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The Role of Perceived Costs and Perceived Benefits in the Relationship Between Personality and Risk Related Choices

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Abstract

This paper considers how perceptions of costs and benefits can influence the association between personality and risky choice behaviour. We assessed perceptions and behaviours in six domains (ethical; investment; gambling; health and safety; recreational; social) using the DOSPERT (Weber, Blais & Betz, 2002) and measured personality using the NEO PI-R (Costa & McCrae, 1992). Results from structural equation modelling showed that personality had a direct effect on risky choice behaviour in four domains (social, ethical, gambling and recreational risk taking). In addition, perceived costs and benefits mediated the relations between personality and risk taking in the five domains (social, ethical, gambling, recreational and investment risk taking). Evidence for a mechanism that integrates both direct and indirect effects of personality on behaviour is discussed.

Introduction

The purpose of this article is to contribute towards current theory and research on the mechanisms by which personality and risk-related choice behaviour are linked. We report on a study of the associations between personality, the perceived costs and benefits of 39 risky choices in six domains, and the perceived likelihood of taking each of these choices. A substantial body of research indicates that the tendency to take risk is associated with personality (e.g. Carducci & Wong, 1998; Lauriola & Levin, 2001; Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005; Olson & Suls, 2000; Zuckerman, 1979; Zuckerman, Ball, & Black, 1990). In comparison, the mechanisms underlying the relationship between personality and risk taking are not well researched (Katz, Fromme, & D'Amico, 2000).

We begin by briefly reviewing the literature on the relationship between personality and risk-related choice, and then consider how personality and risk-related choice might be linked through perceptions of costs and benefits.

Personality and Risk Behaviour

Early studies examining the relations between dispositions and risk taking focused primarily on sensation seeking (Zuckerman, 1979), and significant relationships have been found between sensation seeking and risk taking in relation to dangerous sports (Zuckerman, 1983), making decisions about driving speed (Goldenbeld & van Schagen, 2007), smoking heavily (Zuckerman et al., 1990), volunteering for combat units in the army (Hobfoll, Rom, & Segal, 1989) and making risky financial investments in simulations (Harlow & Brown, 1990).

Later studies indicate that risky decision-making is also associated with a broader range of personality traits. Carducci and Wong (1998) examined the influence of Type A personality on financial risk taking in everyday money matters (e.g., personal investments and household affairs) and found that subjects who were classified as Type A took greater financial risks than Type B subjects. In a longitudinal study of health-risk behaviours using the Multidimensional Personality Questionnaire (MPQ, Tellegen, 1982), Caspi et al. (1997) found that specific patterns of MPQ dimensions identified in an individual at childhood and youth were linked to different health-risk behaviours demonstrated by this individual at adulthood. Wulfert et al. (1999) found that dispositional factors related to personality, such as impulsivity and deception, were associated with unsafe sexual behaviour among HIV positive individuals. Individuals who rate themselves as more self-disciplined, responsible, reliable, and dependable than others, characteristics which are associated with personality (Costa & McCrae, 1992), are less likely to be involved in driving accidents than those who rate themselves lower on these attributes (Arthur & Graziano, 1996).

More recently, research on the relationship between personality and risk behaviour has used the five-factor model of personality (Digman, 1990) as measured by the NEO-PIR (Costa & McCrae, 1992). Olson and Suls (2000) examined the relationship between the Big Five personality dimensions and individual risk judgements. When presented with risky dilemmas, respondents made more extreme, risky judgments if they were relatively high in openness and agreeableness, and low in emotional stability. Another study of the relationships between the Big Five and risk taking (Nicholson et al., 2005), this time in the recreational, health, financial, career, safety, and social risk taking domains, found that self-ratings of the frequency of risk

taking were associated with high extraversion and openness; and with low neuroticism, agreeableness, and conscientiousness.

Explanations for the Relationship Between Personality and Risky Decision Making

Despite the reliable associations between personality dimensions and risk-taking behaviour outlined in the research set out above, the mechanism (or mechanisms) by which personality is linked to risk-taking is not fully understood (Katz et al., 2000). Only a small number of studies have indeed examined the relationships between expected outcomes, personality, and risk taking behaviours. Katz et al. (2000) examined both personality traits and outcome expectancies as explanations for heavy drinking, drug use, and unsafe sexual behavior among 162 college students. Results indicated that while personality and past experience were associated with outcome expectancies (i.e. the benefits and costs of engaging in a particular behavior), outcome expectancies and personality also independently predict the likelihood of risk taking behaviour. In a study of young adults, Cohen and Fromme (2002) examined associations between personality traits (social conformity and sensation seeking), self-efficacy, high risk sexual activity, and substance abuse. They found that sensation seeking and social conformity were related to substance use and sexual behaviour indirectly through outcome expectancies, and that social conformity was also associated directly with these risky behaviors.

The studies by Katz et al. (2000) and Cohen and Fromme (2002) described above are concerned with a narrow range of personality variables and focus on the prediction of a narrow band of behaviours. The present study extends existing research on the direct and indirect influence of personality on risk taking in two ways.

