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Table of Contents

Integrating Technology in Psychological Interventions: A Comprehensive Review of Approaches, Challenges, and Future Direction

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Abstract

The integration of technology into psychological interventions has emerged as a transformative approach to addressing the increasing demand for mental health services. Technological tools such as mobile applications, virtual reality (VR), artificial intelligence (AI), telepsychology, digital therapeutics, and mindfulness-based technologies offer novel ways to enhance treatment accessibility, personalization, and scalability. These tools have the potential to expand the reach of psychological care, particularly for individuals in underserved areas or those with limited access to in-person therapy. This review explores how technology is currently being used in therapeutic settings, evaluates the effectiveness of these tools, and highlights both the opportunities and challenges associated with their use. Key issues, such as privacy concerns, data security, user engagement, and the digital divide, are discussed. Despite these challenges, technology has proven to be an effective tool in managing mental health conditions, including anxiety,

depression, and PTSD. Furthermore, the review explores the future of technological advancements, focusing on how emerging technologies may further improve psychological interventions and integrate seamlessly into clinical and non-clinical environments. This review aims to provide valuable insights into the role of technology in modern psychological care and its potential for shaping the future of mental health treatment.

Keywords

psychological interventions, technology, digital therapeutics, telepsychology, virtual reality, artificial intelligence, mobile applications and mindfulness interventions

1. Introduction

The advent of technology has had a profound impact on nearly every aspect of human life, including mental health care. Traditionally, psychological interventions have relied on in-person interactions between therapists and clients, with therapies such as cognitive-behavioral therapy (CBT), psychoanalysis, and family therapy being delivered face-to-face. However, as demand for mental health services continues to rise, traditional models face challenges related to accessibility, cost, and availability. The integration of technology in psychological interventions offers a solution to many of these challenges. Mobile applications, teletherapy platforms, virtual reality (VR), artificial intelligence (AI), and digital therapeutics are all examples of technological innovations that enhance therapeutic practices by increasing accessibility, personalizing treatment, and enabling scalable delivery models.

This article provides a comprehensive review of how technology is being incorporated into psychological interventions. We examine various technological tools, evaluate their effectiveness in improving therapeutic outcomes, and discuss challenges and limitations associated with their use. Additionally, we explore future directions for research and practice in this evolving field.

The integration of technology into psychological interventions is a rapidly growing field, with research consistently demonstrating both its promise and its challenges. Over the past few decades, technological advances in mobile applications, teletherapy, virtual reality (VR), artificial intelligence (AI), and digital therapeutics have prompted a reevaluation of traditional therapy models. Below is a review of key studies and findings in each of these areas.

2. Objectives of the Review

The primary objectives of this review are:

1. To provide a detailed overview of how technology is currently being used in psychological interventions.

2. To examine the technological tools and platforms that are integrated into psychological therapy.

3. To evaluate the effectiveness of these technologies in improving therapeutic outcomes.

4. To identify challenges and limitations in adopting technology-driven interventions.

5. To explore future directions for research and the expansion of technology in psychological care.

3. Technological Tools in Psychological Interventions

3.1 Mobile Applications

Mobile applications like Moodpath, Headspace, and Woebot have emerged as effective tools in psychological interventions, providing users with tools such as mood tracking, CBT-based exercises, and mindfulness activities. These apps offer accessible and user-driven interventions but face challenges related to engagement and adherence.

3.2 Telepsychology and Online Therapy Platforms

Telepsychology delivers therapy remotely through platforms such as BetterHelp and Talkspace. Studies show online CBT can be as effective as in-person therapy. However, technological limitations and privacy concerns are notable barriers.

3.3 Virtual Reality (VR) and Augmented Reality (AR) in Therapy

VR and AR have been effective in exposure therapy and mindfulness-based interventions. They provide immersive experiences for treating phobias and PTSD but face limitations due to cost and technical requirements.

3.4 Artificial Intelligence (AI) in Psychological Interventions

AI chatbots like Woebot offer immediate support and symptom reduction. AI also supports personalized treatment through data analytics, although ethical concerns about empathy and privacy persist.

3.5 Digital Therapeutics (DTx) in Psychological Interventions

Digital therapeutics offer evidence-based treatments via software programs. They are effective in managing depression, anxiety, and insomnia, particularly when combined with traditional therapies.

3.6 Mindfulness Technology Interventions

Mindfulness apps such as Calm and Insight Timer offer guided practices. VR-enhanced mindfulness is also being used to improve emotional regulation and well-being, although user over-reliance and engagement remain concerns.

4. Benefits of Incorporating Technology in Psychological Interventions

4.1 Increased Accessibility and Reach

4.2 Convenience and Flexibility

4.3 Scalability and Cost-Effectiveness

4.4 Personalization and Data-Driven Insights

4.5 Enhanced Monitoring and Progress Tracking

4.6 Reduction of Stigma and Increased Privacy

4.7 Support for Self-Help and Empowerment

4.8 Integration with Traditional Therapy

4.9 Innovation and Continuous Improvement

5. Challenges and Limitations

5.1 Privacy and Confidentiality Concerns

5.2 Technological Barriers

5.3 Lack of Human Interaction

5.4 Regulatory and Ethical Issues

6. Future Directions and Research

As technology continues to evolve, further research is needed to assess the long-term effectiveness of digital interventions and their potential to replace or complement traditional therapeutic methods. Future studies should explore the integration of AI in personalized treatment plans, the use of VR in more diverse therapeutic contexts, and ways to overcome technological barriers to ensure equitable access to mental health care.

7. Conclusion

The integration of technology into psychological interventions offers exciting possibilities for improving mental health care. From mobile apps to AI-powered chatbots, these innovations provide new ways to engage clients, enhance therapy delivery, and expand access to care.

However, challenges such as privacy concerns, technological access, and the need for human connection must be addressed for technology to reach its full potential. Continued research and development are essential to overcoming these challenges and ensuring that these tools are used effectively and ethically in clinical practice.

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Community Structure of Phytoplankton Community in Two Different Areas along Getalsud Dam of Jharkhand State

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Abstract

Blooms including red-tides caused by phytoplankton are of significant value in the aquatic environment as they affect marine economy. Hence, an analysis of phytoplankton becomes essential in any study concerning hydrobiological investigations. Present study focusses attention on a thorough investigation of phytoplankton with reference to their species makeup, percentage contribution, population density and community structure. All these are calculated by prescribed formulas. The present study areas (stations 1 and 2) form a typical dumping yard system. Both the stations are present in the Jharkhand state along Getalsud dam basin area. The first collection site was fixed near the northern bank of the dam which was 1 km west of the residential area. The second selected site was fixed near the southern bank of the dam which was 2 km east of the small industrial area. The river water is extensively utilized for agriculture, fisheries, irrigation and navigation purpose. For two years, samples were taken from the surface waters of the research sites once a month, from October 2022 to September 2023. For convenience's sake and easy interpretation, a calendar year was divided into four seasons: postmonsoon (January to March), summer (April to June), premonsoon (July to September) and monsoon (October to December). These samples were utilised for qualitative examination after being stored in 5% neutralised formalin. Regarding the quantitative analysis of phytoplankton, the settling technique was used. Plankton numerical analysis was performed using Utermonl's inverteo-plankton microscope. Analysis of phytoplankton of stations 1 and 2 showed the presence of 187 species. Diatoms were the dominant group contributing 71.12% followed by greens and blue greens contributing 9.63% and 8.56% respectively. Dinoflagellates and others contributed only 3.74%. Each group's percentage contribution towards phytoplankton composition in the increasing order was as follows: Others < Dinoflagellates < Blue-greens < Greens < Diatoms.

