



Big Five Personality traits and risky decision-making: A Study of behavioral tasks among college students

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ABSTRACT

Introduction: Decision-making is affected by the personality of the individual making the decision. As a fundamental human personality structure, the Big-Five personality traits might significantly impact risky decision-making. The current study investigated the association between the Big-Five traits and risky decision-making among undergraduate college students. **Methods:** Data was collected from 251 undergraduate college students aged 18 to 25, of whom 89 were male and 164 were female. Risky decision-making was measured in a laboratory using the Iowa Gambling Task and a self-administered scale to evaluate the Big Five personality traits. **Results:** This study showed that agreeableness, neuroticism, and conscientiousness correlated with risky decision-making. However, a significant association between risky decision-making with extraversion and openness was not identified. According to the results, men were more prone to making risky decisions than women. **Conclusion:** the results highlighted that personality traits influence individuals, particularly neuroticism, agreeableness, and conscientiousness. The results are significant as they help us to understand how personality traits contribute to risk-taking behaviour. More investigation in this field is required, especially regarding the role of the dark personality triad in decision-making.

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Keywords: Big Five, decision-making, Iowa Gambling Task, Personality, risk-taking behaviour, and risky decision-making.

1. Introduction

Decision-making is a crucial and inseparable part of everyone's daily lives (Sanfey, 2007). It is a process that requires cognitive skills and allows people to make choices from a number of available options (Icelliglu & Ozden, 2012; Tomassini et al., 2012). When a person wants to make a decision, they will compare different alternatives and analyse the available options. They will then use their assessment criteria to evaluate all possible choices and choose the best one (Douglas & Martin, 2014; Mendes et al., 2019; Nutt & Wilson, 2010). Previous studies suggest a clear correlation between an individual's criteria to evaluate choices and the experiences of individual life (Icelliglu & Ozden, 2012). Maoz and Yaffe (2014) indicate that the decision-making process consists of three steps: collecting information (memory), intention to act, and finally, carrying out the decision (Maoz & Yaffe, 2014).

Previous studies have found that decision-making is not always

without risk (Chatterjee, 2014; Crone, 2014; Dahlbäck, 1990). Some risky decision-making is unavoidable and sometimes necessary since it may have positive outcomes. However, Blakemore & Mills (2014) and Wang et al. (2019) mention that reckless decision-making might have undesirable outcomes which could influence the individual's future (Bechara & Damasio, 2002; Van Leijenhorst et al., 2008). Understanding the advantages and disadvantages of decision-making is thus crucial if people are to make decisions safely (Van Leijenhorst et al., 2008).

Studies have illustrated that individuals who fail to evaluate a risky behaviour properly might make risky decisions (Crone et al., 2008; Gardner & Steinberg, 2005). Consequently, they are likely to commit various sorts of risk-taking behaviour, such as crime, sexual abuse, smoking cigarettes, substance use, and aggressive driving (Boyer, 2006; Figner et al., 2009; Galvan et al., 2006). Risk-takers usually prefer risky choices when comparing alternatives (Shen & Yuan, 2020). However, not everyone takes significant risks equally; one possible reason for these differences might be the impact of people's personality traits, especially those highlighted by the five-factor model (Dahlbäck, 1990; Gullone & Moore, 2000).

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Personality traits can change an individual's perception of how risky a choice might be when making a decision; however, the role of personality traits on the perception of risk differs from one trait to another (Figner & Weber, 2015; Lee & Tseng, 2015). Although the Big-Five personality trait model has been regarded as a fundamental personality framework by researchers for a number of decades, most investigations have concentrated on the associations between impulsivity and risky decision-making (Bagby & Widiger, 2018; Buelow & Cayton, 2020; Lauriola & Levin, 2001). Recent evidence has demonstrated that the Big-Five traits may influence individual task performance (Buelow & Cayton, 2020). The association between personality traits, especially the five-factor model (FFM) and risky decision-making, requires further investigation (Lauriola & Levin, 2001).

Costa & McCrae (1992, 2011) indicated that neuroticism, extraversion, openness, agreeableness and conscientiousness are universal personality structures. Hundreds of personality researchers have confirmed that these traits exist among all people (McCrae & Costa, 2008). Each personality trait has distinct characteristics (McCrae & Costa, 1997). A number of studies have also identified an association between these traits and risky behaviour (e.g., Bogg & Roberts, 2004; Oehler et al., 2018; Wilt & Revelle, 2009). Previous studies have demonstrated that agreeableness is negatively associated with hostility, aggression, antisocial behaviour, drug abuse, and drug addiction (Kotov et al., 2010; Malouff et al., 2005; Miller & Lynam, 2001; Tackett et al., 2019). However, high levels of agreeableness predict self-regulation and low impulsivity (Cumberland-Li et al., 2004).

