Impact of Gaming on Human Risk Behavior

By

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Approval

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Dedication

I dedicate this thesis work to my parents who from the start encouraged and supported me. Also to my advisor who is an endless source of motivation and guidance.

It is also dedicated to my brothers, sisters, friends and to my teachers with whom I have an exceptional and admirable relationship.

Certificate of Originality

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by any other person, nor material which to a substantial extent has been accepted for the award of any degree or diploma at NUST SEECS or at any other educational institute, except where due acknowledgement has been made in the thesis. Any contribution made to the research by others, with whom I have worked at NUST SEECS or elsewhere, is explicitly acknowledged in the thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except for the assistance from others in the project's design and conception or in style, presentation and linguistics which has been acknowledged.

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Signature: _____

Acknowledgment

First and foremost praises be to Allah, the Almighty, on whom ultimately we depend for direction and guidance.

I wish to express my deep sense of gratitude to my supervisor Dr. Sarah Shafiq Khan for giving me a chance to work with her, in a research environment and polish my skills.

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List of Abbreviations

AVGL Action video game likeness

AVGT Action video game time

PVGL Puzzle video likeness

PVGT Puzzle video game time

SVGL Strategy video game likeness

SVGT Stretegy video game time

MARITALS Marital status (single, married)

CFA Confirmatory factor analysis

MANOVA Multivariate analysis of variance

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Abstract

Video games earn massive amount of money, produce heated debate, and their players spend huge amount of time on these games. These things make games one of the leading forms of personal and social entertainment. Due to the popularity of games, there is an increased interest in their design and effects on stakeholders.

So far, gaming research has focused on game design, interactional issues, as well as the psychological effects on gamers. Recently, most of the gaming research has focused on players' psychology, cultures, and games contents. However, we still need to develop a deeper understanding of 'why people engage in gaming'?

There are three reasons why gaming has received so much attention recently. 1). The size and growth rate of the gaming market; 2). Gaming popularity; and. 3). Role of gaming in human computing interaction. Scholars have argued to take gaming research seriously based on a range of social, cultural, economic and technological factors. The global gaming market is one of the largest. For example, the UK's video gaming industry is bigger than the film and music industry. Gaming industry has also been declared as one of the most creative industries.

Cognitive psychologists have been investigating the possible societal value of playing various computer games. Cognitive abilities, such as attention, concentration, reaction time, visual tracking, memory, hand-eye coordination, mathematical ability, and verbal ability are the key factors found to be influenced by gaming. Literature suggests that playing computer games may significantly increase cognitive performance. Risk taking behavior is a dominant part of human personality. It plays a vital role in various aspects of a person's life. For example,

investment decisions, ethical decisions, health related issues, purchasing decisions, etc. are affected by where the decision maker lays on the risk taking scale. Recent research has found that people vary in terms of their risk tolerance. Also, their risk taking tendencies differ depending on the situation. For example, a person may have a different risk tolerance when it comes to financial decisions, as compared to ethical decisions. This phenomenon is referred to as domain specific risk. Domain specific risk taking behavior has been measured in different cultures and environments. Each culture has different social values, history, and ideology; which in turn affects risk taking behavior. Cross cultural differences are also found to influence risky decision making.

Hence, in the light of the emerging importance of the understanding of gaming, and emergence of role of risk behavior in human decision making, the objective of this project is to examine the role of risk behaviors on gaming habits. We do it by conducting a survey among the moderate to high level gaming professionals. During our study, we investigate three types of video games (action, puzzle and strategic) and their respective impacts on three types of risk attitudes (health/safety, social and recreational). The results of our study have validated the proposed research question that video game preferences really does affect the risk taking behaviors of individuals in their daily life. We also observed influence of gender and marital status in some domains.

Chapter 1
Introduction

This chapter gives the basic idea of the media, use of media, market value, influence of media at human life, and its effects on risk taking attitude. It also presents why video games are important to study. Moreover, it provides the research question, gives an idea of expected results, and methodology to get and evaluate the results. Finally, it presents the structure of this thesis document.

1.1. Media

Ever since the revolution in technology has prevailed, a huge impact has been gripped by the media. The trends of books, newspapers, photography, movies and radio, TV has been evolved due to easily accessible forms of Internet, Social media forums, smart phones and interactive video games which integrates entertainment with learning. The technology today has not only made everything mobile and available, but is also very affordable due to its low cost. Today, the advance features of technology have attracted the human race in all the aspects of life. Either it is work, home, social environment/interactions, entertainment or other stuff; humans are happily converting towards the technological intervention to facilitate themselves. We can know about the happenings in the world while sitting in our homes through Media. Media is the latest mode of information and knowledge which is always and everywhere available. The influence of media has made us so much dependent on the technology and its diversified features. There is an impact of media that has influenced us therefore we should know how it really works. The impact level basically depends upon the frequency of access to media.

To ensure the statement that claims the impact of media on our lives, consider answering the questions that follow. Do you feel like flying like Superman? Are you inspired by the style of your favorite celebrity? Do you wish to have a lifestyle like you favorite personality? Have you ever wished to have super powers to kill the bad guys in your town? If your answer is yes to any of these questions, then it's surely the media that have influenced you to become what you see in it. However, it is important to realize that everything has its pros and cons which somewhat affects the dynamics of society we live in.

The media affects us psychologically as well. It affects our behavior to think and respond to changes. Young generation has been the most prominent victim of idealization of heroes, they see in the movies. The actors in a role of hero are such an inspiration for them that even the evil doings of them are considered to be the purpose of good cause for them.

Media have been hypothesized to have effects across a broad range of context. McGuire [1] noted several common media effects like; (a) how buying is influenced by the impact of advertisements (b) campaigns concerning politics, (c) how Public announcement's effect personally as well as socially, (d) how social controls are effected (e) how aggressive behaviors are affected by the media, (f) cognition and style effects. McQuail's [2] adds some more areas of media effects: (a) knowledge gain and distribution in society, (b) revolution's broadcast, (c) social norms from socialization, (d) adoption of culture and institution.

Figure 1 depicts the time spent on media by the users in the last quarter of 2012. 4.33 hours for PC users and 0.72 hours for game-consoles were spent respectively daily by the users. Online PC was the most used feature of the media by the users and they spent a huge amount of time daily on it as compared to other modes of media. A total of 10.63 hours was spent per day.

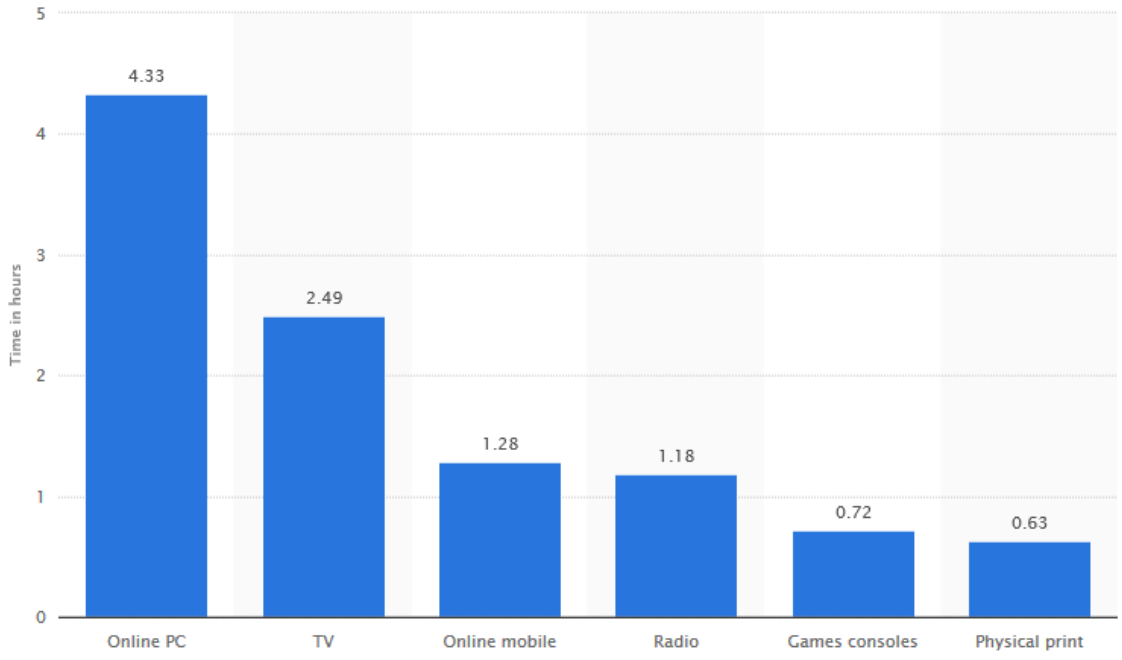

Figure 1: Time spent on media daily [3].

According to a study, television was available in the rooms of almost all the teenagers and the number of families that own four or more than it televisions was noted to be 24% [4]. Radio/cassette players and compact disks were found to be the most frequent media type which had a percentage of 76.8 and 67.4 respectively. The other forms of media found in the room of teenagers were televisions (52.5%), computers (57.8%), internet (52%) and games consoles (38.7%). An average of three hours on weekdays and 3.2 hours on weekends were the amount of time spent watching the television by the teenagers. They spent 0.69 hours per day on weekdays and 1.09 hours per day on weekends on the gaming consoles. The internet was used for 0.83 hours and 1.15 hours (per day) on weekdays and weekend respectively. The boys were observed to like fighting, sports and driving games as compared to adventure games liked by the girls. The boys spent much time downloading the video games and surfing the internet. The girls preferred to chat online and send emails to their friends and families [5]. Figure 2 shows results of different types of media (Television, tablet, online,

smartphones, etc.) usage from 2010 to 2014. Television is at top in all media type. Smartphones and tablet usage is increasing gradually.

