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The big five personality traits and reporting of health problems and health behaviour in old age

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Objectives. To assess whether the 'big five' personality traits are related to health behaviour among British older people.

Design. The NEO Five Factor Inventory, together with questions on medical problems, perceived health status, positive health behaviours, and frequency of visits to general practitioners were administered to people aged between 75 and 84 years.

Method. Fifty people (21 men and 29 women) were interviewed, drawn from four GP lists in Southampton.

Results. Neuroticism was associated with a number of reported medical problems, negatively perceived health status and frequency of visits to the GP. Extraversion was associated with positive health behaviours. Openness to experience and agreeableness were associated with positive health perceptions. There were some striking differences between associations found within the male and female groups. Agreeable women reported fewer medical problems and less frequent visits to the GP than antagonistic women, whereas conscientious men reported more positive health perceptions and more visits to the GP than non-conscientious men.

Conclusion. Since associations are evident for each of the personality traits, all of the 'big five' personality traits should be included in research on health behaviour to investigate their relevance for clinical practice.

It has long been recognized that personality exerts an influence on health. This influence may be direct, as in the link between Type A behaviours and coronary heart disease. Alternatively, it may be indirect, via health promoting behaviours, or through effects on health complaints and symptom reporting (Coleman, 1997). Most research has concentrated on the primary level of personality functioning, usually referred to as personality traits, which indicate enduring disposition to act and feel in particular ways independent of context (McAdams, 1995). In the last 10 years there has been a growing consensus that there are five basic or primary traits which are invariant across age groups and cultures (McCrae & Costa, 1991). These 'big five' traits are generally denoted with the terms neuroticism, extraversion/introversion, openness to experience, agreeableness/antagonism, and conscientiousness.

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Personality traits are generally stable throughout adulthood, with some slight decrease in neuroticism and extraversion noted with increasing age (Costa & McCrae, 1984). However, it has been suggested that personality traits along with other psychosocial variables may have a stronger link with health in old age, in terms of reporting of physical symptoms, satisfaction with health, general well-being and healthy behaviour (Booth-Kewley & Vickers, 1994; Costa & McCrae, 1984; Rodin & Salovey, 1989). In interpreting the way both younger and older people present their symptoms it is important that medical practitioners take account of influences from personality. Yet so far we have limited scientific evidence on this subject, and almost none in the UK.

Age, health and psychological functioning

The majority of research on age, health and psychological functioning has been done in the USA. The major dimensions investigated have been illness reporting, perceived health status, positive health behaviours, and visits to medical practitioners.

Illness reporting increases with age (Victor, 1991), although some age-related symptoms may not be fully reported as they are often seen as an inevitable part of the ageing process (Rodin & Salovey, 1989). Gender differences are evident. Both Israeli and American studies have found women to report more symptoms and to be less tolerant of pain than men (Anson, Paran, Neumann & Chernichovsky, 1993; Hale, Perkins & May, 1986; Rodin & Salovey, 1989).

Perceived health status is affected by age, gender, social circumstances (including marital status) and socio-economic status, as well as by functional impairment and fears and beliefs about disease (Barsky, Cleary & Klerman, 1992; Goldstein & Hurwicz, 1989; Rodin & Salovey, 1989; Victor, 1989). A decline with age is evident in the number of people reporting their health as 'good' (Victor, 1991). American and Australian studies have suggested that, although satisfaction with life increases over time, satisfaction with health declines (Costa & McCrae, 1984; Hong & Giannakopoulos, 1994). But British research by Wright (1987) carried out on a wide age range found on the contrary that perceived health satisfaction increases with age, and that health satisfaction is most usefully viewed as an inverse function of the discrepancy between perceived current and best possible health status.

