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THE STRUCTURE OF MENTAL HEALTH: HIGHER-ORDER CONFIRMATORY FACTOR ANALYSES OF PSYCHOLOGICAL DISTRESS AND WELL-BEING MEASURES

ABSTRACT. This paper addresses the question of whether psychological distress and subjective well-being are the opposite poles of the same axis of mental health or independent constructs that should be measured on two independent axes. The measures used in this study originate from a preliminary ethnosemantic study and the content analysis of narratives of psychological distress and well-being episodes experienced by a random sample of francophone Quebecers (Canada). Two scales were produced: a Psychological Distress Manifestation Scale (PDMS) based on 23 items and four factors (Anxiety/Depression, Irritability, Self-Depreciation, and Social Disengagement), and a Psychological Well-Being Manifestation Scale with 25 items and six factors (Self-Esteem, Social Involvement, Mental Balance, Control of Self and Events, Sociability, and Happiness). Structural equation modeling analyses confirm that these 10 factors can be viewed as components of two correlated dimensions (psychological distress and well-being) ($r = -0.65$) of a two-dimensional latent construct which reflects a higher-order concept of mental health. We conclude that assessment of mental health in general populations should use concomitant measures of psychological distress and well-being.

It has been proposed that to increase the sensitivity and the precision of the mental health measures we should include, in mental health measurement, signs of psychological well-being that will distinguish among individuals who report almost perfect scores on measures of psychological distress (Veit and Ware, 1983). In fact, a substantial proportion of people in the general population report only a small percentage of symptoms included in psychological distress scales. Also, if measures of the frequency or intensity of distress symptoms, usually derived from clinical populations and diagnostic criteria, are better predictors of psychiatric disorders

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in general, positive affects could be more useful in differential diagnosis. For example, it has been proposed that low scores on positive affect scales is "a critical factor in distinguishing depression from anxiety and other disorders" (Watson and Kendall, 1989: 21). Such a combination of psychological distress and well-being measures could also be important for national epidemiological studies interested in monitoring national health status and predicting demands in mental health care services. For now, it is not yet clearly known whether it is a deterioration in psychological distress or a decrease in the psychological well-being that is the best predictor of health-seeking behaviour. Few researches have addressed these issues notably because the time frame to report distress symptoms (usually one or two weeks) is shorter than that for well-being (from one to twelve months). Here lies a first methodological prerequisite to further researches.

But a second more fundamental prerequisite is to question if psychological distress and well-being are opposite poles of a same continuum of mental health or if they do refer to two independent constructs and realities that should be measured on two independent axes? It has been proposed (Santé nationale and Bien-être Canada, 1988) that mental disorders and mental health are two interrelated but globally independent constructs that should be measured on two independent axis. A first axis based on the high or low prevalence of mental disorders expresses a gradation in level of incapacity and distress related to a given mental disorder. A second one oppose an optimal to a minimal mental health state and refers to an harmony or equilibrium between social, economic, professional or living conditions that permit optimization of mental capabilities. So even an individual presenting severe mental health disorders (i.e. a schizophrenic) with an adequate medication can show a good "mental health" if his (or her) life conditions and social life (access to a professional life, to a social support network, to adequate living conditions, etc.) are adequate. So high levels of distress symptomatology are not mechanically incompatible with high scores on life satisfaction, happiness, hedonic affect, cognitive appraisal of living conditions and other components of well-being. The goal of this paper will then be to test the hypotheses that psychological distress and well-being are two independent latent constructs based

on specific first-order constructs of negative and positive manifestations of ill and well-being and that they are both related dimensions of a higher-order mental health construct. We will then answer the question of the relevance of measurement scales combining both positive and negative dimensions of mental health.

Psychological Distress and Well-Being: Unidimensional and Multidimensional Hypotheses

Dohrenwend and his colleagues (1980) have launched a debate on the patterns of inter-relationship between the dimensions of both psychological distress and well-being arguing for a single-factor interpretation. The observed strong inter-correlations between measures of self-esteem, hopelessness, sadness, depression, anxiety and general well-being and their correlations with clinically assessed disorders support the unidimensional hypothesis. Referring to Frank (1973) they propose that all the scales used to assess mental health would refer to a global concept of demoralization or to a nonspecific psychological distress (Dohrenwend et al., 1980).

Contrary to that position, others argue for the independence between distress and well-being (Goldberg et al., 1982; Veit and Ware, 1983). Bradburn (1969) has already interpreted high inter-items correlations within groups of positive and negative items and the instability of the correlation of the positive and negative affect subscales with emotions such as anxiety and depression as proof that the Affect Balance Scale defines two distinct independent and uncorrelated dimensions. The reservations based on the fact that the independence between positive and negative scales is true for some specific factors (i.e stressful life events, physical activity, smoking) (McDowell and Praught, 1982) and that it could result from an inappropriate use of factor analysis (Van Schuur and Kruijtbosch, 1995) partially invalidates Bradburn's independency hypothesis. Cherlin and Reeder (1975) suggested from an analysis of the Affect Balance Scale that this negative-positive axis hide other components of well-being that should be measured on a pleasantness-unpleasantness and an energy-tiredness axis. Finally, the transcultural validity of the independence between distress and positive affect is not demonstrated. For example, while it has been

shown (Clark et al., 1981) that positive affect along with other first-order constructs (such as depressed affect, somatic and retarded activities and interpersonal relations) refer to the same higher-order construct i.e., depressive symptomatology in U.S. subjects, this positive affect construct presents low correlations with these distress constructs and did not load on a second-order factor in a Japanese population (Iwata and Roberts, 1996).

Veit and Ware (1983) offer an explanation for this dependence-independence dilemma and concluded that a large third-order mental health factor underlies the positive and negative symptoms included in the highly correlated second-order construct of psychological distress and well-being. The goal of this paper is to test this hypothesis but from an original set of distress and well-being manifestations reported by a general population of french-speaking Quebecers (Canada) through lived episodes of psychological distress and well-being. In fact, we believe that the validity of this hypothesis testing rests on the content and construct validity of the dimensions of psychological distress and well-being that defined the virtual mental health construct.

