006 while the CASP-19 2004 (-.18, $p = .054$) and Depression 2004 (.53) had significant direct effects on Depression 2006.

Significant Total and Indirect Effects of the Exogenous Variables on Life Satisfaction 2006

Social Support 2004 had a total effect of .21 on Life satisfaction 2006 even though it did not have a direct effect on this variable. Social Support also had a total indirect effect of .19 on Life Satisfaction 2006. The total effect was calculated by taking into account the mediating effect of Social Support 2004 on Life satisfaction 2006 (.24) through Life satisfaction 2004 as well as other indirect effects that were not significant on their own. The total indirect effect value indicated that Social Support had an overall significant indirect effect on Life Satisfaction 2006 through all the possible indirect effects regardless of whether or not they were significant on their own. Physical

Functioning Impairment 2004 had a total effect of $-.24$ on Life satisfaction 2006.

Significant effects used to calculate the total effect included the direct effect of Physical Functioning Impairment 2004 on Life satisfaction ($-.21$) and the indirect effect of Physical Functioning Impairment 2004 on Life Satisfaction 2006 ($-.11$) through Life satisfaction 2004. Depression 2004 had a total effect of $-.33$ on Life satisfaction 2006, and a total indirect effect of $-.22$. Significant effects used to calculate the total effect included the direct effect of Depression 2004 on Life satisfaction ($-.11$, $p = .58$) and the indirect effect of Depression 2004 through Life Satisfaction 2006 ($-.28$) through Life satisfaction 2004.

Significant total and indirect effects of the exogenous variables on Depression 2006

Social Support 2004 only had a weak total indirect effect on Depression 2006 ($-.08$) after controlling for the other variables in the model. The indirect effect of Social Support 2004 on Depression 2006 was partially significant ($-.05$, $p = 0.62$). Physical Functioning Impairment 2004 had a total effect of $.14$ on Depression 2006, and a total indirect effect of $.01$. There were no significant specific effects from Physical Functioning 2004 to Depression 2006 except for the effect of Physical Functioning Impairment 2004 on Depression 2006 ($.08$, $p = 0.058$) through the CASP-19. Depression 2004 had a total effect of $.62$ on Depression 2006 and a total indirect effect of $.1$. Significant effects used to calculate the total effect included the direct effect of Depression 2004 on Depression 2006 ($.62$) and the indirect effect of Depression 2004 on Life Satisfaction 2006 ($.07$) through CASP-19.

More on mediating effects

Initial analysis of the final model suggested three significant mediating effects. Based on the results, it was concluded that Life Satisfaction 2004 mediated the relationship between Social Support 2004 and Life Satisfaction 2006 when taking the relationship between the exogenous factors, the CASP-19 and Life Satisfaction 2006 into account. I concluded that Life Satisfaction 2004 worked as a total mediator because the bivariate relationship between Social Support 2004 and Life Satisfaction 2006 decreased from a significant .29 to a non-significant direct path, 0.019, when the variables were entered into the model. In addition, further analysis indicated that the effect of Social Support 2004 on Life Satisfaction 2006 (.24) remained significant after being moderated by the CASP-19. I also found that the CASP-19 mediated the relationship between Social Support 2004 and Depression 2006 (indirect effect = -.05, $p = 0.062$) as suggested by the observed change from a significant bivariate correlation (-.19) to a non-significant structural path (0.042) within the larger model. The CASP-19 was also found to be a mediator between Physical Functioning Impairment 2004 and Depression 2006 (indirect effect = .08, $p = 0.058$) as suggested by the change from a significant bivariate correlation (.39) to a non-significant structural path (.05). These total mediation effects indicated that high levels of Social Support (2004) increased Life Satisfaction (2006) two years later by affecting current levels of Life Satisfaction (2004) while Social Support (2004) affected Depression (2006) by affecting the current CASP-19 level (2004). The results also suggested that the negative effect of Physical Functioning Impairment (2004) on Depression (2006) could be buffered by high levels of on the CASP-19 (2004).

The final model also revealed that the basic dimensions of quality of life (QOL) have complex interactions with each other at the first order factor level and that these interactions are likely to affect a person's level of QOL, which can be represented in terms of a higher order concept. In addition, this model highlighted the direct effect of Physical Functioning Impairment 2004 (-.21) on Life Satisfaction 2006, which goes beyond the effects of all the other predictors included in the model. Also, the effects of Physical Functioning Impairment (2004) on Life Satisfaction were stronger two years later (2006) compared to its effect on current Life Satisfaction (2004). Thus, Physical Functioning Impairment is a good example of a variable that functions differently at different levels of the QOL concept. For example, Physical Functioning Impairment did not load as strongly on the second-order QOL factor compared to Depression, Life Satisfaction and Social Support; however, Physical Functioning Impairment (2004) was a significant player at the first-order factor level of QOL dimensions having a causal effect on Life Satisfaction (2006) above and beyond base levels of Life Satisfaction, Depression, Social Support and CASP-19. These results indicated that even though impairments in Physical Functioning were not particularly the strongest indicator of a higher order QOL factor, they strongly affected QOL through Life Satisfaction, which is highly related to QOL.

DISCUSSION

The presented modeling results supported the main study's hypothesis, which stated that quality of life (QOL) in older adults is a comprehensive and multidimensional construct that can be understood at different levels of analysis. Based on the more macro-level results, it can be concluded that Physical Functioning, Depression, Life Satisfaction, and Social Support are core dimensions of QOL. Based on a more micro-level of analyses, the results indicated that Physical Functioning Impairment was more likely to independently cause changes in Depression over time than the other way around. I also concluded that Life Satisfaction and Depression were related through reciprocal causation across time; with Life Satisfaction having a greater effect on Depression compared to the effect of Depression on Life Satisfaction. Thus, while the macro level of analysis highlighted the contributing roles of each first-order factor in representing the higher order QOL construct, examination of the first-order factors on a more micro-level of analysis suggested different sets of dynamic relations.

As noted above, the results supported that Social Support, Physical Functioning, Depression and Life Satisfaction were significant domains of a multidimensional model of QOL; however, the results did not support the prediction that perceived Financial Satisfaction and the CASP-19 (Control, Autonomy, Self-realization, and Pleasure) were significant domains of the specified QOL model. Moreover, the findings suggested that the CASP-19 model was highly redundant with the developed second-order QOL model and that the second-order QOL model accounted for 96% of the variance of the CASP-19 factor. This comparison between the second-order QOL model and the CASP-19 suggested that both factors measured a very similar construct. In addition, these two

latent factors had similar predictive validity in regards to Depression when the effect indicator of Depression was removed from the second-order QOL model, which provides evidence further evidence of measurement equivalence. Overall, both the second-order QOL model and the CASP-19 model appeared to adequately capture the multifarious QOL construct in this sample of older adults.

As predicted, Social support, Physical functioning and Depression were significant predictors of QOL as measured by the CASP-19; however, Financial Satisfaction was not a significant predictor of the CASP-19. Notably, the CASP-19 factor did not directly predict the Life Satisfaction factor two years later after taking into consideration the other variables in the final model suggesting that a general sense of well-being does not predict satisfaction with life after accounting for the effects of baseline levels of Life Satisfaction, Social Support, Physical Functioning Impairments and Depression.

The current results did not support Lenze et al.'s (2001) bidirectional perspective on the relationship between Physical Functioning and Depression, which stated that not only Depression is a risk factor for a decline in Physical Functioning but that a decline in Physical Functioning is also a risk factor for Depression. The current findings also contrasted with a meta-analysis by Stuck et al. (1999) who concluded that depression is one of the strongest risk factors for physical functioning decline. Conflicting with the predominant view of psychopathology, longitudinal data supported that Physical Functioning had a significant effect on Depression while Depression failed to show a significant effect on Physical Functioning. Thus, the observed improvements in Depression accompanied by improvements in Instrumental Activities of Daily Living

(IADLs) reported by Oslin et al. (2000) might have been the result of improvements in Physical Functioning. This hypothesis is supported by a study conducted by Dimidjian and colleagues (2006), which provided evidence for the anti-depressant effect of behavioral activation.

The hypothesized reciprocal relationship between Depression and Life Satisfaction was supported. Nonetheless, Life Satisfaction had a greater effect on Depression two years later compared to the effect of Depression on Life Satisfaction showing once more that depression is unlikely to be the main variable when it comes to QOL. Thus, clients might benefit more if researchers and practitioners focus more on Life Satisfaction and other areas of positive psychology instead of focusing on mental illness. The finding that Physical Functioning and Life Satisfaction were more predictive of Depression than the other way around are supported by Kennedy et al. (1990) and Asakawa et al. (2000) who found that increasing disability and declining health preceded the emergence of depressive symptoms as well as a decline in Social Support and Life Satisfaction (Asakawa et al., 2000). On the other hand, Callahan (2005), Coulehan et al. (1997), and Oslin et al. (2000) concluded that Physical Functioning tends to increase after depression is treated; however, both formal and informal treatment of depression usually involve an increase in activity level.

Further analysis of the data provides insight on the mechanism behind Assakawa and colleagues' (2000) findings. They concluded that a decrease in Physical Functioning was accompanied by a decrease in Social Contact and Life Satisfaction as well as an increase in Depression. The current results suggest that decreased Physical Functioning predicted an increase on Depression and a decrease on Life Satisfaction.

Thus, the current results highlighted the important role of Physical Functioning in older adults, and how limits in this factor may adversely affect QOL more generally. The current findings also showed that better Physical Functioning is positively related to the total QOL score (.46-.47), which is consistent with Chan et al.'s (2006) findings.

QOL researchers have explored the directional paths between depression and QOL. Researchers have studied QOL, more generally, causing a change in depression, depression causing a change in QOL, and depression as a manifestation of QOL (Moore et al., 2005). The findings of the present study suggested that due to the broad, multidimensional, and multilevel nature of QOL, Depression and QOL can be related in different ways at different levels of analysis. For example, at a more micro-level, Depression differentially relates to other dimensions of QOL (Physical Functioning, Life Satisfaction); while at a more macro-level, Depression is a manifestation of overall QOL and, at the same time, future Depression can be predicted by overall QOL regardless of whether or not Depression is included in the QOL measurement model. Thus, future research will benefit by examining QOL at both fine-grained micro-levels as well as broader, more macro-levels of analysis. This type of research is likely to show that the relationships between psychological concepts are complex and highly determined by the variables included in the model as well as the model's level of specificity.

As mentioned before, Financial Satisfaction loaded weakly on QOL. The significant but small relationship between QOL and Financial Satisfaction has also been reported by Diener et al. (1999) supporting that money does not guarantee happiness. Therefore, it can be said that satisfaction with economic resources is vaguely related to well-being. Furthermore, financial status is commonly studied as a demographic

characteristic and demographic characteristics appear to be only slightly related to QOL (Diener et al., 1999, Keyes et al., 2002) and they accounted for less than 1% of the variance in the studied QOL dimensions included in the present study.

The results of the current study were not congruent with Smith et al. (1999)'s findings, which suggested that Social Functioning has a small direct effect on QOL (.09) after taking Mental Health, Physical Health and Physical Functioning into account. Within the current study, Social Support (.29) remained a strong predictor of the CASP-19 after taking into account Physical Functioning Impairments and Depression. To some extent, differences between the current study and these latter studies could be due to important sample differences and also statistical methodology. Nevertheless, additional longitudinal research with a variety of methods and measures will help to further address these issues.

