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Variations in subjective wellbeing: the mediating role of a psychological resource

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ABSTRACT
This study examines the mediating role of psychological resources on life satisfaction, an indicator of subjective wellbeing. The evidence identifies several life events and changing circumstances that can be potentially detrimental to the wellbeing of older adults. Based on the literature, a theoretical model was developed with the hypothesis that adaptation to potentially adverse events draws on psychological resources central to the self. The study participants were a random sample of 423 community-dwelling people aged 70 years and over. All respondents were interviewed in their own homes using a structured schedule. Quantitative data were obtained on age, gender, social support, marital status, physical functioning, bodily pain, loneliness, isolation and housing difficulties. Subjective well-being was assessed by the life satisfaction index, and the psychological mediator was conceptualised as a measure of environmental mastery. The first round of analyses found that variations in well-being were associated with housing difficulties, isolation, loneliness, physical functioning, pain, support networks and marital status. The full model established perfect mediation by environmental mastery occurred for the variables housing problems and physical functioning, and partial mediation occurred for the variable loneliness – supporting the original hypothesis. The results add to the evidence from an increasing number of studies that demonstrates how psychological resources underlie the processes of adaptation to the changing situations that accompany increasing age and prevent negative outcomes.

KEY WORDS – subjective wellbeing, older people, psychological resources, environmental mastery, mediation.

Introduction

Subjective wellbeing is considered an important component of 'the good life' (Lawton 1983; Ryff and Keyes 1995; Diener *et al.* 1999; Smith 2000; Landau and Litwin 2001), with positive outcomes considered to be an indicator of successful ageing (Bowling 1991). Individual subjective

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experiences of well-being are generally assessed by cognitive evaluations of life (life satisfaction) and emotional states (Ryff and Singer 1996; Diener *et al.* 1999; Smith *et al.* 1999). This study examines the role of psychological resources in contributing to life satisfaction in a sample of community-dwelling older people. It is considered that there are psychological resources that underlie the processes that promote a sense of control, coping and adaptation, and that these change little with increasing age (Baltes and Baltes 1986; Lachman 1986; Ryff and Singer 1996). Such personal qualities can be acquired over the lifespan (Ryff and Singer 1996) and are essentially cognitive, involving different ways of viewing and interacting with individuals and the environment (Brandstädter and Greve 1994).

It has been proposed that the regulation of subjective wellbeing can occur through psychological resources that promote adaptation to adverse situations (Smith *et al.* 1999; Staudinger *et al.* 1999). There is a strong theoretical basis for this proposal. The widely quoted model of 'selective optimisation with compensation' describes how individuals can deal with ageing and the age-related tendencies for increased losses and fewer gains. This model focuses on regulatory processes that may be a factor influencing subjective well-being at older ages (Baltes 1993). The model of assimilation and accommodation developed by Brandstädter and Greve (1994) described how individuals coped and accommodated changes in their lives by the cognitive regulation of aspirations. Within philosophy, the existentialist view suggests that many of life's events are out of our control, and wellbeing is derived from how we face up to and deal with such situations (Sixsmith 1993). In that sense, positive well-being may occur when an individual has the personal resolve to feel in control and can adapt their behaviour accordingly.

Psychological resources have been conceptualised under various names and definitions including the better-known examples arrayed in Table 1. Although the list is not exhaustive it makes clear that, despite definitional differences, these resources share the element of psychological strength. This could have a positive impact on the psychological functioning of an older person, particularly in the adaptation to changing life events and circumstances. It is clear from the literature that certain situations in older age can be crucial to well-being. For example, a recent study of people aged 75 and more years in the UK found that increasing age, being widowed, divorced or separated, and detrimental life events (recent death or separation of a loved one, serious illness of a loved one or moving residence) were significantly associated with depression (Osborn *et al.* 2003).

Housing is now acknowledged by policy-makers as an important determinant of well-being and crucial for maintaining the quality of life

TABLE 1. *Summary of psychological resources*

Author and date	Concept	Definition of concept
Rotter 1966	Locus of control	A belief as to whether a person feels their life is controlled externally by luck, fate or the behaviour of others, or internally through their own behaviour and competence.
Pearlin *et al.* 1981	Mastery	The extent to which a person perceives control over events and situations.
Rosenberg 1965	Self-esteem	Sense of worth/confidence/self-respect.
Ryff 1989	Environmental mastery	The extent to which a person feels capable of managing the external world.
Ardelt 2000	Wisdom	Cognitive, affective and reflective personality qualities.
Rutter 1995	Resilience	Psychological strength or mental resistance.
Bandura 1977	Self-efficacy	The extent to which a person perceives they can succeed at what they want to do.
Kobassa, Madi and Kahn 1993	Hardiness	People under stress who have a greater sense of control, commitment and challenge will stay healthier than people who are less hardy.

