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A reappraisal of the Malaise Inventory

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Summary. In recent years Rutter's Malaise Inventory has been used increasingly to measure levels of stress among those who care for people with dependency needs. Although there has been an element of dispute in the literature about the unidimensional nature of the scale, later work (Bebbington and Quine 1987) tends to suggest that Malaise Inventory scores can be used as a single internally consistent measure of stress. In this study consideration is given to the results of a national sample survey of 527 members of the Association of Carers (now Carers: National Association) which suggests the existence of two valid dimensions to the Malaise Inventory across a wider range of carer groups. Implications for future development and administration of the scale as a measure of stress are discussed.

The prevailing emphasis on community care policy has helped to bring necessary attention to the pivotal role of informal carers as supporters of people with dependency needs. As service interventions become more sophisticated and tailored to the needs of carers as well as the cared for, it is vital that efforts are made to establish the nature and scope of stresses and strains faced by carers in this process.

In the United States thinking on this matter seems to have been guided by the early work of Holroyd (1974) and by later subsequent attempts to develop models of stress adaptation which have been empirically tested and refined (Crnic et al. 1983; Holroyd and Guthrie 1986; Dunst et al. 1986; Stoneman and Crapps 1988 for example). By contrast, most UK research in this field has been based on early research by Michael Rutter (Rutter et al. 1970a, b) who adapted the Cornell Medical Index to assess psychosomatic symptoms associated with mental well-being or 'malaise'. According to Rutter the resulting questionnaire of 24 items used 'simple language ... designed to tap the different types of emotional disturbance commonly seen in adults. Items referred to the emotions ... and to physical matters which have important psychological components'. As a clinician he believed that individuals (mothers) scoring affirmatively on five or more of the twenty-four items on the inventory were considered to be at risk of emotional disturbance. In assessing the validity of the scale Rutter et al. (1970a) stated that "the inventory differentiates moderately well between families with and without psychiatric disorder" (p. 160).

Within the UK studies using the Malaise Inventory have tended to concentrate on the well-being of parents, although usually mothers, of disabled children (Anderson and Clarke 1982; Bebbington and Quine 1987; Bradshaw and Lawton 1978; Burden 1980; Dorner 1975; Gath 1977; Hirst 1983; Pahl and Quine 1985; Quine and Pahl 1986; Tew and Lawrence 1975). Recent exceptions were studies of the care of elderly people reported by Wright (1986) and Quine and Charnley (1987). In all these previously reported studies the Malaise Inventory is used as a unidimensional measure of emotional stress. Hirst's (1983) analysis was however equivocal in this respect. He drew attention to the moderate or even weak relationship between items and a common factor following a principal components analysis, suggesting that Malaise scores were untrustworthy for testing empirical hypotheses about degrees of stress.

Table 1. Comparison of Malaise Inventory scores across studies

Study	Subjects	Mean score	*n*
This study	Members of the Association of Carers	9.0	527
Bradshaw and Lawton 1978	Parents of severely disabled children who had applied to the Family Fund	9.0	303
Burden 1980	Parents of severely disabled infants	6.1	25
Quine and Pahl 1986	Mothers of severely mentally handicapped children	5.8	200
Cooke 1982	Parents of ESN(s) children	5.7	78
Quine and Charnley 1986	Carers of elderly people	3.9	226

Bebbington and Quine (1987) contended that Hirst used an inappropriate methodology for factor analysis and argued the case for confirmatory factor analysis using LISREL VI (Joreskog and Sorbom 1985). The outcome was nevertheless only marginally different from that reported by Hirst with the authors concluding that the results are again indicative of a single, rather moderate factor. They add that the data would be unlikely to pass a formal test of significance for a single factor but that as factor models are usually only an approximation to reality, it is the general fit of the model rather than the formal test of significance which matters.

The data reported in this reappraisal of the Malaise Inventory come from a British national sample survey of 527 carers who were members of the National Association of Carers (later to become Carers: National Association during 1988) (Nolan and Grant 1989). The Malaise Inventory was included as part of a self-administration questionnaire designed primarily to ascertain sources of stress in situations where a need for care was evident and the remainder of the questionnaire comprised items developed by the authors for that purpose. The Malaise Inventory was included in order to allow us to cross-validate our own Carer Perceived Problem Checklist (CPPC) within a stress adaptation model. The reason for restricting this paper to a reappraisal of the Malaise Inventory is because our findings tend not to support the results of previous studies whilst pointing to a different factorial structure which is not wholly constant across carer groups.

