

CRITICAL APPRAISAL OF THE PSYCHOLOGICAL THEORIES ON COGNITIVE FLEXIBILITY

Benita Dooshima Aki¹, Andrew E. Zamani², Abubakar M. Tafida³

^{1,2,3}Department of Psychology, Nasarawa State University, Keffi.



Published in
VOI- 2 Issue: 4

DOI:10.5281/zenodo.21589176

PP: 79-93

*Correspondence:

Benita Dooshima Aki
Department of Psychology,
Nasarawa State University,
Keffi Email:
baki@bsum.edu.ng

Abstract

Overwhelming environmental signals make it hard for individuals to successfully navigate and function effectively. Cognitive flexibility, being one of the core domains of executive functions alongside working memory and inhibition, is profound in all aspects of human endeavor, including in education, clinical practice, and day-to-day living. Understanding the factors that make people flexible or rigid in their thinking will go a long way in helping people to adapt to change, multitask, promote a flexible lifestyle, and achieve effective learning and mental well-being. A Desk Review of literature appraised key theoretical frameworks that have offered insights into this concept, they include; cognitive flexibility theory emphasizes the ability to adapt knowledge and view problems from multiple perspectives, facilitating effective learning in complex domains, theory of mind emphasizes the importance of understanding others' mental state which is also crucial for predicting behavior, and flexible living. Executive function theory identifies cognitive flexibility, working memory, and self-control as distinct yet interrelated processes supporting goal-directed behavior, and dual process theory, posits that individuals utilize two cognitive systems: a fast, automatic one (System 1) and a slower, more deliberate one (System 2). Cognitive flexibility involves the ability to switch between these systems appropriately. While all these theoretical frameworks are useful in various ways, they differ in their unique perspective of the concept of cognitive flexibility, enabling individuals to be flexible enough to shift perspectives and adapt to the ever-changing environments. It is therefore recommended that clinicians, educators, and parents employ multiple perspectives to flexibly navigate life changes for effective mental well-being.

Keywords: cognitive flexibility, executive functions, psychological theories.

Introduction

Flexibility is considered a hallmark of human cognition and intelligent behavior. Several behaviors have been considered flexible. They include multitasking, novelty generation, and flexible problem-solving (Ionescu, 2012). Flexibility can also be looked at in two ways: first, it can be seen as the 'ability to modify thought processes based on a shift in rules or demands', and second, it is the 'ability to think about multiple things simultaneously'. (Bock et al., 2015). Cognitive flexibility is a vital aspect of cognitive functioning that enables an individual to work effectively by disengaging from a previous task, reconstructing a new way to respond to the problem, and implementing this new response set to the task at hand. Higher cognitive



flexibility is associated with favorable outcomes, including greater resilience to negative life events and stress as well as a better quality of life in older individuals. Diamond (2013) described cognitive flexibility as one of the three core executive functions alongside inhibition and working memory. It is the ability to adjust one's thinking and behavior and adapt to novel or changing environments, specifically to the problem (Zmigrod et al., 2019; &Armbruster et al., 2012). It is a higher level of creativity in adulthood (Chen et al., 2014). By implication, cognitive flexibility is crucial in helping individuals adjust their unhealthy lifestyles easily through flexible thinking and the ability to act.

People are often faced with many signals and demands from their environment, which can feel overwhelming and make it hard to navigate and function effectively. Although many international scholars have discussed this issue in theory, there has been little focus on how these ideas can be put into practice to help people handle life's challenges without feeling overloaded. There is also a depth of local literature on this issue in Nigeria. This systematic appraisal examines theories related to cognitive flexibility and their practical applications in supporting adaptive living without being overwhelmed. Some of which include cognitive flexibility theory, theory of mind, executive function theory, dual process theory, and others.

First, Cognitive flexibility theory was introduced in 1988 by Rand Spiro, Paul Feltovich, and Robert Coulson while studying how people learn in complex, and "ill-structured domains". Their work highlighted the importance of being flexible, adapting knowledge, and looking at problems from multiple angles instead of sticking to one rigid view. They argued that cognitive flexibility is relevant in knowledge acquisition as it affords the learners the opportunity for flexible behaviors that allow them to learn, unlearn, and relearn new materials for a more effective learning process. Much as this theory provides insights into the effective learning process in a dynamic world, its major criticism is that it is resource-intensive and complex for individuals who may not be familiar or cognitively flexible.

Second, another important theory in the explanation of the concept of cognitive flexibility is the theory of mind by Premack and Woodruff (1978), who posit that cognitive flexibility is the ability to shift perspectives and understand that others may think, feel, or believe differently from oneself. In other words, it means adapting one's thinking to seeing situations through someone else's point of view. This theory is relevant in developmental studies as well as in clinical settings, etc. Its critics say that it reduces the complexity of social cognition to simplified tasks, such as false-belief tests, thereby neglecting broader cultural, cognitive, and contextual influences.

