Psychometric Properties of Three Scales of Depression and Well-being in a Mature New Zealand Sample

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Psychometric properties of three standardised scales were examined in a sample of 174 individuals aged 50-65 who had experienced job loss. Measures evaluated were depression (CES-D), affect (ABS), and life satisfaction (LSS). A confirmatory factor analysis (CFA) was performed on each measure, revealing that the optimal number of factors was three for the CES-D, two for the ABS, and either one or three for the LSS. Internal consistency was adequate for all measures. A second order hierarchical factor analysis was performed to determine whether the three measures significantly contribute to an overarching construct of well-being and showed that the three measures share a significant amount of common variance. A second model was tested in which positive and negative subscales and the LSS were proposed to load separately, and its fit indices were superior to the first model. The conclusion was reached that all three measures can be used with mature New Zealand respondents, and that the three measures significantly overlap in their measurement of subjective well-being. This information is of particular use to future research using older New Zealand participants.

Measurement tools developed internationally are commonly used on New Zealand samples. While it is generally sufficient to select measures for research in New Zealand based on their stated internal consistency as assessed in overseas studies, it is of benefit to be able to refer to a source that has demonstrated an adequate level of internal consistency on a New Zealand sample. It is also of benefit to use more than one outcome measure when collecting data. When a predictor variable can demonstrate its association across a number of similar outcome measures, this increases the confidence we can put in its predictive value. Further, international innovations in statistical modelling mean that related but independent outcome measures can be combined, with minimal measurement error, in order to validate the presence of a single higher order construct (Joreskog & Sorbom, 1996). Using higher order constructs enables a more robust assessment of areas such as adjustment.

The present research examined the psychometric properties of three standardized overseas scales that assess aspects of psychological well-being, in an older New Zealand sample (aged 50 to 65) that has experienced job loss after the age of 50. Initially, the paper seeks to use confirmatory factor analysis to determine the optimal factor structure of each scale. The paper also aims to compare the observed levels of internal consistency with those found in overseas samples. Finally, it aims to establish whether, using structural equation modelling, the three scales demonstrate adequate model fit in their representation of the higher-order construct of subjective well-being (SWB).

Reasons for Using the Selected Sample

Use of this sample is of benefit for three main reasons. The first reason is population ageing and the research interest in positive ageing that it has generated (Dalziel, 2001; Ng, 1998; White, 1999). The second reason is that concern exists for the treatment and future of the older worker in New Zealand (Sparrow, 1999; White, 1999). Validated measures of subjective well-being should be of value to New Zealand researchers continuing in these fields.

The third reason is that job-loss is a major life event that can have serious repercussions for a number of domains in the individual's life (Jahoda, 1982). Mallinckrodt and Bennett (1992) found that rates of depression ran as high as 48% in their sample of displaced male blue-collar workers. While highlighting the importance of research into coping with job-loss, this sample provides an interesting testing ground for the psychometric properties of SWB measures due to the likelihood of wider variability in observed well-

being scores than would be found in a random sampling of the population.

Defining the Construct of Subjective Well-being

"*The subjective definition of quality of life is democratic in that it grants to each individual the right to decide whether his or her life is worthwhile. It is this approach to defining the good life that has come to be called 'subjective well-being' (SWB)*" (Diener, 2000, p. 34). It includes both cognitive and affective evaluations by the individual of their lives and is said to be of growing importance in both western and non-westernised countries (Diener). The evaluation of SWB would therefore seem to constitute a key criterion in determining whether an individual is ageing positively.

Three components are generally included in the measurement of SWB: a) presence of positive emotions, b) absence of negative emotions, and c) satisfaction with life (Argyle, 1996). All of these components have been found to inter-correlate at a moderate to high level (approximately .50), indicating that sufficient independence is present between the measures to warrant separate evaluation. Further, it is argued that for SWB to be measured accurately, each of these areas must be assessed (Diener, 2000). All three of the measures assessed in this study tap into one or more component of SWB and are outlined below.

Centre for Epidemiological Diseases Depression Scale (CES-D)

Developed in the USA by Radloff (1977), the CES-D is a widely used self-report depression screening instrument in studies assessing non-clinical populations in both the United States (Coyne, Gallo, Klinkman & Calarco, 1998) and Europe (Wrosch & Heckhausen, 1999) and has been found to perform comparably with the Beck Depression Inventory (BDI) and the General Health Questionnaire (GHQ) (Coyne, 1994). The CES-D was chosen for this study because it has demonstrated its suitability for older populations (Davidson, Feldman, Penny & Crawford, 1994; Gupta & Yick, 2001; Krause, 1988) and has previously been used in job-loss research (Buendia, 1989).