Study context and sample

With the exception of two recent studies on the care of the elderly (Wright 1986; Quine and Charnley 1987) all the previous published work on the Malaise Inventory appears to have been carried out on parents, mainly mothers, of disabled children. By contrast, our sample comprised carers reflecting a range of relationships to those that they were caring for: 53 were parents caring for disabled children, 132 were spouses caring for partners aged less than 65, 125 were spouses caring for partners aged 65 or more and 217 were children caring for parents. In terms of disability groups, age and years spent caring, subjects were similar to those resident carers reported in the recent GHS study of informal carers (Green 1988). Additionally the gender ratio in the study sample was 7.8 women: 2.2 men. This bias towards women, whilst greater than that reported in the GHS study, is nevertheless lower than studies which have tested or applied the Malaise Inventory. However it is clear that dependants in our sample are functionally more incapacitated than those in the GHS

Table 2. Malaise symptoms and principal component loadings

Malaise Inventory item		% reporting affirmatively	Factor loading[a]	
1.	Do you often have backache?	60	0.30	(0.32, 0.34)
2.	Do you feel tired most of the time?	77	0.45	(0.59, 0.52)
3.	Do you often feel miserable and depressed?	67	0.64	(0.68, 0.68)
4.	Do you often have headaches?	37	0.38	(0.45, 0.44)
5.	Do you often get worried about things?	73	0.54	(0.57, 0.53)
6.	Do you usually have great difficulty in falling asleep or staying asleep?	55	0.46	(0.59, 0.49)
7.	Do you usually wake unnecessarily early in the morning?	59	0.31	(0.30, 0.46)
8.	Do you wear yourself out worrying about your health?	29	0.49	(0.46, 0.63)
9.	Do you often get into a violent rage?	21	0.43	(0.33, 0.36)
10.	Do people often annoy and irritate you?	54	0.48	(0.43, 0.50)
11.	Have you at times had a twitching of the face, head or shoulders?	17	0.30	(0.21, 0.41)
12.	Do you often become scared for no good reason?	27	0.57	(0.46, 0.62)
13.	Are you scared to be alone when there are no friends near you?	14	0.45	(0.36, 0.54)
14.	Are you easily upset or irritated?	50	0.57	(0.57, 0.64)
15.	Are you frightened of going out alone or of meeting people?	12	0.39	(0.27, 0.38)
16.	Are you constantly keyed up and jittery?	44	0.65	(0.45, 0.63)
17.	Do you suffer from indigestion?	31	0.30	(0.12, 0.27)
18.	Do you often suffer from an upset stomach?	25	0.36	(0.11, 0.40)
19.	Is your appetite poor?	16	0.35	(0.24, 0.34)
20.	Does every little thing get on your nerves and wear you out?	33	0.67	(0.44, 0.61)
21.	Does your heart often race like mad?	30	0.48	(0.44, 0.50)
22.	Do you often have bad pains in your eyes?	24	0.40	(0.17, 0.47)
23.	Are you troubled with rheumatism or fibrositis?	45	0.24	(0.25, 0.17)
24.	Have you ever had a nervous breakdown?	14	0.31	(0.02, 0.34)

[a] Figures in brackets for Bebbington and Quine (1987) and Hirst's (1983) findings.

study. Since the sample is comprised of members of the Association of Carers it may in this sense be considered a self-selecting group. This may help to account for the reported high level of stress in this study compared to other published research (Table 1). The only other study describing similar mean levels of stress was that of Bradshaw and Lawton (1978) whose sample of families applying to the Family Fund could also be looked upon as self-selecting. Whilst details of socio-economic status are not available Rutter's original work indicated that correlations between malaise and SES were low and statistically insignificant.

Results

A more detailed breakdown of responses to the Malaise Inventory is given in Table 2. This confirms that the Association of Carers sample scores affirmatively on a wide range of items, with 81% having a score of 5 or more suggesting, in Rutter's terms, psychiatric disturbance. The principal components analysis produced results which were broadly in line with Hirst's and Bebbington and Quine's findings and the alpha coefficient of 0.82 suggested that the inventory was reasonably internally consistent.

Like Hirst (1983) we subjected the principal components solution to rotation to assess whether separate dimensions could be identified. Using the Varimax model which maximises separation between factors, rotations with up to seven components emerged, all with eigenvalues greater than 1.0, a finding consistent with Hirst's study. Although statistically distinct, a seven factor solution was far from parsimonious although it did lead to an interpretable clustering of items. Broadly speaking, the first two factors were concerned with feelings of upset and irritability (items 14, 16, 10, 20 in particular) and fear (items 13, 15, 19 in particular) whereas the remaining factors without exception identified physical manifestations of stress. It was therefore decided to search for a factorial solution which was simpler.

