

Empirical Report

“Eat Drink and be Merry”. Healthy Lifestyle and Subjective Well-being

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Degrees

Bachelor of Psychology

In Partial Fulfilment of the Requirements of

(Post) Graduate Diploma of Psychology

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Submitted

24th October 2005

Word Count

4,996

I, the undersigned, declare that this Empirical Report is less than the specified word limit, and that it comprises original work and writing by me, and that due acknowledgement has been made to all other material used.

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Abstract

The aims of this study were to develop a healthy lifestyle satisfaction scale to measure subjective well-being and to determine where the healthy lifestyle dimension (including both lifestyle satisfaction and experience) fits in the homeostasis model of subjective well-being and the proximal-distal hypothesis. Healthy diet, sleep and exercise have all been studied separately and have been shown to predict life satisfaction. To date no studies have investigated the combined influence of all these factors. Neighbourhood well-being, personal well-being and national well-being have been shown to be distinct dimensions of subjective well-being. This study tested whether healthy lifestyle well-being was an additional dimension, or whether satisfaction with one's healthy diet, sleep and exercise is subsumed by health satisfaction as one of the domains of personal well-being. The participants were 195 male and female Australian adults who completed a survey questionnaire with measures of healthy lifestyle well-being and experience; homeostatic model experiential, personality and cognitive buffer predictors of subjective well-being, and life satisfaction. The findings provided support for the healthy lifestyle satisfaction scale being a reliable measure with some content validity. Healthy lifestyle experience had an additive effect as a component of experiential input that predicts life satisfaction. Healthy lifestyle well-being had an additive effect on the contribution of personal health in the prediction of life satisfaction. The prediction that the healthy lifestyle domain would fall in the conceptual space of subjective well-being between neighbourhood and personal well-being was not supported. Healthy lifestyle well-being was found to contribute to the prediction of both personal well-being and life satisfaction. As the study was exploratory, future studies are needed to confirm the results, and to examine further how healthy lifestyle satisfaction and experience play an important role in individuals' subjective well-being.

"Soul you have ample goods laid up for many years. Take your ease; *eat, drink and be merry.*" Luke 12:19

From everyday discussions with friends and in the media, one would expect that an individual's satisfaction with how they live their life would be closely related to their satisfaction with life in general. Surprisingly, there appears to be little direct psychological research that investigates the relationship between subjective well-being and lifestyle. Subjective well-being has been extensively studied, and has been defined as a relatively stable construct that consists of positive and negative affect in combination with life satisfaction (Lox, McAuley, & Tucker, 1995).

Cummins and his colleagues have proposed a homeostatic model of subjective well-being (Cummins, Gullone, & Lau, 2002; Mellor, Cummins, Karlinski, & Storer, 2003) to explain how people maintain their level of life satisfaction at a fairly constant and positive level, and how there may be individual differences in the effectiveness with which individuals respond to life challenges. The model is illustrated in Figure 1 (from Mellor et al., 2003).

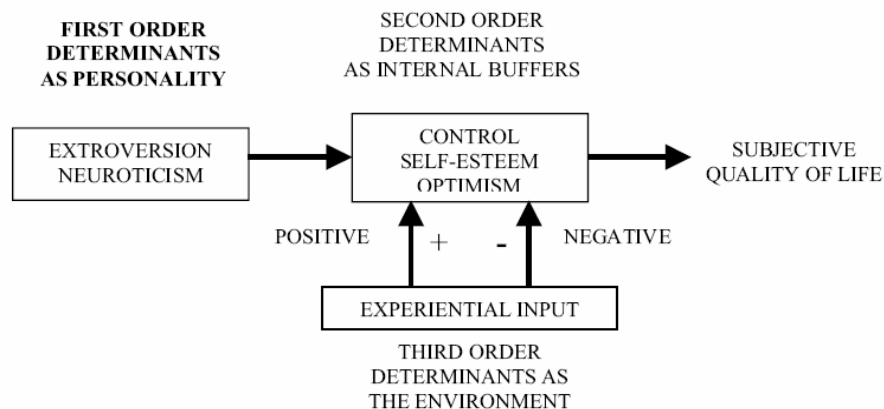


Figure 1
A model for subjective quality of life homeostasis

It is assumed that the impacts of personality factors (neuroticism and extraversion) and experiential input (positive and negative life experiences) on subjective well-being are filtered by cognitive buffer factors (optimism, perceived control and self-esteem). Davey (2004) established results that were not consistent with the homeostatic model. Under maintenance conditions, the only personality and cognitive buffer factor that was a significant predictor of subjective well-being was self-esteem. This finding suggests the need for further empirical investigation of the model.

The homeostatic model of subjective well-being provides a theoretical framework for exploring how healthy lifestyle experiences combine with general life experiences and psychological factors in the prediction of subjective well-being.

“Lifestyle” has not yet been established as a construct in psychological literature. So what is a lifestyle? Lifestyle has been defined by the World Health Organisation (1999) as a “way of living that will decrease the risk of you becoming ill and a way of living that helps you enjoy your life more”. This definition fits the notion that lifestyle experiences are components of an individual’s interaction with the external world, and thus in terms of the homeostatic model of subjective well-being, part of the experiential input.

Three main factors have been identified as contributing to a healthy lifestyle: healthy exercise, healthy sleep quantity and quality, and a balanced diet. Positive experience of each of these factors has been reported to be positively related to subjective well-being (Abel, 1991; Corle et al., 2002). Most existing studies have focused on the establishment of a relationship between one of the factors and well-being or life satisfaction, rather than a multi-factor approach.

Studies of the relationship of physical exercise and well-being, have found that exercise experience is related positively to well-being. Valois, Zullig, Huebner and Drane (2004) found significantly lower levels of life satisfaction among adolescents who did not participate in physical exercise at all, while athletes who had retired, or had been injured and who were no longer able to partake in their elite sport also had lower levels of life satisfaction (Stephan, Bilard, Ninot, & Delignières, 2003). Riddick and Stewart (1994) presented attitudes of older women towards exercise and leisure impacted on their life satisfaction, with black women in their sample reporting lower levels of life satisfaction and more negative views towards activity and leisure than white women. Ogden et al. (1997) reported that those chronically ill patients who choose to exercise improved their subjective well-being. Similarly, Lox, McAuley and Tucker (1995) studied HIV patients and found there was a significant difference in patients’ life satisfaction before and after an exercise program was implemented. Data on healthy adults’ exercise and well-being are needed to establish more clearly the links between healthy exercise, healthy lifestyle and subjective well-being.