There have been mixed findings on the factor structure of the CES-D. Radloff (1977) found four factors in an American sample: depressive mood, positive affect, somatic symptoms and interpersonal problems. Gupta and Yick (2001), using a sample of 76 Chinese immigrants aged over 50 and employing a methodology of confirmatory factor analysis, found a three-factor solution: somatic/depressed affect, positive affect, and interpersonal/depressed affect. McArdle, Johnson, Hishinuma, Miyamoto and Andrade (2001) and Cheung and Bagley (1998) both found two-factor solutions. McArdle et al., using a sample of over 5000 Polynesian and non-Polynesian high school students, reported their factors to be depression and positive feelings. Cheung and Bagley, with a sample of 138 Hong Kong Chinese couples, ranging in age from 20 to 70, found two factors and labeled them interpersonal problems and depressive symptoms (the latter included items measuring somatic symptoms, depressed mood, and positive affect).

The authors of this paper chose to conduct confirmatory factor analysis on each of these factor structures in order to establish the best fit for this older New Zealand sample. Two alternate hypotheses for best fit were compared; these were based on whether age or cultural background has the dominant influence:

Hypothesis 1(a): Radloff's (1977) CES-D factor structure will show the best fit because the sample used in this study is from a Western country.

Hypothesis 1(b): Gupta and Yick's (2001) CES-D factor structure will show the best fit because the sample used in this study is aged over 50.

Affect Balance Scale (ABS)

Developed in the USA by Bradburn (1969), the ABS measures subjective well-being through the assessment of both positive and negative affect and has been widely used on older populations (MacIntosh, 1998). Despite its popularity, there has been substantial debate as to how the scale should be used. Bradburn (1969) originally saw the scale as uni-dimensional, where negative affect was subtracted from positive affect to reach an overall balance of affect. Data from 10 European countries have supported this contention (Van Schuur & Kruijtbosch, 1995). Others argue that positive and negative affect represent two separate factors that can have unique interactions with other variables (Diener, 2000) and therefore treating the ABS as a single factor is erroneous. This two-factor model has been demonstrated in British (Warr, Barter & Brownbridge, 1983) and Asian (Devins, Besier, Dion, Pelletier & Edwards, 1997) samples. In light of these debates, the ABS will be examined in both uni-dimensional and two-dimensional forms to ascertain the best fit.

Life Satisfaction Scale (LSS)

Warr (1978) created this scale for use on 1655 redundant British workers. Scale items were then modified by Warr, Cook and Wall (1979) for use in the work domain. It took its current form when revised by Leana and Feldman (1992) for use in their studies on unemployment in the USA. In all three applications, the samples assessed were blue-collar workers. Leana and Feldman's version expanded assessment of family and social life satisfaction, and was used in uni-dimensional form.

The previous incarnation used by Warr et al (1979) found three factors, respectively termed satisfaction with personal life, satisfaction with standards and achievements, and satisfaction with lifestyle. They noted that the three-factor solution was comparable to the one factor solution and that the degree of specificity required should determine which factor structure was used. However, this version included items that assessed satisfaction with Britain's political climate which are not included in the version used here. Given the lack of uniformity in previous usage, the LSS will be tested in 1, 2 and 3 factor forms to ascertain the best fit.

After establishing the optimal factor structure for each of the three measures, their observed levels of internal

consistency will be compared against levels observed on overseas samples to evaluate comparative performance on a New Zealand sample.

Optimal Measurement of the Construct of Subjective Well-being

Given that all three measures theoretically comprise components of SWB, structural equation modelling will be used to test the prediction that:

Hypothesis 2: All three measures will contribute to a higher order construct of SWB.

Two models will be assessed. The first model tests whether the three measures, as separate but related entities, contribute to SWB. The second model tests Diener's (2000) argument that positive affect, negative affect and LSS are independent but related contributors to SWB. Therefore, the second model will combine the positive affect components from the ABS and CES-D into a latent factor, as with the negative affect components from the two scales, with the LSS contributing the third latent factor. To the extent that Diener's recommendation for the measurement of subjective well-being is correct, it is hypothesized that:

Hypothesis 3: The second model will show a superior model fit with the overall construct of SWB compared to that found for the first model.

Method

Participants

The sample consisted of 174 individuals in New Zealand (103 males, 71 females) aged between 50 to 65 years who had lost their job at some point over the age of 50. Of males, 74% had partners, compared to 39.4% of females. They were predominantly Caucasian (95%) and approximately 70% had previously held jobs that were mid to high level in status. An average of 2 years had passed since job loss, ranging from 0 to 12 ½ years. Redundancy was the most common reason given for the loss (83.3%). Half of the sample had never previously experienced unemployment, with a further 25% having experienced it only once. Males had been employed in the job that they had lost for a median of 9 years, females for 6 years. Only 13.8% had regained full-time work, with 39.1% working part-time, and 54.5% reporting that they were still actively seeking work. In terms of adjustment, 41% of females and 43% of males reached the CES-D's cut-off for depression, which is a score of 16 or more out of a maximum possible score of 60 on this instrument.