(Institute of Rural Health 2002; National Assembly for Wales 2001). Little attention has however been given to the impact of the internal or domestic environment on health and wellbeing, for the emphasis tends to be on the effects of housing tenure and the external environment (Stewart *et al.* 2002). For older people, the home is particularly important. It provides security, refuge and a place for expressing individuality, and for retaining control over their lives (Gurney and Means 1993; Langan, Means and Rolfe 1996; Means 1997). Osborn *et al.* (2003) found that living in rented, sheltered or residential accommodation was significantly associated with depression. An initial assessment of a poor-quality internal home environment was sufficient to predict the onset of depression in a one-year follow up assessment among older people without depressive symptoms at baseline (Stewart *et al.* 2002).

Social isolation and loneliness occur frequently in later life, often as a result of the loss of a spouse or friends (Wenger *et al.* 1996). The absence of companionship or of a confiding relationship has been found to reduce wellbeing and to increase the risk of depression (Chappell and Badger 1989). In contrast, the availability of social support has been found to increase life satisfaction and decrease depressive symptoms in older adults (Jang *et al.* 2000; Newsom and Schulz 1996). The health status of older people is firmly on the political and research agenda, and in a general adult population, good health has been found to be associated with high wellbeing scores (Wood 1987). A longitudinal study found that the most salient life domain for older people aged in the eighties is health and the

maintenance of mobility (Wenger, Burholt and Scott 2001). In older people, reductions in physical health and functioning and most health problems have been linked to poor and worsening levels of life satisfaction (Bowling *et al.* 1993; Bowling, Grundy and Farquhar 1997).

Whilst the literature clearly identifies potential 'risk' factors and negative outcomes, the psychological resources and capacities that underlie adaptation to changing situations, and ultimately prevent negative outcomes, are inadequately understood (Diener *et al.* 1999; Staudinger *et al.* 1999). 'Mastery' may be a particularly relevant resource in older age (Femia, Zarit and Johansson 1997). It has been found to be an important mediator between chronic stressors and depression and between chronic stressors and poor health, and to be associated with better mental health and functioning (Badger 1993, 2001). Mastery was found to influence reported levels of health-related quality of life (Kempen, van Soderen and Ormel 1997), while the inclusion of mastery in a model predicting depression trebled the variance, from the 10 per cent explained by demographic variables to 33 per cent (Jang *et al.* 2000). A longitudinal study of older people with lowered functioning levels found that, in comparison to those with low to medium levels of mastery, those with high levels showed no significant increase of disability (Kempen, van Soderen and Ormel 1999).

There is other compelling evidence of the benefits of environmental mastery. It has been found to mediate the potential negative impact of community relocation for older women (Smider, Essex and Ryff 1996), to be higher in a group of older women who chose not to have children than a comparison group who were involuntarily childless (Jeffries and Konnert 2002), and to contribute to the absence of mood disorders in rheumatoid arthritis sufferers (Mangelli *et al.* 2002). Multiple sclerosis sufferers with low environmental mastery had more global fatigue and fatigue-related distress than others (Schwartz *et al.* 1996). Other research has found that older adults demonstrate no reduction in psychological resources central to the self, such as self-esteem or sense of personal control, despite losses in functioning and the perception of such losses (Baltes and Baltes 1986; Lachman 1986). Indeed, environmental mastery has been shown to increase across the lifespan (Ryff and Singer 1996).

Staudinger *et al.* (1999) have suggested that a better understanding of the regulation and maintenance of positive subjective wellbeing requires improved knowledge of the psychological resources that ultimately influence outcome. This paper specifically examines the role of 'environmental mastery', in mediating between potential age-associated 'risk' factors and subjective well-being. Mediation is defined by Baron and Kenny (1986: 1176) as occurring when the effects of an independent variable on the

dependent variable are mediated by processes that possess psychological significance central to the individual. In their words, 'something intervenes between input and output'.

Environmental mastery was felt to be a particularly appropriate measure for a community-based survey of older people, as some of the available study sites have the most deprived housing and the poorest access to services in Wales (National Assembly for Wales 2000). The resident older people who experience problems may need to adapt their behaviour to the high level of environmental 'press' experienced in the environment to maintain positive subjective wellbeing (Lawton 1989*a*). Environmental mastery will underlie the process of adaptation.

