UNIVERSITETET I OSLO

Master's thesis

Is naturalistic decision making a requirement for mission command?

Intuitive decision making and its relation to mission command, in the United States Army, and the Norwegian Forsvaret.

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Spring 2022

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Abstract

The United States Army has had problems with the practical implementation of the leadership philosophy mission command [MC]. The Norwegian military on the other hand has achieved mostly MC in practice.. It is established that the concept of MC is an effective force multiplier. At the same time the decision making model of naturalistic decision making [NDM] has been acclaimed as an effective model for decision making, when dealing with little time, few resources and expert decision makers. This study aims to find out if there exists a correlation between NDM and MC, and to explore the possible differences this makes in Norway vs. in the U.S. Army and in micro vs. macro situations.

To test the hypothesis, that NDM, and MC are linked, and that there exists differences between the two countries on the amount of correlated material. The thesis is structured in two parts. In the first a narrative literature review was conducted to develop a theoretical framework built on NDM and MC, based on comparison of different interpretations of these terms. The second part of the thesis revolves around testing the hypothesis. Starting with a systematic literature review,collecting data. Then, I coded the data in NVIVO to determine when facets of MC and NDM were attained, as well as when the terms regarded under the theme of "opposite of MC" were reached. In addition to when opinions about MC (positive or negative) were expressed. The data was then classified through four attributes (macro, micro, Norway and USA) to ensure the possibility of conducting sub-analysis on these terms. The second part of the thesis ends in a compiling of the dataframe in R, before running several regression analysis, and testing for correlations on multiple variables of the dataset. The results showed an acceptance of the hypothesis; the terms of NDM and MC were strongly correlated, with a clear difference between what terms were significant in the different attributes.

These results suggest that organizations have to facilitate the use of NDM to employ, and institutionalize MC. Institutionalization could be strengthened in the U.S. Army by ensuring a more holistic organizational culture, following tenets of human relations management over classical management theory.

Acknowledgements

1. Introduction

I will in this thesis explore the concept of mission command [MC] in two different military organizations, namely the U.S. Army and the Norwegian Forsvaret. Both of the organizations have stated intent to implement and actively use mission command as their leadership philosophy. Forsvaret has often been praised as an effective user of this system in amongst others the Balkans (Ingesson, 2017), and in Afghanistan (NOU:2016:8), taking great risks and developing a method of individual autonomy relying on own experiences. This is in contrast to the traditional elements of warfare like strict coordination, and heavyset hierarchies (Sjöstedt & Noreen, 2021). The U.S. Army on the other hand, has been criticized for not achieving their goal of implementing the new leadership philosophy (Shamir, 2011). Vandergriff (2017) proposes that this can be explained by a failure to change organizational culture away from strict hierarchies and interpersonal rivalries in the U.S. Army.

I hypothesize that the variation in the effective use of mission command stems from a difference in how the two states perceive, and have internalized the concept of mission command. In the U.S. they often use the term of maneuver warfare interchangeably with mission command. The U.S. then puts emphasis on the literal description of the word *Maneuver* as movement, stating that they achieve MC if they physically move troops on the battlefield. Consequently, the U.S. overlooks the other aspects of mission command. They have hyped up their achievements as successes stemming from the doctrine; mission command. In Operation Desert Storm, some theorists (Evans, 2021, Hughes, 1995) claim that the war was a success in mission command based upon the airland battle doctrine. Still, most (Hooker, 1993) agree that the war was fought as a conventional war, with few elements of mission command present.

The difference in how the countries interpret mission command might lie in how they interpret the decision maker. As mission command is a trust based philosophy, where a high amount of autonomy is given to the decision maker, an organization would need to facilitate a decision making style where trust and autonomy plays a large role. I propose that there exists a correlation between the employment of mission command (MC), and the characteristics of naturalistic decision making [NDM].

The Thesis follows a two-part structure, with Part I as a narrative literature review going through theoretical contributions on the subjects of both intuitive decision making and mission command. The literature review culminates in a synthesization of both MC and NDM by discussing the pre existing conditions for both. I compare the U.S. Army, the Wehrmacht and the Norwegian Forsvarets versions of mission command before I combine them into one general framework with 5 terms. I also combine naturalistic decision making and supporting arguments to create four overall themes that are seen in NDM. Part II, is a test of the hypothesis. The hypothesis is tested using a qualitative systematic literature review; searching through traditional academic literature, and some gray literature for sources claiming mission command, naturalistic decision making in military context, decision making in military context amongst others. The data used in the analysis is mostly composed of journal articles, doctrine, and masters / doctoral thesis to test the hypothesis stated in part one. The analysis of the gathered material is done by coding the material in NVIVO. The codes used are developed through a mix of two methods; first developing a set codebook based upon the first part of the thesis. Thereafter, limited exploratory coding in vivo. The data is then extracted into R studio to easier handle the large dataset. I then check for correlation between NDM and MC, before I discuss the implications the findings have on the previous theoretical framework.