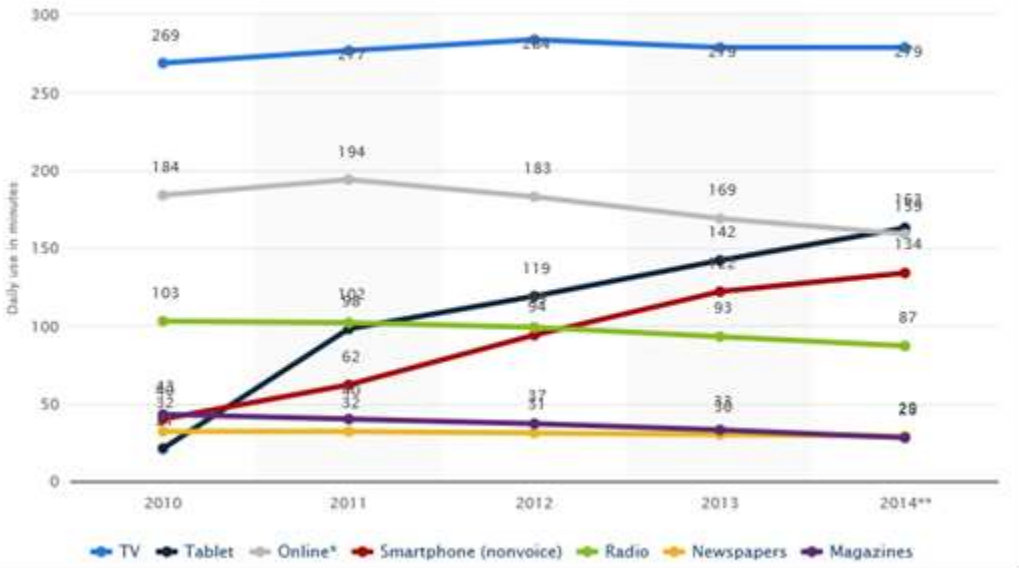

Figure 2: The daily media use on average in the United States from 2010 to 2014 (in minutes) [3].

1.2. Motivation

According to the study of Escobar-Chaves and Anderson, from the year 2010 to 2014 for the youth of United states, it was observed that the one U.S youth spent much of their time in an increasing trend on the media and were also much involved in unhealthy activities [6]. Social science and health researchers have strictly aware in their studies that the excessive use of media results in an extensive adaptation of aggressiveness and violence in the behavior of the young generation. It also affects through number of health concerns which lead to unhealthiness. Most of the major health problems are a result of a number of known and unknown reasons/factors. They are basically not due to the result of a single cause, but a combination/related to multiple factors. Just as all the people who die from the lung cancer does not have the addiction of smoking behind the cause. There could be other unknown

reasons as well, but the probability of lung cancer is increased by excessive use of tobacco. The World Health Organization states 6 million deaths and a damage of half a trillion dollars each year due to smoking tobacco [6].

Figure 3 Shows a calculation that the risk of developing lung cancer is 25 times higher among male smokers than among male non-smokers [7].

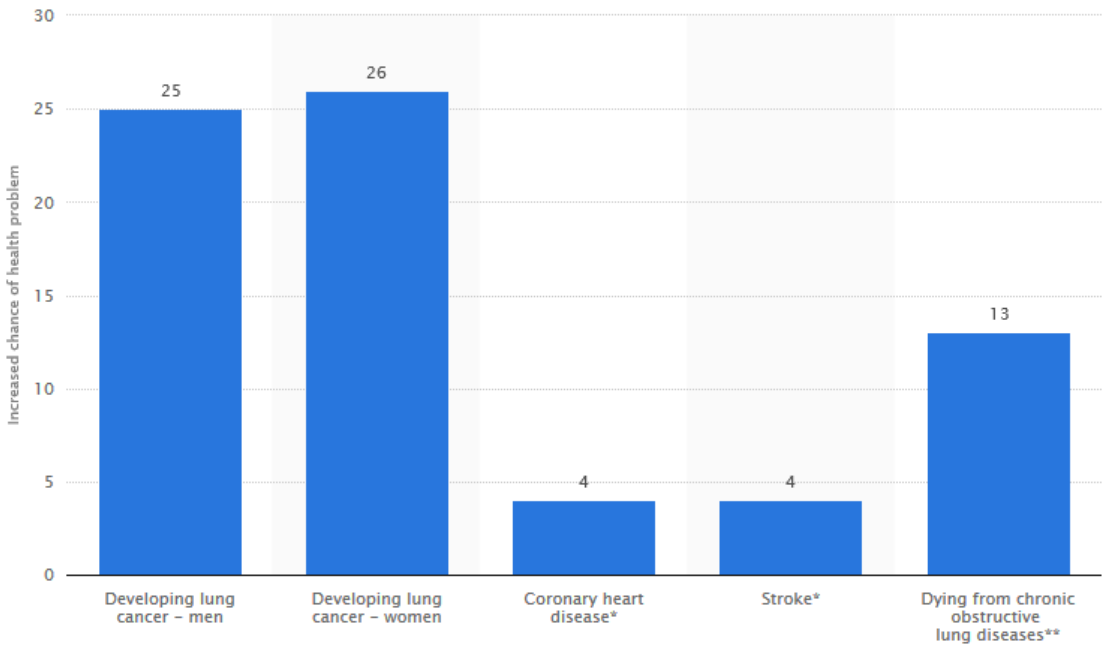

Figure 3: Result of smoking has increased the chance of health problems in the United States (2014) [3].

Video games are one of the most emerging media type today in all age groups. According to the Entertainment Software Association (ESA) [8] most frequent game players shared that video games are a source of connection with their friends and the other half of the game players stated that the video games enable them to spend time with their family.

"Video games provide a social setting where family and friends come together to connect, learn and have fun,"

Said Michael D. Gallagher, president and CEO of ESA [8].

Statistics provided by the ESA 2015 Essential Facts on the demographics of gamers, the types of games played and the platform used for these kind of games, the video games on the top-selling list and information about the other industry sales. Considerable findings include:

- **35 years** is the average age of the male game player whereas 43 years is for the female [8].
- **Women 18 years** or older represent outweighs the number of boys of the age 18 or above in game playing [8].
- On average, **13 years** is the time, gamers are playing games [8].
- More than **$22.41 billion** was spent by consumers on games' content including hardware accessories [8].

The rapid and immense growth of the gaming industry has alerted the scientist towards the effects of video games on the people who regularly play them. The video games have a classification which depends on different bases like the game play, storyline, and the content of the game (violent/nonviolent) and freedom of the player. According to the experimental studies, aggressive attitudes have been observed from the players who play violent games as compared to the players playing non-violent games [9].

Studies have shown that gaming affects cognitive abilities in players, such as memory, attention, executive control, scanning and tracking [10, 11, 12, 13, 14, 15, 16]. Gaming is also shown to be addictive [17], and a popular mean for social interaction and improving interpersonal skills. While considering human behavior, risk-taking attitudes play a significant role in daily lives. Risk attitudes vary among human beings depending on domain of risk and cultures. Different cultures have different social values, social history, and social ideology and they impact the risk behavior. Cross-cultural differences are found to influence

risky decision making [18, 19, 20, 21]. While comparing risk preferences of Chinese and American participants in different decision situations, Weber and Hsee [22] found Chinese participants to be more risk seeking than their American counterparts in the investment domain. They also noted that, ‘‘the past and the current levels of attention given to cultural determinants to decision-making were not just low, but inadequate’’ (p.34) [22].

Research shows that there is a possible connection between the high level of media exposure and risk behaviors in adolescence. The U.S. Centre for Disease Control and prevention (CDC) has identified six critical types of adolescent health risk behaviors. They include physical inactivity, poor eating habits, smoking, alcohol use, sexual behavior and violence. These behaviors don't just affect the health of adolescents, but also affect their education and employment prospects, and may lead them to criminal activities [6].

Researches have shown significant impact of various types of entertainment sources on human behavior. Risk glorifying media content such as smoking and drinking role models in movies, plays, and advertisement expressively increase the risk taking behavior in people. It also positively increases the risk promoting cognition and emotion [23]. Many studies find the positive correlation between exposure to risk glorying media and risk taking behavior. For example Beullens and Bulck [24] found a positive correlation between exposure to risk glorifying media and attitude toward risky driving in traffic situations. Different researches show a positive association between risk glorifying media and risky habits. People smoking on media positively correlate with people smoking in real life [25, 26], alcohol commercial and alcohol consumption [27]. Fischer et al., [28] found that frequency of playing video games positively correlates with motor vehicle collisions and obtrusive driving while negatively correlating with cautious driving. Kubitzki obtained data of 657 participants under 13-17 age group, and found the positive link between exposure to risk glorifying racing games and underage illegal driving [29].

1.3. Objective of this study

In this exploration, we are interested in finding out how this upcoming and emerging source of entertainment media (Video games) is impacting our abilities to take risks in various domains. During our study, we will experiment three types of video games (action, puzzle and strategic) and their respective impacts on three types of risk attitudes (health/safety, social and recreational). The research concerns to the students of universities and the gamers on social forums. The study will conclude the results on the behavioral characteristics of the participants towards responding to risks.

