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Risk Perception and its Relation to Locus of Control in Adolescents

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ABSTRACT

Anger was mounting across India following a Pune court's decision to require a 17-year-old boy, who allegedly killed two people in a drunk driving accident, to write an essay as part of his sentence. Critics are calling for a more severe punishment, claiming the judiciary is being too lenient. According to Devendra Fadnavis, the deputy chief minister of Maharashtra, the teenager was supposedly speeding in a Porsche when it collided with a motorcycle, resulting in two fatalities. The number of crimes, such as theft, drug and sexual abuse, and murder, involving adolescents has been increasing over the last decade. This trend has raised serious concerns for the welfare of both the youth and society as a whole.

Introduction

Studies on risk-taking behaviour show adolescence as a crucial phase where individuals pursue autonomy and identity, often facing challenges that shape their growth. While many adolescents successfully transition to healthy adulthood, others struggle to realize their full potential (Igra & Irwin, 1996).

Adolescence

Adolescence involves profound physical, psychological, sociocultural, and cognitive transformations, driving processes like identity formation and social exploration. These behaviours can have both positive and negative outcomes, though their potential for serious consequences often draws research focus to

their adverse effects. According to the National Institute on Alcohol Abuse and Alcoholism and the Global Burden of Disease (2019), alcohol is a major risk factor for disease among 10- to 24-year-olds, contributing to 2.1 million global deaths in 2019, primarily among males.

Concept of Risk-Taking Behaviour

The study of adolescent risk-taking gained momentum in the 1980s, with DiClemente, Hansen, and Ponton (1996) highlighting that lifestyle choices, not biological factors, are the primary drivers of adolescent mortality and morbidity. Understanding these behaviours can help reduce their harm. For instance, speeding may save time but risks accidents or fines. Boyer (2006) defines risk-taking as actions with potential for loss, harm, or legal consequences.

Types of Risk-Taking Behaviours

Gullone, Moore, Moss, and Boyd (2000) propose four categories:

1. Thrill-Seeking: Engaging in dangerous activities like extreme sports

2. Rebellious: Behaviours like smoking or drug use with potential harm

3. Reckless: Actions like drunk driving or theft with social and health risks

4. Antisocial: Behaviours like lying or bullying with social and legal consequences.

Factors Influencing Adolescent Risk-Taking Behaviour

1. Hormonal Influences

Hormonal changes, particularly during puberty, significantly affect adolescent risk-taking. Both early and late pubertal maturation are linked to increased risk-taking, as these changes alter adolescents' physiological and psychological states (Irwin & Millstein, 1986).

2. Brain Development

The adolescent brain undergoes significant changes that contribute to risk-taking tendencies. The limbic system, responsible for emotional regulation and reward-seeking, matures faster than the prefrontal cortex, which governs impulse control and rational decision-making. This imbalance leads to heightened emotional reactivity and reward sensitivity, often overriding logical reasoning (Casey, Getz, & Galvan,

2008). The nucleus accumbens, linked to pleasure and reward, shows increased activity in adolescents, predisposing them to seek instant gratification through risky behaviours.

3. Cognitive Processes

Cognitive development significantly shapes adolescent risk-taking. Adolescents' perceptions of environmental cues influence their decision-making. Concept of adolescent egocentrism suggests teenagers develop a "personal fable," viewing themselves as unique and immune to harm, which drives risk-taking by reducing perceived consequences.

4. Societal Influences

Societal norms and cultural contexts significantly influence adolescent risk-taking. Media portrayals of risky behaviours as glamorous can normalize them for impressionable teens. Structural factors, like access to cigarettes or lenient alcohol laws, increase risk-taking opportunities. Beyond family, societal values shape identity and behaviour.