Key Words: Phytoplankton, population density, Species richness, Blooms, Autotrophs

Introduction

Phytoplankton being the autotrophs (primary producers), initiate the aquatic food-chain. Secondary (zooplankton) and tertiary producers (shell fish, finfish and others) depend on them directly or indirectly for food. Phytoplankton also acts as markers of the quality of the water and natural regions which are characterized by typical species or species groups. In addition, phytoplankton clearly have a major part in the global biogeochemical cycling of carbon, nitrogen, phosphorus, silicon and many other elements (Broecker, 1974). Blooms including red tides caused by phytoplankton are of significant value in the aquatic environment as they affect marine economy. Hence, an analysis of phytoplankton becomes essential in any study concerning hydrobiological investigations.

The use of plankton in hydrography has been investigated by a number of authors in both India (Goswami and Singbal, 1974; Saha et al., 1975; Jacob et al., 1980; Joseph et al., 1980; Paramasivam and Sreenivasan, 1981; Subramanian, 1981; Litaker et al. 1987; Roden et al., 1987; Rao and Durve, 1987; Devassy and Goesh, 1988; Mani and Krishnamurthy, 1989; Gouda and Panigrahy, 1989; Ram et al., 1990; Panigrahy and Rajashree Gouda, 1990; Umamaheswara Rao and Sarojini, 1992; Kannan and Vasantha, 1992; Durga Prasad, 1994) and abroad (Takashi and Fukazawa, 1982; Eskinizi-Leea et al., 1988; Hans Paerl, 1988; Kilham and Heckey, 1988; Shchur et al., 1989; Shomers and Marshall, 1989; Figueiras, 1989; Vilicic et al., 1989; Dvarte et al., 1990; Guzkowska and Gasse, 1990; Gotsisskretas and Satsmadjis, 1990; Jensen et al., 1990; Marshall and Alden, 1990; El-Gindy and Dorham, 1992) waters.

Materials and Methods

The present study areas (stations 1 and 2) form a typical dumping yard system. Both the stations are present in the Jharkhand state along Getalsud dam basin area.

Station 1:
The river Subarnrekha is one of the important rivers of Jharkhand originating from Ranichua place in Piska/Nagri of the state. The famous Getalsud dam is an artificial reservoir situated in Ormanjhi, Ranchi constructed across the Subarnrekha river. The first collection site was fixed near the northern bank of the dam which was 1 km west of the residential area.

Station 2:
The second selected site was fixed near the southern bank of the dam which was 2 km east of the small industrial area. The river water is extensively utilised for agriculture, fisheries, irrigation and navigation

purposes. In recent times, its water is put into multifarious use. Innumerable factories, workshops, human inhabitations and new townships have sprung up along its banks. These add untreated domestic, industrial and other wastes into the river at various points thus introducing many kinds of pollutants. It is also a focus of religious and recreational activity during many festive occasions. There is every possibility for these pollutants to reach the tail end of the southern bank. Quality of the river water till its tail end might be changing with the addition of effluents.

For two years, from October 2022 to September 2023, samples were taken monthly from the surface waters of the study sites. For ease of use and simple understanding, a calendar year was divided into four seasons: postmonsoon (January to March), summer (April to June), premonsoon (July to September) and monsoon (October to December). These samples were utilised for qualitative examination after being stored in 5% neutralised formalin. The Sukhanova (1978) settling method was used for the quantitative analysis of phytoplankton. The inverteo-plankton microscope from Utermonl was used to do numerical plankton analysis.

To identify phytoplankton, Hustedt's classic works (1930-1966) were used along with other references such as Venkatraman (1939), Cupp (1943), Subrahamanyan (1946), Prescott (1954), Wood (1954, 1963 a, b, c), Desikachary (1959, 1987), Hendey (1964, 1974), Sournia (1968, 1970, 1978), Steidinger and Williams (1970), Taylor (1976) and Anand et al. (1986). The collected phytoplankton was categorised into five main groupings for convenience: diatoms, dinoflagellates, blue greens, greens and 'others'.

Shannon and Wiener's (1949) formula was used to determine species diversity index (H'):

$$H' = -\sum Pi \log_2 Pi$$

Species richness (SR) was calculated as described by Gleason (1922):

$$SR = (S - 1)/\ln(N)$$

Evenness index (J') was calculated using the formula of Pielou (1966):

$$J' = H'/\log_2 S$$

Dominance index ($) was calculated using the formula of McNaughton (1967) as described by Ignatiades and Mimicos (1977):

$$\$ = 100 * (n_1 + n_2)/N$$

Results

Species Composition

During the current study period, 187 phytoplankton species were identified from both sites. Of the 187 species, 133 species belonged to diatoms (Bacillariophyceae), 13 species to dinoflagellates (Dinophyceae), 16 species to bluegreens (Cyanophyceae), 18 species to greens (Chlorophyceae), and 7 species to others (Silicoflagellates and Euglenophyceae). A total of 136 species were documented from station 1, and 148 species from station 2.

Percentage Composition

Station 1: Diatoms ranged from 0.98% to 100%, with the lowest in summer (April). Bluegreens varied from 0 to 82.5%, highest in premonsoon (July). Others ranged from 4.0% to 20.0%, peaking in February.

Station 2: Diatoms varied from 12.0% to 100%. Dinoflagellates ranged from 0 to 22.5%, peaking in February. Bluegreens varied from 0 to 65.6%, highest in October. Greens ranged from 7.0% (May) to 86.0% (December). Others ranged from 2.0% to 14.0%, peaking in October.

Phytoplankton Population Density

Station 1: Density ranged from 114 to 36,000 cells/l, peaking in February (post-monsoon).

Station 2: Density ranged from 50 to 104,915 cells/l, highest in May (summer).

Species Diversity

Station 1: Diversity index (H') ranged from 0.24 (September) to 3.95 (December).

Station 2: H' ranged from 0.94 (March) to 4.54 (December).

Species Richness

Station 1: SR ranged from 0.18 (September) to 4.24 (February).

Station 2: SR ranged from 0.62 (March) to 4.11 (January).

Species Evenness

Station 1: J' ranged from 0.24 (September) to 0.97 (December).

Station 2: J' ranged from 0.28 (July) to 0.98 (December).

Dominance Index

Station 1: Dominance index ranged from 16.00 (January) to 99.89 (September).

Station 2: Ranged from 10.0 (January) to 93.0 (July).

Discussion

Analysis showed diatoms were dominant (71.12%), followed by greens (9.63%), bluegreens (8.56%), dinoflagellates, and others (3.74%). More species were observed at station 2. Ninety-seven species were common, 39 exclusive to station 1 and 51 to station 2.

Diatom species such as Achnanthes brevipes, Chaetoceros affinis, and Navicula pastrum were found year-round at station 1. Station 2 had species like Asterionella glacialis, Coscinodiscus marginatus, and Rhizosolenia alata throughout.