The Structure of Psychological Distress

Psychological distress is defined as a nonspecific syndrome that covers constructs such as anxiety, depression, cognitive problems, irritability, anger or obsession-compulsion (Ilfeld, 1976; Préville et al., 1991; see Gotlib and Cane, 1989; Weissman et al., 1988 for a review of distress scales and their dimensions). Depression and anxiety are usually recognized as core distress syndromes that each have psychological and somatic components (Mirowsky and Ross, 1989; Ilfeld, 1976; Watson and Kendall, 1989). Sleep disorders, eating disorders, loss of energy, physical manifestations of stress are somatic symptoms also associated with clinical cases of depression and anxiety (APA, 1994; Kirmayer, 1984) and then included in distress scales. It has not been clearly established whether they are true components of psychological distress or simply physical consequences of it (Katon et al., 1991). Some argue that somatic complaints are instead concomitant manifestations but not components of a distress construct, and that they must not be included in distress measurements because of their correlation with both

physiological and emotional problems (Wells, Golding and Burnam, 1988). This debate is still left open.

Relying on exploratory and confirmatory factor analyses, it has been demonstrated (Préville et al., 1995; Martin et al., 1989; Veit and Ware, 1983; Zautra et al., 1988) that a second-order hierarchical model expressing a more general syndrome of "nonspecific psychological distress" represents the symptoms more adequately than a first-order model based on orthogonal or oblique solutions. In the same way, Tanaka and Huba (1984) have shown that although the primary factor structure of items from the Beck Depression Inventory and the Psychiatric Epidemiology Research Interview varied slightly across different samples, a second-order factor was always found that related strongly to physiological, cognitive and motivational manifestations of depressive and psychological distress symptomatology. So there seems to exist a virtual construct of psychological distress that structure various affective, cognitive and possibly somatic dimensions of ill-being.

The Structure of Well-Being

Even though psychological distress symptoms can be defined as negative reactions to recent life difficulties, they give an incomplete picture of people's long-term mental health. A recent review of the progress and opportunities in assessing subjective well-being (Diener, 1994), proposed that people's well-being must be conceived as, and assessed through measurement of, multiple cognitive (life satisfaction, morale) and affective (positive emotions, negative affects) components and that such a long-term well-being is a meaningful construct in terms of cross-situational consistencies as well as of temporal stabilities (Diener, 1994). Psychological well-being is generally considered as a component of quality of life scales (Parmentier, 1994)

General well-being has also been defined as a balanced nourishment of the mind, body and spirit (Vella-Brodrick and Allen, 1995). According to Veit and Ware (1983) a general positive affect and emotional ties are dimensions of subjective well-being (and not objective well-being usually associated with quality of life concept, (Parmenter, 1994)). Okun and Stock (1987) define well-being as "an umbrella construct referring to the affective reactions of individuals

to their life experiences along a positive-negative continuum" (1987: 481). It should have three subordinate components that involve specific time frame cognitive content: 1) life satisfaction as an evaluation of goal attainment, past oriented with strong cognitive content; 2) morale or morale condition toward discipline and confidence, future oriented with moderate cognitive content and 3) happiness as affective reaction toward daily life founded on positive and negative emotions, present oriented with low cognitive content.

Happiness is then a major component of well-being. It refers to both an affective component expressing a "hedonic level of affect" (pleasant affective experiences outbalance unpleasant ones) and a cognitive component regarding the contentment or the perception that wants have been met (Veenhove, 1994). Independently of the debate on happiness as a fixed trait of individuals, either rooted in temperamental disposition, (Tellegen et al., 1988), in cognitive inclination or in acquired disposition (Costa et al., 1987), or in a fixed national character (Inkeles, 1990/91, cited by Veehoven, 1994), it has been convincingly proposed that happiness is no immutable trait. Inasmuch as it is defined as a positive evaluation of the quality of life-as-a-whole, not as an elated mood, happiness is dictated by living conditions and then, in spite of inner disposition, better society make people happier (Veehoven, 1994, 1998).

Others stress the cognitive component of subjective well-being and define it as "a thoughtful appraisal of quality of life as a whole, a judgment of satisfaction with life" (Argyle, 1987: 5). On the whole, researches confirm (Diener, 1984) that subjective well-being is based both on an affective (hedonic) component and a cognitive component namely life satisfaction defined as "a global judgment that people make when they consider their life as a whole" (Diener, 1994).

METHOD

Using confirmatory factor analytic procedures, this paper will test the multidimensionality of distress and well-being constructs. It will also test the hypothesis that these constructs are partially explained by a higher-order construct of "mental health" rather than being at opposite ends of a unidimentional mental health continuum.

Ethnosemantic Analysis of Distress and Well-Being Manifestations

To test these hypotheses, we started by the construction of an original pool of items that guarantees a good content validity to our measures. This content validity rests on four strategies. First of all, we did not include items on the sole basis that they are derived from normative psychiatric diagnostic criteria or associated with psychiatric cases of mental diseases. Secondly, from an ethnosemantic perspective, we rid ourselves from the empiricist symptomatic approach. We should analyse the signs people recognize as meaningful, and signs to which they refer to live, to express and to communicate their distress and well-being in a specific sociocultural context. We agree with Good (1994: 99) who argue that "symptoms are given meaning within a cultural system relationally, by the position they occupy within complex symbolic codes". Thirdly, from a phenomenological perspective, we list manifestations associated with episodes of distress and well-being experienced in the daily life and reported through narratives. Finally, from an anthropological perspective, we rely on culture specific significant items that are not hypothetical universal empirical entities but, instead, vehicles of dense symbolic content. These distress manifestations must reflect the way a specific ethnocultural group (here francophone Canadians from Quebec) constructs its representation of distress and well-being. This approach recognized the fact that culture defines the meanings associated with these signs, the sensitivity/insensitivity of the community to distress manifestations, the normality and acceptability of manifestations, the adequacy of expression of mental health problems, and the vulnerability or *seuil de tolérance* of the individual to life experience.