Furthermore, in line with the recommendations of Bebbington and Quine (1987), the data were subjected to a confirmatory factor analysis using LISREL VI. This procedure also failed to identify a single common factor.

The goodness of fit of a factor solution can be assessed using an adjusted goodness of fit index (GFI, Joreskog and Sorbom, 1985) which takes values between 0 (no fit) and 1 (perfect fit). The value for the single factor model was 0.89. There was a significant deviation of the data from this model ($X^2_{(252)} = 781, P < 0.001$).

A two factor orthogonal solution was therefore tested in LISREL. Although the data still significantly deviated from this solution ($X^2_{(230)} = 625$, $P < 0.001$), there was some increase in the GFI to 0.91. There was, however, little extra benefit to be derived from allowing these two factors to be oblique ($X^2_{(229)} = 617$, $P < 0.001$: GFI 0.91) where the interfactor correlation was 0.26.

Although the two factor solution affords only a small increase in GFI, it generates an outcome for the Malaise Inventory whose content validity, construct validity and internal consistency are wholly acceptable. It can be seen from Table 3 that a two factor solution using a Varimax rotation divides malaise into two explicable dimensions which for simplicity we have termed psychological malaise and physical malaise respectively. They explain 20.6% and 6.6% of the total variance accounted for which falls roughly between variances explained in previously reported one factor solutions.

A Varimax solution would be expected to cause maximum separation between the factors and this indeed is the case, with only one item (worry re health) loading on both. Of greater interest is the interpretable way in which the factors can be distinguished. Factor one consists predominantly of psychological symptomatology, whereas factor two appears almost wholly to do with physical symptoms. We believe this distinction is unequivocal and more than satisfies the criterion of content validity. It will also be noted that item 24 (nervous breakdown) fails to load on either factor and would thus appear to be peripheral to the scale, as previously suggested by Bebbington and Quine (1987).

Equally, it is instructive to link this two factor solution back to the manner in which the Malaise Inventory was originally constructed. In the introduction we reported that Rutter deliberately incorporated into the scale items to do with the emotions and others to do with physical matters he considered had imporant psychological components. At one level the results reported here reflect no more than what Rutter first formulated, but the pattern of symptomatology depicted in Table 3 points towards two distinct sub-scales for psychological and physical symptoms in turn. Conceptually this seems to make better sense than a unidimensional scale which mixes symptoms.

Thus far our analysis of the Malaise Inventory which discriminates dimensions of psychological and physical symptoms has been based on grounds of internal consistency and content validity. The strength of the argument would be much increased, however, if analysis of construct validity demonstrated that these two components had

Table 3. Malaise symptoms: principal components analysis, varimax rotation

Factor 1 Psychological malaise		Factor 2 Physical malaise	
Item	Factor loading	Item	Factor loading
20. Nervy/worn out	0.689	18. Upset stomach	0.629
14. Upset	0.647	17. Indigestion	0.629
16. Jittery	0.624	11. Twitch	0.502
3. Miserable	0.622	22. Pain in eye	0.448
5. Worried	0.538	21. Racing heart	0.444
10. Irritated	0.515	4. Headache	0.440
6. Sleep problems	0.492	1. Backache	0.402
12. Scared	0.489	23. Rheumatic	0.382
9. Violent rage	0.481	8. Worried re health	0.369
2. Feel tired	0.465		
7. Wake early	0.405		
13. Scared to be alone	0.375		
8. Worried re health	0.351		
19. Poor appetite	0.339		
15. Scared to go out	0.330		

very different sets of causes and precursors. In order to test this we used causal path analysis to investigate the two types of Malaise and to identify the nature of their precursors.

Causal path analyses

Our carers completed the Carer Perceived Problem Checklist which contained 30 potential problems carers might face, and covered the domains of social life, economic situation, relationship with the dependant and wider family, professional and family support, dependency factors and the carer's reactions to the demands of caregiving. The checklist comprised two sections which asked carers first to consider if they experienced a particular stressor in their caring environment and secondly to indicate the degree of actual stress they perceived that stressor to evoke. We performed two separate factor analyses on the returns of 527 respondents who were caring for either a parent, a spouse < 65 years of age, a spouse > 65, or a child. First we analysed the responses relating to aspects of the caring environment, then we performed a totally separate analysis of the responses concerning the degree of stress that the environment factors were perceived to cause. Both analyses used principal component analysis followed by varimax rotation with the normal default criteria.