The majority (144) were self-selected by response to media releases which invited voluntary research participants. The remaining 30 responded to a general mail out from the Wellington Work and Age Trust's mailing list (10% response rate). Respondents came predominantly from the North Island (1 from the South Island), with the majority located in and around Wellington, Kapiti Coast, Wairarapa, Hawke's Bay, Rotorua, Auckland and Whangarei.

Measures and Procedure

The data on the scales under observation comprised the outcome measures of a larger dataset that primarily focused on coping with job loss. Individuals were sent the materials by post and asked to return them once completed. Participation was entirely voluntary and anonymity was assured.

Centre for Epidemiological Diseases Depression Scale (CES-D): This 20-item self-report measure assesses the frequency of depressive symptoms in an individual's life within the preceding week. Each item is rated on a four-point scale, scored from 0 to 3. A score of 0 is given to a scale item when the respondent has felt that way for less than 1 day in the preceding week, 1 = 1-2 days, 2 = 3 to 4 days, and 3 = 5-7 days. An example of an item measuring depressive affect is "*I was bothered by things that don't usually bother me*". Four of the items (4, 8, 12, and 16) measure positive affect and are reverse scored, an example being "*I felt I was just as good as other people*" (Radloff, 1977).

In its uni-dimensional form the 20 items are summed, resulting in a possible score range of 0 to 60. The general cut-off for depression is a score of 16 or higher. The creator of the scale reported high internal consistency (α = .85 in general populations, and α = .90 in clinical samples) and adequate test-retest reliability (r = .45 and .70 respectively) (Radloff, 1977). Recent studies by Ying, Tsai, Yeh and Huang (2000) and Knight, Williams, McGee and Olaman (1997) both found α = .88 in their samples of (respectively) Chinese American college students and women in mid-life. Ying et al also found test-retest reliability to be .77 after one month.

Affect Balance Scale (ABS): This scale asks respondents to focus on their feelings over the past few weeks. Respondents can answer yes or no to each of the 10 items, half of which measure positive affect (items 1, 3, 4, 7 and 9) and half negative affect (items 2, 5, 6, 8, and 10). The five positive affect items are each assigned a 1 for yes and a 0 for no, then the total is summed (possible range in score of 0 to 5). An example of a positive affect item is "*did you feel on top of the world?*" The 5 negative affect items are scored in the same manner, with an example being "*did you feel lonely or remote from other people?*" The uni-dimensional score is achieved by subtracting the negative affect score from the positive affect score, then adding a constant of 5 to avoid values below zero. The resulting score ranges between 0 (low affect balance) and 10 (high affect balance) (Bradburn, 1969).

Overseas samples have shown the uni-dimensional scale returned less than optimal internal consistency, ranging between α = .36 and .64 in samples of adults from Western European countries (Van Schuur & Kruijtbosch, 1995). Assessment of the two factor model, on a sample of 452 Canadian adults aged 54 to 70, found slightly less than optimal alpha's for positive affect (α = .62) and negative affect (α = .62), and moderately stable scores over three years (r = .44 and r = .45 respectively) (Maitland, Dixon, Hultsch & Hertzog, 2001).

Life Satisfaction Scale (LSS): This 15-item self-report measure assesses the respondent's satisfaction with their current life situation 'these days', utilizing a 5-point Likert-type scale ranging from 1 = very dissatisfied to 5 = very satisfied. A 'not applicable' option is also provided. Areas assessed include social relationships, family, financial standing, activities and accomplishments. Leana and Feldman (1992) reported α = .83 for the uni-dimensional scale. Items can either be totaled or averaged.

Results

Factor Structure of Scales

Confirmatory factor analysis, with LISREL 8.5 (Joreskog & Sorbom, 1996), was used to test the optimal number of factors for each scale. Five fit indices were used, three of absolute fit and two of relative fit, following the suggestions of Bryant and Smith (2001). The ratio of chi-square value to degrees of freedom (Hoelter, 1983), the goodness-of-fit index (GFI; Joreskog & Sorbom, 1996), and the root mean square of approximation (RMSEA; Steiger, 1990) have all been used to characterize the fit of the data to the proposed model in an absolute sense. A smaller ratio score signifies good fit, and values near 2.0 are considered acceptable. A GFI above .90 and an RMSEA below .10 are considered evidence of a good model fit. The two relative fit indices, the comparative fit index (CFI; Bentler, 1990) and the non-normed fit index (NNFI; Bentler & Bonnett, 1980), compares the stipulated model with the "null" model, which assumes that there is no common variance among the measure's items. A value greater than .90 in both cases is considered acceptable (Bentler & Bonnett, 1980).

