

The Fog of War: An Avenue to Explore Vulnerabilities and Mitigating Measures to Cognitive Warfare

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ABSTRACT

Recent academic research has underscored the detrimental impact of war on mental health, yet earlier studies indicate that civilians and soldiers under extreme conditions not only experience declining mental well-being but may also become more susceptible to cognitive warfare. This susceptibility can be attributed to prolonged mental fatigue resulting from extended stays in bomb shelters or trenches, limited access to communication channels, Russian dominance of the information landscape, and a wide array of Russian influence techniques. This suggests that the fog of war does not affect all individuals uniformly. In regions where it is denser, the combination of restricted access to reliable information and individuals' cognitive coping mechanisms under extreme circumstances may create vulnerabilities that can be exploited. Furthermore, influence techniques targeting human cognition and may be significantly potent when directed at individuals with compromised cognitive capabilities. This paper aims to shed light on how cognitive warfare methods impact civilians and military personnel under extreme conditions, particularly concerning their sense-making abilities. Specifically, the paper proposes a preliminary framework for studying and comprehending the experiences of individuals, whether on the frontline or from a distance, in order to better understand how they perceive varying and potentially conflicting information sources.

1.0 INTRODUCTION

Since Russia's full-scale invasion of Ukraine, the toll on human life, military and civilian, has been tremendous [1], [2], [3]. The Russian leadership had planned a short victory march in Ukraine but was met with fierce resistance, both in terms of kinetic and intangible warfare (e.g. information and cyber warfare) [4]. Concerning the latter, Ukraine has since 2014 been working effortlessly with information security management to withstand Russian influence and information manipulation [5]-[8].

However, as war lingers, Russian information manipulation appears to be gaining traction. A study conducted after approximately 15 months of war suggests relatively substantial support for Russian narrative framings that seek to undermine the trust between Ukrainian society and the government [9]. One proposed explanation for this development is psychological fatigue and disappointment among the Ukrainian population, likely rooted in inflated expectations about the reality of war, declining support in the West, hardships at the battlefield, and, not the least, that there is no end in sight. This points to the importance of understanding how cognitive resilience is impacted by external factors regarding susceptibility to information manipulation and sense-making.

Moreover, earlier research and journalistic accounts indicate that external factors and their potential susceptibility to information manipulation differ among target groups [10]. During the long war in the Donbas before the full-scale invasion, it has been noted that soldiers who are mentally exhausted run an increased risk of falling prey to information manipulation [11]. Journalistic accounts similarly report that civilians who have spent extended time at the battlefield tend to believe false information. This susceptibility can be attributed to prolonged mental fatigue resulting from extended stays in bomb shelters or trenches, limited access to communication channels, Russian dominance of the information landscape, and a wide array of Russian influence techniques. This suggests that the fog of war does not affect all individuals

uniformly. In regions where it is denser, the combination of restricted access to reliable information and individuals' cognitive coping mechanisms under extreme circumstances may create vulnerabilities that can be exploited. Furthermore, influence techniques targeting human cognition and may be significantly potent when directed at individuals with compromised cognitive capabilities. It is also well known that part of the Russian strategy to exert influence on Ukrainians is to target family members of soldiers, likely profiting from their emotionally weakened state [6].

Setting out from the premise that one central aspect of warfare is to break adversary morale and resilience, with this paper, we wish to explore how external environmental and contextual factors impact human sense-making capacities and how threat actors might exploit these factors to influence and manipulate target audiences in a weakened mental state. The theoretical frame for the paper is cognitive warfare, a contested concept whose conceptual border between propaganda and information warfare is unclear. The purpose is to a) provide a research avenue to empirically study the impact of external stimuli on sense-making during wartime, b) assess how this might be exploited by threat actors, and c) use the results for developing mitigating measures to cognitive warfare.

In this paper, we discuss earlier research on cognition concerning information manipulation and malign influence techniques (e.g. propaganda and information warfare), which is followed by a discussion of the theoretical gains from understanding cognition and influence through the lens of cognitive warfare. We argue that cognitive warfare is a fruitful concept for widening the analysis of influence manipulation and malign influence techniques since it focuses on the importance of external stimuli. Moreover, we discuss earlier research concerning these aspects, focusing on sense-making and mental fatigue. Finally, we present an analytical for empirical enquiry.