1.4. Structure of this study

In Chapter 2 we will discuss related work done so far. In chapter 3 we will discuss the methodology, tool and techniques used for data analysis. Also give a brief idea of the dataset and the scale used for risk attitude. In chapter 4, we will discuss results for each risk domain. Chapter 5 gives detail discussion regarding the experiments and results of experiments. Lastly, chapter 6 gives final conclusions and future works that can be done.

Chapter 2
Literature Survey

2.1. Risk

Nowadays people are living most complex life than ever before. They need to take tough and instant decisions frequently to manage their life. The outcomes of such decisions and surrounding conditions are more or less uncertain; therefore these actions have risk in advance. Everyone wants to overcome uncertainty in these outcomes, but no one can predict them. In cases where the outcomes are clear and controllable then they are not risky action [30]. Risk defines in many ways, but most likely it has experienced the effect of danger [31]. Individual differs with each other in understanding the risk it may depend on social and cultural conceptions and experience of the world [32].

2.1.1 Risk and uncertainty

Studies have clearly shown that individual has to understand two factors for taking risk; nature of uncertainty and the degree to which something matters. It is also understandable that different people experience different things under different circumstances. This results in different perceptions of different people about other people's perception about the risks. It is the situation which makes the decisions uncertain. For example, deciding whether to increase the speed of car on the road depends on either reaching to your desired destination in less time or the fear of being caught for over speeding [33].

The decisions are mostly taken without clear information which results in uncertain outcomes. Considering the cases where someone decides whether to go for medicinal operation without knowing the consequences of the operation. Also to put resources into business or securities exchange without knowing ahead of time whether business sector will go up or down or to go

to court without recognizing what will be the court choice. All above listed cases include reasonable uncertainty. A decision under uncertainty requires an assessment of two properties: the desirability of possible out-comes and their likelihood of occurrence [34].

All risk ideas have one common component; a distinction in the middle of certainty and probability. Rosa [35] characterized risk as a circumstance or an occasion where something of human worth (counting people themselves) is in question and where the result is uncertain. Thus, uncertainty is nearly identified with risk and assumed as an important mediator of human response in situations with unknown outcomes, psychological construct. It "exists just in the psyche; if an individual's knowledge was absolute, that individual would have no uncertainty".

Decision theory or theory of choice separates risk from uncertainty. According to this theory, risk involves probability of possible outcomes, whereas uncertainty involves probabilities of unknown outcomes [36]. Most real world situations are uncertain, with intermediate probabilities [37]. Frank Knight recognized two sorts of uncertainty in 1921 in a book named risk; risk, uncertainty and Profit. Uncertainty is when we know potential results ahead of time, and we may even know the odds of these outcomes. For example, before we roll a pair of dice we know all the odds of possible outcomes in advance. Cards are a bit trickier than dice, but we can know the chances ahead of time. Another kind of uncertainty is ‘Genuine uncertainty’ and it happens when a lot of actor interacts after some time and we don't have the foggiest idea about the conceivable outcomes [38].

The response to different situations and uncertainty can be explained by different risk terms such as, averse, seeking, tolerant or neutral. Table 1 explains all these risk attitude terms. These are the choices that are made by different individuals or groups in various situations depending on their perceptions. There can be a variety of different responses by different individuals depending on different situations; they can be categorized in the following Figure 4 under four basic positions:

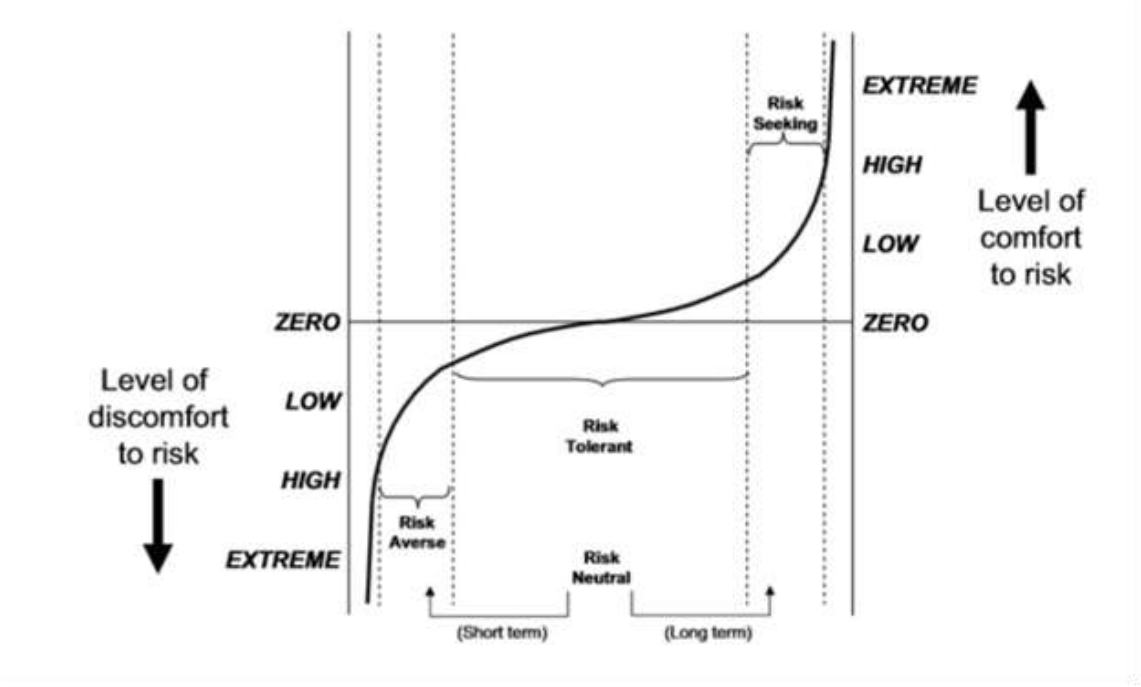

Figure 4: Risk Attitude Spectrum [39].

Table 1: Risk attitude terms [39]

Term	**Definition**
Risk averse	Unhappy with uncertain results and not willing to take risks.
Risk seeking	Always like to take chances in uncertain outcomes and feel happy to exploit opportunities.
Risk Tolerant	Tolerate uncertain outcome if necessary. Otherwise never respond to threats.
Risk neutral	Not happy with long term uncertain outcomes and like to take short term decisions.

2.1.2. Risk Perception, attitude, and behavior

Risk perception is the subjective judgment that individuals make about the attributes and seriousness of a risk. Individuals make diverse appraisals of the hazardousness of risk, for example; utilization of atomic energy, scientific specialists pronounces utilization of atomic energy safe however open observation was against the utilization of atomic energy. Individuals saw it as threats to the earth. This is because of the distinction between overstated open discernment and incorrect information on scientific facts. Individuals have exaggerated fears due to inadequate or incorrect information [40].

Risk perceptions are impacted by numerous components, for example, newness, stigmas, dread and emotional states of the perceiver. The valence theory of risk perception clarified two kinds of feeling positive (happiness and optimism) and negative (fear and anger). Positive feelings lead to idealistic risk perceptions while negative feelings impact a more cynical perspective of risk. Individuals express more concern toward issues with prompt impacts instead of long haul issues that may influence future eras, for example, environmental change or population growth. Individuals as a rule experience regular issues, for example, unsafe waste or pesticide-utilize and not specifically impacts by long haul issues like environmental change. For long haul issues the vast majority just has virtual experience through history, stories and media and so forth. Individuals don't comprehend the significance of these long hauls or damaging conduct of these issues, even specialists give fundamentals or exploratory truths [39].

Risk perception is the subjective appraisal of the likelihood of a predefined kind of incident and how concerned we are with the outcomes. To perceive risk incorporates assessments of the likelihood and also the results of a negative outcome. It might likewise be contended that as influences identified with the action is a component of risk perception. Risk perception goes beyond the individual demographic and status values. It involves many factors like social and cultural construct, history and ideology [37].

Conscious, subconscious and affective factors (feeling and emotions) can separately detail the factors affecting the perception of risk. These three factors combine to become a triple strand that influence and combines effect on the individual's response to any given situation. Figure 5 explains the triple strand of influences on perception and risk attitude.

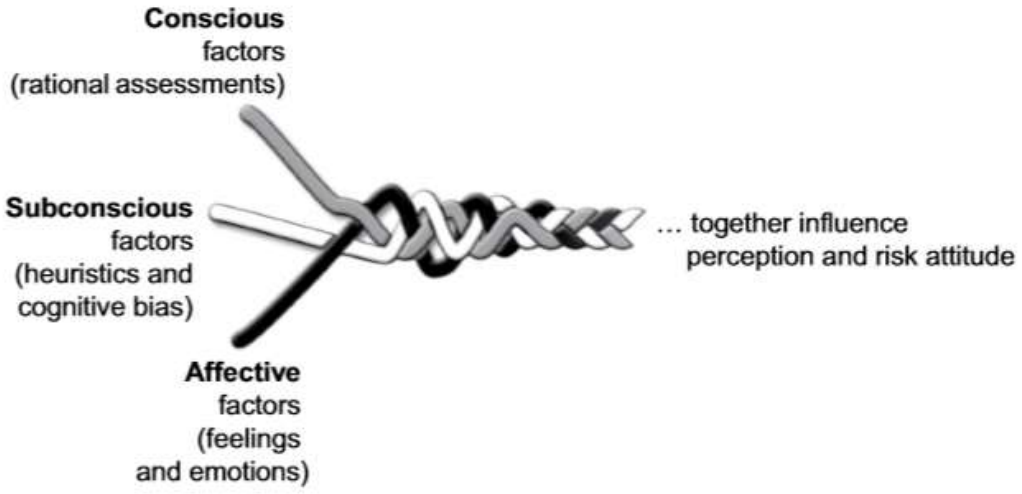

Figure 5: The triple strand of influences on perception and risk attitude [33].

