The study of the adolescent brain has advanced significantly thanks to scientific methods like MRI. Adolescents' inclination towards immediate rewards and social advantages can inform educational and health practices. Cognitive control involves various aspects, such as inhibitory control (like choosing a healthy snack over candy), working memory (remembering a phone number), cognitive flexibility (switching between cognitive processes), and optimal reasoning. Structural MRI studies, like Diffusion Tensor Imaging (DTI), have also revealed immaturities in connections in the adolescent brain. It's intriguing how these findings align with evidence from animal studies, suggesting a peak in dopamine availability, the neurotransmitter that supports motivation, during puberty. Early post-mortem brain studies suggested that the visual cortex develops earlier than other brain regions, leading to the idea that reasoning abilities in adolescence might be limited. However, accumulating neuroimaging evidence has shown a more nuanced profile of brain maturation, supporting the notion that adolescents have access, albeit sometimes limited, to adult-level reasoning. Structural studies have shown that while much of the gray matter in the brain reaches maturity during adolescence, regions involved in complex information processing, such as the prefrontal cortex, are still maturing. Functional MRI studies are a great addition to the structural findings because they allow us to measure how the brain functions during cognitive tasks like reasoning and motivation. It's fascinating to see that while basic aspects of cognition are present early in development, the ability to engage these systems in a controlled and reliable manner continues to strengthen throughout adolescence. Functional MRI studies have mainly focused on the prefrontal cortex and have found diverse results depending on the ages tested and the tasks used. Dual systems models of heightened motivation during adolescence recognize that while sensation-seeking and risk-taking behaviors can have negative consequences, they also play an important role in adaptive development. Resting-state fMRI is also a recent addition, revealing brain networks that support various behaviors when subjects are not engaged in a task. These changes are reflected in the thinning of gray matter, which is believed to be a result of synaptic pruning, an adaptive process that helps shape the brain to meet the demands of the environment and promote optimal survival. recent post-mortem studies have shown that synaptic neural connections multiply during childhood, but then there's a steep loss of these connections during adolescence and beyond. What continues to strengthen is the ability of the prefrontal cortex to network with other brain regions, which is crucial for enacting controlled behavior. It's interesting to note that during adolescence, there may be a hyper-sensitivity in the brain regions that support motivation when presented with opportunities for rewards. It's interesting to note that resting state fMRI studies have shown that brain networks supporting cognitive, sensorimotor, and motivational systems are well organized early in development. It's during this period that heightened motivation and sensation-seeking drive the gathering of experiences, which helps our brain systems adapt to the demands of the environment. Structural MRI measures changes in gray matter, where neurons reside, and white matter, which facilitates communication between neurons. Functional MRI provides detailed information about oxygen changes during specific tasks, helping us understand the role of different brain regions during adolescence. These methods have allowed developmental cognitive neuroscientists to understand which brain processes are fully developed during adolescence and which are still maturing. It's fascinating how the combination of reasoning and rewards can contribute to

sensation-seeking and risk-taking behaviors that are often seen during adolescence.This implies that adolescents may be driven by rewards and may face limitations in their reasoning, especially in situations where there is heightened motivation.This model suggests that adolescents' capability to reason should not be dismissed, but rather engaged with an understanding of their heightened sensitivity to rewards and the new access to adult-level cognition.It's a crucial stage for forming relationships and social circles, as social processing during this time engages the brain's reward centers, influencing decision-making.The brain changes and heightened motivation during adolescence drive the gathering of experiences that shape how individuals interact with their environment.It's crucial to protect and promote positive experiences during this time to avoid disruptions in development and ensure positive outcomes throughout life.One important aspect that improves during this time is Cognitive Control, which refers to the ability to generate voluntary behavior for a planned goal.However, during adolescence, there is an increased ability for integration between these networks, which allows for more complex reasoning and decision-making.The literature suggests that there is a dual systems approach to understanding adolescent neurobehavioral functioning.