The Caring Environment Analysis resulted in the 11 factors shown in Table 4. These factors are readily open to interpretation and yet they span the range of the multiplex caring environment, from the degree of physical care needed, through the amount of family support, to the financial consequences of caring. The two major factors,

Table 4. Caring environment factors (PC analysis, varimax rotation)

Factor F1: degree of physical care	
% variance explained: 19.0%	
Help dress	0.837
Help wash	0.781
Help toilet	0.755
Help walk	0.719
Help bath	0.711
Personal care	0.649
Help feed	0.634
Immobility	0.510
Help house	0.378
Physically tiring	0.317
Factor F2: poor carer/dependant relationship	
% variance explained: 11.6%	
Dependant's failure to appreciate	0.746
Lack of help from dependant	0.722
Lack of meaningful relationship	0.613
Manipulative dependant	0.603
Demanding dependant	0.596
No satisfaction from caring	0.557
Dependant's problem behaviour	0.542
Dependant becomes agitated	0.454
Carer feels angry about situation	0.438
Dependant's upsetting behaviour	0.410
Factor F3: incontinence	
% variance explained: 7.3%	
Bladder night	0.829
Bladder day	0.827
Incontinence	0.782
Bowel night	0.754
Bowel day	0.741
Help toilet	0.332
Factor F4: dependant's problem behaviours	
% variance explained: 4.7%	
Dependant communication diffs	0.775
Dependant disorientated	0.772
Dependant's upsetting behaviour	0.684
Dependant wanders & self-risk	0.669
Dependant becomes agitated	0.669
Dependant's problem behaviour	0.437
Dependant's immobility	0.313
Factor F5: carer's reaction to caring	
% variance explained: 3.6%	
Carer cannot relax	0.707
Carer lack of control	0.685
Carer's guilt about caring situation	0.634
Threatened emotional well-being	0.574
Threatened physical well-being	0.505
Carer's lack of sleep	0.449
Carer angry about caring situation	0.401
Carer physically tired	0.399
Caring strains family relations	0.380
Factor F6: restrictions on carer's social-life and relaxation	
% variance explained: 3.1%	
Caring strains social life	0.694
Carer has no time for friends	0.670
Carer has no private time	0.638
Carer has no holidays	0.624
Carer physically tired	0.432
Threatened emotional well-being	0.327
Factor F7: financial consequences	
% variance explained: 2.9%	
Financial difficulties	0.732
Lowered standard of living	0.701
Threatened physical well-being	0.419
Carer's lack of sleep	0.372
Factor F8: lack of family support	
% variance explained: 2.8%	
Lack of family support	0.833
Fewer visits from relatives	0.812
Carer's anger about caring sit'n	0.336
Factor F9: lack of professional support	
% variance explained: 2.6%	
Lack of professional support	0.790
Lack of professional's understanding	0.783
Factor F10: threatened family relations	
% variance explained: 2.4%	
Carer no time for family	0.768
Threatened family relations	0.531
Manipulative dependant	0.328
Factor F11: other problems	
% variance explained: 2.1%	
Other problems	0.868
Dependant needs help about the house	0.392

Table 5. Stress factors (PC analysis, varimax rotation)

Factor S1: stress: poor carer/dependant relationship	
% variance explained: 10.4%	
Stress dependant's failure to appreciate	0.683
Stress dependant's problem behaviour	0.639
Stress lack of help from dependant	0.600
Stress demanding dependant	0.581
Stress manipulative dependant	0.566
Stress lack of meaningful relationship	0.556
Stress no satisfaction from caring	0.467
Stress carer angry about caring situation	0.369
Stress threatened family relations	0.347
Stress threatened emotional well-being	0.342
Stress carer's guilt about caring situation	0.317
Stress carer has no time for friends	0.316
Factor S2: stress: carer's reactions to caring	
% variance explained: 22.3%	
Stress carer lack of control	0.608
Stress carer cannot relax	0.559
Stress carer's guilt about caring situation	0.490
Stress threatened emotional well-being	0.457
Stress carer has no private time	0.448
Stress carer angry about caring situation	0.394
Stress threatened family relations	0.371
Stress threatened physical well-being	0.363
Stress carer's lack of sleep	0.330
Factor S3: stress: physical demands of caring	
% variance explained: 3.6%	
Stress personal care	0.617
Stress carer physically tired	0.489
Stress dependant's immobility	0.466
Stress incontinence	0.461
Stress threatened physical well-being	0.449
Stress carer's lack of sleep	0.413
Stress carer cannot relax	0.347
Factor S4: stress: restrictions on carer's social-life and relaxation	
% variance explained: 3.5%	
Stress carer has no time for friends	0.628
Stress caring strains social life	0.623
Stress carer has no holidays	0.450
Stress carer has no private time	0.361
Stress threatened emotional well-being	0.351
Factor S5: stress: lack of family support	
% variance explained: 3.0%	
Stress lack of family support	0.799
Stress fewer visits from relatives	0.656
Factor S6: stress: lack of professional support	
% variance explained: 2.0%	
Stress lack of professional's understanding	0.946
Stress lack of professional support	0.536
Factor S7: stress: financial consequences	
% variance explained: 2.1%	
Stress financial difficulties	0.734
Stress lowered standard of living	0.606