Third, the Executive Function Theory, proposed by Miyake et al. (2000), identified cognitive flexibility as the main executive function. It is based on the idea that executive functions are made up of a set of three interrelated but distinct cognitive processes, which include: cognitive flexibility, also known as shifting, working memory, also referred to as updating, and self-control, otherwise known as inhibition. Together, these functions support higher-order thinking and goal-directed behavior, while remaining partially independent of one another. Critics argue that this theory oversimplifies complex cognitive processes by reducing them to just three core components, maintaining that executive functions are more dynamic and context-dependent than the model suggests, making it difficult to capture their full scope with this framework.

Fourth, Dual Process Theory, proposed by Wason and Evans in 1974 and later expanded upon by Kahneman in 2011, posits that people think in two ways: referred to as "systems 1&2". A quick, automatic style (System 1) and a slower, more careful style (System 2). It sees cognitive flexibility as the ability of an

individual to switch between these two systems at the appropriate time. That is, flexible enough to discern when to engage fast thinking, but slow down for deeper reasoning when the situation calls for it. This theory has received major criticisms mainly because it is hard to test, as the boundary between System 1 and System 2 is not clearly defined or easy to measure.

It is important to note that the above theories do not exclusively explain cognitive flexibility. This study adopts these few to meet its objectives.

The objectives of this study are, therefore,

1. To evaluate selected psychological theories on cognitive flexibility
2. To make a systematic appraisal and comparison of the psychological theories on cognitive flexibility
3. To determine the clinical implications of the theories

Psychological Theories on Cognitive Flexibility and Application

Over the years, scholars seeking to understand the concept of cognitive flexibility have developed a range of psychological theories. These theories aim to explain how individuals adapt their thinking, shift perspectives, and adjust strategies when faced with new or complex situations. Each framework provides unique insights into this concept. Some of these theories include.

Cognitive Flexibility Theory

Cognitive Flexibility Theory (CFT), propounded by Spiro and his colleagues in 1988, is one of the learning theories that emerged to address the limitations of fixed knowledge models, like schema theory. Unlike the schema theory, it enables learners to approach tasks from different, unpredictable, multi-perspective angles known as 'criss-crossing'. The theory emphasizes the importance of presenting knowledge from multiple perspectives and through diverse case studies, enabling learners to apply understanding beyond the original conditions in which it was acquired. The theory emphasizes that learning is context-dependent and necessitates highly targeted instructional approaches. CFT views learning as an active process in which individuals construct meaning from their experiences. The central aim of research in this area is to identify effective ways of designing learning experiences that cultivate deep, flexible, and adaptable internal representations of subject matter (Miller, 2010)

Major Goals and Principles of Cognitive Flexibility Theory

Cognitive Flexibility Theory (CFT) is a learning theory created to help people deal with complex and difficult knowledge. It revolves around four basic goals. Firstly, it sets out to help learners understand difficult but important subjects. That is, instead of just memorizing facts, it encourages deeper learning that focuses on real understanding of the main ideas. Secondly, it prepares learners to use their knowledge in flexible ways in real-life situations. Cognitive flexibility theory suggests that people should not rely only on fixed routines or stored answers. Instead, they should combine knowledge and experiences from different times to handle new and unfamiliar challenges. This makes learning more adaptable and creative. Thirdly, CFT sets out to encourage learners to develop open and flexible ways of thinking. Rather than simply forgetting outdated knowledge, CFT focuses on changing habits, beliefs, and ways of seeing the world. By doing this, it helps learners use knowledge effectively in complex situations. Fourthly, CFT's goal is to use modern learning environments, such as hypermedia, to support flexible and meaningful learning. These tools allow learners to view information from many perspectives and connect ideas in different ways, making it easier to understand complex subjects (Spiro et al., 2003)

Basic Principles of Cognitive Flexibility Theory

The theory is built on the following principles.

1. **Multiple Representations of Knowledge:** Cognitive Flexibility Theory (CFT) emphasizes the importance of multiple knowledge representations when dealing with complex or “ill-structured domains”. Knowledge that must be applied in diverse ways requires varied forms of representation, as viewing a situation through different conceptual lenses often reveals new and significant features. CFT advances the idea of “principled pluralism” (Spiro, 2001), which encourages the integration of multiple perspectives supported by evidence, rather than an unstructured “anything goes” approach. Cognitive Flexibility Hypertexts (CFHs) play a central role in guiding learners to assemble and justify knowledge from different viewpoints. By fostering open knowledge structures and encouraging an internal dialogue among alternative perspectives, CFT not only prepares learners for collaborative and group learning but also equips them to simulate these collaborative benefits in independent problem-solving contexts (Spiro et al., 1996).
2. **Interconnectedness:** Cognitive Flexibility Theory (CFT) highlights the interconnected nature of conceptual and case knowledge, arguing that such knowledge cannot be confined to rigid mental compartments or presented in a strictly linear format. Within Cognitive Flexibility Hypertexts (CFHs), information is structured through multiple organizing frameworks, allowing the same material to be accessed and combined in varied ways. Each organizational pathway brings different elements into relation, enabling learners to apply knowledge across a wide range of contexts. This flexible, nonlinear structure is central to fostering transferable knowledge and supports the development of learning that can adapt to complex and diverse situations.
3. **Context-dependency and conceptual variability:** Cognitive Flexibility Theory (CFT) stresses that while conceptual knowledge is vital, its use in real-world situations is rarely fixed. Instead, concepts are applied differently depending on the context, timing, and combinations with other ideas. Cognitive Flexibility Hypertexts (CFHs) emphasize showcasing these variations across contexts, helping learners recognize the flexible nature of concepts. This approach equips individuals to apply their conceptual knowledge more effectively and independently in diverse and unpredictable situations.
4. **Cases and minicases:** Cognitive Flexibility Theory (CFT) shows that learning from real cases is one of the best ways to prepare people to apply knowledge in many different situations, especially when general rules are not enough. To speed up this process, Cognitive Flexibility Hypertexts (CFHs) use many small but carefully chosen examples, called minicases. These minicases act like small windows into larger, more complex situations, giving learners a sense of the bigger picture. While no single example can show everything, using many interconnected minicases helps learners gradually build a fuller and more accurate understanding. Learning is most effective when these minicases are rich in detail and connect to different parts of the subject, making it easier to transfer knowledge to new problems.