In order to evaluate the effects of environmental mastery, the variation in subjective well-being will be examined initially across demographic, housing and health variables. In congruence with the literature, it is hypothesised that subjective well-being varies with age, gender, marital status and support networks. Lower subjective well-being is predicted amongst respondents who are lonelier, isolated, have housing problems, poor physical functioning and body pain. To demonstrate mediation, a model will be developed with the predictors of wellbeing being derived from the research literature, and the ordering of the variables being guided by theoretical considerations of the logic of causal ordering (as described by Davis 1985). It is hypothesised that the demographic and objective factors will directly influence subjective well-being and be mediated by the inclusion of a psychological resource that captures an individual's sense of mastery. The model therefore encapsulates adaptation and positive psychological functioning.

Method

Sampling

The data presented here were collected as part of a wider survey of the housing needs and preferences of older people in North Wales.[1] The sample was selected to be representative of diverse areas: a dispersed farming community, a retirement destination, an ex-quarrying community, an urban area, a concentration of difficult-to-let sheltered housing, and a market town. In order to identify the appropriate age group (70 or more years)[2] and to achieve a random sample, a door-to-door census of occupied households in the chosen communities was conducted. The electoral rolls for the areas listed 8,098 names and addresses, which were entered onto a census sheet for interviewers to record the occupants' age, gender and preferred language of interview (English or Welsh).

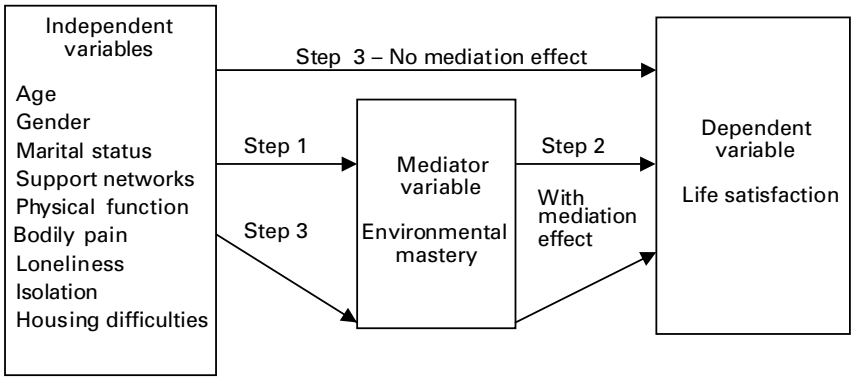

Figure 1. Pathways of the mediation model.

Random sampling was used to draw a proportional sample from each community.

Interviewing

The interviewers were trained by the research team, and professional conduct and ethical guidelines were circulated to them.[3] English and Welsh versions of the questionnaire were used by the interviewers. Front-back translation was carried out by North Wales Health Authority, which ensured that the items represented the intent of the questionnaire items within the cultural context. It was important that meanings were shared across the participating cultural groups. The respondents selected for inclusion in the sample were sent a letter describing the study and indicating when an interviewer might call. Welsh-speaking interviewers were matched with Welsh-speaking respondents. Face-to-face interviews took place in the respondents' own homes, and all questions were read to them. The final sample size was 423, a response rate of 54 per cent from the identified sample.

Measures: independent variables

Information was collected on age, gender and marital status. For some analyses, the age of the respondent was coded into five age groups.[4] Each of the marital status categories: single, married, widowed and divorced/separated, were coded as dichotomies for the multiple regression analyses. Social support was assessed using the Wenger network typology (1994) of five categories.[5] Isolation was measured on an aggregate scale based upon eight 'objective' items: lives alone; has no close relatives; never visits

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relatives or friends; has no contact with neighbours; has no telephone; is alone for more than nine hours a day; lives more than 50 yards from nearest neighbour; and housebound (Wenger *et al.* 1996). One isolation point was scored for each item, giving a maximum isolation measure score of '8' and a minimum of '0'. Loneliness was assessed using a seven-item scale that asks whether the respondent feels lonely much of the time; does not meet enough people; has no one to confide in; wishes for more friends; has no one to ask a favour of; has no real friend in the area; and whether they spent the previous Christmas alone and were lonely (Wenger *et al.* 1996). One loneliness point was scored for each item, giving a maximum loneliness measure score of '7' and a minimum of '0'.