The findings from the current study provide support for a number of previous findings: Depression was negatively correlated with QOL (Chan et al., 2006; Netuveli et al., 2006), Economic Strain was correlated positively with Depression (Perling et al., 1981), low levels of Social Support were associated with increased Depression (Newsom et al., 1996), and QOL was not strongly correlated with Cognitive Functioning in older adults (Seymore et al., 2008). In addition, the results of the current study supported that low levels of Social Support were associated with decreased Life Satisfaction (Aquino et al., 1996) and increased Depression (Newsom et al., 1996). The results partially supported Lee et al.'s (2005) findings, which suggested that only the Physical and Psychological factors had strong loadings on Lee et al.'s second order QOL factor, while Social Relationships and the environment only had indirect effects on

QOL. Similarly, the current study found that Physical Functioning had the strongest direct effect on the CASP-19 factor followed by Depression and Social Support. To the extent that the current results showed that the Life Satisfaction (2006) factor was a strong indicator of QOL, the Lee et al.'s (2005) findings are more conveniently replicated: The Physical Functioning and Depression factors had direct effects on Life Satisfaction while Social Support was only indirectly related to Life Satisfaction (2006). The current findings were also congruent with Netuveli et al. (2006) and Wiggins et al.'s (2006) findings in that the CASP-19 factor was positively related to Social Support and negatively related with perceived Economic Hardship, Depression and Physical Impairment.

The overall findings from the current study supported a multidimensional model of QOL as proposed by the World Health Organization (1998). The factors included in the current study have a moderate overlap with the factors used by WHOQOL, while also being more specific. The Physical Functioning factor used in the current study looks at physical impairment while the WHOQOL's Physical Domain looks at pain and discomfort, energy and fatigue and sleep and rest. Even more related to the Physical Functioning factor used in the current study is the Independence Domain of the WHOQOL, which looks at mobility, activities of daily living, dependence on medication or treatments and working capacity. Within the current study, Psychological Health was measured by looking at current and somewhat more permanent affective states (depression and life satisfaction) while the WHOQOL Psychological Domain looks at positive feelings, thinking, learning, memory and concentration, self-esteem, body image, and negative feelings. In addition, both studies looked at social relationships,

with the current study focusing on the quality of the relationships and social support and the WHOQOL focusing on personal relationships, social support, and sexual activity. The WHOQOL also looks at an Environment Domain, which covers physical safety and security, home environment, financial resources, health and social care as well as others domains. In relations to the Environmental Domain, this study only covered Financial Satisfaction.

By looking at the dimensions of QOL covered in the current study and comparing them to the dimensions studied by people using the WHOQOL, it can be inferred that the WHOQOL is a comprehensive measure of overall QOL while the second-order QOL model developed in this study looks at more specific domains of QOL. As stated previously, looking at specific domains of QOL can be advantageous in that the results are easier to understand and manipulate. At the same time, many of the research findings obtained in the WHOQOL studies were supported by the current study. For example, the last model (Figure 21) on the present study indicated the same relationships patters suggested by Power et al. (1999) who found that the Environment domain had the weakest predictive effect on (overall ratings of) QOL (.13), followed by Social Relationships (.21), Psychological Health (.23) and Physical Health (.46). Similarly, the current results suggested that Social Support (.29) had the least impact on one of the QOL measure used in the current study, CASP-19, followed by Depression (-.37) and Physical Functioning Impairments (-.45). These results also indicate that QOL can be accurately measured with different scales and that the results will still likely be quite robust. This observation is also supported by the fact that several different measures can account for significant variance of general QOL factors. For example,

Lee and colleagues (1999) found that the mentioned WHOQOL factors explained the majority of the variance in an overall QOL indicator (.92); Power et al. (1999) found that the WHOQOL model explained most of the variance in an overall QOL factor (51%-75%); Ring et al. (2007) concluded that Subjective Well-being and Psychological Well-being account for 41% of the variance in IQOL and the current study found that the developed model of QOL explained 96% of the variance in the CASP-19. Further support for the broadness and complexity of the QOL concept comes from research with the WHOQOL. This research suggested that the WHOQOL factorial structure is invariant across cultures (Power et al., 1999) and across people suffering from pulmonary disease, hypertension, peptic ulcers, sinusitis and liver disease (Yao & Wu, 2005). The current study found that the developed QOL model was generalizable regardless of people's gender, ethnicity, education and age. Therefore, the results provide further support for the robustness of the QOL concept and for Keyes et al.'s (2002) findings, which indicated that QOL is a comprehensive construct that remains constant throughout a person's life and is invariant across people with diverse demographic characteristics.

As suggested by the literature review, specific measures of QOL and well-being are likely to be two overlapping approaches to understating QOL more generally. The CASP-19 is conceptually related to psychological well-being through mastery (or control and autonomy in CASP-19 terminology) and to subjective well-being or hedonic well-being through the CASP-19's pleasure domain. Furthermore, the strong relationship between the CASP-19 and Life Satisfaction provides partial support for viewing life satisfaction as an overall judgment of QOL or as defined by Pavot and Diener (1993, p.

164) a “conscious cognitive judgment of one’s life in which the criteria for judgment are up to the person.” This is also supported by the strong loading of the first order Life Satisfaction factor into the second QOL order factor, which suggested that Life Satisfaction provides the strongest differentiation between people with high and low QOL. As such, the current results indicated that QOL researchers could confidently use both the CASP-19 and the Satisfaction with Life Scale as robust indicators of the QOL construct.

Overall, this study provided a detailed and in depth analysis of four domains of QOL (Physical Functioning, Depression, Life Satisfaction and Social Support) increasing understanding of the QOL concept. Also, the presented models may serve as another starting point for testing specific hypothesis about the relationships between the domains of QOL as well as fostering research on the different levels of the QOL concept. Moreover, the current results suggested how changes in particular QOL dimension are likely produce change in overall QOL. The strong theoretical background of the presented models and the selected statistical procedures offered another perspective into the circular logic observed in many QOL articles, in which researchers use some dimensions of QOL to predict other aspects of QOL without considering the possibility of bidirectional effects among the factors that comprise the multidimensional QOL construct. This somewhat new perspective is facilitated by the use of structural equation modeling, which allows simultaneous specification of multiple factors and the analysis of complex relationships between latent variables across time.

The results of the present study are useful in that they provide researchers with a deeper understanding of what QOL is and how various dimensions of QOL relate to

each other. However, the current study failed to provide evidence for a simpler, more understandable definition of QOL. Instead, it highlighted the complexities of this concept, which should be viewed as a broad, subjective, multidimensional, and multilevel construct. The findings also indicated that the QOL construct could be accurately measured with diverse scales developed to measure people's general well-being or people's perception of their psychological functioning as well as using separate dimensions of QOL. Most significantly, this study undermines the importance of depression on determining QOL and presents several models which can be used not only by researchers, but also by clinicians who can develop treatment strategies based on the predetermined structural paths in order to accomplish therapeutic goals as they relate to QOL.

Limitations and Future Directions

Because of the nature of secondary data research, spirituality could not be included as a possible domain of QOL, even though several authors suggested spirituality as an important domain, especially when measuring QOL in older adults (WHOWOL-SRPB, 2006) and in people with physical illnesses (Dalby, 2006). A relative weakness of the study was that it used items that are not part of published measures; nonetheless, all the items within each factor had high internal consistency and the bivariate correlations between the factors were consistent with the research literature for each factor. Other weaknesses of the study were that the models were not replicated with different subsamples and that the small proportion of ethnic minorities in the sample did not allow for invariance testing for the structural models across groups.

Future research should focus on specifying the directionality of the relationships between different domains of QOL as well as on specifying different levels of the QOL construct. Also, advanced quantitative methods, such as structural equation modeling, should be used to study the complex relationships between QOL related factors. A byproduct of using structural equation models is that they provide an effective manner of summarizing and validating research findings. In addition, QOL research might benefit the most from longitudinal studies and field research designed to test the causal implications between QOL dimensions as well as studying the effect of manipulating different dimension of QOL. Researchers might need to focus not only on the dimensions that have the most effect on overall QOL but also on finding which dimension of life are not significant domains of QOL. This approach is suggested in order to increase our understanding of QOL as well as the limits of this broad construct. This far, research seems to suggest that financial status is not strongly related to overall QOL and that cognition is only important in certain cases, such as in people suffering from Schizophrenia (Savilla et al., 2008) and when cognition is studied within a broader concept such as the Psychological Domain of the WHOQOL.

QOL is not only an interesting research topic and an important outcome measure; it is also a construct easily translated into clinical practice. Practitioners can potentially evaluate clients' QOL and select a treatment focus to increase QOL based on research findings. For example, a clinician working with older adults might assess QOL using the CASP-19 or the Satisfaction with Life Scale. After a baseline assessment, clinicians might decide to help clients increase their QOL by fostering activities that increase physical functioning such as exercise (Penninx et al., 2002) or

medical treatment; lower depression by using intervention such as increasing physical activity (Dimidjian et al., 2006) or through a variety of psychotherapies (Robinson et al., 1990); increase life satisfaction by helping clients incorporate valued activities into their routines (Forman et al., 2007); increase social support by improving clients' social skills (Sarason et al., 1985), by referring the client to diverse group activities or by using a combination of the mentioned strategies.

Table 1

Missing Data Analysis

Variable	Cohen's <i>d</i>	Complete data <i>M</i> (<i>SD</i>)	Missing data <i>M</i> (<i>SD</i>)	Range
Strength and Movement 04	0.64	.25 (.33)	.45 (.33)	0-1
CASP-Autonomy 04	-1.16	3.21 (.67)	2.94 (.59)	1-4
CESD-Negative Mood 04	0.65	.18 (.31)	.26 (.35)	0-1
CESD-Negative Mood 06	0.68	.18 (.31)	.27 (.37)	0-1
CESD-Somatic 06	0.98	.25 (.32)	.38 (.37)	0-1
Strength and Movement 06	0.88	.26 (.35)	.57 (.31)	0-1

Table 2

Variables' Means and Standard Deviations

	Variable	N	M	SD	Range
Physical Functioning 2004	ADLs	727	0.11	0.25	0-1
	ADL_SM	1352	0.27	0.34	0-1
	IADLS	1652	0.06	0.16	0-1
CESD 2004	Negative Mood	1347	0.19	0.31	0-1
	Not Happy	1346	0.12	0.28	0-1
Life Satisfaction 2004	Life Satisfaction 1	1327	4.92	1.39	0-7
	Life Satisfaction 2	1330	5.14	1.38	0-7
Social Support 2004	Family Positive	1254	3.01	0.87	1-4
	Children Positive Support	1150	3.32	0.73	1-4
	Friends Positive	1218	3.14	0.73	1-4
	Frequency of Contact	1271	4.38	0.95	1-6
CASP-19 2004	CASP Control	1315	3.05	0.65	1-4
	CASP Autonomy	1332	3.18	0.66	1-4
	CASP Pleasure	1335	3.67	0.45	1-4
	CASP Self-Realization	1331	3.12	0.63	1-4
Cognition 2004	Total Recall	1326	10.13	3.18	1-20
	Serial 7s	1279	3.88	1.42	0-5
	MMSE	1048	6.49	0.83	2-7
Financial Satisfaction 2004	Satisfaction	1317	2.97	1.06	1-5
	Difficulty paying bills	1308	3.75	1.05	1-5
	Shortage of money	1333	2.3	0.99	1-4
Physical Functioning 2006	ADLs	681	0.14	0.27	0-1
	ADL_SM	1255	0.3	0.36	0-1
	IADLS	1255	0.07	0.18	0-1
CESD 2006	Negative Mood	1240	0.19	0.32	0-1
	Not Happy	1238	0.12	0.29	0-1
Life Satisfaction 2006	Life Satisfaction 1	535	4.15	1.28	1-6
	Life Satisfaction 2	528	4.37	1.29	1-6

Higher scores indicate higher levels of the variable

Table 3

Estimated Covariance Matrix for the Latent Variables (Figure 15)

