

Personality, Risky Health Behaviour, and Perceived Susceptibility to Health Risks

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Abstract

We examined the relations between personality (Five-Factor Model), risky health behaviours, and perceptions of susceptibility to health risks among 683 university students. The hypothesis was that personality would affect perceptions of susceptibility to health risks in two ways: directly, irrespective of risky health behaviours, and indirectly, through the effects of personality on risky health behaviours. The students were surveyed about smoking, being drunk, drunk driving, risky sexual behaviour, and perceptions of susceptibility to related health risks. In path-analytical models we found the expected direct and indirect effects. The personality dimensions of Agreeableness and Conscientiousness had negative direct effects on perceptions of susceptibility as well as negative indirect effects through risky health behaviours. Neuroticism was the only personality dimension to show positive direct effects on perceptions of susceptibility as well as negative indirect effects. Copyright © 1999 John Wiley & Sons, Ltd.

INTRODUCTION

Subjective perceptions of susceptibility to health risks are an important component of several theories of health behaviour (Janz and Becker, 1984; Rogers, 1983). These theories state that once people perceive themselves as being susceptible to health risks, they form intentions to take preventive actions or to give up risky health behaviour. An important approach to measuring perceived susceptibility focuses on comparative estimates of one's own risk as compared to that of others (Weinstein, 1984). The advantage of this approach is its ability to detect biased perceptions without having to rely on usually unobtainable individual risk probabilities. A substantial body of research has shown that people tend to rate their own susceptibility to health risks as being comparably lower than that of their peers (van der Pligt, 1994). This bias has become known under the label of 'unrealistic optimism' (Weinstein, 1982).

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Whereas, on the average, people tend to show an optimistic bias regarding their future health, there is evidence that at the individual level, this bias is attenuated according to individual health behaviour (van der Pligt, 1994). For instance, smokers give higher mean estimates of perceived susceptibility to lung cancer than non-smokers, although they do not arrive at 'realistic' risk judgments. In a similar vein, risky health behaviours such as drinking or unsafe sexual practices are associated with higher perceived susceptibility to related health risks (Eiser and Gentle, 1988; Lee, 1989; McCoy, Gibbons, Reis, Gerrard, Luus and Sufka, 1992; Otten and van der Pligt, 1992; Reppucci, Revenson, Aber and Reppucci, 1991; Strecher, Kreuter and Kobrin, 1995; Taylor, Kemeny, Aspinwall, Schneider, Rodriguez and Herbert, 1992; van der Velde, van der Pligt and Hooykaas, 1994).

Theories of health behaviour do not usually provide for effects of personality on risk perceptions and risky behaviour. Correspondingly, there are hardly any studies of the relation between personality and perceived susceptibility. Still, there are good reasons to expect that personality affects perceptions of vulnerability. Neuroticism, for instance, one of the five basic factors of personality¹, is related to the tendency to worry about one's health (Costa and McCrae, 1985) and to the inclination to inflate perceptions of symptoms of disease (Watson and Pennebaker, 1989; 1991). Indeed, a recent study demonstrated that Neuroticism predicted higher perceived susceptibility to negative life events (Darvill and Johnson, 1991).

Along with having direct effects, personality may also have indirect effects on perceived susceptibility through the effects of personality on risky health behaviours. Many studies have documented that personality traits such as Extraversion, Type A Behaviour or Cynical Hostility, Psychoticism, and Sensation Seeking predict the inclination to engage in risky health behaviours such as smoking, drinking, high-risk sports, and risky sexual behaviour (Furnham and Saïpe, 1993; Goma i Freixanet, 1991; Sieber and Angst, 1990; Wijatkowski, Forgays, Wrzesniewski and Gorski, 1990). In contrast, Conscientiousness predicts the inclination to refrain from risky health behaviours such as smoking and excessive drinking (Booth-Kewley and Vickers, 1994; Friedman, Tucker, Schwartz, Martin, Tomlinson-Keasey, Wingard and Criqui, 1995; Lemos-Giráldez and Fidalgo-Aliste, 1997).