Diatoms, especially pennates, dominated post-monsoon and premonsoon seasons. Dinoflagellates peaked during monsoon/post-monsoon, greens in premonsoon/monsoon, and bluegreens in summer/monsoon. These seasonal shifts are driven by changes in environmental parameters.

Station 2's higher population density is likely due to proximity to the Dam's bank, supporting typical marine species such as Campylodiscus ornatus, Odontella sinensis, and Thalassionema nitzschioides. Phytoplankton density correlated positively with temperature, salinity, nutrients, and chlorophyll-a.

Species diversity and richness were lower during blooming due to dominance of a few species. This aligns with findings from other estuarine studies.

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NEURAL MECHANISMS OF HUMAN DECISION MAKING: INSIGHTS FROM COGNITIVE NEUROSCIENCE

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Abstract: Decision-making is a complex cognitive function that influences human behaviour across diverse contexts, including personal, professional, ethical, and economic domains. It involves evaluating available choices, predicting potential outcomes, and selecting the most appropriate action based on internal and external factors. This process is essential in daily life, encompassing a wide range of activities, from simple tasks like choosing a meal to more complex decisions such as financial investments or moral judgments. Each decision, regardless of its complexity, involves specific neural circuits and cognitive processes that work together to achieve desired outcomes.

This paper aims to provide a comprehensive review of the neural substrates of decision making, focusing on the prefrontal cortex, basal ganglia, and limbic system, which work in concert to facilitate cognitive control, reward evaluation, and emotional regulation. The role of key neurotransmitters, including dopamine, serotonin, and norepinephrine, is examined in the context of risk-taking, reward processing, and impulsivity. Furthermore, the paper explores theoretical models of decision-making, including dual process theory and prospect theory, alongside their neurobiological underpinnings. Practical applications are discussed in fields such as psychopathology, artificial intelligence, behavioral economics, and policy-making. The interplay between rational and emotional decision-making, cognitive biases and real-world implications of neuroscience research are examined. By integrating interdisciplinary perspectives, this research contributes to a nuanced understanding of decision-making and offers potential pathways for improving judgment and decision-making strategies in clinical, technological, and societal settings.

Keywords: Decision-making, Cognitive Neuroscience, Prefrontal Cortex, Dopamine, Behavioral Economics, Cognitive Biases, Neurotransmitters, Artificial Intelligence. @ Metainnovate March 2025 (www.metainnovateybnujournal.com)

Introduction:

Decision-making is a complex cognitive function that allows individuals to evaluate options, predict outcomes, and select the most appropriate actions in a dynamic environment. This process is essential in daily life, encompassing a wide range of activities, from simple tasks like choosing a meal to more complex decisions such as financial investments or moral judgments. Each decision, regardless of its complexity, involves specific neural circuits and cognitive processes that work together to achieve desired outcomes.

Traditionally, decision-making was viewed as a rational, linear process driven by logical reasoning and conscious deliberation. However, contemporary neuroscience has transformed this understanding by revealing that decision-making is a result of the intricate interplay between cognitive, emotional, and neurobiological factors. Modern research has shown that decision-making is not solely governed by rational thought but is significantly influenced by emotions, past experiences, and underlying biological mechanisms.

Advances in neuroimaging technologies, particularly functional magnetic resonance imaging (fMRI) and electroencephalography (EEG), have been instrumental in uncovering the complexities of decision-making. These technologies allow researchers to map the specific brain regions involved in different aspects of decision-making, providing insights into the dynamic interactions between various neural networks. For example, fMRI offers high-resolution images of brain activity, enabling the identification of areas associated with reward processing, risk evaluation, and executive functions. EEG, on the other hand, provides temporal precision, capturing the rapid neural oscillations that underlie decision-related cognitive processes.

In addition to neuroimaging, computational modeling has emerged as a powerful tool for understanding the mathematical principles that govern decision-making. By creating models that simulate decision-making processes, researchers can test hypotheses and explore the mechanisms that drive decision outcomes. These models incorporate variables such as risk, reward, uncertainty, and individual preferences, offering a quantitative framework for understanding how decisions are made.

This paper aims to provide a comprehensive examination of the neural mechanisms involved in decision-making. It will explore the role of neurotransmitters, such as dopamine and serotonin, in shaping risk-taking behaviors and reward perception. Furthermore, it will discuss the implications of these neuroscientific findings for various fields, including mental health, where understanding decision-making can inform therapeutic interventions; artificial intelligence, where insights from human decision-making can enhance machine learning algorithms; and economics, where the integration of cognitive and emotional factors can refine models of consumer behavior and market dynamics.

Neural Architecture of Decision-Making

Decision-making relies on a distributed network of brain regions that process information, regulate emotions, and execute motor responses. These neural circuits can be categorized into three primary regions:

2.1 Prefrontal Cortex (PFC): The Seat of Rational Decision-Making

The prefrontal cortex (PFC) plays a central role in high-level cognitive control, impulse @ Metainnovate March 2025 (www.metainnovateybnujournal.com) regulation, and strategic decision-making. It integrates inputs from sensory, emotional, and reward systems to facilitate complex problem-solving.

➢ Dorsolateral Prefrontal Cortex (DLPFC):

➢ Governs working memory, cognitive flexibility, and logical reasoning.

➢ Essential for evaluating the long-term consequences of actions.

➢ Disruptions in the DLPFC (e.g., in schizophrenia or ADHD) impair cognitive control, leading to irrational, impulsive choices.

➢ Ventromedial Prefrontal Cortex (VMPFC):

➢ Processes social and emotional inputs to shape value-based decisions.

➢ Lesions in the VMPFC have been linked to poor risk assessment and diminished empathy (e.g., in individuals with psychopathy).

➢ Orbitofrontal Cortex (OFC):

➢ Integrates reward and punishment signals to refine decision-making.

➢ Dysfunction in the OFC leads to compulsive behaviors and impaired reward-based learning (e.g., in gambling addiction).

The PFC's intricate network facilitates the integration of complex cognitive tasks and moral judgments, highlighting its pivotal role in adaptive and flexible decision-making.

2.2 Basal Ganglia: Reinforcement Learning and Habit Formation

The basal ganglia are subcortical structures that play a critical role in learning from past experiences and reinforcing behaviors based on rewards and punishments.

➢ Striatum (caudate nucleus and putamen) encodes reward-prediction errors, helping individuals adjust choices based on unexpected outcomes.

➢ Globus Pallidus and Subthalamic Nucleus regulate motor and cognitive aspects of decision-making.

➢ Dysfunction in the basal ganglia contributes to addictive behaviors, compulsions (OCD), and Parkinson's disease, where individuals struggle with initiating or inhibiting actions.

The basal ganglia's reinforcement learning mechanisms enable the formation of habits and the modulation of behavior based on reward contingencies, underscoring their importance in adaptive decision-making.

2.3 Limbic System: Emotional and Risk-Based Decision-Making

The limbic system modulates emotional responses, influencing impulsivity, fear-based decisions, and preference formation.

Amygdala:

➢ Processes fear and reward-related stimuli.

➢ Hyperactivity is linked to anxiety disorders and excessive risk aversion.

➢ Hypoactivity contributes to reckless behaviors, as seen in individuals with antisocial personality disorder.

Hippocampus:

➢ Stores past experiences that shape future decisions.