	Physical Functioning	Depression	Life Satisfaction	Social Support	Cognition
Physical Functioning	.024				
Depression	.011	.049			
Life Satisfaction	-.069	-.149	1.467		
Social Support	-.019	-.04	.249	.339	
Cognition	-.03	-.063	.398	.106	3.189
QOL	.005	.011	-.069	-.019	-.03

Estimated Correlation Matrix for the Latent Variables

	Physical Functioning	Depression	Life Satisfaction	Social Support	Cognition
Physical Functioning	1				
depression	.322	1			
Life Satisfaction	-.371	-.553	1		
Social Support	-.206	-.307	.353	1	
Cognition	-.107	-.16	.185	.102	1
QOL	.465	.693	-.798	-.443	-.231

Table 4

Estimated Covariance Matrix for the Latent Variables (Figure 21)

	Physical	CASP-19	Depression 04	Life Satisfaction 04	Social Support
Physical Functioning	.024				
CASP-19	-.044	.214			
Depression 04	.014	-.064	.049		
Life Satisfaction 04	-.066	.47	-.155	1.6	
Social Support	-.003	.103	-.031	.319	.322
Life Satisfaction 06	-.07	.323	-.125	1.049	.198
Depression 06	.017	-.072	.041	-.172	-.029

Estimated Covariance Matrix for the Latent Variables

	Life Satisfaction 06	Depression 06
Life Satisfaction 06	1.36	
Depression 06	-.151	.071

Estimated Correlation Matrix for the Latent Variables

	Physical	CASP-19	Depression 04	Life Satisfaction 04	Social Support
Physical Functioning	1				
CASP-19	-.0615	1			
Depression 04	.415	-.629	1		
Life Satisfaction 04	-.336	.802	-.553	1	
Social Support	-.029	.393	-.248	.444	1
Life Satisfaction 06	-.381	.59	-.478	.702	.294
Depression 06	.399	-.584	.689	-.509	-.195

Estimated Correlation Matrix for the Latent Variables

	Life Satisfaction 06	Depression 06
Life Satisfaction 06	1	
Depression 06	-.479	1

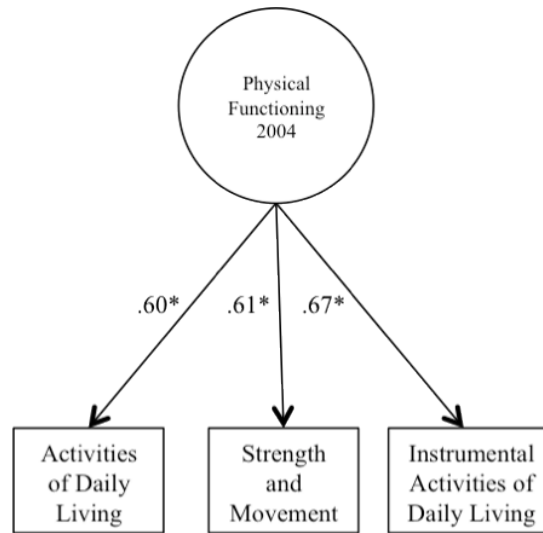
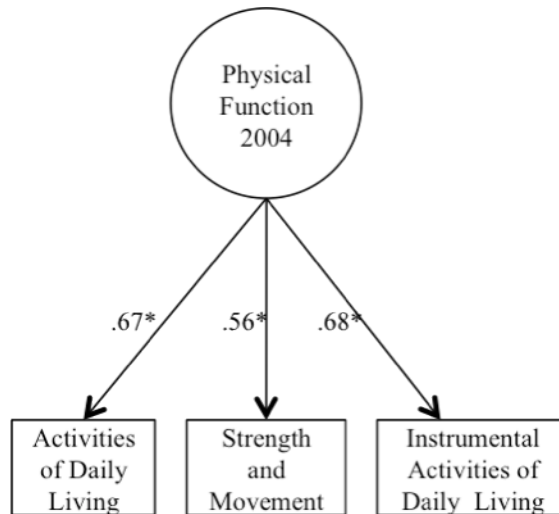


Figure 2. Standardized results of a just identified confirmatory factor analysis of Physical Functioning, 2004. The first illustration is based on listwise data results ($n = 727$). The second illustration is based on imputed data results ($n = 1352$).

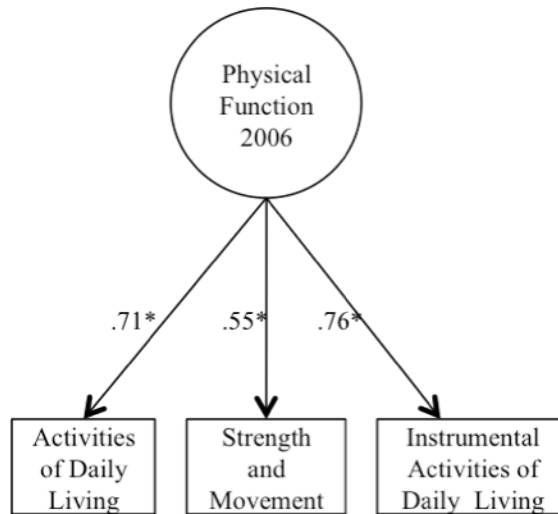
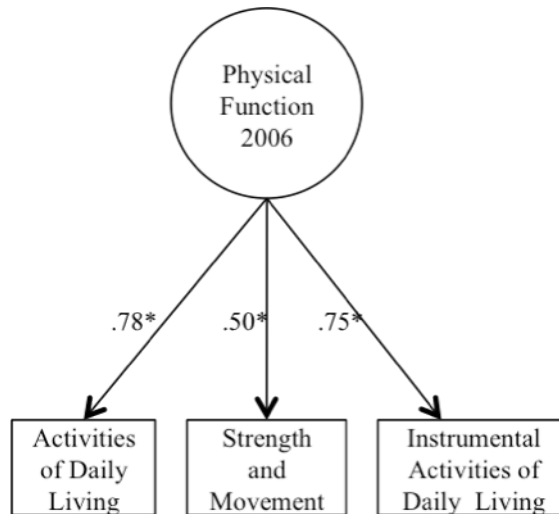


Figure 3. Standardized results of a just identified confirmatory factor analysis of Physical Functioning, 2006. The first illustration is based on listwise data results ($n = 681$). The second illustration is based on imputed data results ($n = 1255$).

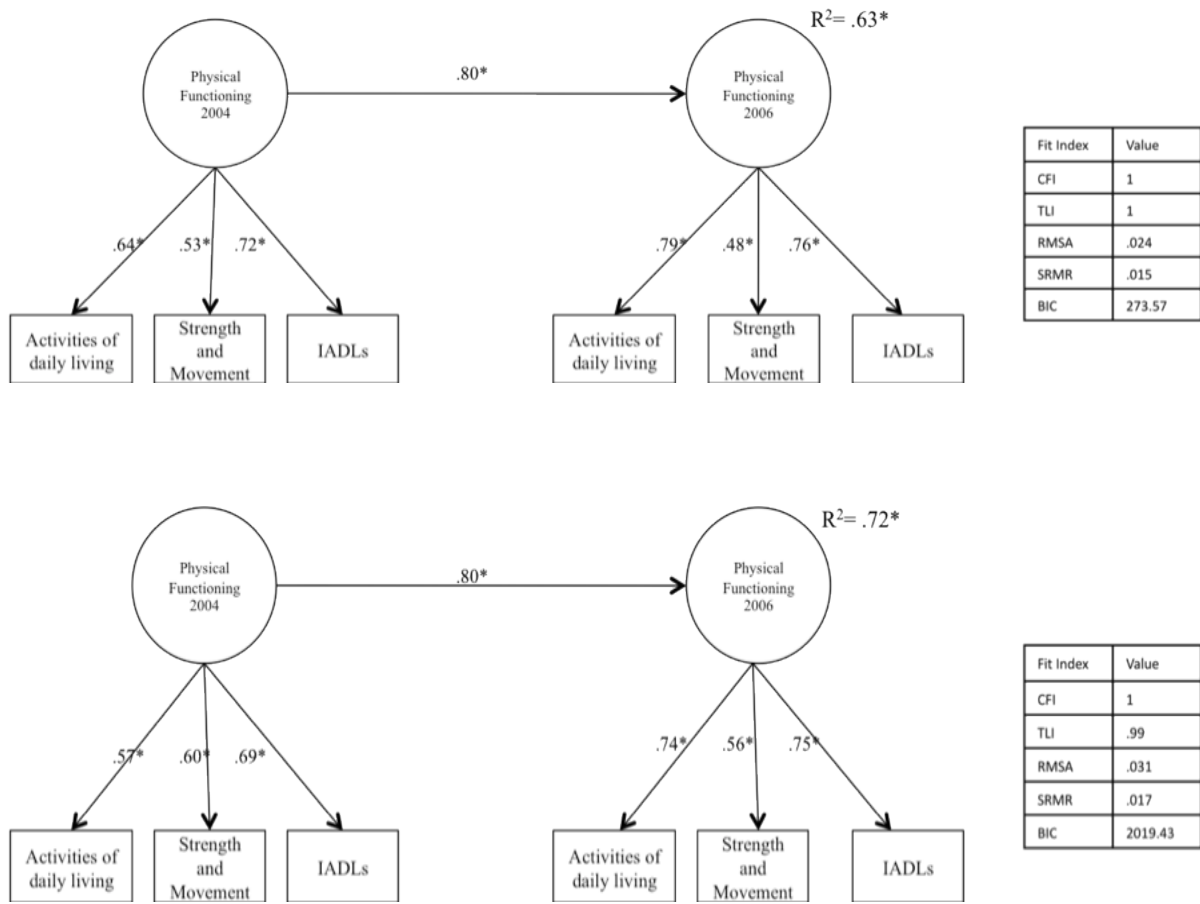


Figure 4. Construct stability of Physical Functioning. The first figure is based on listwise data ($n = 551$) and the second figure is based on imputed data ($n = 1352$).

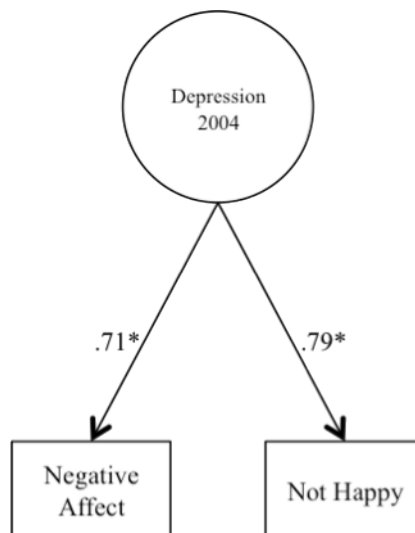
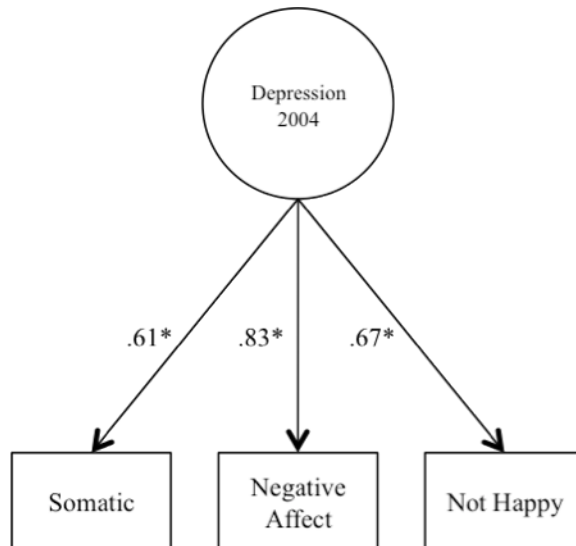


Figure 5. Standardized results of a just identified confirmatory factor analysis of Depression, 2004. The figure on the top is based on listwise data ($n = 1346$) and shows depression as being formed by three composites. The illustration on the bottom is also based on listwise data ($n = 1352$) and Depression factor is represented by two composites.