First, the range of personality traits investigated is extended to include the Big Five traits (Digman, 1989, 1990). Second, in order to examine whether the indirect and direct model of the influence of personality on risky decision making can be generalized beyond the specific settings in which this has been studied previously (e.g. sexual behaviour and substance use), it is examined here in a much broader range of contexts: ethical, recreational, investment, health and safety, gambling, and social.

In this study we predicted that Big Five personality traits will be associated with risk taking both directly and indirectly via payoffs (i.e. perceived costs and benefits). We examine three possible explanations for the link between personality and risk taking. The first possibility is that personality is associated with risk taking behaviour indirectly via an influence on "payoff weightings". Payoff weightings, akin to outcomes expectancies, are the perceived benefits and costs (risk) associated with choice to engage in a particular behaviour. The second possibility is that personality is associated with behaviour directly. The third possible explanation is an integrated model whereby personality influences risk taking behaviour both directly and indirectly and the specific pathway for a decision is influenced by the context, or decision domain. These models of the relations between personality, perceived costs and benefits, and risk taking behaviour are set out in Figure 1.

Insert Figure 1 about here

In the study set out below we developed and tested the above model and examine the relations between a broad range of personality traits and risk related choice in a range of different situational domains. We used two well validated measures: the NEO PI-R to measure personality (Costa & McCrae, 1992), and the DOSPERT (Weber, Blais & Betz, 2002) to measure outcome expectancies (costs and benefits), and risk related choice in six distinct domains (ethical, recreational, investment, gambling, health and safety, and social). A multi-domain measure of risk enabled an examination of the extent and nature of the associations between personality and behaviour.

The primary hypotheses tested here are that (a) perceived costs and benefits will mediate the relation between personality and risk taking in each domain and (b) personality will also be directly associated with the likelihood of risk taking in each domain.

Method

Participants

The participants were 204 UK postgraduate students drawn from management programmes. The sample comprised 67.2% women and 32.8% men. The mean age was 26.70 years (range = 21-48, standard deviation = 6.12 years).

Measures

The likelihood of taking a variety of risky decisions, and the perceived costs and benefits of these decisions, were examined with a set of items and scales developed by Weber, Blais and Betz (2002). This measure, popularly referred to as the DOSPERT,

comprises 40 items (risky decisions), divided into six domains (ethical, investment, gambling, health and safety, recreational, and social). Participants are required to examine the risky decisions three times, once to indicate the likelihood that they would engage in each behaviour, once to indicate the strength of the perceived benefits of each behaviour, and once to indicate the perceived cost (risk) of each behaviour (all three being measured on five-point Likert scales). One amendment was made to the DOSPERT, an item referring to tornado chasing was omitted as this was judged not to be relevant to the UK sample. For each of the six domains, mean scores were calculated for each participant for (a) the likelihood of risk taking, (b) the perceived benefits of risk taking, and (c) the perceived costs of risk taking.

Personality was assessed using the NEO PI-R (Costa & McCrae, 1992), a comprehensive measure of six facets of personality in each of five factors. In this study we used factor level data obtained by summing the 30 constituent items. The five factors are as follows:

1. Neuroticism: the degree to which people are prone to experience anxiety, anger, impulsive decision making, pessimism and stress.
2. Extraversion: the degree to which people are outgoing, sociable, assertive, enjoy a fast pace of life, sensation-seeking and experience positive emotions.
3. Openness: preferences for abstract, theoretical thinking, interest in own and others' feelings, aesthetics, and conservative versus relative values
4. Agreeableness: the extent to which people are frank, straightforward, trusting, modest about their achievements, co-operative, altruistic and tender minded.
5. Conscientiousness: the degree to which people are organised, prepared, conform to rules, achievement striving, goal focused and deliberative.

Results

Correlational Analyses

Correlations between the measured variables in the social, ethical, investment, and recreational domains are shown in Table 1.

Insert Table 1 about here

The correlation coefficients indicate that the risky choice is typically associated with low perceived cost (risk) and high perceived benefits. The associations between risky choice, perceived costs and perceived benefits are stronger between domains than across domains. The correlations between personality, perceived costs and benefits and risk related choice behaviour (likelihood), and the means and standard deviations of the risk scale variables, are shown in Table 2.

Insert Table 2 about here

There were eleven significant associations between personality and the likelihood of taking risks, eight significant associations between perceived benefits and

risk taking, and four associations between perceived costs and risk taking. These findings suggest personality is associated with choice, and that the associations between personality and perceived benefits are stronger than the associations with perceived costs in some cases. The correlations between personality, outcome expectancies and choice are strongest in the ethical domain.

The overall personality configuration associated with risky choice was low scores in neuroticism, agreeableness and conscientiousness, and high scores in extraversion and openness. These data fit with previous research (Heaven, 1996; Lounsbury, Steel, Loveland, & Gibson, 2004; Salgado, 2000; Wilkinson & Abraham, 2004). However, there are some exceptions. Notably, high neuroticism was associated with gambling behaviour, and high perceived risk for health and safety, recreational and social domains. This is similar to Nicholson et al's (2005) finding that neuroticism was associated with drinking and smoking.

