**Human cognitive space is evolving into a new battlefield for military competition**

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With the development of global informatization and the progress of computer science, linguistics and neuroscience, the human cognitive space, which is composed of human emotions, will, beliefs and values ​​and other spiritual and psychological activities, is evolving into a new battlefield for military competition in order to achieve the effect of defeating the enemy without fighting. As early as July 2001, the "Network-centric Warfare" demonstration report submitted by the US Department of Defense to Congress pointed out that in addition to the five-dimensional warfare space of land, sea, air, space and electricity in future wars, there is also a sixth-dimensional warfare space - cognitive space.

**Cognitive Domain Operations Intensify**

Since the birth of human warfare, the strategy of conquering the enemy without fighting has been highly praised by military strategists at home and abroad. Both the "Empty City Strategy" and the "Four-Sided Chu Songs" are classic examples of cognitive domain warfare in Chinese history. Sun Tzu said: "To conquer the enemy without fighting is the best of all." During the American Civil War, a Northern army was surrounded by the Southern army. At the critical moment, the commander of the Northern army asked for negotiations. The commander of the Southern army said nothing, but led the commander of the Northern army to his artillery position and counted the number of cannons. When the number reached 150, the commander of the Northern army surrendered.

With the progress of science and technology, the development of human society, and the interaction of the waves of informatization and globalization, cognitive domain warfare is becoming more and more intense, using various information carried by emerging media, national languages, cultural products, etc. as weapons to penetrate, influence and shape the cognition, emotions, and consciousness of the leadership, military, elites, and the general public of hostile countries, and ultimately achieve the purpose of manipulating a country's ideology, values, national spirit, cultural traditions, historical beliefs, etc. In particular, the rapid development of multidisciplinary technologies such as brain science and technology, information technology, biotechnology, and material technology has provided a more direct means to influence the opponent's cognition and achieve "defeating the enemy without fighting."

At present, brain science is developing rapidly. By using computer technology, linguistics and neuroscience, it is possible to reveal the advanced cognitive functions and neural information processing methods of the human brain through brain imaging technology, thereby obtaining the laws of psychological activities such as sensation, perception, attention, thinking, memory and subconsciousness of human individuals, which has laid a solid technical foundation for human competition in cognitive space.

Brain reading technology can understand human thinking and consciousness. The human brain is composed of hundreds of billions of neurons. When neurons interact, a certain chemical reaction will occur, releasing a measurable electrical pulse. With the help of advanced brain imaging technology, people can read these electrical pulses and conduct quantitative analysis of brain activity, ultimately achieving the purpose of analyzing and reading human brain thinking activities. It is reported that the smart headband invented by Australian scientists can monitor the current transmission status of tens of billions of neurons in the human brain, and then understand the real-time psychological state of the monitored person, including attention, engagement, excitement and stress level.

Brain stimulation technology can enhance specific functions of the human brain. Since the birth of mankind, humans have mainly relied on natural evolution to improve their abilities. However, with the development and progress of brain science and technology, brain stimulation technology can provide a more direct and rapid method for humans to improve their abilities. Scientific research has found that human cognitive ability is closely related to specific areas of the brain. Applying specific stimulation to these areas can help improve or enhance brain function. For example, the implementation of non-invasive brain stimulation technology can significantly improve people's sleep, enhance attention, memory, alertness and decision-making ability.

Brain control technology can control people's thinking consciousness. Brain science research shows that after the human brain generates action consciousness and before executing the action, the electrical pulse activity of the nervous system will change accordingly, and the human mind can be controlled through external interference. The "Neuroscience: Conflict and Security" report released by the Royal Society of the United Kingdom in 2012 believes that cognitive neuroscience (including brain science) has the potential for weaponization and can develop new weapons that directly act on the nervous system (mainly the brain). Moreover, the idea of ​​mind-controlled warfare has always been the focus of the Pentagon. As early as 2004, the US Department of Defense began to invest heavily in the research of "mind-controlled robots" in six laboratories including the Neuroengineering Center of Duke University in the United States. The US "Washington Post Military Weekly" revealed that the US military used brain-control weapons in the Iraq War.