Theoretical Frameworks for Understanding Adolescent Risk-Taking Behaviour

Byrnes' Decision-Making Model

Byrnes' Decision-Making Model (Byrnes, 1998) views risk-taking as an inherent part of decision-making in an uncertain world. Rather than being solely harmful, risk-taking can be adaptive, fostering growth and opportunity (Miller & Byrnes, 1997). The model distinguishes between justified risks with potential benefits and those posing significant harm, framing risk-taking as a calculated process. It identifies five factors explaining differences in adolescent and adult risk-taking:

1. Consideration of Options: Adolescents consider fewer options, often prioritizing immediate rewards.
2. Evaluation of Consequences: Adolescents vary in assessing outcomes, reflecting cognitive developmental differences.
3. Value Assignment: Adolescents prioritize social or emotional rewards over pragmatic ones.
4. Outcome Probability Estimation: Adolescents often misjudge outcome likelihood due to limited experience or biases.
5. Decision-Making Criteria: Adolescents rely on heuristic reasoning rather than analytical approaches.

The Health Belief Model

The Health Belief Model (HBM), developed by Terry et. al. (1993), predicts health-related behaviours based on attitudes and beliefs. It posits that behaviour results from a rational assessment of risks and benefits, with four core constructs:

1. Perceived Susceptibility: Belief in vulnerability to a health threat, increasing preventive behaviour likelihood.
2. Perceived Severity: Assessment of a threat's seriousness, motivating preventive action.
3. Perceived Benefits: Belief in the efficacy of preventive measures, encouraging action if benefits outweigh costs.
4. Perceived Barriers: Obstacles like inconvenience or stigma, where lower barriers promote health-protective behaviours.

REVIEW OF LITERATURE

Risk Perception and Its Role in Shaping Risk-Taking Behaviour

Risk perception, defined as an individual's subjective judgment of the probability and gravity of potential outcomes, is a fundamental factor influencing risk-taking behaviour. Numerous studies highlight that the extent of perceived risk significantly sways a person's choice to engage in hazardous activities (Bonem et. al. 2015). Typically, heightened risk perception correlates with a reduced tendency to undertake such actions, demonstrating a clear inverse relationship between risk perception and risk-taking (Weber et. al. 2002). Conversely, individuals who minimize the perceived dangers are more likely to exhibit pronounced risk-taking behaviour, driven by an attraction to potential benefits (Weber et. al. 1997; Mellers et. al.1997).

Health-related risk perception also plays a vital role. Sloan et. al. (2003) found that limited awareness of smoking's long-term effects diminished risk perception among adolescents, leading to higher smoking rates and associated health risks. However, when confronted with serious conditions like lung disease or stroke, adolescents exhibited heightened risk awareness, prompting behavioural adjustments. These findings indicate that interventions enhancing knowledge can shift risk perceptions and reduce harmful actions.

RISK TAKING BEHAVIOUR AND LOCUS OF CONTROL

The locus of control is a key factor shown to influence the actions of individuals engaging in risky behaviours. It refers to the extent to which people perceive events as being under their personal control, as opposed to being shaped by powerful external forces or circumstances. Essentially, it reflects how much individuals believe they can steer the outcomes of their lives. In 1966, Rotter introduced this concept as a significant personality trait, now widely recognized as locus of control. Research indicates that those with an internal locus of control are more likely to partake in activities considered risky, based on multiple studies exploring this relationship.

Research indicates that the nature of the risk can influence the extent to which individuals with internal or external loci of control are willing to engage in riskier behaviours. This is backed by various studies. Such differences can affect whether risk-takers are driven by internal motivations or external circumstances. Salminen and Klen (1994) observed that workers in construction and forestry with an external locus of control were more prone to taking greater risks in both sectors.

METHODOLOGY

Sample of the study

The research commenced with an initial group of 650 teenage participants, comprising 350 males and 300 females, to maintain a balanced gender representation. They were recruited from various Senior Secondary schools in Dehradun, which were chosen specifically to ensure consistency in their socioeconomic status, cultural exposure, and educational environment.

The participants were selected using an incidental sampling method, based on their availability and willingness to take part. For the sake of data accuracy, only completely filled-out surveys were included in the analysis, and any incomplete submissions were disregarded. After this screening process, the final sample comprised 449 students, whose information was meticulously analysed for the study.

Inclusion criteria:

1. Adolescents of ages between 16-18 years.
2. Adolescents studying in class 10^{th} to 12^{th}.
3. Adolescents studying in the schools of Dehradun city.