1.1 Disposition

This thesis sets out to explore the correlation between mission command [MC], and naturalistic decision making [NDM]. I do this through five chapters 2-6. Chapter 1 is the Introduction consisting of the Background, a Scope of the Field and a Scope of the Thesis and Delimitation The main part of the thesis is divided into Part I: Narrative Literature Review consisting of Chapter 2 Decision Making and Chapter 3 Mission Command, and Part II: Qualitative Systematic Literature Review consisting of presenting and testing the hypothesis in Chapter 4 to 6.

Chapter 2 focuses on the decision making process, where I start by giving a short introduction to the history of decision making research, and the differences between intuitive and rational decision making in 2.1. I present the naturalistic decision making model. In 2.2.1 i present a thorough depiction of what terms are essential for NDM these are later used in the coding process.

Chapter 3 gives an overview over mission command, where I in 3.1 present the historical background of mission command. In 3.1.1 I present the Wehrmacht's version of mission command which is one of three "versions" of MC I used to develop terms for MC. I use chapter 3.2.1 and 3.2.2 to present what MC means in modern militaries. As there is a deviation from doctrines and MC in practice I give an overview over some differences in 3.2.3. The chapter ends in 3.3 where I present the five different terms of mission command as used in this thesis.

Chapter 4 outlines my hypothesis, research questions and sub questions.

Chapter 5 shows the considerable work that was done with methodological challenges. 5.1 gives a detailed overview of how the data collection was done, showing databases searched, and process of attaining search terms, as well as the preliminary filtration of documents. In 5.2 I give a comprehensive look at the work I did, when coding the data material in NVIVO. 5.3 Goes through the work of putting together a dataframe for further analysis. I used R to program regression analysis with multiple methods, as well as calculating the correlation coefficients for all of the data. Ending in visualizing the correlations through easy to interpret correlograms.

In Chapter 6, I present and interpret the data found through chapter 5. This is done in 6.1 presenting the main data, through two levels, the main themes 6.1.1 , and the child nodes 6.1.2. After this I perform a sub-analysis in 6.2 where I perform a similar process as in 6.1. Through main themes in 6.2.1 and child nodes in 6.2.2 both of these are spread out through the attributes of Country (USA / Norway) and level of analysis (micro / macro). The chapter ends in 6.3 with a discussion on the implications the findings have when compared to the theoretical framework presented in chapter 2 and 3.

1.2 Background

Mission command [MC], directive command and auftragstaktik all represent the same thing an intention based style of leadership, where the leader takes the back seat, by proclaiming a mission- or campaign's intent and thereby letting the individual soldiers, NCOs, and officers decide how to go through with each mission.

Mission command has since the 1980s become a trend word in militaries worldwide. Regarded as an effective force multiplier, mission command is often credited with being one of the main reasons for Prussian and later German military success against large and traditionally strong adversaries. While many nations indicate that they practice mission command, there are substantial differences in how the term is used in practice. I explore the possibility of this difference originating in different decision making models used, where I propose the use of Gary Klein's (1998) model of naturalistic decision making [NDM], as necessary to attain true mission command. The naturalistic decision making model is a framework put in place, detailing how skilled experts make decisions in high stress and high risk situations. Focusing on achieving satisficing decisions quickly, instead of analytically optimal choices. I propose that mission command is wholly dependent on naturalistic decision making, to exist, as the philosophy of MC prioritizes quick decisive action, made autonomously from leadership. It would therefore be necessary to employ a decision making strategy stressing quick action, such as NDM.

1.3 Scoping the Field

The field of decision making, as well as the subject of mission command, are both widely researched subjects. Still I have yet to find an empirical study, exploring the subject of decision making models, and their correlation with mission command. There has been extensive amounts of literature on mission command such as Eitan's (2011) important work on examining the implementation and effectiveness of mission command in the British, the U.S., and Israeli forces. With James Wright (2015) sharing the skepticism and explaining in greater width how the U.S. has had, and still has problems implementing true mission command, with the culprits being seen as; high risk of subordinates taking the wrong decisions, and lack of trust between commander and subordinate. He also uses the argument of better communications technology making decentralized decision making obsolete, as it is possible to have detailed command over all participants at all times. In addition to this, the American Military system is a very competitive career field (Wright, 2015, Vandergriff, 2017), leading to commanders that are not willing to relinquish control, if that means they will lose some of the credit for the mission's success.