The literature on dieting and subjective well-being has established a solid relationship, with body image being an important related factor. Kitsantas et al. (2003) and

Thome and Espalage (2004) studied samples of adolescents already diagnosed with an eating disorder, those at high risk, and those without eating disorders. Both studies reported that participants with eating disorders or bad eating behaviours had lower levels of life satisfaction and lower levels of coping skills. Research on obesity has shown that there is a decreased level of life satisfaction among those who are obese (Karlsson, Sjöström, & Sullivan, 1998; Tanco, Linden, & Earle, 1998). There appears to be little research that is directly relevant to how an individual's satisfaction with the "healthiness" of their eating relates to their satisfaction with their "healthy lifestyle", and the contribution of these perceptions to subjective well-being.

A relationship between sleep experience and subjective well-being has been established in several studies. Blagrove, Farmer and Williams (2004) reported lower well-being in those who suffer from nightmare distress and those who suffer frequent unpleasant dreams. Manocchia, Keller and Ware (2001) studied sleep, mental health and the chronically ill. Sleep problems were a contributing factor to mental health problems and other health-related problems. It was argued that the more chronically ill the patient, the more sleep problems they had and hence their lower levels of quality of life. This view is consistent with conclusions from other research (Xavier et al., 2002) on quality of life and illness. Little research has been undertaken on the role of sleep satisfaction for the subjective well-being of adults in the general population.

No existing study has examined whether the three healthy lifestyle factors combine to make a coherent "healthy lifestyle" construct. To progress an understanding of this, the construct need first be established, and then empirically tested with other factors that have been proposed to underlie subjective well-being. The homeostatic model of subjective well-being provides one theoretical framework to explore these relationships.

Recent studies have demonstrated that neighbourhood (Cummins & Chambers, 2004) and national well-being (Cummins et al., 2003) are dimensions of subjective well-being which are distinct from personal well-being. Cummins et al. (2003) reported levels of satisfaction were significantly higher for personal wellbeing (73%) than for national well-being (57%), and less variable. In their explanation of these differences Cummins et al. proposed two hypotheses: proximal-distal and abstract-specific. These are illustrated in Figure 2. The proximal-distal hypothesis, focused on in this study, proposed that the highly stable and positive satisfaction level of personal well-being is due to this life dimension

being more self-relevant and more directly controlled by an individual's homeostatic system.

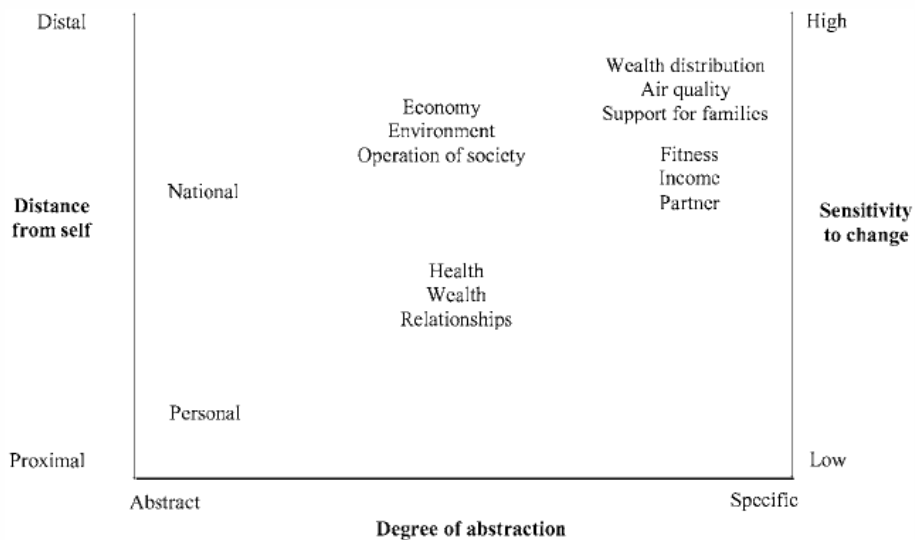


Figure 2. Bi-dimensional model of subjective wellbeing sensitivity to external forces of change.

In a subsequent study, Cummins and Chambers (2004) reported evidence of a separate third dimension, representing neighbourhood well-being. Thus items representing salient domains in life dimension grouped to form separate factors, with little overlap. Consistent with the proximal-distal hypothesis, neighbourhood well-being was found to have intermediate satisfaction levels (65%), being lower than personal (75%) and higher than national (61%) satisfaction levels.

Intuitively, given that “healthy lifestyle” is conceptually more self-relevant and thus more likely to be controlled by the individual than either neighbourhood or national well-being, if “healthy lifestyle” is a distinct dimension of an individual’s subjective well-being, it would be expected that satisfaction levels would fall closer to personal well-being than the more distal neighbourhood and national well-being dimensions.

The purpose of the present study was to explore further the relationship of healthy lifestyle and subjective well-being, using the homeostatic model of subjective well-being as the theoretical framework. Based on the literature reviewed, five predictions were tested.

Hypotheses

Firstly, a reliable healthy lifestyle well-being scale can be developed based on satisfaction levels in the domains of healthy sleep, eating and exercise satisfaction. This

prediction was tested by a reliability analysis and correlations of a healthy lifestyle scale developed for the study with items measuring satisfaction levels in the three domains.

Secondly, healthy lifestyle satisfaction is a dimension of subjective well-being distinct from personal, neighbourhood and national well-being. This prediction was tested by a factor analysis of items from four well-being scales. Scores on the items on the healthy lifestyle scale were predicted to form a separate factor from scores on the other three scales. Further, given the domains constituting the healthy lifestyle scale relate to satisfaction with different aspects of personal health, it was predicted that the factor analysis would demonstrate that the personal well-being scale item for health satisfaction, would load high on the healthy lifestyle factor.

Thirdly, healthy lifestyle well-being as a dimension of subjective well-being fits the conceptual space between personal well-being and neighbourhood well-being. This prediction follows from the proximal-distal hypothesis and assumes that healthy lifestyle well-being has greater self-relevance than neighbourhood well-being, and less self-relevance than personal well-being. This prediction was tested (a) by comparing the satisfaction levels and the variability ranges of scores on four well-being scales, and (b) by determining that scores on the healthy lifestyle scale made a unique contribution (additional to that of the other three well-being scales) to the prediction of subjective well-being..

