

Integrated Information Theory Wiki

(www.iit.wiki)

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Abstract

Integrated information theory (IIT) aims to provide a scientific account of consciousness and its place in nature. The IIT Wiki is designed to support you in learning about the IIT methodology, its mathematical formalism, and the intrinsic ontology that follows from the theory. If you are new to IIT, we suggest you [start here](#) and follow the sequence in the menu. The wiki pages are interlinked with one another, with a [glossary](#), and with [academic papers](#).

This version of the IIT Wiki (June 30, 2024) covers PART I: Ontological Foundations of IIT, which focuses on IIT as a theory of consciousness. Future releases of content will also cover PART II: Empirical Validation of IIT and Part III: Implications of IIT’s Intrinsic Ontology. Like the theory itself, this wiki is a work in progress, and we invite you to help us improve and expand it. At the bottom of the pages, please ask questions or upvote existing ones.

IIT has been largely developed at [UW–Madison’s Center for Sleep & Consciousness](#), which is also responsible for the content of this wiki.

Cite the IIT Wiki

If you wish to cite the content of this wiki, we have provided citation details at the bottom of each page (or FAQ). To cite the IIT Wiki as a whole, please use the following:

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PART I: Ontological Foundations of Integrated Information Theory

Overview: Integrated Information Theory as a Theory of Consciousness

What does it mean to explain consciousness scientifically?

The IIT Method

1. Introspect to characterize phenomenal structure
2. Formulate phenomenal properties in physical (causal) terms
3. Establish the identity of a phenomenal structure and a Φ -structure
4. Account for contents of experience
5. Validate empirically in humans
6. Extrapolate beyond humans

Foundations of IIT: Phenomenal & Physical Existence

0th Axiom

Three Methodological Assumptions

Realism

Operational physicalism

Atomism

0th Postulate

Axioms & Postulates of IIT: From Phenomenology to Physics

Five Axioms: Essential properties of every experience

Five Postulates: Essential properties of the substrate of consciousness

Axiom $\rightarrow$ Postulate Summary

Intrinsicality: 1st Axiom & Postulate of IIT

Intrinsicality Axiom

Intrinsicality Postulate

Information: 2nd Axiom & Postulate of IIT

Information Axiom

Information Postulate

Integration: 3rd Axiom & Postulate of IIT

Integration Axiom

Integration Postulate

Exclusion: 4th Axiom & Postulate of IIT

Exclusion Axiom

Exclusion Postulate

Composition: 5th Axiom & Postulate of IIT

Composition Axiom

Composition Postulate

Distinctions

Relations

Φ -structures and Φ

Φ -structure Visualization

The Fundamental Identity of IIT: Phenomenal Structures & Φ -structures

The Fundamental Identity of IIT

Identity as a complete, naturalistic account of consciousness

Identity as explanatory

Identity as a good explanation

Computing Φ : Identifying a Complex & Unfolding its Φ -structure

1. Existence: Define a substrate model

2. Intrinsicity: Select a candidate complex

3. Information: Compute intrinsic information

4. Integration: Compute integrated information (φ_s)

5. Exclusion: Identify the main complex

6. Composition: Unfold the Φ -structure of the main complex

Contents of Experience

Why does space feel the way it does?

Video tutorial for space

Plasticity in the structure of visual space

[Of maps and grids](#)

[The unfathomable richness of seeing](#)

[Why does time feel the way it does? \(in development\)](#)

[Why do objects feel the way they do? \(in development\)](#)

[FAQs: The Method of IIT](#)

[What do you mean by consciousness?](#)

[Why not build a theory of consciousness starting from empirical neuroscientific research?](#)

[If IIT starts from experience, isn't this method "subjective" and thus unscientific?](#)

[What constitutes a “good explanation” of consciousness, according to IIT?](#)

[If introspection requires reflection, how can we be sure that non-reflective experiences exist at all?](#)

[Why is the perturbational approach so important in IIT?](#)

[FAQs: The Axioms of IIT](#)

[What is meant by the term axiom in IIT?](#)

[If the axioms are “immediate” and “irrefutably true,” shouldn’t they also be self-evident?](#)

[Why aren’t the experiences of space and time considered axioms in IIT?](#)

[Does intrinsicity imply an ego, self, self-awareness or self-report?](#)

[Can't I have a vague or generic experience, which isn't "specific"?](#)

[Is my experience "specific" owing to the potential experiences I could be having?](#)

[If I have two unrelated contents of experience, doesn't this mean my experience is not "unitary"?](#)

[Isn't "definiteness" in the exclusion axiom the same thing as "specificity" in the information axiom?](#)

[Aren't there some experiences that have no structure?](#)

[What counts as a "component" of experience?](#)

[FAQs: The Postulates of IIT](#)

[Why are the postulates so important in IIT?](#)

[What is the meaning of cause–effect power in light of other notions of “causal power”?](#)

[Does the intrinsicity postulate mean that the substrate of consciousness is not influenced by its environment?](#)

[How is information in IIT different from "Shannon information"?](#)

[There have been many proposals for calculating \$\Phi\$. Why should we consider one to be the “right” measure?](#)

Why do we assess the causal power of all orders of mechanisms? Why not simply assess the causal power of the individual units alone?

FAQs: Computing Φ (technical)

How do we get a TPM?

How do we obtain the “backward” probabilities needed for cause selectivity?

What is a valid (or “legal”) partition?

Why is Φ impossible to calculate for systems larger than a few units?

How do we determine the causal grain at which integrated information (φ_s) is maximal?

Why do we normalize φ_s when searching for the minimum partition? (in development)

FAQs: IIT & Some Philosophical Questions

If IIT assumes “realism,” does this make it a realist theory of consciousness? (in development)

If IIT assumes “physicalism,” does this make it a materialist theory of consciousness?

If IIT assumes “atomism,” does this make it a reductionist theory of consciousness? (in development)

Is IIT an emergentist theory of consciousness?

How does intrinsic in IIT relate to the notion as used in philosophy (e.g. Lewis)?

Do we have free will according to IIT?

Are computers conscious according to IIT?

Glossary of IIT Terms

PART II: Empirical Validation of Integrated Information Theory

(in development)

PART III: Implications of IIT’s Intrinsic Ontology

(in development)