Nilsson (2020) signals four key themes necessary to fulfill the requirements of mission command in the Swedish Army, and explores how these are attained in a small, but growing military. The link between decision making authority and organizational structure in militaries has been explored by Talbot (2003), suggesting that the hierarchical systems in place in the modern U.S. military are antiquated if one should perform autonomous leadership in lower levels of the organization. Giving relevance to this thesis. is amongst others, Ochs (2020) paper on the difficulties presented when different allied countries have varying perceptions of what mission command is, explaining how this might affect cooperation between allies in a future conflict.

Naturalistic decision making itself was conceived through a contract from the U.S. Department of Defense. While the preliminary study was done on a group of fireground commanders, the findings lead to the discovery of how experts make decisions through naturalistic decision making. Even if the original research was not made explicitly on military personnel, the field of NDM lends itself quite naturally to militaries. This is because the prerequisites for NDM often are explained as high risk, low resource situations, with experienced decision making individuals at the helm. NDM has therefore always been quite relevant for military organizations. Klein (2008) himself went through some of the accomplishments the NDM community have attained, citing intuitive decision making as part of an earlier military command and control manual in the U.S., as well as the significance NDM has on tactical planning and decision making in the Swedish military [in 2006, there have been multiple large reforms of the Swedish Armed Forces since then]. While some research has been done on mission command and naturalistic decision making before, the field is still quite open for further analysis. The NDM field has since Klein's original model also expanded quite a lot. The field now covers different interpretations of the original idea, where some of the newer models vary so drastically from the original that they might be considered decoupled from the NDM tradition. Such as Pfaff et al. (2013) focusing on option awareness where the main focus of the model is situational awareness and sharing information to ensure robust choices.

1.4 Scope of Thesis and Delimitation

The data used for this project consists of publicly released doctrines, surrounding the organization of military units, found in official archives of both American and Norwegian

governments, official government reports on the effectiveness of logistics, fighting, and other organizational aspects, articles in organizational, and military journals, journalistic pieces, and student papers (masters / phd thesis). Because of the secretive nature of militaries, all reports and plans relating to military doctrine are not publicly available. The deliberate choice to use open and public data comes with the added benefit of few ethical concerns to take into consideration. The data is public and will pose little to no threat to individuals. Furthermore, it would be hard to imagine that the codification of different nations military-leadership doctrines, which are already public, would pose any national security threats.

This thesis focuses on the command philosophy of Auftragstaktik. The philosophy is developed mainly for land forces. There exist some similar styles of command, both for sea (command by veto / negotiation) and air (Boyd's OODA loop); these similar styles will not be discussed in this thesis.

As of quality concerns, it is always important for me as a researcher to be aware of possible biased prepositions. I have previous experience in the armed forces myself and I have through my time in uniform personal exposure to both of the mentioned militaries. I am therefore naturally in a position where I might be biased in my review. I have as far as possible tried to stay neutral as well as sought out literature that does not necessarily fit into my preconceived notions of the two organizations. I am in this project aiming to understand the organizations mentioned, and how they make decisions, thus stating biased material will be of little value.

Part I: Narrative Literature Review

In the following chapter I will present the theoretical framework used in this thesis. The framework consists in the main part of naturalistic decision making, and mission command, as well as their supporting arguments. The chapter opens with a presentation of decision making theory, before delving into the composition of the naturalistic decision making model, ending in four themes to be used in later analysis. Thereafter, I render the leadership philosophy of mission command, presenting it with some history and the significance it has through doctrinal use today. I draw parallels between parts of mission command and parts of naturalistic decision making. The part ends with the synthesized themes of mission command, to be used in the analysis.

2. Decision Making

2.1. General Decision Making

The decision making process lies at the heart of our everyday lives. What clothes to wear, or what to eat for dinner, all of these mundane tasks are examples of decision making processes we all experience everyday, and that we through repeated training and exposure get quite skilled at. Decision making processes in this thesis will cover two main conceptualizations of how decisions are made. The first being rationalistic decision making, proposing that man is rational, and always seeks to make the optimal choice. The other concept is intuitive decision making, proposing that man makes decisions that are "good enough" based on previous knowledge. I will in this chapter first explain some of the process behind rationalistic and intuitive thinking, and its effect on decision making. Secondly I present the naturalistic decision making model, and its tenets.

The field of decision making research has traditionally focused on rationalistic decision making. This changed with Herbert Simon (1997) being accredited as one of the most influential early proponents of decision making research, and being responsible for dividing the field into two distinct paradigms: the rationalistic, and the intuitive. When Simon first started researching organizations, the existing research on the subject was based on classical

management theory, such as Henri Fayol, Max Weber, and Charles Taylor putting heavy emphasis on the rationality of man. The rationalistic approach has its origins in John Stuart Mill and the model of "Homo Economicus", a completely rational being, used as the basis for economic and organizational theory. Rationality was in other words a defining factor for effective management. The problem lies in the fact that humans are never able to achieve perfect rationality. While Simon (1997, p. 93) explores the idea of a completely rational actor, through a concept called objective rationality. This type of rationality is a prerequisite of classical management theory. Simon explains three conditions necessary to obtain objective rationality, and explains why they are not possible to obtain:

1. Rationality requires complete knowledge and anticipation of the consequences that will follow on each choice. Knowledge of consequences is always fragmentary.
2. Since these consequences lie in the future, imagination must supply the lack of experienced feeling in attaching value to them. But values can be only imperfectly anticipated.
3. Rationality requires a choice among all possible alternative behaviors. In actual behavior, only a very few of all these possible alternatives ever come to mind.
   (Simon, 1997, pp. 93-34)

Simon's explanation shows how objective rationality is an impossibility with people, which in this case makes rationalistic decision making, as seen in classical management theory, impossible as well. Individuals are complicated, a decision maker will never be able to anticipate what thoughts are relevant in another decision maker's head, nor will he be able to know about the family life of each of his employees. More often than not, humans are not able to understand the full complexity of a situation. While decisions are dependent on a multitude of complex variables that one has to be able to systematically analyze, and react to in a rational fashion. Another problem that arises is that an action that is rational in one complex variable might be irrational in the next.

Objective rationality has different meaning to different people, what might seem perfectly rational on an organizational plane, might be wholly irrational through the lens of one of its members (Simon, pp. 88-89). As an example, a soldier in the trenches during the First World War rationality would depend on our context. The general staff would expect rationality through working towards the goal of your country; you would sit in the trench, pop your head up, and when the whistle is blown, run out into no man's land to achieve glorious gains "For King and Country". The poor private in the trenches on the other hand, would see it as rational to rather stay in safety, he would gain more by staying alive, than what a few measly

meters gained would benefit him, personally. It is therefore important to keep in mind that all organizations are made up of many individuals, and all of these have their own version of objective rationality. Objective rationality is therefore an impossible dream.

As a replacement for objective rationality, Simon (1997, pp. 88, 119) proposes the term bounded rationality and the figure of the "*Administrative man*" as contrary to the classical economic man. Bounded rationality explains the process of choice through simplified mental models. There are multiple ways to interpret the models we use to be able to process situations in simpler ways. One of these are known as heuristics or simplified mental models used as general tools to explain, and understand the world around us, without the need for deep analysis, thereby saving time, and mental resources (Gigerenzer & Brighton, 2011, p. 3). Heuristics are general tools that are familiar to psychologists, for example the "law of small numbers" (Kahneman, 2013, pp. 121-131) stating that humans expect all groups to be representative of whole populations even though a random sample might be skewed. Another one, which will be used more in this thesis, is the NDM style of mental models (Klein, 2015, p. 165), putting emphasis on tacit knowledge with experts, ending in prototypes, that can be modified to fit any situation[1]. While an objective rationality seeks to analyze every choice in its full complexity, the bounded rational approach seeks to satisfice by choosing the option deemed "good enough", based on certain mental tools that the decision maker possesses.

2.1.1 Dual Processing

The difference between rationalistic and intuitive decision making is often explained through the use of two different types of mental processes. Firstly, we have the system 1 approach (Kahneman, 2013, p. 26), similar to the intuitive side of decision making, being quick and commanding little in the form of mental resources. Secondly, the system 2 approach (p. 27) explains demanding mental activity.

Dual process theory proposes that human beings have two primary ways of conducting mental activity: System 1 and System 2. The different systems are often called by other names such as impulsive - analytical, intuitive - rational, or systematic - automatic (Evans, 2008, p. 257). The two systems are different in multiple ways. Evans (2008, p. 257) divides the two systems

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[1] See chapter 2.2.1 on pattern recognition.

by their characteristics. System 1 explains the mental processes that are intuitive and easy to accomplish. System 1 is also the mental system that animals use, it is quick and demands little in the form of mental resources. Evans (2008, p. 261) also proposes that system 1 can handle multiple processes in parallel, like eating at the same time as you're walking. One normally uses system 1 approaches in most everyday situations, like what to eat for lunch or what to wear, as mentioned above. These situations are automatic and require very little thought even if they might be complicated. System 2 on the other hand, is a slow moving analytical process that is mentally demanding (p. 257). Typical system 2 tasks require you to stop and think about what you are doing. Examples of this would be figuring out how much food to make when having guests over. In contrast to system 1, system 2 approaches are linear (pp. 261-262) and are not able to handle multiple processes in parallel, as all mental capacity is taken up by the process of analyzing.