The present study set out to explore the associations between the five basic factors of personality (Five-Factor Model), risky health behaviours, and perceived susceptibility to health risks. Both direct and indirect effects of personality on perceived susceptibility are expected. Direct effects would be those that remain when risky health behaviours are controlled, whereas indirect effects would be those that are mediated through the effects of personality on risky health behaviours.

METHOD

Sample

The present study is based on an anonymous survey among students of the University of Zurich, Switzerland. All students who were enrolled in the fifth semester of their major received a questionnaire three months after the beginning of the winter term ($N = 1739$). Questionnaires were returned by 683 students (53.2 per cent women,

¹Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness (McCrae and Costa, 1990).

46.8 per cent men; mean age 24.8 years, $SD = 3.5$; response rate = 39.2 per cent). Similar low response rates among students were observed in other surveys conducted by the Department of Psychology and may be due to the high overall number of surveys carried out among university students in Zurich. Responders were students in the following faculties: law, 16 per cent; economics, 11 per cent; medicine, 17 per cent; humanities, 40 per cent; science, 14 per cent; theology, 1 per cent. Compared to the entire cohort, women and students of the humanities were slightly over-represented, whereas students of economics were under-represented.

Instruments

Personality

The personality dimensions of the Five-Factor Model were assessed using the German version of the NEO-FFI (Borkenau and Ostendorf, 1993; Costa and McCrae, 1989). The NEO-FFI comprises 60 items that are rated on a five-point scale ranging from *strongly agree* to *strongly disagree*. Each of the five NEO-FFI scales is composed of 12 items². The following means, standard deviations, and Cronbachs' alphas were obtained: Neuroticism, $M = 2.79$, $SD = 0.67$, $\alpha = 0.86$; Extraversion, $M = 3.42$, $SD = 0.56$, $\alpha = 0.79$; Openness to Experience, $M = 3.85$, $SD = 0.56$, $\alpha = 0.71$; Agreeableness, $M = 3.57$, $SD = 0.45$, $\alpha = 0.71$; Conscientiousness, $M = 3.53$, $SD = 0.58$, $\alpha = 0.83$. The intercorrelations between the NEO-FFI scales were reasonably low (between $r = 0.03$ and $r = 0.20$), except for a correlation of $r = -0.44$ between Neuroticism and Extraversion.

Health behaviours

Four health behaviours were examined that are common among students and are widely known to increase the risk for different health problems. These health behaviours were 'smoking', 'being drunk', 'drunk driving', and 'risky sexual behaviour'. Smoking was operationalized as the number of cigarettes smoked per day. The frequency of being drunk, drunk driving, and risky sexual behaviour was reported for the period of the past three months on a three-point scale (1 = *never*, 2 = *once*, 3 = *several times*).³ Being drunk and drunk driving were addressed by means of single questions. Risky sexual behaviour was assessed by three items that inquired about the frequency of having started a new sexual relationship, having had sex with a person one had just met for the first time, and having had unprotected sex with a new sexual partner. Because of high intercorrelations among these three items, they were combined into a single scale ($\alpha = 0.70$), labelled 'risky sexual behaviour'. The means and standard deviations of these measures are reported in Table 1.

Perceived susceptibility to health risks

Perceptions of susceptibility to health risks were assessed following Weinstein's approach (1987). Participants were asked to rate their personal risk of experiencing

²Due to an error, the item 'I am an active person', which belongs to the Extraversion scale, was missing from the questionnaire.

³The use of a short prevalence period with a distinct beginning and end (from the start of the winter term until the day the questionnaire was filled in) ought to improve accuracy of recall. The low-threshold answer format took into account that the participants were from a generally well functioning population and that the prevalence period was very short.

Table 1. Intercorrelations among measures of perceived susceptibility to health risks and of risky health behaviours

	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1 Smoking	—								2.78	6.42
2 Being drunk	0.17**	—							1.61	0.78
3 Drunk driving	0.13**	0.24**	—						1.20	0.53
4 Risky sexual behaviour	0.19**	0.21**	0.15**	—					1.11	0.28
5 PS to lung cancer	0.58**	0.26**	0.11**	0.18**	—				-0.86†	1.13
6 PS to alcohol dependency	0.20**	0.39**	0.17**	0.19**	0.40**	—			-1.30†	0.98
7 PS to driving accidents	0.06	0.09**	0.17**	0.02	0.10**	0.11	—		-0.45†	0.91
8 PS to VD/AIDS	0.04	0.17**	0.09**	0.32**	0.26**	0.37**	0.22**	—	-1.19†	0.81

Note: $N \geq 640$; * $p \leq 0.05$; ** $p \leq 0.01$; two tailed. PS, perceived susceptibility.