Structural Equation Modelling

For each domain structural equation modelling using EQS was carried out to investigate the direct associations between the Big Five personality traits and the likelihood of risk taking, and the indirect associations between the Big Five personality traits and the likelihood of risk taking (via costs and benefits). The initial model for each domain allowed all five personality traits to predict costs, benefits, and the likelihood of risk taking, and for costs and for benefits to predict the likelihood of risk taking. In all cases, the Big Five personality traits were allowed to co-vary as there is some evidence which indicates that these dimensions are not independent (Costa & McCrae, 1992).

To evaluate the goodness of fit of the six measurement models, the Standardized Root Mean Square Residual (SRMS; (Steiger & Lind, 1980)), Root Mean Square Error of Approximation (RMSEA; (Steiger & Lind, 1980)), and Comparative Fit Index (Bentler, 1990) were selected. For the SRMR, values of up to .09 indicate good fit (Hu & Bentler, 1999); for RMSEA values of less than .05 indicate good fit and values up to .08 suggest a satisfactory fit (Browne & Cudeck, 1993). For the CFI, values indicating good fit are at least .95 (Hu & Bentler, 1999).

Each domain-specific model was tested in turn by first examining the three fit indices. In all cases the initial model was poorly fitted to the data, and from this point an exploratory approach was adopted in order to ascertain the best fitting models. Table 3 shows the fit indices for the models which were found to have the best fit in each domain for five of the six domains. It was not possible to identify a well-fitting model for the other domain, health and safety, probably due to the very pronounced positive skew for perceived benefits. The model for the gambling domain is satisfactory, and the fit for the other four models is very good.

Insert Table 3 about here

Figures 2 to 6 how the best fitting models in each of the five domains. In four of the five domains (i.e. social, ethical, recreational and gambling) the expected combination of direct associations between personality and the likelihood of risk taking, and the indirect relations between personality and risk taking (via cost and benefits) were confirmed. In the remaining domain, investment, the likelihood of risk taking was

strongly associated with the perceived benefits of doing so, and the only personality trait significantly associated with these benefits is agreeableness (negatively).

Insert Figures 2 to 6 about here

Discussion

In this study we found that personality has an impact on choice behaviour both directly and via perceived costs and benefits. This finding is consistent with the argument that a more integrated model of risky choice behaviour is required when examining the association of personality with individual risk related choices (Cohen & Fromme, 2002; Katz et al., 2000). The variation across decision domains found in this study strengthens this argument as it indicates that contextual factors influence the relations between personality, costs, benefits, and risk-related choices as the pathways between the factors vary in each domain. In some situational domains there are direct associations between personality variables but this is not the case in all situational domains. In the discussion that follows we discuss evidence for the possible mechanisms through which personality influences choice behaviour.

First, we consider the evidence for the direct associations between personality and choice behaviour. In the ethical domain, associations with agreeableness and conscientiousness found in research on integrity testing (Marcus et al., 2006) were replicated. Consistent with the direct association model, in the social and ethical domains, there were significant direct paths between personality and risky decision-

making (agreeableness and openness in the case of social choice behaviour, and agreeableness and conscientiousness for ethical choice behaviour).

In addition, consistent with the mediated model, costs and benefits mediated the relations between personality and risk taking in the social and ethical domains (neuroticism, agreeableness and openness for social risk taking, and neuroticism for ethical risk taking). Here, neuroticism was associated with high perceived benefits and risky choice which fits with previous research in these domains. Lauriola and Levin (2001) also refer to the importance of the domain and risk taking in the case of neuroticism. For example, in their research, Lauriola and Levin (2001) found that people were risk seeking if they perceived possible increases in losses from status quo. They suggested that people with high scores in neuroticism, when faced with possible losses, see the benefits of taking risks in order to avoid these losses. Nicholson et al (2005) suggested that the positive association between neuroticism and health risk taking was due to choices to drink alcohol and smoke being perceived as beneficial due to their short term positive impact on anxiety. In this study, it is also possible that participants with high scores in neuroticism saw the benefits of risky social behaviour, (e.g. plagiarising an essay), as being more useful than potential costs (e.g. failing the paper). Participants high in agreeableness perceived low costs, and were likely to make a risky choice in the social domain. This finding seems likely to reflect the items in the DOSPERT (Weber, Blais & Betz, 2002) which are concerned with conformity and co-operation (e.g. agreeing with friends, not asking your boss for a raise) rather than going against social norms that might be more typically associated with risk taking and low agreeableness.

In general, personality, perceived benefits, and perceived costs accounted for a substantial amount of variance in risk related choice. Specifically, in the ethical and social domains, the models shown in figures 2 and 3 accounted for 42% and 55% of the variance respectively. In the recreational and investment domains, where only perceived benefits had a significant relationship with risk related choice, the percentage of variance in risky decision-making accounted for was 53% and 48% respectively. These findings suggest that risk related choice can be partially predicted by a combination of personality, perceived benefits and costs, and in some cases by perceived costs and benefits alone, providing some support for the integrated model of choice behaviour.