British studies also indicate that older people behave in a relatively healthy manner, with lower rates of smoking and alcohol consumption, due to lower incomes, temperate habits when young or to the earlier mortality of those with higher rates. Although active leisure pursuits decline, gardening and walking remain popular into old age, with an interest in healthy diets and weight control (Victor, 1991). With increasing age, people may become more vigilant and responsive to health threats, seeking medical advice earlier. A number of studies suggest that American older people are more active than younger people in prevention of illness, tend to be more compliant with medical regimens and cope better with illness than do younger adults (Rodin & Salovey, 1989; Leventhal, Leventhal & Schaefer, 1992). Visits to the doctor are commoner in women and among widowed persons (Rodin & Salovey, 1989). But these studies have not been replicated in Britain.

Research on personality traits and health

Because of their longer established history in personality research, most work on personality and health has been done on the traits of neuroticism and extraversion, but evidence is growing that the other three primary traits also have major associations with health behaviour.

Neuroticism has been shown to be linked with greater symptom reporting (Davis, Ralevski, Kennedy & Neitzert, 1995), poorer perceived health (Adler & Matthews, 1994; Cockerham, Kunz & Lueschen, 1988), more complaints about health and health worries (Costa & McCrae, 1984; Reis, Gold, Andres, Markiewicz & Gauthier, 1994), and more frequent visits to the doctor (Frazier, Hooker & Siegler, 1993). Neurotic people also express lower levels of well-being (McCrae & Costa, 1991; Schmutte & Ryff, 1997) and higher levels of negative affect. Negative affectivity itself is related to health complaints (Watson & Pennebaker, 1989). These findings are consistent with features of neuroticism such as self-pity, anxiety and worry. Despite their greater health worries, neurotic people have also been found to show less sensible health behaviours (Booth-Kewley & Vickers, 1994).

People with a high score on extraversion have been found to report fewer psychological and physical symptoms (Spiro, Aldwin, Levenson & Bosse, 1990), although they may be less reticent about coming forward and presenting symptoms to their doctor. Extraversion is thought to be linked to a better perceived health status, through its influence on well-being and positive affect which lessens health worries (Costa & McCrae, 1984; McCrae & Costa, 1991). Extraversion has also been linked to both positive (diet, exercise) and negative (substance use, e.g. alcohol, smoking) health behaviours (Booth-Kewley & Vickers, 1994).

People with a high score in openness to experience have the ability to notice new events and put new interpretations on their observations. Older people commonly ascribe aches and weakness to ageing (Rodin & Salovey, 1989). Open people may be more likely to relate these to medical problems, possibly leading to an increase in symptom reports. A low score on openness has been linked to a blunting of the effects of ill-health (Costa & McCrae, 1984), possibly by improving perceived health status. Open people tend to experience both good and bad feelings more intensely, with no overall effect on well-being (McCrae & Costa, 1991). Openness may have a positive association with substance use (Booth-Kewley & Vickers, 1994) and therefore a negative link with healthy behaviour.

Agreeableness has been linked to positive affect and well-being (McCrae & Costa, 1991; Schmutte & Ryff, 1997) and possibly to less cynicism about health (Johnsson-Saylor, 1991) and thus better perceived health status. Agreeableness may also be connected with better health behaviour in terms of exercise, self-care, substance use and dietary control (Booth-Kewley & Vickers, 1994).

Conscientiousness, like extraversion and agreeableness, has been linked with positive affect (Schmutte & Ryff, 1997) and well-being, possibly via a sense of achievement (McCrae & Costa, 1991). Connections between conscientiousness and health behaviour are well established: conscientious people exhibit good long-term healthy behaviours in regard to exercise and diet and less negative behaviours such as substance use (Booth-Kewley & Vickers, 1994). They also display better self-care (Brickman, Yount, Blaney,

Rothberg & DeNour, 1996) and compliance with medical advice (Christensen & Smith, 1995). All these factors could explain the link between conscientiousness and longevity (Adler & Matthews, 1994).

Aims of study

For this preliminary British investigation into the associations between personality traits and reporting of health problems and health behaviour, the investigators decided to focus on the middle old group (75 to 84 years). It was reasoned that this strategy was likely to deliver a sample in which the incidence of ill-health would be high but not all pervasive. Taking into account the suggestion of a closer relationship between health and psychosocial variables with age, it was expected that significant associations would appear in a homogeneous sample of this age group of relatively modest size. Measures were selected to assess both the big five personality traits, and the four dimensions of health reporting and behaviour most evident in the literature.