degree of physical care and the quality of the carer/dependant relationship explain 19% and 12% of the total variance respectively.

The Analysis of the Perceived Stress caused by Caring resulted in 7 factors (Table 5) which fittingly subdivide the construct system of stress into similar partitions (stress caused by the nature of the carer/dependant relationship, stress caused by the degree of family support, stress caused by financial consequences, etc.) to those resulting from the *totally independent* analysis of the caring environment.

Factor scores on these two sets of factors were then used as explanatory variables of the two Malaise subscales in a causal path analysis using LISREL VI. The LISREL model (Joreskog and Sorbom 1984; Saris and Stronkhorst 1984) allows estimation and testing of causal models with and without latent variables, measurement models, and factor analytic models using maximum likelihood estimation of covariance structure within the same program. Structural equation models represent causal theories with linear, proportional and additive effects. The variables which the model should account for are called endogenous variables, the i^{th} endogenous variable being denoted y_i. The predetermined variables which are not explained by other variables in the theory are called exogenous, the i^{th} exogenous variable being called x_i. The effect on the i^{th} endogenous variable from the j^{th} endogenous variable is denoted by β_{ij}. The effect on the i^{th} endogenous variable from the j^{th} exogenous variable is denoted by γ_{ij}. If the data are standardised then β and γ represent path weights such that an increase of one standard deviation in the prior variable would cause an increase of β (γ) standard deviations in the endogenous variable. The type of model that we specified rests on few prior assumptions. It has few restrictions in that it assumes that *any* prior abilities may affect *any* later ones. We have taken the aspects of the caring environment as the exogenous variables, since those studies we review in the introduction show carers score higher on stress and on the Malaise Inventory, and there can be little or no opportunity for stressed individuals to self-select as carers. We have then allowed these environmental factors to affect all of the endogenous factors (both stresses particular to caring and general malaise factors, thus gamma paths run to all these endogenous variables). Furthermore, we allowed beta paths from the caring specific stressors to Malaise factors. This type of fully saturated model initially fitted is shown in Fig. 1. The F factors, along INT, a measure on a 7 point scale of the frequency of caring provision, are the exogenous variables. We allowed all possible causal paths (γ) between these and all the stress (S) and malaise (M) factors, and all possible paths (β) from the Stress variables to the Malaise factors. We allowed covariation between the complete set of variables within each column. The amount of variation of the i^{th} exogenous variable is denoted by Φ_{ii} and the amount of covariation of the i^{th} and j^{th} exogenous variable is denoted by Φ_{ij}, this being the observed correlation; the amount of variation in the i^{th} disturbance term is denoted by Ψ_{ii}, (this = $[1\text{-}R^2]$ for the i^{th} endogenous variable); the amount of covariation between the i^{th} and j^{th} disturbance term is denoted by Ψ_{ij}.

The model specification entails that the beta and gamma weights on the causal paths reflect specific direct causal weights between the variables controlling for all indirect effects, spurious relationships and joint effects. Similarly the psi values represent the correlation between the endogenous variables within the stress factor column that is left unexplained by the joint effects of the complete