Perception has a major role in driving the risk attitudes which directly affect the quality of decisions made under different uncertain situations.

Risk attitude and risky behavior have been studied very often in psychology [21, 41]. Arrow–Pratt measure of absolute risk-aversion (ARA) is a commonly used metric defined as: u''(x)/u'(x), where u is utility function, u' and u'' are first and 2nd derivatives of utility function u [42, 43]. Theory of reasoned action is a well-known model of risk taking attitude and risk taking relationship and the theory of planed behavior expands the risk taking relationship [21, 44]. Risk behavior is influenced by attitudes and subjective norms about a behavior (as well as perceived behavioral control). Also in turn, determine the probability of

the behavior occurring. Attitudes themselves are defined as the rational integration of the expectancies and values put on the outcomes of the behavior [21].

Many studies conducted to explore human risk behavior give us insights into different dimensions of risk taking. Expected utility (EU) and prospect theory [45], investigate risk attitude. Risk attitude is "'a descriptive label for the shape of the utility function presumed to underlie a person's choices" [21]. Risk attitude is classified into three types: risk seeking, risk averse and risk-neutral. Researchers view risk attitude as a personality trait in personality and social psychology. According to Weber et al., [21] individual risk behavior is domain specific, where the risk behavior is not consistent across domains .

Risk attitude is content particular people don't give off an impression of being reliably risk seeker or risk averse crosswise over distinct domains and circumstances, when utilizing the same strategy, as recorded in both research studies and administrative contexts [46]. So it shows the risk attitude is content specific and may be influenced by many factors like culture, social values, history and person status who is taking the risk [18]. Peoples are willing to take more risk individually as compare to in the group [47]. Another study shows that the person having administrative jobs is considerably different in risk attitude. They take more risky decisions using company money, comparatively when involving personal money [48].

Risk behavior involves some potential for danger or harm against some reward [49]. Risk taking covers a wide range of behaviors that includes both positive and negative ones [49, 50]. Risky activities in which profit and loss ratio is already defined to have predictable risk e.g. gambling or lottery. Some risky activities in which profit and loss ratio is ambiguous have unpredictable risk. Predictable risk carries an identifiable risk of loss or harm occurring each time they are performed whereas in unpredictable outcomes are not defined. Smoking and alcohol use are examples of unpredictable, risky activities, i.e. where the user doesn't know what amount of the substance will be harmful. But risk increased with each repetition [49].

Risky behavior, risky investment, gambling, reckless driving, child's injuries, smoking, drinking, and extreme sports are major concerns for general public safety in scientific research. Traffic accidents are a major cause of injuries worldwide. Reckless driving along with drugs, risky behavior, and speeding are getting attention worldwide [51].

2.1.3. Factors influencing risk attitudes

Researchers highlight many factors that influence risk attitudes. Weber et al., [21] found gender differences in all domains (financial risk, ethical risk, health/safety risk and recreational risk) accept social risk behavior . Dohmen et al., [52] and Weber et al., [21] founds women are more risk averse than men. Byrnes et al., [50] did a meta-analysis review over 150 papers in gender differences in risk perception. Age is also an important factor in risk taking behavior and is negatively associated with risk taking attitude [52, 53]. Family background also influences risk taking attitude. Results have shown that educated parents are more willing to take high risk [18, 52]. In Pakistan, rural and urban societies are quite diverse in terms of education, economics, and lifestyle.

Findings have also shown that risk glorifying media content and risk taking behavior are both positively associated. Experimental evidence shows that exposure to alcohol and smoking in movies and in other media increases the consumption level of alcohol resulting in smoking behavior and alcohol related problems. The effects of risk glorifying media are not domain specific so the forms of risk glorifying media are to be investigated [51]. Nowadays, most of the media content contains exemplified risk taking behavior. It includes games and movies with risky stunts, reckless racing, smoking, drinking and gun shooting, etc. Researchers have found that exposure to risk glorifying content increases the level of risk taking behavior.

About 875,000 children die every year in the world because of un-intentional injury [54]. According to social learning theory, children's risk of injury can be influenced by many sources, including video games and television. Previous research suggests that these media

sources display risky behavior and general disregard for safety. This can influence children to perform risky behavior causing injury [55].

Studies have shown significant gender differences in risk taking tendencies. Women are found to be more risk averse than men as they invest less than men in risky assets, but they can be influenced [56] . An experiment conducted on children of Columbia and Sweden having age between 9 and 12 shows that both girls and boys accomplished all tasks, but the boys took more risks than girls due to variance in their risk taking behavior. The experiment had four tasks: running, word search, math and skipping rope [20].

Dreber et al., [57] measured risk-taking in tournament-bridge decisions. The study was conducted with skilled bridge tournament players. These players consider risk probabilities quite frequently. North American bridge championship fall 2008 participants were recruited for this study. The results indicated no major gender difference in risk taking in Tournament Bridge decision-making. But there was significant difference in financial risk taking attitude of males and females. Females were significantly more financially risk-averse than males. It also explores self-reported risk taking and self-reported behavior in risky activities.

In the last three decades, U.S. is well known for highest adult obesity rates in the world for all age groups [6, 58]. National Health Examination surveys, 2003-04 show that the ratio of obesity increased more than three percent for children aged 6-11, and it is increased five percent for ages 12-19 years [6]. Almost 35 percent of the U.S. population of ages between 6-19 years old is considered overweight and nearly half of them are considered as obese. Poor health problems, including diabetes, hypertension, high cholesterol, orthopedic, and sleep disorder are known to be increased by obesity [58]. U.S. spent $99 million on obesity related problems in 1995 [59], most of them relates to 2 diabetes, heart disease and hypertension [60]. Obesity-related diseases cost the U.S. nearly 6 percent of its spending on health [6].

Researchers think that a decrease in metabolic rate, physical activity and increase in calorie intake or eating in response to food advertisement while watching TV is the link between television watching and obesity. Similarly, video games may also be linked to obesity. About

$1 billion is annually spent on food advertisements [62]. In U.S only $1.4 billion was spent on food products and $1.2 billion to promote restaurants on TV in 1997 [63]. More than 75% of advertisement budget is spent on television advertisement [64].

An observational study shows that TV viewing is link to total energy intake and intake of foods advertised on TV [65]. Among youth those who watched TV more than 5-hours a day, ratio of being overweight is five time greater to those who watch less than 2-hours [6]. TV watching is positively linked with Obesity In girls also [66].

An experimental study also shows the link between watching movies and obesity. Usually movies do not include product advertisement most used strategy is product use by actors and product placement [6]. In an experimental study 105 children of 6-7 year; participants were divided into 'treatment and control' groups. Treatment group saw movie clip character drinking Pepsi Cola and control group children saw the movie clip without Pepsi Cola. After viewing movie children who saw a character with Pepsi cola were more likely to choose Pepsi [67].

Link between video games and obesity is not tested enough. Some studies show video games positively relate to weight status of girls [68]. Some studies suggest video game playing is related to higher energy spending [69]. Studies show some video games need an extreme physical movement, for example; 'Dance Dance Revolution' is making positive differences [70]. The McDonald's, Kellogg's, General Mills, and Hostess websites all have 'Advergames' although these are not directly linked to obesity, but it contributes to children choices for food and beverages [6].

Smoking is one of the major health concerns for the U.S. government [71]. Smoking is associated with many health problems such as cough, physical fitness, lung disease [72]. The majority of new smokers are adults, in 2005, the majority of the new smoker almost 63 percent were less than 18 years old [73]. Factors that influence smoking in adolescents are social norms, advertisement and promotions, peer pressure. Cigarette companies spent a large amount of budget for promotions of products, in 2003, $15.2 billion was spent on

advertisement to promote their products [74]. Several studies found the correlation between media advertisement and smoking [6].

Gidwani [75] studied the relationship between television exposure and smoking initiation in adolescents. He found a positive association between the number of hours watching TV and smoking initiations, those who watch television 5 hours a day are more likely to start smoking than who watch 3-4 hours a day [75]. More they watch more they feel positive for smoking [76]. Many studies provide strong evidence between exposure to smoking in media and becoming smokers. In 1998, forty-six U.S. states banned cigarette advertising in movies, commercial videos, television show, any motion picture, and in video games [77]. Advertiser know that youngsters influenced by what they see on media. Longitudinal, experimental, and cross-sectional studies all finds positive correlation between viewing smoking at media (television, movies, video games, internet, music and in Advertisement) and becoming smokers.

Alcohol use is another big problem in children and adolescents as it carries some harmful consequences like school performance and risky behaviors. Underage drinking positively correlates with motor accidents, crime, immature injuries and deaths, and school fighting [78]. Alcohol manufacturers spend $1 billion every year at the advertisement and it is everywhere in sports events at electronic media, on the internet [74]. Alcohol advertiser relates it with an image of success, fun, love and it's designed to appeal youngsters through movies, television, magazine, radio, and billboards. Research strongly suggests that exposure to alcohol at media increase adolescent alcohol use [6].