Evans & Curtis-Holmes (2005) show an experiment where they test the use of logical processes in two groups by challenging the participants with syllogisms. Syllogisms are logical arguments, composed of two premises and a conclusion, which can either be correct or incorrect. A syllogism might be easiest to explain through an example, here through a quote in the series "Generation kill" taking place under the invasion of Iraq in 2003 (Burns et. al., 2008):

Premise: Most people in America right now think of Iraq as a dangerous country. Now, if I were to stand up, I might get killed. (Iraq is a dangerous place)
Premise: To us, behind this wheel it's pretty safe. (Iraq is a safe place right now)
Conclusion: So to us, Iraq is a safe country. (Iraq is sometimes a safe place)

To create stress for the respondents through the use of time (Evans & Curtis-Holmes, 2005, pp. 385-386), the first group had a time limit of ten seconds that they became aware of 5 seconds into the experiment. While the second group was a control group with unlimited time. The time-pressured group had a clear higher percentage of acceptance of the syllogisms where there was a believable conclusion, than the other group when the time limit was imposed. This shows a trend where the intuitive approach naturally favors the end product, instead of the logical analysis needed to get to the end product.

2.1.2 Cognitive Style

Humans are quite unique, we differ in the style of clothes to wear, in what food we like, and in the style of music we enjoy. The difference naturally expands into our style of decision making. Some of us have an inherent urge to survey all possible opportunities when making a decision. These people mostly prefer system 2 approaches to big decisions. At the other end of the scale some people enjoy making impulsive choices, getting decision making processes over with, and not putting more energy into the choice than absolutely necessary. These people prefer system 1 approaches. We call the incline towards one of the two systems, "cognitive style". Of course most people are not extreme on either end, preferring system 1 or 2. The choice of style is contingent on the situation at hand, and other circumstances, such as mood of the day, or how hungry we are.

Cognitive style, being a way to explain individuals differences, through how they perceive information, learn, act, make decisions, think, and solve problems (Kozhevnikov, 2007, p. 464) Research on cognitive styles has fluctuated in popularity, with its importance being controversial at times. This has led to a large number of coexisting theories on cognitive styles with no agreed upon framework for measurement of biases (Kozhevnikov, 2007).

Cognitive styles are more often than not made up of one or more pairs of attributes. Most of the pairs mentioned, are graded on scales, with two extremes on either end. The attributes and the amount of pairs vary greatly from model to model (pp. 467-468), for example Field dependent - Independent (Witkin, et al. 1977) pertaining to one's ability to see an object in light of its surrounding or independent of them, or Holist - Serialist (Kozhevnikov, 2007, p. 468) focusing on major patterns to make decisions or focusing on major patterns in a given situation. Although there historically has been little agreement in what styles are true representations of peoples cognitive style, Allinson & Hayes (1996, p. 122) explain how most of the proposed pairs for cognitive style can in essence be generalized to two distinct attributes: intuition, and analysis. Where intuition is responsible for such characteristics as; quick thinking, spatial awareness, and exploration. The analytical attribute cognitive style refers to antonyms of intuition, these are for example; linearity, systematic approaches, and structure.

The summarization of all cognitive styles into the two values of intuitive and analytical, might be an oversimplification. As all people are complex and use compromised forms of cognitive styles of varying degrees (p. 123), still there seems to be some merit. I will therefore in this thesis continue to put emphasis on the values of intuitive and analytical cognitive styles.

As previously stated the importance of cognitive styles has been controversial, with many pointing out how a person's cognitive style has little to say, where learned skills, and issues surrounding general cognitive constraints that are universal are more important regarding an individual's performance (Kozhevnikov, 2007, p. 464). The mere existence of cognitive styles suggests that there could be a normative value given to the two distinctions in cognition, where one could benefit from different attributes during different situations. Bakken & Hærem (2011, p. 126) supports this argument by stating how decisions made with analytically minded individuals were more effective than that of intuitive minded ones in most situations. The study showed one large exception, and that was in situations where there was a short time limit. When there was a time limit, one saw a large difference between analytically minded people and intuitive ones, with intuitively minded people making decisions with vastly better outcomes than their antonyms. This coincides with the study made by Evans & Curtis-Holmes (2005, pp. 385-386), where time was the definitive factor for the use of analytical or intuitive thinking.

2.2 Naturalistic Decision Making

The school of thought surrounding naturalistic decision making is a natural continuation of Herbert Simons's (1997) research into intuitive and institutional management theory. In stark opposition to analytical decision making which was at the time (and some would say still is) the leading paradigm in decision making research. Klein (1998) meant that man's admiration with rational decision making models, supported by the evidence created in lab controlled experiments, was simply a wrong depiction of how humans made decisions. Klein argued that humans are not computers, who analyze pros and cons, gathering all available information. Nor do people in real situations compare different options when making a choice. People instead choose the first acceptable option that satisfies the demands in the situation and is contained within the constraints. The option is calculated based on earlier knowledge and expertise gained through experiencing similar situations multiple times. The experts then recognize patterns that are similar to a "prototype" one manages to simulate mentally by

tapping into previous knowledge on how to solve the task. This makes the response extremely quick and relatively easy to conduct. Through the use of intuition one does not need to gather unnecessary new information nor does one compare different choices. When the first acceptable choice is mentally simulated, one sets the plan into action. By making decisions based on satisficing results one effectively combats decision paralysis.