2.0 COGNITION AND INFLUENCE

Propaganda can be traced back to ancient Greece as a communicative technique and philosophical concept [12]. It is a well-studied phenomenon concerning the emergence of mass media and state wartime communication during the early 20th century and onwards [13]. During the last decade, scholars have turned their interest to propaganda and digital media under the heading of computational propaganda [14]. Coupled with this development, increasing attention has been given to disinformation. Most likely explicitly developed as a propagandistic tool by the Soviet Union's intelligence services (*dezinformatia*) in the 1950s [15], disinformation is commonly seen as a generic term to describe different types of deceptive communication techniques [16], [17].

Information warfare (including psychological warfare) is typically seen as an integral part of modern warfare, but like propaganda, it has a long history, typically associated with millennia-old warfare theory [18]. From a military perspective, information warfare often refers to measures used to gain an advantage over an adversary through information, such as unique access to untainted information, as the adversary has deceitful or false information. The purpose of information warfare is, among other things, typically described to influence adversaries' decision-making, disorient them, and degrade their morale and will to fight (civilians and soldiers) [19]. While democratic states usually restrict the term's application to defensive measures during open conflict and war, it is well documented that Russian military strategic and theoretical thinking sees information warfare (also conceptualised as information confrontation) as a permanent aspect of interstate relations, even below the threshold of war [20]. Russian intelligence services have since long been using information warfare methods (e.g. active measures) to influence elections, stir up polarisation, and create smoke screens in democratic countries, not the least in Ukraine.

Several studies discuss how propaganda and information warfare can manipulate human cognition and emotions to direct human behaviour. Although this is a young field of research, numerous studies address how the digital media landscape, underpinned by the logic of the attention economy [21], affects human

cognition and emotions [22]. The research includes attention deficits [23], political agenda setting [24], cognitive biases [25], the attraction of negatively framed news [26], long-term exposure to particular information [27], imagined internationalisation of knowledge by merely sharing it [28], social and political polarisation [29], and the impact of algorithms for selective exposure to information [30]. There is, however, a considerable lack of consensus regarding the precise impact of these factors on human cognition. This is due in part to the weight attributed to how a diverse array of manifest and dependent variables (including cultural, social, political, and biological elements) impact cognition.

The tendency in contemporary propaganda and information warfare studies to focus on digital media covers only one aspect of how information warfare methods are used against soldiers and civilians. For example, the Russian war of aggression against Ukraine shows that Russian actors use a wide range of methods, from face-to-face contacts to micro-targeting of vulnerable groups and large-scale disinformation campaigns in social media [31]. Moreover, the above research typically focuses on how cognitive abilities are affected by different forms of communication and their potential for use in propagandistic and information warfare purposes [32].

3.0 COGNITION AND EXTERNAL STIMULI

Analysts and researchers have been seeking to holistically understand and conceptualise cognition to propaganda and information warfare to meet the challenges of rapidly emerging communication technologies and the ever-complex information environment. Cognitive warfare has emerged as a concept to achieve this end [33]. However, the current state of research is fragmented, and what differentiates cognitive warfare from its conceptual siblings is still being determined.

Alonso Bernal and colleagues, for example, centre their discussion of cognitive warfare around public opinion. They state that while measures taken to influence public opinion are as old as civilisation itself, they concede that “the *weaponisation* of public opinion is a novel, threatening development in how we interact” [34]. So forth, they define cognitive “warfare as the weaponisation of public opinion, by an external entity, for the purpose of 1) influencing public and governmental policy and 2) destabilising public institutions” [34]. Our question is in what way this is a new phenomenon, and subsequently, in what ways it differs from other forms of manipulation of public opinion to achieve specific goals.

Compare the above definition with Garth Jowett and Victoria O’Donell’s widely-used definition of propaganda: “Propaganda is the deliberate, systematic attempt to shape perceptions, manipulate cognitions, and direct behaviour to achieve a response that furthers the desired intent of the propagandist” [35]. While the “external entity” is lacking in Jowett and O’Donell’s definition, it stands clear from their work that propaganda has been widely used by adversaries to influence and undermine each other, from individual morale to society. During the 20th century, foreign actors widely used rumour, radio, television, and newspapers for propagandistic purposes: to win foreign populations’ hearts and minds and spread disinformation, distrust, and confusion in targeted societies [36].