While perceived benefits are likely to be important to understanding choice behaviour, a significant finding in our study is that personality traits can predict risk related choice behaviour in certain domains independently of cost-benefit evaluations. To understand this process it is useful to draw on the literature on automaticity. The notion of automaticity suggests that many decision processes operate at a subconscious level using algorithms and heuristics (Bargh & Chartrand, 1999). Research supports the notion of subconscious rule building and rule following (Van Osselaer, Ramanathan, Campbell, Cohen, Dale, Herr, Janiszewski, Kruglanski, Lee, Read, Russo, & Tavassoli, 2005) which can be based upon habits developed over time (Kim, Malhotra, & Narasimhan, 2005).

The concept of automaticity could be helpful in explaining direct relations between personality and behaviour and this may be particularly true in ethical and social domains of behaviour where people with certain personality traits may develop some automatic rules of behaviour that are consistently applied in certain situational domains.

For example, it is relatively easy for a conscientious person to quickly develop a rule that high levels of preparation make work more efficient. Work situations involving preparation, which is particularly relevant to conscientiousness traits, could lead to a rule being developed and, when faced with a decision about whether to prepare for a meeting or not, the conscientious individual may carry out the work without undertaking a cost-benefit analysis. Moreover, the conscientious person in this situation is likely to attend to the rewards of their preparedness, reinforcing learning that is trait relevant. This kind of rule following can be likened to a heuristic driven by personality. Personality factors could have an important role to play in automaticity and decision making (Banse & Greenwald, 2007), both of which may play a critical role in personality-behaviour associations.

The current study has provided interesting information that can be used to develop understanding of the processes through which personality might influence decision making behaviour. However, there are both advantages and disadvantages to our approach. A more naturalistic measure of decision making that provided more contextual information about the nature of the risks under investigation would assist both decision makers who would be able to make choices more closely associated with their actual behaviour. In addition, there are also choice behaviours that are likely to be almost entirely situationally driven and further consideration of context could add to understanding of when situational context is more significant in shaping choice behaviour than personality.

This study suggests that there are several avenues for useful future research. First, studies could assess personality and trait relevance for the same group of participants. This would enable assessment of the extent to which ratings of trait

relevance are more closely associated with individual traits or situational characteristics. Second, the nature of the risks examined could be examined in terms of potential trait relevance rather than simply by domain. The more naturalistic and detailed approach described above would help to achieve this. Third, more in-depth data regarding costs and benefits could be collected, for example the perceived magnitude and likelihood of risks have a role to play in cost-benefit analysis. Analyses of these data would enable a clearer sequential model of the processes through which personality influences decision behaviour to be developed. Finally, there could be further research that extends the current study by considering the role of affect in the perceptions of benefits and costs and choice behaviour. Studies by Finucane, Alhakami, Slovic and Johnson (2000), and Finucane and Holup (2006), have shown that affect can be used as a heuristic and combined with perceptions to create risk values. The combination of factors could develop further our understanding of the mechanisms through which personality influences behaviour.

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Table 1: Descriptive statistics and correlations between personality and risk scales

	Mean (SD)	Alpha	Emotionality	Extraversion	Openness	Agreeable-ness	Conscien-tiousness
Likelihood of ethical risk taking	1.94 .(62)	.74	.15	.096	.13	-.32**	-.43**
Benefits of ethical risk taking	2.10 (.52)	.79	.16	.20*	.18*	-.20*	-.37**
Costs of ethical risk taking	3.68 (.62)	.82	.07	-.12	.02	.09	.07
Likelihood of investment risk	2.68 (.69)	.78	.09	.04	.03	-.15	.08
Benefits of investment risk	3.09 (.72)	.73	.02	.16*	.03	-.10	.09
Costs of investment risk	2.91 (.89)	.74	.09	-.04	.03	.08	-.02
Likelihood of gambling risk	1.55 (.78)	.84	.08	-.02	.17*	-.29**	-.35**
Benefits of gambling risk	1.86 (.89)	.88	.16*	.13	.16	-.15	-.27**
Costs of gambling risk	4.07 (.91)	.87	-.10	.02	.07	.12	.05
Likelihood of health and safety risk	2.41 (.70)	.68	-.05	.25**	.24**	-.12	-.26**
Benefits of health and safety risk	1.57 (.47)	.65	-.05	.16	.14	-.01	-.07
Costs of health and safety risk	3.83 (.64)	.78	.26**	-.06	.03	.01	-.09
Likelihood of	2.70	.84	-.14	.16	.18*	.01	-.13

recreational risk	(.95)						
Benefits of recreational risk	2.78 (.84)	.82	-.15	.10	.11	.09	-.05
Costs of recreational risk	3.26 (.68)	.75	.21*	-.06	-.11	-.03	-.02
Likelihood of social risk taking	3.28 (.55)	.61	-.09	.24**	.40**	-.15	-.01
Benefits of social risk taking	3.07 (.47)	.50	-.05	.07	.18*	-.06	.08
Costs of social risk taking	2.30 (.52)	.67	.24**	-.01	.05	-.26**	-.11

N=154

** Correlation is significant at the 0.01 level (2-tailed),

* Correlation is significant at the 0.05 level (2-tailed).

