

One Hundred Years of Solitude: Solipsism and Existentialism as Features of the Boltzmann Brain

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Abstract

Gabriel García Márquez's *One Hundred Years of Solitude* is a Latin American novel dealing with several themes including existentialism and the ambiguity of time and its strange cyclical nature within the text. Many critics have studied the novel by often shedding light on the themes of post-colonialism, magical realism, and solitude, while the heavy themes of chaos and circular time are discussed by a small number of critics, or even, none at all. This paper aims to approach the themes of chaos and circular time by giving sense to them through the application of the Boltzmann Brain hypothesis by combining the disciplines of both the practical science of cosmology and the philosophical lens of existentialism as well as solipsism. By applying the Boltzmann Brain through in-depth analysis of *One Hundred Years of Solitude*, the paper will deal with two sections, the first being scientific, which deals with demonstrating the literal construction and deconstruction of Macondo, while the philosophical section will deal with character analysis by applying existentialism and solipsism onto the patriarch and matriarch of Macondo.)

Keywords: Boltzmann Brain, Equilibrium state, *Úrsula*, José Arcadio Buendía, Existentialism, Solipsism

Introduction

The Boltzmann Brain hypothesis is divided into two disciplines within this research paper: scientific and philosophical. The scientific section of this research will connect the emergence of Boltzmann Brains to the creation of Macondo, in how they both function and behave similarly, and above all, how they each govern a whole world with time in accelerated motion. The universe is created, at the most basic level, out of atoms. Atoms can form molecules, and groups of molecules can form matter. Sir Arthur Eddington (1928) described entropy as “The practical measure of the random element which can increase in the universe but can never decrease.” In the equilibrium state, entropy is high, meaning there is no energy available for creating order. However, when entropy is low, more energy is available for creating order. These variations in entropy arise from fluctuations. If a fluctuation results in a low entropy state, molecules can be assembled to create matter, e.g., a Boltzmann Brain. These fluctuations are rapid in their existence as equally as their deaths, resulting in a creation that is wholly chaotic in form and nature. This was later developed by many following physicists, like Albrecht and Sorbo (2004), who claimed, “Any fluctuation F will start in equilibrium and evolve to some state with minimum entropy S_f , at which point entropy starts increasing and the system return to the equilibrium state.” (P. 2). They further hypothesized that it would be much easier for the fluctuation to result in a brain, rather than an entire complex galaxy full of people.

(P. 8). The brain, termed the Boltzmann Brain, creates the world around it, the people, the memories, the places, and the events. The town of Macondo, within Gabriel García Márquez's novel *One Hundred Years of Solitude*, is created similarly. It is created in isolation from the world, rapidly, in which events happen rapidly and die rapidly. It is a vessel that inhabits thousands of assembling and disassembling characters, like infinite fluctuations in an everlasting de Sitter phase, assembling into Boltzmann Brains and disassembling into chaos.

The philosophical section concerns itself with character analysis, not only in the existential and solipsistic aspect of the Boltzmann Brain hypothesis, but also in its relation to time and its perception by José Arcadio Buendía and Úrsula. Existentialism is the realization that one must create meaning in life despite its meaninglessness, whereas solipsism is the belief that the existence of everyone outside oneself is fake. The previous terms exhibit relationships to both the patriarch and matriarch of Macondo and their relationships to the Boltzmann Brain. Time comes to play in between these ties, knotting it together by creating a repetitive world without meaning, giving the illusion that the existence of time is a forgery, and the world is an illusion. In fact, time is the harbinger of the Boltzmann Brain, and it results in the combination of the definitions of both existentialism and solipsism into one term. It develops through philosophical stages of awarenesses, the first being an existential awareness in which both of them realize that there is no meaning in the world and they must create one to make sense of the world, the second one is when the meaning they attempted to create deteriorates into a solipsistic awareness of the world, in which the realization shifts to them thinking that they are solitary beings in the world without a soul to share consciousness with. The Boltzmann Brains, José Arcadio Buendía and Úrsula, share attributes of existentialism and solipsism, which tie the hypothesis to the two characters. Existentialism correlates to the Boltzmann Brain due to it being the creator of the fake brain and its memories, like how Úrsula and José Arcadio Buendía create meaning in life when they come to the realisation that there is no meaning in the world they inhabit, and Solipsism in the sense that it is a solitary, single operating brain with the same fake memories, as seen through the solitary, as well as isolated, lives and thought processes led by Úrsula and José Arcadio Buendía. The process of shifting from one awareness to another