Two health measures were used that assessed physical functioning and bodily pain. Limitations in physical performance were assessed with the physical functioning scale of the Short Form 36 questionnaire (SF-36). The SF-36 has been shown to be a reliable and valid indicator of health status in older people (Medical Outcomes Trust 1993). Respondents were asked 10 questions regarding health limitations across typical daily activities, such as climbing stairs. Answers were coded '3'=not limited at all; '2'=yes, limited a little; '1'=limited a lot. The responses to the 10 questions were aggregated, giving a maximum of 30, and following the SF-36 manual procedure, the score was transformed into a continuous measure with a range from zero to 100.

For the bodily pain dimension of the SF-36, respondents were asked how much pain they had experienced during the past week, and how much had pain interfered with their normal work (including housework). Responses range from 'none' (=1) to 'very severe' (=6). The scores were transformed into a continuous measure from zero to 100. To examine housing difficulties, respondents were asked a series of single item questions that assessed whether or not they had difficulties at home with lighting, heating, draughts, noise or other nuisance, security, floor covering, decoration, household repairs and maintenance, lack of facilities and difficulties with using the toilet. Answers were recorded as 'no problems' (=0) and 'problems' (=1). For the regression model, the items were aggregated into a continuous scale from zero to 10. Given that this scale was developed specifically for the study, its internal consistency was examined and Cronbach's alpha found to be 0.69.[6]

The dependent variable

Subjective wellbeing was examined by the Life Satisfaction Index (Wood, Wylie and Sheafor 1969). It was developed for use with older populations and different ethnic groups, and is the most commonly used measure in

gerontology research (Bowling 1991). It is a global measure of past, present and future states and is considered to be an indication of 'successful ageing'. Respondents were asked whether they agree or disagree with each of 13 items relating to satisfaction with life. In the initial scale development, reliability was found to be 0.79 using a split-half reliability coefficient (Wood, Wylie and Sheafor 1969). In the current sample, reliability (Cronbach's alpha) was 0.71. Each item is scored '0', '1' or '2', with the total score ranging from zero to 26.

Measures: the psychological mediator

This was assessed by the nine item Environmental Mastery Scale which has given good results (Ryff 1989). A high score indicates that the person has a sense of mastery and competence in managing the environment, can control a complex array of external activities, makes effective use of surrounding opportunities, and is able to choose or create contexts that are suitable to personal needs or values. A low score indicates that the individual has difficulty managing everyday affairs, feels unable to change or improve the surrounding context, is unaware of any opportunities around them, and lacks a sense of control. The measure gives a continuous score between zero and 54. The measure correlates positively with other measures of positive functioning (internal control, self-esteem) and negatively with measures of negative functioning, *e.g.* depression (Ryff 1989). The parent scale from which this one was derived has high internal consistency (Cronbach's alpha 0.86–0.93). The internal consistency in the current sample (Cronbach's alpha) was 0.70.

Analysis

The first step was to examine the statistical significance of variations in the average score of the dependent variable for different categorical values of the independent variables using Student's *t* tests. Homogeneity of variance tests (the Levene statistic) for age group, network type and marital status found that they did not satisfy the assumptions required for parametric analyses. The non-parametric equivalent, the Kruskal–Wallis one-way analysis of variance (ANOVA) by ranks was used for these variables. The median scores and inter-quartile ranges are reported. Pearson's linear correlation test was used to determine relationships between physical function, bodily pain, poor housing and well-being, and Spearman's rank correlation was applied to the relationships between isolation, loneliness and the wellbeing variable. Multiple regression analyses were then used to determine the independent predictors of life satisfaction and the mediation effect of environmental mastery. According to Baron

TABLE 2. *Characteristics of the respondents*

Variable	*N*	%	Variable	*N*	%
Age group (years)			Marital status		
70–74	137	32.8	Single	30	7.2
75–79	135	32.3	Married	217	51.8
80–84	85	20.3	Widowed	157	37.5
85–89	45	11.0	Divorced/separated	15	3.6
90+	15	3.6	Social networks		
Gender			Family dependent	73	17.4
Males	172	41.1	Locally integrated	133	31.7
Females	247	58.9	Local self-contained	50	11.9
			Wider-community focused	76	18.1
			Private restricted	73	17.4

and Kenny (1986), the mediation hypothesis states that the effects of stimuli on behaviour are mediated by various internal transformation processes. The mediation effect of the psychological resource 'environmental mastery' was tested according to the rationale proposed by these authors.