Table 2: Correlations between risk scales

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Likelihood ethical																	
2 Benefits ethical	.69**																
3 Risks ethical	-.38**	-.36**															
4 Likelihood investment	.17*	.15*	-.17*														
5 Benefits investment	.11	.21**	-.12	.65**													
6 Risks investment	-.17*	-.12	.36**	-.39**	-.38**												
7 Likelihood gambling	.42**	.19**	-.11	.25**	.27**	-.24**											
8 Benefits gambling	.24**	.45**	-.12	.10	.26**	-.01	.50**										
9 Risks gambling	-.15*	-.07	.46**	-.14*	-.10	.22**	-.39**	-.36**									
10 Likelihood health & safety	.40**	.30**	-.10	.08	.15*	-.02	.29**	.21**	.00								
11 Benefits health & safety	.23**	.31**	-.20**	.09	.07	-.10	.12	.18**	-.13	.53**							

12 Risks health & safety	-.11	-.16*	.62**	-.11	-.14*	.25**	-.01	-.01	.32**	-.27**	-.47**						
13 Likelihood recreational	.29**	.23**	-.17*	.18*	.11	-.07	.21**	.08	.03	.38**	.22**	-.20**					
14 Benefits recreational	.23**	.29**	-.07	.04	.14	.05	.17*	.20**	-.00	.29**	.27**	-.10	.69**				
15 Risks recreational	-.07	-.08	.38**	-.02	.00	.15*	-.08	.01	.20**	-.12	-.21**	.46**	-.42**	-.37**			
16 Likelihood social risk	.23**	.13	-.11	.11	.09	-.04	.13	-.02	.13	.39**	.09	-.03	.22**	.08	-.07		
17 Benefits social	.21**	.15*	.10	.04	.06	.02	.17*	-.02	.12	.30**	.02	.11	-.01	.10	.13	.52**	
18 Risks social risk	-.03	.01	.23**	.09	.02	.07	-.03	.09	.02	-.09	.09	.13	-.15*	-.11	.31**	-.23**	-.15*

N = 204

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Table 3

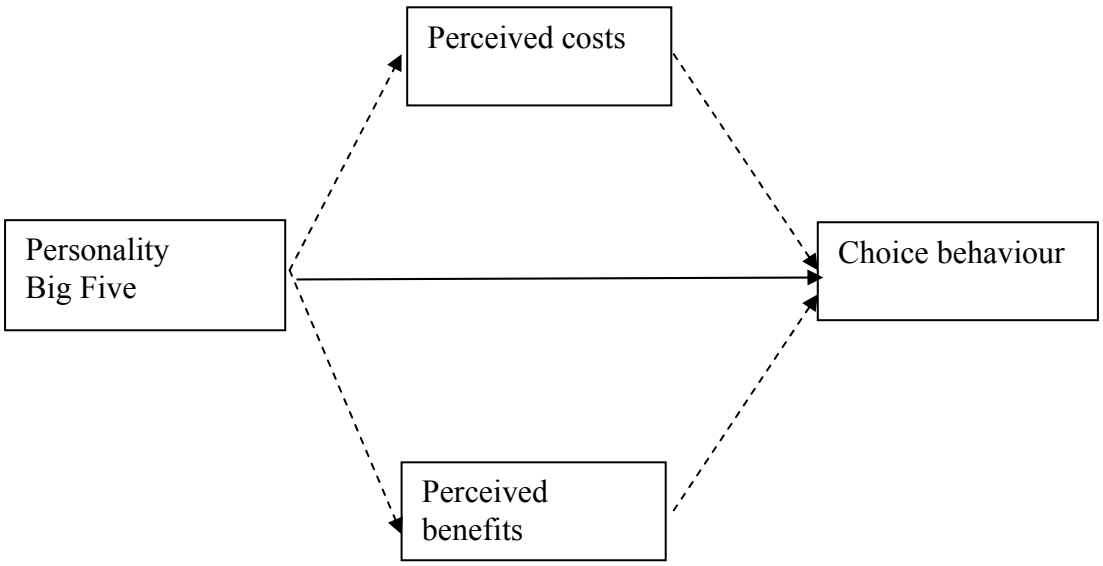
Fit Indices of the Model in Each Domain

Domain	X^2	df	p	SRMR	RMSEA	RMSEA 90% CI	CFI
Ethical	30.61	16	.02	.09	.08	.03 -.12	0.95
Investment	14.57	16	.33	.06	.06	.00 -.09	0.99
Recreational	21.99	16	.08	.08	.06	.00 -.10	0.96
Social	15.36	16	.50	.06	.00	.00 -.07	1.00
Gambling	32.96	16	.01	.08	.08	.05 -.13	0.91