Methods

Recruitment and interviewing

Persons aged between 75 and 84 were randomly selected from the lists of four general practitioners covering different areas of the city of Southampton. Any person with psychiatric illness was excluded. A letter of information was sent to each person with an attached consent form. Those who responded positively were contacted by telephone to arrange a convenient interview time. Questionnaires were administered in the respondent's own home and consisted of four sections (see below). Demographic and social details were also recorded.

The participants

Of the 95 people contacted, 50 agreed to take part in the study, 21 men and 29 women, a response rate of 53%. The average age of the men and women was similar (79.5 and 79.9 years, respectively), but a much higher proportion of the men were still married, 71% compared with 31% of the women. The sample was spread over a large range of occupational classes (14, 41, 27, 16, 2% in social classes 1, 2, 3, 4 and 5, respectively).

The questionnaires

Personality traits (NEO–FFI). Costa & McCrae's 60-item Five-Factor Inventory (NEO–FFI) was used in this study. The questions are answered on a 5-point scale from strongly disagree to strongly agree. Validity and reliability data are given in the NEO manuals (Costa & McCrae, 1985, 1989, 1992).

Reported medical problems. The instrument used has been developed at the University of Southampton Department of Geriatric Medicine in the course of a longitudinal study begun in 1977–78 (Hall, Briggs, MacLennan, Marcer, Robinson & Everett, 1983). It contained 10 questions on daily life functions (eyesight, hearing, speech, walking, tremor, limb weakness, joint problems, breathing, continence and retention) and 8 questions on illnesses experienced in the last 10 years (including stroke, heart attack, thyroid disease, diabetes, lump or growth diagnosis/removal, severe skin disorder, depression and other medical problems). The sum scores calculated were adapted to assess not only the number of medical problems reported but also their severity.

Perceived heatlh status. The Short Form–36 health survey questionnaire (SF–36) was the measure of perceived health selected for this study. It is a 36-item questionnaire measuring 8 variables: physical functioning, social functioning, role limitation (physical), role limitation (emotional), mental health, vitality, pain and general health perception. The SF–36 was developed in the USA, so slight changes in wording were adopted to make it more suitable for use in the UK (Brazier *et al.*, 1992; Jenkinson, Coulter & Wright, 1993). When used in an interview setting, the SF–36 has been found to be suitable for an elderly population (Lyons, Perry & Littlepage, 1994) but certain questions, such as those concerning vigorous activities (running, participating in strenuous activities), are not relevant to many older people, so the changes in format suggested by Hayes, Morris, Wolfe & Morgan (1995) were adopted.

Positive health behaviours. Six questions regarding important aspects of healthy behaviour (alcohol consumption, smoking, exercise, diet, compliance with medical advice and with medical prescriptions) were devised for this study. Answers were given on a graded scale and coded from 0 to 4 in terms of their recognized healthiness.

GP consultation. Participants were also asked how often they consulted their GP per year, on a scale from less than once a year to at least once every couple of months.

Statistical analysis

The data collected were entered into SPSS for statistical analysis. Number of medical problems, scores from each dimension of the SF–36, the health behaviour index, and frequency of visits to GP were calculated and correlated to the NEO–FFI personality trait measures. Data were analysed for the whole sample and for males and females separately. Only statistically significant findings (p values of less than or equal to .05) from two-tailed significance calculations have been reported below. Stepwise multiple regression analysis has also been used to examine the independence of personality associations with the health variables.

Results

Personality traits

Scores on the NEO–FFI traits approximated to normal distributions. However, this sample had lower scores for openness and agreeableness, and the males in the sample had a lower conscientiousness score, in comparison to the US norms reported by Costa & McCrae. The former may reflect US/UK differences in characteristic responses to the NEO–FFI. However, in regard to the conscientiousness finding, it is noteworthy that many of the men in this study spontaneously noted that they had become less conscientious since they had stopped working, whereas the majority of women had been housewives all their married lives and reported no change.