allows the Boltzmann Brain to break the static nature of both José Arcadio Buendía and Úrsula and maintain dynamism within them.

By combining the two disciplines of science and philosophy, this study aims to illuminate light on the unexplained chaos within the literary work of Gabriel García Márquez's *One Hundred Years of Solitude*. The disorder in the characters' senses of solitude throughout the novel can be explained through the disorderly maintained solitude in the Boltzmann Brain, proving that that solitude must coexist with a string of philosophical madness that fastens them into existence. Like how Úrsula and José Arcadio Buendía exhausted themselves through the stages of existentialism and solipsism, and how the existence of the Boltzmann Brain, although solitary, is chaotic in birth and death. The solitary nature of José Arcadio Buendía and Úrsula allowed them to prolong their existence in their pursuit of meaning. However, within that meaning and solitude, there was a philosophical madness urging them into submission towards a world of chaos lacking time. The chaos, of course, is a creation beyond the fake world they inhabit; it is a fluctuation within a pocket universe that brought them to life in seconds, only to give them a death as rapid as their coming to life. This chaos is misunderstood by them, but chaos is not supposed to be understood; it is only there to misguide the characters into discovering meaninglessness. The results of this are the death of the Boltzmann Brain and the isolated and fake town of Macondo.

1.1 Aim of Research

The aim of the research is to give reason to the general chaotic events taking place within Macondo, and the chaos within time by applying the Boltzmann Brain theory. While most studies focused on implementing sense on the aspect of solitude within the novel, this research diverts from such a tradition and instead aims to use logic and science to further investigate and give reason to the constant repetitions and the rapidity of time in *One Hundred Years of Solitude*. The text will be read through the lens of the scientific Boltzmann Brain hypothesis with its ties to the philosophical concepts of existentialism and solipsism.

2.1 Research Questions

With the aim of the research being the explanation of chaos, and the chaos within time, by applying the Boltzmann Brain, the following questions will be answered in the paper:

- How does applying the existentialist and solipsistic theory of the Boltzmann Brain affect the meaning of the novel?
- Why do both the patriarch and matriarch alienate themselves from others in terms of thinking?
 - How does this difference affect their lives and the deeper meaning of the novel?
 - How does it support the theory of them being Boltzmann Brains?
- How does the rapidity of time in the novel and repetitive nature of the Buendía family line be explained by the Boltzmann Brain theory?

3.1 Definitions and Key Terms

Boltzmann Brain Hypothesis: A thought experiment that allows physicists to explore the likelihood of a fully formed brain to exist in the universe, as opposed to the existence of an entire universe.

Fluctuation: A rapid, temporary, and random deviation in the amount of energy at a point in space.

Entropy: Central to the second law of thermodynamics, which states that the entropy of an isolated system left to spontaneous evolution cannot decrease with time.

De Sitter Phase: A cosmological model characterized by a positive cosmological constant (vacuum energy) and an absence of matter, resulting in an exponentially expanding universe.

Low Entropy: Energy is more ordered or concentrated

High Entropy: Energy is more disordered or dispersed.

Existentialism: A philosophical theory that acknowledges individuality and the individual's capabilities in creating their own meaning in life.

Solipsism: The theory of the self or, more specifically, one's mind, being the only existing factor in the world.