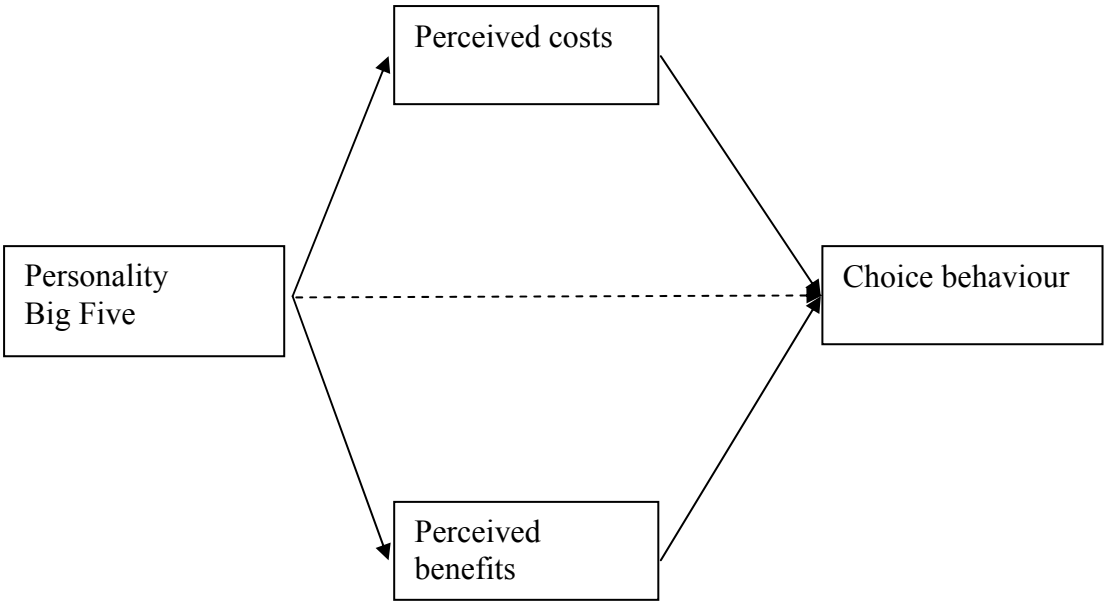
Figure 1

The proposed model of risk related choice behaviour

a. Personality has a direct influence on choice behaviour



b. Personality influences choice behaviour via costs and benefits



c. An integrated model of personality and choice behaviour

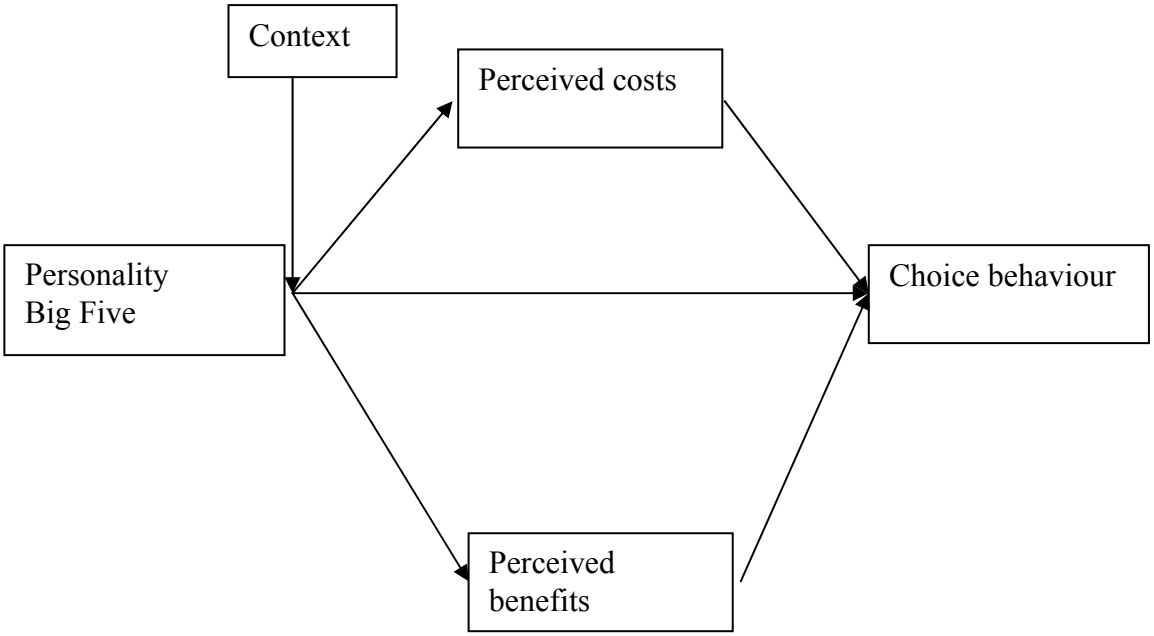


Figure 2

Best Fitting Model for Social Risk Taking

Note: Neur = Neuroticism, Open = Openness, Agree = Agreeableness. For clarity of presentation, neither error terms nor significant covariance paths between personality traits are shown. Numbers are standardized path coefficients.