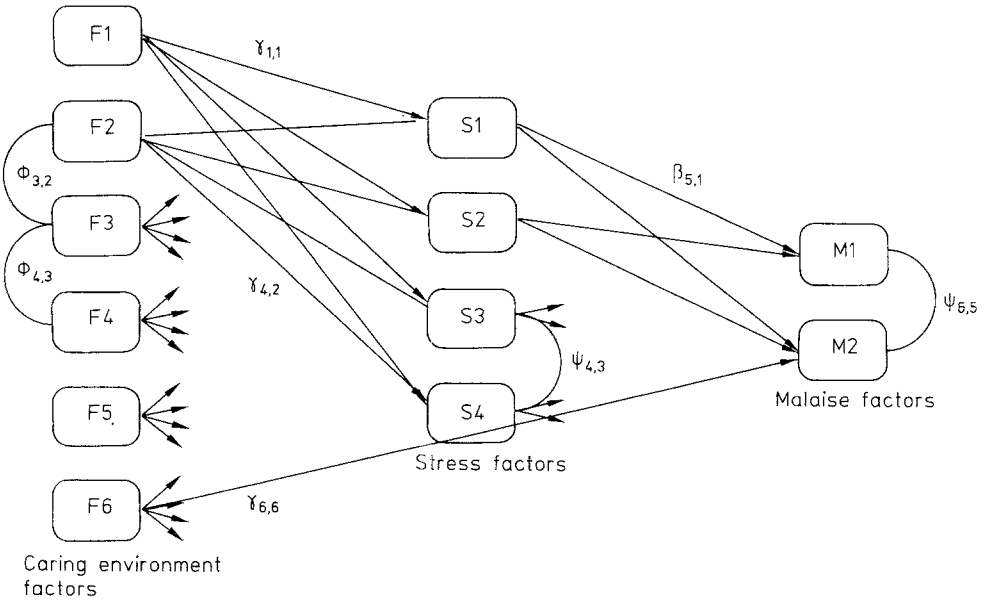

Fig. 1. Fully saturated model

set of causal paths linking these endogenous variables. Although we had wished to estimate a measurement model where the factor-analytic procedures were performed by LISREL as part of the causal model analysis, this proved far too large a computation.

The scores used for these analyses are factor scores calculated 'in the old way' by employing only those variables (Tables 3, 4, 5) which have substantial loadings (> 0.3) on a given factor. We have used LISREL here in an exploratory fashion to do causal path analysis to identify patterns in the data. We have not tested a priori theoretical models against the data, since with this set of variables there are numerous plausible models which could be argued.

Thus we can, for example, propose valid reasons why all of the exogenous variables might affect Malaise. Therefore we did not take the accretion approach of, for example TETRAD (Glymour et al. 1987), which involves:

1. specifying a small *a priori* model where, according to the simplicity principle, as few casual connections as possible are invoked,
2. testing it, and
3. elaborating on this skeletal model by sequentially adding in edges or vertices to the graph representing the model and assessing whether these additions improve the model.

Rather we were guided by the principles of Thurstone (1935) whereby the aim of science is simplification: the same principle that underpinned our use of factor analysis in the prior analyses and that of Rutter in the development of the original scale. Thus LISREL was used to estimate the causal effects and other parameters for a fully saturated model where all paths between and within columns were freed. Other model selection procedures (e.g. Tetrad) might have yielded quite different model specifications, but so moreover would different starting models within Tetrad given the large number of variables in the model and the resultant wealth of theoretically plausible skeletal starts. Our approach therefore seemed appropriate since, like multiple regression, it involved a clear algorithm and all of the relevant variables. However, as with all other modelling enterprises, the results warrant replication in other studies.

We believe that the resultant model is both theoretically plausible and interesting. It explains 48% of the variance of Psychological Malaise (M1) and 23% of the variance of Physical Malaise (M2).

The data in Table 6 represent the standardised solution where a pathweight represents the amount of change in a variable (in standard deviation sd units) caused by one sd of change in another variable. The significant path coefficients for the model are shown. The column headers are the causal variables, the row headers, the effect variables. Thus the pathweight from F2 (poor carer/dependant relationship) to S1 (stress concerning poor carer/dependant relationship) is 0.80. The other beta and gamma weights can be interpreted accordingly. Thus we can see that environmental factors F5 and F10 have quite varied effects on Stress variables, whereas others, like F9 (lack of professional support) are quite specific in their influence, 0.73 to S6 (stress caused by lack of professional support) and 0.07 to S7 (stress caused by financial consequences of caring). The residual covariation between specific stress factors (psi), once prior causal paths have been determined, is unanimously low.