CES-D. Radloff (1977) initially proposed a four-factor structure for this scale, and subsequently Gupta and Yick (2001) have proposed a three-factor solution, and McArdle et al. (2001) and Cheung and Bagley (1998) have proposed two-factor models. Each of these were compared with the baseline single-factor model in an attempt to identify the best fitting model.

Table 1 shows the resulting fit indices for these models. The one-factor model showed a poor fit, none of the indices, with the possible exception of the RMSEA, fall within the acceptable range. The McArdle et al. model also appears deficient in that the ratio is high, the GFI is below .90, and the CFI and NNFI are both well below .90. The remaining three models produced good ratio scores - all well below 2.00 - and the relative fit indices are all in the acceptable range. However, none of the GFIs are greater than .90, and the RMSEA for the Cheung and Bagley model is relatively high (.089).

The two best fitting models are the Radloff and the Gupta and Yick models. For each of the five model fit indices used here, the Gupta and Yick model proves to be superior. However, it should be noted that the size of the difference between the two of them is relatively small, and neither of them obtained a GFI greater than .90. A chi-square test (Kline, 1998) has proved useful in comparing the fit between two nested models, and that was utilized here. The difference in chi-square between the two models was 7.76 with 3 degrees of freedom. This yields a p value of .06, suggesting that the difference between the two models is marginally significant. We can conclude that these two models yield very similar fits, although the Gupta and Yick model is slightly better, supporting alternate hypothesis 1b. The Gupta and Yick (2001) subscales were: positive affect (items 4, 8, 12 and 16), somatic/depressed affect (items 1, 2, 3, 5, 6, 7, 11, 17, and 20), and interpersonal/depressed affect (items 9, 10, 13, 14, 15, 18 and 19).

ABS. The two chief possibilities for the ABS are the one-factor and the two-factor models (with positive and negative affect separated into two five-item subscales). Table 2 shows the model fit indices for the two models. The one-factor model yields a ratio that is just above the 2.00 cutoff, the GFI is acceptable, the RMSEA is just below the acceptable cutoff of .10, but the two relative fit indices fall below .90. In comparison, the two-factor model is superior for all five indices. The three measures of absolute fit are acceptable, and the two measures of relative fit are close to acceptable. The chi-square test yielded a difference of 15.76 with 1 degree of freedom for a p value less than .001. Thus, we can conclude that the two-factor model is superior to the one-factor model.

LSS. Given the paucity of previous research, the three possible models tested were the one-, two-, and three-factor models. Table 2 reports fit indices for these models. The ratio scores were greater than 2.00 for all three models, none of the models obtained a GFI above .90, only one of the RMSEA values was found to be below .10, and none of the

Table 1. Model fit indices for five proposed measurement models for the Centre for Epidemiological Diseases Depression Scale (CES-D)

	Number of Factors in each Model				
Model fit indices	One[a]	Two[b]	Two[c]	Three[d]	Four[e]
Ratio of χ^2 >/df	2.44	2.40	1.66	1.53	1.60
GFI	.80	.86	.81	.88	.87
RMSEA	.094	.059	.089	.052	.057
CFI	.83	.84	.92	.94	.93
NNFI	.81	.82	.91	.93	.92

Note. The five models are: [a]Baseline model; [b]McArdle et al.; [c]Cheung & Bagley; [d]Gupta et al.; [e]Radloff. The first three indices are measures of absolute model fit and the last two are measures of relative model fit.

Table 2. Model fit indices for proposed measurement models for the Affect Balance Scale (ABS) and the Life Satisfaction Scale (LSS)

	Number of Factors for ABS		Number of Factors for LSS		
Model fit indices	One	Two	One	Two	Three
Ratio of χ^2 >/df	2.13	1.91	2.22	4.61	3.46
GFI	.91	.93	.86	.79	.85
RMSEA	.09	.07	.09	.14	.11
CFI	.83	.89	.88	.79	.85
NNFI	.78	.85	.86	.74	.81

Note. The first three indices are measures of absolute model fit and the last two are measures of relative model fit.

relative fit indices were greater than .90. Despite the general lack of fit, the best fitting model seems to be the one-factor model. It yielded the best ratio (close to 2.00), an RMSEA below .10, and the other three indices were just marginally below .90. The two-factor model obtained the poorest fit of the three models, and the three-factor model obtained only a slightly worse fit than the one-factor model.

A chi-square comparison of the one- and three-factor models obtained a chi-square difference of 14.49 with 28 degrees of freedom for a *p* value of .98. Thus, it seems that although the one-factor model obtained better fit indices across the board, the difference between it and the three-factor model was negligible.

Figure 1 shows the result of the measurement model for the three-factor model, outlining the items in each factor. On the left-hand side of this figure (and in Figures 2 and 3 to follow), values in brackets represent the standardized regression coefficients, whereas unbracketed values refer to the unstandardized regression coefficients. The results show that the career and social subscales are more important for the overall construct of the scale than family (probably because many of the female respondents were not married). The career and social subscales were moderately to highly correlated (.70), and the family subscale was less highly correlated with the other two subscales. Items 10 (the house or apartment you live in) and 12 (your present state of health) both loaded onto the family subscale but their inclusion reduced levels of internal consistency and they were not theoretically homogenous with the other items, so they were dropped from the three-factor model.

