Understanding and Interpreting Entropy: A Case Study of George Orwell’s Nineteen Eighty-four

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Abstract: Nineteen Eighty-four is a representative work of Orwell, a famous British writer, which successfully presents the persecution of authoritarianism to readers, while the characters in the novel have distinct characteristics and strong emotional colors. Various kinds of surveillance and control, real and false torture hit people’s hearts, revealing the dark side of authoritarianism. Based on the theory of entropy concerned with all types of disordered managements, this paper analyze the problems faced by the protagonist and the other characters. It discusses the characters’ efforts of overcoming the increase of entropy and their state of being restricted by authoritarianism through the political instruments, and examines different kinds of entropy under relative factors — Entropy under the creation of nothingness, entropy under the control of thoughts and the deprivation of emotion. This study hopes to provide new ideas for people to pay attention to their own existence, political phenomena, independent thinking and achieve transcendence.

Keywords: Nineteen Eighty-four, entropy, authoritarian, George Orwell.

1. Introduction

In 2021, there were some riots in the United States, including the storming of the U.S. Congress and the killing of a black man by a white policeman. Meanwhile, the controversy surrounding military coup in Burma was growing. All these were concerned with a disordered social management and might easily remind us of the entropy theory and Nineteen Eighty-four by George Orwell. The initial researches on entropy have been mostly focused on the aspects of physics, but now the value of it has permeated commerce, sociology, literature and so on. Entropy is inevitable and how to slow down it matters in life, social and so on. The political behavior disorder can lead to the accelerating growth of the entropy. Once the entropy reaches its extreme value, it can result in the destructive situation.

Nineteen Eighty-four is related to Orwell’s experience during the Spanish Civil War, the brutality of which had a profound and terrifying effect on people’s lives. At that time left and right groups attacked each other, while the prisoners of war were tortured and killed due to the religious divergence. Various social contradictions finally reached the pole of increasing entropy under pressure, and pulled to the indelible tragic outcome on the ideological level. In Nineteen Eighty-four, Orwell succeeds in revealing such a terrifying situation, with all the protagonist Winston’s efforts ultimately become trivial, ridiculous and futile.

Based on the theory of entropy concerned with all types of disordered managements, this paper will analyze the problems faced by the protagonist and several other characters in Nineteen Eighty-four, examine different kinds of entropy under relative factors, concerning characters’ efforts of overcoming the increase of entropy and their state of being restricted by authoritarianism through the political instruments. This study hopes to help people have a deeper understanding of social phenomena and themselves so as to establish more sound objectives and more correct values, with a promotion in social development and progress.

2. Understanding Entropy

2.1. Law of Entropy

In 1824, Law of Thermodynamics was proposed first by Nicolas Léonard Sadi Carnot (1796-1832), a French engineer. According to Carnot’s theory, the total of high temperature and low temperature heat sources is substantially related to the maximum thermal efficiency of all types of machines that use internal energy to conduct work. In 1850, the problem of thermal work conversion based on Carnot was further examined by Rudolf Julius Emanuel Clausius (1822-1888). In addition to the law of conservation of energy, another law be added, which points that it is impossible to transmit heat from a low temperature to a high temperature without the consumption of energy or other changes. This is the second law of thermodynamics.

In 1854, Clausius first introduced the parameter of “entropy” in his paper “Another Form of the Second Law of Heat Theory of Mechanics”. Then in 1865, Clausius published a paper entitled “Convenient Forms of the Principal Equations of the Thermal Theory of Mechanics”, which formally named this parameter quantity entropy, and he proved that in any isolated system, the sum of the entropy of the system should not be reduced by. Since then, law of entropy increase has been officially discovered. Law of entropy increase laid the foundation for physics, and it also has a profound influence and reference for the development of psychology and sociology. Two famous short sentences by Clausius have been forever remembered in the natural and philosophical worlds — “The entropy of the universe tends to a maximum” and “in reversible changes entropy remained constant.”