Literature Review

- *The Finale* by Rita A. Begernholtz (1993) focuses on Gabriel García Márquez's portrayal of satire to showcase the absurdity of life while ridiculing solemnity and reducing the importance of it. The style of writing and exaggeration in the satirized bits of the novel suggest that Márquez created a town that mirrors the real world. The town of Macondo and the real world are both satirical in a literal sense; nothing makes sense within both these dimensions, and time is as circular as the events. In this paper, Melquíades's relationship with time is used to explain the issue of time within the novel. The paper claims that the narration of the novel was posed to give the effects of the events existing only for a moment, due to its rapidity.
- The application of Paul Ricoeur's theory of *Time and Narrative* by Álvarez Martínez (2004) onto *One Hundred Years of Solitude* analysed the sudden time shifts in the novel. By using Melquíades to engage with the idea of 'Temporal Structure', which refers to shifts in time in a disorderly manner, Álvarez Martínez drew the conclusion that Macondo's existence supports circular time, with no beginning or end. The paper then explained
- how the novel was written in a way that new beginnings occurred constantly, and characters were reincarnated through repetitions in names and incest. This causes the novel to exist in a state of an eternal present. The eternal present goes as far as the characters focusing on a "remembered past" due to their inability to accept their present lives.
- The concept of time was further studied by Nematillayev A. (2025) in comparison of two works by Gabriel García Márquez in his paper, *The Use of Lexical Means for Shaping Space-Time perception in Gabriel García Márquez's One Hundred Years of Solitude and Love in the Time of Cholera*. In this comparative study, *One Hundred Years of Solitude* was said to be governed by magic, unlike *Love in the Time of Cholera*, to the point that it blurred the lines between reality and superstition, making anything possible. Even time is chaotic, and its cyclical nature maintains a demolishing of time's existence. This is evident by the novel's lexical use of words that suggest immortality such as "forever" and "eternity". *Love in the Time of Cholera*, on the other hand, has a firm grasp on the issue of time and handles it with precision.

FINDINGS & DISCUSSIONS

1.3 Macondo: A Fluctuated Creation

When José Arcadio Buendía first laid eyes on Macondo it was isolated, to the point that the novel claimed thus: “The world was so recent that many things lacked names, and in order to indicate them it was necessary to point.” (Marquéz, 1967, p.1). With those lines being said, it gave the impression that the town itself represents the entity of a newborn fetus cradled by José Arcadio Buendía, the maternal figure. The isolation of the town of Macondo reflects the state of equilibrium within the cosmological cycle, where fluctuation, in this case, José Arcadio Buendía and his family, has not yet disturbed the neutral equality within the emptiness of Macondo. The coming of José Arcadio Buendía is like an intermittent fluctuation, which disturbs the isolated neutrality of Macondo, the equilibrium state. Due to this disturbance, matter begins to form, matter being events, thus evolving the town of Macondo and flourishing it from the state of equilibrium into a state of fluctuated chaos. In this state, events are constantly occurring, and the town is bustling with characters and the different paths in life they take, only to return to the original cycle they had left, yet will always belong to. Once the structure, the town of Macondo, is demolished, it dies an entropy death, and the structure is erased and returned to equilibrium, into nothingness.

The cosmological cycle factors through two states: the high entropy state and the low entropy state, both of which further justify equilibrium and chaos. A high entropy state is when molecules are spread out, where there is space for disorder. These molecules are excluded from the chaos created by external factors, as the town of Macondo was before it was named and given purpose by the cluster of occurrences, inhabitants, and the recurrent formation of life. This cluster can be explained through molecule clusters, which result in a state of low entropy, which

means it is undergoing Poincaré Recurrences. This was explained by Dyson, Kleban, and Susskind (2002) as “A large thermal fluctuation to a very low entropy configuration”. (P. 6). In this state, shifts occur and order, as in molecules are assembling themselves into order to create matter, forms randomness which explains the recurring disorder within Macondo, and the birth and rebirth of characters such as Melquíades, and the sudden shift from a town of José Arcadio Buendía’s liberalism to a town governed by conservatism led by Apolinar Moscote. The survival of the town of Macondo is dependent on low entropy, which in its turn is dependent on the sudden emergence of chaotic events. The chaos was governed solely by the Buendía family line. Once Aureliano the Third was realized to be the last standing Buendía, the town was wiped out by a hurricane, marking the abrupt departure from chaos.

