

<https://doi.org/10.33472/AFJBS.6.6.2024.5846-5857>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

Strategic Communication With Respect To Impact of Aging on Cognitive Ability, Memory, and Decision –Making Process among Students and Adults

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Article Info

Volume 6, Issue 6, June 2024

Received: 17 April 2024

Accepted: 27 May 2024

Published: 20 June 2024

*doi: 10.33472/AFJBS.6.6.2024.5846-5857***ABSTRACT:**

Aging is an inevitable and universal process that impacts various aspects of human development, including cognitive abilities, memory, and decision-making processes. As individuals age, they often experience declines in certain cognitive abilities. Fluid intelligence, which encompasses problem-solving, abstract reasoning, and cognitive flexibility, tends to decline gradually over time. On the other hand, crystallized intelligence, which reflects acquired knowledge and expertise, generally remains stable or may even improve with age. These changes in cognitive abilities have important implications for various aspects of daily functioning, including work performance, decision-making, and independent living. Memory processes also undergo notable changes during the aging process. Older adults often experience difficulties in episodic memory, which involves the recall of specific events and personal experiences. However, semantic memory, which pertains to general knowledge and concepts, is usually well-preserved. Age-related changes in memory can impact daily activities, such as remembering appointments, names, and details of recent events. In addition to cognitive abilities and memory, decision-making processes are influenced by aging. Older adults may exhibit a more cautious approach to decision-making, tending to prioritize emotional and social factors over risk-taking behaviors. This change in decision-making strategies may be influenced by both cognitive changes and accumulated life experiences. Understanding the changes that occur in cognitive abilities, memory, and decision-making processes during aging is crucial for promoting healthy aging and developing appropriate behaviors and support systems. The present research focuses on identifying protective factors and strategies to mitigate cognitive decline, such as engaging in intellectually stimulating activities, maintaining a healthy lifestyle, and fostering social connections. Furthermore, cognitive training programs along with scientific interventions have shown improved cognitive functions in older adults. Further a study on Subjective Memory Complaints (SMC) and decision making in young and older adults of the Siksha "O" Anusandhan Deemed to be University was undertaken and it was corroborated that though Subjective Memory Complaint and aging are critical and it declines as age advances, but strategic psycho-social interventions can address these challenges effectively.

Keywords: strategic communication, cognitive ability, memory, decision-making, aging.

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1. Introduction

Aging is an inevitable process that brings about various changes in the human body, including

cognitive abilities, memory, and decision-making processes. As individuals grow older, they may experience alterations in their cognitive functioning, which can impact their daily lives and overall well-being (Ferrucci *et. al.*, 2020). Understanding the dynamics of aging and cognitive development is crucial for developing effective interventions to promote healthy aging and maintain cognitive vitality. Aging is a natural and inevitable process that affects various aspects of human life, including cognitive abilities (Longo *et. al.*, 2015). As individuals grow older, they may notice changes in their thinking, memory, and problem-solving skills (Corberand *et. al.*, 1981). Understanding the nature of these changes is essential for individuals, caregivers, and healthcare professionals to develop strategies that support healthy cognitive aging and maintain a high quality of life (Khan *et. al.*, 2017).

Objectives & Methodologies

The objectives of this study are

- To analyze the impact of aging in cognitive development, memory and decision-making process
- To come out with effective strategies for better work performance and productivity in old age
- The present study has highlighted the following issues by putting some valuable insights and finding appropriate strategies to address:
 - Factors affecting the fluid intelligence and crystallized intelligence among aged people
 - Improvement in episodic memory and semantic memory
 - Promoting healthy and balanced lifestyle for aged people to address cognitive decline effectively

The research methodologies adopted for this study is complete library research mainly based on secondary data collection techniques. The other methodologies adopted in this study are personal meetings, interviews and discussions with 136 staff of different colleges under Siksha “O” Anusandhan Deemed to be University comprising of both young and aged to have a comparative analysis of the impact of aging among different age groups. Total 136 staff is taken as samples for this study with detail discussion and analysis of the problems they face during their communication in the workplace.

The study was undertaken to assess the Subjective Memory Complaints (SMC) and Decision making in young and older adults of the university.