Report of medical problems

When asked about their health in the last ten years, 20% reported depression and 16% a heart attack. Thirty per cent had had a lump or growth diagnosed or removed and 20% reported severe skin problems. Forty-four per cent of respondents had some problem with their eyesight, 40% had trouble hearing, and 40% found walking difficult. Very few respondents reported strokes, tremors or speech problems. A degree of shortness of breath troubled 46% of those interviewed. Men and women reported a similar amount of medical problems. Incontinence, however, was reported by 24% of women and only 10%

of men. Eighteen per cent suffered from constipation. Overall, the frequencies were similar to the Southampton Ageing Project for this age range (Coleman, Ivani-Chalian & Robinson, 1999), suggesting that the sample was representative of this population.

Perceived health status

As might be expected with an older sample, physical functioning and physical role limitation scores were worse than general population norms for the SF–36 (Lyons, 1993). However, this sample scored better on all other measures of perceived health, which is consistent with Wright's (1987) findings.

Positive health behaviours

Positive health behaviours were reported more by those who indicated higher levels of vitality ($r = .45$, $p < .001$, better social functioning ($r = .34$, $p < .05$), better physical functioning ($r = .43$, $p < .01$) and a better general perception of their health ($r = .33$, $p < .01$).

GP consultation

One third ($N = 17$) of the sample consulted their GP once a year or less, one third ($N = 16$) about once every 6 months, and one third ($N = 17$) more frequently. Frequency of visits were associated among the women with age ($r = .40$, $p < .05$), number of medical problems ($r = .46$, $p < .05$), poorer general health perception ($r = -.49$, $p < .05$), physical role limitation ($r = .56$, $p < .01$) and poorer physical functioning ($r = -.41$, $p < .05$). By contrast, among the men only weakness in the limbs was associated with frequency of visits to the GP ($r = .45$, $p < .05$).

Associations between personality traits and health measures

Table 1 reports significant associations between personality traits and health measures for the whole sample and for men and women separately.

Neurotic people reported significantly more medical problems, most notably depression, tremor, breathlessness, constipation, skin trouble and strokes. This phenomenon was more noticeable among the men. Neurotic people had worse general health perceptions, poorer mental health and greater physical role limitation. Neurotic men reported less vitality and more pain, as well as more emotional role limitation, while neurotic women reported worse social functioning. Neuroticism was not linked with positive health behaviours in this sample. However neurotic men visited their GP more often than non-neurotic men.

Extraversion was not linked with the number of medical problems reported, apart from less skin trouble and tremor in women (but given the number of items in the medical questionnaire, these findings could have been due to chance). Extraverted women had better general health perceptions and better physical functioning. Extraverted people reported more vitality and more positive health behaviours. Extraversion was not linked to frequency of visits to the GP.

Table 1. Significant correlations between the five personality traits measured by the NEO–FFI (N = neuroticism; E = extraversion; O = openness to experience; A = agreeableness; C = conscientiousness) and four types of health measure (total in roman type, males in boldface and females in italics) (N = 50)

	N	E	O	A	C
Reported medical problems					
Total	*.47***			*−.31**	
	.53*			*−.56****	
	*.38**				
Tremor	*−.30**	*.38**		*.30**	
Joints			**−.73*****		
Breathing	*−.34**		*.41**	*.38***	
	−.54*			*.53***	
Stroke	*−.33**				
Retention	*−.31**		**−.44***		*.31**
					.43*
Depression	*−.53****				*.40***
	−.64**				**.54****
Lump					*−.44****
Skin	*−.28**	*.41****			
Perceived health status					
General health	*−.53****	*.36***		*.31**	*.56****
	−.52*	*.40**	*.45**	*.43**	**.64****
	*−.53***				
Physical function		*.45**	*.43**	*.40**	
Role limitation	*−.51****		*.38**		
(Physical)	**−.57****				
	*−.44**				
Role limitation	*−.34**				
(Emotional)	**−.49***				
Social function	*−.37***				
	*−.53***				
Pain	**−.46***		*.32**		
Mental health	*−.69****			*.40**	
	−.72***				
	*−.66****				
Vitality	*−.49****	*.37***	**−.54***	*.37***	*.36****
	−.74***		*.47**	*.62*****	**.56****
Positive health behaviours					
Total		*.29**			
Visits to GP					
Frequency over year	*.40***			*−.36****	
	.51*			*−.53****	

*p < .05; **p < .01; ***p < .001.