Precisely, CFT principles emphasize an adaptively creative response to new situations, rather than the more mechanical following of routinized schemes that already exist in memory (Miller, 2010). It offers an extension to the idea of the way students process new information, suggesting that we do not simply retrieve packets of old knowledge but assemble them to form new realities that best relate to the learning of

new material. It advocates avoiding oversimplification of instruction, providing multiple representations of content, emphasizing case-based instruction, context-dependent knowledge, knowledge construction and not transmission, and introducing complexity at an early stage (Florivic & Apostol, 2024).

Application of Cognitive Flexibility Theory

People with cognitive flexibility tend to see challenges as manageable and can adjust their thinking amid situations. They can recognize different ways to approach a situation and replace maladaptive thoughts with adaptive and useful ones. This ability helps them cope better and supports their overall well-being (Almutawa et al., 2025).

Areas of application and benefits of cognitive flexibility theory include:

1. **Switching between tasks:** An individual who has good cognitive flexibility can quickly switch from one task to another without difficulty, such as switching from working on a work task to handling a personal problem.
2. **Changing strategies:** An individual who is dealing with obstacles in completing a task can change the strategy used to achieve the desired results. For example, in problem solving, if one approach does not work, cognitively flexible individuals may try another approach.
3. **Adapting to change:** Cognitive flexibility also includes the ability to adapt to changing situations or policies. For example, in a work environment, an employee who can adapt to changes in company rules or policies quickly will be more efficient and cope better with the job.
4. **Thinking out of the box:** Individuals who have cognitive flexibility tend to be able to think creatively and see various points of view in solving problems. They are not fixed on one way of thinking or understanding but are open to exploring possible alternatives and new ideas.
5. **Adjusting plans:** When initial plans do not fit the situation, cognitively flexible individuals can easily redesign their plans to achieve their goals.

Finally, Spiro, in 1978 described cognitive flexibility as the ability to restructure knowledge into an adaptive response to changing situations. They argued that cognitive flexibility is relevant in knowledge acquisition as it affords the learners the opportunity for flexible behaviors that allow them to learn, unlearn, and relearn new materials for a more effective learning process. Cognitive flexibility is an important mental ability that supports success in learning, work, and social interactions. It enables people to think quickly, adjust to new situations, and handle challenges effectively. In simple terms, it is one's capacity to adapt their thinking patterns when responding to, understanding, or solving problems (Saputra et al., 2022).

Theory of Mind

The term "Theory of Mind" was first introduced by primatologists, David Premack and Guy Woodruff in 1978 in their paper "*Does the chimpanzee have a theory of mind?*" They suggested that chimpanzees may be capable of inferring the mental states of others from the same species. Theory of mind refers to "the cognitive capacity to impute causal mental states to self and others to explain and predict behavior" (Farrant et al., 2014). It is the ability that enables individuals to construct representations of others' mental states for example, (beliefs, desires, intentions, imaginations, emotions) and to use those representations flexibly to explain and predict others' behavior in human interactions. It plays a key role in successful social interaction. An individual with a theory of mind can reflect on the content of his or her own and others' mind (Baron-Cohen, 2001)

Clinical Applications

Clinicians have assessed the implications of impairment in theory of mind observed in individuals with a range of disorders, including neurodevelopmental and psychiatric conditions, such as autism spectrum disorder, attention deficit and hyperactivity disorder, developmental language disorder, and schizophrenia, as well as in acquired brain injuries, particularly those affecting the right hemisphere (Korkmaz, 2011). Several researchers have also demonstrated the link between theory of mind and cognitive flexibility. For example, Sami et al. (2023) found that people with greater cognitive flexibility showed stronger brain activity in areas linked to understanding others' thoughts, such as the right middle frontal gyrus and temporoparietal junction. This suggests that the ability to shift perspectives and think flexibly supports the Theory of Mind's capacity to interpret and understand others' mental states.