Novice vs. Experienced

Klein (1998) repeatedly talks of the importance of expertise to effectively employ naturalistic decision making. This seems to be correct after their findings, but it would make the choice of autonomy in lower levels counterintuitive in case of war. This would especially be in the case of the Norwegian Forsvaret where one would be expecting complete mobilization of most citizens to fight the quantitatively larger adversary for survival of the nation. The mobilization would result in large part of untrained individuals now befitting military uniforms and weapons. In case of war, one would therefore in respect to following the notions of expertise to plan the education of everyday civilians in military skills before the outbreak of war. Norway's reaction to this is to employ universal conscription as a counter, so that all or most members of society are obligated to attend conscription, as a caveat this obligation is put down in law. However, most people in Norway no longer serve their conscription; and out of about 66 000 people each demographic year between 18-24, only around 10 000 served their conscription in 2021 according to Forsvaret (2022). In other words the Norwegian military might be facilitating for RPD at the current state of affairs, but one has to put into question how the military would fare in an actual total war. Klein (1998, pp. 28-29) proposes that novices such as these might benefit from using rational models like Jannis and Mann's conflict theory (1977, in Klein 1998, p. 29), but that this only is applicable in perfect conditions (enough time, resources, information etc.) one would therefore believe that rational choice models might be beneficially used to teach novices.

The stark difference between experienced and inexperienced individuals in high risk situations, are also used as an example in other similar intuitive decision making theories, Reyna et al. (2003, in Reyna 2004, p. 61) describes how experienced cardiologists sift through fewer data points to determine the cause of chest pain in patients than those who are inexperienced. The experts also seem in tradition with RPD to assess the options in a cyclical

but binary way, mentally simulating each option fully, and discarding them if they are not up to the task at hand.

Accumulating experience is an extraneous task. New members of an organization might be good at some of the things they are trained at, but to gain expertise in one's field, there is a need to drill. Klein (1998, p. 287) explains how one could learn all the rules and regulations in the book, but still not end up as an expert: "[...]in natural settings, perceptual learning takes many cases to develop." Further stating that there are no shortcuts to expertise, one has to experience a multiple of situations that are alike, or similar enough so that one can use the knowledge gained in a situation on new tasks.

Singular Evaluation Approach

When exploring what response we have to situations, the naturalistic decision making model expects its users to choose the preferred plan of action based on experience. The plan should be simulated mentally to expose any discrepancies that might arrive. If the simulation ends up being incapable of solving the situation then the plan is discarded, and a new simulation starts with different variables to combat the failure. This approach is repeated until one finds a satisficing solution. The approach consists of in a linear fashion deciding what to do at each step to achieve the planned objective. This method for finding the right course of action does not consist of comparing multiple approaches. Singular evaluation instead focuses on visualizing the consequences of an action completely before rejecting the option of accepting it and then going through with it. If one chooses to scrap an option, one simply starts anew with a different one. The process stops when there is an adequate solution to the problem at hand (Klein, 1998, p. 19 - 20). Klein (1998, p. 20) uses Herbert Simons (1997) concepts of "satisficing" and "optimizing", where he argues that expert individuals seek satisficing as a way to speed up the decision making process in a crisis, in contrast to optimizing which is a labor and time intensive process.

2.2.1 Terms of NDM

Naturalistic decision making consists of multiple important themes. I will here explain the significance and the process of the four main themes: intuition, mental simulation, situational awareness, and big picture as well as their underlying functions.

Intuition

The first term of naturalistic decision making is the use of intuition. Intuition is an undefinable way to predict outcomes without being able to understand why. The difficulty of condensing the intuitive process down to quantifiable measures, means that intuition is often overlooked as a part of the skillset experts have in their inventory. To accommodate for intuitive decision making, one has to give a huge amount of trust to the decision maker themself, as well as forgiving errors that might arise from erroneous decisions made in the moment. The opinions are context dependent and would in many cases be difficult to explain after the action is over. Intuition is similar to System 1 reasoning in dual process theory (Thompson et al. 2011, p. 108). Intuition is one of the mainstays of naturalistic decision making because the model begets trust in the decision maker's expertise, and thereby his ability to make good decisions quickly.

The use of intuition in a set situation is decided by assessing a feeling of rightness [FOR] (Thompson et al. 2011, p. 109), in the decision maker's own choices. This feeling is provoked by the confidence one has in their own skills in a given field, and is closely related to the similarity the situation at hand has to previous ones (pp. 111-112). As well as the fluency of which one is able to transform and express previous knowledge as closely as possible into what you're experiencing at the moment. If the FOR is low, there is a significant chance of the decision maker to automatically employ system 2 reasoning (p. 34, 36). When not familiar with the situation, a skilled decision maker makes the choice of reevaluating the situation, and by doing this purposefully employs system 2 reasoning (Klein, 1998, p. 32).