Information was also collected from secondary sources to know their difficulties in memorizing and understanding different things and issues as well as decision-making. During the survey, overall it was found that young ones were very active, adaptive and quick in their responses and decision-making unlike the old and aged. But the common decline in memory and decision making was seen among older adults. Personal one to one interaction with the respondents was very helpful in finding the gap between different age groups related to cognitive ability, memory and decision-making.

2. Literature Review

Cognitive Abilities and Aging

Cognitive abilities encompass a wide range of mental processes, including attention, perception, memory, problem-solving, and decision-making. With advancing age, individuals tend to experience changes in their cognitive abilities (Salthouse, 2004). One of the key concepts in cognitive aging is the distinction between fluid intelligence and crystallized intelligence. Fluid intelligence, which involves reasoning, problem-solving, and cognitive

flexibility, tends to decline gradually with age. This decline may be attributed to changes in brain structure, neurotransmitter levels, and processing speed (Tucker-Drob & Salthouse, 2008). On the other hand, crystallized intelligence, which reflects acquired knowledge and expertise, remains relatively stable or may even improve with age (Tucker-Drob, 2009). This suggests that older adults can maintain or enhance their cognitive performance in domains that rely on accumulated knowledge and experience.

Memory and Aging

Memory processes are also significantly influenced by the aging process. Episodic memory, which involves the recall of specific events and personal experiences, tends to decline with age (Hess, 2005). Older adults may experience difficulties in remembering recent events, names, and details. However, semantic memory, which pertains to general knowledge, concepts, and vocabulary, is usually well-preserved or even shows improvement (Burke & Light, 1981). This suggests that while the ability to remember specific events may decline, the storage and retrieval of general knowledge remain relatively intact (Light, 1991). Additionally, older adults may adopt compensatory strategies, such as using external memory aids or relying on familiarity cues, to enhance their memory performance (Bieri *et. al.*, 2023).

Decision-Making Processes and Aging

Decision-making processes are complex cognitive functions that involve evaluating options, assessing risks and rewards, and making choices. As individuals age, their decision-making processes may undergo changes (Frank & Seaman, 2023). Older adults often exhibit a more cautious approach to decision-making, placing greater emphasis on emotional and social factors (Chen *et. al.*, 2023). They tend to prioritize emotional well-being and interpersonal relationships over risky or uncertain outcomes. This change in decision-making strategies may be influenced by both cognitive changes and accumulated life experiences (Heisler *et. al.*, 2023). Older adults' decision-making preferences may also be influenced by a desire for maintaining stability and reducing uncertainty in their lives.

Promoting Cognitive Well-being in Aging

While cognitive changes are a natural part of the aging process, there are strategies that can help promote cognitive well-being in older adults. Engaging in mentally stimulating activities, such as puzzles, reading, and learning new skills, has been associated with better cognitive functioning in older adults. Regular physical exercise has also been linked to improved cognitive performance and a reduced risk of cognitive decline. Maintaining healthy lifestyles such as balanced diet, adequate sleep, involvement in physical activities like yoga, aerobics and walking exercises along with social engagement are highly essential for cognitive health. Additionally, cognitive training programs, such as memory training or problem-solving exercises, have shown promising results in improving cognitive functions in older adults (Shrestha *et. al.*, 2019).

Fluid Intelligence and Crystallized Intelligence

One significant aspect of cognitive aging is the differentiation between fluid intelligence and crystallized intelligence. Fluid intelligence encompasses reasoning, problem-solving, and adaptability, whereas crystallized intelligence refers to accumulated knowledge and experience (Jankowski *et. al.*, 2023). While fluid intelligence tends to decline with age, crystallized intelligence remains relatively stable or may even improve. This implies that although certain cognitive processes may be affected, older adults can leverage their wealth of knowledge and expertise to compensate for these changes (Cipolotti *et. al.*, 2023; Arndt *et. al.*,

2023).

Processing Speed and Attention

A common cognitive change experienced during aging is a decline in processing speed. Older adults may take longer to process and respond to information, leading to potential difficulties in complex tasks that require quick thinking (Zhao *et al.*, 2023). Old and aged people tend to show such kind of behaviours during interactions. Additionally, attention span and the ability to sustain focus may be affected. Older adults may find it harder to filter out distractions and maintain concentration for extended periods. However, it is important to note that while there may be changes in speed and attention, older adults can still perform well in tasks that require deliberate and focused attention (He *et al.*, 2023; Fuoli *et al.*, 2023).

