

## The Effect of Smoking on Risk Taking in Decision Making

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### ABSTRACT

In contemporary times, smoking is a very prevalent behaviour and has been studied alongside a variety of variables on the dimensions of health and well-being and has been found to be associated with cognitive processes as well. With this reference, the present study aims to understand the difference between smokers and non-smokers inclination to risk-taking in decision making. Suitable objectives and hypothesis are formed accordingly. The sample (N=56) consisted of college students and employees from around India. Data was collected through Iowa Gambling Task, DOSPERT scale and General Decision-Making Style Scale and analyzed using MANOVA and t-test. The findings suggest that smoking affects risk-taking and in turn decision making. Further, the findings suggest that the smokers take higher risk in decision making and smoker and non-smoker have different decision-making style. Difference in some aspects of risk taking and decision-making style was also found between males and females. However, no difference was indicated from the results on the basis of occupational status. Limitation and further suggestion have been discussed as well.

**Keywords:** *Smoking, Risk-Taking, Decision Making*

### Decision Making

Decision making is one of the basic cognitive processes of human behaviors by which a preferred option or a course of actions is chosen from among a set of alternatives based on certain criteria. It has also been defined as the “process or sequence of activities involving stages of problem recognition, search for information, definition of alternatives and the selection of an actor of one from two or more alternatives consistent with the ranked preferences” (Wasby). Herbert Simon (1960) defined decision making as a multistage process which starts with problems on an individual or social agenda and moves through stages of construction or search for alternatives, choice among alternatives and implementation of decisions. It is usually regarded as a cognitive study as it involves mental and logical reasoning (Ahmed, et al, 2012). It is also a course of action consciously chosen based on some criteria from available alternatives for the purpose of desired result (Massie, 2009).

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### Theories of decision making

There is no universal agreement on a standardized classification on the theories (Anwar, 2014). According to Ahmed et al (2012), Decision theories can basically be grouped into two: Normative and descriptive decision theory. While normative theory explains how decisions should be made, descriptive theory explains how decisions are made. Many researchers have also classified the theories as either rational or non-rational (Gigerenzer, 2001; Hansson, 2005; Oliveira, 2007). Some of the contemporary decision-making models include the subjective expected utility, heuristics theory, game theory, attribution, and prospect theory. Savage (1954) developed the axiomatic subjective expected utility (SEU) theory in which a decision maker chooses between alternatives (or strategies) in the presence of risk. Savage capitalized on the assumption that the decision maker will always tend to seek pleasure and avoid pain and as such, he will make the following computations: i) Subjective utility that accounts on the individuals judged weightings of utility, rather than on objective criteria. ii) Subjective probability that accounts on the individuals estimates of likelihood, rather than on objective statistical computations. Kahneman and Tversky (1979) developed the theory of choice that accurately describes how people actually go about making their decisions. In simple words, they established that people aspire for uniqueness in relation to prospects being considered and will tend to shy away from the components shared by all. They also discovered that people lean more towards the outcomes obtained with certainty than those obtained by mere probabilities. The word “attribution” literally means the grant of responsibility and tries to explain the behavior attributed to a person or situation. Heider (1958) initiated the theory, later Weiner and colleagues (e.g., Jones et al., 1972; Weiner, 1974) developed a theoretical framework and divided the behavior attribute into internal and external factors. Weiner (1974) advances a three-stage process that underlies an attribution. (i) The person must perceive or observe the behavior. (ii) Then the person must believe that the behavior was intentionally performed, and (iii) the person must determine if they believe the other person was forced to perform the behavior (in which case the cause is attributed to the situation) or not (in which case the cause is attributed to the other person). Weiner confined the theory on the most important factors affecting the attribution for achievement such as ability, effort, task difficulty, and luck. Weiner also classified attribution along three causal dimensions: locus of control, stability, and controllability. The game theory is often considered the mathematical study of strategic decision making. It is considered to be an interactive decision theory as it takes into consideration the conflict and cooperation between intelligent rational decision makers. In Heuristics theory, it is highlighted that when decision makers make satisficing decisions, they may use a set of heuristics to guide their decisions. Heuristic is a rule of thumb that can help the decision maker find a solution in a complex and uncertain situation (Moustakas, 1990).

### *Types of decision making*

Scott & Bruce (1995) have identified two main approaches to decision-making style. Firstly, decision-making styles can be understood as a habitual pattern which individuals use in decision-making. Secondly, decision-making styles can be understood as individuals' characteristic mode of perceiving and responding to decision-making tasks. In their later work, the same authors defined decision-making styles as “the learned habitual response pattern exhibited by an individual when confronted with a decision situation. It is not a personality trait, but a habit-based propensity to react in a certain way in a specific decision context.” (Scott & Bruce, 1995). Five decision-making styles have been identified as a result of a project based on four separate populations and described in behavioral terms (Scott & Bruce, 1995).