Cyclical time in the town of Macondo is what gives the effects of the novel having no end or beginning due to its rapidity in motion. This supports Macondo’s momentary existence (Rita A. Begernholtz, 1993), sharing traits with the Boltzmann Brain, whose existence is also momentary. (P. 18). The repetitions of names are the manifestation of cyclical time through incestual themes in the novel. The offspring in the Buendía family are named after predecessors, creating a family without individualism, blurring the line to the point that Aureliano José confuses another woman with his aunt, Amaranta, during an intimate moment. The incestual thoughts then become reality as the novel progresses, as seen through the relationship of Aureliano Babilonia and his aunt, Amaranta Úrsula, proving that not much energy is put into creating these characters, which is a characteristic of a low-entropy Boltzmann fluctuation. In the De Sitter space, if time were infinite and in constant movement, infinite brains are created. Meaning, the Boltzmann Brain does not need much energy to be created, given that time is continuous of course, compared to creating a whole universe, although it is still a structured fluctuation generally. The low functionality of the creation of the Boltzmann Brain mirrors the low functionality of the town of Macondo, in which the focus refuses to divert from the Buendía family and from what is connected to José Arcadio Buendía and Úrsula, the Boltzmann Brains of Macondo. Once the town of Macondo begins to shift its direction towards change politically and systematically into conservatism, as if the Boltzmann Brain could not handle the

energy required for this shift, it obliterated the town using a hurricane. Therefore, the breaking of Macondo coincides with both the breaking down of the Buendía family and the change to conservatism. This is a shift from the equilibrium state, and the energy required by the Boltzmann Brain to fix it was too great a demand, leading it to its destruction.

2.3 The Concocted Existence of Macondo

José Arcadio Buendía, without understanding, stretched out his hand toward the cake, but the giant moved it away. “Five reales more to touch it,” he said. José Arcadio Buendía paid them and put his hand on the ice and held it there for several minutes as his heart filled with fear and jubilation at the contact with mystery. (P. 15)

Macondo’s strange structure in the novel uses the logic of magic to account for “phenomena” that are alien to them, which is due to the isolation of the town of Macondo. By replacing the logic of “magic” with the logic of “randomness”, scientifically authentic logic would be implanted within the town of Macondo, rather than logic that is completely superstitious. All things in life are random, until given a purpose and a name, much like the ice that was strange to José Arcadio Buendía and given purpose and a name by Melquíades. While the town is structureless and grounded in, the Boltzmann Brain is organised by maintaining the town and its existence. As seen through how they thought ice to be magical, but then they gave sense to it and a name to it, thus finding its purpose, and giving it a logical reason for its existence and how it can fit in the world within the novel. Even with the structure of memories, life, and a world, the Boltzmann Brain is, in itself, a random function within the universe.

The previous statement ties the randomness of the Boltzmann Brain to the randomness of the town of Macondo, proving the instability of both the universe inhabited by the Boltzmann Brain and the world created by it.