There are diverse theoretical and practical implications to these results and we discuss these in detail (Nolan et al., in press). It is the clear fractionation of the causation of Psychological and Physical Malaise which is important for present purposes. Whilst both physical and psychological malaise are affected by the same environmental factor, F5 – Carer's reaction to caring, psychological malaise has but one other exogenous variable as a predictor, viz a negative path weight from F10 – Threatened family relations. Physical malaise, in contrast, has a significant path weight from F8 – Lack of family support, and two substantial, but non-significant, paths from F7 – Financial

Table 6. Results of the LISREL causal path analysis

GAMMA	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
S1	–0.02	0.80*	–0.05*	–0.04	0.14*	0.01	0.00	–0.01	0.02	0.06*	0.01	0.05*
S2	–0.03	0.02	0.01	0.01	0.86*	0.00	–0.04	0.01	0.03	0.08*	0.03	0.07*
S3	0.26*	0.07	0.11*	–0.05	0.51*	0.08*	0.09*	0.05	0.04	–0.03	–0.01	–0.04
S4	–0.07*	0.13*	0.01	–0.05	0.21*	0.50*	–0.05	0.07*	0.00	0.11*	0.02	0.07*
S5	–0.05	–0.13*	–0.01	0.04	0.09*	–0.00	0.04	0.79*	–0.06	0.09*	–0.05	–0.04
S6	–0.02	–0.01	0.02	–0.03	0.17*	–0.03	–0.01	0.00	0.73*	–0.05	0.01	–0.01
S7	–0.05	0.07*	–0.00	0.00	–0.18*	–0.03	0.92*	–0.01	0.07*	0.05	–0.01	0.06*
M1	0.01	0.00	–0.04	–0.03	0.32*	–0.09	0.01	–0.01	–0.00	–0.09*	–0.00	0.00
M2	–0.06	0.10	–0.08	–0.05	0.35*	–0.09	0.14	0.16*	0.04	–0.03	–0.01	0.04

BETA	S1	S2	S3	S4	S5	S6	S7
S1	–	–	–	–	–	–	–
S2	–	–	–	–	–	–	–
S3	–	–	–	–	–	–	–
S4	–	–	–	–	–	–	–
S5	–	–	–	–	–	–	–
S6	–	–	–	–	–	–	–
S7	–	–	–	–	–	–	–
M1	0.10	0.30*	0.06	0.03	0.11*	–0.04	0.07
M2	–0.17	–0.04	0.15*	0.03	–0.10	–0.04	0.06

PSI	S1	S2	S3	S4	S5	S6	S7	M1	M2
S1	0.20*								
S2	0.07*	0.18*							
S3	0.07*	0.05*	0.37*						
S4	0.08*	0.10*	0.09*	0.42*					
S5	0.04*	0.04*	0.04*	0.07*	0.30*				
S6	0.03*	0.05*	0.01	0.03	0.05*	0.40*			
S7	0.03*	0.03*	0.05*	0.05*	0.02	0.05*	0.25*		
M1	–	–	–	–	–	–	–	0.52*	
M2	–	–	–	–	–	–	–	0.15*	0.77*

Squared Multiple Correlations For Structural Equations

S1	S2	S3	S4	S5	S6	S7	M1	M2
0.80	0.82	0.63	0.58	0.70	0.60	0.75	0.48	0.23

Standaridised path-weights: * paths are significant on t-test at $P < 0.05$.

consequences and F2 – Poor carer/dependant relationship. It seems therefore that physical malaise is much more an effect of the actual environment than is psychological malaise.

This dissociation is confirmed by the beta-weights leading to the two malaise factors. There is but one significant such path for physical malaise, that from S3 – Stress concerning the physical demands of caring, which itself stems from the exogenous factors of F5 – Carer's reaction to caring, F1 – Degree of physical care, F3 – incontinence, F7 – Financial Consequences, and F6 – Restrictions on Carer's Social-life and Relaxation. In contrast there are two strong endogenous predictors of psychological malaise, viz. S2 – Stress stemming from the carer's reactions to caring, and S5 – Stress about lack of family support.

Thus using the CPPC it was possible to determine whether it was the existence of environmental variables or their perceived degree of threat which accounted for the explained variance in psychological malaise. Our measures explained 48% of the variance of psychological malaise and a large portion of this was mediated by the perceived degree of threat that the situation was seen to pose. This is consistent with the transactional model of stress reported in the stress literature (Jacobson 1983; Clarke 1984a, b; Spaniol and Jung 1987) and is an approach which is being increasingly utilised in clinical practice with families under stress (Spaniol and Jung 1987; Boss 1988; Rolland 1988). In contrast the battery of tests only explained 23% of physical malaise, and here the major causes were to be found in the actual environment rather than the perception of that situation.