Table 3. Comparison of Internal Consistency Ratings in NZ and Overseas Samples

Scale	# of items	NZ α	Overseas α
Overall CES-D	20	.92	.90
Somatic subscale	9	.86	.74
Positive affect subscale	4	.80	.64
Interpersonal subscale	7	.81	.77
Overall LSS	15	.89	.83
Family subscale	3	.72	—
Social subscale	4	.72	—
Career subscale	6	.90	—
Overall ABS	10	.75	.64
Negative affect subscale	5	.64	.62
Positive affect subscale	5	.68	.62

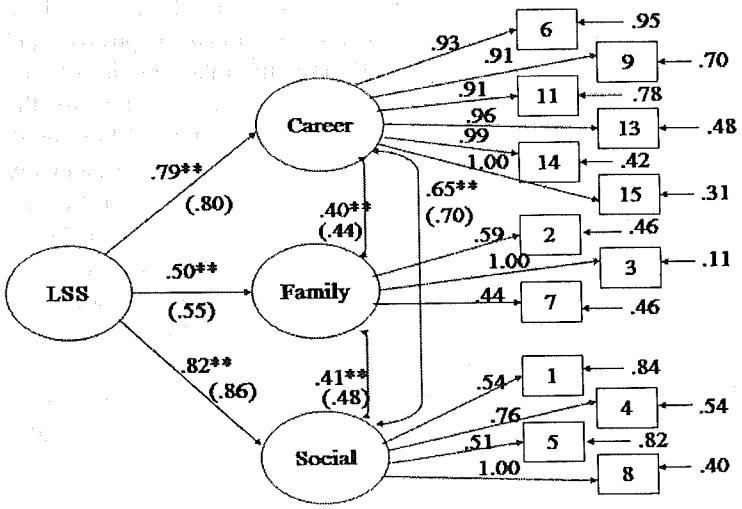
Note. CES-D = Centre for Epidemiological Diseases Depression Scale; ABS = Affect Balance Scale; LSS = Life Satisfaction Scale.

Internal Consistency of Scales

Table 3 presents the observed Cronbach's alphas (α) for each of the scales and sub-scales and provides a comparison with the highest alphas reported from the overseas studies cited in the method section. For all scales the New Zealand sample returned higher internal consistency than the overseas studies. The two ABS subscales were slightly sub-standard (less than .70).

We next considered whether either of the one- or three-factor models of the LSS is superior from the standpoint of internal reliability. The alpha for the one-factor model is .89, and the three alphas for the subscales are .72, .72, and .90. Although two are in the .70s, a low acceptable range, all three can be classified as acceptable. If one or more had fallen below .70, then we could have rejected the three-factor model on that basis. These results, however, suggest that one could use either the one-factor or the three-factor model with about equal confidence.

Figure 1. Measurement Model for the Measure of LSS.



Higher Order Models: Do These Three Measures all Assess Subjective Well-Being?

First model. A question posed in the introduction was whether these three measures all tap into the same higher order construct, namely subjective well-being. A way to test this hypothesis is by generating and evaluating a second order measurement model in which the three measures all contribute to a second order variable, in this case, SWB. Since it was not possible, due to the number of respondents, to allow all items of each measure to be included in the measurement model, we adopted the strategy proposed by Bagozzi and Edwards (1998) of using packets of items as indicators. Figure 2 depicts the resulting structural equation model obtained from LISREL, and Table 4 reports the relevant fit indices. The items of each subscale were added and these scores served as the indicators of the respective measures. The three-factor model of the LSS was adopted for this analysis because it was felt that this model would embody more information than the one-factor model. As noted above, either of these can be used—it depends upon one's use of the measure.

The fit indices of this CFA presented a somewhat mixed situation. The ratio of chi-square to degrees of freedom was found to be considerably higher than 2.00, the RMSEA was not less than .10, the GFI was slightly lower than .90, and the two other relative fit indices were lower than .90 too. These results suggested that the fit of the model fell slightly short of what is expected. However, an inspection of Figure 2 verifies the assumption that these measures shared much common variance. The standardized covariances (i.e., correlations) among the three measures were high: from a low of .82 to a high of .94. The gamma loadings of the three measures on the second order construct, well-being, were all large as well, from a low of .85 to a high of .97. These results suggest that these three measures were highly correlated and all significantly contributed to the construction of a higher order construct, and this was taken as support for the second hypothesis.