Content Validity

A random sample of 195 Quebecers (french canadians) were interviewed, at home, in 60 to 120 minutes sessions. In this proportionate stratified sample, 57% of the respondents were females, 70% were employed or at school, 61% were bachelors, separated or divorced, and the mean age was 40 years old for both men and women. All were french speaking and 92% of them were born in the province of Quebec. They were asked to report in detail the manifestations, perceived causes, reactions of persons in close circle, process of

help-seeking and impact on daily life of, first, a significant episode of psychological distress (depression, anxiety, burn-out, stress, etc.) they themselves experienced and, second, a significant episode experience by a significant member of their social network. Wording was: 'Have you (and do you know someone near you that) experienced, in the past weeks or months, a state of distress, (for example feelings of anguish, stress, discouragement, aggressiveness, irritability, depression, burn-out) and this to such an intensity that it has an impact on your (its) social relationships or professional activities?' This twofold exercise was repeated for what respondents reported as a lasting episode of significant good psychological health during which 'you (or he/she) was, for example, happy, psychologically balanced, in harmony with yourself (him/herself)'. Content analysis of about 4 000 pages of distress and well-being episodes narratives produced two corpora of 4 671 distress manifestations condensed in 176 sub-categories and then in 47 categories and of 3 956 signs of well-being condensed in 100 sub-categories and 37 categories. A final pool of 73 manifestations of distress and 76 signs of well-being was created considering four criteria: 1) number of individuals having reported that manifestations, 2) relative frequency of a given item in the original pool of items 3) capacity of the items to condense the complexity of the meanings associated to other items of a given category, 4) strategic importance of low prevalence items (i.e suicidal ideation). (See Massé et al. (1997a) for details).

Scales Construction

A second stratified random sample of 398 french speaking Quebecers (Table I) were asked, at home by an interviewer, if they have experienced never, rarely, half the time, frequently or always the manifestations or signs of distress and well-being in the past month. Exploratory factor analyses produced a psychological distress scale of 23 items based on four oblique factors (Self-Depreciation, Irritability/Agressivity, Anxiety/Depression, Social Disengagement) and a well-being scale with 25 items based on six oblique factors (Self-Esteem, Social Involvement, Mental Balance, Sociability, Control of Self and Events, and Happiness). Appendices A and B present the items included in these scales and relevant statistics. It is worth noting that a joint exploratory factor

TABLE I

Sociodemographic characteristics of subjects in the sample (N = 398)

Sociodemographic characteristics	N	%
Sex		
Men	197	49.5
Women	201	51.5
Age, years		
15–24	48	12.1
25–34	70	17.6
35–44	82	20.6
45–54	76	19.1
65+	51	12.8
Mean = 46.3; Standard deviation = 17.3	71	17.8
Born in Quebec	345	86.7
Born elsewhere in Canada	5	1.3
Born abroad	48	12.0
Education		
High school not completed	104	26.2
High school completed	106	26.8
College	80	20.2
University	106	26.8
Not specified	2	–
Mean (years) = 13.1; Standard deviation = 4.1		
Employment status		
Wage earner	141	35.1
Autonomous worker	24	6.0
Unemployed	70	17.5
Student	41	10.3
Retired	91	22.8
Housekeeper	33	8.3

analysis of the 48 items required a 10 factors oblique solution which exactly recovered the structures of the distress and well-being scales analysed separately with the exception of item 31 of the Sociability factor which also negatively loaded on the Irritability/Agressivity factor. Complete results of the construct and criterion validity and of the reliability of a Distress Manifestations Measure Scale (DMMS) as well as a Well-Being Manifestations Measure Scale (WBMMS) have been presented elsewhere (Massé et al., 1998a, 1998b).

Models and Analyses

Three sets of models were tested. The first two sets pertain to the structures of psychological distress and well-being analysed separately. They are factor analytic (first order) in nature. The exogenous latent variables used were the four factors of the distress (DMMS) scale and the six factors of the well-being (WBMMS) scale; the items were used as indicators. Four models will be reported here: M_1, unifactorial; M_2, correlated factors with perfect simple structure and uncorrelated residuals; M_3, correlated factors with uncorrelated residuals; M_4, correlated factors with correlated residuals. The last three models form a sequence of nested models (M_2 within M_3 within M_4). The null model (M_0) specifying independent items was used as a reference model. The third set of models posits a single exogenous latent variable of mental health which directly influences two endogenous latent variables of distress and well-being. The indicators of the latter are scores on factor-based scales (Pedhazur and Pedhazur, 1991). Two sets of indicators for the distress latent variables have been used: including or excluding a Somat score based on a seven item scale.

Both the Lee, Poon and Bentler (1994) approach for the analysis of the ordinal indicators (of the distress and well-being models analysed separately) implemented in EQS 5.5 as well as the similar approach (polychoric and asymptotic covariance matrices with weighted least squares) implemented in PRELIS 2.14 and LISREL 8.14 failed to produce a normal transformation of the data suitable for analysis. Following Byrne (1994) recommendation for evaluating confirmatory factor models with non-normally distributed populations, Satorra-Bentler Scaled Statistics were used. For the mental health higher-order models, maximum likelihood estimates were obtained based on the covariance matrix of the indicators. For all models, standard and scaled chi-square statistics were obtained as well as indices of goodness-of-fit (only AIC, SRMR and CFI are reported here). Akaike Information Criterion (AIC) is a fit index that takes into account the degree of parsimony of the model; the smaller, the better the fit (as computed by EQS it can be negative hence indicating a good fit).The Standardized Root Mean Square Residual (SRMR) index measures the difference between observed and fitted variances and covariances; a null SRMR indicates a perfect fit,

values of 0.05 or less are desired (Sörbom and Jöreskog, 1982). The Comparative Fit Index (CFI) allows the assessment of fit relative to other models; the closer to its maximum of 1 the better the fit, values of 0.90 or greater indicate a good fit (Bentler, 1995).

The whole process of developing the final models followed the model generating approach outlined in Jöreskog and Sörbom (1993). Lagrange Multiplier tests were performed to estimate the chi-square reduction obtained by freeing previously constrained to zero parameters (Bollen and Long, 1993; Byrne, 1994).