†Significantly lower than zero (95 per cent confidence interval).

different health risks in the future in comparison with other students of their age. Answers were rated on a five-point scale ranging from *much below average* (-2), through *average* (0), to *much above average* (+2). The health risks relevant to the health risk behaviours in the present study were lung cancer, alcohol dependence, injury by car or motorcycle accident (labelled 'driving accidents' in the following), venereal diseases (VD), and AIDS. Because ratings of perceived susceptibility to VD and perceived susceptibility to AIDS correlated with $r = 0.75$, they were combined into a single score, labelled 'perceived susceptibility to VD/AIDS'. The means and standard deviations of these measures are reported in Table 1.

Statistical analysis

Hierarchical multiple regression analyses were used to calculate direct and indirect effects of personality on perceived susceptibility in a series of path models (Baron and Kenny, 1986; Cohen and Cohen, 1983). In these models, ratings of perceived susceptibility to health risks were the dependent variables, the NEO-FFI scales were the predictors, and health behaviours were the mediators.

First, by means of stepwise regression analyses (p of entry 0.05), with ratings of perceived susceptibility as dependents and the NEO-FFI scales as predictors, we selected those NEO-FFI scales that had independent direct effects on each rating of perceived susceptibility. Second, we determined the direct effects of the selected NEO-FFI scales and the respective health behaviour on ratings of perceived susceptibility. For this purpose, each rating of perceived susceptibility (as dependent) was regressed on the preselected NEO-FFI scales and the respective health risk behaviour (the predictors).⁴ These analyses yielded the path coefficients (standardized betas) for all paths ending in the ratings of perceived susceptibility. Third, a series of regression analyses was run to determine the path coefficients for paths pointing from the NEO-FFI scales to risky health behaviours. Fourth, for the calculation of the

⁴Gender was partialled out first, but was found to be insignificant in all analyses after health behaviours had been included. Therefore, the final models were calculated without taking gender into account.

final path models, only those NEO-FFI scales with either direct or indirect significant effects on perceived susceptibility to health risks were retained. The magnitude of the direct effect corresponds to the standardized beta of the respective path. The magnitude of the indirect effects corresponds to the products of the path coefficient of the path pointing from each NEO-FFI scale to each risky health behaviour with the path coefficient of the path pointing from the risky health behaviour to the rating of perceived susceptibility.

RESULTS

Table 1 shows the means, standard deviations, and intercorrelations of measures of risky health behaviours and measures of perceived susceptibility to health risks. In general, the means of the measures of risky health behaviours in this sample were low. Male students had higher mean values than female students with regard to being drunk ($t = -7.20$; $p \leq 0.0001$), drunk driving ($t = -5.32$; $p \leq 0.0001$), and risky sexual behaviour ($t = -3.47$; $p \leq 0.001$). The intercorrelations between the four risky health behaviours were positive but relatively small.

The means of the four ratings of perceived susceptibility to health risks were significantly lower than zero (95 per cent confidence interval). This indicates a general optimistic bias in the sample. Male students had higher ratings than female students with regard to perceived susceptibility to lung cancer ($t = -4.94$; $p < 0.05$) and perceived susceptibility to alcohol dependence ($t = -3.47$; $p \leq 0.001$). The intercorrelations between the four measures of perceived susceptibility were positive, and were in the small to moderate range. All measures of risky health behaviours correlated with all ratings of perceived susceptibility, but for each risky health behaviour, the correlation with the corresponding measure of perceived susceptibility was the most prominent. For example, smoking correlated most strongly with perceived susceptibility to lung cancer, whereas risky sexual behaviour correlated most strongly with perceived susceptibility to VD/AIDS.