The insomnia plague arrived as randomly as it left the novel, with no explanation attached to it. In addition to the insomnia plague, three characters also appeared in the town in an unsystematic manner. First, Rebeca’s appearance was

marked by her random personal habits, such as eating dirt and whitewash, and carrying the bones of her parents in a sack, as if her odd behaviours led to the oddity of the random occurrence of the insomnia plague. The second was Francisco the Man, who appeared as an informative figure, building a bridge between the town of Macondo, the town of the Boltzmann Brain, and the fake towns that are non-existent. The importance of the figure in the scheme of randomness is exhibited through his random disappearances and reappearances, marking his instability in the fake mind of the Boltzmann Brains of Macondo. The last figure appeared through a resurrection to provide a cure for the insomnia plague. The cure was produced by Melquíades, who also reappeared in the novel through resurrection, and the cure was done through “magic” by the usage of an ambiguous, mysterious, and unexplained substance. Although the events that took place were ambiguous and mystical, almost magical in the sense that they happened, the three figures performed together to both create the randomness of the insomnia plague and demolish it through the randomness of Melquíades’ coming and his magical cure. The Boltzmann Brain creates events for a fake world, only to be wearied of it to the extent that it replaces the random event with another random event, thus entrapping the fake town of Macondo in an endless, repeated, and random cycle. Álvarez Martínez (2004) illustrated the idea of chaos and repetition elaborately by stating that “The novel contains no index and its chapters have no titles; it is a chain of repetition and continuity itself.” (P. 177).

The appearance of different cultures in Macondo is a method of communication between the outside world and the town of Macondo. Since the outside world does not exist, the character of Francisco the Man is relied on to represent such a line of communication, vanishing as spontaneously as he appears, further incorporating randomness within the text. Through this character, who represents cultural exchange between towns that do not exist, and people who do not exist, the Boltzmann Brain further attempts to incompletely deploy real-life phenomena, like religion, onto the world it created. However, it is incomplete knowledge of said religion since the town of Macondo is a fake town, and the Boltzmann Brain can create any nonsensical beliefs and happenings as it pleases, as seen through the beliefs around town about Francisco the Man defeating the “devil”. This further implements the belief of magic onto the citizens of Macondo, even though that is not the case. The real reason behind the capabilities of Francisco the Man is randomness and the incomplete knowledge of the Boltzmann Brain regarding certain things within the real world. Therefore, Macondo is filled with random, chaotic incidents that do not make sense, and since no sense is attached to them within the minds of citizens, they resort to magic. Magic is

used in the real world, external to the fake world created by the Boltzmann Brain, to explain strange occurrences. In the fake world of the Boltzmann Brain, these occurrences can simply be explained by the Boltzmann Brain's ability to be completely made out of chaos, therefore bursting said chaos onto its creations.

3.3 The Dynamism of José Arcadio Buendía and Úrsula

The patriarch and matriarch of the town of Macondo uphold the title of being dynamic characters within the novel. The aspect of dynamism within them relies on the fact that they are both simultaneously Boltzmann Brains. The probability of two Boltzmann Brains existing in the same perceptive reality is small, yet not improbable. Both of these Boltzmann Brains would exist within the same perceptive reality but remain solitary and more focused on their own perceptions rather than a co-existing perception. This explains the negligence of José Arcadio Buendía towards their family, as seen through these lines:

José Arcadio Buendía took his wife's words literally. He looked out the window and saw the barefoot children in the sunny garden and he had the impression that only at that instant they had begun to exist, conceived by Úrsula's spell. Something occurred inside of him then, something mysterious and definitive that uprooted him from his own time and carried him adrift through an unexplored region of his memory. (P. 14)

While José Arcadio Buendía is neglectful towards Úrsula and his family, Úrsula is neglectful towards science and attentive towards the family she must raise. Adding to that, Úrsula is the only character who does not even uphold the Buendía family name. Instead, she is known as simply Úrsula or Úrsula Iguarán, further proving the point that she and her husband are solitary in their perceptions of the world they inhabit, and that they share little to almost no life with each other. This shows the duality in their characters and how they experience two stages of philosophical realisations; the first being existential, that they are in a meaningless world that necessitates for them to create meaning within it, and the second being solipsism, negating the first and concluded within their minds that they are both Boltzmann Brains, resulting in a withdrawal from the "world" they inhabit.