Intuition as is in its concept is difficult to explain. The systems we use to analyze a situation, or the "invisible" cues experts use to determine the next course of action (Klein, 1998, pp.

34-35) Klein further expresses typical intuitive ways experts see the world that other people do not, these include but are not limited to:

- Patterns and small differences that novices do not notice.
- Anomalies- events that did not happen according to a mental simulation, and other violations of expectancies.
- Events that either already happened in the past or are going to happen in the future.
- Their own limitations.
  (Klein, 1998, pp. 148-149)

It is clear that experts inhabit skills that beginners do not. The discovery of patterns, as well as anomalies to expected outcomes, is a way for experts to gather intelligence and thereby becoming more situationally aware (Klein, 1998, p. 150). This difficulty to explain your steps is one of the reasons that intuition often gets a bad reputation. Which is especially true in incidents where the decision was made upon a faulty reading of the situation, and therefore did nothing to better or in some cases worsened the problem at hand.

An important part of the intuitive processes is recognizing the situations at hand, through pattern recognition one assembles familiar prototypes in order to effectively solve tasks.

Pattern recognition

> Experts see the world differently. They see things the rest of us cannot. Often experts do not realize that the rest of us are unable to detect what seems obvious to them. (Klein, 1998, p. 147).

Experts make prototypes based on their previous knowledge. The prototype is made up of certain cues about how a situation is supposed to unfold, developed through hundreds of similar experienced cases. Every situation is therefore measured up and recognized as fitting the prototype, or not fitting the prototype. If the situation fits the prototype the expert immediately knows which steps to take. If an expectation (Klein, 1998, p. 151) is broken or the situation does not fulfill prototypical patterns, there evolves a new process of simulating the opportunity to be able to take advantage of opportunities to change the tide in your favor. To further explain what a prototype is through the lens of NDM an example would be best:

Imagine a car. You might have imagined a Ford f450, or maybe you thought of the ElectraMeccanica SOLO EV. These two are quite different; the first one is a huge pickup truck with double rear wheels, a large truck bed for storing stuff, and a huge diesel engine. The second one is a comically small, three wheeled electric car. The two vehicles are vastly different, with very different purposes. Still, when seeing either one you would intuitively know that they are cars, you would probably have the skills to drive both, and you would know how to open their doors. Why both are cars, is difficult to explain, but they fit the prototype even when they have few similarities.

While prototypes can be used to find out how to solve tasks, the same system can be used to notice when something is not as it should. Experts notice anomalies through the recognition of patterns that do not fit the original prototype for a situation they are experiencing (Klein, 1998, p. 39).

In addition to using mental prototypes, one might use analogues and metaphors as a basis for further problem-solving.

Metaphors

Situations where we explain through NDM are more often than not situations known by heavy risk, many unknowns and stresses in the form of lack of resources to solve the problem easily. These situations, often called crises, are where NDM really shines (Evans & Curtis-Holmes, 2005, pp. 385-386) and is superior to rational decision making models. These situations are complex, and difficult to understand. We therefore often exchange the actual situation for a mental image of similar situations: this can be a picture, a story, a prototypical mental image, etc. The metaphors used, might be a direct exchange of actual situations, or they might be interpretations of other situations (Klein, 1998, pp. 197-198). In either way the metaphors can be used as jumping-off points for further decisions made. By exercising metaphors in our decision making, we are able to employ strategies, known to us in new and different situations. The American army supposedly made use of previous knowledge in designing the grenade t-13 during the Second World War, making it similar in shape, design, and weight to a normal American baseball (Rottman, 2010, p. 38). Although this is not a metaphor, by dictionary standards (Merriam-Webster. n.d.) as it is closer to a simile, or just a replication of american baseballs, the main concept remains the same, using a known item for soldiers in effect of increasing their proficiency in an area.

Mental Simulation

> Mental simulation is the ability to imagine people and objects consciously and to transform those people and objects through several transitions, finally picturing them in a different way than at the start. (Klein, 1998, p.45)

Through intuitive processes a decision maker lays a preliminary plan for how to solve the issue at hand, he bases this on his prototypes, and what has worked before. Therefore he starts with a prototype as base for further development of a solution, the evolution and application of the prototype is done through mental simulation. The process of mental simulation can both be used to predict what is going to happen, by predicting the coming state. It can also be used to figure out what has happened, unraveling a chain of events that one can use in the future to predict similar events.