Over last 50 years, many studies conducted in different countries all over the world during different time periods and they show that violent media increase the likelihood for aggressive behaviors [79, 80, 81, 82, 83]. Some people deny media violence, even some educated people [84]. There are many reasons people deny media violence, one reason is that sometimes people think media violence should be immediate for example playing violent media game and immediately shooting someone. Some studies find evidence that the effects of violent

media are harmful, but some not, but it is clear that violence, media influenced the factors for the long run and short run aggressions [83].

Researches have shown significant impact of various types of entertainment sources on human behavior. Risk glorifying media content such as smoking and drinking role models in movies, plays, and advertisement expressively increase the risk taking behavior in people. It also positively increases the risk promoting cognition and emotion [51]. Many studies find the positive correlation between exposure to risk glorying media and risk taking behavior. For example Beullens and Bulck [24] found a positive correlation between exposure to risk glorifying media and attitude toward risky driving in traffic situations. Different researches show a positive association between risk glorifying media and risky habits. People smoking on media positively correlate with people smoking in real life [25, 26], alcohol commercial and alcohol consumption [27]. Fischer et al., [28] found that frequency of playing video games positively correlates with motor vehicle collisions and obtrusive driving while negatively correlating with cautious driving. Kubitzki [29] obtained data of 657 participants under 13-17 age group, and found the positive link between exposure to risk glorifying racing games and underage illegal driving.

Human risk attitude varies in different domains. Weber et al., [21], developed a psychometric domain-specific risk-taking scale to measure the risk attitude in five different domains social risk, ethical risk, financial risk (investment and gambling), health/safety risk and recreational risk. The scale is valid for risk attitude measurement in different cultures such as Spanish, Dutch and German culture. There are differences in eastern and western cultures [18]. Weber & Hsee [22] compare American and Chinese risk preferences in different decision situation like sure and the probabilistic payoff. They noted that “the past and the current levels of attention given to cultural determinants to decision-making were not just low, but inadequate”.

2.2. Gaming

Games are leading form of computer software and a source of entertainment. They earn massive amounts of money; produce heated debate, and their players spend huge amount of time on them. These things make video games one of the leading forms of personal and social entertainment. Due to the popularity of video games, there is increased interest in their working and effects. Until recently video games were neglected as an area of research, but now things have changed due to people working in the field of Human-Computer Interaction [85].

Past research conducted on video games was focused on exploring video game design, and interactional issues. There was lack of research in the psychology and effects of video games. However, today most video game research originates from psychology, players cultures, games contents and impact of video games on players. These studies do not explore ‘what a game is’ and ‘why people engage in gaming’ [86].

2.2.1. Games and Gamers Classifications

Games are classified in many ways, like story line, structure of video games, player’s freedom, and video game content etc. if we classify games based on story line then there are two main categories finite and infinite video games. In infinite video games the story is either stuck or looping endlessly. In finite games the game has an actual ending [87]. Games are also categorized based on their game play. A set of game play challenges is called game genre. Games are also classified regardless of their content and structure. In action games it is not essential to be based on real world scenarios, most of time fantasy or the outer space world is used to make it more interesting. Role playing, strategy, simulation and some action games are a common example of this type of genre classification [88].

A person who participates in a game is called a gamer or player. In most games the best performer is the winner. In multi-player game there may be more than one winner. Players are

categorized on the basis of game type, gaming time, and interest. Casual, Core, Hardcore are few types of gamers. Casual gamers have limited time and interest in game playing. They are slower paced than hardcore players [89]. Core gamer has a wider range of interest in game than casual gamers and they like to play different types of games. The mid-core gamer enjoys games but may not finish every game they buy. Hardcore gamers put a considerable amount of time in playing video games. They have up-to-date technologies and prefer to play complex games and often look for information about games [90].

Players play video games with different motivations. Theory of game motivation divides video game players' motivation in three types of rewards; achievement, recognition and satisfaction. The player can feel and satisfy these rewards and psychological needs by playing video games. Players may differ with each other in these motivations and needs. It is possible that someone is playing for only one of these motivations and another is playing for multiple. The basic psychological needs are danger management, gain of knowledge, feeling competent, managing tasks, competition, award and power, caring, emotional regulations and cooperation with others to get rewards. Figure 6 showing the theory of gaming motivation and 11 basic needs attached with three rewards [91].

Figure 6: Theory of Gaming Motivation [91].

Player motivations also differ with each other which relate to different demographic variables (age, gender, usage pattern, in game behavior) [92]. Liebert & Yee analysis shows motivation in MMORPGs does not suppress each other as Bartle, 1996 advised [92]. If a player scores high in a game, this does not mean that they scored low on social component. Different peoples choose to play video games with different reasons and interest and one game have

different meaning for different players. Liebert & Yee [92] explore the motivation of playing games in MMO players and also motivational factors and effect of game play for different players. They provide a solid model to understand players' motivations and a tool to access those motivations. The model also provides insides into game playing behavior, usage patterns and demographic variables in relation to player motivations.

Everyday millions of people play different types of games with different motivations and interest. Literature shows that video games relates to players in many ways like age, gender, decision making, in game and out game behavior, cognition, memory, etc. Also, as discussed before, the risk behavior of human beings have significant practical implications. In this study, we are exploring if exposure to video games impact the risk taking behavior of players. We would also control the study for factors such as age, gender, player's proficiency and, game type etc., along different risk domains.

Video games, improve basic cognitive skills that can be applied to novel tasks and stimuli [93]. Cognitive psychologists have been investigating the possible social impacts of video games playing. In 1983, Lynch finds that cognitive abilities, memory, visual tracking, mathematical ability and verbal abilities are key components in video games [94]. Researcher focused on video games impacts on cognitive performance. Wadhams introduces new terminology "ludology" in 2004 for computer game research [10, 95].

Visualization is the ability to mentally manipulate visual patterns. Sims & Mayer found that Tetris players have better visualization than non-Tetris players. Video game players are good in forming a mental image of a whole task before performing it [10, 96].

Skilled video game players are better able to filter out relevant and irrelevant information and they focus on the information [10]. Computer gamers are better able to concentrate on game features and perform better in different video games [97]. Green & Bavelier found that computer games increased attention capacity and useful field of view [98].

Kuhn and Ho [10] found that video game players are better able to create reasoning strategies and control information . This control information ability leads them to find a better relationship between concepts [10, 99].

Video games like super breakout help to increase the visual scanning and visual tracking. Simon et al., [100] found that super breakout 12 hours training can increase players visual scanning and visual tracking.

In conclusion, the researchers found that playing games, even for a short period of time can increase cognitive skills like visualization, memory, tracking, scanning, concentration, executive control and selective attention. But these cognitive performances do not exist independently [10]. Kearney [101] conducted a study to determine the relationship between video game playing and cognitive performance . SynWin [102] computer tool was used to measure the cognitive performance and action video game (counter strike). Participants played SynWin for three times, twice for practice and one after playing video game. Results show increase in SynWin score for game players so playing first-person shooter game (counter strike) can increase cognitive performance [10, 101].

2.3. Research Question

As previous seeing media has influence at our risk taking behavior. So we are exploring the relationship between risk taking attitude of players and different types of games. The attitudes towards the risks in our study are assumed on the basis of preferences towards the category of games selected, the choice of gaming device and the amount of time dedicated towards the game that is played. Different people with different game playing approaches will surely have different perception about taking risks in their daily life. The impact of the relation between the games and the behavior of the individual surely impacts in taking all sorts of decisions in life as people try to absorb and adopt the influence of the characters they see in different forms of media. We will try to examine the direct relation between risk attitude and gamming preferences and how they influence the way people make decisions in daily life. Therefore research question can be concluded as following:

“Exploring the relationship between Risk attitude and Gaming preferences?”

Chapter 3
Methodology

This chapter explains the methodology of the complete process of data analysis techniques used. The following section explains about the dataset, the results from the pilot, and risk attitude scale used to measure risk attitude of video game players. Confirmatory factor analysis (CFA) was used to check the reliability and validity of measurement model. The final section explains the Multivariate analysis (MANOVA).

3.1. Dataset

Participants were included from two key sources. First, College students were invited through college emails and gaming communities. Second, web volunteers were welcomed, through social networking sites and public communities/forum postings, including various www.facbook.comFacebook gaming pages and groups like, www.kyscencehai.com, and www.pakgamers.com.

The final dataset comprised of (N=286) participants enrolled from all sources, 60% members selected from College and 40% from social networking sites or gaming groups. The age of respondents ranged from 20 to 45 years. Final sample incorporated 80% male and 20% female members. The survey was conducted through google docs.

3.2. Pilot

The survey was piloted among a small sample of 25 college students to ensure its clarity, as well as applied in various risk domains. For each risk measure, we added two additional options in the Likert scale i.e. “did not understand” and “does not apply to me”. After the first pilot test, we further reworded the questions that marked high on “did not understand”. Fortunately, none of the questions were selected as “does not apply to me” allowing us to keep the measures. After first pilot results, some modifications were made in risk attitude

scale and the scale was tested again as second pilot among a small sample of 30 participants. The results were satisfactory. The final survey is given in Appendix A.