José Arcadio Buendía comes to the realizations of the meaninglessness of the world from an early stage of the novel. When his obsession with science and progress leads to wanting to capture a daguerretype, a photograph, of God, to ensure his existence or "put an end once and for all to the supposition of His existence." (P. 55), José Arcadio Buendía, enraged, shares similarities to the philosophical movements of existentialism, and begins to give meaning to the world he lives in through science, abandoning God. The new course of meaning he had claimed for his life is meaning that exposed his mind to insanity, to the point where he is tied to a chestnut tree by his family, a reflection of ultimate death in the disguise of withdrawal. The insanity that rooted itself within his mind isolated him from the world, where it seemed like he believed in nothing but his own existence. On top of that, José Arcadio Buendía claimed that "Suddenly I realized that it's still Monday, like yesterday." (P. 80), indicating that he realised that time was cyclical, and he lived within that cyclical time in a fake world. Nematillayev Akramjo (2025) demonstrated the point by stating that, "The repetitive use of character names across generations (e.g., Aureliano, José Arcadio) suggests a cyclical destiny where lives echo and repeat." He was prevented from interacting with nature since a shelter was built for him to protect him from rain, yet he was indifferent towards his inability to interact with nature due to the fact that he cannot relate to a family that does not attempt to understand his realisations that the world around them is fake. The patriarch became neglectful of what he once found, the town of Macondo, and instead he fell into a state of decline where he only needed to make sense to himself, thus raving in Latin without any regard to who can or cannot understand him. José Arcadio Buendía succumbed into a state of solipsism, where his central focus was himself and his interest in science. His neglect and isolation symbolise his forms of realisations towards solipsism and his existence being the only one he cares for, and the only one that has a consciousness within the land he inhabits, deeming him to be a Boltzmann Brain, due to his inability to live a long life and therefore dying an entropy death.

Úrsula's development of her realisation, on the other hand, took longer than José Arcadio Buendía's. Instead of neglecting the family, Úrsula gives meaning to life and herself through it by concerning herself with taking charge of the family. From when she gave birth to their two sons, she is seen participating in their lives instead of withdrawing to external passions as José Arcadio Buendía had done. Not only that, but the matriarch is also committed towards taking in strangers, or rather, near strangers such as Rebeca, and taking care of them, thus extending the family. By doing this, she proves the fulfillment of the maternal instincts within her, not only is she taking care of the family, she is taking care of Macondo

as a whole, since Macondo is composed of the Buendía family. Like the Boltzmann Brain, Úrsula is elusory, with little to no connection to the past or future as she wholly dedicates herself to the present time due to her extensive care for her family. The only time when she had heavily cared about the past was when she was speculating about the cyclical nature of time:

She watched them with her four senses so that they never took her by surprise, and after some time she discovered that every member of the family, without realizing it, repeated the same path every day, the same actions, and almost repeated the same words at the same hour. Only when they deviated from meticulous routine did they run the risk of losing something. (P. 252)

Thus, marking her transition from the existential view of the world, to the solipsistic. Losing her eyesight is her expression of being exposed to the fake world created by the Boltzmann Brain, in the fabric of unreality was revealed to her. She did not need to see, for she already knew where everything was and how everyone operated since they followed the same pattern. She did not want to see, since seeing was the same as not being able to see, both of them leading to nothingness. Once the realisation came to Úrsula, the world around her began to resort back to the equilibrium state, meaning that a spike of chaos will make its last appearance so that the fake world of the

Boltzmann Brain could dissolve its chaos into equilibrium, since everything was becoming unorderly and chaotic in the means of a big shift in motion and cycle, to the point where Úrsula could not rely on the patterns of her family, telling Amaranta that she was not sitting where she was supposed to (P. 253). With Úrsula's realisations having taken place, the death of the Boltzmann Brain and the fluctuation was in progress, marking the death of the town of Macondo.

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