Second Model. Another way to conceptualise the relationships among the subscales is presented in Figure 3. This model suggests a tripartite assessment of well-being in that positive affect, negative affect, and life satisfaction are considered to be separate but related aspects. Table 4 reports the fit indices of this model in comparison to the first model.

The most notable result here was that the second model fit the data better than the first. The fit indices for the second model were superior in all cases. The ratio approached the standard 2.00 level, the RMSEA almost reached .10, but most importantly, the GFI, CFI, and NNFI all fell above .90. These results suggested that the grouping of similarly worded items yielded a better model than grouping items within pre-existing measures.

Figure 3 shows that positive affect, negative affect, and life satisfaction constructs were highly correlated (between .93 and .94), and that they all highly loaded on the higher order construct of well-being (.96 or .97). The lambda parameters showed that the ABS subscales did not load on their respective constructs as highly as the CES-D and LSS subscales. In sum, in support of the third hypothesis, this model seemed to fit the available data better than the measure-based ordering of constructs.

Table 4
Comparison of Model Fit Indices Obtained for the Two Second Order Measurement Models

	Two Measurement Models	
Model fit indices	First Model	Second Model
Ratio of χ^2 >/df	4.36	2.99
GFI	.89	.92
RMSEA	.14	.11
CFI	.88	.93
NNFI	.83	.90

Note. The first three indices are measures of absolute model fit and the last two are measures of relative model fit. The first model describes a model in which the three first order constructs are the three measures: LSS, ABS, and CES-D. The second model describes a model in which the three first order constructs conform to the theoretical structure of wellbeing: positive affect, negative affect, and life satisfaction.

Discussion

The results showed support for hypotheses 1b, 2 and 3. With regard to hypothesis 1b, the marginal superiority of the Gupta and Yick (2001) factor structure to the Radloff (1977) structure of the CES-D suggests that age had a stronger influence than culture. However, both of the models performed reasonably well. Therefore, researchers using this measure in the future would be advised to test both factor structures. Support was found for the second hypothesis in that both the first and second models demonstrated a high degree of common variance among the three measures and adequately loaded onto the higher order construct of subjective well-being. Finally, the third hypothesis was supported in that the second higher order model showed a better model fit than the first, in agreement with Diener's (2000) contention that positive affect, negative affect and life satisfaction are independent but related constructs in the measurement of subjective well-being.

With regard to the factor structure of the ABS, there is reason to argue for separate treatment of positive and negative affect, particularly in light of the superior fit seen in the second higher order model. The situation for the LSS was less clear. In line with the findings of Warr et al. (1979), either one- or three- factor solutions can presumably be used. The advantage of the one factor model is the fact that all 15 items can be used in the assessment. The three-factor model requires the deletion of two items, however this version would arguably be more useful for researchers who wish to target specific aspects of life satisfaction. Alternatively, the three core factors can be standardized and added together to represent a single balanced measure of life satisfaction in which each component has an equal contribution.

The New Zealand sample returned higher levels of internal consistency than those reported from overseas. This engenders a good deal of confidence for using these three measures on New Zealand samples. Having said this, the ABS returned slightly less than acceptable alphas for the two sub-scales, which seems in keeping with trends observed overseas (Maitland et al., 2001). Nevertheless, its performance is passable, and it is up to future researchers whether they wish to use this measure or consider alternatives.

Research on this sample is timely and politically relevant. Population ageing is a phenomenon affecting a number of Western countries, from which New Zealand is not exempt. As reported by White (1999), *People born between 1945 and 1965, more than a million in New Zealand, are the first full generation for over 100 years to reach 45 plus on mass*" (p. 5). Further, these individuals can look forward to an additional 30 to 50 years of productive life past the age of 45 (White, 1999). Presently, a number of initiatives are underway in New Zealand to address the issues of population ageing and positive ageing. This is demonstrated in both scholastic appraisal (Ng, 1998) and in the public domain (Dalziel, 2001; White, 1999). Studies such as the present one can aid researchers in deciding which outcome measures they can safely select for future projects concerning positive ageing and to encourage more thorough evaluations of psychological well-being.

Figure 2. Measurement Model for the First Higher Order Model.