➢ Damage to the hippocampus impairs memory-based decision-making, increasing reliance on heuristics (mental shortcuts).

The limbic system's interplay with other neural circuits highlights its role in balancing emotional and cognitive factors in decision-making, providing a comprehensive understanding of how decisions are influenced by emotional states.

Neurotransmitters and Their Role in Decision-Making

Neurotransmitters regulate motivation, impulse control, and reinforcement learning, directly impacting decision-making. These biochemical messengers are crucial for modulating neural activity and enabling the complex cognitive processes required for effective decision-making.

3.1 Dopamine: The Reward Signal

➢ Enhances motivation and goal-directed behavior by modulating reward anticipation.

➢ Elevated dopamine levels promote risk-taking (e.g., in substance abuse, mania) and increase the likelihood of seeking novel and potentially rewarding experiences.

➢ Dopamine depletion (e.g., in Parkinson's disease) leads to indecisiveness, apathy, and cognitive inflexibility, impairing an individual's ability to make decisions.

➢ Dopamine's role as a reward signal makes it a critical factor in reinforcement learning and behavioral adaptation. The neurotransmitter's influence extends to the modulation of pleasure, reward, and goal-directed actions, highlighting its importance in both everyday decision-making and pathological conditions.

3.2 Serotonin: The Impulsivity Regulator

➢ Higher serotonin levels promote patience, long-term thinking, and a preference for delayed gratification.

➢ Low serotonin levels are associated with impulsivity, aggression, and short-term reward preferences (e.g., in depression, borderline personality disorder).

➢ Serotonin's regulatory function on mood, emotion, and impulsivity underscores its significance in decision-making processes. The neurotransmitter's ability to modulate responses to aversive stimuli and enhance self-control plays a pivotal role in shaping behavior and choices.

3.3 Norepinephrine: Stress and Decision-Making

➢ Modulates arousal, alertness, and attention, thereby enhancing an individual's capacity to respond to environmental demands.

➢ Plays a crucial role in rapid decision-making under pressure (e.g., in emergency responders and military personnel).

➢ Norepinephrine's involvement in the fight-or-flight response highlights its importance in decision-making during high-stress situations. By modulating cognitive processes such as attention and arousal, norepinephrine enables individuals to make swift and effective decisions in critical circumstances.

Theoretical Models of Decision-Making

Several theoretical models have been proposed to explain the cognitive and neural mechanisms underlying decision-making. These models provide valuable insights into the diverse factors that influence choices and behaviors.

4.1 Dual-Process Theory: Fast vs. Slow Thinking

Proposed by Daniel Kahneman, this model describes two decision-making systems:

System 1:

Fast, intuitive, heuristic-driven, influenced by past experiences. This system operates automatically and quickly, often relying on mental shortcuts to reach decisions.

System 2:

Slow, deliberate, logical, requiring cognitive effort. This system is responsible for analytical thinking and conscious reasoning, involving thorough evaluation of information and potential outcomes.

The interplay between these two systems highlights the complexity of decision-making, where both automatic and controlled processes contribute to the final choice. Understanding the balance between System 1 and System 2 can provide insights into cognitive biases and decision-making errors.

4.2 Prospect Theory: Loss Aversion and Risk Perception

➢ People assign disproportionate weight to losses, fearing loss more than they value equivalent gains.

➢ The amygdala and PFC regulate this bias, influencing financial and health-related decisions.

➢ Prospect Theory, developed by Daniel Kahneman and Amos Tversky, emphasizes the asymmetry between gains and losses in decision-making. The theory suggests that individuals are more sensitive to potential losses than to potential gains, leading to risk-averse behavior. This bias is mediated by neural circuits involving the amygdala and prefrontal cortex, which shape risk perception and decision outcomes.

Applications in Psychopathology, AI, and Behavioral Economics

The insights gained from studying decision-making processes have significant implications for various fields, including mental health, artificial intelligence, and behavioral economics.

5.1 Psychiatric Disorders and Decision-Making Deficits

Schizophrenia: Disruptions in dopamine and PFC impair rational decision-making, leading to difficulty in evaluating risks and benefits.

Addiction: Excessive dopamine response skews reward perception, promoting compulsive behaviors and impaired decision-making.

Understanding the neural and neurochemical basis of decision-making deficits in psychiatric disorders can inform the development of targeted interventions and therapeutic strategies. By addressing the underlying mechanisms, it is possible to improve decision-making capabilities and overall quality of life for affected individuals.5.2 Artificial Intelligence and Computational Decision-Making

Artificial intelligence (AI) has made significant strides in recent years, particularly in areas that require complex decision-making. By drawing inspiration from human cognitive and neural mechanisms, AI systems are being developed to perform tasks that traditionally required human intelligence. These systems are revolutionizing various sectors, including healthcare, finance, and robotics.

Healthcare: AI models are being used to assist in medical diagnosis, treatment planning, and patient care. For example, machine learning algorithms can analyze medical images to detect diseases such as cancer with high accuracy. These systems mimic the decision-making processes of human experts, combining data analysis with probabilistic reasoning to arrive at conclusions.

Finance: In the financial sector, AI is being used to predict market trends, assess risks, and optimize investment strategies. Algorithms that incorporate principles from behavioral economics and neuroscience can better understand market dynamics and investor behavior, leading to more informed and effective decision-making.

Robotics: AI-driven robots are increasingly being used in manufacturing, logistics, and even healthcare. These robots rely on decision-making algorithms to navigate complex environments, perform tasks, and interact with humans. By integrating insights from human decision-making, these systems can operate more efficiently and adapt to changing circumstances.

The development of AI systems that emulate human decision-making processes has the potential to enhance the efficiency and effectiveness of various applications. By incorporating principles from neuroscience and cognitive psychology, AI can achieve greater accuracy, adaptability, and efficiency in tasks such as diagnosis, financial forecasting, and autonomous navigation. However, it is essential to ensure that these systems are designed with ethical considerations in mind, particularly regarding transparency, accountability, and bias.

5.3 Behavioral Economics and Policy-Making

Behavioral economics integrates insights from psychology and neuroscience to understand how individuals make economic decisions. Traditional economic models assume that individuals are rational actors who make decisions to maximize utility. However, behavioral economics recognizes that human decision-making is often influenced by cognitive biases, emotions, and social factors.

Cognitive Biases: Understanding cognitive biases, such as loss aversion, anchoring, and confirmation bias, can help policymakers design interventions that promote healthier and more rational choices. For example, recognizing the bias toward loss aversion can inform strategies to encourage savings and investments, while understanding heuristic-driven decisions can enhance public health campaigns.

Nudging: One of the most influential concepts in behavioral economics is the idea of "nudging," which involves designing choices in a way that guides individuals toward better decisions without restricting their freedom of choice. For instance, placing healthier food options at eye level in cafeterias can nudge individuals toward making healthier dietary choices. @ Metainnovate March 2025 (www.metainnovateybnujournal.com)

Policy Design: Behavioral economics has significant implications for policy-making. By understanding how individuals make decisions, policymakers can design interventions that are more effective in achieving desired outcomes. For example, tax incentives can be structured to encourage environmentally friendly behaviors, and public health campaigns can be designed to reduce smoking rates.