To demonstrate mediation, three pathways were tested using multiple regression (see Figure 1). In Step 1, the independent variables should predict the mediator. In Step 2, the mediator should predict the outcome variable, and in Step 3, the independent variables should predict the outcome variable. Perfect mediation occurs when a previously significant relationship between the independent variables and the dependent variables becomes insignificant with the inclusion of the mediator. When the mediating variable is included in the last equation, a decrease in the coefficients in Step 3 demonstrates an element of mediation (Baron and Kenny 1986).

Results

Socio-demographic characteristics

Table 2 profiles the characteristics of the respondents. The mean age was 78.0 years (standard deviation 5.6 years), and the mean score of the subjective wellbeing indicator (life satisfaction) was 18.5 (s.d. = 4.7). One third of the respondents (34%) reported problems with their housing.[7] In relation to social networks, 32 per cent of the respondents were 'locally integrated', 17 per cent were 'family dependent', 12 per cent were 'local self-contained', 18 per cent were 'wider-community focused', and 18 per cent were 'private restricted'. A small minority (3%) could not be

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TABLE 3. *Median life satisfaction scores for marital status and network type*

	Life Satisfaction		
	Median	Quartile 1	Quartile 3
Marital status			
Single	21.0	19.5	23.0
Married	20.0	17.0	22.0
Widowed	18.0	15.0	21.0
Divorced/separated	17.0	8.0	21.0
Network type			
Family dependent	18.0	14.0	21.0
Locally integrated	20.0	18.0	22.0
Local self-contained	19.5	15.0	22.0
Wider-community focused	20.0	17.0	22.0
Private restricted	20.0	15.2	21.7

classified by the network typology. Although almost one-third were locally integrated, there were prevalent indications of isolation, for 42 per cent had one such item, 19 per cent two items, and 38 per cent had three or more. Reports of loneliness were not so prevalent, with just over half (52%) of the respondents having no indications of loneliness, but 28 per cent had one item, 11 per cent two, and nine per cent had three or more.

The mean physical function score for the whole sample was 61.2 (s.d. = 29.0). A fifth (21%) reported that they were limited a lot with lifting or carrying groceries, 15 per cent with climbing one flight of stairs, 22 per cent with bending, kneeling or stooping, 39 per cent with walking more than one mile, 10 per cent with walking 100 yards, and 22 per cent when performing moderate activities, such as pushing a vacuum cleaner or moving a table. Moderate to severe pain during the past week was experienced by over one-quarter (29), while 20 per cent reported that pain interfered with their normal activities. The mean bodily pain score for the whole sample was 73.4 (s.d. = 26.3).

Univariate analyses

There were no significant differences in life satisfaction scores between men and women or among the age groups, but it did vary significantly by marital status ($H = 25.09$ (4), $p < 0.001$). Those who were divorced/separated had the lowest scores, with single respondents reporting the highest scores (Table 3). Differences in life satisfaction scores by network type were significant ($H = 13.80$ (4), $p < 0.01$). Those in the 'family dependent' category reported the lowest scores, while the highest score was for 'wider community focused' respondents.

TABLE 4. *Correlations between study variables*

	Age	Housing	Lonely	Isolated	Physical function	Pain	Life satisfaction	Mastery
Age		−0.06	0.07	0.26**	−0.29***	−0.07	−0.09	−0.15**
Married	−0.29**	−0.04	−0.23***	−0.67***	0.16**	0.01	0.19**	0.17**
Widowed	0.30**	0.01	0.18**	0.49*	−0.13**	0.01	−0.17**	−0.12*
Divorced	0.05	0.12*	0.07	0.13*	−0.10*	−0.08	−0.12*	−0.11*
Single	−0.04	−0.03	0.06	0.27***	0.00	0.01	0.07	−0.02
Network 1	0.04	0.08	0.10*	−0.06	−0.14**	−0.02	−0.15**	−0.07
Network 2	−0.06	−0.06	−0.11*	−0.07	0.03	0.04	0.11*	0.10*
Network 3	−0.02	0.01	−0.02	−0.01	−0.03	−0.08	−0.01	−0.01
Network 4	0.00	−0.06	−0.05	−0.00	0.17***	0.08	0.09	0.05
Network 5	0.03	0.05	0.11*	0.15**	−0.06	−0.04	−0.06	−0.11*
Gender	−0.15**	−0.04	−0.12*	−0.30***	0.18**	0.11*	0.07	0.15*
Housing			0.16**	0.07	−0.17*	−0.16**	−0.24***	−0.28**
Loneliness				0.30**	−0.17**	−0.24**	−0.41**	−0.31**
Isolation					−0.23**	−0.13**	−0.21**	0.22**
Physical function						0.57**	0.31**	0.27**
Pain							0.32**	0.22**
Life satisfaction								0.41**