The behavioral side of conscientiousness has a crucial role in determining how people behave in the environment (Roberts et al., 2009). Low levels of conscientiousness contribute to risky behaviour, such as heavy alcohol consumption, drug abuse, risky driving, unsafe sex, lack of exercise, poor diet, and smoking tobacco (Bogg & Roberts, 2004). Akbari's et al. (2019) meta-analysis study identified a positive relationship between neuroticism and risky-driving behaviour. Neuroticism also predicts family conflict (Gross, 2008), drug abuse (Costa & McCrae, 1992), alcohol consumption (Boyer, 2006), and financial risk-taking (Oehler et al., 2018).

According to Nicholson et al. (2005), extraversion is positively associated with risky behaviour. High extraversion levels predict risk-seeking (Li & Liu, 2008), and extroverted people might die from risky behaviour (Wilt & Revelle, 2009). Openness to experience refers to motivation to discover things and the tendency to engage in profound thinking (McCrae & Costa, 1997). Openness is a broad trait that underlies behavioral, emotional, and cognitive abilities. People with high openness levels tend to have a rich emotional life, non-traditional attitudes, be better able to withstand ambiguous situations, and have more behavioral flexibility (McCrae & Costa, 1997) and creativity (Schwaba, 2019). Openness impacts social perceptions towards social attitudes, choosing partners and peers, and political acts (McCrae & Costa, 1997).

Based on past studies into the relationship between Big-Five and risk-taking behaviour (e.g., Bogg & Roberts, 2004; Oehler et al., 2018; Schwaba, 2019; Wilt & Revelle, 2009), this paper

hypothesises that personality traits correlate with disadvantageous choices of experimental behavioral tasks. The present study aimed to examine the association between the Big-Five personality traits and risky decision-making among Kurdish undergraduate college students. Conducting a study among the Kurdish population has two important aspects. First, this study leads to understanding and recognise the Kurdish personality characteristic, that studies in this area are very limited. Second, this research is also important to identify the association between personality traits and actual risk taking in different cultural background.

2. Method

2.1 Participants

The current study was carried out among university students. The total number of participants who participated in this study was 251 that comprising 89 males (%35.5, $M_{age} = 20.64$, $SD_{age} = 2.05$), and females (%64.5, $M_{age} = 21$, $SD_{age} = 2.38$). The age of participants was between 18 to 25 years old.

2.2 Measurements

2.2.1 The Big Five Inventory (BFI)

The Big-Five Inventory (BFI; John et al., 2008) is a 44-item self-report questionnaire that measures the Big-Five traits. It uses a 5-point Likert scale ranging from 1 (disagree strongly) to 5 (agree strongly). Examples of items include "full of energy" (extraversion), "Is calm, even in tense situations" (neuroticism), "Is sophisticated in art, music, or literature" (openness), "Is generally trusting" (Agreeableness), and "Works hard" (Conscientiousness). The BFI's internal consistency ranges from 0.79 to 0.87 with a total mean 0.83, and convergent validity for this scale has been found, ranging from 0.82 to 0.99 with a total mean of 0.95. The internal reliability for the Kurdish version was 0.85 for extraversion, 0.80 for agreeableness, 0.83 for conscientiousness, 0.85 neuroticism and 0.81 for openness with a total mean 0.83. Regarding validity, the Kurdish version of the BFI had a convergent validity.

2.2.2 The Iowa Gambling Task (IGT)

The Iowa gambling task (IGT; Bechara et al., 1994) is 100 trials computerised version of the Iowa gambling task used to evaluate risky decision-making (Bechara et al., 2000). In the IGT task, subjects were loaned \$2,000 at the beginning of the test. In each trial, four cards (A, B, C, and D) were present on the computer screen, and participants were asked to pick one. One of the cards can be chosen, resulting in winning or losing money. At the beginning of the test, subjects are unaware that cards A and B are disadvantageous and C and D are advantageous. Participants receive feedback throughout the trial and can learn which choices are most advantageous while performing the test. Choosing card A or B would result in significant short-term profits but would have harmful long-term outcomes (high-risk decision-making). However, choosing card C or D would have short-term advantages but have a better long-term impact. To evaluate the risky decision-making score on IGT, some studies calculated the number of cards selected from advantageous and disadvantageous decks (Davis et al., 2007; Gonzalez et al., 2005;

Hooper et al., 2008; Lösel & Schmucker, 2004; Zermatten et al., 2005). This study calculated the number of disadvantageous cards (A + B) to determine risky decision-making.