It could be argued, as Bernal and colleagues do, that the “advent of the internet and mass media have made possible the large-scale manipulation of populations via targeted, accessible, multimodal messaging, which can now exist under the guise of anonymity” [34]. However, not only has radio played a similar role during the Cold War, but the aforementioned term computational propaganda is already used to cover this aspect of the new digital media landscape.

Concerning the distinction between information warfare and cognitive warfare, they argue that information warfare “works to control the flow of information”, whereas cognitive warfare “deals with thought and behaviour” [34]. This definition is also questionable since the literature widely acknowledges that information warfare aims to change how targeted audiences think and act. Add to this the new AJP-10

NATO doctrine for strategic communication, which is explicitly behaviour-centric: “AJP-10 introduces StratCom as the primary function for ensuring all NATO activities are conceived, planned and executed with a clear understanding of the critical importance of informing and influencing the perception, attitudes and behaviours of audiences to achieve objectives to attain the end state” [37]. Thus, behaviour-centric communications is not unique to cognitive warfare. It could even be argued that it lies at the very heart of political communication.

There are several similar definitions of cognitive warfare, as discussed here [33]. Other definitions of cognitive put a stronger emphasis on digital technology. For example, Bernard Claverie and François Du Cluzel define it as “an unconventional form of warfare that uses cyber tools to alter enemy cognitive processes, exploit mental biases or reflexive thinking, and provoke distortions, influence decision making and hinder action, with negative effects, both at the individual and collective level” [38]. They add that cognitive warfare extends beyond the human consequences of cyber warfare where “a cognitive effect is not a by-product of action, but its very objective” [38]. Moreover, as the authors point out, the field of human enhancement through bio- and nano-technology coupled with advances within the neuro- and cognitive sciences opens up new avenues of human-to-computer interaction, such as the brain-machine interface [39], which can be exploited for malign purposes [38]. While cyber-enabled influence techniques are already recognised in the literature on information warfare and arguably fit within the conceptual framework of information warfare [40], the novelty resides in the capability for cyber activities to target “cognitive abilities directly” [38]. That is, altering cognitive capabilities before any sense-making process takes place. However, targeting cognitive capabilities is not in itself a novelty. For example, pharmacological substances and psychological manipulation have since long been used to achieve this end, and it has been explicitly used for warfare purposes [41].

Against this brief literature discussion, the fundamental query is perhaps not what cognitive warfare is but what it adds to an already saturated conceptual field. As Zac Rogers argues, “anything resembling a bounded and discrete set of meanings to be associated with cognitive warfare has yet to emerge and seems a way off” while adding that “the conflation of operational information warfare with cognitive warfare is a category error which must be addressed first [42]. Following Rogers’ call to conceptual clarification, Tzu-Chieh Hung and Tzu-Wei Hung define cognitive warfare “as activities undertaken to manipulate environmental stimuli to control the mental states and behaviours of enemies as well as followers in both hot and cold wars” [43]. While information beyond doubt is an external stimulus, the advantage of this definition is that it shifts focus from information and influence to the control of cognitive functions. They argue that although all the conceptual siblings to cognitive warfare “contain the element of influence operations and may impact human cognition, only cognitive warfare is specifically dedicated to brain control” [43]. They specifically refer to the neurosciences but, arguably, the manipulation of external stimuli also includes how environmental factors impact cognitive capabilities such as sense-making.

4.0 COGNITION, SENSE-MAKING, AND MENTAL FATIGUE

The sense-making process lies at the heart of our perceptual and cognitive systems. It relates new information to previous beliefs in a way that (ideally) helps one function well in the real world. Sense-making is ubiquitous and involves attribution, framing, pattern recognition, learning, and emotion. As such, this primary human feature affects many different aspects of people’s lives.