The study by Jacques and Zelazo (2005) attests that children's ability to use language, especially labeling, plays an important role in the development of cognitive flexibility, which in turn influences their performance on Theory of Mind (TOM) tasks such as false-belief and appearance–reality tests. Their research showed that around age four, labeling begins to significantly affect how children perform on tasks requiring flexible thinking. This suggests that improvements in language help children shift perspectives and understand others' mental states, highlighting a strong link between language development, cognitive flexibility, and ToM. Theory of mind is also crucial in the understanding of neurodevelopmental disorders and psychiatric disorders such as autism spectrum disorders, schizophrenia, bipolar disorders, etc. (Frith, 2019).

Theory of Mind (ToM) is now widely used to describe a group of mental abilities that allow individuals to recognize that other people have their own beliefs, desires, plans, hopes, knowledge, and intentions, which may be different from theirs (Korkmaz, 2011).

Core Assumptions:

- Humans (and some non-human primates) can attribute mental states such as beliefs, desires, knowledge, and intentions to themselves and others.
- Others' mental states may be different from one's own and guide their behavior.
- ToM develops gradually in children, typically around age 4–5
- **autism spectrum disorder (ASD):** ToM deficits explain difficulties in understanding others' perspectives, social cues, and intentions.
- **Schizophrenia:** Impairments in ToM are linked with delusions and difficulties in social cognition.
- **ADHD & Social Communication Disorders:** Problems with perspective-taking and emotional understanding are studied within a ToM framework.
- **Neurorehabilitation:** Applied in assessing and treating individuals with brain injuries affecting social cognition.

Criticisms:

- **Overemphasis on Cognition:** Critics argue that ToM reduces social understanding to abstract reasoning, neglecting emotional and embodied aspects of interaction.

- **Cultural Bias:** Developmental milestones for ToM vary across cultures, challenging universality.
- **Task Validity Issues:** False-belief tasks may not fully capture ToM abilities; passing/failing may depend on language or executive function rather than pure ToM.
- **Alternative Models:** Some propose that social behavior can be explained without assuming an internal “theory,” but rather through direct perception and interaction.

Executive Function Theory

Executive function theory, originated by Miyake and his colleagues in 2000, proposes that a group of mental processes helps people control their thoughts, actions, and emotions to achieve goals. These processes include working memory, planning, attention, problem-solving, inhibition, and cognitive flexibility skills that are vital for managing daily life and social relationships. This theory is particularly important in understanding developmental disorders, as weaknesses in these areas can greatly affect how individuals think, behave, and interact with others

In the context of autism, Executive Function Theory explains that individuals often experience difficulties with working memory, self-control, and flexible thinking. Such challenges can make it harder to plan tasks, manage time, or adapt to new or unexpected situations. For example, strong inhibitory control helps a person think before acting impulsively, while cognitive flexibility allows them to handle changes in routines. When these skills are impaired, it can lead to struggles in both social and academic settings. (Fiveable, 2024)

Historical development and clinical relevance

Brief historical background has it that Executive Function Theory can be traced to early neurological research, most notably the case of Phineas Gage in 1848. Gage, a railroad worker who survived a traumatic brain injury to his frontal lobe, subsequently displayed profound alterations in personality and behavior. This case offered some of the earliest evidence that the frontal lobes play a critical role in self-regulation and goal-directed behavior, for example, cognitive flexibility. The theory’s formal development advanced significantly in the mid-20th century, largely due to the contributions of Soviet neuropsychologist Alexander Luria, who emphasized the prefrontal cortex as being central to behavioral control, planning, and purposeful action.

Many scholars have contributed to the contemporary understanding of executive functions. Alexander Luria established the neuropsychological groundwork for the theory, while neuroscientist Joaquin Fuster expanded this understanding by demonstrating the prefrontal cortex’s critical role in organizing and guiding behavior over time. In clinical neuropsychology, Donald T. Stuss and Michael Alexander conducted seminal research showing that damage to specific areas of the frontal lobe results in distinct impairments across different executive processes including cognitive flexibility.

A major advancement came from Akira Miyake and colleagues (2000), who proposed that executive function is a multifaceted construct comprising interrelated but distinct components, namely, inhibition, cognitive flexibility, and memory. In developmental psychology, Adele Diamond made significant strides in explaining how these functions emerge and evolve throughout childhood. Additionally, Russell Barkley’s work underscored the relevance of executive functions in understanding Attention-Deficit/Hyperactivity Disorder (ADHD), arguing that deficits in executive control are central to the disorder’s manifestation.

Key Assumptions of the Theory

Executive Function Theory is grounded in several key assumptions.

First, it posits that executive functions are both modular and interconnected. While distinct processes like inhibition and working memory can be identified, they frequently operate in tandem.

Second, the theory assumes that these functions are primarily localized in the prefrontal cortex, particularly the dorsolateral and ventromedial areas. However, other brain regions, such as the anterior cingulate cortex, basal ganglia, and cerebellum, also contribute to executive processing.