According to Clausius, the universe as a whole is in motion. Motion generates energy, which can take many forms, including potential energy, kinetic energy, chemical energy, and so on. The law of conservation, which is the first law of thermodynamics, governs the transfer and transformation of various kinds of energy. This can be revealed as follows:
In a closed system, the total value of entropy only increases. Increase means that there are with the reduction of efficiency, the intrinsic relationship between matter and energy can only be developed from exploitable to unusable, from efficient to ineffective, from orderly to chaotic, and so on, until the world runs out of energy to do work. Then the whole world fell into eternal silence. (Clausius, 2010, p. 45)

In the isolation of a closed system, heat is always from high to low temperatures, from order to disorder. And the process is irreversible. The significance of this discovery lies in that human beings are in a closed environment and do not accept the injection of ideas from the outside world. It is a natural tendency for human beings to become increasingly chaotic.

The law of growing entropy holds that if no work is done by an external force in an isolated system, the system will deteriorate into a lifeless mass of stuff. There are no exceptions. It’s worth noting that the law of entropy only rises when two requirements are met: first, there’s no external force at work, and second, the environment is a closed system. The publication of Albert Einstein’s (1879-1955) theory of relativity in the early 20th century made people realize that any law of physics has a certain scope, and so does law of entropy. In a closed country, the control of the state spreads all over the country, and that can be closed.

Based on Clausius’ entropy law, the correlation entropy theory is derived. Concepts related to law of entropy increase include dissipative structures, information entropy, fuzzy entropy, generalized entropy, heat death and chaos theory, and so on. Next, several more key entropy theories will be discussed, concerning the process of character change, social disorder and so on.

2.2. Chaos Theory

Chaos theory is about the evolution of systems from order to disorder. It is the study of irregular and unpredictable phenomena, as well as the processes that lead to them. “This theory belongs to nonlinear science, only nonlinear system can produce chaotic motion. Nonlinearity is one of the typical properties of complexity in nature and is the universal law of all matter motion” (Liu, 2018).

Chaos is an old term, and the term connected with “disorder” and “chaos” has become a new paradigm of physical and mathematical thinking. Chaos theory, as a new subject, was previously unsolvable doubts. “The change in entropy caused by the exchange of matter and energy between the system and the environment is called entropy flow” (Zhang, 1988, p. 171). The harmony, coordination and law of thought is orderliness and organization, namely low entropy.

2.3. Psychological Entropy

The word “psychological entropy” has long appeared in the field of psychology, and many scholars at home and abroad have used “entropy” to describe psychological phenomena. The introduction to this concept can promote the study of human psychological development. However, the connotation and concept of psychological entropy still lack of clear and appropriate understanding and definition.

The original setting of individual psychology is a relatively closed system. The complex psychological operation process is affected by individual perception, emotion and thinking, etc. All psychological characteristics and explicit behaviors are closely related and interact with each other. The external environment takes various events as the carrier and affects the operation of the internal psychological system. In this process, psychic positive entropy represents negative mental pollutants. Psychic negative entropy represents positive active spiritual energy, such as positive knowledge information, emotion and thoughts.

Psychological entropy can judge whether an individual works calmly and withstands the test. When the increase of entropy in the mental world reaches too chaotic, people will be depressed, lose their fighting spirit and happy experience of life. Mental entropy is also called flow. “Psychological entropy” is the key concept in flow. Flow is a psychological experience that makes you feel comfortable and focused. “Whenever information disrupts consciousness by threatening its goal we have a condition of inner disorder, or psychic entropy” (Mihaly, 2008).

Flow is put forward by Mihaly Csikszentmihalyi (Mihaly, 2008). It is similar to psychological entropy that reflects the degree of disorder in the mental world and it represents the harmony and order of the individual’s heart and mind, such as yoga, meditation, etc. Gym workouts to a certain extent fall under the category of mental entropy. These exercises cultivate the mind and train the individual’s concentration. States of flow are more likely to occur when solving previously unsolvable doubts. “The change in entropy caused by the exchange of matter and energy between the system and the environment is called entropy flow” (Zhang, 1988, p. 171).