Openness to experience, similarly, was not linked with reporting of medical problems, apart from less breathlessness in women and more joint pain and constipation in men (again perhaps due to chance). Open women had better general health perceptions and physical functioning, less physical role limitation and pain, and more vitality. Contrastingly, open men reported less vitality. Openness was not linked to positive health behaviours or to frequency of visits to GPs.

Agreeable women reported fewer medical problems, particularly breathlessness and tremor. They had a better general perception of their health and more vitality. Agreeable women also reported better physical functioning and mental health. Agreeableness was not correlated with positive health behaviours, but agreeable women visited their GPs less often than non-agreeable women. None of these associations were significant for the men alone.

Conscientiousness was not linked to overall reporting of medical problems, but conscientious men reported less depression and constipation while conscientious women reported more lumps or growths. Conscientious men had a better general health perception and more vitality. Conscientiousness was not linked to positive health behaviours or to frequency of visits to GPs.

Table 2 shows the results of stepwise multiple regression analyses in which the five personality trait scores were entered as independent variables to predict medical problems, perceived health, positive health behaviours and visits to the GP. Neuroticism was a significant predictor of most of the health measures, and the other traits of some of them. For example, extraversion was a predictor of both vitality and positive health behaviours. Most striking, however, are the sex differences that emerge from the analysis. Most of the health measures were predicted by different traits in men and women. Only neuroticism and conscientiousness featured as significant predictors among the men, whereas agreeableness and openness were also important predictors among the women.

Reporting of medical problems was predicted positively by neuroticism in men, but negatively by agreeableness in women (i.e. more antagonistic women reported more medical problems). Positive health perception in men was predicted positively by conscientiousness and negatively by neuroticism, whereas in women it was predicted positively by high openness as well as negatively by neuroticism. Positive physical functioning could not be predicted in men, whereas in women 44% of the variance could be accounted for by a combination of extraversion and openness (both positively) and conscientiousness (negatively). Other perceived health status measures (SF–36), physical role limitation, emotional role limitation, pain, lack of mental health and lack of vitality, were predicted solely by neuroticism in men. However in women openness also predicted lack of role limitation, lack of pain, and vitality, and agreeableness predicted vitality. Reported mental health was linked negatively and strongly (by as much as 50% of the variance) to neuroticism in both sexes. Frequency of visits to the GP was predicted positively by neuroticism and conscientiousness in men, but negatively by agreeableness in women.

Discussion

This study has demonstrated the relevance of all five personality traits to measures of health reports and health behaviour. Neuroticism was the most associated trait, which is

Table 2. Significant personality trait (N = neuroticism; E = extraversion; O = openness to experience; A = agreeableness; C = conscientiousness) predictors of health measures and their *t* values from multiple regression analyses, for the whole sample, and for males and females separately ($N = 50$)

	Total	Males	Females
Reported medical problems			
Total	N −3.688***	N 2.711*	A −3.546**
Perceived health status			
General health	N −3.968***	C 2.908**	N −3.384**
	A 3.872**	N −2.283*	O 2.780**
Physical function			E 2.910**
			C −2.424*
			O 2.274*
Role limitation	N −4.483***	N −3.026**	N −2.526*
(Physical)	O 2.050*		O 2.080*
Role limitation (Emotional)	N −2.524*	N −2.422*	
Social function	N −2.783**		N −3.226**
Pain	O 2.310*	N −2.259*	O 2.202*
Mental health	N −6.662***	N −4.484***	N −4.545***
Vitality	N −3.319*	N −4.093***	A 3.544**
	E 2.053*	C 2.209**	O 2.136*
Positive health behaviours			
Total	E 2.113*		
Visits to GP			
Frequency over year	N 2.45*	N 3.422**	A −3.229**
	A −2.067*	C 2.112*	