The integration of behavioral economics into policy-making has the potential to improve societal well-being by promoting healthier, more rational choices. By recognizing the cognitive biases and decision-making heuristics that shape human behavior, policymakers can design interventions that benefit society as a whole. However, it is crucial to ensure that these interventions are ethically sound and respect individual autonomy.

Future Directions in Decision-Making Research

The field of decision-making is rapidly evolving, with new technologies and methodologies offering unprecedented opportunities to explore the neural and cognitive mechanisms underlying human choices. Future research should focus on several key areas to further advance our understanding of decision-making and its applications.

6.1 Interdisciplinary Approaches

One of the most promising directions for future research is the integration of interdisciplinary approaches. Combining insights from neuroscience, psychology, economics, and artificial intelligence can lead to more comprehensive models of decision-making. For example, neuroeconomic studies that merge economic theory with neural data can provide a deeper understanding of how individuals make financial decisions under uncertainty. Similarly, collaborations between neuroscientists and AI researchers can lead to the development of more sophisticated algorithms that mimic human decision-making processes.

6.2 Longitudinal Studies

Longitudinal studies that track decision-making processes over time can provide valuable insights into how these processes evolve with age, experience, and changes in brain structure and function. For instance, understanding how decision-making abilities develop in children and decline in older adults can inform interventions aimed at enhancing cognitive function across the lifespan. Longitudinal studies can also shed light on the long-term effects of interventions, such as cognitive training or pharmacological treatments, on decision-making abilities.

6.3 Individual Differences

There is growing recognition that individual differences play a significant role in decision-making. Factors such as personality traits, genetic predispositions, and cultural background can influence how individuals perceive risks, evaluate rewards, and make choices. Future research should explore these individual differences to develop personalized interventions that cater to the unique needs and preferences of different individuals. For example, understanding how genetic variations in dopamine receptors affect risk-taking behavior can lead to tailored treatments for individuals with addiction or impulse control disorders. @ Metainnovate March 2025 (www.metainnovateybnujournal.com)

6.4 Real-World Applications

While much of the research on decision-making has been conducted in controlled laboratory settings, there is a need for more studies that examine decision-making in real-world contexts. Field studies that observe decision-making in natural environments, such as workplaces, schools, and public spaces, can provide insights into how cognitive and emotional factors interact in complex, real-life situations. These studies can also inform the design of interventions that are more effective in real-world settings, such as nudges that encourage healthier eating habits or more sustainable behaviors.

6.5 Ethical Considerations

As our understanding of decision-making grows, so do the ethical implications of applying this knowledge. For example, the use of neuroimaging and AI in decision-making raises concerns about privacy, consent, and the potential for misuse. Future research should address these ethical considerations to ensure that advancements in decision-making research are used responsibly and for the benefit of society. Ethical guidelines and regulations should be developed to govern the use of neurotechnologies and AI in decision-making contexts.

Conclusion:

Decision-making is a complex and multifaceted process that involves the interplay of cognitive, emotional, and neural mechanisms. Advances in neuroscience have significantly enhanced our understanding of these mechanisms, offering valuable insights into how decisions are made and how various factors influence them. The applications of this knowledge are far-reaching, with implications for mental health, artificial intelligence, and behavioral economics.

As we continue to explore the neural and cognitive underpinnings of decision-making, it is essential to adopt interdisciplinary approaches, conduct longitudinal studies, and consider individual differences. Real-world applications and ethical considerations must also be at the forefront of future research to ensure that advancements in this field are used responsibly and effectively.

By fostering collaboration across disciplines and addressing the ethical implications of decision-making research, we can develop more comprehensive models of decision-making and create interventions that improve the quality of life and societal well-being. The ongoing integration of neuroscience, psychology, economics, and artificial intelligence holds the promise of optimizing decision-making processes and reducing cognitive biases, ultimately leading to better outcomes in various domains.

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IMPACT OF ENVIRONMENTAL FACTORS ON THE DEGRADATION OF VARIOUS STEEL GRADES OVER TIME

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Abstract: The pace at which metals and other materials corrode is significantly influenced by atmospheric pollutants including SO_2, NO_2 and CO_2. The rate of corrosion in steels is determined by their chemistry. Studies conducted in numerous nations have shown that pollution has a significant impact on corrosion rate. When moisture combines with the acidic gases produced by factories, the atmosphere becomes acidic. The corrosion behavior of two steel types—plain carbon steel (PCS) and weathering steel (WS)—exposed to the atmosphere of Jharsuguda is described in this study. The exposure of the samples took place between 2014 and 2019. Compared to WS, PCS exhibits a higher rate of corrosion. This is explained by the development of protective, nonporous oxide layers on WS. Raman spectroscopies validate the findings. The mechanism of air pollutants has been ascertained by analyzing the dusts collected at Jharsuguda. Laboratory researches on exposed samples have been conducted in order to determine the mechanism and comprehend the causes. Raman spectroscopy and other techniques have been used to investigate the mechanisms behind the degradation of various steel grades.

Keywords: Plain Carbon Steel (PCS), Rust, Raman spectroscopy, Weathering Steel (WS)

Introduction

Steel is a crucial component used in the construction of buildings, bridges, roads and many other structures. Steels are used because of their strength, longevity and durability. The primary component of the earth that sustains any nation's economy is steel. Steels initially develop iron oxide on their surface when exposed to any kind of environment. The type of oxides determines the formation of the oxide layer [1–3]. Lepidocrocide (γ-FeOOH), goethite (α-FeOOH), akaganeite (β-FeOOH), and feroxyhite (δ-FeOOH) are among the oxides that form on the surface of steels during atmospheric corrosion [4-5]. The composition of the atmosphere and chemistry determine the type of oxide. When steel is exposed to concrete, a passive layer—a protective coating that contains adherent and nonporous oxides—forms on the surface. The development of passive layers prevents corrosion in concrete environments. The surface of these passive layers is primarily composed of goethite (α-FeOOH) and maghemite (γ-Fe2O3) [6]. Our goal was to conduct this study because steels exposed to open air developed various oxides that might be protective or unprotective and may be used to forecast the rate of corrosion and lifespan of steels. Because of its higher environmental air pollution, we have selected Jharsuguda.

Experimental details

In this study, two structural steel grades—WS and PCS—were used. Hot rolled plates were used to cut the 150 mm, 100 mm, and 4 mm steel coupons. Prior to being fixed to the exposure rack at Jharsuguda, the steels' surfaces were belt polished and degreased in acetone. Table 1 lists the chemical compositions of the steels employed in this investigation.

Table 1: Chemical compositions of structural steels used in the this study

	Wt% of alloying elements										
Steels	C	Mn	Si	S	P	Ni	Mo	Cu	Cr	Al	Fe

WS	0.087	0.375	0.40	0.005	0.123	0.292	0.01	0.351	0.498	0.05	Balance
PCS	0.146	0.757	0.02	0.005	0.014	0.01	0.01	0.01	0.03	0.04	Balance

The identical steels were used for the laboratory tests as well. Different kinds of experiments were conducted to evaluate the corrosion behaviour of steels. Samples were exposed to the climate of Jharsuguda in the initial sets of trials. Jharsuguda is a dirty

industrial area. Table 2 displays the types of climates as well as the average annual statistics for SO_2, NO_2 and particulatematter (PM).