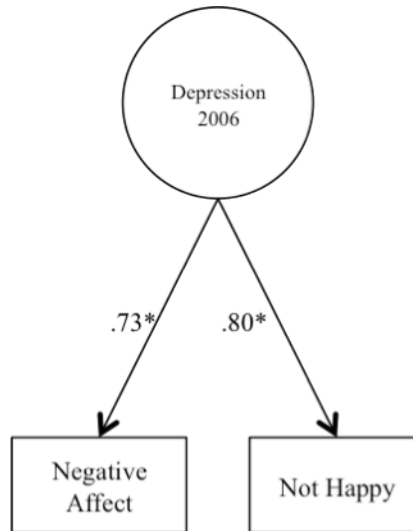
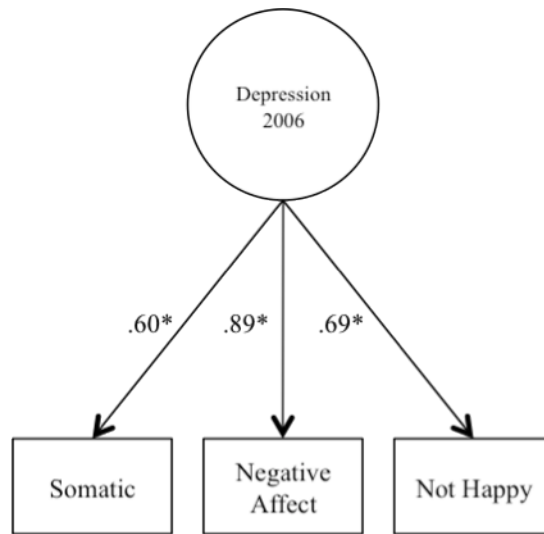


Figure 6. Standardized results of a just identified confirmatory factor analysis of Depression, 2006. The figure on the top is based on listwise data ($n = 1238$) and shows depression as being formed by three composites. The illustration on the bottom is also based on listwise data ($n = 1238$) and it is represented by two composites

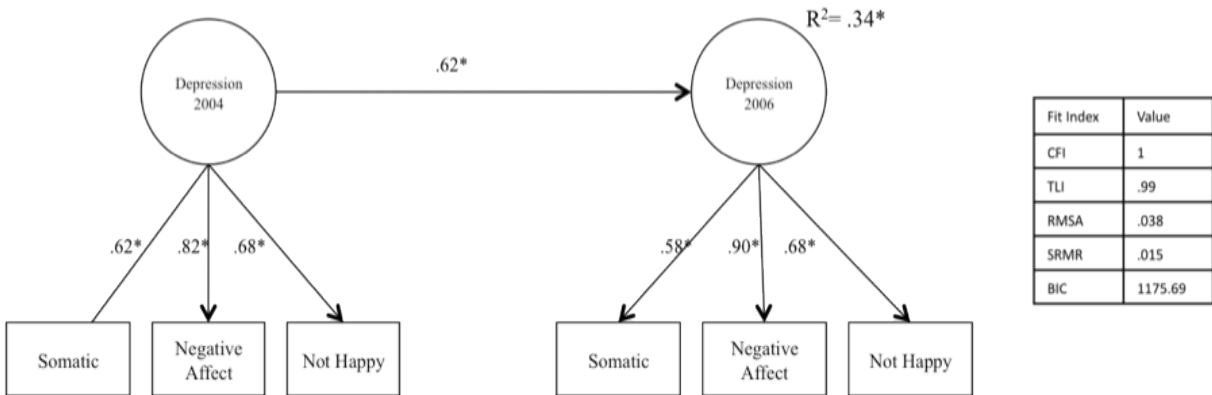
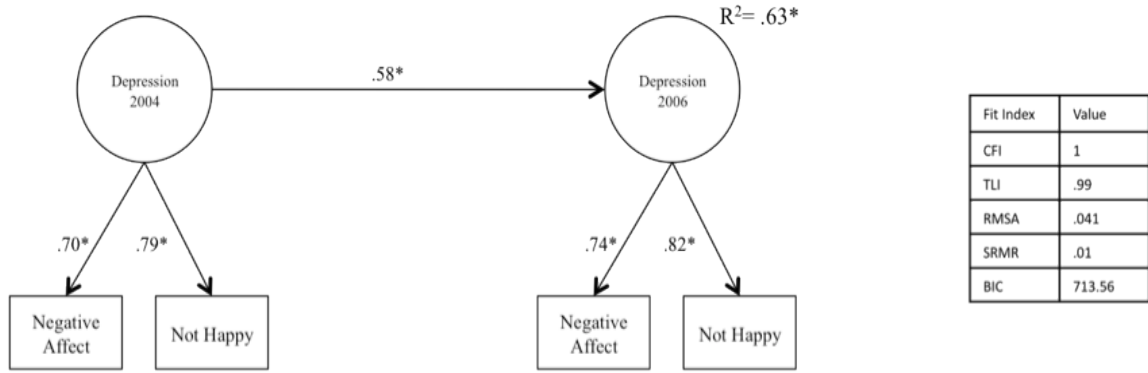


Figure 7. Construct stability of Depression. Both figures are based on listwise data ($n = 1236$).

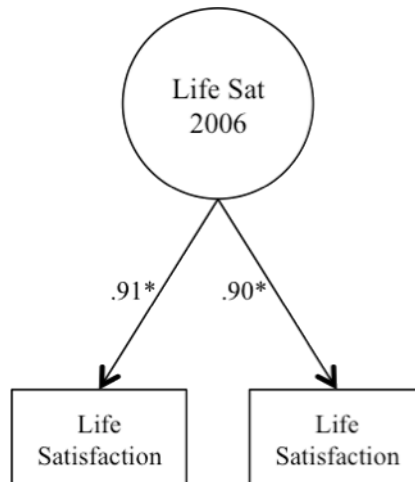
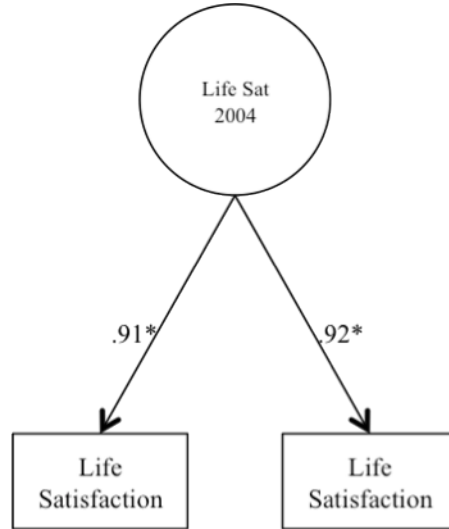


Figure 8. Standardized results of a just identified confirmatory factor analysis of Life Satisfaction. The illustration on top is based on the 2004 listwise data ($n = 1325$). The illustration on the bottom is based on the 2006 listwise data ($n = 528$). An illustration based on imputed data is not included because n only increased by 155.

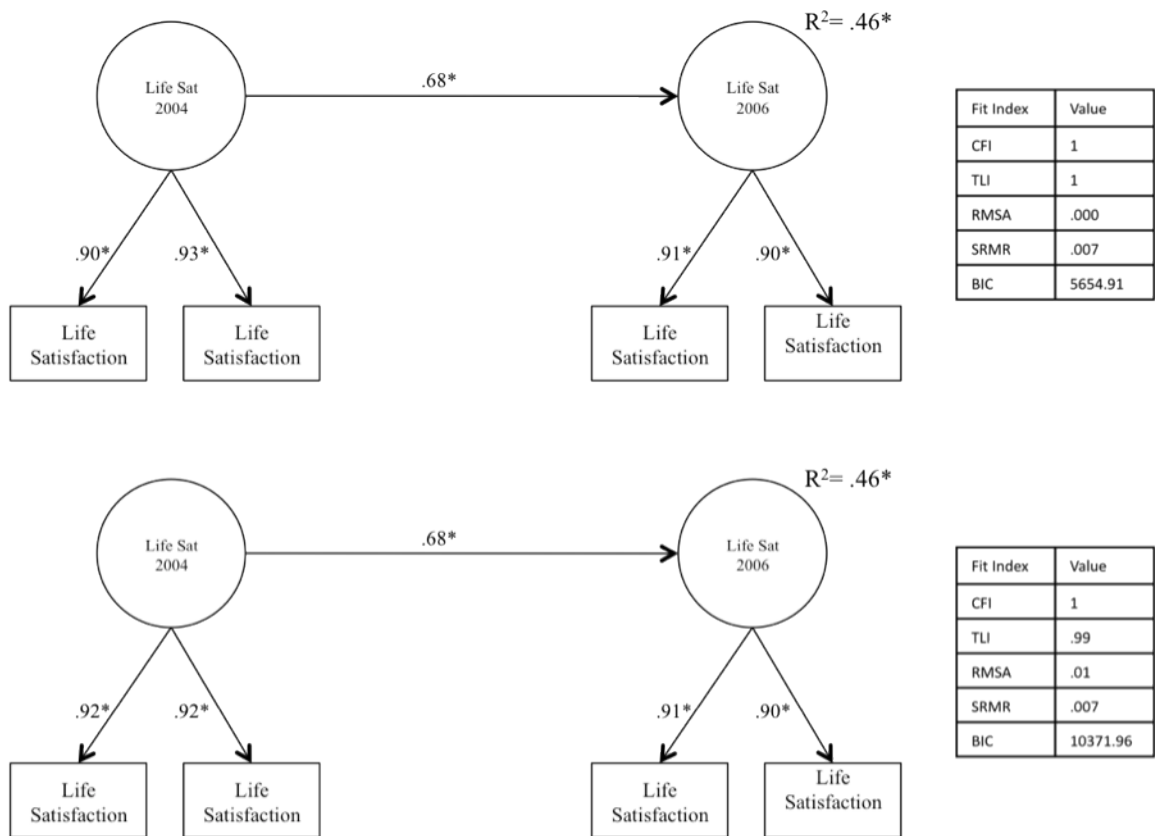
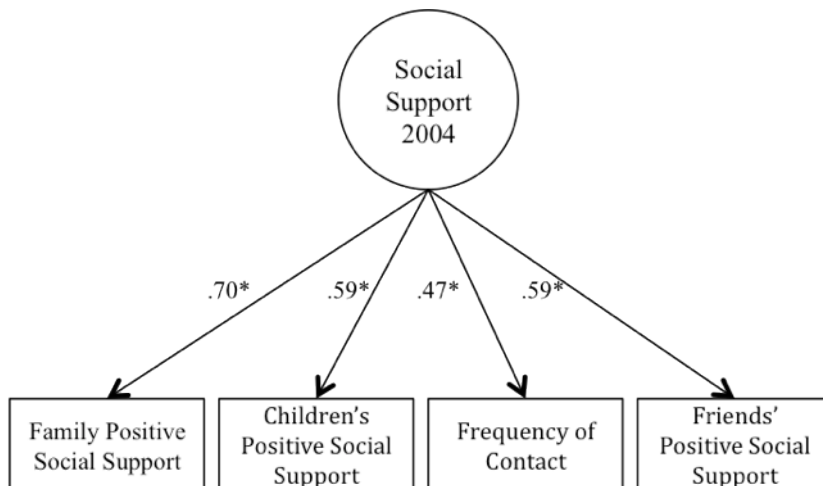
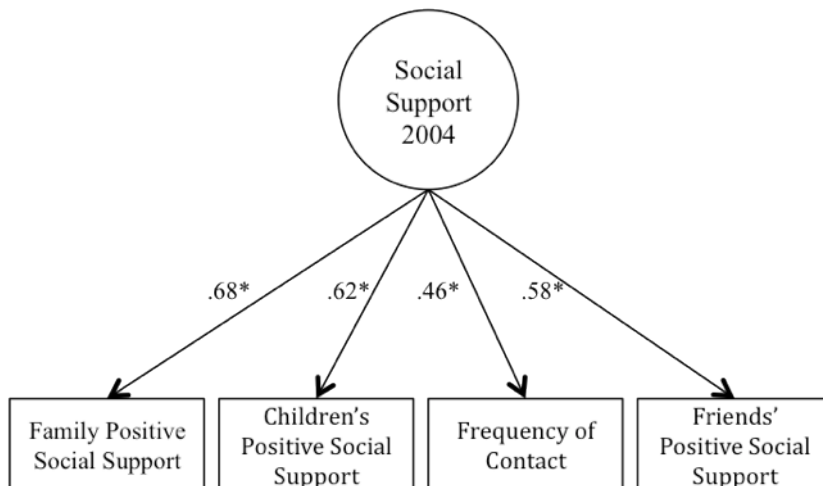


Figure 9. Construct stability of Life Satisfaction. The first illustration is based on listwise data ($n = 522$). The second illustrations is based on imputed data ($n = 1336$).