RESULTS

The goodness-of-fit statistics of the distress models are reported in Table IIa. The unifactorial model (M_1) clearly does not fit the data, χ^2/df is larger than 3 suggesting a poor fit (Carmines and McIver, 1981), CFI values for both standard and robust estimations are smaller than 0.90, the Satorra-Bentler χ^2 is large ($p < 0.01$), thus indicating a lack of fit. The four factors models (M_2, M_3, M_4) show a noticeable improvement over the null model (M_0) and the one-factor model (M_1). In order to assess the need for imposing correlations on the factors, M_2 was compared to a four orthogonal factors model denoted M_2-orth with perfect simple structure and uncorrelated residuals. Since M_2-orth is nested within M_2 it is possible to test the reduction in χ^2, thus the improvement of fit, related to allowing the factors to be correlated by testing $\Delta\chi^2$ the difference in the Satorra-Bentler χ^2 between the models. The results for M_2-orth ($\chi^2 = 948.43$, $df = 230$) yield $\Delta\chi^2 = 566.25$ with $\Delta df = 6$, which indicate a significant improvement ($p < 0.01$). Further improvements with respect to M_2 ($\Delta\chi^2 = 68.28$, $\Delta df = 7$, $p < 0.01$) is obtained with M_3 by departing from the simple structure of the factor regression coefficients (matrix Λ in Lisrel notation). Five items load on two factors and one item in three factors (see Appendix A). Although fit indices for M_3 indicate a good adjustment, the Satorra-Bentler χ^2 is significant ($p < 0.01$). The final model (M_4) which comprised 11 small (ranging from 0.07 to 0.15) but significant ($p < 0.05$) correlations among residuals further improves the fit ($\Delta\chi^2 = 94.01$, $\Delta df = 11$, $p < 0.01$). Moreover, its Satorra-Bentler χ^2 is not significant ($p = 0.24$).

TABLE II

Goodness-of-fit statistics for the distress and well-being models

Model	χ^2	*df*	χ^2/df	AIC	SRMR	χ^2 robust	χ^2/df robust	*Prob* robust	CFI robust
a) Distress									
Independent (M_0)	4 706.30*	253	18.60	4 200.30	–	–	–	–	–
Unifactorial (M_1)	1 095.48*	230	4.76	635.48	0.07	738.79*	3.21	0.00	0.77
Four correlated factors (M_2) perfect simple structure uncorrelated residuals	547.69*	224	2.44	94.69	0.05	382.18*	1.71	0.00	0.93
Four correlated factors (M_3) uncorrelated residuals	445.60*	217	2.05	11.60	0.04	313.90*	1.45	0.00	0.96
Four correlated factors (M_4) correlated residuals	304.20*	206	1.48	−107.89	0.03	219.89	1.07	0.24	0.99
b) Well being									
Independent (M_0)	4 693.66*	300	15.64	4 093.66	–	–	–	–	–
Unifactorial (M_1)	1 051.15*	275	3.82	501.15	0.06	677.98*	2.47	0.00	0.87
Six correlated factors (M_2) perfect simple structure uncorrelated residuals	728.82*	260	2.80	208.82	0.05	485.85*	1.87	0.00	0.93
Six correlated factors (M_3) uncorrelated residuals	510.29*	249	2.05	12.29	0.04	348.16*	1.40	0.00	0.97
Six correlated factors (M_4) correlated residuals	383.73*	239	1.61	−94.26	0.03	263.59	1.10	0.13	0.99*

* $p < 0.01$

The results of the well-being models reported in Table IIb parallel those of the distress models. In this case, the six factors models (M_2, M_3, M_4) show noticeable improvement over the null model (M_0), the one-factor model (M_1) as well as over the six orthogonal factors model (M_2-orth) with perfect simple structure and uncorrelated residuals (the reduction in Satorra-Bentler χ^2 from M_2-orth to M_2, $\Delta\chi^2 = 1066.27$ $\Delta df = 6$ is significant with $p < 0.01$). The sequence of nested within models (M_2, M_3, M_4) show improvement of the fit: $\Delta\chi^2(M_2, M_3) = 137.69$, $\Delta df\ (M_2, M_3) = 11$, $p < 0.01$; $\Delta\chi^2(M_3, M_4) = 84.57$, $\Delta df\ (M_3, M_4) = 10$, $p < 0.01$. The last model (M_4) with nine significant correlated residuals ranging from 0.09 to 0.15 presents the best fit.

Table III presents the goodness-of-fit statistics for the mental health models. Clearly, higher-order models without Somat (M_1 and M_2) better fit the data than unifactorial models (M_{01}, M_{02}) or the independent model (M_{00}). Furthermore, correlating the residuals (M_2) improve the fit over uncorrelated residuals (M_1) ($\Delta\chi^2(M_1, M_2) = 88.83$, $\Delta df\ (M_1, M_2) = 9$, $p < 0.05$). Similarly for Somat models, the reduction in χ^2 for the correlated residuals model (MS_2) with respect to the uncorrelated one (MS_1) is significant ($\Delta\chi^2(MS_1, MS_2) = 115.95$, $\Delta df\ (MS_1, MS_2) = 10$, $p < 0.05$).