Notes: Network 1 = family dependent; Network 2 = locally integrated; Network 3 = local self contained; Network 4 = wider community focussed; Network 5 = private restricted. Spearman's rank correlation coefficients are reported.
Significance levels: *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Among the bivariate correlations between the independent variables and life satisfaction, a significant association was found with having 'more problems with housing' ($r=-0.24$) (Table 4). Isolation and loneliness also correlated significantly with life satisfaction. Those who reported more problems with isolation had lower life satisfaction ($r_s=-0.21$), as did those who reported more problems with loneliness ($r_s=-0.41$). Both health variables were significantly associated with life satisfaction. Higher physical functioning was related to better life satisfaction ($r=0.31$; $p<0.001$), as was higher body pain scores (indicating the absence of problem) ($r=0.32$).[8]

Mediation analysis

The mean mastery score was 47.4 (s.d. = 5.9). Table 5 summarises the results of the regression analysis of mastery with the independent variables. The variables isolation, loneliness, physical functioning and housing problems significantly predicted environmental mastery and explained 20 per cent of the variance. The dependent variable (life satisfaction) was then regressed onto the independent variables. At this stage mediation can only occur if the same variables that predicted the mediator in the first

TABLE 5. *Mediation coefficients*

Variable	Beta	Standard error	Standardised beta
A (Dependent variable – environmental mastery)			
Loneliness	−1.05	0.25	−0.20**
Housing problems	−1.23	0.27	−0.21**
Physical function	3.74	0.01	0.18**
Isolation	−0.58	0.25	−0.11*
B (Dependent variable – life satisfaction)			
Physical function	1.88	0.01	0.11*
Loneliness	−1.26	0.19	−0.30**
Housing problems	−0.43	0.20	−0.09*
Bodily pain	2.67	0.01	0.15**
Widow	−1.19	0.44	−0.12**
Divorced	−2.61	1.13	−0.10*
C (Dependent variable – life satisfaction)			
Loneliness	−1.07	0.19	−0.25**
Physical function	1.19	0.01	0.07
Housing problems	−0.22	0.20	−0.04
Widow	−1.04	0.43	−0.11*
Divorce	−2.29	1.10	−0.09*
Mastery	0.18	0.04	0.23**

Notes: Step 1 – $r=0.44$, $R^2=0.20$; Step 2 – $r=0.52$, $R^2=0.27$; Step 3 – $r=0.54$, $R^2=0.32$.
Significance levels: * $p<0.05$, ** $p<0.001$.

regression predict the dependent variable. Three of them, namely loneliness, physical functioning and housing problems, significantly predicted the dependent variable and explained 27 per cent of the variance. The final model, regressed the dependent variable (life satisfaction) onto the mediator (environmental mastery) *and* the independent variables. In this model, the relationships of housing problems and physical functioning with life satisfaction were insignificant, which demonstrates the mediation effects of environmental mastery in relation to these two variables. Although loneliness was still significant in this model, the coefficient was reduced after the inclusion of mastery. The inclusion of mastery increased the explained variance to 32 per cent.

Discussion

This study has examined the role of a psychological resource and its mediating effects on subjective well-being among older adults who experience detrimental life events and changing circumstances. Old age is often accompanied by changes in health status and social support, which in turn can influence levels of isolation and loneliness, while the home environment can become a difficult place to be in because of physical

restrictions. Based on the literature, a theoretical model was developed with the hypothesis that adaptation to potentially adverse events occurs by drawing on psychological resources central to the self. The findings add to the increasing evidence that psychological resources underlie the processes of adaptation to the changing situations that can accompany increasing age and which help to prevent negative outcomes.

The univariate analyses demonstrated that variations in several such situations influenced wellbeing, yet the multivariate analyses found that, for some of the variables, poor outcomes were mediated by a psychological resource, in support of the hypotheses. Applying Baron and Kenny's (1986) criteria, this study found that perfect mediation occurred for two of the variables. Previous research has demonstrated how crucial housing and the environment are to the psychological wellbeing of the resident (Lawton 1983, 1989*b*). Here, the experience of housing problems directly predicted reductions in life satisfaction, although the effect was not significant when the respondents' sense of environmental mastery was taken into account.