For humans to make sense of the constant bombardment by external stimuli, the brain tends to classify information into digestible bits. More precisely, our neural mechanisms have evolved to simplify and condense information because of the brain’s limited capabilities to process and retain information. These neural mechanisms underlie our perception, memory, language, and other cognitive processes. The notion that perception and cognition seek to make sense of the world dates back to the early 20th century. For instance, Gestalt psychology concerns how the mind structures dispersed stimuli into meaningful

information. Gestalt psychologists established several principles explaining how the mind makes sense of the environment by constructing global wholes from disordered stimuli [44].

From the mid-1950s onwards, researchers focused on how people make sense of their social world and how the context in which information is perceived affects information processing and evaluation. This led to an explosion of different theories and concepts in behavioural and psychological science, which all held that people have an inner drive to favour consistent and easily understood information that “feels” good. Human beings’ fascination for narratives is a clear example of the innate drive for sense-making. Humans appear inclined to enjoy telling and hearing stories about things that may help make sense of many intertwined events. These cognitive quirks might seem relatively harmless at first; however, a highly impactful line of research on legal psychology found that narratives much more persuade jurors to make sense of facts rather than logical arguments [45].

Thus, by constructing stories, individuals can organise and remember events coherently, giving the individual a sense of predictability and control. Unfortunately, this strong drive for sense-making could make people vulnerable in highly uncertain and extreme conditions since it is often accentuated when unexpected and disruptive events occur – especially man-made. Research on such events, like terrorist events, clearly shows that people immediately need to make sense of the event. Studies focusing on microblogging on social media after these events demonstrate that people’s initial messages can be characterised as information sharing. However, as time passes, people usually begin to share their opinions on the event. Both information and opinion-sharing tweets seem to function as sense-making mechanisms, which in turn helps people create a narrative of the event [46], [47]. Like terrorist attacks, wartime events like shootings shelling, and ground invasions are beyond doubt to be characterised as disruptive events that people (both civilians and military personnel) need to make sense of to survive mentally. A specific aspect unique to wartime situations is the often prolonged mental fatigue, long-term uncertainty, and general extreme conditions that people must endure.

The literature is plentiful when it comes to investigating the impairing effects of mental fatigue on, for instance, information processing [48], decision-making [49], and emotion regulation [50]. There is also applied research from various fields, such as law enforcement [51], nursing [52], and sports science [53], demonstrating the impairing effects of mental fatigue. When it comes to military research, there are, of course, many studies aiming at understanding the effects of mental fatigue. Still, the vast majority focuses on performance and decision-making within the context of potential operational errors [54] or mental fatigue among military personnel and its relation to mental health [55].

Previous research shows that under harsh conditions involving mental fatigue and uncertainty, people are less able to create, process information, and make decisions and are affected both emotionally and behaviorally. However, how long-term mental fatigue affects soldiers and civilian populations during wartime needs to be better understood. It is conceivable that the adverse effects of mental fatigue make soldiers and civilians especially susceptible to different types of influence. Recent research that draws insight from famous war novels to understand the impact of extreme conditions on sense-making suggests that when sense-making collapses for the individual, there is a clear tendency to try to make sense of things via others’ reactions and behaviours – through vicarious sense-making [56]. Thus, in extreme situations, like prolonged war, contextual and external stimuli appear to render individuals susceptible to manipulative sense-making information.

Seeing extreme environmental factors through the frame of cognitive warfare highlights how external stimuli might predispose human cognition to specific outcomes. Against this backdrop, we understand cognitive warfare as a metatheoretical framework encompassing its conceptual siblings. It emphasises how external stimuli - from environmental to pharmacological and technological factors - impact cognition and emotions to predispose individual and collective sense-making capabilities[50], [57]

This perspective on cognitive warfare emphasises how threat actors might utilise external stimuli to influence diverse target audiences. It underscores the critical need for additional research on the impact of external stimuli, aiming to mitigate these effects. This entails gaining a practical understanding of how threat actors may exploit these vulnerabilities. Consequently, this insight forms the basis for generating new knowledge and devising strategies to counter cognitive warfare.

5.0 FUTURE WORK

To empirically study the above-presented theoretical frame through the lens of cognitive warfare, we have submitted a research proposal to the Swedish Research Council's 2023 call for funding in societal security. If funded, it would be a three-year project based primarily on fieldwork in Ukraine.