Table 2 shows the correlations of the NEO-FFI scales with measures of risky health behaviours and measures of perceived susceptibility to health risks. Very different correlational patterns emerged for the different NEO-FFI scales. Neuroticism was not significantly correlated with any of the risky health behaviours, but showed positive correlations with perceived susceptibility to alcohol dependency, perceived susceptibility to drunk driving, and perceived susceptibility to VD/AIDS. Extraversion showed small but significantly positive correlations with being drunk and with risky sexual behaviour, but a negative correlation with perceived susceptibility to alcohol dependency. Openness manifested a positive correlation with risky sexual behaviour, and a positive correlation with perceived susceptibility to lung cancer, but a negative correlation with perceived susceptibility to driving accidents. Agreeableness showed negative correlations with the four risky health behaviours, as well as with the corresponding ratings of perceived susceptibility to health risks. Conscientiousness manifested negative correlations with smoking, being drunk, and risky sexual behaviour, and with the corresponding ratings of perceived susceptibility to lung cancer, alcohol dependence, and VD/AIDS.

Figure 1 illustrates the direct and indirect effects of the NEO-FFI scales on perceived susceptibility to lung cancer. Agreeableness showed a negative indirect effect on

Table 2. Correlations of the NEO-FFI scales with risky health behaviours, and perceived susceptibility to health risks

	NEO-FFI				
	N	E	O	A	C
Risky health behaviours					
Smoking	0.02	0.01	0.08	-0.15**	-0.16**
Being drunk	-0.06	0.11**	0.07	-0.18**	-0.18**
Drunk driving	-0.05	0.01	-0.05	-0.13**	-0.05
Risky sexual behaviour	-0.03	0.12**	0.08**	-0.18**	-0.12**
Perceived susceptibility to					
Lung cancer	0.05	-0.05	0.09*	-0.13**	-0.17**
Alcohol dependency	0.13**	-0.10*	0.04	-0.24**	-0.18**
Driving accidents	0.11**	-0.07	-0.13**	-0.14**	-0.06
VD/AIDS	0.13**	-0.03	0.03	-0.19**	-0.20**

Note: $N \geq 656$; * $p \leq 0.05$; ** $p \leq 0.01$; two tailed. N, Neuroticism; E, Extraversion; O, Openness to Experience; A, Agreeableness; C, Conscientiousness; VD, venereal disease.

perceived susceptibility to lung cancer through smoking ($-0.13 \times 0.56 = -0.07$) but no direct effect. Conscientiousness had both a negative direct effect (-0.07) and a negative indirect effect ($-0.13 \times 0.56 = -0.07$). Figure 2 shows the effects of the NEO-FFI scales on perceived susceptibility to alcohol dependency. Neuroticism had a positive direct effect (0.12) along with a negative indirect effect through being drunk ($-0.12 \times 0.37 = -0.04$). Agreeableness showed a negative direct effect (-0.15) along with a negative indirect effect through being drunk ($-0.17 \times 0.37 = -0.06$). Conscientiousness manifested a negative direct effect (-0.08) along with a negative indirect