Fourthly, it was predicted that higher positive levels of experience in the three healthy lifestyle domains act as experiential inputs in the homeostatic model of subjective well-being. It was assumed that high positive experience scores in the three healthy lifestyle domains would provide an additive positive contribution as an experiential input to the model. This prediction was tested in a regression analysis on subjective well-being in which scores on the independent variables measuring healthy lifestyle experience (sleeping, eating, exercise), and the homeostatic model factors (life event, personality and cognitive buffers) were regressed on life satisfaction.

Finally, healthy lifestyle satisfaction in the three domains was tested as a contributor of satisfaction with personal health as part of personal well-being. It was predicted that high levels of satisfaction in these domains would make an additive contribution to the prediction of the personal health domain, the level of personal well-being, and the

prediction of life satisfaction. This prediction was tested by a hierarchical regression analysis with satisfaction scores in the three healthy lifestyle domains.

Method

Participants

The participants were drawn randomly from a database of previous participants at the Australian Well-being project who had indicated that they were willing to participate in further projects. 340 participants were sent the questionnaire and 201 returned it completed, giving a response rate of 57.35 percent. The demographics of some participants were unknown from the database, but of those that were known there were 90 females ($M = 60.75$ years old, $SD = 15.37$) and 30 Males ($M = 60.75$ years old, $SD = 12.68$). The age of participants ranged from 18 years old to above 80 years old. No enticements were given for participation.

Measures

As this study was run in conjunction with other studies there were a number of items included in the questionnaire that were not relevant to this study. These are presented in Appendix A. The remaining scales relevant to this study are outlined below. All scales used an 11-point Likert scale (ranging from 0 to 10) which was unconventional for most of the scales.

Personal well-being was measured using one global life-satisfaction item “How satisfied are you with your life as a whole?”, and using the 7-item Personal Well-being scale (Items 2-8) developed as part of the Australian Unity Wellbeing project (Cummins et al., 2001). The scale asks participants “How satisfied” they are with their standard of living, health, life achievements, personal relationships, safety, security and community connectedness. Cummins (2001) reported a high reliability of .82 across many samples. In this study the personal well-being scale had an alpha of .86.

Neighbourhood Well-being was assessed with seven items (Items 10-16), each measuring a broad neighbourhood-based domain. An item example is: “how satisfied are you with the level of trust in your neighbourhood?” Items for the scale were developed by Holloway (2003), who reported high Cronbach’s alpha of .89. In this study the neighbourhood well-being scale had an alpha of .88

National Well-Being was assessed with seven items (Items 17-23), each measuring a broad Australian-based domain. An item example is: “how satisfied are you with life in Australia?” Items in this scale were developed by Cummins et al (2003), who reported alpha’s ranging from .70 to .85. In this study the national well-being scale had an alpha of .90.

Healthy Lifestyle was assessed with six items (Items 100-105) with measures of satisfaction in the domains of exercise, diet and sleep. An item example item is: “How satisfied are you with how well you sleep?” A further seven questions (Items 106-112) measured Healthy life style experience. Example items were “How much do you agree with the following statements? “I usually sleep well”. Healthy lifestyle items were developed for this study.

Personality based on extraversion and neuroticism was measured using the four relevant questions from the Ten Item Personality Inventory (TIPI), a short inventory for measuring the Big Five personality dimensions (Gosling, Rentflow, & Swann, 2003). Gosling and colleagues (2003) found a coefficient alpha of .68 for extraversion and .73 for neuroticism. In this sample the alphas were .61 for extraversion and .54 for neuroticism.

Life events were measured using one item that asked participants, “Has anything happened to you recently causing you to feel happier or sadder than normal?” Participants answered, “Yes, happier,” “Yes, sadder” or “No.” A scale was created by recoding scores as 1 = “sadder”, 2 = “no event”, 3 = “happier”.

Cognitive Buffer Factors. Self-esteem, optimism and perceived control scales were used to measure the cognitive buffer factors.

Self-esteem was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1979). This ten-item scale is designed to measure global self-esteem (e.g. “On the whole I am satisfied with myself”). Previous studies found reliabilities ranging from .72 to .90 (Gary-Little, Williams, & Hancock, 1997; Robins, Henden, & Trzesniewski, 2001). In the current sample the coefficient alpha for the self-esteem scale was .87.

Optimism was measured using the Life Orientation Test-Revised (Carver & Scheier, 2003). The scale measures generalised optimism versus pessimism (eg. “Overall, I expect more good things to happen to me than bad”). The reliability of the scale has been found to range from .75 to .85. The coefficient alpha for the optimism scale for this sample was .88.

Perceived Control was measured using a nine-item scale developed for the Australian Unity Wellbeing project (Chambers, Hollway, Parsons, & Wallage, 2003). Primary control, secondary control and relinquished control were each measured by three items. All items begin with the statement “When something bad happens to me I...” An example of a primary control question is “I ask others for help or advice,” an example of a secondary control question is “I remind myself something good may come of it,” and an example of a relinquished control question is “I spend time by myself.” A Cronbach’s coefficient alpha of .76 was reported by Chambers et al (2003) for the Perceived Control scale, with the three relinquished control items reverse coded. The coefficient alpha for the perceived control scale with this sample was .62.

Procedure

Ethics approval was granted by the Deakin University Ethics Committee, although part of a larger study, separate ethics approvals were obtained (Appendix B). Surveys were mailed to the participants and included a plain language statement (Appendix B), a letter to the participant (Appendix B), and a reply paid envelope. The plain language statement explained the purpose of the survey, that it was voluntary, and that the completion and returning of the questionnaire indicated consent. The instructions to participants on the front of the questionnaire assured confidentiality. The questionnaires were designed to take approximately 20 minutes to complete and participants returned the completed questionnaires by mail within a few weeks of receipt.

Results

The data were initially screened for errors and missing data. Data were checked for inaccurate data entry using minimum and maximum frequencies for all items. Missing data were assessed with SPSS Descriptives, revealing that less than 5% of the data was missing, with no pattern. Missing values were then replaced with the mean. Preliminary analyses of the distributions of scores on all variables for outliers and normality were conducted. Outliers were assessed and when found were deleted. SPSS 12.0 Descriptives revealed violations of normal distribution for all scales. Given the expected skewed distributions commonly found for scales in subjective well-being studies (Cummins, Gallone, & Lau, 2002) and given the relatively small sample, data was not transformed, as this would alter the natural shape of the distribution and reduce accuracy (Tabachnick & Fidell, 1996). Details of this data screening and assumption testing are provided in Appendix C.