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The first of them, the rational style, is characterized by the search for and logical evaluation of alternatives. It is also characterized by the comprehensive search for information, inventory of alternatives and logical evaluation of alternatives. In another word, rational decision-making style is ascribed by use of reasoning and logical and structured approaches to decision making.

The intuitive style is characterized by attention to detail and a tendency to rely on feeling characterized by attention to details in the flow of information rather than systematic search for and processing of information and a tendency to rely on premonitions and feelings. That is, decision-making style is defined by dependence upon hunches, feelings, impressions instinct experience and gut feelings.

The dependent one is characterized by the search for and reliance on the advice of others and before making any decision, individuals using this style seek direction and support of others. In different words, a dependent style is defined by a search for advice and guidance from others before making important decisions.

Avoidant decision-making style is defined by withdrawing, postponing, moving back and negating the decision scenarios. The avoidant style is the tendency to avoid decisions whenever possible and spontaneous style is characterized by a sense of immediacy and desire to complete the decision-making process as soon as possible.

Spontaneous decision-making style is characterized by making rapid, quick, impulsive and prone to making “snap” or “spur of the moment” decisions. A spontaneous style is characterized by a feeling of immediacy and a desire to come through the decision-making process as quickly as possible (Scott and Bruce, 1995; Spicer and Sadler Smith, 2005; Thunholm 2004; Rehman and Waheed, 2012).

### ***Risk Taking***

Risky behavior or risk-taking behavior is defined according to Trimpop (1994) as “any consciously, or non-consciously controlled behavior with a perceived uncertainty about its outcome, and/or about its possible benefits, or costs for the physical, economic or psycho-social well-being of oneself or others.” Turner et al. (2004) described risk-taking behavior further as either a socially unacceptable volitional behavior with a potentially negative outcome in which precautions are not taken. Risk-taking and decision-making represent two important construct that overlap and have independent features. Increased risk-taking behavior occurs during adolescence. Multiple factors likely contribute to this phenomenon, including biological changes, peer pressure, individual differences in genetic composition and environmental exposures, and cultural and family influences. Developmental changes may also affect decision-making during this period (Rutherford, Mayes, & Potenza, 2010), potentially leading to seemingly poor choices based on biases towards immediately rewarding experiences over those with long-term benefits. (Balogh et.al, 2013). Following damage to the ventromedial prefrontal cortex, humans develop a defect in real-life decision-making, which contrasts with otherwise normal intellectual functions. It is implicated in the processing of risk and fear, as it is critical in the regulation of amygdala activity in humans.<sup>[2]</sup> It also plays a role in the inhibition of emotional responses, and in the process of decision making and self-control. It is also involved in the cognitive evaluation of morality. (Bechara et.al, 1994)

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### *Smoking*

Smoking behaviors are actions taken by a person that are associated with the burning and inhalation of a substance. Smoking behavior is multifaceted and includes the actual act of smoking, puffing style, depth of inhalation, and rate and frequency of smoking. The act of smoking consists of several behaviors and is usually applied to tobacco/cigarettes. A smoker is defined as a person who has a lifetime history of smoking 100 cigarettes or more with current smoking on some days or every day. Environmental or social factors (e.g., peer pressure) often play a role in smoking initiation. Over time, smoking behavior can become a pattern (i.e., habit) and tolerance develops, which indicate a state of dependence. (Baker et.al, 2013)

Neuroimaging techniques, such as fMRI and positron emission tomography (PET), have been used to assess the neural substrates associated with the cognitive effects of nicotine and abstinence from nicotine in dependent subjects. A general conclusion from studies of smokers and nonsmokers is that nicotine, administered by various routes, can increase task-related activity in the prefrontal, parietal, and occipital cortices, as well as in the caudate nucleus and thalamus, and decrease task-related activity in the anterior cingulate gyrus and cerebellum while subjects perform a variety of cognitive tasks. One of the areas of prefrontal cortex is ventromedial prefrontal cortex associated with risk and fear (Xu et.al, 2005)

### **REVIEW OF LITERATURE**

Most of the studies in the area of smoking have tried to analyse the nature, underlying and maintaining factors or the implications of smoking in college students. Halerpin and colleagues (2010) assessed health and behavioral risks associated with different levels of smoking among a sample of college students found that any level of smoking (compared to no smoking) was associated with high-risk drinking, risky driving and other risk-taking behaviour. Similar findings have been obtained by many researchers who have found smokers' nicotine satiation level affect IGT deck selections during the task (Ert & Yehchaim, 2013). Risky decisions are correlated with smoking status in both teenagers and adults (Bourque et al., 2013). Although there have been research studies linking risk taking to smokers (Buelow & Surr, 2010; Murthy & Doodhi, 1991), there is a dirth of Indian literature regarding the same.