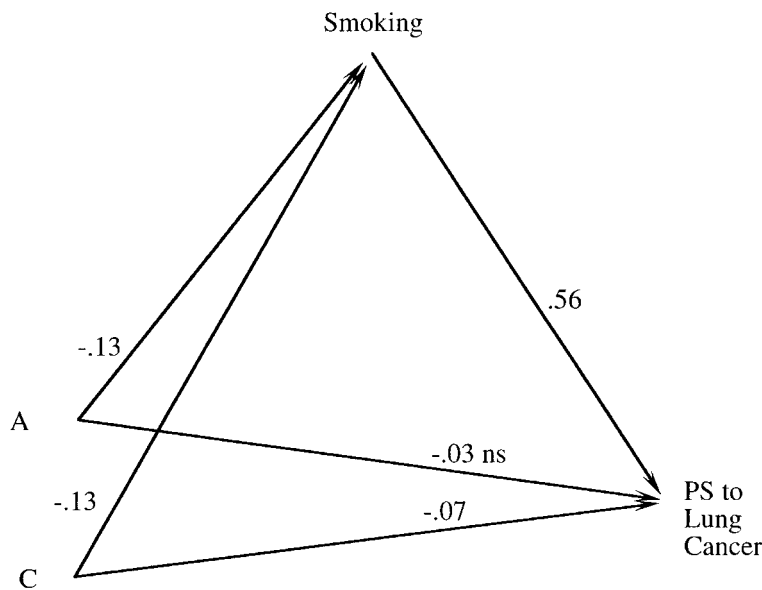


Figure 1. A, Agreeableness; C, Conscientiousness; PS, perceived susceptibility. Note: Path coefficients are standardized betas. All coefficients are significant ($p \leq 0.05$), unless indicated ns (non-significant)

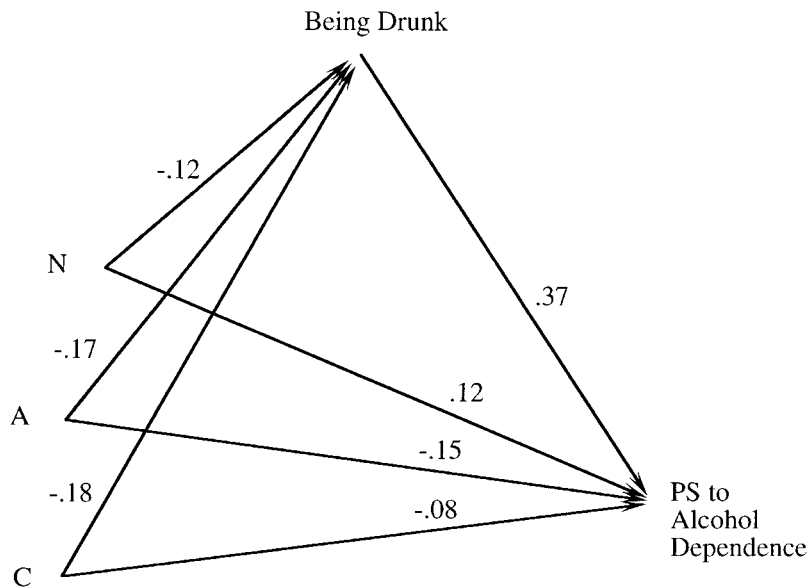


Figure 2. N, Neuroticism; A, Agreeableness; C, Conscientiousness; PS, perceived susceptibility. Note: Path coefficients are standardized betas. All coefficients are significant ($p \leq 0.05$), unless indicated ns (non-significant)

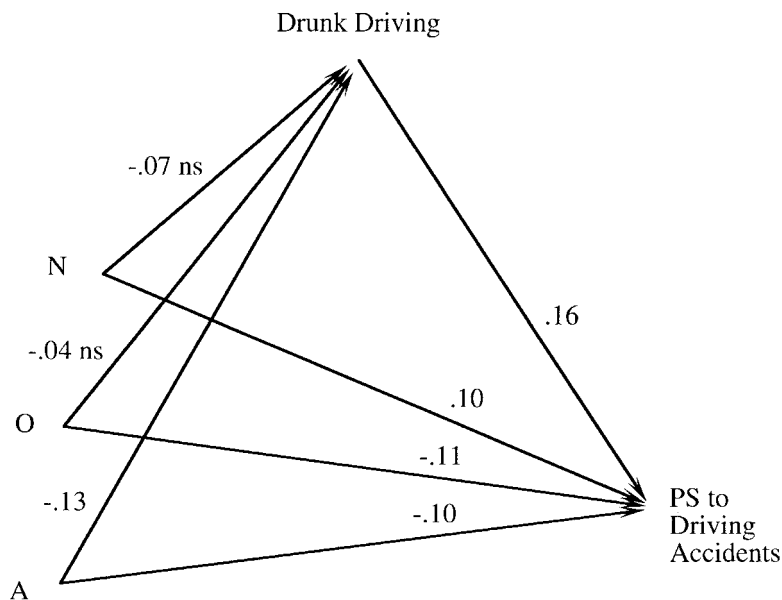


Figure 3. N, Neuroticism; O, Openness to Experience; A, Agreeableness; PS, perceived susceptibility. Note: Path coefficients are standardized betas. All coefficients are significant ($p \leq 0.05$), unless indicated ns (non-significant)

effect ($-0.18 \times 0.37 = -0.07$). Figure 3 illustrates the effects of the NEO-FFI scales on perceived susceptibility to driving accidents. Again, Neuroticism showed a positive direct effect on perceived susceptibility (0.10) but no indirect effect. Openness showed a negative direct effect (-0.11) but no indirect effect. Agreeableness manifested a