2.3 Procedure and research ethics

The scientific committee of psychology department is responsible for ethical consideration. After explaining the purpose of this study and presenting how it will be conducted, researchers got approval to carry out this study among humans. Then, the researchers announced that an experimental study would be conducted in a laboratory to assess decision-making performance and invited participants to join the study. All participants were given a consent form with a detailed description of the study before participating in the experimental task and answering the survey questions. The consent form outlined the aims of this study and how long it was expected to take to complete and explained that participants had the right to leave the study at any time for any reason. The consent form assured participants that their data would be kept confidential and secure and would only be accessed by the leading researcher. After completing the IOWA gambling task (IGT), participants completed the Big Five Inventory. They received some credit at the end of the study.

2.4 Data analysis

The IBM SPSS Statistics version 23 was used to analyse the data collected for this study. The Pearson correlation coefficient was conducted to understand the relationship between the Big-Five traits and risky decision-making. Multiple regression analysis was used to identify the extent to which personality traits predict risky decision-making. In addition, an independent sample t-test

was used to examine the significant mean difference between males and females concerning risk decision-making.

3. Results

This study found that males ($M = 52.61, SD = 8.60, SE = 0.9$) make riskier decisions than females ($M = 49.85, SD = 9.22, SE = 0.7$), $t = 2.3, p < 0.05$ (CI 95%: 0.41, 5.10), $d = 0.30$. The age between 18 to 25 years old did not significantly affect risky decision-making $F = 0.77, p = 0.51$. The results also indicated an association between risky decision-making and the Big Five personality traits and % 23.5 of risky decision making was accounting by Big Five traits (see Table 1 and 2). More specifically, results showed that agreeableness $r = -0.29, p < 0.01, r^2 = 0.08$, and conscientiousness $r = -0.21, p < 0.01, r^2 = 0.04$ negatively correlated with risky decisions. The strength of this association between agreeableness and risky decision making was 8 %, however, for the conscientiousness was 4 %. The findings demonstrated that neuroticism was positively correlated with risky decision-making $r = 0.37, p < 0.01$, the strength of this correlation was 0.13. Personality was a good predictor $F = 15.08, p < 0.01$ for risky decision making. The results found that neuroticism $\beta = 0.36, t = 6.25, p < 0.01, f^2 = 0.14$, conscientiousness $\beta = -0.13, t = -2.30, p < 0.01, f^2 = 0.01$ and agreeableness $\beta = -0.24, t = -4.35, p < 0.01, f^2 = 0.06$ predict risky decision-making. No statistical evidence suggests that extraversion and openness affect decision-making, and their $p > 0.05$.

Table 1: Descriptive statistics and correlations between the Big Five personality traits and risky decision-making.

Variables	M	SD	Skew.	Kurt.	1	2	3	4	5	6
Extraversion	23.286	4.765	0.408	0.194	–	0.154*	0.062	– 0.235**	0.077	– 0.053
Openness	33.852	5.667	– 0.624	0.018		–	0.08	– 0.149*	0.173**	– 0.016
Agreeableness	21.446	5.5187	1.079	0.984			–	– 0.065	0.205**	– 0.292**
Neuroticism	22.525	6.388	0.247	– 0.722				–	– 0.134*	0.376**
Conscientiousness	22.729	5.849	0.072	– 0.661					–	– 0.218**
Risky decision making	50.836	9.091	– 0.075	– 0.426						–

Note: * $P < 0.05$, ** $P < 0.01$.

Table 2: Multiple regression analysis for the Big Five and risky decision-making

Variables	R ²	DW	b	SE	β	t	sr ²	95% CI	
	0.235	1.777						Lower Bound	Upper Bound
Constant			46.649	5.124	–	9.105**	–	36.557	56.74
Extraversion			0.088	0.111	0.046	0.792	0.051	– 0.130	0.306
Openness			0.118	0.092	0.074	1.28	0.082	– 0.064	0.301
Agreeableness			– 0.41	0.094	– 0.249	– 4.354**	– 0.268	– 0.596	– 0.225
Neuroticism			0.518	0.083	0.364	6.252**	0.371	0.355	0.681
Conscientiousness			– 0.208	0.09	– 0.134	– 2.30*	– 0.145	– 0.386	– 0.03

4. Discussion

This study used a quantitative research method. Quantitative methods allow researchers to collect numerical data that can be analysed via statistical measures and are generally employed to examine the association between two or more variables, make predictions, and find the mean difference between groups (Aron et al., 2013).