Hypothesis One: *A reliable healthy lifestyle well-being scale can be developed based on satisfaction levels in the domains of healthy sleep, eating and exercise.*

The Healthy Life Style Satisfaction items formed a scale with a satisfactory Cronbach's alpha reliability of .87. Table 1 presents the item alpha results and the correlation of the items with items on the Personal Well-being scale, and the Life Satisfaction item. For these items it can be seen that in general, the healthy lifestyle items were significantly correlated with all domains on the personal well-being scale. These results provide support for the first hypothesis that the three healthy lifestyle domains can be combined to form a reliable single measure.

Table 1

Healthy Lifestyle Satisfaction Item Alpha and Correlation with Personal Well-being Domains and Life Satisfaction

Item	Alpha ^a	Standard of living	Correlation						
			Health	Achieve	Personal Relationships	Safety	Community	Security	Life Satisfaction
Well you sleep	.709	.231**	.365**	.374**	.213**	.353**	.357**	.327**	.334**
Well you eat	.888	.305**	.366**	.285**	.180*	.300**	.217**	.219	.319**
Well you exercise	.636	.276**	.428**	.336**	.207**	.179*	.193**	.177**	.359**
Diet is healthy	.663	.198**	.328**	.280**	.219**	.183*	.157*	.136	.277**
Fitness level	.663	.231**	.567**	.435**	.221**	.212**	.255**	.185**	.396**
Body weight	.650	.210**	.450**	.285**	.154*	.127	.184**	.117	.280**

Note. ^a Alpha if item deleted. Correlations: ** $p < 0.01$ level, * $p < .05$ (2-tailed).

Hypothesis Two: *Healthy lifestyle satisfaction is a dimension of subjective well-being distinct from personal, neighbourhood and national well-being.*

For the second hypothesis a factor analysis was conducted to examine whether healthy lifestyle satisfaction was a distinct dimension of subjective well-being. This analysis was run using SPSS Data Reduction. The 25 items were subjected to maximum likelihood analysis for four factors. Prior to analysis, the data were checked for suitability to perform factor analysis. Inspection of the correlation matrix revealed many coefficients of .3 and above. The Kaiser-Meyer-Olkin test of sampling adequacy produced a result of .88 showing that factor analysis could be run on the data, while the Bartlett's test of sphericity value was significant at $p < .01$ showing that the variables are related. The analysis explained 57.39% of the variance. To aid interpretation a Varimax rotation was performed. The Varimax rotated four factor solution is presented in Table 2 showing the results for items with values higher than .30.

Table 2

Varimax Rotation of Four Factor Solution for Well-being Items

Item	1	2	3	4
<u>Personal</u>				
Your standard of living				.547
Your health		.492		.382
Achieving in life		.324		.627
Personal relationships				.477
Safe you feel				.553
Feel part of your community			.503	.698
Your future security			.455	.636
<u>Neighbourhood</u>				
The level of trust			.681	
The amount of social participation			.805	.313
The common goals and values			.873	
The state of the natural environment	.394		.659	
The availability of public resources	.389		.325	
The amount of people's borrowing and sharing			.577	
<u>National</u>				
The economic situation	.663			
The state of the natural environment	.789			
The social conditions	.827			
Government	.769			
Business	.815			
National Security	.631			
<u>Healthy Lifestyle</u>				
How well you sleep		.353		.375
How well you eat		.514		

How well you exercise	.890
Your diet is healthy	.645
Your fitness level	.921
Your body weight	.775

It can be seen that National well-being items loaded onto Factor one, Healthy Lifestyle well-being items onto Factor 2, Neighbourhood well-being items onto Factor 3 and Personal well-being items onto Factor 4. There were few items that loaded on more than one factor. In general these results support distinct well-being dimensions representing National, Neighbourhood, Healthy Lifestyle and Personal Well-being, and thus provide support for the second hypothesis.

Hypothesis three: Healthy lifestyle well-being as a dimension of subjective well-being fits the conceptual space between personal well-being and neighbourhood well-being.

The next analysis tested the proximal-distal hypothesis to determine if Healthy Lifestyle well-being occupies a conceptual space intermediate between personal and neighbourhood well-being in the prediction of life satisfaction. The SM% scores and standard deviations for the four well-being scales are shown in Table 3 together with their correlations and the results of a standard regression analysis against Life Satisfaction scores. Only Personal well-being made a significant unique contribution to the prediction of Life Satisfaction ($sr^2 = .29$). The four well-being scales jointly contributed a further .31 in shared variability. A total of 60% (59% adjusted) of the variability in life satisfaction was accounted for by the predictors.

Table 3

Regression Analyses for Well-being Variables on Life Satisfaction

Variables	Mean	SD	N	r	β	sr^2	R^2
<u>Model</u>							.60**
National	62.06	18.38	195	.37	.02		
Neighbourhood	64.75	16.14	193	.45	-.10		
Healthy Lifestyle	63.76	19.38	189	.41	.03		
Personal	72.51	14.93	189	.77	.81***	.29	
(Life Satisfaction: DV)	77.85	16.91	195				

Model: Unique variability = .29; shared variability = .31; *** $p < .001$; * $p < .05$. $p < .001$ for all bivariate correlations.

Inspection of the mean values and standard deviations for national, neighbourhood and personal well-being scales is consistent with the proximal-distal hypothesis that the more

self-relevant scale (personal) would have a higher mean score (72%) than the other more distal scales (65%, neighbourhood; 62% national), and also a lower variance. The prediction that scores on the healthy lifestyle scale (64%) would fall midway between neighbourhood and personal well-being scores was not supported; neither was the prediction for the standard deviation met. These results provide little support for the hypothesis that healthy lifestyle well-being would fit in the conceptual space of subjective well-being between neighbourhood and personal well-being.

Hypothesis Four: *Higher positive levels of experience in the three healthy lifestyle domains act as experiential inputs in the homeostatic model of subjective well-being.*

The next analysis tested the healthy lifestyle experience as a contributor to experiential input as a factor in the homeostatic model of subjective well-being. A standard regression analysis was conducted with life satisfaction as the dependent variable and the independent variables being the three healthy lifestyle experience measures (sleeping, eating, and exercise); life event; personality factors; and cognitive buffer factors. The results are presented in Table 4.