Another central assumption is that executive functions follow a developmental trajectory. These functions emerge in early childhood, develop through adolescence, and can decline with aging or due to neurological conditions.

Importantly, the theory also assumes that executive functions are plastic and trainable, meaning that they can improve with practice, education, and intervention.

Finally, executive functions are considered essential for adaptive, goal-directed behavior in everyday life, from managing tasks at work to regulating emotions in social situations.

Core Components of Executive Function Theory

Based on the model proposed by Miyake et al. (2000), executive functions can be divided into several core components. Including: Inhibition, cognitive flexibility, and working memory. Others, as identified by other researchers, include planning and self-regulation.

Inhibition refers to the ability to control automatic or impulsive responses, which is crucial for self-discipline and focus.

Cognitive flexibility, or shifting, is the capacity to adapt thinking and behavior in response to changing rules or environments.

Working memory, often called updating, involves holding and manipulating information over short periods, a key skill in problem-solving and decision-making.

planning, which involves setting goals and determining the steps to achieve them, and **monitoring**, or the ability to assess one's performance and adjust as needed.

Self-regulation encompasses the integration of many of these processes, allowing individuals to control their emotions and actions in alignment with long-term goals.

Applications and Relevance

Executive Function Theory has wide-ranging applications across multiple disciplines. In neuropsychology, it helps clinicians assess and treat patients with brain injuries, strokes, or neurodegenerative diseases such as Alzheimer's and frontotemporal dementia.

In developmental psychology, executive functions are used to understand typical and atypical child development, including conditions like ADHD and autism spectrum disorder.

In education, awareness of executive function has led to interventions designed to support students with difficulties in organization, attention, and self-control. Educational psychologists use assessments to identify executive dysfunction and create individualized learning strategies.

In the field of clinical psychology, executive function impairments are increasingly recognized in conditions such as depression, schizophrenia, and anxiety disorders, all of which may involve difficulties in planning, motivation, or cognitive flexibility. Additionally, executive function has become a focal point in cognitive training programs, mindfulness practices, and even corporate productivity strategies. Tools like the Wisconsin Card Sorting Test, the Stroop Test, and the Tower of London are commonly used to assess different aspects of executive functioning in both research and clinical settings.

Criticisms and Limitations

Despite its widespread acceptance, Executive Function Theory is not without criticism. One major challenge is the lack of a universally agreed-upon definition of executive functions, leading to variability in research methods and interpretations. Moreover, there is an ongoing debate about whether executive function is truly separate from general intelligence or simply another expression of it.

Another limitation is the "task impurity problem," which refers to the fact that most executive function tests engage multiple cognitive processes simultaneously, making it difficult to isolate specific functions. Additionally, critics point out that executive functioning can be influenced by cultural, environmental, and contextual factors, which are not always adequately accounted for in theoretical models or assessment tools.

Dual Process Theory

Dual process theory, proposed by Peter Wason and Jonathan ST. BT Evans 1974 is a central framework in cognitive psychology that seeks to explain how human beings think, reason, and make decisions. It posits that two distinct cognitive systems operate simultaneously to shape human judgment: one that is fast, automatic, and intuitive, and another that is slow, deliberate, and analytical.

Brief historical background.

The origins of the theory can be traced back to the 1970s, when early research in reasoning tasks, particularly by Peter Wason, highlighted the limitations of human logical reasoning. The more structured development of the theory, however, emerged through the work of Daniel Kahneman and Amos Tversky in their seminal studies on heuristics and biases published in 1974. These studies demonstrated how individuals often rely on mental shortcuts, which, although efficient, can lead to systematic errors in judgment. Later, Keith Stanovich and Richard West (2000) advanced the framework by clearly distinguishing between two systems of thought, which they labeled as System 1 and System 2. Daniel Kahneman further popularized this conceptualization in his influential book *Thinking, Fast and Slow* (2011), making the theory widely accessible across both academic and non-academic fields.

Key Assumptions of Dual Process Theory

First, dual process theory assumes that there is the existence of two separate cognitive systems. System 1 is characterized as fast, automatic, intuitive, emotional, and effortless. It underpins most day-to-day decisions and judgments by relying on heuristics and prior experiences. In contrast, System 2 is slow, deliberate, logical, and effortful. It requires conscious engagement and is typically invoked when individuals are faced with complex problems, abstract reasoning, or situations where accuracy is paramount.

Second, the theory assumes that these two systems do not operate in isolation but rather interact with one another. In many cases, System 1 generates immediate impressions or intuitive judgments, while System 2 monitors, evaluates, and, if necessary, overrides these judgments. This interactive process highlights the balance between efficiency and accuracy in human cognition.

Third, the principle of cognitive economy is central to the theory. Because human beings have limited cognitive resources, they rely heavily on System 1, which conserves mental effort. However, this reliance often comes at the cost of errors and biases. System 2, though more accurate and reliable, demands significant cognitive effort and therefore is only engaged selectively.