Table 2: Pollution data

Year	Pollution data (μg/m^3)		
	SO_2	NO_2	PM
2014-2016	44	56	100
2017-2019	35	48	153

All of the test samples were placed on steel racks that were angled 440 degrees and facing south. To prevent galvanic connections, the samples were fastened to the rack using brass nuts, bolts and porcelain insulators. Three sets of samples were removed from the racks and brought into the lab for various tests after the two-year exposure period. The ASTM G50-76[7] procedure was followed for the atmospheric exposure tests. As advised by ASTMG1-90, the rust on the exposed specimens was cleaned using an acid solution [8, 9].

From the steel surface, a few grammes of rust were scraped off and saved for the additional research. The publication now includes the average data for the three sets of specimens.This solution, which is composed of 0.5%wt NaCl + 0.1%wt $CaCl_2$ + 0.25%wt $NaHCO_3$, is said to replicate a saline, humid atmosphere. In order to conduct the EIS investigations, a sinusoidal voltage of 10 mV (relative to the open circuit potential) was applied to the working electrode, and the frequency was changed from 100 kHz to 0.01 Hz. Rust was extracted from the samples and subjected to Raman spectroscopy using an Almega dispersive Raman Spectroscope. The materials were excited by a He–Ne laser beam with a wavelength of 529 nm. To prevent rusts from changing due to the laser's heating effect, the laser's power was kept as low as feasible at 0.14mW. However, the Raman spectra with substantial noise was recorded when the laser intensity was reduced below 0.15 mW. Thus, it was determined to keep the laser power at 0.14mW. Depending on the type of sample, the collecting duration was adjusted from 70 to 150 seconds. An Olympus microscope set to 50 magnifications was used to focus on the locations of the specimens to be examined. In order to fine-focus on a specific area of the sample, the sample holder featured a motorised platform with a Jokey. The grating had a pinhole of 26 µm and 671 lines/mm. The device was calibrated using pure silicon at the 522 cm-1 peak before samples were analysed.

Results and discussion

Raman spectroscopy was used to determine the type of rust that had developed on the steels. Goethite (α-FeOOH) and maghemite (γ-Fe_2O_3) are the primary iron oxide phases that form on the surface of WS, whereas lepidocrocite (γ-FeOOH) and haematite (α-Fe_2O_3) are formed on PCS. Iron oxide's goethite and maghemite phases are highly protective, non-porous, and surface-adhesive [6, 8]. Raman spectra display in figure and the table has embedded peaks. According to the majority of researchers, lepidocrocite (γ-FeOOH) forms on steels during the early phases of air corrosion [10].

Additionally, it is proposed that the chemistry of steels plays a major factor in the development of rust. This experiment revealed that while non-porous, adherent, and protective iron oxides, such as goethite and maghemite are formed on WS steel, porous, non-adhesive, and unprotective oxides, including the strong haematite and lepidocrocite are formed on PCS steel. Cormell et al. have found that the formation of goethite on the steel surface protects the steel from further corrosion [11].

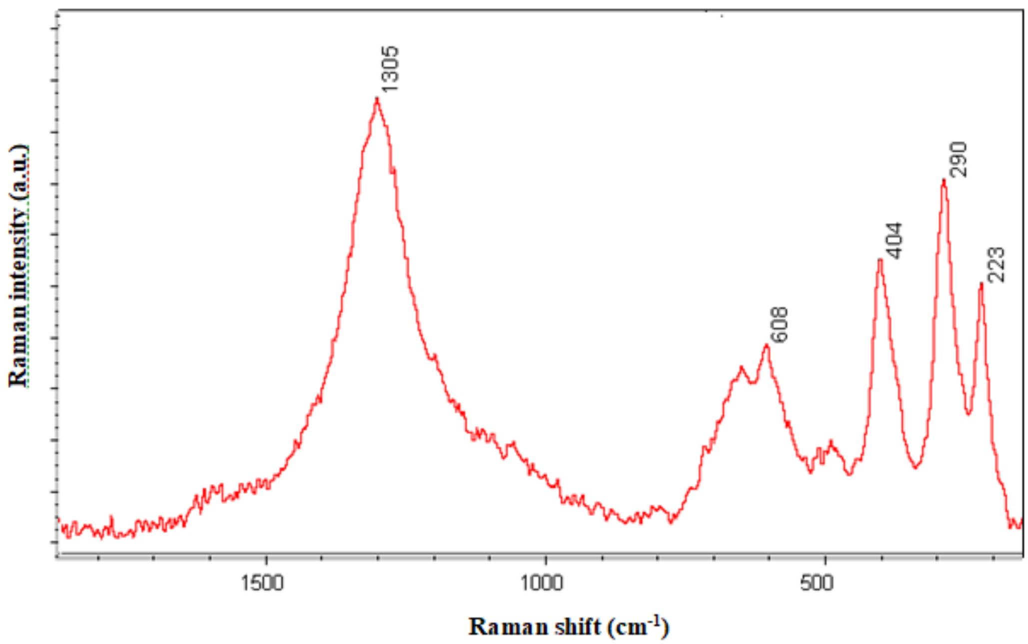

Fig 1: Raman spectra of rust formed on PCS

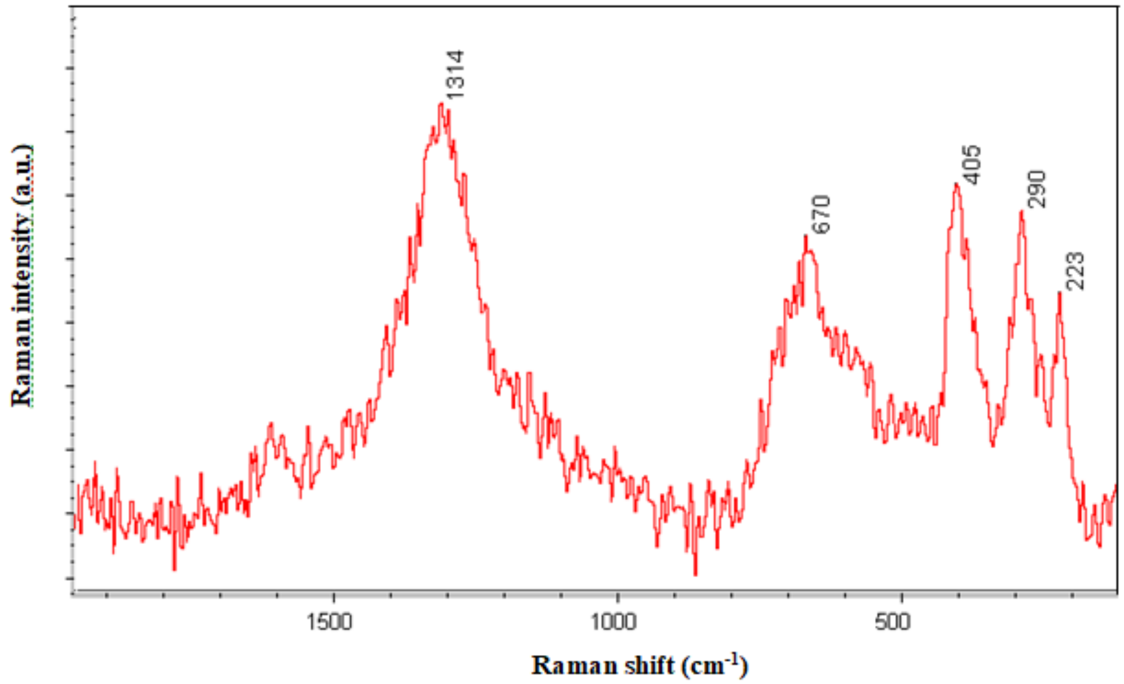

Fig 2: Raman spectra of rust formed on WS

Figure 1: Peaks Attribution (cm^{-1})		Figure 2: Peaks Attribution (cm^{-1})	
223	α-Fe_2O_3	223	α-Fe_2O_3
290	α-Fe_2O_3	290	α-Fe_2O_3
404	α-Fe_2O_3	405	α-Fe_2O_3
608	α-Fe_2O_3	670	γ-Fe_2O_3
1305	γ-FeOOH	1314	γ-Fe_2O_3