This presented research project aims to investigate the impact of the Russo-Ukrainian war on individuals' sense-making processes through semi-structured interviews with civilians and soldiers who have experienced prolonged exposure to the conflict, including being cut off from the Ukrainian information space and enveloped in a Russian one. The interviews will provide in-depth insights into how external stimuli influence cognition and emotions, potentially making individuals more susceptible to malign influence. As such, it will draw on and contribute to the existing body of work on the war's impact on mental health [58], [59] and long-term cognitive resilience, as discussed above [9].

The project employs a multi-level analytical framework. The first level focuses on the respondents' narrated sense-making experiences, recognising the influence of various factors on the validity and generalizability of the data. The second level examines independent demographic and contextual variables alongside factual events that will be verified through triangulation and secondary sources. The third level involves interpreting the data through psychological, social, cultural, political, and theories of war perspectives to enhance our understanding of sense-making and cognitive vulnerabilities.

Given the challenges of conducting interviews in conflict areas, the analysis will be an iterative process to ensure the validity and reliability of the research findings. The project aims to interview individuals at the frontline of the war, including those in previously occupied areas and areas under continued shelling. Risk assessments will be conducted for each field trip to ensure the safety of the researchers.

In case fieldwork at the frontline is deemed too dangerous, interviews will be conducted with internally displaced people in calmer areas in Ukraine or with soldiers on leave. If travel to Ukraine is not possible, interviews will be conducted with Ukrainian refugees outside the country who have experience from the frontline.

It's important to note that the data collected will not be a fully generalisable representation of the respective social groups but rather an exploratory step towards understanding the relationship between sense-making and cognitive warfare in extreme conditions. The project's results will provide valuable insights for future research and may inform strategies to mitigate the effects of cognitive warfare on the general population during wartime.

In conjunction with the qualitative approach outlined in the research proposal, it is imperative to incorporate longitudinal quantitative studies to comprehensively understand the impact of external stimuli on sense-making processes within different social groups. While qualitative interviews provide invaluable depth and nuance to individual experiences, quantitative studies can offer a broader perspective and enable us to discern overarching patterns and trends over time. By employing statistical methods and longitudinal data collection, we can analyse how factors such as demographic variables, contextual influences, and exposure to specific stimuli correlate with shifts in cognitive processes. This combined qualitative-quantitative approach holds significant promise in illuminating the complex interplay between external stimuli and sense-making, thereby advancing our capacity to develop robust strategies to counter adversary cognitive warfare.

Moreover, it equips us with the tools needed to bolster cognitive resilience in populations facing the challenges of crisis and conflict, ultimately contributing to more effective responses in times of adversity. This integrative approach ensures that our research provides in-depth insights into individual experiences and offers a broader understanding of the societal impact, laying the foundation for more targeted and impactful interventions.

6.0 CONCLUSION

In the wake of Russia's invasion of Ukraine and the subsequent war of aggression (2014-2023), with this paper, we have set out to elaborate on the interplay of non-cognitive warfare and its relation to external stimuli, specifically through the theoretical frame of cognitive warfare. We have argued that comprehending how external factors affect cognitive resilience is crucial in understanding susceptibility to adversary cognitive warfare methods.

In our discussion, we explored the theoretical benefits of applying the concept of cognitive warfare alongside its counterparts, namely propaganda and information warfare. We contended that cognitive warfare offers a unique perspective, considering how individuals respond to information and recognising the significant influence of contextual factors and external stimuli.

We delved into the pivotal role of the sense-making process within human cognition, particularly its function in processing information under extreme conditions. Our analysis uncovered how mental fatigue can significantly affect decision-making and emotional regulation, illuminating the vulnerabilities that may arise in such circumstances.

Our exploration culminated in the proposal of a research initiative focused on empirically investigating the impact of external stimuli on sense-making processes during wartime. This initiative employed a multi-level analytical framework, utilising semi-structured interviews with individuals who have endured prolonged exposure to conflict.

In essence, this paper underscores the imperative of understanding how external stimuli interact with cognitive processes in the context of warfare. It advocates for further research to inform strategies for countering cognitive warfare and fortifying cognitive resilience. This research initiative serves as a tangible application of the theoretical framework presented, contributing to a deeper comprehension of the complexities surrounding cognitive warfare in the Russo-Ukrainian war.

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