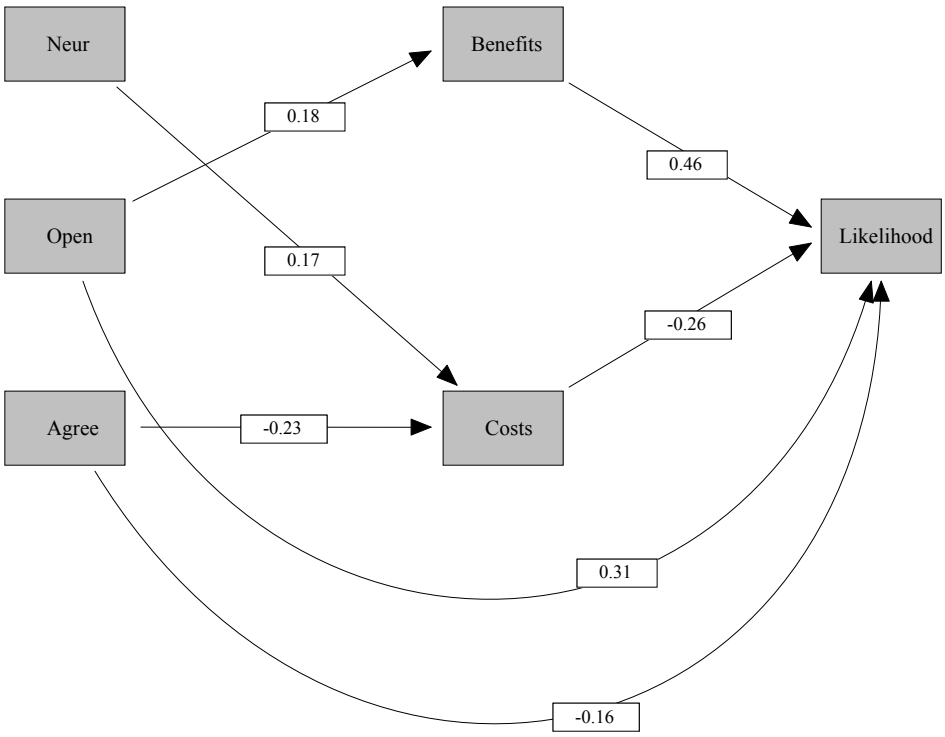


Figure 3

Best Fitting Model for Ethical Risk Taking

Note: Neur = Neuroticism, Agree = Agreeableness, Consc = Conscientiousness. For clarity of presentation, neither error terms nor significant covariance paths between personality traits are shown. Numbers are standardized path coefficients.

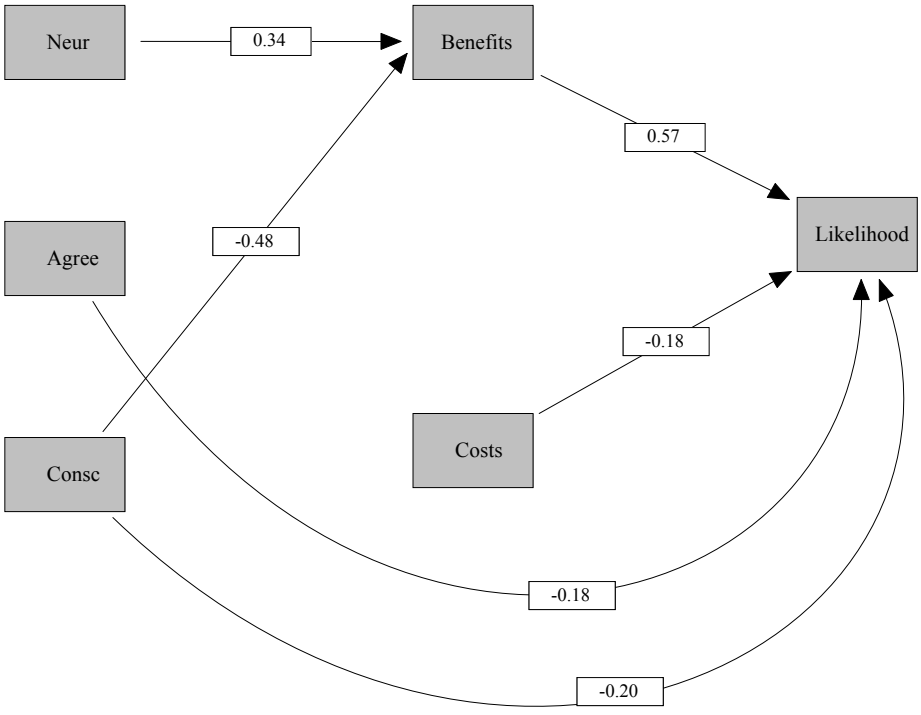


Figure 4

Best Fitting Model for Gambling

Note: Neur = Neuroticism, Ext = Extraversion, Agree = Agreeableness, Consc = Conscientiousness. For clarity of presentation, neither error terms nor significant covariance paths between personality traits are shown. Numbers are standardized path coefficients.