Figure 1 represents the path diagram (completely standardized solution) of the mental health model without Somat (M_2) which has the best fit. The structure of the regression coefficients linking the latent endogenous variables Well-being and Distress to their respective indicators (matrix Λ_y in Lisrel notation) is very close to simple structure with the exception of the indicators Happiness and Anxiety/depression which have a factor complexity of two (both latent variables are involved in their description). The regression coefficients on the alternate latent variable are small and negative (-0.26 for happiness on distress and -0.16 for anxiety/depression on well-being). Seven correlations among the residuals range in absolute value from 0.19 to 0.33. As compared to this model (M_2), the model with Somat which presents the best fit (MS_2) shows an identical structure with the exception of two new correlations between the residuals of Somat and Anxiety/Depression (0.31) and Happiness (-0.32) (cf. Figure 2). Overall, the value of the different coefficients are marginally different. Although a statistical test on

TABLE III

Goodness-of-fit statistics for mental health models

Model	χ^2	*df*	χ^2/df	AIC	SRMR	χ^2 robust	χ^2/df robust	*Prob* robust	CFI robust
Without Somat									
Independent (M_{00})	2 435.20*	45	5.16	2 345.20	–	–	–	–	–
Unifactorial (M_{01}) uncorrelated residuals	457.72*	35	13.08	387.72	0.08	224.42*	–	0.00	0.84
Unifactorial (M_{02}) correlated residuals	355.47*	28	12.70	299.47	0.07	183.62*	–	0.00	0.87
Higher-order (M_1) uncorrelated residuals	172.90*	34	2.16	104.90	0.05	111.62*	3.28	0.00	0.93
Higher-order (M_2) correlated residuals	33.88	25	1.36	16.12	0.02	22.79	0.91	0.59	1.00
With Somat									
Independent (MS_0)	2 771.01*	55	50.38	2 661.01	–	–	–	–	–
Higher-order (MS_1) uncorrelated residuals	233.35*	43	5.43	147.35	0.05	154.88*	3.60	0.00	0.92
Higher-order (MS_2)	54.95*	33	1.67	11.05	0.03	38.93	1.18	0.22	1.00

* $p < 0.01$

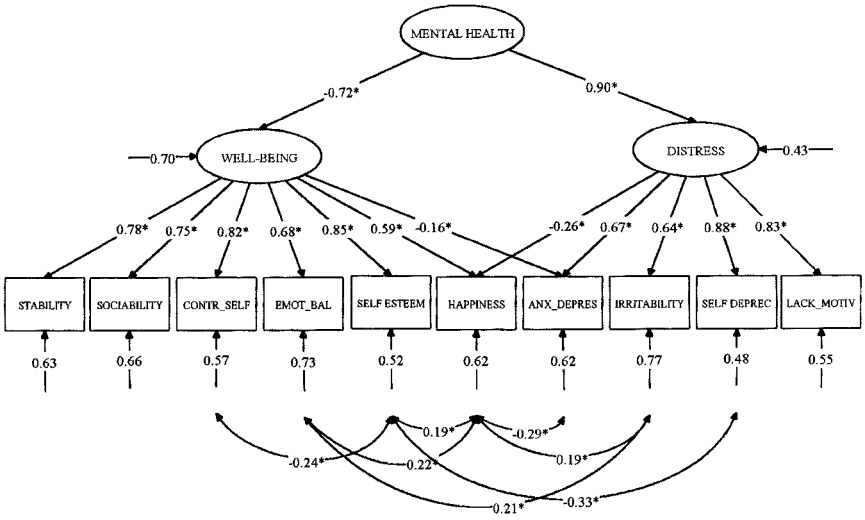

Figure 1. Path diagram for the higher-order mental health model with correlated residuals (M_2).

the reduction of χ^2 from MS_2 to M_2 is not possible since MS_2 is not nested within M_2, both models have essentially the same structure. Furthermore, on the basis of the indices of fit, M_2 fits the data slightly better than MS_2. The higher order factor of mental health (in M_2) relates positively to Distress (0.90) and negatively to Well-being (-0.72). The correlation between the lower order factors is -0.65 (and -0.64 in MS_2).

DISCUSSION

The goal of this research was to test a higher-order model in which a latent construct of mental health is linked to two interrelated subconstructs of psychological distress and well-being whose indicators are scores obtained on ten dimensions of positive and negative manifestations of mental health. Structural equation modeling analyses led us to conclude that the model that offers the best interpretation of the structure of psychological distress and well-being experienced by a general population is a higher-order model (M_2) represented in Figure 1. Though technically this model is a second-order factor analytic one, the fact that the two sets of indicators are respectively based on four and six first-order factors indicate that in this model, mental health is conceptually defined as a third-order construct.

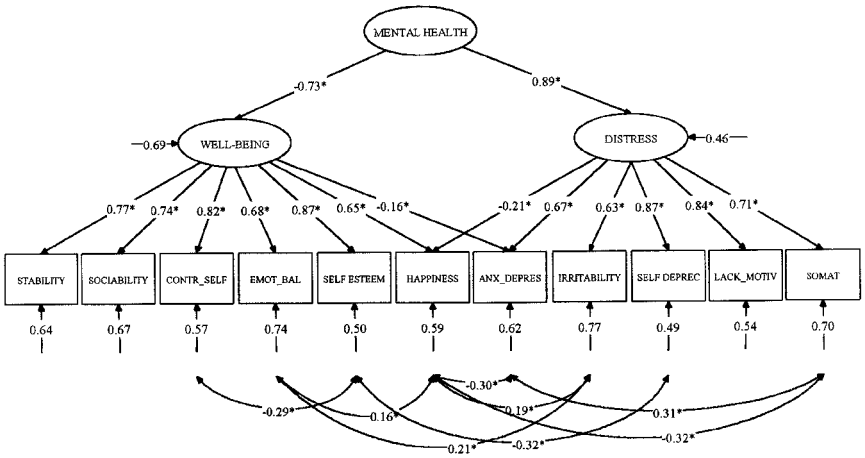

Figure 2. Path diagram for the higher-order mental health, model with correlated residuals and Somat indicator (MS_2).

Testing the Model with Four Dimensions of Distress

Statistics associated with model M_4 for the distress scale confirm that manifestations of distress are explained by a first-order four factors model reflecting a nonspecific psychological distress construct. Albeit we did use factor-based scores instead of the original item scores as indicators, results are consistent with those reported by Martin et al. (1989) and Préville et al. (1995). They both conclude that the 29 items derived from the Psychological Distress Index (a french adaptation of the Psychiatric Symptom Index (Ilfeld, 1976) and regrouped under four factors (depression, anxiety, anger, cognitive problems) are more adequately represented by a second-order hierarchical model.