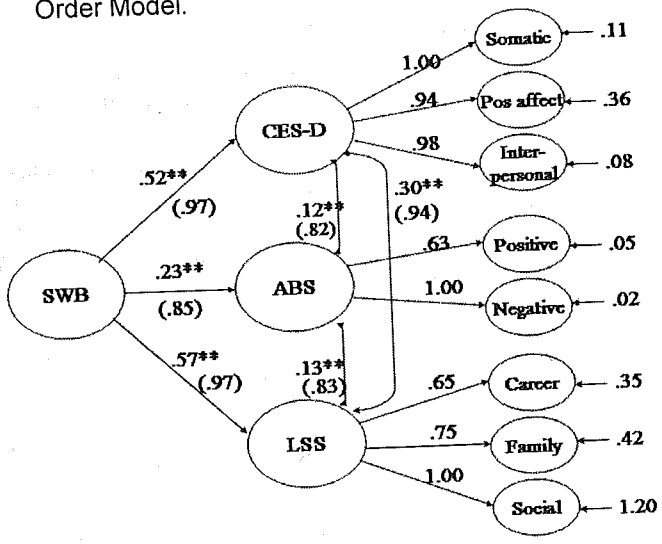
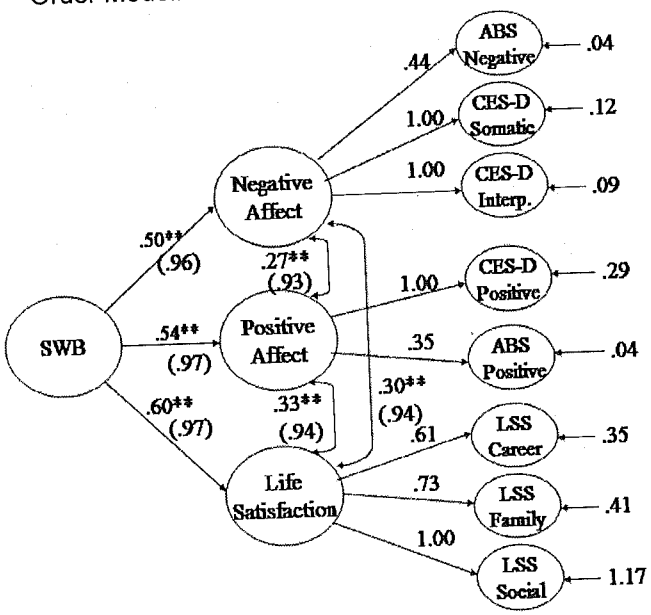


Figure 3. Measurement Model for the Second Higher Order Model.



An important issue for older workers is the fear, or the reality, of becoming redundant. Research indicates that older workers remain unemployed for longer than younger workers irrespective of levels of job-search intensity (Wanberg, Watt & Rumsey, 1996). Further, in New Zealand the rates of unemployment for those over 45 have shown a 53% increase between 1986 and 1996, the largest increase across age categories (Sparrow, 1999). The surveying of employers and displaced workers indicates that employers' negative attitudes toward older workers contribute to these trends (Sparrow, 1999; White, 1999). This raises important societal and political implications, and research is required to assess the fiscal, social, and psychological impacts of such trends and to establish means to counteract their negative effects. The fact that over 40% of the sample in this study met the cut-off for depression indicates that the psychological impact of job loss is costly.

The results of the study are not without limitations. The sample characteristics should be noted (age of participants, the experience of unemployment, and the predominance of Caucasians) as they could potentially influence the factor structures of the scales, thereby limiting confidence in generalization to other members in New Zealand society. The chief limiting factor, perhaps, is the lack of individuals from non-Pakeha groups: we see a strong need for future research with more diverse populations. Regardless, this paper provides a template through which such future research can be applied.

In conclusion, this study used an older New Zealand sample that had experienced job loss, in order to assess the psychometric properties of three standardized overseas adjustment measures. The results indicated that each measure produced multi-factor solutions that could be combined in such a way as to accurately measure a higher order construct of subjective well-being. All scales returned adequate levels of internal consistency, superior to levels found on overseas samples. The results can be used in research on the topical areas of positive ageing and older worker unemployment, and also as a procedural template for future researchers wishing to validate their measures and for those who would seek to generalize the measures used in this study to a more diverse population.

References

Argyle, M. (1996). Subjective well-being. In A. Offer (Ed.), *In pursuit of the quality of life* (pp. 18-45). New York: Oxford University Press.

Bagozzi, R. P., & Edwards, J. R. (1998). A general approach for representing constructs in organizational research. *Organizational Research Methods, 1*, 45-87.

Bentler, P. M. (1990). Comparative fix indexes in structural models. *Psychological Bulletin, 107*, 238-246.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88(3)*, 588-606.

Bradburn, N. M. (1969). *The structure of psychological well-being.* Chicago: Aldine.

Bryant, F. B., & Smith, B. D. (2001). Refining the architecture of aggression: A measurement model for the Buss-Perry Aggression Questionnaire. *Journal of Research in Personality, 35*, 138-167.

Buendia, V. J. (1989). Psychology and psychopathology of unemployment: Depression and social support. *Psiquis, 10(2)*, 47-53.

Cheung, C. K., & Bagley, C. (1998). Validating an American scale in Hong Kong: the Center for Epidemiological Studies Depression Scale (CES-D). *The Journal of Psychology, 132(2)*, 169-186.

Coyne, J. C. (1994). Self-reported distress: analog or ersatz depression? *Psychological Bulletin, 166 (1)*, 29-45.