*$p < .05$; **$p < .01$; ***$p < .001$.

in harmony with US findings. However, in this sample, whereas neuroticism and conscientiousness were the most predictive traits among men, agreeableness and openness appeared as significant predictors among women in addition to neuroticism. As a consequence, the results for the whole sample are a poor reflection of the results for men and women taken separately. This suggests that different motivations may play a part in health reporting in men and women. For example, among women antagonism (low agreeableness) appeared as the major personality associate of reporting medical problems, expressed lack of vitality and visits to the GP. Among men, the same variables were predicted most strongly by neuroticism.

The fact that agreeable women indicated fewer medical problems, made fewer vists to GPs, and expressed better perceived health status, physical functioning, mental health and vitality, may reflect attempts to make the lives of others more pleasant by not complaining, or perhaps by a more overall positive outlook. As mentioned earlier, a low score in agreeableness has been found to be linked to distrust of medical advice and cynicism about health (Johnsson-Saylor, 1991). But the health psychology literature gives no suggestion why the same phenomenon should not also be evident among men.

The contrasting findings on openness to experience, with open men displaying less vitality and open women more, could be explained by the roles that men and women adopt after retirement. Men may experience a more dramatic alteration in daily life when work stops, while women often continue their domestic duties as before. Men who are open and therefore more sensitive to such alterations may feel less active and vital in later years for this reason.

It is also noteworthy that conscientiousness was linked to general health perception, perceived vitality and visits to the GP in men, but not in women.

Although measures of perceived health status were strongly associated with reporting of medical problems, personality remains a significant independent predictor of the latter (accounting for around 30% of the variance according to stepwise multiple regression analysis), so it should not be ignored when judging the health status of an individual. Possible gender differences should also be taken into account. The data suggest a model whereby, in deciding whether or not to visit the GP, the women of this group appeared to weigh up their medical problems and health status, especially well-being, but were also influenced by a low level of agreeableness. By contrast the number of medical problems and perceived health status did not appear to affect the frequency with which males in the sample visited their GP. Instead it seems that worry about health (neuroticism) and conscientiousness are the key motivational factors.

The generally lower levels of association found between personality and healthy behaviour deserve comment. In particular, the expected link between conscientiousness and the index of positive health behaviours was not found among men or women. It is worth noting that healthy behaviour requires not only motivation but capacity. People with many health problems may be less able to exercise or to obtain and cook healthier foods, for example, and their disillusionment with medical services may lead to lower compliance. Ill-health may also reinforce negative health behaviours such as smoking and alcohol. Alternatively, negative health behaviours may lead to worse health and more medical problems. Positive health behaviours were found to be linked to a better general perception of health which may be a key determining factor. The association between social function and healthy behaviour may be due to the influence of family, friends or groups (Rodin & Salovey, 1989) or because being healthy allows not only better health behaviour but also a more fulfilling social life. Consistent with this explanation was the link found between extraversion and healthy behaviours.

Conclusions

Self-reported health has been shown by this study to be significantly influenced by personality traits. Taking these characteristics into account may improve assessment of health status, as well as decisions on management and service provision. For example, neurotic and agreeable persons with the same medical condition are liable to be treated very differently: the greater complaints of the more neurotic person leading to earlier referral, diagnosis and treatment.

In general practice settings, it is likely that understanding of personality aids practitioners in assessing and dealing with people they know reasonably well. However, in a hospital setting, there is often little opportunity for getting to know the personality of a patient in the busy clinic or ward. Inclusion of formal information on personality

traits could be helpful. With the growing evidence from behavioural genetics of the high heritability component for all of the major personality traits, evident also in later life (Pedersen, 1996), their assessment has growing credibility and importance. Certainly the present study has highlighted the value of taking all five factors into account. Studies which use only neuroticism and extraversion risk losing a substantial amount of information, particularly among women. Further studies are required using larger samples of different age groups to see how generalizable the present findings are.

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