Table 4

Regression Analyses for Healthy Lifestyle Experience and Homeostatic Model Variables on Life Satisfaction

Variables	Mean	SD	N	r	β	sr^2	R^2	ΔR^2
<u>Model 1</u>							.12	.12**
Sleep Experience					.04			
Eating Experience					-.06			
Exercise Experience					.21**	.03		
<u>Model 2</u>							.33	.11**
Sleep Experience	66.33	23.10	190	.37	.04			
Eating Experience	70.10	21.10	195	.30	-.06			
Exercise Experience	54.82	28.45	194	.33	.21**	.03		
Life Event	2.07	0.73	190	.24	.12			
Extraversion	53.32	24.63	194	.25	.06			
Neuroticism	29.64	19.83	193	-.28	.06			
Self-esteem	75.52	16.85	189	.49	.26**	.03		
Optimism	68.70	18.74	195	.48	.24**	.03		
Perceived Control	67.52	11.05	189	.38	.07			
(Life Satisfaction: DV)	77.85	16.91	195					

Model 1: Unique variability = .03; shared variability = .09; Model 2: Unique variability = .09; shared variability = .24; ** $p < .01$; $p < .001$ for all bivariate correlations.

The three Healthy Lifestyle experience measures all correlated significantly with life satisfaction. In Model 1, the three healthy lifestyle experience variables accounted for 12%

of the variance, with exercise experience accounting for a unique 3% of the variance. In Model 2, three variables made a significant unique contribution to the prediction of Life Satisfaction, including one of the Healthy Lifestyle experience variables: Exercise ($sr^2 = .03$), Self-esteem ($sr^2 = .03$), and Optimism ($sr^2 = .03$). A further 24% of the variance was accounted for by the shared variance of the whole set of variables. A total of 36% (33% adjusted) of the variability in life satisfaction was accounted for by the predictors. These results support the hypothesis that healthy lifestyle experience accounts for additional shared, and in the case of exercise experience, unique variance in the prediction of life satisfaction.

Hypothesis Five: *Healthy lifestyle satisfaction in the three domains contributes to personal health satisfaction, personal well-being and life satisfaction.*

The final hypothesis tested was that healthy lifestyle satisfaction would have an additive effect on the contribution of personal health satisfaction and personal wellbeing in the prediction of life satisfaction. Table 5 presents the results of a hierarchical regression which tested this prediction. For each Model the unique and shared variance has been estimated to determine if there is an additional contribution to the variance accounted for by the healthy lifestyle satisfaction domains. In the first model, it can be seen that the three healthy lifestyle satisfaction measures predict a significant amount of variance in life satisfaction. Following the entry of personal health satisfaction in the second model, the three healthy lifestyle domains contribute to the shared variance (12%) but make no unique contribution (whereas personal health satisfaction makes a 25% unique contribution). With the entry of personal well-being, the healthy lifestyle domains continue to contribute to the shared variance (16%), with personal well-being providing a significant unique contribution of 24%. These results support the view that the three healthy lifestyle domains provide a significant additive contribution to the prediction of life satisfaction together with personal health satisfaction and personal well-being.

Table 5

Regression Analyses for Healthy Lifestyle Satisfaction, Personal Health Satisfaction and Personal Well-being on Life Satisfaction

Variables	Mean	SD	N	r	β	sr^2	R^2	ΔR^2
<u>Model 1</u>							.193	.193***
Sleeping					.217**	.04		
Eating					.006			
Exercise					.306***	.06		
<u>Model 2</u>							.371	.177***
Sleeping					.118			
Eating					-.005			
Exercise					.090			
Personal Health					.503***	.25		
<u>Model 3</u>							.612	.241***
Sleeping	63.67	26.33	196	.334	-.030			
Eating	70.72	28.49	194	.245	.020			
Exercise	57.58	26.05	194	.391	.062			
Personal Health	69.85	21.04	195	.591	.127			
Personal Well-being	72.51	14.93	189	.770	.671***	.24		
(Life Satisfaction: DV)	77.85	16.91	195					

Model 1: Unique variability = .10; shared variability = .09; Model 2: Unique variability = .25; shared variability = .12; Model 3: Unique variability = .59; shared variability = .02.

*** $p < .001$ for all bivariate correlations.

Discussion

Results of the study suggest there is room in the model of subjective well-being for another dimension, that of the healthy lifestyle. This study was of theoretical importance because it potentially provides a new dimension in the study of predictors of subjective well-being.

Most importantly this study demonstrated a meaningful place to start in terms of lifestyle satisfaction. The results were supportive of a healthy lifestyle satisfaction scale and the finding that the lifestyle satisfaction scale was supported, was essential for the continuation of the study.

Secondly, the results of the study supported healthy lifestyle as a dimension of subjective well-being. The loadings of items onto factors showed a distinct new factor that was separate from personal, national and neighbourhood well-being. The healthy lifestyle items, as predicted, loaded onto the lifestyle domain, while there was some cross-loading between items on factors with health loading onto healthy lifestyle, rather than personal well-being. Reasons for this result could be driven by thoughts of participants believing that their health is a direct result of their lifestyle and hence the high loading onto the lifestyle factor.

Additionally, there was a clear relationship between healthy lifestyle, personal health satisfaction and personal well-being. As predicted, the healthy lifestyle dimension displayed an additive effect on the contribution of personal health satisfaction and personal well-being in the prediction of life satisfaction. In addition, healthy lifestyle satisfaction only contributed shared variance to the prediction of life satisfaction when personal health satisfaction was added contributing unique variance.

Healthy Lifestyle Well-being and the Proximal-Distal Hypothesis

One of the interesting findings of this study was that healthy lifestyle was shown not to occupy the conceptual space between personal and neighbourhood well-being.. The proximal distal hypothesis was supported in the view that personal well-being possessed the highest mean values and the lowest variability; however there was no evidence to suggest that mean scores on healthy lifestyle fell between the dimensions of neighbourhood and personal well-being. In fact healthy lifestyle was revealed to have lower mean values than both neighbourhood well-being and personal well-being. The view that healthy lifestyle would fit between subjective well-being and neighbourhood well-

being came from the research conducted by Cummins et al. (2003) and Cummins & Chambers (2004). The healthy lifestyle was seen to not fit between the two dimensions noted above. There was no support for the prediction that healthy lifestyle well-being is to be more self-relevant as a well-being dimension than either neighbourhood or national well-being and is as more directly controlled by the individual's homeostatic system.