Coyne, J. C., Gallo, S. M., Klinkman, M. S., & Calarco, M. M. (1998). Effects of recent and past major depression and distress on self-concept and coping. *Journal of Abnormal Psychology, 107(1)*, 86-96.

Dalziel, L. (2001). *The New Zealand Positive Ageing Strategy.* Wellington: Senior Citizens Unit, Ministry of Social Policy.

Davidson, H., Feldman, P. H., & Crawford, S. (1994). Measuring depressive symptoms in the frail elderly. *Journal of Gerontology, 49(4)*, 159-164.

Devins, G. M., Beiser, M., Dion, R., Pelletier, L. G., & Edwards, R. G. (1997). Cross-cultural measurements of psychological well-being: The psychometric equivalence of Cantonese, Vietnamese, and Laotian translations of the Affect Balance Scale. *American Journal of Public Health, 87(5)*, 794-799.

Diener, E. (2000). Subjective well-being: the science of happiness and a proposal for a national index. *American Psychologist, 55(1)*, 34-43.

Gupta, R., & Yick, A. (2001). Validation of CES-D scale for older Chinese immigrants. *Journal of Mental Health & Aging, 7(2)*, 257-272.

Hoelter, J. W. (1983). The analysis of covariance structures: Goodness-of-fit indices. *Sociological Methods and Research, 11*, 325-344.

Jahoda, M. (1982). *Employment and Unemployment.* London: Cambridge University Press.

Joreskog, K., & Sorbom, D. (1996). *LISREL 8.5.* Lincolnwood, IL: Scientific Software International.

Knight, R. G., Williams, S., McGee, R., & Olaman, S. (1997). Psychometric properties of the centre for epidemiological studies depression scale (CES-D) in a sample of women in middle life. *Behavioural Research Therapy, 35(4)*, 373-380.

Krause, N. (1988). Positive life events and depressive symptoms in older adults. *Behavioral Medicine, 14(3)*,101-112).

Leana, C. R., & Feldman, D. C. (1992). *Coping with Job Loss: How Individuals and Communities Respond to Layoffs.* New York: Lexington Press.

Macintosh, R. (1998). A confirmatory factor analysis of the Affect Balance Scale in 38 nations: a research note. *Social Psychology Quarterly, 61(1)*, 83-95.

Maitland, S. B., Dixon, R. A., Hultsch, D. F., & Hertzog, C. (2001). Well-being as a moving target: measurement equivalence of the Bradburn Affect Balance Scale. *Journal of Gerontology, 56B(2)*, 69-77.

Mallinckrodt, B., & Bennett, J. (1992). Social support and the impact of job loss in dislocated blue-collar workers. *Journal of Counseling Psychology, 39(4)*, 482-489.

McArdle, J. J., Johnson, R. C., Hishinuma, E. S., Miyamoto, R. H., & Andrade, N. N. (2001). Structural equation modeling of group differences in CES-D ratings of native Hawaiian and non-Hawaiian high school students. *Journal of Adolescent Research, 16(2)*, 108-149.

Ng, S.H. (1998). Social psychology in an ageing world: Ageism and intergenerational relations. *Asian Journal of Social Psychology, 1*, 99-116.

Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385-401.

Sparrow, M. (1999). *Midwinter Spring, Smart Business and Older Workers: The Research, Labour Market Demographics Survey.* Auckland, NZ: EEO Trust.

Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*, 173-180.

Van Schuur, W. H., & Kruijtbosch, M. (1995). Measuring subjective well-being: Unfolding the Bradburn Affect Balance Scale. *Social Indicators Research, 36(1)*, 49-74.

Wanberg, C. R., Watt, J., & Rumsey, D. J. (1996). Individuals without jobs: an empirical study of job-seeking behaviour and reemployment. *Journal of Applied Psychology, 81(1)*, 76-87.

Warr, P. (1978). A study of psychological well-being. *British Journal of Psychology, 69*, 111-121.

Warr, P. B., Barter, J., & Brownbridge, G. (1983). On the independence of positive and negative affect. *Journal of Personality and Social Psychology, 44(3)*, 644-651.

Warr, P., Cook, J., & Wall, T. (1979). Scales for the measurement of some work attitudes and aspects of psychological well-being. *Journal of Occupational Psychology, 52(2)*, 129-148.

White, J. (1999). *Midwinter Spring: Smart Business and Older Workers: New Zealand Guide to Best Practice for Employers in an Ageing Population.* EEO Trust: Auckland.

Wrosch, C., & Heckhausen, J. (1999). Control processes before and after passing a developmental deadline: Activation and deactivation of intimate relationship goals. *Journal of Personality and Social Psychology, 77*, 415-427.

Ying, Y., Tsai, J. L., Yeh, Y., & Haung, J. S. (2000). The conception of depression in Chinese American college students. *Cultural Diversity and Ethnic Minority Psychology, 6(2)*, 183-195.

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