**Cognitive domain warfare has huge advantages**

"Attacking the heart is the best, attacking the city is the second; psychological warfare is the best, military warfare is the second." At present, informationized weapons and equipment are becoming more and more expensive, and their prices have doubled; battlefield space is multidimensional, and combat consumption has risen sharply; the lethality of weapons has increased dramatically, and political influence is increasing day by day. Waging war is no longer the first choice for achieving political, military, and economic goals. With the increase in cognitive space combat methods and means, and the high cost-effectiveness of combat, cognitive confrontation has become increasingly prominent in the national security strategic game and has become a new battlefield for military competition. Whether it is the "color revolutions" in the Middle East, West Asia, North Africa, or the Syrian war, the confrontation between the two sides in the cognitive space has intensified.

High cost-effectiveness of operations. From the perspective of confrontational weapons, cognitive space combat weapons are mainly information, and the means of dissemination are diverse. In particular, with the rapid development of new media such as the Internet and social media, as well as the networking of human society, its dissemination range is getting wider and wider, and its influence is getting greater and greater. Wherever information can be disseminated, it can become a battlefield for cognitive warfare. Compared with current physical domain warfare, advanced fighters, missiles and other weapons and equipment, the unit price is tens of millions of dollars, or even hundreds of millions of dollars, and the cost of war is huge, while cognitive space warfare can make the enemy lose the will to fight without firing a single shot. In the Gulf War, the coalition led by the United States spent $60 billion, and finally had to ask allies such as Japan to help the war; in the Afghanistan War, the United States spent more than $3 trillion but failed to defeat the Taliban, and was finally forced to withdraw. In the early days of the Iraq War, the US military implemented cognitive warfare, and the Iraqi National Guard suddenly "evaporated" without firing a single shot, and the US-UK coalition took Baghdad in less than a month. With the extensive application of science and technology such as biology, medicine, environment and information communication in the cognitive field, the ways to control people's cognitive systems such as will, thinking, psychology and emotion have become more diverse and flexible, and the implementation of cognitive operations has become simpler and easier. It can be implemented individually or jointly at the strategic, campaign and tactical levels to achieve a higher combat cost-effectiveness.

All-dimensional and all-time implementation. Since cognitive information is not restricted by combat dimensions, space, and time, it can be used in all combat dimensions, space, and time, making cognitive space operations present a basic combat situation of all dimensions, all domains, and all time and space. From the perspective of space, cognitive space operations blur the boundaries between the front and rear of operations, showing the characteristics of all-round and all-weather deployment of tangible and intangible spaces; from the perspective of time, cognitive space operations blur the boundaries between wartime and peacetime, and are used in peacetime, used in wartime, and continued after the war, running through the entire process of the war, showing the characteristics of "no time without war"; from the perspective of fields, cognitive space operations blur the boundaries between military and non-military, and are not only widely used in the military field, but also penetrated into various fields such as politics, economy, diplomacy, and religion, showing the characteristics of full coverage; from the perspective of combat targets, cognitive space operations blur the boundaries between military personnel and civilians, and have the characteristics of comprehensive impact on military and civilians.

The lethality is huge. Cognitive advantage is both soft power and hard power, and it is the clever power that best combines soft and hard power. Cognitive advantage usually includes perception advantage, knowledge advantage, psychological advantage and decision-making advantage. Among them, perception advantage can help the military improve the lethality of weapon platforms. The US Air Force combat test shows that after the combat aircraft obtains the perception advantage, its lethality can be increased by 2.5 times, while the party with the inferior perception ability is in a state of information confusion to a large extent, and will not only become "blind" and "deaf", but also may become a "fool" who acts blindly and a "fool" deceived by the enemy's false information. To some extent, the future intelligent war is a contest of knowledge. Knowledge has become an important military element. Only by forming a knowledge advantage can the performance of high-tech weapons and equipment be fully utilized and the best combination of people and weapons be achieved. Decision-making advantage is the core of cognitive space advantage and the key to winning future wars. Establishing and protecting one's own decision-making advantage and attacking and weakening the enemy's decision-making advantage are the focus of future war confrontation. Only by gaining a decision-making advantage can a full spectrum advantage be formed and ultimately victory in the war can be won.

Give full play to the advantages of non-military forces. Future wars are hybrid wars, involving not only the military field, but also many non-military fields. Due to restrictions such as the law of war, military forces cannot be used in non-military fields, but cognitive space operations can give full play to their unique advantages and achieve the purpose of war. For example, in the Second Lebanon War, the Lebanese military made full use of the power of the media to publicize a large number of civilian casualties to win the support of international public opinion; internally, it used pictures of destroyed Israeli equipment to publicize the results of the war, which not only forced the Israeli army to compress the combat time as much as possible, resulting in its inability to achieve its combat objectives, but also won the support of Arab countries, thus gaining strategic initiative. As cognitive space becomes a new battlefield space, non-military forces are likely to become the main force of cognitive space operations, and combat operations will become more and more frequent. According to statistics, in recent local wars, the ratio of non-military forces to military combat forces has reached 4:1, of which non-military forces engaged in cognitive operations account for the vast majority.