Sabia S, et al.,2013 conducted a study on “Impact of smoking on cognitive decline in early old age:( the Whitehall II cohort study). The study was conducted to examine the association between smoking history and cognitive decline in the transition from midlife to old age. Data are from 5099 men and 2137 women in the Whitehall II study, mean age 56 years (range=44–69 years) at the first cognitive assessment (1997–1999), repeated over 2002–2004 and 2007–2009.The cognitive test battery was composed of tests of memory, vocabulary, executive function (composed of one reasoning and two fluency tests), and a global cognitive score summarising performance across all five tests. Smoking status was assessed over the entire study period. Linear mixed models were used to assess the association between smoking history and 10-year cognitive decline, expressed as z-scores. Compared to never smokers, middle-aged male smokers experienced faster cognitive decline in global cognition and executive function. In ex-smokers with at least 10-year cessation there were no adverse effects on cognitive decline.

In “*Association between tobaccp smoking and cognitive functioning in young adults*” Chamberlain S R, et al. Am J Addict (2012) investigating impulsivity in young people aged 18-.Subjects undertook neurocognitive assessment using the Cambridge Neuropsychological

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Test Automated Battery (CANTAB). Demographic, clinical, and cognitive differences between smokers (N = 37) and nonsmokers (N = 177) were characterized. Results showed that in comparison to nonsmokers, nicotine users showed significant cognitive impairments on sustained attention (target detection:  $p = .005$ ), spatial working memory (errors:  $p = .023$ , strategy use:  $p = .004$ ), executive planning ( $p = .002$ ), and did not appropriately adjust behavior as a function of risk (Gamble task risk adjustment:  $p = .004$ ). Smokers were intact on general response speeds and response inhibition.

Richard M, et al. 2003, investigated the effects of cigarette smoking on midlife cognitive performance on the topic "Cigarette smoking and cognitive decline in Midlife: Evidence from a prospective birth Cohort study". Multiple regression was used to test the association between cigarette smoking and changes in cognitive test scores among male and female members of the British 1946 birth cohort aged between 43 and 53 years. Results shows that smoking was associated with faster declines in verbal memory and with slower visual search speeds. These effects were largely accounted for by individuals who smoked more than 20 cigarettes per day and were independent of sex, socioeconomic status, previous (adolescent) cognitive ability, and a range of health indicators. The study concludes that heavy smoking is associated with cognitive impairment and decline in midlife. Smokers who survive into later life may be at risk of clinically significant cognitive declines.

Investigation of the constructs that drive smokers' risk-taking behavior was studied by Ert, Yechiam and Arshavsky (2013). The sample consisted of 87 participants including both male and female. Among them 15 males and 17 females were smokers. An experimental analysis showed that smokers were more easily tempted by immediate high rewards compared to nonsmokers. Thus, the salience of risky alternatives that produce large rewards most of the time can direct smokers to make bad choices even in an abstract situation such as the Iowa Gambling Task. The findings of the study suggested that the risk-taking behavior associated with smoking was not related to the mere pursuit of rewards but rather reflected a tendency to yield to immediate temptation.

Schepis et al. (2011) examined stress-induced changes in response inhibition, inattention, and risk taking as related to smoking status and posttreatment smoking abstinence. 12 adolescent smokers participated in a smoking cessation intervention and 15 adolescent nonsmokers completed a 2-session protocol assessing stress-related change in response inhibition and inattention, risk taking, nicotine withdrawal symptoms, and self-reported stress. Results indicated that at baseline, smokers had greater inattentive responding and risk taking when compared with nonsmokers. In all participants stress exposure led to significant increases in stress, anger, and depression and also increased nicotine craving and impulsive responding in smokers. Also smokers who were not abstinent at the end of treatment experienced greater stress-induced risk taking when compared with those who were abstinent.

### ***Rationale***

The fact that smoking affects our health, physically and mentally, is a well-researched topic. Smoking has been found to affect many areas of our brain influencing our cognitive functioning. Decision making is one of the cognitive functions smoking may affect. Decision making is an important activity we engage in, in our everyday life, be it very significant decisions or minute decisions of daily concerns. Smokers have been found to have a tendency to be impulsive as they are tempted by immediate gratification. In this context, it is beneficial understand how much do smokers induce in risk-taking behavior in

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decision making. It is of practical benefits to use this understanding and sensitize people of the consequences and also suggest interventions.

Further, researches on this area are very limited and have not been studied in Indian context.

**Aim:** To understand the difference of smokers and non-smokers inclination to risk-taking in decision making

### *Objectives*

- To assess the effect of smoking on risk-taking and decision making.
- To assess the difference in the effect of smoking on risk-taking in decision making between males and female
- To assess the difference in risk-taking and decision making of college students and employees.

