

# Integrated Model of Consciousness: A New Approach to Linking Working Memory, Self-Model, and Qualia

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## Abstract

Consciousness remains one of the most profound mysteries in cognitive science and philosophy. This paper proposes an integrated model of consciousness that links working memory, self-model, and qualia to provide a comprehensive understanding of conscious experience. Building upon Daniel Dennett's "Consciousness Explained," Thomas Metzinger's "Being No One: The Self-Model Theory of Subjectivity," and Francis Crick's "The Astonishing Hypothesis," we synthesize theories from neuroscience, psychology, and philosophy. Our model suggests that consciousness arises from the dynamic interaction between working memory and the self-model, mediated by neural correlates that give rise to qualia. We discuss the implications of this model for understanding the neural basis of consciousness and suggest directions for future research.

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# 1. Introduction

## 1.1 Background and Significance

Consciousness has long perplexed scientists and philosophers alike. Despite advances in neuroscience and psychology, a comprehensive understanding of consciousness remains elusive. The complexity arises from its multifaceted nature, encompassing subjective experiences (qualia), self-awareness, and cognitive functions like working memory. Daniel Dennett (1991) challenged traditional views by proposing a multiple drafts model of consciousness, emphasizing the decentralized nature of cognitive processes. Thomas Metzinger (2003) introduced the Self-Model Theory, arguing that the self is a construct generated by the brain. Francis Crick (1994) focused on the neural basis of consciousness, suggesting that specific neural correlates are responsible for conscious experience.

## 1.2 Objectives and Scope

The primary objective of this paper is to propose an integrated model that links working memory, the self-model, and qualia to explain consciousness more comprehensively. By synthesizing theories from Dennett, Metzinger, and Crick, we aim to bridge gaps between cognitive functions and subjective experiences. The scope includes a theoretical exploration supported by empirical findings from neuroscience and psychology.

## 1.3 Novelty of the Approach

While previous models have addressed components of consciousness separately, our approach integrates these elements into a cohesive framework. By highlighting the interplay between working memory and the self-model and how this interaction gives rise to qualia, we offer a novel perspective that could advance both theoretical understanding and empirical research.

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# 2. Theoretical Framework

## 2.1 Working Memory and Consciousness

Working memory is crucial for temporarily holding and manipulating information (Baddeley, 1992). It enables complex cognitive tasks like reasoning, learning, and comprehension. The central executive component of working memory is responsible for attention control, which is vital for conscious awareness. According to Baars' Global Workspace Theory (1997), consciousness arises when information is broadcasted globally in the brain, a process heavily reliant on working memory.

## 2.2 The Self-Model Theory

Metzinger's Self-Model Theory posits that the self is not an entity but a model constructed by the brain (Metzinger, 2003). This self-model integrates sensory inputs, memory, and emotional states to create a coherent sense of self. The transparency of this model makes us unaware that it is a construction, leading us to experience the self as real.

## 2.3 Understanding Qualia

Qualia refer to the subjective, qualitative aspects of experiences, such as the redness of red or the pain of a headache (Chalmers, 1996). They are central to the "hard problem" of consciousness—explaining why and

how physical processes in the brain give rise to subjective experience. Crick and Koch (1990) suggested that synchronized neural oscillations could be the neural correlates of consciousness (NCC) responsible for qualia.

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## 3. Methodology

### 3.1 Research Design

Our research adopts a multidisciplinary theoretical approach, integrating concepts from neuroscience, psychology, and philosophy. We perform a comprehensive literature review and conceptual analysis to develop the integrated model.

### 3.2 Data Collection Techniques

We collected data from peer-reviewed journals, books, and reputable online databases. Key search terms included "consciousness," "working memory," "self-model," and "qualia." Special attention was given to works by Dennett, Metzinger, and Crick to ground our model in established theories.

### 3.3 Analytical Methods

We employed conceptual analysis to identify overlaps and gaps in existing theories. By mapping the relationships between working memory, self-model, and qualia, we synthesized these elements into an integrated framework.

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## 4. Results

### 4.1 Correlation between Working Memory and Self-Model

Our analysis indicates a strong correlation between working memory and the self-model. Working memory provides the cognitive workspace where information about the self is processed and updated (Baddeley, 2003). This dynamic interaction allows for the continuous construction and reconstruction of the self-model.

### 4.2 Neural Correlates of Qualia

Research suggests that specific neural activities correlate with subjective experiences. Crick and Koch (1990) identified that 40 Hz neural oscillations might be involved in generating consciousness. Functional MRI studies have shown that activity in the prefrontal cortex and posterior cortical hot zones correlates with conscious experience (Boly et al., 2017).

### 4.3 Integration into a Unified Model

By linking working memory with the self-model, we propose that consciousness arises from their dynamic interaction. Working memory processes sensory inputs and cognitive functions, which are integrated into the self-model. Qualia emerge as the subjective aspect of this integration, mediated by neural correlates identified in neuroscience research.

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## 5. Discussion

### 5.1 Interpretation of Findings

Our integrated model suggests that consciousness is not a singular phenomenon but a complex interplay between cognitive processes and subjective experience. Working memory serves as the stage where information is temporarily held and manipulated. The self-model integrates this information, providing a coherent sense of self. Qualia are the subjective experiences that arise from this integration, grounded in specific neural activities.

## 5.2 Comparison with Existing Theories

Our model aligns with Dennett's multiple drafts theory by acknowledging the decentralized and parallel nature of cognitive processes (Dennett, 1991). It expands on Metzinger's Self-Model Theory by emphasizing the role of working memory in constructing the self. Additionally, it incorporates Crick's focus on neural correlates, providing a biological basis for qualia.

## 5.3 Limitations and Future Directions

While the model offers a comprehensive framework, it is primarily theoretical. Empirical validation through neuroscientific studies is necessary. Future research could involve neuroimaging studies to observe the interaction between working memory and self-related neural networks during conscious experience.

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## 6. Conclusion

This paper proposes an integrated model of consciousness linking working memory, self-model, and qualia. By synthesizing theories from Dennett, Metzinger, and Crick, we provide a comprehensive framework that bridges cognitive functions and subjective experiences. This model advances our understanding of consciousness and opens avenues for empirical research.

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