One final LISREL analysis confirms the dissociation. We contrasted the results of the fully saturated model with one which specifies that physical and psychological malaise were the same factor. In this model we fixed as equal each of the effects onto M1 and M2 (i.e. gamma F1 to M1 = gamma F1 to M2 and so on for the 12 exogenous variables, beta S1 to M1 = beta S1 to M2 and so on for the 7 stress factors). This model seriously and significantly ($X^2 = 71.7$, d.f. 19, $P < 0.001$) deviated from the data with high modification indices for the betas from S2 (41.4), S1 (33.3), S4 (21.1) and S5 (13.4) and for the gammas from F5 (25.4) and F2 (17.7) due to the forced equalising of these paths. Large modification indices indicate that the constraints of the model (in this case the

equality of effects on both M1 and M2) should be freed (Joreskog and Sorbom 1984) and it is thus clear that, at least in our sample, physical and psychological malaise are quite different entities.

Discussion

That it was possible to explain a significantly greater proportion of the variance in psychological malaise accords with recent empirical work on caregiving which suggests that the most pervasive adverse effects are emotionally focussed (George and Gwyther 1986; Eagles et al. 1987). The explainable variance in physical malaise is much lower but this seems likely to be due to biological or physiological factors which were not taken into account in this study. Whilst a fuller discussion of the results forms the basis of a separate paper (Nolan et al., in press) we believe that the limited data presented here are sufficient to justify both the construct and the empirical validity of the two factor solution proposed.

In addition, the inclusion within the questionnaire of a self-rating scale on emotional and physical health, together with a separate analysis of the pervasiveness and stress-provoking potential of individual items from the CPPC, allowed for a degree of concurrent validity to be established for a two factor solution. However the possibility of one instrument 'interfering' with another should be borne in mind here.

The suggestion that the Malaise Inventory may consist of two or more separate dimensions is not altogether inconsistent with previous commentaries (Philp 1978; Hirst 1983). The alpha coefficient for the psychological subscale indicates good internal consistency (0.81) which is almost equal to that for the scale as a whole (0.82). The physical malaise sub-scale presents an adequate but lower alpha (0.63), suggesting that it may not be as robust as that for psychological malaise.

Additional analysis shows that malaise scores on both dimensions differ little between the four principal carer groups comprising the study sample. However, we were also interested to see whether psychological and physical malaise constructs held true across carer groups, so a Varimax rotation was run for each. The detailed analysis is yet to be fully reported but we believe the main outcome is instructive set against the historical development of the Malaise Inventory. A two factor solution based on psychological and physical malaise held together for three of the four carer groups: spouses caring for partners aged less than 65, spouses caring for partners aged 65 or more and children caring for parents/relatives. The only group for whom this solution did not work was parents caring for disabled children, in other words the one group that has formed the basis of almost all the published work on the development of the Malaise Inventory.

For parents caring for children the two factor solution was not distinct in terms of a fairly unequivocal division between psychological and physical malaise, but contained a mixture of items with both physical and psychological variables loading on to both factors. Even so there was a degree of commonality across all four carer groups with eight variables, all psychological, loading heavily on to the first factor. However, for parents these variables were also accompanied by physical symptoms of backache, headache, indigestion and upset stomach, the latter two loading heavily (0.50 and 0.69 respectively). At this stage we can only postulate the reasons for this. Whilst, on one hand, parents had been caring for significantly longer and for individuals with greater dependency needs and levels of incontinence than the other carer groups, we suspect that the nature of their attachment to their disabled children, their concerns about having to abrogate responsibilities for care as they age (Richardson 1987; Grant, in press) as well as the norms and obligations surrounding continued caregiving, all induce parents to 'put up with' stresses associated with caring where others might give up.

Although these findings are not altogether out of step with earlier studies, they do suggest that the Malaise Inventory has qualitatively different, highly interpretable and conceptually meaningful factorial dimensions for other carer groups. Wider administration of the Malaise Inventory as a measure of stress amongst carers should take this into account. Results of our preliminary causal path analysis using LISREL VI for the two factor solution suggest the existence of different precursors for psychological as opposed to physical malaise. If this is indeed the case, we consider the results have noteworthy pragmatic implications in terms of helping those in the caring professions to identify correlates and/or precursors of different kinds of stress among carers which could be used to guide intervention.

Finally, it is worth bearing in mind that subjects in this study were looking after individuals with high dependency needs which may have resulted in physical symptomatology being emphasised more than usual. The extent to which this acts as an interference factor in the reported dimensionality of the Malaise Inventory remains to be tested in replication studies on carers in different role relationships with individuals at lower levels of dependency. Further research might also be directed to examining how far a transactional model of stress adaptation helps to explain levels of stress amongst different carer groups living in different social and economic circumstances.

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