The present study investigated the role of the Big-Five traits in risky decision-making. The present study found that males and females differed in their approach to risk decisions and that males tended to make risky decisions more than females. The findings were consistent with previous studies (Hooper et al., 2008; Lauriola & Levin, 2001). This difference may be due to gender differences in personality traits. Concerning the Big Five traits, studies have identified distinct personality characteristics in terms of gender that suggest women are more agreeable than men (Costa et al., 2001). Moreover, females scored higher than males in several facets of conscientiousness, especially self-control and dutifulness (Costa et al., 2001; Feingold, 1994). Anger, or hostility, is an aspect of neuroticism in which females do not consistently outperform males (Costa et al., 2001). Differences in personality traits might thus influence people's decision-making and explain why men and women differ in their decisions.

Some studies, for example Nicholson et al. (2005) and Piovesan & Willadsen (2021), examined the association between the Big-Five personality model and risky decision-making. Although studies such as Li & Liu (2008) and Nicholson et al. (2005) have claimed that extraversion and openness are positively related to risk-taking behaviour, it was not found a significant association between risky decision-making with extraversion and openness. This result is consistent with Buelow & Cayton (2020), who did not find evidence for this relationship.

This study identified a positive association between high-risk decision-making and neuroticism. According to Denburg et al. (2009), neuroticism significantly correlated with behaviour decision tasks. Moreover, the study findings revealed a significant positive association between neuroticism and risky decisions (Liu et al., 2021). In addition, others found neuroticism was a negative predictor of advantageous choices on the IGT (Hooper et al., 2008; Icelliglu & Ozden, 2012). People with high neuroticism chose disadvantageous decks more often than advantageous decks (Hooper et al., 2008).

The results also reveal a negative correlation between conscientiousness and risky decision-making. This result is consistent with Gardiner and Jackson (2012), who found a negative association between conscientiousness and high-risk decision-making. Furthermore, Joseph & Zhang's (2021) recent study found a negative association between conscientiousness and self-reported risky decision-making. Conscientious people tend to take more responsibility, have good self-control, postpone gratification, and accept social norms (Roberts et al., 2009). They thus have a lower risk of feeling guilty and think carefully about their actions and decisions (Jackson & Hill, 2009).

The present study found a negative correlation between agreeableness and risky decision-making. This result is consistent with Buelow & Cayton (2020) and other studies that found risk

preferences are associated with agreeableness (Soane & Chmiel, 2005). Agreeable individuals might use heuristics more frequently than those less agreeable, resulting in fewer risks being taken during decision-making (Buelow & Cayton, 2020). Agreeable individuals can regulate their behaviour properly and are more cooperative with their parents in making their decisions (Wang et al., 2019). Agreeableness is thus negatively associated with hostility, aggression (Tackett et al., 2019), antisocial behaviour (Miller & Lynam, 2001), drug abuse (Malouff et al., 2005), and drug addiction (Kotov et al., 2010). However, Cumberland-Li et al., (2004) found that higher levels of agreeableness predict self-regulation and were related to a low level of impulsivity.

This study has some shortcomings which should be mentioned. The first limitation is the limited sample size; only 251 students took part in this study, which may have influenced on the generalizability of the results. Secondly, only college undergraduate students at Soran University participated, which could be considered a biased sample. It is thus crucial to repeat the study across a more diverse population to understand the extent to which the present study's findings are consistent.

Conclusions

The present study found that personality traits can influence individual decision-making, particularly traits such as neuroticism, agreeableness, and conscientiousness. In addition, it was found that boys are more likely to make risky-decisions than girls on the IGT. This study also has several implications. First, the results are significant, as they can be used to understand why some people are more prone to making risky decisions than others are. Second, the relationship between risky decision making and personality traits has not previously been studied among the Kurdish population, making the current study the original work in this area. Thus, this study will provide a framework for understanding the Kurdish personality characteristic. The Big Five personality traits might not provide a complete understanding of the aetiology of risky-decision making, meaning more investigation is required in this area. Future studies should explore the role of the dark personality triad in decision-making.

Conflict of interests

The two authors declare that they have no conflict of interest.

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Author contribution

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Zana Babakr. The first draft of the manuscript was written by Zana Babakr and Nabi Fatahi commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data Availability Statement

The datasets are available from the corresponding author on reasonable request.

Ethical Approval

The ethical committee approved to conduct the present study on humans.

Consent to participate

All participants received a participation consent form and were informed that their data analysis was for publication.

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