Memory and Recall

Memory changes are among the most noticeable cognitive alterations in aging. Episodic memory, which involves recalling specific events and personal experiences, may decline. Older adults may experience challenges in remembering recent events, names, or details (Hoffmann & Hosch, 2023; Hirnstein *et al.*, 2023). However, semantic memory, which includes general knowledge and vocabulary, tends to be better preserved. This means that older adults can still access and utilize a vast array of knowledge and information, even if they encounter difficulties in recalling specific incidents (Stasiak *et al.*, 2023; Ortega-de San Luis, & Ryan, 2022).

Executive Functions and Problem-Solving

Executive functions, including planning, decision-making, and problem-solving abilities, may also be impacted by aging. Older adults may experience challenges in multitasking, inhibiting irrelevant information, and adapting to new situations (Drigas & Karyotaki, 2019; Kovari, 2020). Complex problem-solving tasks may require more time and effort (Mamrot & Hanć, 2019; Leikin *et al.*, 2020). However, with adequate support, cognitive training, and the application of strategies like breaking tasks into smaller steps, older adults can continue to engage in effective problem-solving and decision-making processes (Vermeulen *et al.*, 2019).

Factors Influencing Cognitive Aging

Several factors contribute to the changes in cognitive abilities during aging. Biological factors, such as age-related brain changes, including decreased brain volume, changes in neurotransmitter levels, and alterations in neural connectivity, play a role (Ali & Kunugi, 2020; Fisher *et al.*, 2019). Lifestyle factors, including physical activity, social engagement, and mental stimulation, can influence cognitive health. Chronic health conditions, medication use, and overall cardiovascular health also impact cognitive function in older adults (Tucker-Drob, 2019).

Memory is a fundamental cognitive function that plays a crucial role in our daily lives. As individuals age, they often experience changes in memory processes, which can have a significant impact on their ability to recall information, remember events, and navigate their environments (Pettigrew & Soldan, 2019). Understanding the effects of aging on memory is essential for individuals, caregivers, and healthcare professionals to develop strategies that support healthy cognitive aging and maintain optimal memory function (Krivanek *et al.*, 2021).

Episodic Memory Decline

One of the most noticeable changes in memory with aging is a decline in episodic memory.

Episodic memory refers to the ability to recall specific events, experiences, and personal details (Greene, & Naveh-Benjamin, 2023; Doss & Gallo, 2023). Older adults may find it more challenging to remember recent events, details of conversations, or specific occasions. This decline is attributed to changes in the brain's structures involved in encoding, storing, and retrieving episodic memories, including the hippocampus and frontal regions (Belblidia *et. al.*, 2023; Kang, 2023).

Semantic Memory Preservation

In contrast to episodic memory, semantic memory, which encompasses general knowledge, facts, and concepts, tends to be better preserved in aging. Older adults can retain a vast array of information accumulated over their lifetime (Ekstrom & Hill, 2023; Groussard *et. al.*, 2019). This preservation of semantic memory contributes to the ability to recognize familiar objects, understand language, and navigate familiar environments. However, the retrieval speed of semantic memory may become slower, requiring more effort and time to access stored information (Coane *et. al.*, 2022; Kumar *et. al.*, 2022).

Working Memory Changes

Working memory, the cognitive system responsible for temporarily holding and manipulating information for immediate use, undergoes changes with aging. Older adults may experience difficulties in maintaining and manipulating multiple pieces of information simultaneously (Ludyga *et. al.*, 2022). Tasks that require attention, concentration, and mental effort, such as multitasking or mentally juggling complex information, may become more challenging. However, the use of strategies like chunking, visualization, and external memory aids can help compensate for these changes and improve working memory performance (Grover *et. al.*, 2022).

Prospective Memory Challenges

Prospective memory refers to the ability to remember to perform planned actions in the future, such as remembering to take medication or attend appointments (Mahy, 2022). Older adults may experience challenges in prospective memory due to difficulties in maintaining future-oriented intentions and executing the intended actions. The use of external cues, reminders, and establishing routines can help support prospective memory in daily life (Stedall *et al.*, 2022).

The decision-making process is a fundamental cognitive function that plays a vital role in our daily lives. As individuals age, they often experience changes in decision-making abilities, which can have significant implications for their choices, risk assessment, and overall quality of decision outcomes. Understanding the impact of aging on the decision-making process is crucial for individuals, caregivers, and healthcare professionals to develop strategies that support healthy cognitive aging and maintain optimal decision-making capabilities (Kobayashi *et. al.*, 2019).