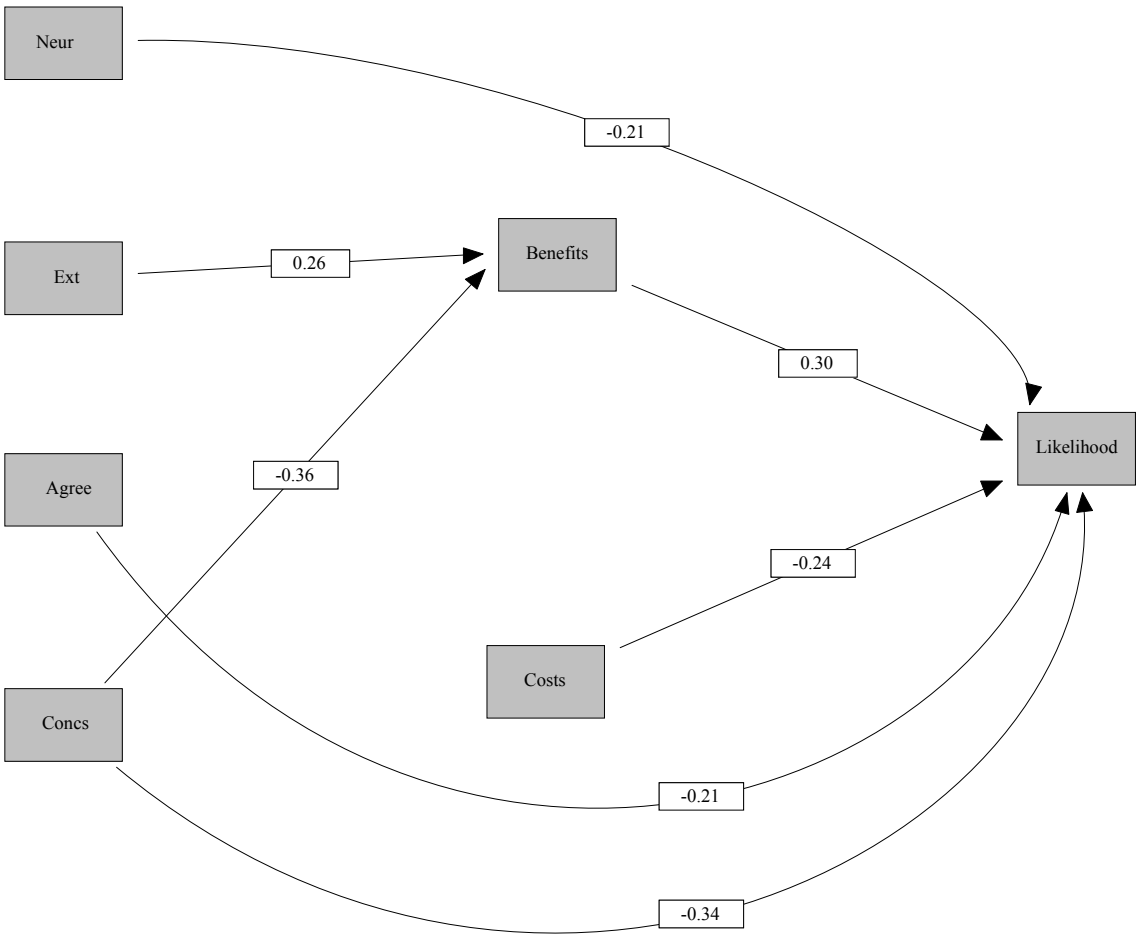


Figure 5

Best Fitting Model for Investment Risk Taking

Note: Agree = Agreeableness. For clarity of presentation, neither error terms nor significant covariance paths between personality traits are shown. Numbers are standardized path coefficients.

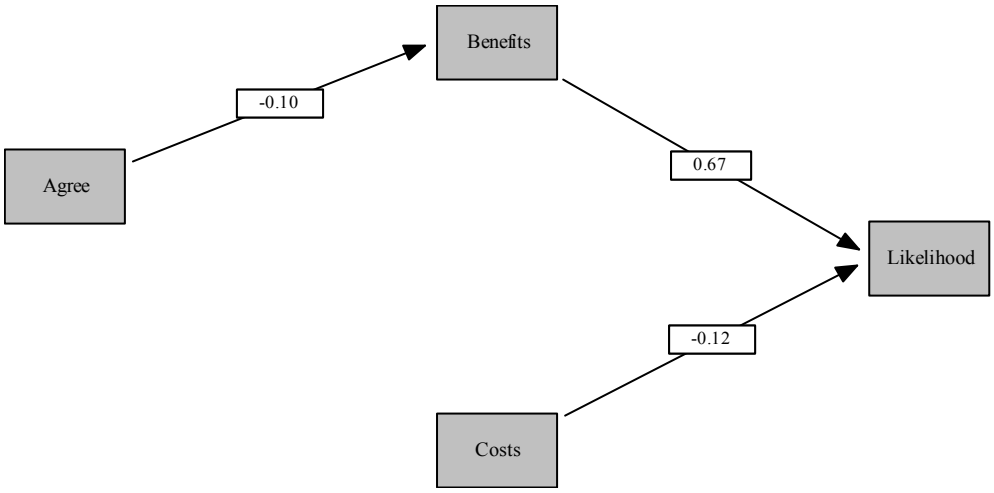


Figure 6

Best Fitting Model for Recreational Risk Taking

Note: Neur = Neuroticism, Ext = Extraversion, Open = Openness, Consc = Conscientiousness. For clarity of presentation, neither error terms nor significant covariance paths between personality traits are shown. Numbers are standardized path coefficients.