3.3. Risk attitude, gaming, and demographic measures

It is important to know the gaming exposure of participants; it helps to classify information accordingly. Participants need to provide basic information which helps to grade their gaming exposure. In order to analyze the gaming exposure of the participants, they answered several questions, such as how much time they spend on games every week and do they participate in gaming competitions? Moreover, participants have to say about the types of games they liked most (Action, Puzzle, and Strategy). They also ranked their favorite type of games using a scale from 1 (Never) to 5 (Always) and how regularly they played these games in a week (1 hr., 2 hrs. 16 hrs. Every/week.). Females were more inclined to play puzzle games and married individuals invested more energy in strategic games.

Furthermore, participants indicated via checklist which gaming device they most commonly used to play games (Desktop, Laptop, Tablet, Gaming comfort, Smartphone and other) for each category (Action, Puzzle, Strategy).

3.3.1. Risk attitude

Participants addressed 19 items/questions intended to assess their risk attitude, which was conducted for three domains (Social, Recreational, and Health/Safety). The DOSPERT scale composed by Weber et al., [21] can be utilized to measure risk behavior and risk perception, consisted of 40 items for Health/safety, social, Ethical, Recreational and Financial (Gambling, Investment). Due to poor relevance, a few items/measures were removed from the scale, e.g. consider the item (‘engaging in an unprotected sex'). In culture of Pakistan, people have a conservative approach about sex as they believe it to be an ethical issue rather than a matter of health or safety. Similarly, recreational item “Going down a ski run that is beyond your ability or closed.” was changed to “Climb a wall that is beyond your ability.” As ski run is not easily available for each participant. Gambling is also not considered as a financial matter in

many cultures and also not legal in many countries. Thus, individuals additionally see it as a moral matter as opposed to budgetary. Keeping in view the distinctions in culture, a few things were erased and rephrased because the dimensions that the measurements with which they were related were not those that were hypothetically anticipated.

3.3.2. Gaming preferences

To get the game preferences of the players, questions related to the likeness of a gaming type (Action, strategy, and puzzle), time spent per week on playing the games, and the preferred choice of device for gaming were asked. These probing basically cleared the picture about the preferences of different people favorite device used for gaming.

3.3.3 Demographic

Previous researches shows demographic (gender, age, marital status, etc.) also influencing factors for risk attitude. Male and female were found different in risk attitude in various risk domains. Marital status also found to be an influencing factor. Therefore we used two demographic questions to perceive the influence of gender and marital status in our study.

(1) Gender, and (2) marital status in the study.

3.4. Data Analysis

This section describes the details of data analysis techniques used to validate measurement model.

3.4.1. Data screening

We initially began from finding any missing information in the dataset. There were no missing values in dataset so the quantity of remaining participants was same as starting dataset (N = 286). After that the responses with least interest of participants' involvement responses were removed from dataset through standard deviation (SD) of each participant's

response. SD=0 indicates participants not putting attention or not understanding the questions. Only one participant was removed, making the final data set (N=285).

3.4.2. Confirmatory Factor analysis (CFA)

Principal component analysis with varimax rotation was used to test the initial survey items' loading on the different factors. The criterion used in the analysis was a factor loading greater than 0.5, and Eigenvalues greater than 1.0 [103]. Most items loaded on their respective theorized constructs, but items in social construct (GHB28, GHB21, GHB9, GHB1), Recreational construct (GHB15, GHB13) and four items in Health/Safety (GHB4, GHB7, GHB30, GHB23) were dropped since the factor loadings were < 0.5 or loaded in multiple constructs. The results that were final of the factor analysis are shown in Table 2.

Table 2: Factor loadings

Construct	Item	1	2	3
Social	GHB29	.52		
	GHB14	.63		
Recreational	GHB32		.61	
	GHB31		.64	
	GHB25		.76	
	GHB2		.63	
Health/Safety	GHB34			.52
	GHB33			.54
	GHB26			.51

Confirmatory factor analysis (CFA) was conducted to verify the current exploratory model by using SPSS AMOS 22.0. Results from the CFA shows excellent model fit (CMIN/DF=3.713, RMSEA = 0.02, CFI = 0.97, TLI=0.98, AGFI=0.96), well fit CFA is evidence of scales internal reliability. Risk items having loadings less than 0.5 eliminated from the model. The factor loadings of all items for risk behaviors ranged from 0.51 to 0.76. Convergent reliability and Discriminant validity are also achieved. Complete detail of reliability and validity of measurement model given below.

3.4.3. Measurement Model

Some variables such as job satisfaction, behavior/attitude, education commitment, socioeconomic status, IQ level and some other verbal abilities are more often latent (unobserved) variables. Latent variables are not easy to measure directly like other variables like gender, age, etc. Therefore, observed measure is used to measure the latent variables. The measurement model specifies the relationship between observed measures and latent variables. Before specifying the model, it is very convenient to check the validity and reliability of latent variables indicators. Figure 7 shows proposed measurement model with three latent variables (Social, Recreational, and Health). GHB29 and GHB14 measures were used to capture the social risk attitude. GHB32, GHB31, GHB25, and GHB2 were used for recreational risk attitude. GHB34, GHB33, and GHB26 were used for health. Small round circle with each measure are error terms. These are attached with each measure because there may be some other factors involve in construct but we are not considering them in our study. Error terms are also considered as latent variables in measurement model.

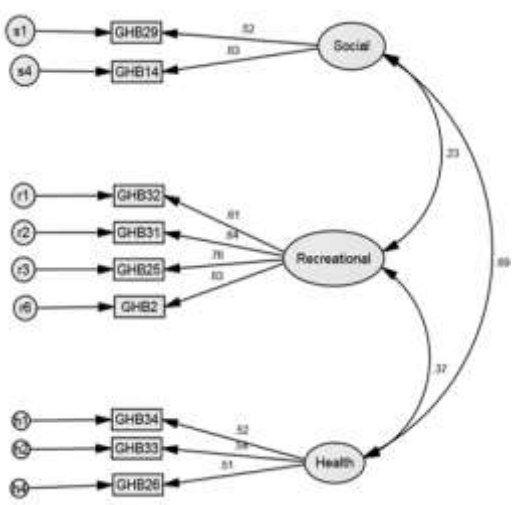

Figure 7 : Measurement Model

3.4.4. Reliability and Validity

Measurement model is assessed by reliability and validity of the proposed model. For reliability, it is needed to achieve estimation of internal consistency and for validity convergent and discriminant validity needed to be achieved [104]. The values of the average variance extracted (AVE), Cronbach's alpha, and composite reliability (CR) are used to evaluate the internal consistency of the proposed model [105, 106]. Table 3, showing the values of the average variance extracted (AVE), Cronbach's Alpha, and composite reliability (CR). All values are above threshold level (AVE = 0.5; CR = 0.7; Cronbach's Alpha = 0.7) which indicates the sufficient internal consistency.

Table 3: Reliability and Validity

Factors	Number of items	Composite Reliability (CR)	AVE (Convergent Validity)	Cronbach's Alpha
Social	2	0.794	0.770	0.83
Health/Safety	4	0.731	0.834	0.748
Recreational	3	0.754	0.736	0.896

3.4.5. Discriminant Validity

Discriminant validity was checked by examining whether the correlations between the variables are lower than the square root of their AVEs.

Table 4 shows that the square root of AVE at main diagonal is greater than the relation with other constructs which shows the discriminant validity of the model. There are no severe cross loading problems regarding discriminant validity. All items used in the model have factors loading more than 0.5 which shows the convergent validity of the model [107].

Table 4: Discriminant Validity

	Recreational	Social	Health/Safety
Recreational	0.857	.330**	.484**
Social	0.330**	.877	.862**
Health/Safety	0.484**	.862**	.913

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

3.4.6. Playing Time and Likeness Correlation

The correlation between games type likeness and gaming time also conducted to determine whether people who like particular category also spend time on it. Table 5, shows the positive correlation between particular game type and gaming time. People who like Action video games (AVGL) also spend much time on it similarly for Puzzle and Strategy games.

Table 5: Time & Likeness correlation

	AVGL	AVGT	PVGL	PVGT	SVGL	SVGT
AVGL	1	*0.585*	-.013	.080	.192	.098
AVGT		1	-.118	.191	.250	.378
PVGL			1	*.593*	.076	-.083
PVGT				1	.120	.177
SVGL					1	*.693*
SVGT						1

Correlation values between each game type and time in bold and italic. AVGL = Action video game likeness, AVGT = Action video game time, PVGL = Puzzle video game likeness, PVGT = Puzzle video game time, SVGL = Strategy video game likeness, SVGT = Strategy video game time.

3.5. Multivariate analysis of variance (MANOVA)

Multivariate analysis of variance (MANOVA) was conducted to find out the correlation between dependent and independent variables. After receiving acknowledgeable results of validity and reliability of the measurement model; a multiple analysis of variance (MANOVA) was conducted to explore the relationship between multiple dependent and multiple independent variables. We can use ANOVA as well for each dependent variable, but MANOVA can do simultaneously for all variables. The acceptable t-value would be ±1.96 with a significance level of 0.05.

MANOVA was conducted with three latent variables (Recreational, Social and Health) as dependent variables (DVs), and AVGL, AVGT, PVGL, PVGT, SVGL, SVGT, gender, and marital status of participants as independent variables (IVs). Table 6 shows the hypothesized mean of DVs and IVs variables

Table 6: Dependent (DV) & Independent (IV) variables

Variables	Meaning
Recreational	Recreation Risk.
Social	Social Risk.
Health	Health/Safety Risk.
AVGL	Action games likeness.
AVGT	Action games playing time per week.

PVGL	Puzzle game likeness.
PVGT	Puzzle video games playing time per week.
SVGL	Strategy games likeness.
SVGT	Strategy games playing time per week.