Our results show, nevertheless, significant differences in the very nature of distress. These differences can be explained by the use of an original pool of items that represents what we have already (Massé et al., 1997b) called the basic vocabulary of a popular language of distress from and through which francophone Quebecers experience and express their distress. The underlying dimensions of that non specific distress can be expected to be different from those derived from a pool of items reflecting clinical psychiatric symptomatology.

A first difference lies in the inclusion of two original dimensions of distress. If depression, anxiety and irritability are dimensions

usually integrated in psychological distress scales, self-depreciation and social disengagement are not. Here distress is expressed through self-critique, loss of self-esteem and an inclusive feeling of incompetence. Self-depreciation show in fact the strongest association (standardized regression coefficient of 0.88) with the first-order construct of psychological distress. This somewhat "cognitive" evaluation of the self component is linked to two "behavioural" components. A first one expresses social disengagement, social withdrawal, loss of interest and lack of initiative towards social involvement and have the second highest regression coefficient (0.83) with the distress construct. A second one, irritability, expresses agressivity, rudeness and conflict with others. Distress appears then not as a pure affective experience but as a social and human relation experience as well. It is as much socio-behavioural in nature as psychological. On the whole, psychological distress does not appear to be restrained, as proposed by Mirowski et Ross (1989: 7) to "unpleasant subjective states of depression and anxiety which have both emotional and physiological manifestations". Self-depreciation and social disengagement are not by-products but rather intrinsic components of distress which is thus as social as it is psychological.

A second difference of interest rests in the merging of depression and anxiety manifestations in a synthetic construct. Usually presented as two independent factors (Ilfeld, 1976; Veit and Ware, 1983) even in the same Quebec population as the one reported in our study (Préville et al., 1991, 1995; Martin et al., 1989), manifestations of depression and anxiety are here indissociable, even in a longer version (46 items) of our DMM Scale (Massé et al., 1997a). The relative moderate regression coefficient (0.67) of this factor with the distress construct shows that distress is not expressed only through affective states in lived episodes. It is worth noting that studies (Gotlib and Cane, 1989) report correlations ranging from 0.50 to 0.84 (0.94 for Préville et al., 1991) between these constructs. Watson and Kendall (1989) suggested that depression and anxiety, as affective states, are strongly correlated because if depression centres on the experience of sadness and anxiety it is an experience dominated by fear, "a person who experiences fear is very likely to report feeling sad as well" (1989: 8). Here, manifestations of depres-

sion and anxiety are part of the same idiom of distress. Finally, many studies report that large proportions of neurotic outpatients show a mixed anxiety/depression syndrome (Goldberg et al., 1987; Prusoff and Klerman, 1974), and that such a mixed syndrome characterizes a substantial proportion of the more severeley depressed community respondents (Blazer et al., 1988). This also seems to be the case in a general population.

Finally, none of the original ten somatic items has been kept in the longer as well as the shorter version of the DMMS. Sleep and eating disorders, tension in back or neck, upset stomach or feeling low in energy are not an independent dimension of distress even if somatic manifestations count for 16% of all the distress manifestations reported in the ethnosemantic study. In fact, eight of the ten somatic items were associated with the same depression/anxiety factor but with low communalities, a pattern reported also by Iwata and Roberts (1996) in a Japanese population. In the present study, when a somatic unifactorial scale derived from seven of the 10 somatic items is added as an indicator of the Distress endogenous variable in the higher-order model (MS_2), no improvement of the model is observed. Somatic construct, then, is not a component of the non specific distress construct even if its manifestations are integrated in the basic popular vocabulary of distress and if their prevalence is correlated with the four other constructs (correlations between scores derived from a somatic scale based on these items and the four factors range between 0.46 and 0.71). These results are also consistent with the ones reported by Préville et al. (1995), who conclude that a second-order five factors model including a somatic scale does not offer a better fit than a second-order four factors model excluding a somatic scale. Are somatic symptoms associated with severe cases of depression and anxiety or confounding factors related to physical diseases (Wells et al., 1988)? Our results suggest that even if a high level of psychological distress is associated with frequent somatic symptoms, somatization is not a dimension but either a consequence or a simple correlate of psychological distress.

Testing a Six Dimensions Model of Well-Being

Confirmatory factor analysis confirms that control of self and events, happiness, social involvement, self-esteem, mental balance and

sociability appear as the basic dimensions or first-order constructs of well-being. They represent signs through which francophone Quebecers experience life episodes characterized by a high level of psychological health. Inasmuch as the items of interest are psychological manifestations that reside in the experience of the individuals, we have here a construct of subjective well-being. This first-order construct is also global since it includes an assessment of all the life domains.

A striking result, is that subjective well-being cannot be restrained to positive affects such as happiness. This factor shows in fact the weakest regression coefficient (0.59) with the well-being first-order construct, a fact that can be partially explained by its weak negative link (regression coefficient of -0.26) with distress. It also indicates that, in post-modern societies, happiness is but only one dimension of well-being, beside sociability, mental balance, control and self-esteem. In fact, factors showing the highest relation with that first-order construct are control of self and events and self-esteem. We can hypothesise that in societies based on individual accomplishment, self-esteem and self-confidence are prerequisites (and possibly products) of social or professional achievements. Subjective psychological well-being is also a matter of mental balance and control of self. Results here are convergent with the proposition of Mirowski and Ross that "it is important for people to feel that they are in control of their own lives, to a large extent, because a sense of control bolsters the will to think about problems and do something about them" (1989: 12). These notions of balance and self-control (on emotions and behaviours) or of the control of the rational mind over body and affects, have been considered by Gaines (1992) as the foundation of the popular ethnopsychology in western societies as well as the basis for the core notion of disorders (of mood, anxiety, eating, sleep, etc.) in the Diagnostic and Statistic Manual of the American Psychiatric Association.

Subjective well-being includes the notion of life satisfaction but is not restricted to that dimension. We agree only partially with the definition given by Veenhoven (1984) who defines subjective well-being as the degree to which individuals judge the overall quality of their life. Such a cognitive appraisal of life seems concomitant with an appraisal of the self. Subjective well-being is as much based on

feelings and affects developed in reaction to good or bad experiences as on cognitive evaluation of the discrepancy between aspiration and achievement (Campbell et al., 1976).