Exclusion criteria:

1. Adolescents with any type of special physical or mental ability.

2. Adolescents below the age of 16 and above the age of 18.

OBJECTIVES

With ample amount of relevant literature and the aim of the present study in mind, the following objectives were anticipated:

- To study the relationship between risk taking behaviour and risk perception among adolescent boys and girls.
- To study gender differences in risk taking behaviour among adolescents.

HYPOTHESES

Based on theoretical considerations and reviewed research studies following hypotheses have been created:

- Adolescents having internal locus of control will be more prone to risk-taking behaviour.
- Male adolescents will show higher participation in risk-taking behaviours as compared to females.

Psychological Tests and Tools

Risk Taking Scale (RTS) – Sarkar (2017)

The Risk-Taking Scale is a thorough risk-taking behaviour questionnaire that is intended to be used with individuals between the ages of 14 and 30. Both health behaviours and risk-taking behaviours that are exploratory are evaluated by this activity. There are fifteen different scenarios: In any circumstance, there are six distinct options. Each of the scenarios is shown to the participant, and they are asked to recommend to their buddy the course of action that they believe to be the most advantageous. In addition, the scale assesses six different aspects of risk-taking behaviours by means of four sub-scales, which are explained in the following manner:

- Academic related risk-taking
- Finance related risk-taking
- Profession related risk-taking
- Games related risk-taking
- Adventure related risk-taking

- Health related risk-taking

Locus of Control Scale (Levenson)

Levenson (1981) argued for a three-dimensional structure, measuring internal control where the outcome is determined by the individual, powerful others where the outcome is determined by other people and uncontrollable chance.

The instrument consists of 24 items. The respondents are instructed to indicate the extent to which they agree or disagree with each statement by writing a number from -3,-2,-1,+1,+2,+3 where -3 refers to strongly disagree and +3 means strongly agree. If you rate high on the Powerful Others scale, the respondent typically believes that their fate is controlled by other people; if the respondent rates high on the Chance scale, they believe their fate is controlled by chance. Whereas a high rating on the Internal Locus of Control scale indicates that the respondent has a strong internal locus of control.

PROCEDURE

Following the administration of all the previously mentioned assessments, each participant received unique instructions for every test. Demographic data was collected on a separate sheet created by the researcher, with students asked to provide their age, gender, and grade. To encourage honest responses, participants were given the option to either not write their names or use pseudonyms. This approach made it easy and comfortable for them to share information on their risk-taking tendencies and responses to other scales. The tests were administered to groups of students between the ages of 16 and 18, with the assistance of teachers, in the classroom and other school settings.

Prior to the assessments, a connection was established with the individuals to build rapport. Participants were assured that their provided information would be kept completely confidential and used solely for research purposes. Consent was obtained from both the students and the school's administration, and the final sample included those who agreed to participate. The students completed the forms individually, and the researcher offered full support to ensure they fully understood the test questions.

RESULTS

The primary objective of this study was to examine the relationship between adolescents' risk-taking behaviour and locus of control. To achieve this, the collected data was analysed using appropriate statistical methods.

FREQUENCY DISTRIBUTIONS

The frequency distributions of means, standard deviations (S.D.), skewness, and kurtosis are presented below. The analysis showed that the data exhibited a nearly symmetrical distribution, making it appropriate for standard statistical methods. This normal distribution pattern supported the use of various parametric analytical techniques on the dataset. The data's symmetrical nature ensured that the basic assumptions for conventional statistical tests were adequately met, allowing for thorough quantitative analysis.

Showing the Means, Standard Deviations (SD), Skewness and Kurtosis of Sample of Adolescents on the Variables Under Study

	N	Mean	Std. Deviation	Skewness	Kurtosis
Risk Taking -Raw Score	449	40.134	9.315	0.004	-0.179
Internal	449	29.855	5.624	-1.081	1.353
Powerful	449	22.258	5.105	0.262	-0.661
Chance	449	28.704	5.265	-0.933	0.904

The data provides a detailed set of descriptive statistics for a sample of 449 adolescents, focusing on four psychological variables: Risk Taking (Raw Score), Internal, Powerful, and Chance. These variables likely reflect distinct psychological constructs, such as propensity for risk-taking behaviour, internal locus of control, perceived personal power or influence, and beliefs in chance or luck. The statistics presented—mean, standard deviation (SD), skewness, and kurtosis—offer a comprehensive view of the central tendency, variability, and distributional properties of each variable. Below, each statistical measure is expanded upon to provide deeper insights into the characteristics of the adolescent sample and the implications of the data.