2.4. Heat Death

Law of entropy leads to the theory of heat death. General thermal and physics textbooks agree that Willion Thompson (1824-1907) and R. Clausius were the first physicists to propose the theory of heat death. But Isaac Newton (1643-1727) had recognized their later theory of heat death more than a hundred years earlier. According to Clausius’ “Second Law on the Theory of Mechanical Heat” in 1867, “the closer the universe is to its limit state of maximum entropy, the less likely it is to continue to change. When it finally reaches this state, there is no further change. The universe will remain forever in an inert state of death” (He & Liu, 2008). This is the origin of the famous Theory of heat death by Clausius. There is an example: energy is not totally transformed to the individual during the heating process. Part of the heat energy is transferred to the surrounding air and dissipated in the universe. This part of the energy cannot be reused, it can only
be increased indefinitely. It represents a degree of disorder. Increasing entropy means everything is moving from order to disorder. However, as for heat death, there is also difference between William Thomson and Clausius. The former clearly believed that the extension of the second law of thermodynamics to the universe was conditional, that is, the universe was assumed to be a “finite” system. The latter does not make such a limitation, but generalizes to the whole universe without conditions. At the same time, some scholars such as Marx criticized the heat death theory.

3. Interpreting Entropy in Nineteen Eighty-four

3.1. Entropy under the Creation of Nothingness

This part will analyze hollow figures, falsified history, false role models as well as the limitation of language to show the increase of entropy under the creation of nothingness.

Concerning the hollow figure, the sentences “and it had just been yesterday, he mused, that the ration had been decreased to twenty grams every week” (Orwell, 1961, p. 58). Hereafter only the page number of this textbook referred to in parenthetical citations) and “the fabulous statistics continued to pour out of the telescreen” (p. 58) shows the nothingness. Their message is taken from the party’s output figures, which stand for nothingness and for the absence of truth. The level of development and the level of conception of such countries is uneven, thus creating a sense that the country is in a state of prosperity. While the actual utilization rate and the abstract concept embodied by the figures are not consistent. This leads to the confusion of people’s thoughts. In the meanwhile, this creates social chaos, and people get false information. Everything is real, but the missing part of the real world and the real concept is missing. “Behind Winston’s back the voice from the telescreen was still babbling away about pig iron and the over fulfillment of The Ninth three-year Plan” (p. 4). The screen still announces the ample material resources; however, it is ethereal. “At every given time, there was some essential item that the Party shops couldn’t provide” (p. 48). The failure to satisfy people’s most basic material conditions is in sharp contrast to the bogus nine-year plan “We didn’t ave these bleeding liters when I was a young man” (p. 88) and “I remember when something like that would have cost around eight pounds, and eight pounds was a lot of money (p. 95)” has some meanings. Devaluation represents a high degree of entropy disorder. In a closed and invalid information system, numbers only represent superficial words, which are meaningless. It doesn’t contain the substantive contents. The information is missing and invalid. There is a contrast between the past and today’s units of measurement. This highlights the nothingness of numbers, the scarcity of materials, and the delusions of people’s lives. The whole society is dead.

In the aspect of the falsified history, even in Winston’s later falsification of history, people do not know the truth. They do not know the true state of the country at all. “The past not only changed, but changed continuously” (Orwell, 1961, p. 79). This means history turns to ashes, people’s cognitive pathway is blocked without exit, the truth quietly passes away, and the society with high entropy and high disorder. No matter how Winston finds the evidence towards the nothingness of the world. He just repeats the same thing crazily and finally get the same result. This means that people here could not get the right answer through constant practice. Even the surviving elders, they are still screened by Big Brother. “The ancient world’s few surviving survivors were unable to compare one epoch to another” (Orwell, 1961, p. 93), so they couldn’t provide any useful information.

In terms of the false role models, “yet she had only the dimmest idea of who Goldstein was” (p. 153). Comrade Ogilvy’s presence suggests that what was seen was carefully designed by Big Brother. “He believed the marriage and the care of a family to be incompatible with a Twenty-Four-a-day devotion to duty” and “he had no subjects of conversation” (p. 47) means people are shaped by knowledge and media. The image created by Big Brother, Comrade Ogilvy, added to the level of chaos. It suggests that truth and nothingness were unknown. “Comrade Ogilvy, who had never existed in the present, now existed in the past” (p. 47). This is the unannounced chaos that causes entropy to increase dramatically. They are designed for controlling the public and influencing their values to become the ones serve for the society willingly.