Both health measures initially correlated positively with life satisfaction, an expected finding given that the most salient life domain for older people is health and the maintenance of mobility (Wenger, Burholt and Scott 2001). The proportion of older people with a 'limiting longstanding illness' generally increases with age (Office for National Statistics 1999). In Wales, the reported prevalence among people aged 75 and more years is 73 per cent (National Assembly for Wales 1999). Given the incidence of chronic illness and mobility problems, the results of the univariate analysis are plausible. Baltes (1991) proposed that such pathologies alter the quality of human ageing. In this study, however, the mediation model found that the influence of physical functioning was mediated by environmental mastery. There was no mediation effect for bodily pain as in the first regression it did not predict the mediator.

High loneliness significantly correlated with lower life satisfaction. Other research has reported that being more socially active positively correlates with life satisfaction (Nezelek *et al.* 2002). Although the multivariate analysis found that with the inclusion of mastery in the model, loneliness still significantly predicted life satisfaction in line with Baron and Kenny's criteria, the reduction in the coefficient at the last step demonstrated partial mediation. The results of the mediation model demonstrate that possessing environmental mastery is the key to experiencing life satisfaction in the midst of adversity. This finding provides strong evidence for the role that psychological resources can have on outcomes, and supports previous findings (Ardelt 1997, 2000; Badger 1993, 2001; Jang *et al.* 2000; Jeffries and Konnert 2002; Kempen, Jelicic and Ormel 1997;

Landau and Litwin 2001; Mangelli *et al.* 2002; Smider, Essex and Ryff 1996; Schwartz, Coulthard-Morris and Zeng 1996).

How various components of an individual's life ultimately influence life satisfaction and positive psychological functioning are of growing importance. The growth of the very old population presents many challenges for government policies and the health and social services. If we are to 'help people live longer and healthier' and to encourage 'active ageing', building a fuller understanding of the factors that can influence positive outcomes in older age should have a high priority (Welsh Assembly Government 2002: 9; World Health Organisation 2002: 12).

There should also be further consideration of the significant variations found in the univariate analyses. These findings support much of the literature about the detrimental effects that housing, health and demographic factors have on subjective well-being. It should however be noted that many of the findings were based on descriptive or univariate analyses and lack the explanatory power of a predictive model. The multivariate analysis found that few of the study variables significantly predicted life satisfaction. This finding is in line with other research. Bowling and Windsor (2001) reported that when complex statistical models have been used, uncertainty arises about the power of objective variables. An extensive review of the subjective wellbeing literature by Diener *et al.* (1999) led them to conclude that overall there are disappointingly small effect sizes for objective variables. In the recent Berlin Ageing Study (BASE), Smith *et al.* (1999) found that socio-demographic variables (age, gender, marital status and institutionalisation) accounted for only six per cent of the variance in life satisfaction scores, and objective factors (hearing, mobility, vision, number of illnesses, income, and social networks) only 10 per cent of the variance. This implies that multivariate approaches are essential to understanding the influences on subjective wellbeing.

In this study, prior to including mastery into the model, 27 per cent of the variance was accounted for by only six variables (housing difficulties, the two health variables, widowed, divorced and loneliness), much higher than the 10 per cent reported by Smith and colleagues. It should be noted, however, that with the exception of 'widowed' and 'divorced', the predictors cannot be fully described as objective measures. Objective measures should normally be 'hard' facts, for example a surveyor's report of housing conditions or an occupational therapist's assessment of functioning in the home environment. A subsequent path analysis on the BASE data found that the respondents' subjective evaluations of the objective conditions were in fact stronger predictors of overall subjective wellbeing than the objective measures (Smith *et al.* 1999). The measures

included in this analysis attempted to be objective, but relied to a certain extent on an individual's perception of physical performance, housing difficulties, loneliness and pain. The element of subjectivity in these measures may explain the higher explained variance.

Some variables were not retained by or significant in the mediation model. Higher isolation scores initially correlated with lower life satisfaction, but were not significant in the mediation model. Chappell and Badger (1989) also found social isolation to be unrelated to subjective well-being. No significant differences in life satisfaction were found between males and females or among the age groups, although the average score dropped slightly in the oldest age group. These variables had no predictive value in the mediation model. This finding replicates previous findings. A survey of almost 60,000 adults in 40 nations found that life satisfaction actually increased slightly from ages 20–29 years to the eighties, with little variation in the eldest two decades (Diener and Suh 1998). The review of the subjective well-being literature by Diener *et al.* (1999) reported that there were no significant gender differences. In contrast, the Berlin Ageing Study found that gender predicted subjective well-being, with males reporting higher life satisfaction than females (Smith *et al.* 1999). The authors postulated that this finding might reflect the fact that the men in their study were financially and socially advantaged. It appears then that subjective well-being is not necessarily directly influenced by several of the widely recognised 'risk factors' in old age. Staudinger (2000) suggested that such findings reflect a 'wellbeing paradox', and that the consistent identification in many findings suggests that it is not simply a methodological artefact.