As this was an older sample this may have an influence on the findings. Older populations may find the healthy lifestyle less important than other important dimensions such as their support and friendships in their neighbourhood and their personal health. Also national well-being may be of particular importance to the older population as they worry about their pensions and the state of the environment. It would be interesting in future research to replicate this study with a younger population to observe whether healthy lifestyle well-being would fall in a different position in terms of the proximal-distal hypothesis.

Healthy Lifestyle Experience and the Homeostasis Model of Subjective Well-being

Additionally, the empirical evidence presented in this study revealed that the healthy lifestyle items that measured experience (sleep experience, exercise experience and eating experience) acted as experiential inputs in the homeostatic model of subjective well-being. The healthy lifestyle experiential items provided additional shared variance (and in the case of exercise unique variance) to the prediction of life satisfaction.

The healthy lifestyle experience items support the theoretical model of Cummins and his colleagues' homeostatic model of subjective well-being (Cummins, Gullone, & Lau, 2002; Mellor, Cummins, Karlinski, & Storer, 2003). The experiences of sleep, diet and exercise in a person's lifestyle were shown to have an experiential input into the homeostatic model. Individuality within the homeostatic model is important and these experiential factors help to explain the different ways in which individuals respond to different stimuli. The findings of this study support the notion of the healthy lifestyle experience as being components of an individual's interaction with the external world, and thus in terms of the homeostatic model of subjective well-being, part of the experiential input that combine with personality and cognitive factors in predicting subjective well-being.

In the nature of the homeostatic model it could be supposed that healthy exercise is the most influential experience in terms of the healthy lifestyle as it was the only healthy

lifestyle experience that contributed unique variance. Explanations for exercise being the only healthy lifestyle experience factor that contributed unique variance, is that exercise has been marketed to the population many times as being the one way to help to make people more healthy. Exercise seems to stand alone in people's minds as being the most important way of maintaining a healthy lifestyle. Although this proposition is speculative at this stage, it does represent an attempt to explain the nature of healthy lifestyle experience as an experiential factor.

However, in support of Davey (2004), from the results formulated the only personality and cognitive buffer factors that were significant predictors of subjective well-being were self-esteem and optimism. The personality factors had no significant role in the prediction of subjective well-being. Future studies can now provide a further understanding of the roles that the three healthy lifestyle experience items present in the homeostatic model.

Diet Satisfaction

The healthy diet satisfaction question (how well you eat) related to personal health satisfaction and life satisfaction. These findings are consistent with the predictions and previous studies. Previous literature found a solid relationship between diet and subjective well-being (Kitsantas et al., 2003; Thome and Espalage, 2004); however, these studies used selected participants with eating disorders and those who are unable to maintain their ideal body weight. It is difficult to compare the two samples as this study was based on randomly selected healthy adults. Previous studies focused on decreased levels of life satisfaction, whereas the current study looked at increased levels of life satisfaction due to diet, replicating a study with this question would be of great importance to extend validity. Healthy diet has fast become a factor of a healthy lifestyle and this reason alone accounts for the relationship between the two diet satisfaction and life satisfaction.

Sleep Satisfaction

Healthy sleep satisfaction was related to both personal health satisfaction and life satisfaction. Relating to previous studies on sleep experience and well-being there was lower well-being in those who reported lower sleep satisfaction (Blagrove, Farmer, & Williams, 2004). In this study there were results that showed sleep provided a significant unique contribution to the prediction of life satisfaction. Those who feel they have a healthy amount of sleep also have higher life satisfaction scores. This result is consistent

with results reported by Manocchia, Keller and Ware (2001) and Xavier et al. (2002) that interrupted sleep, or sleep problems, related to life satisfaction in a way that it has a negative impact and the perceived limits of what a person can do and how they feel, adds another burden in their life and hence decreases their life satisfaction.

Exercise Satisfaction

Healthy exercise satisfaction was shown to be a significant contributor in the prediction of personal health satisfaction and life satisfaction. In this area we must proceed with caution when generalising to the population. Previous studies found that exercise is related to well-being; however in those and the current study the samples were that of an older population or on special groups of adults such as those who are ill (Li et al., 2001; Riddick and Stewart, 1994). Older populations which could be compared to our sample were consistent with previous studies that found exercise and leisure impacted on their life satisfaction with those who do not exercise having a more negative life satisfaction view.

The Lifestyle Construct

Examining the separate factors does not however produce a healthy lifestyle construct. The combined results of the three factors (healthy eating satisfaction, healthy sleep satisfaction and healthy exercise satisfaction) are important to interpret in this study. The healthy lifestyle construct was found to be reliable and make contributions to the prediction of both personal health and life satisfaction. As there has been little research on the definition of a healthy lifestyle construct or scale it is important to notice the input it has on the prediction of subjective well-being. The reliability analysis for the sample was high in this study, as was the relationship between the items on the scale and personal well-being and life satisfaction. This outcome is important for future studies. With the development of the healthy lifestyle satisfaction scale it can be used to predict personal well-being and along with personal well-being it can assist in the prediction of life satisfaction.

Limitations

A number of factors associated with the sampling technique require caution when inferring generalisations from the present study to other adult populations. Although the study intended to avoid being specifically on older participants, their mean age was 60 years, limiting generalisations. Future research could allow for age influences by placing age as a variable in analyses.

Participants in the study were obtained from a pre-existing database and had previously completed similar surveys, and had agreed to complete future ones. These factors may influence the generalisations of findings in relation to ratings of healthy lifestyle, or ratings of life satisfaction as the participants may have greater satisfaction levels than those of the general population.

Conclusion

Taking account of these limitations, it is clear from the literature and the findings of this study, that the domains of healthy lifestyle are important processes influencing Subjective Well-being. A follow up study of similar design, with a larger more diverse sample would add external validity to the findings of this study. This study was rather exploratory in nature (for example the development of the healthy lifestyle scale) and fine tuning of items would perhaps increase reliability of the measures.

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Appendices

Appendix A: Items in the Questionnaire not used in the Study.