Means

The mean represents the average score for each variable, providing insight into the typical level of each psychological trait or belief within the sample:

- Risk Taking (40.134): This variable has the highest mean, suggesting that, on average, adolescents in this sample exhibit a relatively strong tendency toward risk-taking behaviour. This could reflect a developmental characteristic of adolescence, a period often associated with exploration, impulsivity,

or sensation-seeking. The high mean might indicate that risk-taking is a prominent feature in this group, potentially influenced by social, environmental, or biological factors.

- Internal (29.855) and Chance (28.704) These variables have moderate means, indicating that beliefs in internal control (e.g., the perception that outcomes are determined by one's own actions) and chance (e.g., the belief that outcomes are influenced by luck or fate) are less pronounced than risk-taking. These scores suggest that while these traits are present, they are not as dominant in the sample compared to risk-taking behaviour.

- Powerful (22.258): This variable has the lowest mean, implying that adolescents in this sample tend to score lower on perceptions of personal power or influence. This could suggest that many adolescents feel less control over external events or lack confidence in their ability to exert influence, which may be tied to developmental stages, social dynamics, or environmental factors such as family or school settings.

The range of means across these variables highlights the diversity of psychological traits within the sample, with risk-taking being the most prominent and perceived power the least.

Standard Deviations (SD)

The standard deviation measures the dispersion of scores around the mean, indicating the degree of variability within each variable:

- Risk Taking (9.315): With the highest standard deviation, risk-taking behaviour shows the greatest variability among adolescents in the sample. This suggests a wide range of risk-taking tendencies, with some adolescents exhibiting low risk-taking behaviour and others showing significantly higher levels. This variability could stem from individual differences in personality, peer influences, or contextual factors such as socioeconomic status or exposure to risky environments.

- Internal (5.624), Chance (5.265) and Powerful (5.105): These variables have moderate standard deviations, indicating a more consistent distribution of scores compared to risk-taking. The relatively smaller spread suggests that beliefs in internal control, chance, and personal power are more uniformly distributed across the sample, with fewer extreme variations. However, the slight differences in SD values suggest that internal control has slightly more variability than chance or power, possibly reflecting diverse experiences or cognitive development stages among adolescents.

The variability captured by standard deviations underscores the heterogeneity of the sample, particularly for risk-taking, and suggests that interventions or studies targeting these traits may need to account for diverse behavioural profiles.

Skewness

Skewness measures the asymmetry of the distribution, indicating whether scores are clustered more on one side of the mean:

- Risk Taking (0.004): The near-zero skewness value indicates a nearly symmetrical distribution, meaning that risk-taking scores are evenly distributed around the mean. This suggests a balanced representation of low, moderate, and high risk-taking behaviours, with no extreme skew toward either end of the spectrum. This symmetry could imply that risk-taking is a normative trait in this sample, with a broad but balanced range of expressions.

- Powerful (0.262): This variable shows positive skewness, with a longer right tail. This means that most adolescents score below the mean on perceived power, with a smaller number of individuals reporting higher scores (outliers). This distribution could reflect a general tendency toward lower perceptions of personal power, with a few adolescents feeling particularly empowered, possibly due to unique personal or social circumstances.

- Internal (-1.081) and Chance (-0.933): Both variables exhibit negative skewness, with longer left tails. This indicates that more adolescents score above the mean, with fewer individuals reporting lower scores (outliers). The more pronounced negative skew for Internal suggests a stronger clustering of higher scores, meaning that many adolescents in this sample believe they have control over their outcomes, though a small subset report lower internal control beliefs. Similarly, the negative skew for Chance suggests that many adolescents attribute outcomes to luck or fate, but a few score lower on this belief.