Chapter 4
Experimental Results and Evaluation

In this chapter, we present and analyze the results extracted from multivariate analysis MANOVA for each construct (Recreational, Health/Safety, and Social). We have made experiment using IBM SPSS (22.0) tools.

4.1. Recreational risk

The results generated from MANOVA shows ($\beta = 0.286$, t-value = 3.835; $p < 0.05$) the recreational risk attitude is influenced by action video games. Which states that players who like to play action video games are more likely to tend to participate in recreational risk activities, Table 7.

Table 7: MANOVA result for Recreational Risk

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t
AVGL	0.17756493	0.28688	0.0463	3.83521	0
AVGT	-0.015769106	-0.12908	0.00993	-1.5876	0.114
PVGL	0.058811555	0.098456	0.04702	1.25078	0.212
PVGT	-0.008923094	-0.04266	0.01639	-0.54448	0.587
SVGL	0.045765082	0.087954	0.04372	1.04671	0.296
SVGT	0.010094844	0.079499	0.01155	0.87378	0.383

Gender	-0.26055656	-0.13864	0.12493	-2.08564	0.038
MaritalS	0.021395222	0.005597	0.22316	0.09587	0.924

The result (β = -0.13864, t-value = -2.08564; $p < 0.05$) states that males tend to contribute more towards the recreational risk than females. The findings in the experimented results are independent of marital status.

4.2. Social risk attitude

Action video games positively affect social risk attitude. (β = 0.271939, t-value = 3.58815; $p < 0.05$) states that people like to play action games tend to show risk taking tendency in social activities. Table 8 shows results for social risk attitude and its relation with gaming preferences.

Table 8: MANOVA result for Social risk attitude.

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t
AVGL	0.109935591	0.271939	0.03064	3.58815	0
AVGT	-0.01265283	-0.15857	0.00657	-1.92496	0.055
PVGL	0.013125124	0.033642	0.03112	0.42181	0.673
PVGT	0.014092603	0.103163	0.01085	1.29944	0.195
SVGL	-0.010492961	-0.03088	0.02893	-0.36265	0.717
SVGT	0.009810769	0.118292	0.00765	1.28323	0.2
Gender	0.013438183	0.010948	0.08267	0.16255	0.871
MaritalS	-0.028979791	-0.01161	0.14768	-0.19623	0.845

It was observed that gender and marital status have no impact on social risk attitude.

4.3. Health/Safety risk attitude

Action video games positively influence health and safety risk taking attitude of players. The result ($\beta = 0.3002$, t-value = 4.01001; $p < 0.05$) validates the claim. Table 9 shows results for health/safety risk attitude and its relation with gaming preferences.

Table 9: MANOVA results for Health/Safety risk attitude

COVARIATE	B	Beta	Std. Err.	t-Value	Sig. of t
AVGL	0.144691	0.3002	0.03608	4.01001	0
AVGT	-0.01254	-0.13179	0.00774	-1.61959	0.106
PVGL	0.008958	0.019259	0.03664	0.24446	0.807
PVGT	0.015103	0.092731	0.01277	1.18247	0.238
SVGL	0.020071	0.049536	0.03408	0.58903	0.556
SVGT	0.004638	0.046908	0.009	0.51515	0.607
Gender	0.081702	0.055829	0.09736	0.83916	0.402
MaritalS	-0.04149	-0.01394	0.17392	-0.23859	0.812

It was observed that gender and marital status have no impact on health/safety risk attitude.

Overall findings showed game preferences influenced risk taking attitude in various risk domains. We also observed influence of gender and marital status in some domains.

Chapter 5
Conclusion and Future Work

Discussion

Risk-behavior measurement scale opted in our approach proved excellent model fit and showed reasonable reliability & significant validity. The main focus of our study aimed understands the relationship between game preferences and risk taking attitude of the players in various risk domains. The game preferences are Action, puzzle and strategy while risk domains include; social, recreational and health/safety. The research analyzed the correlation between the game preferences and the risk domains and it concluded that the people who play action games are comparatively more aggressive in nature and have different risk taking behaviors than who play puzzle based or strategy games.

5.1. Social Risk attitude

Figure 8 explains the social risk attitude construct. There were six measures used for evaluation of social risk taking attitude, i.e. GHB1, GHB9, GHB14, GHB21, GHB28 and GHB29. A few measures were excluded from social constructs due to less factor loading on the results; hence we were left with only two high impact measures i.e. GHB29, and GHB14.

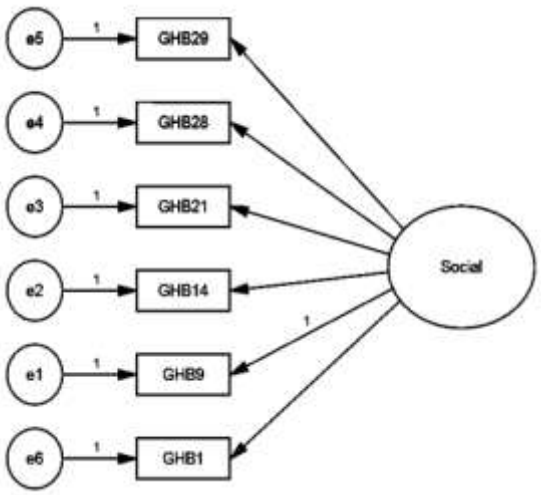

Figure 8: Social risk attitude

The analysis of the results state that the action based video games increase social risk taking activities such as aggression, violence, crime, cheating, shoplifting and learning problems.

These effects were also recorded for the participants who like to play action based video games, even for a short time 3-5 hrs. (Per week). Previous researches showed action games gives rise to aggressiveness in behaviors [108].

Gender and marital statuses were two control variables in measurement scale. Results showed positive effects on both genders by playing action video games. Action games are more popular as compared to other games category. Action games were introduced in the market in 1970s. It was not an issue until the systems like Sony PlayStation issued in late 90's. The advancement in technologies & frameworks enhanced the capacity to develop games with real effects. The more real they have turned, the more enthusiasm there has been in the relationship between violent games and violent behaviors. Today on Amazon, the most sold and popular game is "Call of Duty ". In this action game, players act as fighters from different countries. They are being simulated to military "hot spot" to defeat dangerous enemies. The advance visual and sound enhance this simulation which impels players towards violence. The violence in games has expanded by using high quality graphics, 3D models and sounds. Our results show that the people who play or like action video games are more likely to tend to take social risks. People who play more action games; the society is considerably more concerned about them. The literature has showed that most students involved in shooting and fighting at schools were players of violent shooting games.

In the media world, there are basically two types of media, i.e. Active and Passive. In active media type, there is direct involvement of the player who controls the whole scene and scenario while in the passive media a user can only view it e.g. movies and TV serials. Gaming belongs to the first category of media type (Active). Especially in action video games e.g. in First Person Shooter games category, the player has to perform continuous violent activities. He/she has to do a variety of attack and defense activities such as pushing triggers, shooting enemies, and punching opponents. Players can experience all of these actions and their respective effects as an active participant through high quality graphics. Battlefield with

blood and damaged body parts makes the game environment more realistic and violent for the players. So the player is an actor with a specific end goal to play and win. The player must be the aggressive and committed to the goal. He/she is an active participant in the game which puts more impact on him/her than watching violence on TV. Most researchers recognize that this sort of active participation influences an individual's knowledge patterns in short or long terms as well.

We know from the results; people who like action video games are more inclined towards social risk. Therefore, craze of playing action games influences in many social behaviors, including vandalism, cheating in exam, negative point of view, shoplifting, fighting and grafting, etc. There are two subgroups of risk behaviors; First subgroup includes drinking, smoking and truancy while the second subgroup involves vandalism, shoplifting, battling and grafting. Practices in the first group (drinking, smoking and truancy) principally concern and influence the youngsters themselves, whilst those in the second group (grafting, vandalism, shoplifting and battling) are normally coordinated against outsiders or public property. Individuals of one group who kept on engaging in risky behavioral activities additionally to take part in risky behavior of the other group.

Childhood externalizing behavior links to major problems like adult crime and violence. 2.9 million Teenagers were arrested in 1996 via law authorization organizations Homicide is one of the major causes that leads to the deaths of youngsters of United States and African American young generation [109]. This has resulted in violence being one of the major problems today in the society.

The influence of action video games at cognition and other social behaviors is being studied and researched at many institutions. Playing games with lots of violent content lead to an increment in aggression. Violent game players in comparison to non-violent game players produce an aggressive expectation. Video games influence the aggressiveness and the anxiety of the player. Thus, violent video games are directly related to aggressiveness in behavior, an argument with a teacher and involvement in physical fights. Study has shown that children

have displayed violent behaviors verbally as well as physically in the schools due to result of violent game playing.

Due to the extreme popularity of action games, it has become a major concern for the society. The risk glorifying media such as violent games specifically and other relevant media have serious concerns, such as illegal actions and physical violence. This has prompted the recommendation that playing time for action games should be reduced specially for children. In fact, if the exposure towards media violence is reduced for children, this tends to reduce the aggressiveness in them.

Content analysis of video games shows that almost 85% action games contain violent material. Frequency of violent games, playing and prosocial behavior are negatively related to each other. Hence, there is need to develop attractive prosocial video games that will help to grow prosocial behavior in consumers.