### *Hypotheses*

- Smoking status will have an effect on the choice of deck.
- Gender will have an effect on the choice of deck.
- Occupational status will have an effect on the choice of deck.
- There will be difference between smoker and non-smokers on risk taking and decision-making style
- There will be difference between males and females on risk taking and decision-making style
- There will be difference between college students and employees on risk taking and decision-making style.

## **METHODOLOGY**

### *Design*

The design employed in the present study was correlational research since it involved the measurement of two or more relevant variables and an assessment of the relationship between or among those variables using t tests and drawing bivariate correlations. The variables included types of risk-taking styles, decision making styles as well as performance on the Iowa gambling tasks and their assessment was done between the criterion groups of smokers and non-smokers in order to understand the influence of smoking on decision making especially in the component of risk taking.

### *Inclusion/Exclusion Criteria*

In order to achieve the objectives of the research study, the inclusion criteria for the sample were laid down according to which there would be two groups of participants- one consisted of individuals who smoked and the other who did not. Only those smokers were included in the sample who smoked more than three cigarettes in the day and the individuals in the non smoker group would include those who were complete abstainers of smoking. The sample would further be drawn from across two age groups that of 18- 23 (college students) and 25- 32 years (working employees) since research has found these two age groups to be more susceptible to smoking.

### *Sample*

In accordance to the inclusion and exclusion criteria, a sample of 56 participants was drawn using a convenience sampling technique from the two age groups, thus comprising of

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college students as well as working employees. A comparable number of male and female smokers/nonsmokers were included in the sample to be able to draw conclusions about risk taking behaviour as well as decision making styles with respect to gender.

### *Tools*

- **Iowa Gambling Task:** The Iowa gambling task (IGT) is a psychological task thought to simulate real-life decision making. The original Iowa Gambling Task studies decision making using cards, however, now it is computer based. It was introduced by Antoine Bechara, Antonio Damasio, Hanna Damasio and Steven Anderson, then researchers at the University of Iowa.
- **The DOSPERT Scale:** The risk-taking responses of the 30-item version of the DOSPERT Scale evaluate behavioral intentions -or the likelihood with which respondents might engage in risky activities/behaviors- originating from five domains of life (i.e., ethical, financial, health/safety, social, and recreational risks). The original scale was developed by Weber, Blais, and Betz in 2002 with 40 items. For the present research the revised version with 30 items is used. The responses are given in a 7-point rating scale ranging from 1 (Extremely Unlikely) to 7 (Extremely Likely). The internal consistency reliability estimates associated with the original 48-item English risk-taking scores ranged from .70 to .84.
- **General Decision-Making Style Scale:** Developed by Scott and Bruce in 1995, the general decision-making style is a 25 item scale that measures five types of decision making i.e. rational, avoidant, dependent, intuitive and spontaneous. The responses are made on a 5-point likert scale ranging from 1 for strongly disagree to 5 for strongly agree. The internal consistency of the items ranged from .68 to .94.

### *Procedure*

Adhering to the inclusion and exclusion criteria, participants were contacted and a meeting was scheduled. On meeting, researchers first tried to establish a rapport with the participant. The participant was then briefed about the research purpose and confidentiality of the information disclosed and then informed consent was obtained. Participant was first given the instruction to and asked to play the Iowa Gambling Task. After the completion of the task, the participants was given the instruction to the questionnaire and questionnaire was subsequently administered. After completion, the participant was debriefed and researcher participant relationship was terminated. Similarly, requisite number of participants was identified and data was collected.

### *Ethical Consideration*

The present study was in adherence with the ethical guidelines and principles of research in psychology. Participation in the study was voluntary and prior to people's decision regarding agreement or disagreement with respect to participation they were given adequate information regarding the purpose of the study thus making sure that informed consent was present. They were also apprised about their right as a participant to withdraw at any point of the study if they felt uncomfortable or unable to carry on.

### *Data Analysis*

After the data was collected from requisite number of participants, the data from the researchers was compiled and analyzed using the software SPSS. Pearson's correlation and t-test was used to assess any difference in the dependent variable and explore any significant correlation between the dependent and independent variables.

**RESULTS AND INTERPRETATION**

The aim of the present study was to understand the difference of smokers and non-smokers inclination to risk-taking in decision making. With accordance to the aim suitable objective and hypotheses were formulated. Consecutively, data was collected and analyzed. The following are the tables that were generated and their respective interpretation.