Finally, psychological well-being is not purely delimited by relations with our self, it is also a matter of positive involvement with others and within society. So to be in good mental health means to maintain good relations in one's close circle and to be socially involved and motivated. Social involvement appears here as the positive pole of the social disengagement dimension of psychological distress as self-esteem can be seen as the positive counterpart of self-depreciation. Happiness can also appear as the positive side of depression and anxiety. But, in spite of residual correlations between some of the well-being and distress indicators, model M_2, (Figure 1) supports the hypothesis of relative conceptual discrepancy between the two sets of indicators. Moreover, self-control and mental balance have no direct counterparts in distress manifestations. Hence it does not seem that psychological distress is the inverted mirror image of well-being.

Testing for Mental Health Latent Construct

The exploratory as well as the confirmatory analyses of the data used in the present study strongly suggest that distress and well-being are neither opposite poles of a unique and unifactorial latent concept nor completely independent concepts (see models M_{01}, M_{02} and M_{00} in Table III). They are rather two correlated dimensions ($r = -0.65$) of (at least) a two-dimensional latent construct which may reflect a higher-order concept of mental health. Model M_2 as reported in Table 3 and represented in Figure 1 may then be viewed as a mental health higher-order model where psychological distress is not simply the negative pole of a unidimensional mental health continuum. Rather, in the same way as well-being, it is a distinct component of mental health. Our results are then convergent with those of Veit and Ware (1983) who saw in psychological distress and well-being two unipolar factors underlying a general mental health construct. This result is however inconsistent with the hypotheses sustained by Mirowsky and Ross (1989: 24) who see "well-being and distress as opposite poles on a single continuum: more well-being means less distress and more distress means less well-being" and who explain imperfect correlations found in studies

by random measurement error and by the fact that some people express their feelings less than others. We believe the explanation of our bi-dimensional construct of mental health lies instead in divergent conceptions of psychological distress. Here psychological distress and well-being are not defined through mood and malaise as components of depression and anxiety, as stated by Mirowsky and Ross, but through self-depreciation, irritability and social disengagement. In this configuration, these are more than mere correlates of distress, they are indeed basic dimensions of it. If we can conceive positive and negative affects as opposite poles of an affective dimension, affect is but only one of the dimensions of both distress and well-being.

Other explanations of this conceptual independence have been proposed. Watson and Kendall (1989) have shown that, on the basis of self-reported emotions, and orthogonal factor analysis, negative affective states such as fear, nervousness, anger, guilt, contempt, disgust, sadness, loneliness, and self-dissatisfaction form a broad general factor of negative distress affect (NA) while positive moods (enthusiasm, joy, energy, mental interest, alertness) define a broad positive affect (PA) factor (1989: 11). But inside these general negative and positive affect construct, if anxiety and depression presented a correlation of 0.54, anxiety affective states are strongly associated with general negative affect only (and represent a pure state of high NA), while depression presents high loadings on both general positive and negative affect. So anxiety separates positive affect from negative affect and subjective distress. “In other words, depression – but non anxiety – is related to the experience and/or reporting of low PA” (1989: 10). More importantly, the authors then show that the relation between positive and negative affect is not linear since a low PA is not associated with the same mood (i.e. depressed mood) then a high negative affect. This conclusion converges with that of Green et al. (1993), who show that measures of positive and negative affects varied inversely, but only at low levels and with that of Diner et al. (1993, cited in Diener, 1994), who found that positive and negative affect were clearly statistically separable, although not orthogonal, and who suggest that they should be measured separately. In addition, Watson and Kendall also suggested that low Positive Affect is associated with endogenous

depression (with melancholia) but not with neurotic or exogenous (reactive) depression (Watson and Kendall, 1989: 19). Positive and negative affect and then positive and negative mental health express complex patterns of relation with ill-being and mental diseases.

Stability or Instability of Subjective Well-Being Measures

Another explanation of the relative distinctness between distress and well-being constructs could be found in the differences in the stability of both measures. Even if a high level of distress can originate from current life difficulties, individuals can report a high level of well-being if this construct refers to a long-term satisfaction with life in general and stable personal characteristics. While some argue for the stability approach (Diener and Larsen, 1984; Diener, 1994) and report that measures of subjective well-being and life satisfaction display strong temporal stability in a six-month to six-year time frame (Chamberlain and Zika, 1992; Headley and Wearing, 1989), others report that measures of subjective well-being have low test-retest reliabilities (Strack et al., 1985) and that people's current affective states are an obvious heuristic for evaluating life satisfaction (Sherman and Corty, 1984; Schwarz and Clore, 1983). Yardley and Rice (1991) report that subjective well-being (SWB) shows stability over time and that it is also influenced by transient variables. They propose a two-component model of SWB based on "(1) stable personal characteristics and stable life conditions; and (2) changes in personal characteristics and changes in life conditions" (Yardley and Rice, 1991: 107–108). Even if in the present study, both psychological distress and well-being manifestations were reported on the same time frame: "in the past month", we cannot pretend to control that factor. Content analysis of the distress and well-being episodes narratives in our previous ethnosemantic study suggest that manifestations self-reported were associated with shorter, more clearly delimited episodes of distress and longer, less definite episodes of well-being. A discrepancy in referential time frame of each of the first-order construct can still explain the relative independence of measures based on reported manifestations frequency.

Finally, the higher-order model presented in this study (M_2) shows some overlaps among the four distress and six well-being indicators. It also shows some correlations among residuals. These

results suggest that some underlying dimensions of such a complex and fluid multidimensional concept as mental health still have to be uncovered. Though this research confirms that a virtual mental health concept exists and explains a multiplicity of ill and well-being dimensions, it will probably never be expressed as a purely reified construct. Since mental health is experienced and expressed through manifestations interpreted as culturally significant instead of through symptoms treated as discrete entities, mental health will never be reducible to a delimitable object completely accessible to empirical research. Moreover, our item definition approach based on content analysis of lived episodes narratives confined us to work with underlying factorial constructs derived from a pool of items. This approach does not guarantee the construction of sub-scales assessing specific dimensions such as life satisfaction, morale or optimism that could be part of a mental health virtual construct. The absence of such dimensions in the analysis may explain some of the limits of the final model.