Fit Index	Value
CFI	1
TLI	1
RMSA	0
SRMR	.008
BIC	10529.7



Fit Index	Value
CFI	1
TLI	.99
RMSA	.025
SRMR	.011
BIC	11344

Figure 10. Standardized results of an over identified confirmatory factor analysis of Social Support, 2004. The first illustration is based on listwise data ($n = 975$). The second illustration is based on imputed data ($n = 1346$).

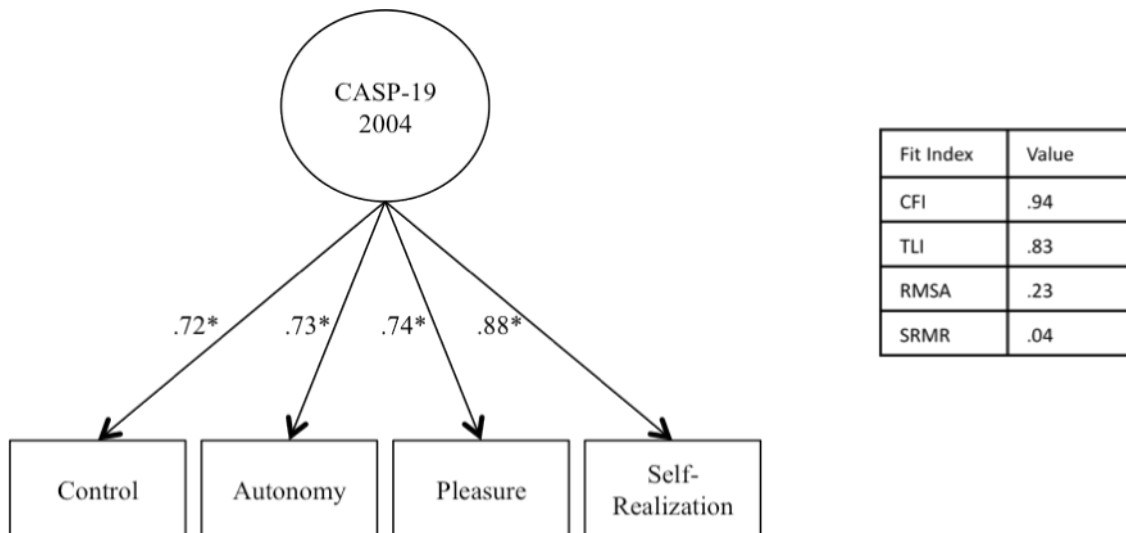


Figure 11. Standardized results of an over identified confirmatory factor analysis of the CASP-19, 2004. The illustration is based on listwise data ($n = 1302$).

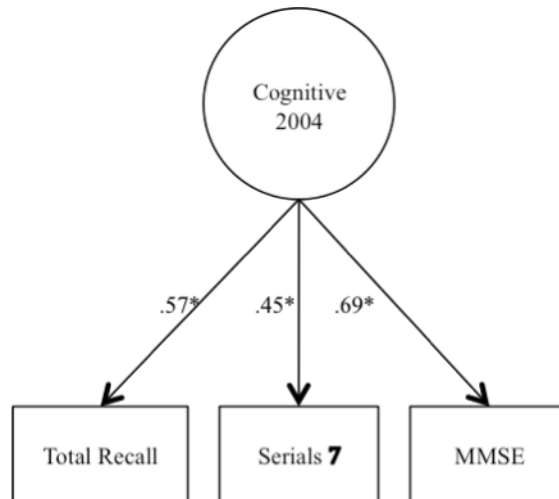
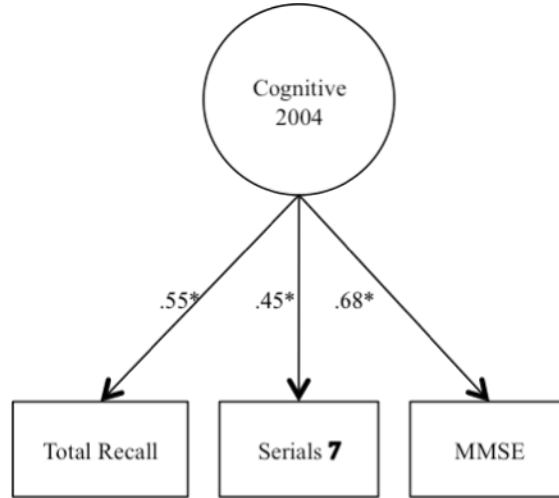


Figure 12. Standardized results of a just identified confirmatory factor analysis of Cognition, 2006. The first illustration is based on listwise data ($n = 984$). The second illustration is based on imputed data ($n = 1346$).

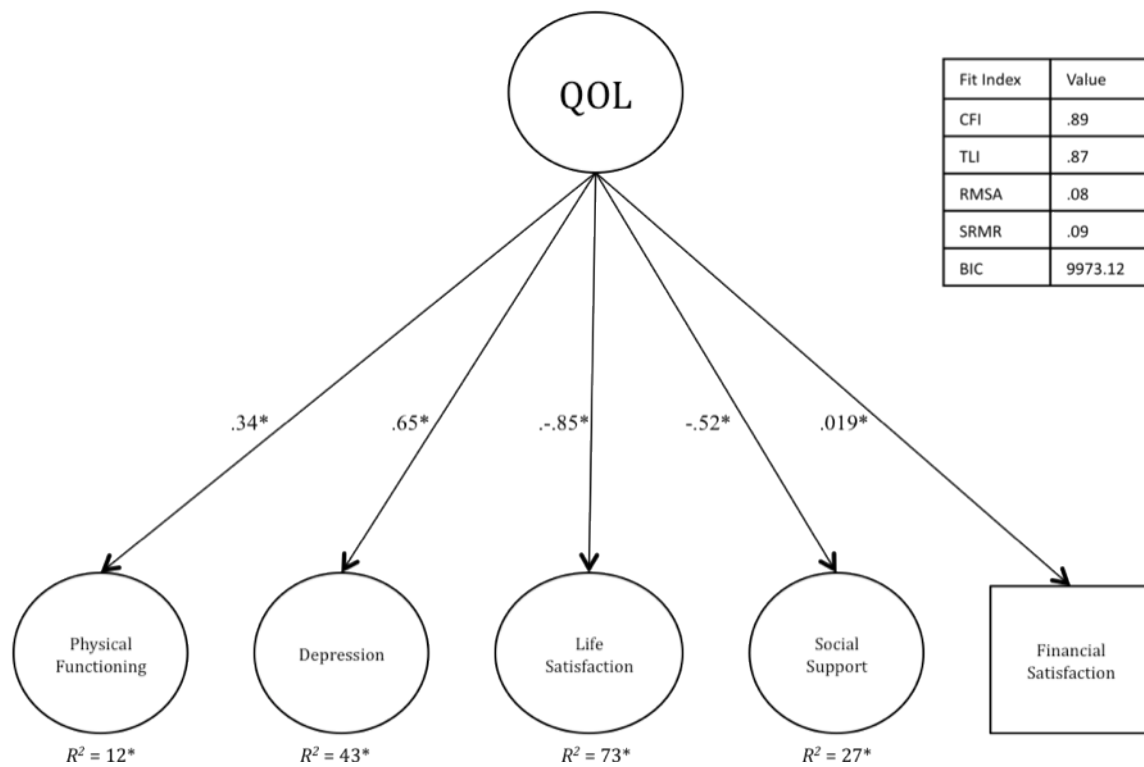


Figure 13. Second order factor analysis of quality of life. The illustration is based on listwise analysis ($n = 486$).

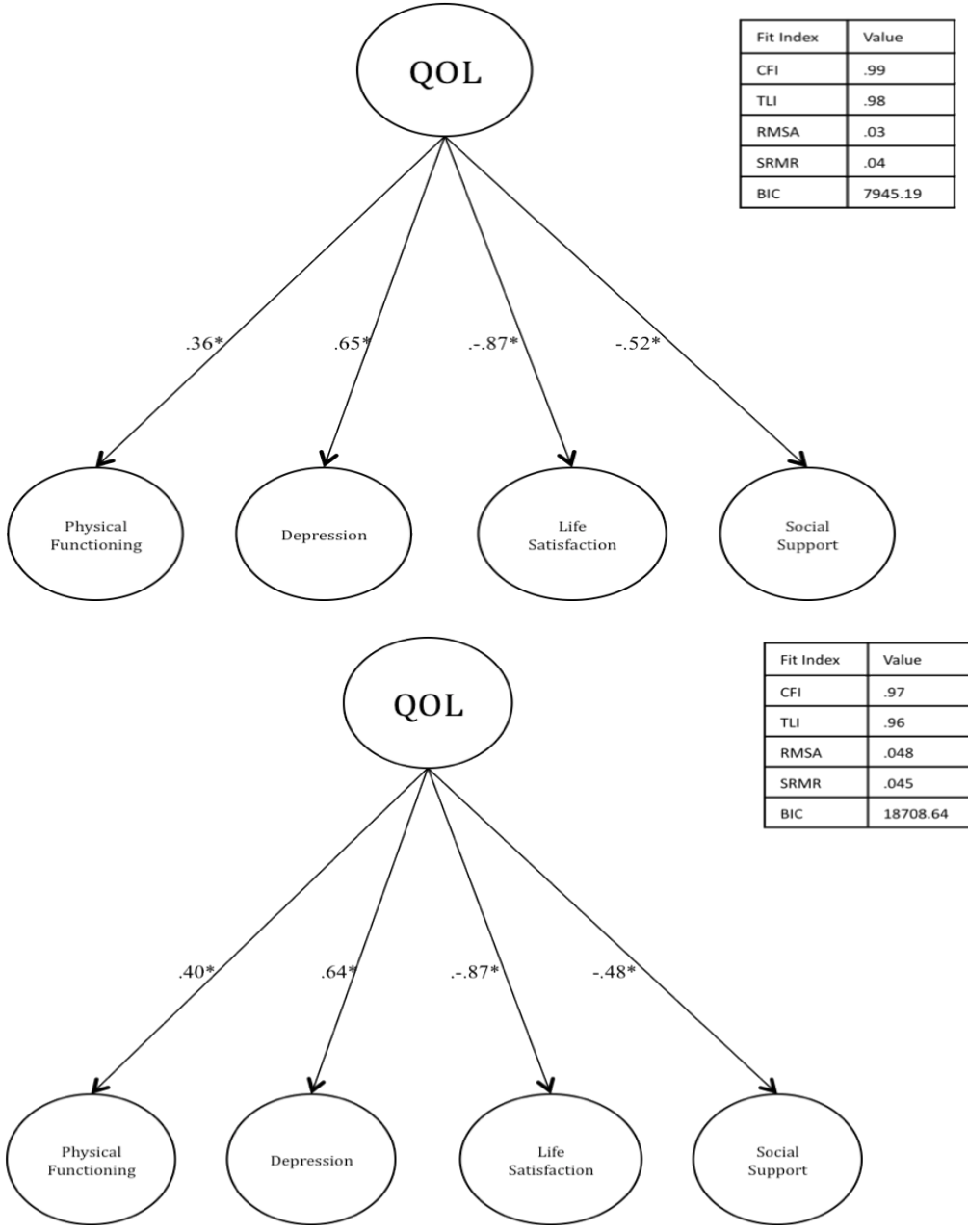


Figure 14. Second order factor analysis of QOL without Financial Satisfaction as a Factor. The first illustration shows the results of the listwise ($n = 509$) while the second illustration shows the results for the imputed data ($n = 1352$).