5.2. Recreational risk attitude

To measure the recreational risk attitude of people, six items were used, including: GHB2, GHB12, GHB15, GHB25, GHB31, and GHB32 as shown in Figure 9. After deleting a couple of items with loading factor less than the threshold value (>0.5), four items GHB2, GHB25, GHB31, GHB32 remained in recreational construct. Multivariate (MANOVA) test results shows that the individuals who play action video games are more likely to contribute in risky and dangerous sports and recreational activities including diving in the river, mountain or wall climbing, racing, reckless driving, and street racings. According

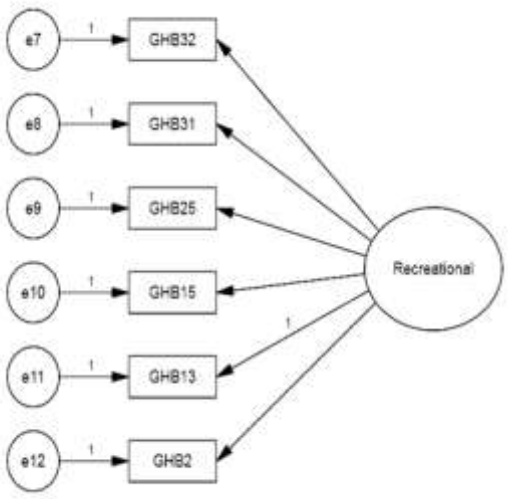

Figure 9: Recreational risk attitude

to finding males takes more risk than females in recreational activities. One of the major causes of unintentional and deadly injuries in kids and youth is their risk taking behavior in daily life activities.

Now societies and domain experts both are working to reduce the risk compelling products and their impacts. For instance, risky practices in street activity, for example, risky driving, unnecessary speeding, unlawful street competing, and neglecting the use of seat belts which resulted in for almost 51% of the aggregate monetary accident cost ($230.6 billion). During 2000 in U.S, 5.3 million people injured and 421,821 lost their life due to motor vehicle accidents and it cost 16.4 million for the government.

Meanwhile, there is significant proof that media with risk glorifying content, for example, games that pretend careless driving, street racing, shooting, smoking, alcohol drinking, or commercial ads for risky sports boost the incident of risk taking practices in the public arena. Studies such as Hurley et al., [110] analyzed medical records during 2000-2003 and found that the patients who got admitted to the hospitals; were reported mostly with copycat injuries. However, it is still not proven yet how this risk glorifying media boost the risk taking attitude and how regular these effects are?

Studies encouraged by media violence gave solid proofs that violent media is positively related to aggressive behavior. A research group has been involved in investigating whether related causal connections can be found between disclosure to risk-glorifying media substance and expanded risk taking preferences. This prospect has been established that a few sorts of media (video games, movies, television shows, and daily paper articles) that portray danger compelling in a positive light causally surge risk encouraging thoughts, feelings, and behaviors.

The present point of view relates to a definition proposed by Ben-Zur and Zeidner [111]: "Risk taking denotes to one’s purposive involvement in some form of behaviors that involves prospective negative significances or losses (social, monetary, interpersonal) as well as perceived positive consequences or gains” (p. 110). Practices risk taking can be observed in

different kinds of fields, such as smoking, prohibited drugs use, alcohol drinking habits in our daily life, street racing, careless driving, over speeding, signal breaking at roads, and participating in dangerous sports like skating, water drafting, hiking, swimming in deep water without proper training or safety precautions.

Any kind of media (Games, TV serials, movies, cartoon, ads, and sports) which we are watching in our daily life are full of risk glorifying content. For instance, MTV presented one of the popular American reality serial “Jackass” in which young actors performed several dangerous activities, i.e. crude, self-injuring stunts and pranks etc. Everyone is performing these dangerous activities in “funny” and risk glorifying way. Vingilis and Smart [23], have recommended that illegal street racing has been popular due to risk glorifying culture of street racing in media. This danger advancing society is even connected to youngsters through cartoons, for example “Speed Racer”. There is also episodic proof of "copycat stunts." for instance; the general public got unfavorable impacts of risk-glorifying video racing games.

One of the most popular games “Need for Speed,” was found in the car of 2 youngsters who were racing in Toronto on January 26, 2006, who collided with a taxi driver that resulted in his death. Such horrible cases have driven policymakers to ponder about the fact that racing games inspire players to perform such students in real life.

5.3. Health/Safety risk attitude

Third, construct of our measurement model was health/safety. Seven items were used to measure the health and safety risk attitude of people. Initially GHB4, GHB7, GHB23, GHB26, GHB30, GHB33, GHB34 were loaded as shown in Figure 10. Some measures were eliminated due to less factor loadings and finally health/safety construct remained with GHB26, GHB33, and GHB34. The results of multivariate test show that the people who play action games are more likely to take health/safety risk. Health and safety problems are major concerns all over the world even in well developed countries. The U.S. Centers for Disease Control and Prevention (CDC) has discovered 6 crucial types of health risk activities those

are a major reason of death or disability in U.S including obesity, violence, smoking, alcohol use, physical inactivity, sexual behaviors, and poor eating habits.

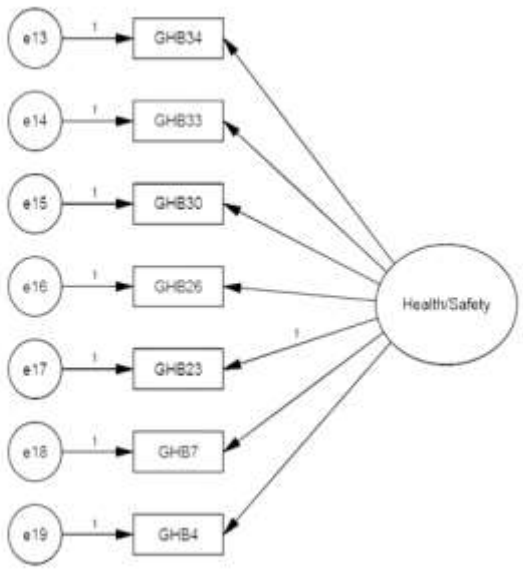

Figure 10 Health/Safety Risk

Literature showed that media have a dominant impact on health activities as well. Nowadays, the foremost reasons of youth, illness and death are due to health risk activities that have been related with media disclosure, involving too much caloric consumption, physical indolence, smoking, youthful drinking, premature sexual activities, and instinctive and opportunistic.

Likewise, writing from longitudinal studies demonstrates the utilization of risk glorifying media substance is emphatically connected with risk taking tendency and behaviors. For instance, Wills et al., explored an example of 961 young adults were influenced by the use of alcohol from the movies in which their favorite characters consumed alcohol. The studies were conducted for smoking, which also impacted the young lot as a result of their inspiration and following of their favorite characters and roles in movies. Introduction to sex on TV and had also influenced in the behavioral changes in the young generation towards sex.

So far the media likewise also can be a very vital source of positive behavior in the students. Different education interactive can result in learning and adopting of different 21st century skills that help in bringing up the capacity of the students at schools. Different difficult to comprehend and boring topics can be educated to students by interesting video games and multimedia video content. These educational resources can affect in the learning behavior of the students, which enhance their critical thinking as well as different life skills. Similarly, as

the current research proposes, different video games with pro-social substance could be utilized to enhance social connections.

The results of our study have validated the purposed research question that video games preferences really does affect the risk taking behaviors of individuals in their daily life.

Future Work

The present research is not without limitations. We have selected this part just to explore the problems which will help us to write proper research questions for future studies. We have considered three risk domains (Social, Health/safety, and recreational). Limited gaming categories were considered in our studies whereas there are a lot of other categories which can be brought to concerns. The other gaming categories are like sports games. We can also find out the short term and long term effects of games with the help of longitudinal experimental study where we can control the experiment environment and can judge the performance of players and change the change in their behaviors. Media has its pros and cons which both cannot be neglected. The negative impact of violent content has resulted in affecting the behaviors of people who consume it which in a process affects the society. Whereas on the other side of the road, media has influenced and improved many lives into a better standard of living. More study in this enormous domain can be carried in different behavioral domains and games category which can help in realizing and minimizing the negative impact of media on the minds and psychology of its consumers.

Appendix A

1. Admitting that your tastes are different from those of your friends. (S)
2. Disagreeing with your parent/guardian on a issue related to selecting/changing your career. (S)
3. Arguing with a friend over an issue on which he/she has a very different opinion. (S)
4. Wearing provocative or unconventional clothes on occasion. (S)
5. Taking a job that you enjoy over one that is prestigious and pays high, but is less enjoyable. (S)
6. Defending an unpopular issue that you believe in a social gathering. (S)
7. Going for camping in the wilderness. (R)
8. Going on a vacation in another city without prearranged travel and hotel accommodations. (R)
9. Climb a wall that is beyond your ability. (R)
10. Periodically engaging in a dangerous sport (e.g., mountain climbing or cliff diving). (R)
11. Trying out bungee jumping (jumping off a bridge/cliff with rope attach to feet) at least once in a life time. (R)
12. Flying a small plane, if you could get a chance. (R)
13. Buying an illegal/narcotic drug for your own use. (H/S)
14. Walking home alone at night in a somewhat unsafe area of town. (H/S)
15. Eating unwashed fruit and vegetables. (H/S)
16. Not wearing a seat belt when being a passenger in the front seat of a car/vehicle. (H/S)
17. Exposing yourself to the sun without using sunscreen.
18. Regularly eating high cholesterol food. (H/S)

Social = S, Recreational = R, Health/Safety = H/S.

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