Conclusions

From the above studies it has been concluded that:

1. Corrosion rate of PCS is higher than WS during all period of exposure;
2. The corrosion rate of WS is less because of alloying elements i.e. Cu, Cr, P, Si and Ni are present;

3. On WS steel very protective, non-porous and adherent oxides (goethite and maghemite) while on PCS non protective, porous and non-adherent oxides (haematiteand lepidocrocite) are formed.

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जयशंकर प्रसाद की काव्य साधना

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प्रस्तावना:

प्रसाद की काव्य साधना उनके काव्यात्मक यात्रा को व्यक्त करने का एक उत्कृष्ट उदाहरण है। उनकी काव्य कृततयों में भतक्त भावनाओं की गहराई और धार्ममक तत्वों का स ुंदर प्रततष्ठान है। उनकी रचनाओं में सरलता, शृुंगार, प्रकृतत, भतक्त और तवरह के भाव अत्युंत प्रभावशाली हैं।

काव्य कला का तवकास:

कहा गया है कक „कतव का जन्म होता है तनमााण नहीं‟। कतव की काव्य धारा के कदशा पररवतान में बाह्य पररतस्ततथयाुं सहायक हो सकती हैं, ककत काव्य रचना के तलए आवश्यक प्रततभा एवुं भाव कता उनमें जन्मजात होती है। प्रसाद भी जन्मजात कतव थे। „कलाधर‟ उपनाम से अत्युंत सरस और मनोहर छुंद की रचना उन्होंने 9 वषा की अवस्था में ही की। तभी तो सत्रह वषा की आय में उनकी रचनाएुं पत्र – पतत्रकाओं में प्रकातशत होने लगीं। क छ समय पश्चात् इुंद प्रकातशत हुई और इुंद में प्रकातशत रचनाएुं आगे चलकर „तचत्राधार‟ और कानन „क स म‟ के रूप में प्रकट हुईं।

उनकी समस्त काव्य रचनाओं का काल क्रमान सार तववरण इस प्रकार कदया जा सकता है:

(1)तचत्राधार (रचना काल 1906 ई० से 1909 ई०)

(2) प्रेम पतथक (सवाप्रथम ब्रजभाषा में 1905 ई० में तथा खडी बोली में 1913 ई० में)

(3) करुणालय (1913 ई०)

(4) महाराणा का महत्व (1914 ई०) (5) कानन क स म (1912 ई० व 1916 ई०)

(6) झरना (1920 ई०)

(7) आुंसू (1925 ई०)

(8) लहर (1931 –32 ई०)

(9) कामायनी (1936 ई०)

इनका सुंतिप्त पररचय यहाुं प्रस्त त ककया जाता है।

(1)तचत्राधार : इसमें इनकी प्रारुंतभक रचनाएुं जो तवतभन्न पत्र-पतत्रकाओं में प्रकातशत हो च की थी, सुंकतलत की गई हैं। तवषय वस्त की दृतष्ट से तचत्राधार में चार प्रवृतियाुं दृतष्टगोचर होती हैं: (1) पौरातणक एवुं ऐततहातसक तवषयों का इततवृिात्मक शैली में वणान (2) प्रकृतत का स्वतुंत्र रूप से तचत्रण (3) प्रेमान भूततयों की व्युंजना और (4) भतक्त भावना की अतभव्युंजना।

प्रकृतत-तचत्रण सुंबुंधी कतवताओं में मानवीकरण की प्रकृतत अपने मूल रूप में प्रकट है:

‘‘भरर अुंक अहौ त म भेंटतत को;

तरु के तहय दाह समेटतत को; @ Metainnovate March 2025 (www.metainnovateybnujournal.com)

त म देखतत हो केतह आस भरी

नतह बोलत हो तरु पास खरी”?1

(2) प्रेम पतथक: ब्रज भाषा में तलतखत यह रचना कालाुंतर में खडी बोली में पररवर्मतत की गई। यह एक छोटा सा प्रबुंध काव्य है जो की प्रणय भावनाओं से ओत – प्रोत है। इस काव्य का एक-एक शब्द अन भूतत से अन प्रातणत है, मानो यह तलखा नहीं गया अतपत कतव के ह्रदय से स्वत: ही उच्छ्वातसत हुआ हो। कथा के आरुंभ में ही कतव का ह्रदय भाव से उद्वेतलत हो उठा है:

“श भ! अतीत कथाएुं यद्यतप कष्ट ह्रदय को देती हैं!

तो भी वज्रह्रदय कर अपना, उसको त म्हें स नाता हुं”!!2

(3) महाराणा का महत्व: इस ऐततहातसक खुंडकाव्य में महाराणा प्रताप की उदारता का तचत्रण देखने को तमलता है। एक बार उनकी सेना के लोग एक म तस्लम रमणी को बुंदी बना लेते हैं। यद्यतप वह रमणी अब्द ाररहीम खानखाना की पत्नी थी, जो उन पर आक्रमण करने आया था, पर वह उसे सम्मानपूवाक लौटा देते हैं। इस प्रबुंध की शैली में ओज ग ण का तवकास तमलता है –

“घोर अुंधेरें में उठती जब लहर हो,

त म ल घात प्रततघात पवन का हो रहा।

छोड, कूदना ततनके का अवलुंब ले,

घोर ससध में, क्या ब धजन का काम है”।3

(4) कानन क स म: „कानन क स म‟ में 1909 से 1917 ई० तक की कतवताएुं सुंकतलत हैं। इसकी अतधकाुंश कतवताओं का तवषय परम तत्व है, कहीं कतव अपने आराध्य की प्राथाना में लीन है तो कहीं उसके करुणक ुंज के वैभव का वणान कर रहा है। मानवीकरण के भी अनेक उदाहरण इस सुंकलन में उपलब्ध हैं। इसके अततररक्त „तचत्रकूट‟, „ श्रीकृष्ण जयुंती‟, „क रुिेत्र‟, „वीर-बालक‟ आकद में ऐततहातसक एवुं पौरातणक तवषयों का तनरूपण हुआ है। इस प्रकार इसमें प्रसाद काव्य की तीन प्रम ख प्रवृतियों का तवकास दृतष्टगोचर होता है।

(5) झरना: एक ओर इसमें प्रकृतत की मुंज ल मनोहर मूर्मत का तचत्रण सजीव रूप में हुआ है