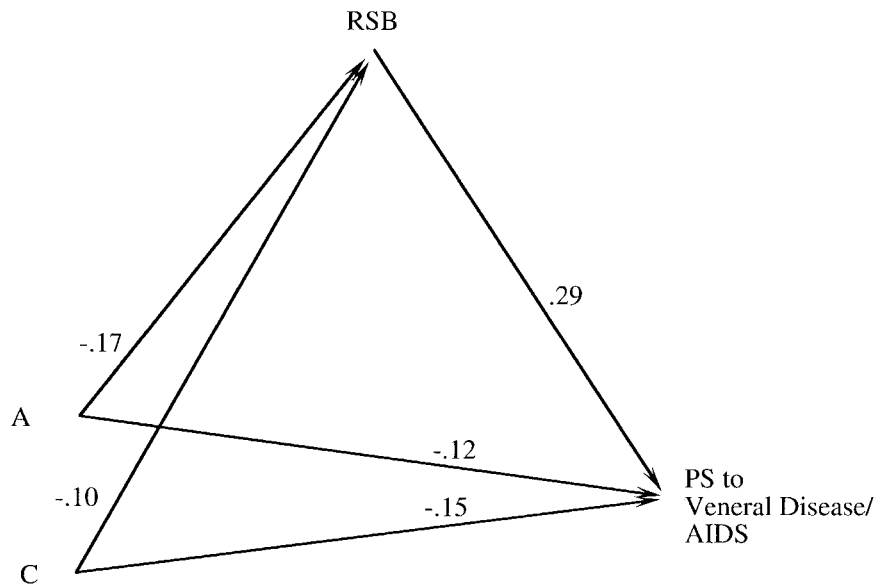


Figure 4. A, Agreeableness; C, Conscientiousness; PS, perceived susceptibility; RSB, risky sexual behaviour. *Note:* Path coefficients are standardized betas. All coefficients are significant ($p \leq 0.05$), unless indicated ns (non-significant)

negative direct effect (-0.11) along with a negative indirect effect through drunk driving ($-0.13 \times 0.16 = -0.02$). Figure 4 demonstrates the effects of the NEO-FFI scales on perceived susceptibility to VD/AIDS. Agreeableness had a negative direct effect (-0.12) along with a negative indirect effect that was mediated through risky sexual behaviour ($-0.17 \times 0.29 = -0.05$). Conscientiousness showed a negative direct effect (-0.15) along with a negative indirect effect ($-0.10 \times 0.29 = -0.03$).

DISCUSSION

The findings of the present study can be summarized as follows. Personality showed small but consistent effects on perceived susceptibility to health risk as well as on risky health behaviours. Path-analytical models gave support for the notion that personality is not only directly related to perceived susceptibility but also indirectly related to perceived susceptibility through risky health behaviours.

Three of the personality factors of the Five-Factor Model, that is Agreeableness, Conscientiousness, and—to some extent—Neuroticism, accounted for most of the significant relations. Agreeableness stood out as being the most consistent predictor of perceived susceptibility to health risks as well as of risky health behaviours. Persons scoring high in Agreeableness were not only more optimistic about future health risks but they also engaged in risky health behaviours less often. The greater optimism of agreeable personalities may be related to their greater trust in other people and the world (Costa, McCrae and Dye, 1991). Moreover, our findings corroborate findings from other studies that showed poor health habits among persons scoring high on measures of Hostility or Type A Behaviour (Kreitler, Weessler, Kreitler and Brunner, 1991; Leiker and Hailey, 1988; Smith, 1992; Vingerhoets, Croon, Jeninga and Menges,

1990), two personality traits that are closely related to the negative pole of Agreeableness (Dembroski and Costa, 1988). They also match findings from a recent study that reported a positive relation between the NEO-Agreeableness scale and good health habits (Lemos-Giráldez and Fidalgo-Aliste, 1997).