*Independent variables on Iowa Gambling Task*

**Table 4.1.1: Multivariate Tests**

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	1.000	1456745.081 <sup>b</sup>	4.000	45.000	.000	1.000
	Wilks' Lambda	.000	1456745.081 <sup>b</sup>	4.000	45.000	.000	1.000
	Hotelling's Trace	129488.452	1456745.081 <sup>b</sup>	4.000	45.000	.000	1.000
	Roy's Largest Root	129488.452	1456745.081 <sup>b</sup>	4.000	45.000	.000	1.000
Gender	Pillai's Trace	.110	1.391 <sup>b</sup>	4.000	45.000	.252	.110
	Wilks' Lambda	.890	1.391 <sup>b</sup>	4.000	45.000	.252	.110
	Hotelling's Trace	.124	1.391 <sup>b</sup>	4.000	45.000	.252	.110
	Roy's Largest Root	.124	1.391 <sup>b</sup>	4.000	45.000	.252	.110
Age	Pillai's Trace	.028	.322 <sup>b</sup>	4.000	45.000	.862	.028
	Wilks' Lambda	.972	.322 <sup>b</sup>	4.000	45.000	.862	.028
	Hotelling's Trace	.029	.322 <sup>b</sup>	4.000	45.000	.862	.028
	Roy's Largest Root	.029	.322 <sup>b</sup>	4.000	45.000	.862	.028
Smoker	Pillai's Trace	.301	4.855 <sup>b</sup>	4.000	45.000	.002	.301
	Wilks' Lambda	.699	4.855 <sup>b</sup>	4.000	45.000	.002	.301
	Hotelling's Trace	.432	4.855 <sup>b</sup>	4.000	45.000	.002	.301
	Roy's Largest Root	.432	4.855 <sup>b</sup>	4.000	45.000	.002	.301

a. Design: Intercept + Gender + Age + Smoker + Gender \* Age + Gender \* Smoker + Age \* Smoker + Gender \* Age \* Smoker  
 b. Exact statistic

Table 4.1.1 indicates the \_\_\_\_\_ of null hypotheses that pertains to smoking status, gender and occupational status and choice of deck. According to Wilks' Lambda, hypothesis 1 is retained at 0.01 and 0.05 significance level. However, hypothesis 2 and hypothesis 3 is rejected as the results are not significant.

**Table 4.1.2 Tests of Between-Subjects Effects**

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	DeckA	438.387 <sup>a</sup>	7	62.627	1.377	.237	.167
	DeckB	238.148 <sup>b</sup>	7	34.021	.490	.837	.067
	DeckC	1464.225 <sup>c</sup>	7	209.175	3.741	.003	.353
	DeckD	496.701 <sup>d</sup>	7	70.957	.728	.649	.096
Intercept	DeckA	26636.450	1	26636.450	585.832	.000	.924
	DeckB	40544.459	1	40544.459	584.413	.000	.924
	DeckC	40691.653	1	40691.653	727.785	.000	.938
	DeckD	29743.740	1	29743.740	305.111	.000	.864
Gender	DeckA	186.625	1	186.625	4.105	.048	.079
	DeckB	4.204	1	4.204	.061	.807	.001
	DeckC	105.179	1	105.179	1.881	.177	.038
	DeckD	34.293	1	34.293	.352	.556	.007



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Occupational Status	DeckA	25.823	1	25.823	.568	.455	.012
	DeckB	23.679	1	23.679	.341	.562	.007
	DeckC	20.496	1	20.496	.367	.548	.008
	DeckD	16.778	1	16.778	.172	.680	.004
Smoker	DeckA	71.731	1	71.731	1.578	.215	.032
	DeckB	150.032	1	150.032	2.163	.148	.043
	DeckC	956.385	1	956.385	17.105	.000	.263
	DeckD	99.834	1	99.834	1.024	.317	.021
Error	DeckA	2182.452	48	45.468			
	DeckB	3330.067	48	69.376			
	DeckC	2683.757	48	55.912			
	DeckD	4679.281	48	97.485			
Total	DeckA	29857.000	56				
	DeckB	44934.000	56				
	DeckC	45677.000	56				
	DeckD	36055.000	56				
Corrected Total	DeckA	2620.839	55				
	DeckB	3568.214	55				
Total	DeckC	4147.982	55				
	DeckD	5175.982	55				

a. R Squared = .167 (Adjusted R Squared = .046)

b. R Squared = .067 (Adjusted R Squared = -.069)

c. R Squared = .353 (Adjusted R Squared = .259)

d. R Squared = .096 (Adjusted R Squared = -.036)

Table 4.1.2 indicate the between variable effect. According to table, there is significant difference between smoker and non-smoker only in their choice of deck C at 0.05, 0.01 and 0.001 significance level. The mean of each criterion group indicate that non-smoker relatively choose deck C more than smokers. However, there was no significant difference indicated in the choice of deck between genders and occupational statuses.