Finally, Dual Process Theory assumes that many of the well-documented biases in human reasoning, such as overconfidence, anchoring, or confirmation bias, stem from the dominance of System 1 processes. To overcome these biases, individuals must deliberately engage System 2 thinking, which can act as a corrective mechanism.

In summary, Dual Process Theory provides a valuable framework for understanding the dual nature of human cognition. Originating from the work of Wason, Kahneman, Tversky, and later Stanovich and West, the theory underscores the dynamic interplay between intuitive and analytical thinking. By highlighting the strengths and limitations of both systems, it has offered profound insights into decision-making processes, not only within psychology but also in fields such as behavioral economics, law, and medicine.

Criticisms of dual process theory

Dual-process theory is a popular way of explaining how we think. It says we use two kinds of thinking: one that is quick, automatic, and intuitive (System 1) and another that is slower and more logical (System 2). This theory has been useful in understanding decision-making; it also has some important drawbacks.

1. One key criticism is its **testability and interpretive framework**.

The **problem of testability** arises because the boundaries between System 1 and System 2 are not always clearly defined or empirically distinguishable. Many cognitive tasks can be explained by either system, and it is often difficult to design experiments that conclusively demonstrate which system is at work. For example, when people make quick judgments, it may be unclear whether the decision was entirely intuitive (System 1) or whether analytic reasoning (System 2) was also involved subconsciously. This makes the theory less falsifiable, since almost any outcome can be retroactively explained by invoking one system or the other (Beary, 2022)

2. Another is its oversimplification of mental processes. Human cognition is incredibly complex and reducing it to just two systems may obscure the dynamism of the thought process and ways in which people think. Some researchers argue that thinking cannot be cleanly divided into two systems; instead, they suggest that cognition exists along a continuum, where intuitive and analytical processes are intertwined rather than distinct. In many real-world situations, people do not switch abruptly from system one to system two; rather, they integrate both forms of thinking simultaneously

3. Educationists have also criticized this theory because it may encourage rigid views of student ability by undervaluing intuition or overemphasizing analytical thinking. A balanced approach should recognize the strengths of both systems and teach students how to apply each effectively.

Comparing Selected Psychological Theories of Cognitive Flexibility

As earlier stated in this article, these theories are essential in the understanding of the concept of cognitive flexibility and its applicability in clinical and other relevant settings where it may be appropriate. The theories include, but are not limited to: cognitive flexibility theory, theory of mind, executive function theory, and dual process theory. These theoretical frameworks are useful in both clinical and learning environments, enabling individuals to be flexible enough to shift perspectives and adapt to the ever-changing environments.

In their unique ways, Cognitive flexibility theory emphasizes the ability to shift perspectives and apply knowledge in new ways, it can guide teaching methods that encourage adaptive learning and problem-solving. Theory of mind helps educators and clinicians understand how individuals interpret the thoughts and emotions of others, which is crucial for developing empathy, social understanding, and effective communication. Executive function theory highlights key mental skills like working memory, cognitive flexibility, and inhibition, supporting interventions that improve attention, goal-directed behavior, and self-control. Finally, dual process theory distinguishes between intuitive (automatic) and analytical (deliberate) thinking, helping practitioners design strategies that balance quick decision-making with reflective reasoning.

All these theories are connected through the concept of cognitive flexibility, which means the ability to adjust one's thinking or behavior in response to changing situations. Each theory shows this differently. For example, cognitive flexibility theory itself helps individuals shift perspective in various situations, theory of mind is about understanding what other people are thinking or feeling, which requires being flexible in seeing things from their point of view. Executive function theory talks about skills like paying attention, regulating emotions, and switching between tasks. Dual process theory explains our flexibility to know when to use both quick, automatic thinking and slow, careful thinking. All of which involves flexible thinking. All these theories, therefore, share the idea that good thinking and learning depend on how well we can adapt, switch between ideas, and view things from different perspectives, creating a common ground where the concept of cognitive flexibility is well understood and put into practice.

While these theories are all related to how people think and adapt, they each explain cognitive flexibility from a different angle. Cognitive flexibility theory itself focuses directly on how people use and rearrange knowledge in new ways, especially when learning or solving problems in complex situations. It highlights the ability to connect ideas and adjust understanding when things don't go as expected.

Theory of mind, on the other hand, looks at cognitive flexibility in a social sense; it describes how individuals understand that others may think, feel, or believe differently from them. It's about mentally shifting between an individual's own perspective to someone else's.

Executive function theory explains cognitive flexibility as one of several mental control skills, such as working memory and self-regulation. Here, cognitive flexibility means being able to switch tasks, change strategies, or adapt behavior when plans fail.

Finally, dual process theory describes flexibility as the balance between two types of thinking, fast, automatic thinking and slow, deliberate reasoning. Being flexible means knowing when to rely on quick instincts and when to stop and think carefully.

Each theory views cognitive flexibility from a unique lens, whether it's about learning and problem-solving, understanding others, controlling thoughts and actions, or shifting between thinking styles; they all point to the mind's ability to flexibly adapt to change.