SECTION K		RELATIONSHIPS											
How often do you feel...		Never										Always	
79	that you lack companionship?	0	1	2	3	4	5	6	7	8	9	10	
80	part of a group of friends?	0	1	2	3	4	5	6	7	8	9	10	
81	that you have a lot in common with the people around you?	0	1	2	3	4	5	6	7	8	9	10	
82	close to people?	0	1	2	3	4	5	6	7	8	9	10	
83	left out?	0	1	2	3	4	5	6	7	8	9	10	
84	isolated from others?	0	1	2	3	4	5	6	7	8	9	10	
85	that no one really knows you well?	0	1	2	3	4	5	6	7	8	9	10	
86	that there are people who really understand you?	0	1	2	3	4	5	6	7	8	9	10	
87	that people are around you but not with you?	0	1	2	3	4	5	6	7	8	9	10	
88	that there are people you can talk to?	0	1	2	3	4	5	6	7	8	9	10	
89	that you are 'in tune' with the people around you?	0	1	2	3	4	5	6	7	8	9	10	
90	that there are people you can turn to?	0	1	2	3	4	5	6	7	8	9	10	
91	you are no longer close to anyone?	0	1	2	3	4	5	6	7	8	9	10	
92	your interests and ideas are not shared by those around you?	0	1	2	3	4	5	6	7	8	9	10	
93	outgoing and friendly?	0	1	2	3	4	5	6	7	8	9	10	
94	that no one really knows you well?	0	1	2	3	4	5	6	7	8	9	10	
95	that you can find companionship when you want it?	0	1	2	3	4	5	6	7	8	9	10	
96	shy?	0	1	2	3	4	5	6	7	8	9	10	
97	alone?	0	1	2	3	4	5	6	7	8	9	10	
98	that your relationships with others are not meaningful?	0	1	2	3	4	5	6	7	8	9	10	
The next questions ask you to think about how satisfied you are with your lifestyle. How satisfied are you...		Very Dissatisfied										Neutral	Very Satisfied
99	with your access to transport on a daily basis?	0	1	2	3	4	5	6	7	8	9	10	

- Appendix B:
1. Ethics Approval
 2. Plain Language Statement
 3. Letter to Participants

Appendix C: Survey Questionnaire

Appendix D: 1. Evidence of analysis of assumptions, missing values and outliers

2. SPSS Outputs for hypothesis

Appendix D1. - Evidence of analysis of assumptions, missing values and outliers

Scale/Variable	Missing Values		Outliers	Normality (Kolomorov-Smirnov)	
	Count	Percent	5% trimmed mean	Statistic	Sig.
Life Satisfaction			7.93	.202	.000*
Personal Well-being	10	5.0	73.32	.086	.002*
Neighbourhood Well-being	6	3.0	65.40	.076	.009*
National Well-being	4	2.0	62.81	.076	.008*
Healthy Lifestyle Well-being	10	5.0	64.23	.067	.039*
Healthy Lifestyle Experience	10	5.0	64.29	.067	.039*
Perceived Control	10	5.0	67.72	.067	.040*
Self-esteem	10	5.0	76.47	.129	.000*
Optimism	4	2.0	69.93	.102	.000*
Extraversion	5	2.5	53.50	.085	.002*
Neuroticism	6	3.0	28.75	.111	.000*

*Violation of the assumption of normality

Appendix D.2 - SPSS Outputs

Hypothesis One: Reliability analysis for the Health Lifestyle Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.869	.874	6

Item Statistics

	Mean	Std. Deviation	N
Q100	6.35	2.633	194
Q101	7.77	2.003	194
Q102	6.01	2.688	194
Q103	7.42	2.171	194
Q104	5.51	2.711	194
Q105	5.61	2.929	194

Item-Total Statistics

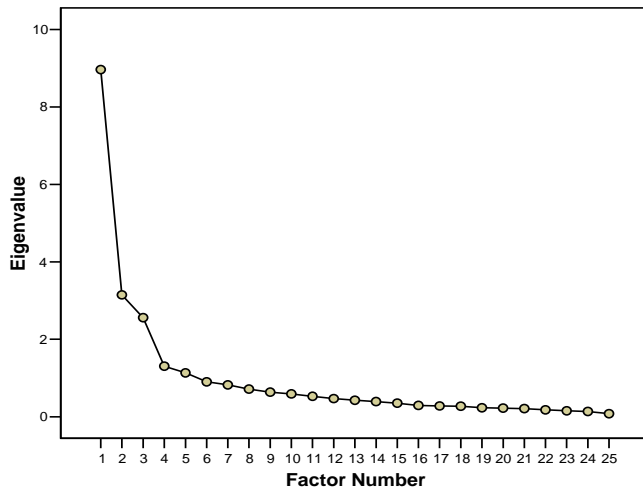
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Q100	32.32	110.022	.430	.331	.888
Q101	30.90	109.212	.657	.639	.852
Q102	32.66	92.847	.785	.774	.825
Q103	31.24	103.915	.725	.666	.840
Q104	33.15	92.297	.789	.816	.824
Q105	33.05	93.407	.684	.636	.845

Hypothesis Two: Factor Analysis; KMO and Bartlett's test, Scree plot and Factor Matrix.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.877
Bartlett's Test of Sphericity	Approx. Chi-Square	3182.803
	df	300
	Sig.	.000

Scree Plot



Factor Matrix ^a

	Factor			
	1	2	3	4
Q2	.583			.323
Q3	.582			
Q4	.638			.400
Q5	.476			
Q6	.508			.347
Q7	.686		-.325	.338
Q8	.676	.312		.305
Q11	.608	.341		
Q12	.725	.361	-.320	
Q13	.756	.330	-.330	
Q14	.672	.346		
Q15	.495			
Q16	.559			
Q18	.550		.435	
Q19	.595		.526	
Q20	.565		.613	
Q21	.499		.594	
Q22	.575		.608	
Q23	.556		.424	
Q100	.441			
Q101	.451	-.353		
Q102	.581	-.683		
Q103	.435	-.485		
Q104	.612	-.708		
Q105	.502	-.603		

Extraction Method: Maximum Likelihood.

a. 4 factors extracted. 6 iterations required.