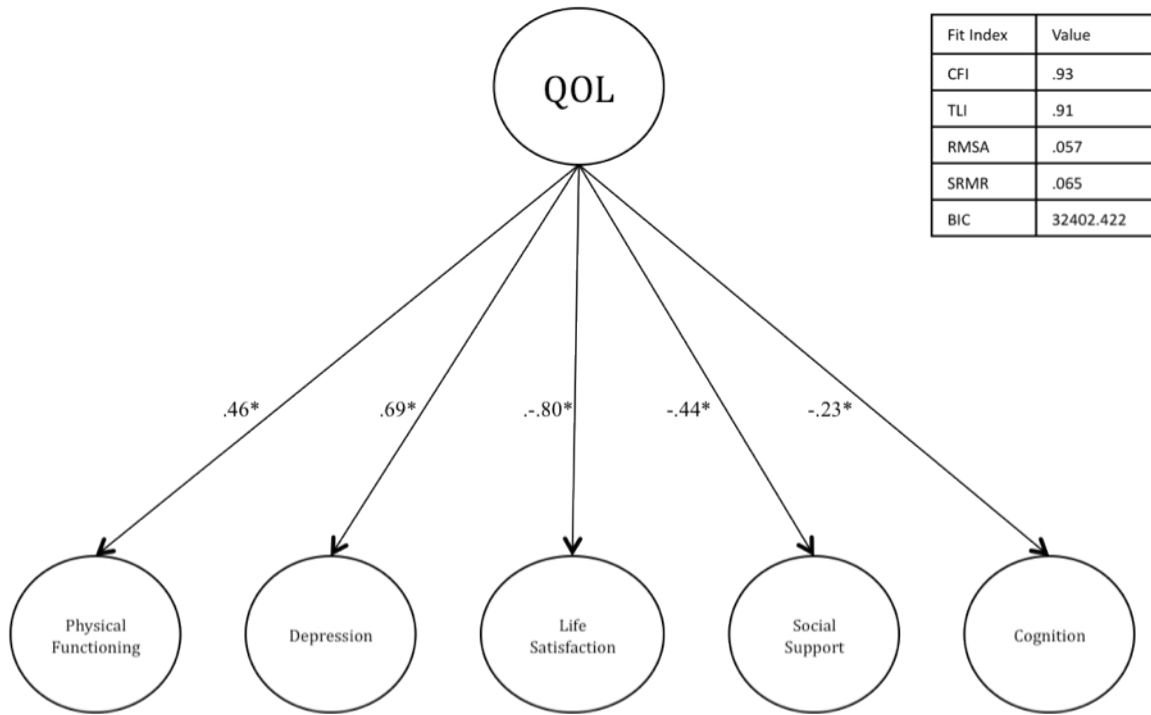


Figure 15. Second order factor analysis of QOL with Cognitive Functioning as a Factor.

The illustration shows the results with imputed data ($n = 1352$).

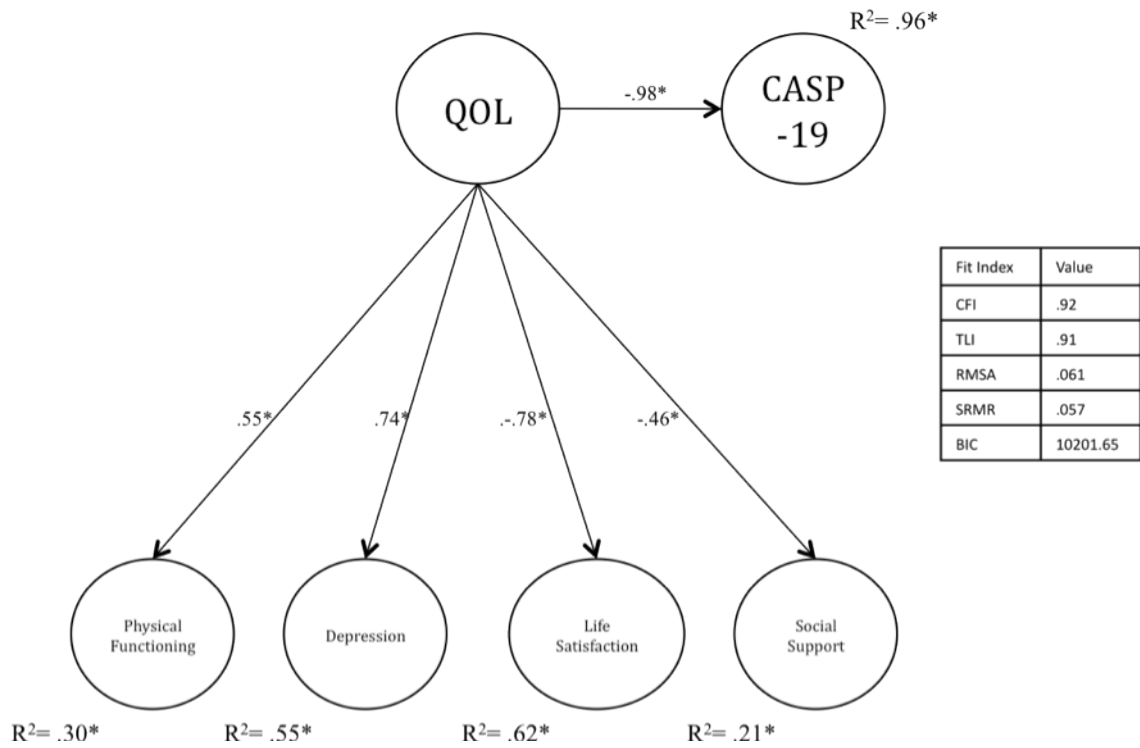


Figure 16. The relationship between the developed QOL model and CASP-19 using listwise data ($n = 491$).

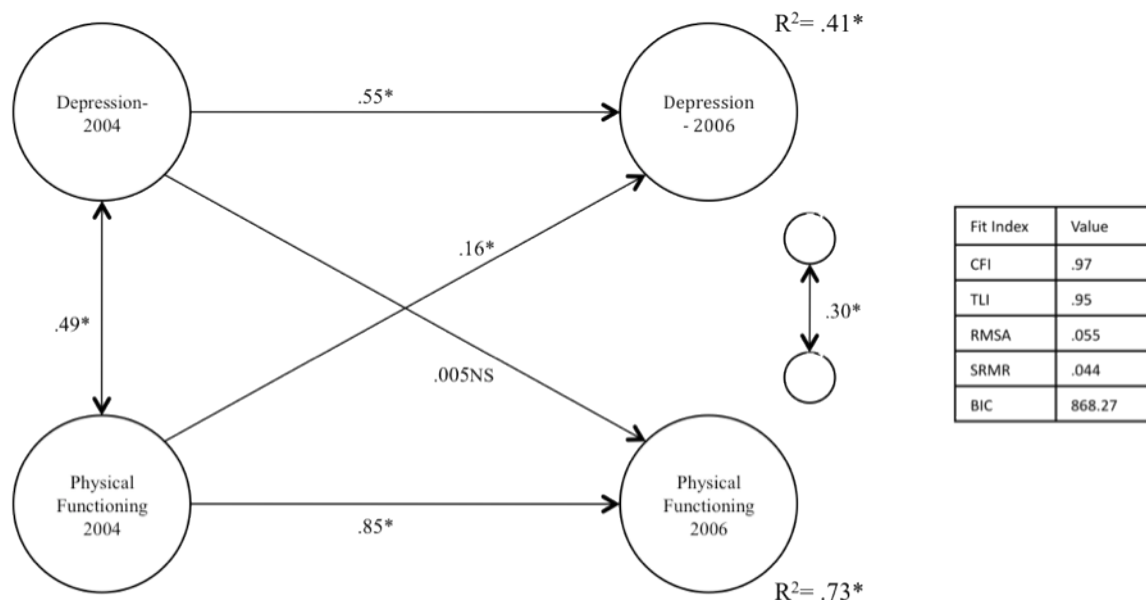
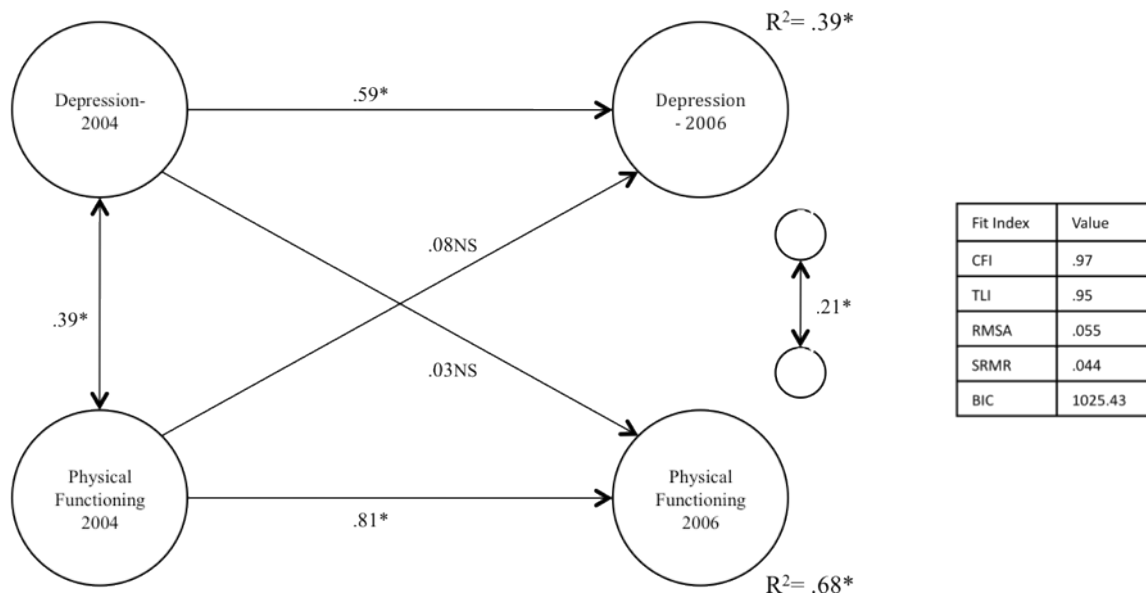


Figure 17. Longitudinal cross-lagged panel of Depression and Physical Functioning.

The first illustration is based on listwise data ($n = 538$). The second illustration is based on the results with imputed data ($n = 1352$).