Clinical Implications of the Psychological Theories of Cognitive Flexibility.

The psychological theories of cognitive flexibility discussed in this study have many clinical implications. Among which are.

1. Helping People Become More Flexible Thinkers

All these theories show that being able to change the way individuals think or act is very important for good mental health. When people find it hard to adjust or see things differently, they may develop problems like autism, ADHD, depression, anxiety, substance use disorders, etc. In psychotherapy, helping people think more flexibly can make it easier for them to handle change and solve problems as they evolve.

2. Improving Self-Control and Planning

These theories also explain how the brain helps individuals to plan, focus, and control their actions. When this control is weak, as in ADHD or after a brain injury, people may act without thinking or struggle to stay organized. Psychotherapists can use this knowledge to teach better self-control, goal setting, and organization skills.

3. Building Social Understanding and Empathy

They also show how flexible thinking helps individuals understand what others feel or think. This is often difficult for people with autism, schizophrenia, or personality disorders. In therapy, exercises that help people see things from others' perspectives or practice social situations can improve relationships and communication.

4. Encouraging Better Decision-Making

These theories together explain that people use both quick, automatic thinking and slow, careful thinking. Sometimes, problems like addiction or anxiety happen when quick reactions take over. Clinicians use this idea to teach people how to pause, reflect, and make better decisions, using tools like mindfulness or thinking strategies.

5. Guiding Treatment for General Mental Health Wellbeing

Generally, these theories help psychologists and therapists understand how the mind works when people are flexible or rigid in their thinking. This guides treatment that aims to help people adapt to change, control their emotions, relate better with others, and make wise choices in daily life.

Conclusion

This article, having appraised the psychological theories on cognitive flexibility, concludes that cognitive flexibility is profound in all aspects of human endeavors, most notably in clinical, educational, and day-to-day life, as it affords individuals the capacity to shift perspectives in the face of changing environmental experiences. The review found that, despite variations in the theoretical perspectives examined in this article, they are all geared towards promoting flexible lifestyles that enable effective learning and mental well-being.

Recommendation

This article, therefore, recommends the following.

Clinicians should explore insights derived from these theoretical perspectives highlighted in this article for an in-depth understanding and application in therapy sessions for an effective intervention strategy. They should tailor their interventions to adapt to each patient's unique needs, avoid a rigid approach towards treatment, and learn to combine or shift between therapeutic models depending on the situation.

Educators should explore and use insights derived from these theoretical perspectives to adapt teaching methods that meet the diverse needs of their students. They should create a teaching environment that encourages creativity and open-mindedness to adapt and shift perspectives to new ideas in the phase of challenging tasks.

Parents can use the insights derived from these theoretical perspectives to adapt to their children's changing needs in terms of problem-solving and effective communication in the home environment and otherwise.

References

1. Almutawa, S. S., Alshehri, N. A., AlNoshan, A. A., AbuDujain, N. M., Almutawa, K. S., & Almutawa, A. S. (2025). The influence of cognitive flexibility on research abilities among medical students: cross-section study. *BMC Medical Education*, 25(1), 7. <https://link.springer.com/article/10.1186/s12909-024-06445-4>.
2. Armbruster, D. J., Ueltzhöffer, K., Basten, U., & Fiebach, C. J. (2012). Prefrontal cortical mechanisms underlying individual differences in cognitive flexibility and stability. *Journal of cognitive neuroscience*, 24(12), 2385-2399. https://doi.org/10.1162/jocn_a_00286.
3. Baron-Cohen, S. (2001). Theory of mind in normal development and autism. *Prisme*, 34(1), 74-183.
4. Beary, A. (2022). *Dual Process Theory: A Philosophical Review*. *American Catholic Philosophical Quarterly*, 96(2), 317-344. <https://doi.org/10.5840/acpq202221250>.
5. Bock, A. M., Gallaway, K. C., & Hund, A. M. (2015). Specifying links between executive functioning and theory of mind during middle childhood: Cognitive flexibility predicts social understanding. *Journal of cognition and development*, 16(3), 509-521. <https://doi.org/10.1080/15248372.2014.888350>.
6. Chen, Q., Yang, W., Li, W., Wei, D., Li, H., Lei, Q., ... & Qiu, J. (2014). Association of creative achievement with cognitive flexibility by a combined voxel-based morphometry and resting-state functional connectivity study. *Neuroimage*, 102, 474-483. <https://doi.org/10.1016/j.neuroimage.2014.08.008>.
7. Diamond, A. (2013). Executive functions. *Annual review of psychology*, 64(1), 135-168.
8. Evans, J. S. B. (2017). Dual process theory: Perspectives and problems. *Dual process theory 2.0*, 137-155. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781315204550-9/dual-process-theory-jonathan-st-evans>.
9. Evans, J. S. B. (2004). History of the dual process theory of reasoning. In *Psychology of reasoning* (pp. 251-276). Psychology Press. <https://www.taylorfrancis.com/chapters/edit/10.4324/9780203506936-12/history-dual-process-theory-reasoning-jonathan-st-evans>.