Several limitations to this study should be considered. It was cross-sectional, which limits the generalisability of the results and its ability to detect and calibrate the causal links. Secondly, although the conceptual model tested here was theoretically derived from previous research, other models may predict different pathways to subjective wellbeing. Future work using complex statistical approaches will allow us to test more models and build a stronger theoretical background. For example, the initial analysis found that subjective wellbeing varied by network type and that the category 'family dependent' reported the lowest life satisfaction score. This is interesting, as people in the family dependent category are on average more robust than others (Wenger 1994). The category includes, however, more widowed people aged 80 years or more who are in poor health. This can result in higher dependency on siblings and subsequently a malfunctioning network (Wenger 1994). Thus, the low life satisfaction score for this group could be interrelated with older age, poor health and a lack of satisfaction with the support provided by their families. A more complex model would allow us to build interaction terms

between the study variables, which would provide a stronger basis for a discussion of the policy and practice implications.

On the positive side, the study used random sampling procedures which endeavoured to be representative of the population, and achieved a sample size which was more than enough for statistical power. Consequently, we feel that the findings should be given consideration. This study, with its emphasis on life satisfaction and mastery represents a contribution to the examination of positive psychological states, in contrast to current research publications which favour negative psychological states in a ratio of 17 to one (Diener *et al.* 1999). From a theoretical perspective, the findings may also further the understanding of the 'wellbeing paradox'.

In conclusion, this study has proposed a possible mechanism by which older people react and deal with differential threats to subjective wellbeing, particularly those arising from declining health and difficulties with their home environment. A recent review of the literature concluded that a consistent finding from research is that the home is the preferred place to be in the last years of life (Burholt and Windle 2001). On that basis, efforts must continue to improve both housing conditions and health status, but the adaptive ability of older people to gain mastery of their environmental conditions, whatever they may be, should be recognised and acknowledged.

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NOTES

1 This paper reports on a study entitled *Housing for an Ageing Population: Planning Implications* (HAPPI). The study represents collaborative research that has arisen from Gwynedd Rural Ageing Network (GRAN). GRAN is a wide network involving those concerned with services to older people in Gwynedd, North Wales. The project was funded by the Wales Office for the Research and Development of Health and Social Care.

2 The target age group was initially 75 or more years, as the literature suggests that it is around this age that ill-health becomes more prominent. The population census figures indicated that the population was too small to generate an adequate sample (allowing for refusals), and the threshold age was set at 70 years.

3 The interviewers were issued with identification cards and instructed to show these when meeting with participants. Interviewers were informed about the management of the questionnaires and personal safety. A majority of the training was spent ensuring that the interviewers were aware of the nature and purpose of the questions.

After training, interviewers understood the necessity of obtaining consent from interviewees, respecting confidentiality, contact with respondents and the confounding influence of the presence of other family members or friends during the interview session.

4 The age groups employed were 1 = 70–74; 2 = 75–79; 3 = 80–84; 4 = 85–89; and 5 = 90 or more years.

5 The groups are: Local family dependent – relies on local family with few friends and neighbours and low community involvement. Locally integrated – informal help to and from friends and neighbours; with involvement in community activities. Local self contained – reliance mainly on neighbours, little community involvement, infrequent contact with relatives, often childless. Wider community focused – active relationships with distant relatives, no local kin, informal help to and from friends. Private restricted – no local kin; minimal contact with neighbours, and low levels of social contact.

6 There is some debate as to the acceptable level for good internal consistency, ranging from >0.50 (Cronbach 1951) to 0.70 (Nunally 1978). In this instance 0.69 was considered adequate.

7 Of these, five per cent had problems with lighting, 22 per cent with heating, 32 per cent with draughts, 18 per cent with noise or other nuisance, eight per cent with security, 3 per cent with floor covering, 28 per cent with the decoration, 47 per cent with household repairs and maintenance, five per cent with a lack of facilities, and eight per cent with using the toilet.

8 All the coefficients reported in this paragraph were significant at $p<0.001$. The sample sizes ranged from 401 to 414. r indicates the Pearson linear product moment coefficient, and r_s the Spearman rank coefficient.

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