The skewness patterns reveal distinct distributional characteristics, with Internal and Chance showing a tendency toward higher scores and Powerful leaning toward lower scores. These findings could inform targeted interventions, such as boosting perceptions of personal power in adolescents with lower scores.

Kurtosis

Kurtosis describes the "tailedness" or peakedness of the distribution relative to a normal distribution, indicating the presence of extreme scores or clustering around the mean:

- Internal (1.353): This variable has the highest positive kurtosis, indicating a leptokurtic distribution with a sharp peak and heavier tails. This suggests that scores are tightly clustered around the mean, with a higher-than-normal proportion of extreme scores (both high and low). This could reflect a polarized sample where most adolescents have similar beliefs in internal control, but a notable subset exhibits significantly higher or lower beliefs, possibly due to individual differences in life experiences or cognitive development.

- Chance (0.904): This variable also shows positive kurtosis, indicating a slightly leptokurtic distribution. Scores are more clustered around the mean than in a normal distribution, with heavier tails suggesting some extreme scores. This pattern suggests that beliefs in chance are relatively consistent across the sample, but a small number of adolescents have notably stronger or weaker beliefs in luck or fate.

- Powerful (-0.661) and Risk Taking (-0.179): These variables have negative kurtosis, indicating platykurtic distributions with lighter tails and a flatter shape. This suggests fewer extreme scores and a more even spread of scores across the range. For Risk Taking, the slightly negative kurtosis indicates a broad distribution with fewer outliers, consistent with its near-symmetrical skewness. For Powerful, the negative kurtosis suggests a flatter distribution, with scores more evenly spread and fewer adolescents reporting extreme perceptions of power.

The kurtosis values provide additional nuance about the shape of the distributions, with Internal and Chance showing more pronounced clustering and extreme scores, while Powerful and Risk Taking are more evenly distributed with fewer outliers.

Gender Differences in Adolescent Risk-Taking Behaviour

The provided data examines gender differences in risk-taking behaviour among a sample of 449 adolescents, with descriptive statistics including sample size (N), mean, standard deviation (SD), t-value, and p-value for the variable Risk Taking (Raw Score). The analysis compares male and female adolescents to determine whether significant differences exist in their propensity for risk-taking behaviour. Below, the results are expanded and paraphrased to provide a comprehensive understanding of the findings, their implications, and potential avenues for further exploration.

Descriptive Statistics

The table presents the following statistics for risk-taking behaviour by gender:

Gender differences in Risk Taking Behaviour

Gender		N	Mean	Std. Deviation	t-value	p-value
Risk Taking -Raw Score	Male	246	43.833	8.120	10.293	.0001**
	Female	203	35.650	8.695		

- Males (N = 246):

- Mean = 43.833: On average, male adolescents exhibit a higher level of risk-taking behaviour, as indicated by their mean score on the Risk Taking (Raw Score) measure.
- Standard Deviation = 8.120: The moderate variability in scores suggests that while many male adolescents engage in risk-taking behaviour, there is some diversity in the extent of this behaviour within the group.

Females (N = 203):

- Mean = 35.650: Female adolescents, on average, report lower levels of risk-taking behaviour compared to their male counterparts, as reflected by their lower mean score.
- Standard Deviation = 8.695: The slightly higher standard deviation for females indicates a marginally greater spread in risk-taking scores compared to males, suggesting some variation in risk-taking tendencies among female adolescents.

Statistical Significance:

- t-value = 10.293: The large t-value from an independent samples t-test indicates a substantial difference in the mean risk-taking scores between male and female adolescents.
- p-value = 0.0001: The highly significant p-value ($p < 0.0001$) confirms that the observed difference in risk-taking behaviour between genders is unlikely to be due to chance, providing strong evidence of a gender-based disparity.

Interpretation of Findings

The analysis reveals a statistically significant gender difference in risk-taking behaviour among adolescents ($t = 10.293$, $p < 0.0001$). Specifically, male adolescents (Mean = 43.833, N = 246) engage in

risk-taking behaviours more frequently or intensely than female adolescents (Mean = 35.650, N = 203). This finding suggests that, on average, boys in this sample exhibit a stronger tendency toward behaviours associated with risk, such as thrill-seeking, impulsivity, or engagement in potentially hazardous activities, compared to girls.