Findings on Conscientiousness were very similar to those on Agreeableness. Again, there was some indication of both greater optimism and better health behaviours among persons scoring high in Conscientiousness. This optimism may be rooted in their generally more secure, competent, and resourceful personalities (Friedman *et al.*, 1995; Lemos-Giráldez and Fidalgo-Aliste, 1997). Concerning better health behaviours, our findings are in line with the rare studies of health behaviour that included a scale for Conscientiousness (Booth-Kewley and Vickers, 1994; Friedman *et al.*, 1995; Lemos-Giráldez and Fidalgo-Aliste, 1997). They also match findings from studies that showed that risky health behaviours are prevalent among persons scoring high in Psychoticism (Furnham and Saïpe, 1993; Jackson and Wilson, 1993; Levenson, 1990; McCown, 1991), a personality factor that is related to the negative pole of Conscientiousness (Zuckerman, Kuhlman, Joireman, Teta and Kraft, 1993).

Findings concerning Neuroticism were especially interesting. Neuroticism was the only personality factor in the bivariate analyses that was *positively* correlated with perceived susceptibility to three of four health risks. Moreover, the path models showed that this higher perceived susceptibility could not be explained by a higher frequency of risky health behaviours. On the contrary, persons high in Neuroticism engaged in risky health behaviours less often than persons low in Neuroticism. In other words, persons scoring high in Neuroticism tend to worry about future health risks in spite of better or no worse health behaviour. This finding fits well with the observation that persons with neurotic personalities tend to be anxious, and pessimistic and that they are inclined to worry about their health (Costa and McCrae, 1985).

Extraversion showed some of the expected correlations with risky health behaviours, but it failed to prove an independent predictor in the path models. One could speculate that this failure might be due to the specific operationalization of Extraversion in the NEO-FFI, where impulsiveness is a facet of Neuroticism rather than of Extraversion (Costa and McCrae, 1989). This operationalization may also partly explain the relatively high intercorrelations between Extraversion and Neuroticism in this study. Openness to Experience was an important predictor neither of perceived susceptibility nor of risky health behaviour. It may be that persons who are open to experience seek mental or spiritual experiences rather than the bodily stimulation provided by risky health behaviours.

There are several limitations to the present study. Some problems are related to the exclusive reliance on a questionnaire for the assessment of our subjects. Risky health behaviours tend to be under-reported in questionnaires. Moreover, common method variance may have led to an inflation of the correlations. The most important problem, however, is the difficulty of establishing causal relations in a cross-sectional design. Whereas the assumption that stable personality traits predict the volatile health behaviours and perceptions of susceptibility appears tenable (Davis, 1985), the causal relation between perceived susceptibility and health behaviour has been disputed on empirical and theoretical grounds. Weinstein (1984), for instance, contended that perceptions of susceptibility to health risks were causally unrelated to previous health behaviours. Others asserted that perceptions of susceptibility to health risks

causally precede a reduction of risky health behaviours or the adoption of preventive behaviours (Janz and Becker, 1984; Rogers, 1983). In contrast—and in line with other researchers (Lee, 1989; Taylor *et al.*, 1992; van der Velde *et al.*, 1994)—we hypothesized that perceptions of susceptibility to health risks causally follow risky health behaviours. The finding of our study that risky health behaviours were related to a higher rating of perceived susceptibility to health risks supports this hypothesis and could not easily be accounted for by the reverse causal relation. Nevertheless, only a prospective study with a minimum of two points of assessment can resolve the issue of causality. Therefore, the results of our study remain exploratory.

In spite of these limitations, our findings on the effects of the NEO-FFI scales on perceived susceptibility to health risks appear promising and may be taken as an argument for the inclusion of personality effects in models of health behaviours. In particular, the effects of Neuroticism on the one hand, and Agreeableness and Conscientiousness on the other hand, appear to warrant further examination.

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