#### *Smoking status on Reaction time, Risk-taking and Decision Making Style*

**Table 4.2: Difference between smoker and non-smoker in reaction time, risk-taking and decision making style**

		Levene's Test for Equality of Variances	Test for of Sig.	t	df	Sig. (2-tailed)
Ethical	Equal variances assumed	1.230	.272	1.761	54	.084
	Equal variances not assumed			1.777	52.246	.081
Financial	Equal variances assumed	.072	.790	2.514	54	.015
	Equal variances not assumed			2.501	51.590	.016
Health	Equal variances assumed	.602	.441	4.704	54	.000
	Equal variances not assumed			4.701	53.567	.000
Recreational	Equal variances assumed	3.826	.056	2.489	54	.016
	Equal variances not assumed			2.519	50.684	.015
Social	Equal variances assumed	7.266	.009	.567	54	.573
	Equal variances not assumed			.577	46.478	.567
Total2	Equal variances assumed	3.783	.057	3.861	54	.000
	Equal variances not assumed			3.913	49.651	.000

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Rational	Equal variances assumed	.000	.994	-1.358	54	.180
	Equal variances not assumed			-1.358	53.676	.180
Avoidant	Equal variances assumed	1.330	.254	1.233	54	.223
	Equal variances not assumed			1.247	51.157	.218
Dependent	Equal variances assumed	2.683	.107	-.970	54	.337
	Equal variances not assumed			-.981	51.158	.331
Spontaneous	Equal variances assumed	.046	.830	1.472	54	.147
	Equal variances not assumed			1.470	53.544	.147
Intuitive	Equal variances assumed	2.116	.152	-2.235	54	.030
	Equal variances not assumed			-2.255	52.489	.028
Reaction	Equal variances assumed	7.435	.009	-2.966	54	.004
	Equal variances not assumed			-3.041	38.839	.004

Table 4.2 indicate the difference of smoker and non smoker in risk taking and its dimension, decision making styles and reaction time. We can interpret that there is significant difference between the criterion groups on risk-taking at  $\alpha = 0.05$ , 0.01 and 0.001. The mean of groups suggest that smokers are relatively higher scores on risk taking than smoker. Further, significance difference was found between the criterion groups in dimensions of risk-taking i.e., financial, health and recreational at  $\alpha = 0.05$ ,  $\alpha = 0.001$  and  $\alpha = 0.05$ , respectively, where, the means of both groups indicate that smokers relatively have a higher score on the same dimensions. Significant difference was also found between smoker and non-smokers in intuitive decision-making style at  $\alpha = 0.05$ , where the mean of the groups indicate that non-smokers relatively have a higher score than smoker. Finally, there was significant difference between the reaction time of the criterion groups  $\alpha = 0.05$  and  $\alpha = 0.01$ , where the mean of smokers is higher than non-smoker.

#### *Gender on Reaction time, Risk-taking and Decision Making Style*

**Table 4.3: Difference between male sand females in reaction time, risk-taking and decision making style**

		Levene's Equality of Variances	Test for of	t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Ethical	Equal variances assumed	.012	.913	2.068	54	.043
	Equal variances not assumed			2.064	53.206	.044
Financial	Equal variances assumed	.508	.479	.670	54	.506
	Equal variances not assumed			.675	52.766	.502
Health	Equal variances assumed	1.100	.299	.214	54	.831
	Equal variances not assumed			.216	52.647	.830
Recreational	Equal variances assumed	.126	.724	.351	54	.727
	Equal variances not assumed			.353	53.677	.726
Social	Equal variances assumed	.061	.806	-2.050	54	.045
	Equal variances not assumed			-2.047	53.271	.046
Total2	Equal variances assumed	.009	.925	.351	54	.727
	Equal variances not assumed			.352	53.999	.726
Rational	Equal variances assumed	.310	.580	-2.547	54	.014
	Equal variances not assumed			-2.533	51.493	.014
Avoidant	Equal variances assumed	2.811	.099	-1.551	54	.127

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Dependent	Equal variances not assumed			-1.569	51.223	.123
	Equal variances assumed	.347	.558	-1.418	54	.162
Spontaneous	Equal variances not assumed			-1.423	53.998	.161
	Equal variances assumed	.341	.561	-2.038	54	.047
Intuitive	Equal variances not assumed			-2.046	53.920	.046
	Equal variances assumed	.308	.581	-1.564	54	.124
Reaction	Equal variances not assumed			-1.572	53.714	.122
	Equal variances assumed	5.538	.022	-3.926	54	.000
	Equal variances not assumed			-4.016	40.899	.000

Table 4.3 indicate the difference of males and females in risk taking and its dimension, decision making styles and reaction time. We can interpret that there is significant difference between the criterion groups in dimensions of risk-taking i.e., ethical and social at  $\alpha = 0.05$ , where the means of both groups indicate that males relatively have a higher score on ethical and females have a higher score on social. Significant difference was also found between males and females in rational and spontaneous decision-making style at  $\alpha = 0.05$ , where the mean of the groups indicate that females relatively have a higher score than males on the same dimensions. Finally, there was significant difference between the reaction time of the criterion groups  $\alpha = 0.05$ ,  $\alpha = 0.01$  and  $\alpha = 0.001$  where the mean of female is higher than males.