Caution and Risk Aversion

One noticeable change in decision making with aging is a tendency towards caution and risk aversion. Older adults often approach decision-making situations with greater deliberation and consideration of potential risks and consequences (Hiebl, 2014). This cautious approach may be influenced by a desire to maintain emotional well-being, stability, and reduce uncertainty in their lives (Szpiro, 1997). The ability to prioritize emotional factors and social implications can lead to more conservative decision-making outcomes (Lucas *et. al.*, 2016).

Decision Time and Processing Speed

As individuals age, decision-making processes may require more time and effort. Older adults may take longer to gather and process information, evaluate options, and reach a decision. This slower decision-making speed can be attributed to age-related changes in cognitive processing, such as declines in working memory capacity and processing speed (Löckenhoff, 2011). Although decision time may increase, older adults can still make effective decisions by allowing for sufficient time and utilizing compensatory strategies such as breaking complex decisions into smaller steps.

Accumulated Knowledge and Expertise

One advantage that older adults bring to the decision-making process is their accumulated knowledge and expertise. Over a lifetime, individuals acquire a wealth of experience, which can influence their decision-making abilities positively. The ability to draw on past experiences, use analogies, and apply learned lessons can enhance decision-making quality and efficiency. Older adults often demonstrate a high level of practical wisdom, which can contribute to effective decision-making in various life domains.

Emotion and Social Considerations

With aging, decision-making processes often incorporate greater emphasis on emotional and social factors. Older adults may prioritize the emotional well-being of themselves and others, as well as consider the impact of their decisions on interpersonal relationships (Salthouse, 2000). This shift may result from increased awareness of the importance of maintaining social connections and emotional harmony. Recognizing and valuing the influence of emotion and social considerations can lead to more holistic and socially responsible decision-making outcomes (Davies *et al.*, 1981).

Analyses & Findings

For a study on Subjective Memory Complaints (SMC) and Decision making in young and older adults of the university, the various tools which were used are t-test, ANOVA test and Chi square test. By using two independent t-tests, differences between the SMCs and no SMCs groups and between older and young people of SOA University on the MFE-30 were studied. Differences in sex distribution were analyzed by means of the Chi square test (χ^2). For the Iowa Gambling Task (IGT) performance, the IG scores on the 100 trials were investigated by using arm-ANOVA with Block (1, 2, 3, 4, and 5) as the within-subject factor and Group (SMCs, noSMCs) and Age (Young, Older) as the between-subject factors. The Greenhouse-Geisser correction was used for effects of Block. ERP data were analyzed for study of parameters of amplitude and latency. Arm-ANOVA was conducted for FRN, with Block (1 and 2), Feedback (wins and losses), and Electrode (Fz and FCz) as within-subject factors, and Group (SMCs, noSMCs) and Age (Young, Older) as between-subject factors. For the P3 component, arm-ANOVA was performed, with Block (1 and 2) and Feedback (wins and losses) as within-subject factors, and Group (SMCs, no SMCs) and Age (Young, Older) as between-subject factors. Post hoc comparisons were employed using Bonferroni's correction when rm-ANOVAs revealed a significant effect. Partial eta square (η^2_p) is provided as indicator of effect size. IBM SPSS version 25 was used for all analyses. A significance $p < 0.05$ was used for all tests.

It was observed during the analysis, that older people of the university with SMCs present shortfalls in the decision-making process. These short falls are seen at the behavioral level, but also in neural mechanisms of early feedback processing of negative outcomes. The results

show that SMCs and aging are critical factors in understanding the inconsistencies in memory and decision-making processes shown among older people in the institutions and to address these problems, strategic interventions need to be taken up both at personal and professional level. Strategies for Adaptive Decision Making:

Strategies for Maintaining Memory Function

While age-related changes in memory are a natural part of the aging process, there are strategies that individuals can adopt to maintain optimal memory function (Park *et. al.*, 2022; Knowlton *et. al.*, 2022; Chaput *et. al.*, 2022):

- Engage in mentally stimulating activities: Keeping the mind active through reading, puzzles, learning new skills, or engaging in hobbies that require cognitive effort can help support memory function.
- Maintain a healthy lifestyle: Regular physical exercise, a balanced diet, sufficient sleep, and managing stress are crucial for overall brain health and memory function.
- Practice memory techniques: Utilize strategies such as mnemonic devices, visualization, repetition, and association to enhance memory encoding and retrieval.
- Create external memory aids: Use calendars, planners, reminders on electronic devices, or memory apps to assist with remembering important tasks and appointments.
- Stay socially engaged: Maintaining social connections and engaging in meaningful social activities has been linked to better memory function in older adults.