10. Farrant, B. M., Fletcher, J., & Maybery, M. T. (2014). Cognitive flexibility, theory of mind, and hyperactivity/inattention. *Child development research*, 2014(1), 741543. <https://doi.org/10.1155/2014/741543>.
11. Fiveable (2024). Executive Function Theory. Intro to Brain and Behavior. <https://fiveable.me/key-terms/introduction-brain-behavior/executive-function-theory>.
12. Florivic, L. M., & Apostol, R. L. (2024). The mediating role of cognitive flexibility on the relationship between emotional intelligence and academic self-regulated learning of senior high school students. *European Journal of Education Studies*, 11(5). <https://oapub.org/edu/index.php/ejes/article/view/5300>.
13. Frith, C. (2019). Theory of mind in schizophrenia. In *The neuropsychology of schizophrenia* (pp. 147-161). Psychology Press. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781315785004-9/theory-mind-schizophrenia-chris-frith>.
14. Ionescu, T. (2012). Exploring the nature of cognitive flexibility. *New ideas in psychology*, 30(2), 190-200. <https://doi.org/10.1016/j.newideapsych.2011.11.001>.
15. Jacques, S., & Zelazo, P. D. (2005). Language and the development of cognitive flexibility: implications for theory of mind. In *Why Language Matters for Theory of Mind*, Apr, 2002, University of Toronto, Toronto, ON, Canada; This chapter originated from the aforementioned conference.. Oxford University Press. <https://psycnet.apa.org/doi/10.1093/acprof:oso/9780195159912.003.0008>.
16. Kahneman, D. (2011). Fast and slow thinking. Allen Lane and Penguin Books, New York. https://durmonski.com/wp-content/uploads/2021/09/Think_Workbook_005.pdf.
17. Korkmaz, B. (2011). Theory of mind and neurodevelopmental disorders of childhood. *Pediatric research*, 69(8), 101-108. <https://www.nature.com/articles/pr92011100>.
18. Miller, R. W. (2010). *Applications of cognitive flexibility theory in cross-cultural training*. TheUniversity of New Mexico. <https://www.proquest.com/docview/612703327?fromopenview=true&pgorigsite=gscholar&sourcetype=Dissertations%20&%20Theses>.
19. Miyake, A., Friedman, N. P., Emerson, M. J., Witzki, A. H., Howerter, A., & Wager, T. D. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: A latent variable analysis. *Cognitive psychology*, 41(1), 49-100. <https://doi.org/10.1006/cogp.1999.0734>.
20. Premack, D. (1988). Does the chimpanzee have a theory of mind?. *Machiavellian intelligence: Social expertise and the evolution of intellect in monkeys, apes, and humans*, 160-179. <https://www.deempathischeorganisatie.nl/wp-content/uploads/2020/02/Premack-Woodruff-1978-Theory-of-Mind.pdf>.
21. Saputra, B., Solihatin, E., & Muslim, S. (2022). Cognitive flexibility abilities in learning: A systematic review of the literature. *Asian Journal of Educational Technology*, 2(2), 54-58. <https://doi.org/10.53402/ajet.v2i2.373>.
22. Sami, H., Tei, S., Takahashi, H., & Fujino, J. (2023). Association of cognitive flexibility with neural activation during the theory of mind processing. *Behavioural Brain Research*, 443, 114332. <https://doi.org/10.1016/j.bbr.2023.114332>.
23. Spiro, R. J. (1988). Multiple Analogies for Complex Concepts: Antidotes for Analogy-Induced Misconception in Advanced Knowledge Acquisition. Technical Report No. 439.



24. Spiro, R. J., Feltovich, P. J., & Coulson, R. L. (1996). Two epistemic world-views: Prefigurative schemas and learning in complex domains. *Applied cognitive psychology*, 10(7), 51-61. [https://doi.org/10.1002/\(SICI\)1099-0720\(199611\)10:7%3C51::AID-ACP437%3E3.0.CO;2-F](https://doi.org/10.1002/(SICI)1099-0720(199611)10:7%3C51::AID-ACP437%3E3.0.CO;2-F).
25. Spiro, R. J., Collins, B. P., Thota, J. J., & Feltovich, P. J. (2003). Cognitive flexibility theory: Hypermedia for complex learning, adaptive knowledge application, and experience acceleration. *Educational technology*, 43(5), 5-10. <https://www.jstor.org/stable/44429454>.
26. Wason, P. C., & Evans, J. S. B. (1974). Dual processes in reasoning?. *Cognition*, 3(2), 141-154. [https://doi.org/10.1016/0010-0277\(74\)90017-1](https://doi.org/10.1016/0010-0277(74)90017-1).
27. Zmigrod, L., Zmigrod, S., Rentfrow, P. J., & Robbins, T. W. (2019). The psychological roots of intellectual humility: The role of intelligence and cognitive flexibility. *Personality and Individual Differences*, 141, 200-208. <https://doi.org/10.1016/j.paid.2019.01.016>.