#### *Occupation status on Reaction time, Risk-taking and Decision Making Style*

**Table 4.4: Difference between students and employees in reaction time, risk-taking and decision-making style**

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Ethical	Equal variances assumed	.403	.528	.425	54	.673
	Equal variances not assumed			.417	47.301	.678
Financial	Equal variances assumed	1.498	.226	-.838	54	.406
	Equal variances not assumed			-.857	53.995	.395
Health	Equal variances assumed	.827	.367	.819	54	.416
	Equal variances not assumed			.840	53.993	.405
Recreational	Equal variances assumed	3.488	.067	1.700	54	.095
	Equal variances not assumed			1.648	43.403	.107
Social	Equal variances assumed	.002	.966	.853	54	.397
	Equal variances not assumed			.861	53.099	.393
Total2	Equal variances assumed	.129	.721	1.068	54	.290
	Equal variances not assumed			1.065	50.949	.292
Rational	Equal variances assumed	.889	.350	.603	54	.549
	Equal variances not assumed			.612	53.545	.543
Avoidant	Equal variances assumed	5.194	.027	-.844	54	.402
	Equal variances not assumed			-.887	50.783	.379
Dependent	Equal variances assumed	.399	.530	-.924	54	.360
	Equal variances not assumed			-.942	53.917	.350
Spontaneous	Equal variances assumed	1.824	.182	.830	54	.410
	Equal variances not assumed			.847	53.941	.401
Intuitive	Equal variances assumed	2.948	.092	-.435	54	.665
	Equal variances not assumed			-.448	53.849	.656
Reaction	Equal variances assumed	.193	.662	.656	54	.515
	Equal variances not assumed			.661	52.809	.512

Table 4.4 indicate the difference of males and females in risk taking and its dimension, decision making styles and reaction time. According to the table, no significant difference

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was found between the criterion groups in risk taking and its dimension, decision making styles and reaction time.

### DISCUSSION

Based on the results of the study, it seems clear that out of the hypotheses formulated, some of them were rejected while some were accepted. The first hypothesis was that the smoking status of individuals would have an impact on the choice of deck selected in the Iowa Gambling Task which assesses risk taking behaviour depending on the choice the participants made on the game wherein two of them are clearly the more 'riskier options' with a greater probability of winning or losing but the risk was higher. Research has found that individuals with damage to the ventromedial prefrontal cortex (VMPFC) are far more likely to choose these decks (Bechara et al, 1994, 1997) and neurobiological studies have shown that smoking is related to causing such a damage in the brain area and since this area is related to decision making processes, the influence of smoking status seems to have an impact it (Fettes, 2017; Shollenberger, 2015). Tobacco use is associated, among other things, to risk-seeking attitude (Pesut et al., 2006).

Other research (Bourque et al., 2013; Raylu & Oei, 2002) drew attention to the fact that risky decision-making is correlated with smoking status in adolescents and adults. There have been studies which have tried to assess the effect of smoking on the Iowa Gambling Task and found that nicotine levels in the brain affects the deck selection in the game in the case of smokers (Ristache, 2015). The results of the present study depict that the only significant difference in the choice of decks between smokers and non smokers was with respect to Deck C which was the safest option and involved the lowest risk and it was found that non smokers chose this option most thus validating the first hypothesis. However, since there were no significant differences in the choice of decks with respect to gender and age, the second and third hypotheses were rejected. This finding can be understood in the light of how it can be assumed that both male and female smokers, be it students or employees as compared to non smokers are more likely to choose the high risk decks instead of the safe one.

In order to assess the difference between smokers on risk-taking and decision making, MANOVA was used and results depicted that there were significant differences between the two groups on certain styles of risk taking and decision making behaviour thus leading to acceptance of the fourth hypothesis. The DOSPERT scale was used to assess domain specific nature of risk taking wherein a significant difference was found on the scores of financial, health and recreational risk taking whereby smokers scored higher on these dimensions suggesting that they were more likely than non smokers to engage in greater risk taking in the domain of these subscale. Smokers are more likely to engage in financial risk taking behaviour ( $t = 2.5, p < 0.05$ ) than non smokers and studies have found embodiment of the same in actions such as investing 10% of annual income into a new business venture (Blair & Weber, 2006) or frequently from one small company to another, including setting up their own organizations (Rauche and Frese, 2000) Career risk taking was significantly associated with lower job level, working in small organizations, shorter tenure, having a greater number of employers and involvement in business start-ups some other instances of financial risk taking, smokers might be indulged in (Hanuch & Wilche, 2006). The most significant difference between smokers and non smokers was found in the domain of health risk behaviour ( $t = 70, p < 0.000$ ) encompassing of acts such as engaging in unprotected sex, driving a bike without helmet, frequent usage of drugs, drinking heavily at a social function (Blais & Weber, 2006). Honestly, making the choice of smoking in spite of knowing its

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devastating health consequences is illustrative of the fact that smokers are quite likely to take risky choices in the department of health. From the results table, another observation made was the existence of a significant difference between smokers and non-smokers in recreational domain as well ( $t = 2.48, p < 0.05$ ) thus suggesting that recreational activities which are considered 'risky' are more likely to be undertaken by smokers than non-smokers and involves plans like bungee jumping, sky diving, riding on fast rollercoasters or related activities.