As for the limitation of language. People are running out of language to express themselves. “We are cutting the language down to the bone” (p. 51). The establishment of a new language system will change people’s way of thinking and limit the vocabulary they can use, which will also cause communicative barriers, laziness in people’s language habits and numbness of thought. The new language also contributes to the entropy increase. “Fragments of ancient literature lingered here and there, imperfectly censored, and it was possible to read them as long as one kept one’s knowledge of Old English” (p. 311). As society develops, the generation that understood old speak gradually gets older and the new generation is restricted by language. The key to the open system can no longer be unlocked, entropy loses the possibility of reverse flow, and society becomes closed in a state of dead silence. Syne is a knowledgeable person who has a thorough understanding of the use of new words and is also outspoken, but “he believed in the principles of Ingsoc, he venerated Big Brother, he rejoiced over victories” (p. 55). But he couldn’t escape threat: “Syne had vanished” (p. 147). The ocean does not allow a soul who knows a lot about language and thoughts, even if patriotic person. In Washington, January 6, 2021—A mob of Donald Trump supporters stormed the U.S. Capitol and rioted in an incident that reflects Americans’ awareness of their own suppression of free speech. Support for Trump has been restricted on Twitter and other social media platforms, and Trump’s own account has been blocked. This phenomenon mirrors the government’s control of mass thoughts in Nineteen Eighty-four. The above incidents show the filtering of speech at the political level, that is, the extreme control and tampering of people’s communicative contents. People don’t have right or qualification to express free speech. As a result, people are limited in the closed level, thus people are placed in an isolated state. This leads to a kind of chaos and leads to an increase in entropy.

What’s more, in the language communication, in today’s inclusive society, technology is supposed to be a way to expand acceptance of ideas. Instead, it has become a gateway. Amusing Ourselves to Death, Neil Postman (Neil, 2005) thought, “a technology, in other words, it is merely a machine. If the medium can only be one-sided, that is, it can only accommodate ideas conforming to “Big Brother”. In the end,
conflicts cannot be created to solve the problem. Conflicts can only accelerate the spread of entropy increase. “Modern rush is dissipative in its dissipative nature of all structures” (Gala, 2011). In modern life, new technology and society’s ongoing replacement are unavoidable, as is the Nineteen Eighty-four timeline’s development trend, which also introduces new instability. However, Karen Horney believes that “hopelessness is an ultimate product of unresolved conflicts” (Horney, 1992, p. 174). If the purpose of two-way communication cannot be achieved in a closed system. Then the information cannot be communicated and society is at a standstill. Just as the voices of marginalized people are silenced by authorities, they are also part of the information being withheld. All of this causes the death of information, the shrinking of the information realm, and the speeding up of entropy increase gradually in the universe.

### 3.2. Entropy under the Control of Thoughts and the Deprivation of Emotion

This part will analyze that the control of electric screen and the prohibition of lonely experience are ways to control thoughts and enhance entropy increase, concerning Winston, O’bien, and the general public under the control of thoughts. Then, the increase of entropy under the deprivation of emotion will be discussed, concerning Katherine the neighbor Parson.

The screen in the novel is an increase in entropy coder, monitoring people’s every move. “So long as he remained within the field of vision which the metal plague command. He could be seen as well as heard” (p. 3). How the government wants you to act, and how people need to listen. This has also led to the so-called closed system of increasing entropy, in which people have no access to the path of ideological emancipation.

Banning solitude is a way to reinforce entropy. Loneliness could let people settle down and uncover their true needs, similar to Jiang Xun’s explanation of loneliness in Six Lectures on Loneliness. People can think about life when they are lonely, and sort out their disorderly thoughts to form constructively cognitive space, which is an excellent way to reduce confusion. A person’s solitude can block the interference of people around him and find his true self. However, loneliness is blocked in Oceania. “To do anything that suggested a taste for solitude, even to go for a walk by yourself, was always slightly dangerous” (p. 82). The raucous crowd will hasten the growth of entropy and cause individual order to tumble into chaos, much like the wind blowing in a dream, taking life and individuals far away from the balanced state’s stable and orderly structure.