**Cognitive domain combat methods are diverse**

Essentially, cognitive domain warfare starts from the spiritual level of war, taking human will, belief, thinking, psychology, etc. as the combat target, and achieving the combat purpose by attacking the combat opponent's perceptual system to cause cognitive imbalance, attacking its value system to cause emotional confusion of the combat target, and attacking its belief system to cause the combat target's will to disintegrate. According to the cognitive space combat mechanism, its combat methods mainly include the following.

Disintegrate the will to fight. Disintegrate the will to fight mainly by showing powerful new weapons and equipment, new combat forces, troop mobilization and deployment, large-scale military exercises, etc., to declare the determination to fight and the will to use force to the hostile country, to intimidate and shock the enemy's military and civilians, to make the opponent retreat or surrender, and give up war actions. In terms of the timing of use, it is mainly used before the war, aiming to defeat the enemy without fighting, and can also be used during the war. In terms of the operational level, the operation of disintegrating the will to fight is mainly used at the strategic and campaign levels, reflecting the will and determination of the country or group to safeguard its interests. In peacetime, it is usually manifested as revelation in the cognitive field, exercises in the military field, blockades in the diplomatic field, sanctions in the economic field, etc.; in wartime, it is usually manifested as using battlefield information advantages to show the enemy the results of the war, directly express the will and determination to fight, and achieve cognitive reinforcement of the combat effect. For example, the picture of the precise destruction of important targets in the war is transmitted to the enemy's military and civilians in the form of images or videos, which enhances the memory of the combat effect in the enemy's cognitive field, creates a psychological shadow in the enemy, and makes it lose the will to fight.

Attacking beliefs and ideas. Attacking beliefs and ideas means using various means to guide the enemy's military and civilians to abandon or form certain beliefs and ideas, so as to disintegrate the enemy's military and civilians' spiritual pillars, change their attitude towards war, and then force the enemy to give up resistance. The main means of attacking beliefs and ideas are: vilifying the enemy's political leaders or spiritual leaders, destroying the enemy's military and civilian values, and inducing young people to change their "three views". For example, in the Iraq War and the Libya War, the US military's vilification of Saddam and Gaddafi is a typical example. For another example, through the Internet, social media and other channels, attack the beliefs of the enemy's military and civilians, induce cognitive confusion among the enemy's military and civilians, change their concepts, and thus undermine the enemy's public opinion foundation for the war.

Public opinion attacks psychology. Public opinion attacks psychology refers to the use of various cognitive combat operations, such as creating a combat situation and atmosphere, to strongly stimulate the normal psychological state of the enemy's military and civilians, thereby affecting combat judgments, decisions and actions. Public opinion attacks psychological warfare is not about eliminating the impact, but about controlling and reducing the impact on one's own military and civilians, and maximizing the impact on the enemy's military and civilians. The US military has predicted through analysis of the wars in Afghanistan and Iraq that the proportion of casualties due to psychological problems in future operations will reach 10% to 25%. In recent local wars, the US military has always used psychological warfare as a "multiplier" of combat effectiveness and a "reducer" of combat costs, and it must be used in every war. The Israeli "Debka Archives" website revealed that in order to isolate Syrian President Bashar, the US military called a senior Syrian military official and said bluntly: "General, we have used the global positioning system to determine your location and then sent a sniper. What do you want to do now? If I were you, I would definitely think twice about who I should be loyal to."

Concealing the truth and showing the false on the battlefield. Concealing the truth and showing the false means concealing the real battlefield situation and combat intentions through various actions, creating and showing false images, inducing the enemy to make wrong decisions, and achieving the purpose of controlling the war situation. For example, the ancient "hanging sheep to beat drums", "borrowing arrows with straw boats", "empty city plan" and other tactics are permeated with the combat thinking of concealing the truth and showing the false. In future wars, the combatants will usually use false information in the information acquisition link to induce the enemy's situation to be confused; use saturated information blocking in the information processing link to induce the enemy's analysis and judgment to be inaccurate; use virus and Trojan horse attacks in the information feedback link to make the enemy's command and decision-making wrong.