Hypothesis three: Model Summary and Coefficients for Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.774 ^a	.599	.590	1.083	.599	66.201	4	177	.000

a. Predictors: (Constant), HLWB, National Well-being, Neighbourhood Well-being, Personal Well-being

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	1.514	.425		3.566	.000			
	Personal Well-being	.092	.008	.809	11.371	.000	.770	.650	.541
	Neighbourhood Well-being	-.010	.007	-.097	-1.483	.140	.448	-.111	-.071
	National Well-being	.002	.005	.022	.394	.694	.366	.030	.019
	HLWB	.002	.005	.028	.506	.613	.412	.038	.024

a. Dependent Variable: Q1

Hypothesis Four: Model Summary and Coefficients for Regression analysis (Life satisfaction, Healthy lifestyle and

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.425 ^a	.181	.167	1.544	.181	13.147	3	179	.000
2	.603 ^b	.363	.330	1.384	.183	8.273	6	173	.000

a. Predictors: (Constant), HEXEREX, HSLEEPEX, HEATEX

b. Predictors: (Constant), HEXEREX, HSLEEPEX, HEATEX, Extraversion Scale SM, Life Event, Neuroticism Scale SM, Perceived Control, Optimism Scale SM, Rosenberg Self-esteem Scale SM

Coefficients ^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	5.492	.435		12.618	.000			
	HSLEEPEX	.019	.006	.261	3.354	.001	.371	.243	.227
	HEATEX	.006	.007	.077	.901	.369	.298	.067	.061
	HEXEREX	.011	.005	.182	2.166	.032	.334	.160	.147
2	(Constant)	2.126	.961		2.214	.028			
	HSLEEPEX	.003	.006	.041	.525	.600	.371	.040	.032
	HEATEX	-.005	.007	-.061	-.742	.459	.298	-.056	-.045
	HEXEREX	.012	.005	.207	2.679	.008	.334	.200	.163
	Life Event	.276	.145	.119	1.900	.059	.240	.143	.115
	Neuroticism Scale SM	.005	.007	.058	.736	.463	-.284	.056	.045
	Extraversion Scale SM	.004	.004	.060	.925	.356	.251	.070	.056
	Optimism Scale SM	.022	.008	.242	2.771	.006	.480	.206	.168
	Rosenberg Self-esteem Scale SM	.026	.009	.259	2.947	.004	.491	.219	.179
	Perceived Control	.011	.012	.070	.870	.385	.380	.066	.053

a. Dependent Variable: Q1

Hypothesis Five: Model Summary and Coefficients for Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.440 ^a	.193	.180	15.31414	.193	14.624	3	183	.000
2	.609 ^b	.371	.357	13.56530	.177	51.226	1	182	.000
3	.782 ^c	.612	.601	10.68382	.241	112.411	1	181	.000

- a. Predictors: (Constant), HSLEEPWB, HEATWB, HEXERWB
- b. Predictors: (Constant), HSLEEPWB, HEATWB, HEXERWB, sQ3
- c. Predictors: (Constant), HSLEEPWB, HEATWB, HEXERWB, sQ3, Personal Well-being

Coefficients ^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	57.289	3.634		15.765	.000			
	HEATWB	.003	.048	.006	.072	.942	.245	.005	.005
	HEXERWB	.199	.054	.306	3.688	.000	.391	.263	.245
	HSLEEPWB	.139	.046	.217	3.001	.003	.334	.217	.199
2	(Constant)	41.620	3.893		10.692	.000			
	HEATWB	-.003	.043	-.005	-.067	.946	.245	-.005	-.004
	HEXERWB	.058	.052	.090	1.129	.260	.391	.083	.066
	HSLEEPWB	.076	.042	.118	1.802	.073	.334	.132	.106
	sQ3	.404	.057	.503	7.157	.000	.591	.469	.421
3	(Constant)	13.597	4.048		3.359	.001			
	HEATWB	.012	.034	.020	.350	.727	.245	.026	.016
	HEXERWB	.041	.041	.062	.996	.321	.391	.074	.046
	HSLEEPWB	-.019	.034	-.030	-.552	.581	.334	-.041	-.026
	sQ3	.102	.053	.127	1.933	.055	.591	.142	.090
	Personal Well-being	.761	.072	.671	10.602	.000	.770	.619	.491

a. Dependent Variable: Life Satisfaction

Appendix E: Figures

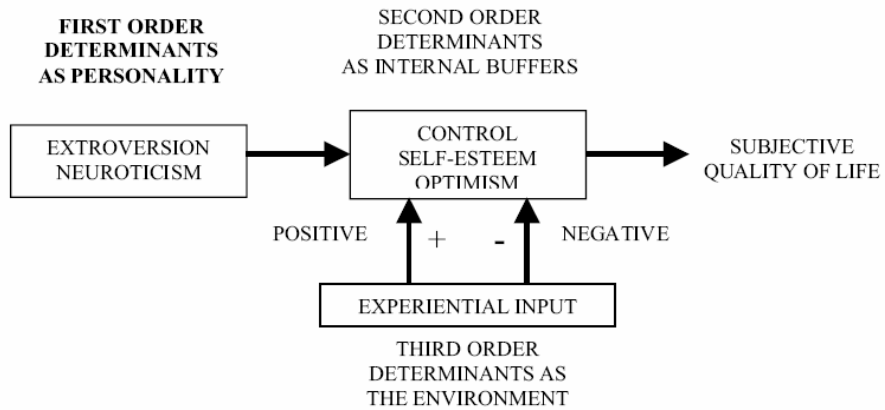


Figure 1
A model for subjective quality of life homeostasis

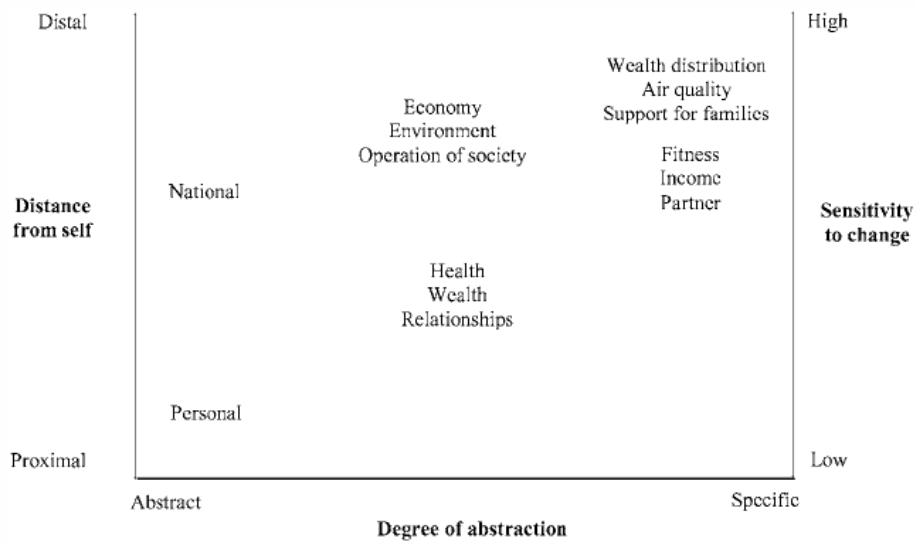


Figure 2. Bi-dimensional model of subjective wellbeing sensitivity to external forces of change.