“हो जो अवकाश त म्हें ध्यान कभी आवे मेरा,

कहो प्राण प्यारे, तो कठोरता ना कीतजए।

क्रोध से, तवषाद से; दया या प्रीतत से;

ककसी भी बहाने से तो याद कीतजए"।।4

दूसरी ओर झरना के गीतों में प्रसाद की भावनाएं कोमलतम अतभव्यतक्त से भी पररपूणा है।

"स कदन-मतण वलय तवभूतषत उषा

स ु ंदरी के कर का संुकेत।

कर रही हो त म ककसको मध र,

ककसे कदखलाती प्रेम तनकेत"।।5

(6) आंसू: आंसू की कथानक की रूपरेखा इसमें स्पष्ट रूप से दृतष्टगोचर नहीं होती। अतीत की स्मृततयों की अतभव्युंजना इसमें योजनाबद्ध ढंग से की गई है। आरुंभ में कतव पाठक को संुबोतधत करके _ "अवकाश भला है ककनको स नने को करुण कथाएं"। अपनी करुण गाथा स नाने के तलए कतव उपय क्त पृष्ठभूतम तैयार करता है। प्रेम की तवतभन्न भाव दशाओं का तचत्रण इसमें मार्ममक शब्दों में हुआ है ककत वेदना की एक हल्की सी छाया सवात्र दृतष्टगोचर होती है। अुंत में कतव इस तनष्कषा पर पहु ुंचता है:

"मादक थी मोहमयी थी, @ Metainnovate March 2025 (www.metainnovateybnujournal.com)

मन बहलाने की क्रीडा।

अब हृदय तहला देती है

वह मध र प्रेम की पीडा”।6

वहीं कतव ने दूसरे सुंस्करण में पररवतान करके इसमें लौकक्क प्रेम को आध्यातत्मक प्रेम का रूप दे कदया है, किर भी इसकी लौकक्कता पूणा रूप से ल प्त नहीं हुए हैं।

“बाुंधा था तवध को ककसने, इन काली जुंजीरों से।

मतणवाले ितणयों का म ख क्यों भरा हुआ हीरो से।।

सबका तनचोड लेकर त म, स ख से सूखे जीवन में।

बरसों प्रभात तहमकान सा आुंसू इस तवश्व सदन में”।।7

इन पुंतक्तयों को देखकर क्या लगता है इसमें ककसी नारी का तचत्रण है या तनग ाण प्रभ का?

(7) लहर: लहर प्रसाद की वह रचना है, तजसमें आुंसू से लेकर कामायनी तक की कतवताओं का सुंग्रह देखने को तमलता है। लहर तक आते-आते कतव सचतनशील हो जाते हैं, यही कारण है कक इसमें अन भूतत के साथ-साथ सचतन की भी प्रधानता है। एक आलोचक के शब्दों में „इसमें अन भूतत में भी झरना तथा आुंसू की अन भूतत से अुंतर है‟। झरना तथा आुंसू की अन भूतत में यौवन का आवेश, आवेग तथा प्रवाह तीव्र है। ककत लहर की अन भूतत में गहराई अतधक है। इसमें यौवन का आवेग झुंझावात तथा हलचल नहीं बतल्क एक शाुंतत गहराई तथा उज्जवलता है। पूवावती रचनाओं की भाुंतत इसमें भी प्रेम, प्रकृतत, रहस्य, जीवन दशान और ऐतततहातसक-पौरातणक तवषयों का तनरूपण हुआ है। यहाुं क छ पुंतक्तयाुं उद्धृत करना ही पयााप्त होगा।

अतृप्त प्रेम –

“तचर कुंठ से तृतप्त तवध र,

वह कौन अककचन अतत आत र!

धीरे से वह उठता प कार,

म झको ना तमला रे कभी प्यार”!!8

तवरहान भूतत-

“तमला कहाुं वह स ख तजसका स्वप्न देखकर जाग गया।

आसलगन में आते-आते म सक्या कर जो भाग गया''।।9

प्रकृतत का मानवीकरण-

"अुंतरिर में अभी सो रही है ऊषा मध बाला।

अरे ख ली भी नहीं अभी तो प्राची की मध शाला''।।10

वस्त तः लहर की रचनाएुं क्या भाव, क्या तवचार और क्या शैली सभी दृतष्टकोण से प्रौढ़ हैं।

(8) कामायनी: प्रसाद की सवाश्रेष्ठ रचना कामायनी मानी गई है। यह एक प्रबुंध काव्य है, तजसमें आकद प रुष मन की जीवन गाथा वर्मणत है। इसका कथानक अत्युंत सुंतिप्त है, उसमें बहुत थोडी घटनाओं का समावेश है। मन और श्रद्धा के तमलन और तवयोग, प नर्ममलन और प नर्मवयोग तथा मन और इडा से तमलन की साधारण सी घटनाओं में ही कामायनी का सारा इततवृि तसमटा हुआ है। यह घटनाएुं भी स्वतः घरटत न होकर पात्रों की सूक्ष्म भाव दशाओं की प्रेरणा से ही अतधक पररचातलत है। कामायनी में पात्रों की सुंख्या भी बहुत कम है। इसके प्रम ख पात्र तो तीन ही हैं-मन , श्रद्धा और इडा। कामायनी प्रकृतत के वैभवपूणा दृश्य एवुं उसकी मादक चेष्टाओं के अुंकन की दृतष्ट से भी पररपूणा है। मानव हृदय की भावनाओं का जैसा सूक्ष्म तचत्रण कामायनी में हुआ है वैसा अत्युंत तमलना द लाभ है। प्रेम और तवरह से सुंबुंतधत प्राय: सभी सुंचाररयों की व्युंजना @ Metainnovate March 2025 (www.metainnovateybnujournal.com)

इसमें सिलतापूवाक हुई है। साथ ही तवचारों की दृतष्ट से भी यह रचना प्रौढ़ एवुं महान है। आध तनक य ग की बौतद्धकता के तवपरीत उन्होंने तरल भावात्मकता का सुंदेश कदया तथा जीवन में इच्छछा ज्ञान और कक्रया के समन्वय की आवश्यकता बताई है।

"ज्ञान दूर, क छ कक्रया तभन्न है इच्छछा क्यों पूरी हो मन की।

तीनों तमल एक ना हो सके यही तबडुंबना है जीवन की"।।11

वस्त तः भाव तवचार और शैली तीनों की दृतष्ट से कामायनी अन पम है।

महत्त्व:

आध तनक सहदी कतवयों में प्रसाद का स्थान सवोच्च माना जाता है। छायावाद के तो वह प्रवताक एवुं सवाश्रेष्ठ कतव माने जाते हैं, अन्य वगों के कतव भी उनकी बराबरी करने में असमथा हैं। उनका महत्त्व इसी से स्पष्ट है कक त लसीदास के रामचररतमानस के पश्चात् दूसरा स्थान „कामायनी" को ही कदया जाता है। वस्त तः प्रसाद में भावना, तवचार एवुं शैली तीनों की पूणा प्रौढ़ता तमलती है, जो कक तवश्व के बहुत कम कतवयों में सुंभव है। प्रेमी, कतव और दाशातनक के लिणों से सुंपन्न कतव का व्यतक्तत्व और कृततत्व दोनों अतवस्मरणीय है, इसमें कोई सुंदेश नहीं।

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