The difference in mean scores (43.833 for males vs. 35.650 for females) is substantial, indicating a clear divergence in risk-taking tendencies. The standard deviations (8.120 for males and 8.695 for females) suggest that while both groups show variability in their risk-taking behaviours, female adolescents exhibit slightly more diversity in their scores. This could imply that while many girls tend to engage in lower levels of risk-taking, a subset may participate in riskier behaviours, leading to a slightly wider spread in their scores compared to boys.

DISCUSSION

Potential Applications

These findings have implications for researchers, educators, and clinicians working with adolescents:

- Risk Taking: The high mean and variability suggest a need for tailored interventions to address risky behaviors, particularly for those at the higher end of the spectrum. Programs could focus on promoting healthy decision-making or addressing environmental triggers.
- Internal and Chance: The negative skewness and leptokurtic distributions suggest that while many adolescents believe in control or luck, some outliers may need support to develop balanced perspectives. For example, those with low internal control beliefs may benefit from interventions fostering self-efficacy.
- Powerful: The low mean and positive skewness highlight a potential area for intervention to boost adolescents' sense of agency or influence, particularly for those scoring below the mean.

This analysis provides a thorough understanding of the central tendencies, variability, and distributional properties of the psychological variables, offering a foundation for further research and practical applications in adolescent psychology.

Contextualizing Gender Differences

The observed gender differences in risk-taking behaviour align with existing literature on adolescent development, which often highlights that males tend to engage in more risk-taking behaviours than females. Several factors may contribute to this disparity:

1. Biological and Neurological Factors:

   - Adolescence is a period of significant brain development, particularly in areas like the prefrontal cortex, which governs impulse control and decision-making. Research suggests that males may experience slower maturation in these areas compared to females, potentially leading to greater impulsivity and risk-taking behaviour. Hormonal differences, such as higher testosterone levels in males, may also contribute to increased sensation-seeking or aggressive behaviours associated with risk-taking.

2. Social and Cultural Influences:

   - Social norms and expectations often encourage boys to take risks as a demonstration of bravery, independence, or masculinity, while girls may face greater societal pressure to exhibit caution or conformity. Peer groups can further amplify these differences, with male peer groups sometimes reinforcing risk-taking behaviours (e.g., through competitive or daring activities) and female peer groups emphasizing social cohesion or safety.

   - Cultural factors, such as media portrayals of gender roles or family expectations, may also shape adolescents' attitudes toward risk-taking.

3. Environmental and Contextual Factors:

   - Differences in risk-taking could be influenced by the environments in which adolescents are socialized. For example, males may have greater exposure to or opportunities for risk-taking activities (e.g., extreme sports, unsupervised activities), while females may face more restrictions or different socialization patterns.

4. Psychological Constructs:

   - The Risk Taking (Raw Score) measure may capture traits like sensation-seeking, impulsivity, or a willingness to engage in uncertain outcomes. Males may score higher on these traits due to a combination of personality factors, developmental influences, or environmental reinforcements.

Implications of the Findings

The significant gender difference in risk-taking behaviour has important implications for educators, clinicians, parents, and policymakers working with adolescents:

Conclusion

The data provides robust evidence of significant gender differences in risk-taking behaviour among adolescents, with males (Mean = 43.833, SD = 8.120, N = 246) demonstrating a higher propensity for risk-taking compared to females (Mean = 35.650, SD = 8.695, N = 203). The large t-value (10.293) and highly significant p-value ($p < 0.0001$) confirm that these differences are statistically meaningful. These findings highlight the need for gender-informed approaches in education, intervention, and policy to address risk-taking behaviours effectively. By understanding the factors driving these differences and their implications, stakeholders can better support adolescents in navigating the challenges and opportunities of this developmental stage. Further research is needed to explore the causes, contexts, and long-term outcomes of these gender disparities in risk-taking behaviour.

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