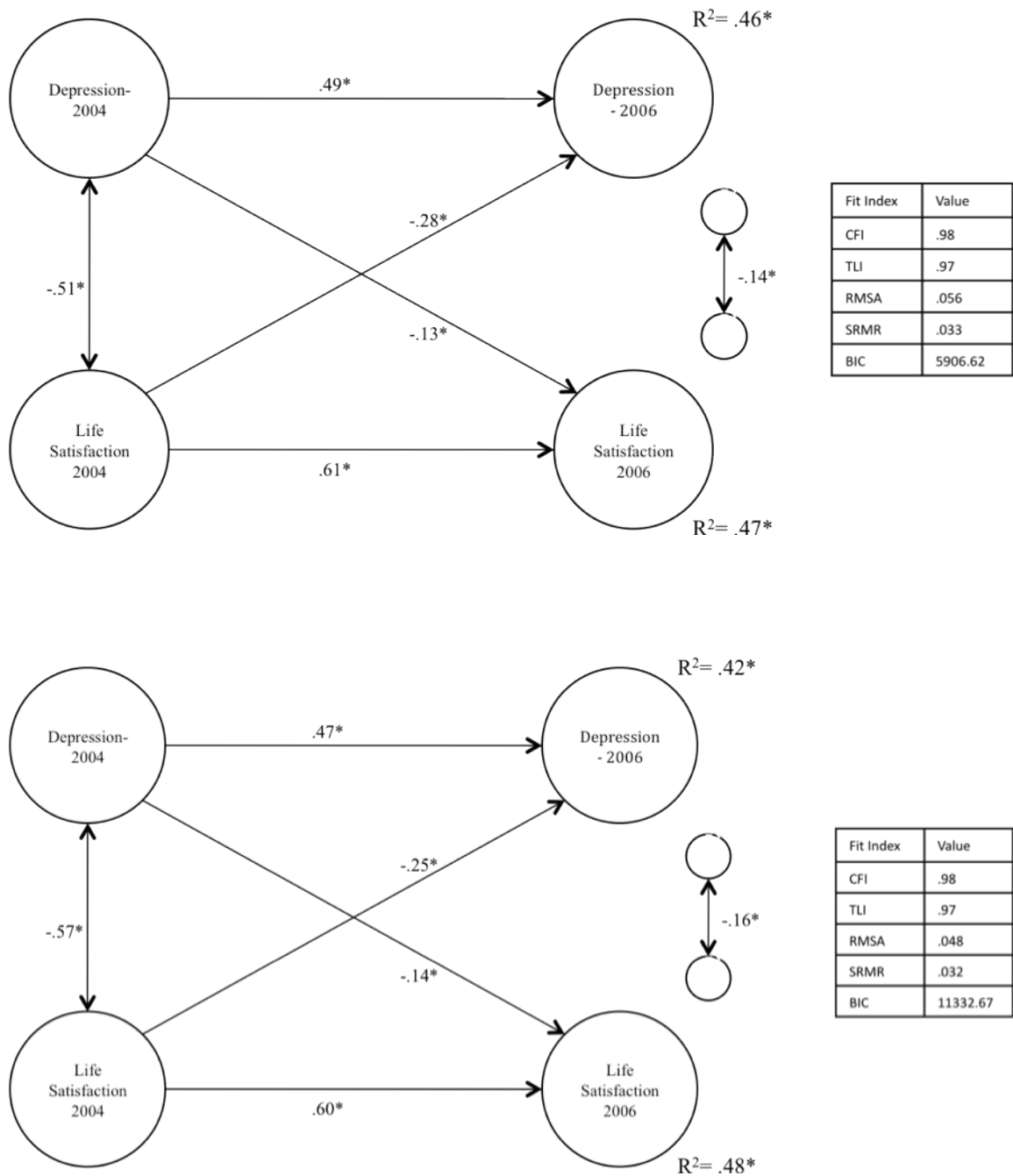


Figure 18. Longitudinal cross-lagged panel of Depression and Life Satisfaction. The first illustration is based on listwise data results ($n = 538$). The second is based on imputed data results ($n = 1352$).

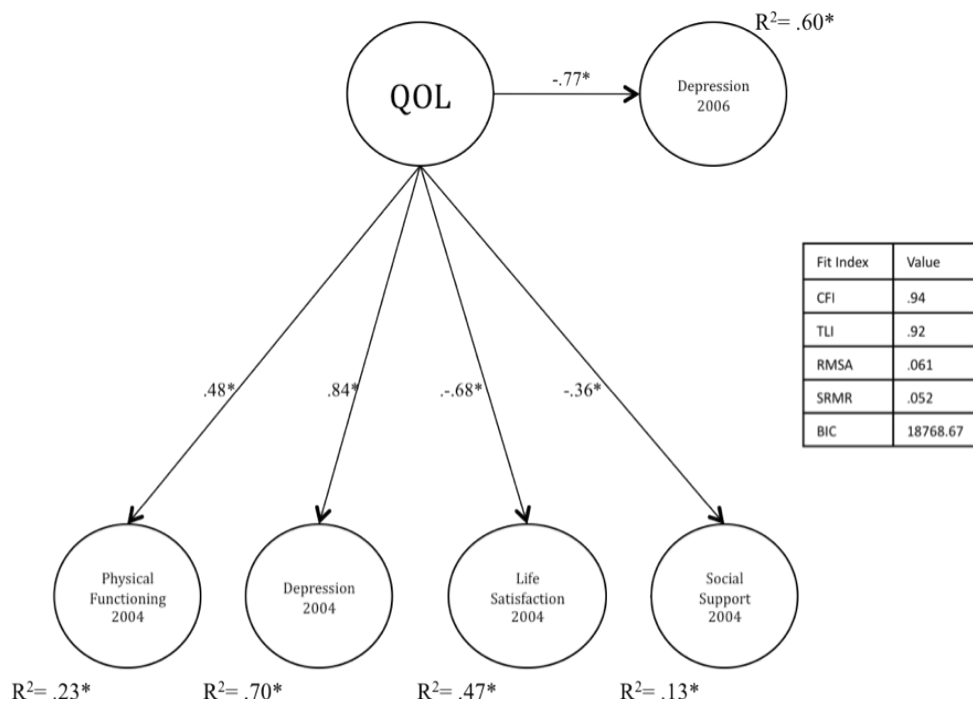
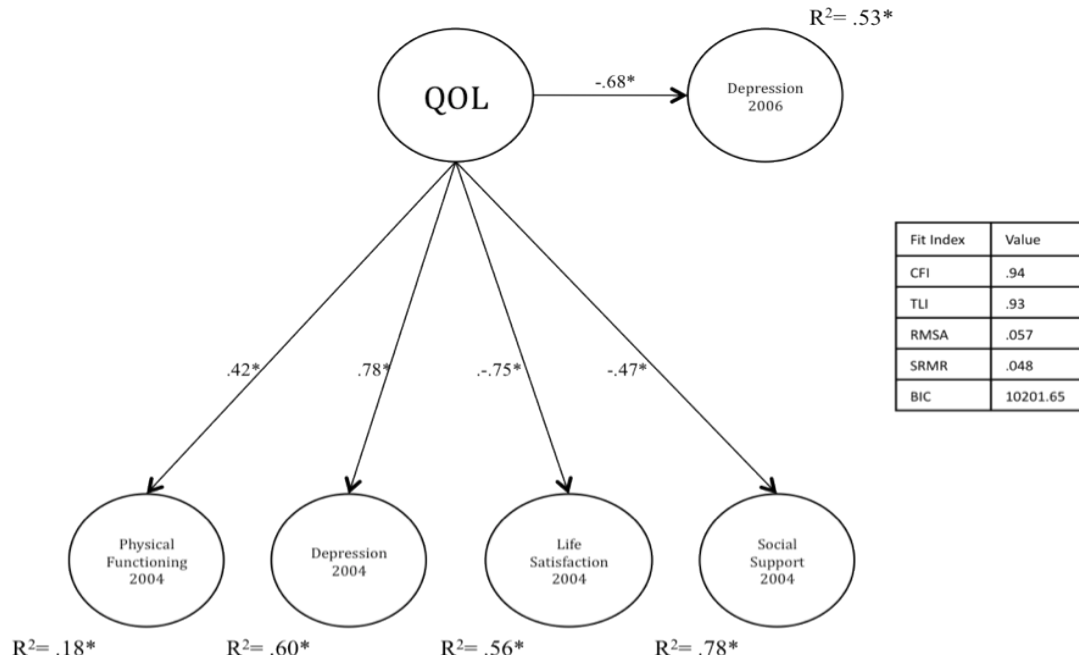


Figure 19. 2004 QOL as a predictor of 2006 Depression. The illustration on the top is based on results using listwise data ($n = 468$) while the illustration on the bottom is based on results based on imputed data ($n = 1352$).

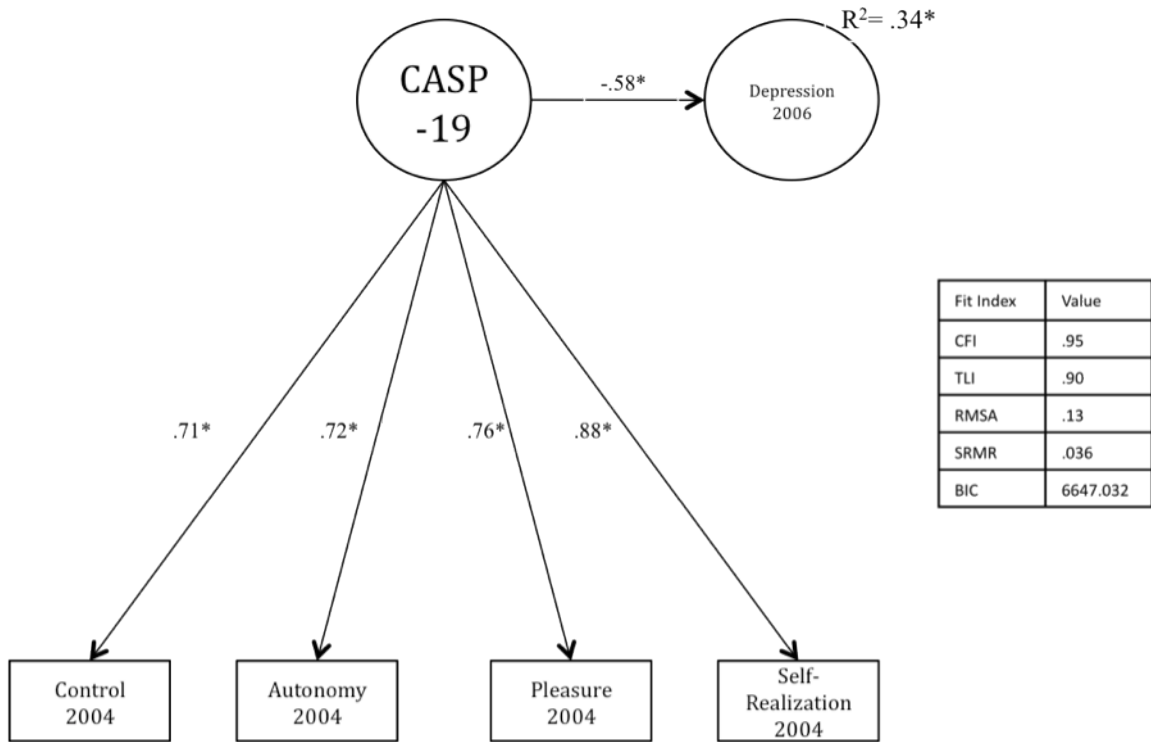


Figure 20. 2004 CASP-19 predicting 2006 Depression. The illustration is based on listwise data results ($n = 1193$).