As for Winston, Winston’s mind was greatly limited, and he had no access to outside powers. The party inculcates within the field of vision which the metal plague command. He could be seen as well as heard “(p. 3). How the government wants you to act, and how people need to listen. This has also led to the so-called closed system of increasing entropy, in which people have no access to the path of ideological emancipation.

Today, there are similarities between Aung SAN Suu Kyi’s detention and Winston’s plight. The west’s agitation in Myanmar is also an increase in entropy imposed by external forces. “Irony in Entropy has to do with social aspiration” (Heffernan, 2011). Entropy is also relevant to politics. The military regime of Burma was an emblem of Orwell’s tyranny. The military government of Burma is in charge of the majority of the country’s economic, political, and legislative affairs. From 1962 to 2010, the country was ruled by the military, which began with Ne Win. After the suppression of anti-military riots in 1988, Myanmar declared the end of military rule. Aung San Suu Kyi, the representative of the National League for Democracy, was released from military prison at the same time. The NLD attempted to win an election in 2015, but was unable to do so because it posed a threat to the military’s dominance. The National League for Democracy (NLD) proposed amendments to Myanmar’s constitution in 2019, calling for the military’s representation in parliament to be reduced, the Commander-in-Chief of the Defense Forces’ role as commander-in-chief to be abolished, and the Commander-in-authority Chief’s to take over the government to be abolished. The NLD achieved a landslide victory in November’s election, but the military, which had already expressed its displeasure with the NLD, accused the poll of being rigged. The preceding demonstrates how powerful totalitarian rule is, and how weak or even helpless the ability to overthrow it is. For the next year, the military has declared a state of emergency, following which new elections will be held. New elections, however, are no longer relevant within the confines of the 2008 constitution. Journals about Aung SAN Suu Kyi suggest that the NLD relies too much on “charismatic leaders” such as Aung SAN Suu Kyi. But her prolonged detention and she lacks of military and economic backing make it difficult for her to integrate

amount of information contradicting Winston’s thinking. It represents an increase in entropy. In the chaos, Winston slowly lost himself. At the end of the book, “he was walking along the white-tiled corridor, feeling as if he were walking through daylight, with an armed guard at his back. The long-awaited bullet was about to enter his head” (p. 297). The light around them contrasts with Winston’s death. Winston knew the day was coming when he was truly a slave. “He loved Big Brother” (p. 298). Living things cannot do work when they are dead. At the same time, Winston’s death can also be understood as Winston hoped to get away from the helpless society so as to get relief. He did not die, but he was already a zombie and no longer had an independent mind and soul. The society had a high level of entropy. In this country’s system, death must be painful. “It needed desperate courage to kill yourself in a world where firearms, or any quick and certain poison, death was completely unprocurable” (p. 102). Death is the way to end the chaos, but it might increase the pain and chaos of the individual. Death represents absurdity, darkness, and fuzziness. People fall into a state of eternal silence, which will be repeated in a continuous cycle. The entropy of social systems continues to rise. From a practical standpoint, the United States’ current predicament is one of rising entropy. One woman was killed and three other rioters were also killed during the afternoon riots in Washington, D.C. on January 6, 2021. Riots seem to be endless, and those who deviate from the current government’s ideology are called reactionaries, that is, those who need to be removed from ideology in Nineteen Eight-four and even face the tragedy of death.
resources (Huang, 2021, p. 11). The cause for this phenomenon is the vicious circle of closure for Aung SAN Suu Kyi just like Winston’s imprisonment.

With regard to O’Brien, in the book, O’Brien is the guy who knows the most about the current society, yet he is also the person who has the most entropy. He is sober but fettered, free but completely divorced from himself, and everything is only for the service of “Big Brother.” “Everything was known to O’Brien. He knew the world a thousand times better than Winston, how degraded the majority of people were, and how the Party maintained them there by falsehoods and brutality” (p. 262). He’s at high entropy. Even though information was flowing to O’Brien, he was in a state of high isolation as well as unable to see the light through a murky mist, and ultimately a tool for maintaining party rule.