With regard to difference in decision making it was found that as compared to smokers, the score of non-smokers on intuitive style of decision making was higher. *The profile of an intuitive decision maker and the use of intuition in decision-making practice* (Malewsky, 2013) The intuitive style of decision making is characterized by attention to detail and a tendency to rely on feeling characterized by attention to details in the flow of information rather than systematic search for and processing of information and a tendency to rely on premonitions and feelings. That is, decision-making style is defined by dependence upon hunches, feelings, impressions instinct experience and gut feelings. Researchers dealing with the issue of intuition postulate that an intuitive decision maker is characterized by specific traits, abilities and predispositions that distinguish them from other decision makers (Agor 1998; Harper 1998; Woiceshyn 2009).

A significant difference between the criterion groups namely males and females was observed with respect to dimensions of risk-taking as well as decision making styles. It was found that males scored higher on the dimensions of ethical ( $t = 2.60, p < 0.05$ ) while on the social subscale ( $t = -2.70, p < 0.05$ ) females scored higher suggesting that men tend to take more risk with respect to issues like revealing a friend's secret to someone else, having an affair with a married woman or passing off somebody else's work as your own as compared to females who were more likely to choose a career that they truly enjoy over a more prestigious one or start a new career in their mid-thirties (Blair & Weber, 2006). In *Gender Differences in Risk Assessment: Why do Women Take Fewer Risks than Men?* (Jenkins & Harris, 2006) it was found that the social domain is the one wherein women are more likely to undertake social risks such as arguing with a friend, discussing about an unpopular issue or asking someone out on a date. Across studies, the social domain is unique in the sense that either no gender differences have been found or it is women who report greater propensity to engage in risky behaviors and perceive overall greater benefit and less risk in doing so (Johnson et al., 2004; Weber et al., 2002).

With respect to a difference between males and females on decision making, the results of the present study showcase a significant difference in relation to rational ( $t = -2.5, p < 0.05$ ) and spontaneous decision-making style ( $t = -2.07, p < 0.05$ ) and the descriptive statistics highlight that the mean of females is a relatively high than males on the same dimensions. Gender stereotypes characterize men and women as fundamentally different, even from different "planets" (Gray, 1992). Women are stereotyped as "intuitive" and men as "rational". However, recent research investigating gender differences in reports of intuitive and rational decision-making styles yields mixed results since the whole idea of women coming out in the professional space as well as becoming more expressive and independent in terms of decision making and other processes. There are hardly any studies which have established such an association and hence more research needs to be conducted with respect to risk taking and decision-making styles in women since there is a dearth of literature on the same. Nevertheless, the hypothesis stating that there would be a difference between males and females on decision making and risk taking was accepted given the results. The last

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hypothesis which stated that there would be a difference in risk taking styles and decision-making styles between college students and working employees was rejected since no significant differences were found. There have been studies which have identified factors related to risk taking or decision making styles in college students as well as adults (Rollison, 2003) but domain wise comparison of either of the concepts have not been explored in detail. That college students are more likely to engage in risky behaviour in terms of health or safety or take ethical risks (Kennison, 2016) or that adults are more likely to take financial risks are some of the findings of researches but in-depth studies on the same are very limited and thus there is a need to conduct more research in this field.

### ***Limitation and Further Suggestions***

Although maximum care was taken during the various stages of the study, it must be emphasized that the findings of the present investigation also suffer from few limitations. The present results are based on a sample of relatively small size and were also not diverse; therefore, generalization of results is a limitation of this study. Due to many reasons, this study covers only certain variables but literature provides evidence of other variables that may have an effect of the variables being studied. Prevalent disadvantage of survey research was its non-response error. People are reluctant to take part in research. Some showed little interest in completing the questionnaire, which reflected in their response. Finally, this study is cross sectional in nature. One cannot draw causal inferences from the results. There could be alternative explanations for the findings.

Considering the limitation of the study, various suggestions can be listed for further researches. A bigger sample with range of different demographics should be considered for generalization of the implication. Many other variables should be incorporated. Incorporating qualitative method with quantitative method would bring greater meaning and reliable results. Further researches should also consider the role of numerous confounding variables that may influence the variable being observed. Finally, an attempt towards longitudinal study should be taken, in order to establish relationship between the independent and dependent variable.

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### **Conflict of Interest**

The author(s) declared no conflict of interest.

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