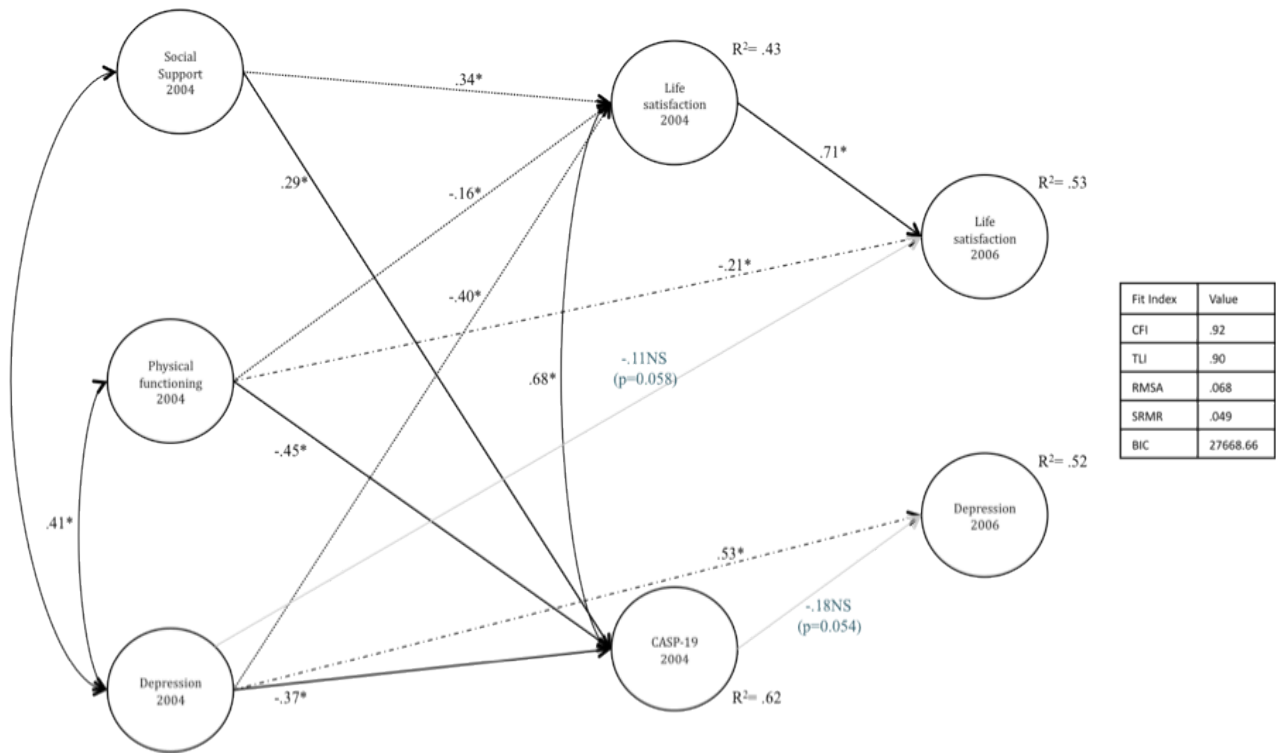


Figure 21. Predicting CASP-19 and Life Satisfaction, 2004-2006. The illustration is based on imputed data results (n = 1352). Dashed lines were used to convey direct effect.

APPENDIX A
2004-2006 PHYSICAL FUNCTIONING QUESTIONS

Physical Functioning Questions

Possible answers to the following questions are: *Yes, no, can't do, don't do, don't know, refuse to answer*. However, the answers were recoded as Impaired and not impaired. The options *don't know* and *refuse to answer* were recorded as missing. Higher final scores in the physical functioning impairment composites indicate higher levels of impairment.

Strength and movement composite.

Because of a health problem do you have any difficulty with walking several blocks?

Because of a health problem do you have any difficulty with pulling or pushing large objects like a living room chair?

Because of a health problem do you have any difficulty with lifting or carrying weights over 10 pounds, like a heavy bag of groceries?

Do you get any help with work around the house or yard because of a health problem?

Activities of daily living.

Because of a health or memory problem do you have any difficulty with dressing, including putting on shoes and socks?

Because of a health or memory problem do you have any difficulty with bathing or showering?

Because of a health or memory problem do you have any difficulty with getting in or out of bed?

Instrumental Activities of Daily Living.

Because of a health or memory problem, do you have any difficulty preparing a hot meal?

Because of a health or memory problem, do you have any difficulty with shopping for groceries?

Because of a health or memory problem, do you have any difficulty with making phone calls?

Because of a health or memory problem, do you have any difficulty with managing your money -- such as paying your bills and keeping track of expenses?

(Compute ADL_SM = mean.2 (walking, pulling, carrying, yard):

(Compute ADLs = mean.2 (dressing, bathing, bed).

(Compute IADLS_04 = mean.3 (meal, shopping, phone, money).

APPENDIX B
2004-2006 CESD-8

Possible answers to the following questions are: *Yes, no, don't know, refuse to answer*. Higher composite scores indicate higher levels of depression. *Don't know* and *refuse to answer* were recoded as missing.

Much of the time during the past week:

You felt depressed?

You felt that everything you did was an effort?

Your sleep was restless?

You were happy?

You felt lonely?

You enjoyed life?

You felt sad?

You could not get going?

compute NegMood = mean.2 (Depressed, lonely, sad).

compute NotHapp = mean.2 (happy (reversed), enjoyed (reversed)).

compute Somatic = mean.2 (effort, sleep, get going).

APPENDIX C

2004-2006 SATISFACTION WITH LIFE SCALE

Possible answers to the questions in 2004 are: *Strongly Agree* = 1, *agree* = 2, *slightly agree* = 3, *neither agree nor disagree* = 4, *slightly disagree* = 5, *disagree* = 6, *strongly disagree* = 7. Possible answers to the questions in 2006 are: *Strongly agree* = 6, *somewhat agree* = 5, *slightly agree* = 4, *slightly disagree* = 3, *somewhat disagree* = 2, *strongly disagree* = 1. The questions were coded in such a way that higher scores indicate higher levels of QOL.

Please say how much you agree or disagree with the following statements:

In most ways my life is close to ideal.

The conditions of my life are excellent.

I am satisfied with my life.

So far, I have gotten the important things I want in life.

If I could live my life again, I would change almost nothing.

Compute LifeSat1 = mean.2 (ideal, satisfied, change).

compute LifeSat2 = mean.2 (Excellent, important).

APPENDIX D
2004 SOCIAL SUPPORT QUESTIONS

Possible answers to the questions: *A lot, some, a little, not at all*. The answers were recoded in such a way that higher scores indicate higher levels of social support.

Children.

Thinking about all of your living children, please check the answer which best shows how you feel about each statement:

How much do they really understand the way you feel about things?

How much can you rely on them if you have a serious problem?

How much can you open up to them if you need to talk about your worries?

Family.

We would now like to ask you some questions about your immediate family. Please check the answer which shows how you feel about each statement.

How much do they really understand the way you feel about things?

How much can you rely on them if you have a serious problem?

How much can you open up to them if you need to talk about your worries?

Friends.

We would now like to ask you some questions about your friends. Please check the answer which best shows how you feel about each statement.

How much do they really understand the way you feel about things?

How much can you rely on them if you have a serious problem?

Frequency of Contact

Possible answers to the following questions are: *Three or more times a week, once or twice a week, once or twice a month, every few months, once or twice a year,*

less than once a year or never. The answers were recoded in such a way that higher scores indicate higher levels of social support

Children.

On average, how often do you do each of the following with any of your children, not counting any who live with you?

Meet up

Speak on the phone

Family.

On average, how often do you do each of the following with any of these family members, not counting any who live with you?

Meet up

Speak on the phone

Friends.

On average, how often do you do which of the following with any of your friends, not counting any who live with you?

Speak on the phone

Family positive social support = $\text{mean}.2(\text{understand, rely, open})$.

Children positive support = $\text{mean}.2(\text{understand, rely, open})$.

Friends positive social support = $\text{mean}.2(\text{understand, rely})$.

Frequency of contact = $\text{mean}.3(\text{ChildrenMeet, ChildrenPhone, FamilyMeet, FamilyPhone, FriendsPhone})$.

APPENDIX E
2004 CASP-19 QUESTIONNAIRE

CASP-19: Control, Autonomy, Self-realization, Pleasure

Possible answers for the CASP-19 are: *Often, sometimes, not often, never.*

The answers were coded in such a way that higher scores indicate higher levels of QOL.

Here is a list of statements that people have used to describe their lives or how they feel. We would like to know how often, if at all, you feel this way.

Control.

My age prevents me from doing the things I would like to.

I feel that what happens to me is out of my control.

I feel free to plan for the future.

I feel left out of things.

Autonomy.

I can do the things that I want to do.

Family responsibilities prevent me from doing what I want to do (1st item removed because of low mean inter-item $r = .235$).

I feel that I can do as I please.

My health stops me from doing things I want to do.

Shortage of money stops me from doing the things I want to do (removed because of low squared multiple correlation = .105 and because it conceptual and statistical overlap with the subjective economic status measure).

Pleasure.

I look forward to each day.

I feel that my life has meaning.

I enjoy the things that I do.

I enjoy being in the company of others.

On balance, I look back on my life with a sense of happiness.

Self-realization.

I feel full of energy these days.

I choose to do things that I have never done before.

I feel satisfied with the way my life has turned out.

I feel that life is full of opportunities.

I feel that the future looks good for me.

Compute CASP_Con = mean.2 (jlb503a_r, jlb503b_r, jlb503c_r, jlb503d_r).

Compute CASP_Au = mean.2 (jlb503e_r, jlb503g_r, jlb503h_r).

Compute CASP_Ple = mean.3 (jlb503j_r, jlb503k_r, jlb503l_r, jlb503m_r,
jlb503n_r).

Compute CASP_SR = mean.3 (jlb503o_r, jlb503p_r, jlb503q_r, jlb503r_r,
jlb503s_r).

APPENDIX F
2004 COGNITIVE FUNCTIONING QUESTIONS

Serial 7s.

Now let's try some subtraction of numbers. One hundred minus 7 equals what?

This question was repeated five times. A summary score of correct responses was calculated and used as the composite called Serial 7s.

Recall.

Immediate recall. I'll read a set of 10 words and ask you to recall as many as you can. We have purposely made the list long so that it will be difficult for anyone to recall all the words -- most people recall just a few. Please listen carefully as I read the set of words because I cannot repeat them. When I finish, I will ask you to recall aloud as many of the words as you can, in any order. Is this clear?

Note: One of four word lists was randomly assigned to be read to the respondent and the words in that list. The first list of words consisted of words 1-10, the second list consisted of words 11-20, etc. The assignment was made longitudinally, so each respondent is assigned a different set of words in each of four successive waves of data collection. The assignment is also made so that two respondents in the same household (i.e., spouses or partners of one another) are not assigned the same set of words in the same or in adjacent waves.

An immediate recall composite was formed by summarizing the number correct words recalled.

Delayed recall.

"After approximately 5 minutes of asking other survey questions (e.g., depression, and cognition items including backwards count, and serial 7's) the respondent was asked to recall the nouns previously presented as part of the immediate

recall task” (Ofstedal et al., 2005, p. 8). A delayed recall composite was formed by summarizing the number correct words recalled.

Total Recall.

A total Recall composite was formed by adding the correct immediate and delayed recall responses.

MMSE.

The Mini Mental Status Exam score was calculated by summarizing the number of correct responses to the following questions:

Please tell me today's date (A point was assigned for each correct answer):
Month, day, year, day of week.

What do you call the kind of prickly plant that grows in the desert?

Who is the President of the United States right now?

Who is the Vice President?

APPENDIX G
2004 FINANCIAL SATISFACTION QUESTIONS

Financial Status

Possible answers to the first two financial satisfactions questions are: *Not at all satisfied, not very satisfied, somewhat satisfied, very satisfied, and completely satisfied.*

Higher scores indicate higher financial satisfaction.

Please indicate which of the following choices best describes how you feel about your current financial situation. (Circle one answer for each line.)

How satisfied are you with (you/your family's) present financial situation?

How difficult is it for (you/yours family's) to meet monthly payments on your (family's) bills?

Possible answers to the third financial satisfaction questions are: *Often, sometimes, not often, never.* Higher scores indicate higher financial satisfaction.

Here is a list of statements that people have used to describe their lives or how they feel. We would like to know how often, if at all, you feel this way.

Shortage of money stops me from doing the things I want to do.

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