In terms of the general people, Big Brother deprives people of their subjectivity. People, like the machinery of the industrial age churning out items that are merely “stuff” for political parties, are cold to things. It results in a rapid increase in entropy and a chaotic condition. Only the Party’s will is respected by the people. People’s fixed thinking has no chance to break through. At that period, everyone is pretty burdened. Winston lived in a society in which the general public was ignorant.” They do not know where they stand; They make themselves accessible without being aware of doing so” (p. 25). Karen Horney said in Our Inner Conflicts: “I am probably amicable normal person” (Horney, 1992, p. 25). The more conscious the people are, the more control they achieve, which is in fact the state of increasing entropy to a very high level. It’s a kind of ignorance. “If there is no subversive force in a society, sooner or later it will be a homogenized, lifeless society” (p. 35). The general people reflect the extremely high degree of ideological control achieved by the American people today. The American people pursue freedom. However, freedom is a kind of nothingness. As of July 22, 2020, data indicates “the total number of infected people in the United States has exceeded 4 million, the death toll has reached nearly 145,000, and the existing confirmed cases have reached 2 million” (Liu, 2020), which is an automatic reaction in mind under the influence of politics. It also echoes the slogan of the novel “Freedom is Slavery” (p. 4). The message that the people received: the pursuit of freedom. It is a way to show the American dream, however, it is a one-way input device that they accepted and obeyed blindly. People’s numbness denote the increasing entropy in society, involving the deprivation of emotion as well.

The masses, only serving for the big brother, are just like the numerous rabble occupying the main body of the society, thus subtly influencing the rest of the group. “We’ve severed the ties that bind kid and parent, as well as man and woman. No one can trust a wife, a child, or a friend these days” (p. 267). Oceanians have no concept of family affection, friendship, or romantic love. They only follow Big Brother’s orders, and they betray, cheat, and rat on one another. People’s apathy results in a lack of information sharing, which means they are unable to transfer useful information. The collective consciousness is closed, increasing societal entropy.

As for Katherine, Winston’s wife, Katherine, had been indoctrinated by Big Brother. “She had not a thought in her head that was not a slogan, and there was no imbecility absolutely none” (p. 66). Winston had no way of communicating with her. Love was nothing more than a means of breeding labor force in Oceania. “The Party did not permit divorce, but it rather encourages separation in cases where there were no children” (p. 66). Originally, love could be opposed to entropy, creating a countervailing force between the two and thus generating more capacity to expand into the future. In Oceania, however, love exists in a literal sense. The love between party members has become a cycle of occlusion and death, just as the tragic ending in One Hundred Years of Solitude repeats the miserable endings and has no way out.

Regarding Parson, “who denounced you? Said Winston. It was my little daughter” (p. 233). In the book, Parsons, Winston’s neighbor, is proud of his daughter’s reporting of spies. “Pretty Smart for a nipper of Seven” (p. 57). This contrasts with Parson, who shouted “Down with Big Brother (p. 233)” in his sleep and was reported by his daughter. Yet Mr. Parson still believes in the party. “I don’t hear her any grudge for it. In fact, I’m proud of her. It shows I brought her up in the right spirit” (p. 233). Even though Parsons is facing death, he is still bound by his thoughts. This is a high degree of thought control, and it speaks volumes about people being used and manipulated. The loyalty they claim is an illusion. Human relations are in chaos.

4. Conclusion

Nineteen Eighty-four depicts the dark and brutal nature of authoritarianism, and reminds readers of social and political problems and the trend of slowing down the increase in entropy. This paper analyze the problems faced by the protagonist and the other characters in the novel. It discusses the characters’ efforts of overcoming the increase of entropy and their state of being restricted by authoritarianism through the political instruments, and examines different kinds of entropy under relative factors — Entropy under the creation of nothingness, entropy under the control of thoughts and the deprivation of emotion. This study hopes to provide new ideas for people to pay attention to their own existence, political phenomena, independent thinking and achieve transcendence.

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