Aging brings about changes in memory processes, particularly in episodic memory and working memory. While older adults may experience difficulties in recalling recent events and multitasking, semantic memory remains relatively intact, allowing them to retain a wealth of knowledge and information (Liu *et. al.*, 2020). By understanding these changes and adopting strategies to support memory function, individuals can enhance their cognitive well-being and maintain optimal memory performance throughout the aging process (McLellan *et. al.*, 2019). Additionally, creating an environment that promotes mental stimulation, a healthy lifestyle, and social engagement can contribute to healthy cognitive aging and overall quality of life (Gathercole & Hitch, 2019).

Strategies for Adaptive Decision Making

To optimize decision-making abilities in older adults, several strategies can be implemented:

- Provide decision support: Offering clear and concise information, visual aids, and decision-making frameworks can facilitate the decision-making process for older adults.
- Enhance information processing: Present information in a simplified and organized manner, and provide ample time for processing and reflection.
- Encourage diverse perspectives: Encouraging older adults to seek different viewpoints and engage in discussions can help broaden their decision-making perspectives and facilitate more informed choices.
- Foster continued learning: Engaging in lifelong learning, acquiring new knowledge, and staying mentally active can enhance decision-making skills and adaptability.
- Consider personal values and preferences: Understanding the values and preferences of older adults and aligning decision-making processes accordingly can promote decision satisfaction and well-being.

The aging process can impact the decision-making process, with older adults demonstrating a more cautious and risk-averse approach. Slower decision-making speed and increased consideration of emotional and social factors are common characteristics of decision making

in older adults. However, accumulated knowledge and expertise can positively influence decision outcomes (Henninger *et. al.*, 2010). By implementing strategies that provide decision support, enhance information processing, encourage diverse perspectives, foster continued learning, and consider personal values, adaptive decision making can be promoted in older adults. Understanding these changes and employing appropriate strategies can support healthy cognitive aging and facilitate effective decision-making processes, allowing older adults

3. Conclusion

Aging is a multifaceted process that affects different individuals in a different manner, and understanding these changes is crucial for a balanced lifestyle. The behavioral change during the aging process provides valuable insights into the complexities of human development related to cognitive ability, memory and decision-making. Cognitive abilities highlight the importance of valuing the wisdom and experience of older adults that bring happiness and prosperity in various domains of life. Furthermore, memory processes also undergo shifts during the aging process. Thereby, understanding both episodic memory and semantic memory, pertaining to general knowledge and concepts, need to be enhanced through various strategic and technical interventions. To support better memory functions in older adults, use of memory aids and leveraging existing semantic knowledge is highly required.

Decision making processes are influenced by aging as well older adults often exhibit a more cautious approach to decision-making, prioritizing emotional well-being and social factors. This can be attributed to both cognitive changes and accumulated life experiences. Recognizing and respecting these decision-making preferences can help facilitate better choices and decision outcomes for older adults both at personal and professional level.

Promoting healthy lifestyle behavior in life, positive attitude, spiritual inclination and feeling of gratitude among aged will certainly lead towards a healthy society. Enabling environments foster more social connections and make people happier. It also catalyzes improvements in overall quality of life and people start to live their lives peacefully and harmoniously with utmost dignity. The current study offers valuable insights into the dynamic nature of human development and how the memory, decision-making skills affect our cognitive ability with the advancement of age across various age groups. By understanding these dimensions, children, students, individuals, caregivers, working individuals and healthcare professionals can adopt various innovative strategies so that they can face any challenges in their life, develop resilience and successfully handle the cognitive aging issues without any glitch. In addition to it, the concerted and coordinated efforts of both Government and Civil Society organizations will certainly empower older adults in leading meaningful and vibrant lives. To conclude, by embracing the diversity and richness that aging brings in the development of cognitive process, will certainly allow aged people to appreciate the lifelong journey of learning and growth.

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