CONCLUSION

The structural models developed here will contribute to substantiate the theoretical model addressed to explain the interrelations between psychological distress and well-being. Mental health is not just the absence of negative symptoms or negatives reactions such as depression, self-depreciation, anxiety or social disengagement. It must also include signs of happiness, mental balance, self-esteem, self-control, sociability, social involvement. A low level of psychological distress does not mean automatically a high level of subjective well-being. These are two different, though correlated, dimensions of a virtual concept of mental health.

This conclusion derives from a phenomenological approach. It is based on manifestations or signs experienced through daily life episodes and, on an ethnosemantic basis, reported through the filter of what popular culture conceives as the appropriate ways to experience and express mental health. The inferential process is thus fundamentally different from an analysis of items derived from theoretically defined concepts of psychological distress and well-being. Even if the former approach, used for the construction

of the initial pool of items, may have prevented the emergence of some theoretically important first-order dimensions (since appropriate items have not been imposed in the initial item pool), its strength lies in the strong content and construct validity of measures of the popular conception of what is distress and well-being.

The results suggest that epidemiological assessment of general population mental health should use concomitant measures of positive as well as negative manifestations. Even if our model confirms the validity of each of the distress and well-being scoring options represented by the DMMS and the WBMMS, it suggests that a single summary score or a vector of conjoint scores derived from the 10 factors identified will give a better assessment of mental health in a general population.

APPENDIX A

Confirmatory factor analysis of the Distress Manifestations Measure Scale (DMMS) standardized solution.

Factors		Matrix Λ				Residual
		F1	F2	F3	F4	variance
F1.	Self-depreciation					
22.	I belittled myself, I put myself down.	0.74				0.45
25.	I felt useless.	0.67				0.56
28.	I lacked self-confidence.	0.79				0.38
39.	I stayed away from others as much as possible.	0.68				0.54
53.	I had difficulty facing my problems.	0.79				0.38
68.	I had the impression that no one loved me.	0.69				0.52
73.	I had the impression that I had messed up my life.	0.76				0.42
F2.	Irritability					
37.	I was at odds with everyone around me.		0.55			0.69
38.	I was aggressive about everything and nothing.		0.77			0.40
41.	I was arrogant and even rude towards others.		0.74	−0.37	0.27	0.46
42.	I had no patience.		0.63			0.60
44.	I was very touchy, I would get angry about any comment directed at me.		0.68			0.54
F3.	Anxiety/depression					
9.	I felt preoccupied and uneasy.			0.71		0.49
10.	I felt sad.			0.82		0.32
11.	I felt depressed or “down in the dumps”.	0.25		0.62		0.35
18.	I felt ill at ease with myself.	0.35		0.46		0.45
34.	I felt stressed and under pressure.		0.27	0.46		0.58
F4.	Social disengagement					
12.	I felt that I wasn’t interested anymore in things that I normally found interesting.				0.71	0.50
43.	I was less receptive to the ideas and opinions of others.		0.37		0.24	0.70
49.	I didn’t feel like doing anything.				0.70	0.51
51.	In general I lacked initiative, I lacked drive.		0.24		0.48	0.58
57.	I felt like throwing everything to the wind, quitting.				0.67	0.56
59.	I had difficulty concentrating on anything.				0.62	0.62

Correlations among factors

	F1	F2	F3	F4
F1	1			
F2	0.64	1		
F3	0.71	0.55	1	
F4	0.88	0.58	0.69	1

APPENDIX B

Confirmatory factor analysis of the Well-Being Manifestations Measure Scale – standardized solution.

Factors	Matrix Λ						Residual
	F1	F2	F3	F4	F5	F6	variance
F1. Control of self and events							
25. I was able to face difficult situations in a positive way.	0.89	−0.31					0.57
39. I was quite calm.	0.61						0.62
50. I was able to find answers to my problems without trouble.	0.69						0.53
55. I was able to clearly sort things out when faced with complicated situations.		1.20–0.63					0.43
F2. Happiness							
3. I felt healthy and in top shape.		0.65					0.58
8. My moral was good.		0.47				0.33	0.53
10. I had the impression of really enjoying and living life the fullest.		0.79					0.38
12. I felt good, at peace with myself.		0.44		0.36			0.40
15. I found life exciting and I wanted to enjoy every moment of it.		0.81					0.34
F3. Social involvement							
44. I felt like having fun, doing sports and participating in all my favourite activities and past-times.			0.61				0.62
49. I had lots of “get up and go”, I took on lots of projects.			0.61				0.62
62. I was curious and interested in all sorts of things.			0.62				0.61
76. I had goals and ambitions.			0.65				0.58
F4. Self-esteem							
19. I had self-confidence.				0.79			0.38
21. I felt useful.				0.67			0.55
22. I felt that others loved me and appreciated me.				0.39		0.33	0.56
27. I felt satisfied with what I was able to accomplish, I felt proud of myself.				0.68			0.53
F5. Mental balance							
67. I lived at a normal pace, not doing anything excessively.			−0.42		0.89		0.64
68. I was true to myself, being natural at all times.					0.23	0.44	0.60
72. My life was well-balanced between my family, personal and professional activities.					0.66		0.56
75. I felt emotionally balanced.				0.81		0.34	
F6. Sociability							
30. I smiled easily.		0.43			−0.37	0.78	0.41
31. I got along well with everyone around me.						0.70	0.51
35. I had a good sense of humour, easily making my friends laugh.			1.05		−1.06	0.74	0.42
45. I was able to concentrate on and listen to my friends.						0.74	0.45

Correlations among factors

F1	1					
F2	0.83	1				
F3	0.81	0.75	1			
F4	0.88	0.86	0.76	1		
F5	0.87	0.73	0.81	0.86	1	
F6	0.72	0.47	0.50	0.76	0.74	1

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