To understand mental simulation one has to break the process down into different stages. Mental simulation in itself is quite similar to a computer simulation, it is relatively linear, and consists of a few steps repeating in cycles when a disruption is noticed. First, one has to figure out the original state and the end state (Klein, 1998, p. 52). Then one has to develop steps towards achieving the end state. These steps are called states and are usually contained to around six steps from original state to end state, these six steps are snapshots of the situation, leading to the end state. The change between these steps are called causal factors and are usually compiled of three changes per state. The causal factors' complexity might change depending on the familiarity and expertise one has in the field. One causal factor for an inexperienced individual might be simple and low in complexity containing only a few maneuvers, while an experienced individual might compound multiple different actions into one. The conjoining of the steps and causal factors, is called the action sequence, and details how change has/ is going to happen. After simulating the causal factors and states step by step, one has to run the simulation through scrutiny (Klein, 1998, p.58). The scrutiny consists of three factors (p. 61). Firstly, coherence considering if the simulation sequence makes sense, and if the causal factors do in fact lead to the states envisioned. Secondly, applicability will the steps lead to the envisioned end state. Thirdly, completeness is the explanation detailed enough, or are important factors left out.

The scrutinization of the action sequence culminates in a binary "yes" or "no" for all three factors, the action sequence is either believable or not. If the internal evaluation is deemed acceptable one runs the action sequence step by step to search for discrepancies in how actions are conducted, problem areas might be run again to straighten out kinks, other modifications to steps or actions might be made. If the action sequence simulated is deemed improbable or in other ways wrong, an experienced individual might throw away the sequence in its entirety and start over on another one. This repeated linear model is repeated until a satisficing action sequence is achieved.

Storytelling

> Most people are quite bad at telling what they're good at or what you're supposed to be doing in a given situation. "If you ask experts what makes them so good, they are likely to give general answers that do not reveal much. But if you can get them to tell you about though cases, [or] nonroutine events [...] you have a pathway into their perspective" (Klein, 1998, p. 189)

Storytelling is a part of making experiences and educating organizations as well as individuals to become more proficient at their tasks. A story, while it might seem mundane and might seem like it has little relevancy as anything else than a "winding down" strategy,will in fact be a vehicle used to transport huge amounts of knowledge to your listeners, as well as for the storyteller themselves. Storytelling is a system of reflecting over and concretizing experiences, into knowledge (Klein, 1998, p. 183). All data conveyed during the storytelling part will be a potential for a listener or the storyteller themselves to fathom new complexities in a situation, and thereby they might be able to make unconscious changes in a prototypical situation, or in the resolution of one. Many organizations have understood this, and it's part of the reason why, after action, reports are crucial in crisis organizations. Both as a way for the individual to share the burden of experienced psychological trauma, and as a way for individuals, and the group as a whole to learn from them, which then gives people advice on new ways to deal with situations.

The storytelling perspective of NDM has its roots in social constructivism that entails how society is made through social actions. Berger & Luckmann, (2000, p. 68) explain how humans have an internal need to express themselves, and through this they change social

reality for the people around. NDMs storytelling factor is parallel to social constructivism and storytelling can therefore easier be explained through the three components of social constructivism(Berger og Luckmann 2000, p.76):

Externalizing: The way people act in accordance to how they think they should act.

Internalizing: The process of unconsciously ingesting other peoples experiences, as well as a group's norms and values.

Objectification: Codification of social structures and artifacts, which then makes an expectation of how people should act and what would happen in a given situation.

(Berger & Luckmann, 2000, p. 76)

An essential part of creating better experts through NDM is therefore through the process of evolving individual storytelling in organizations. To do this one needs to know the key components of stories. All sequences of events are contained in multiple parts, Klein (1998, pp. 177-178) tell about 8 main ingredients of a good story.

- Agents- The people involved.
- Predicament - The problem at hand
- Intentions - the plan
- Action - how agents achieve intentions.
- Objects - resources at hand
- Causality - the effects of actions
- Context - details surrounding the agents and the action
- Surprises unexpected things happening during the story.
   (Klein, 1998, pp. 177-179)

This ingredients list is a good way to start imprinting future experts, in the field of decision making, to become good storytellers. In addition to this to make a good story plausible and easily internalized by the listeners there are conceptual factors that are required. Plausibility, consistency, economy and uniqueness, these concepts are similar to the ones used in mental simulation (Klein, 1998, p. 183). In addition to this Klein, (p. 180 - 181) explains that in order to effectively imprint details from a story into other people's consciousness, three main concepts have to be included.Drama there has to exist a challenge, or be a risk. Wisdom; there has to be a point made out of how the problem was solved, and Empathy, as listeners need to relate to the people in the story.

The other side of storytelling is being deliberate in what you are conveying as well as the other part understanding what you mean (Klein, 1998, p. 216). Understanding each other is a difficult ordeal, words might be sufficiently descriptive in some cases. But in most cases mere words might simply not be enough to convey what you mean in a situation. The intention of what you are doing is of key importance when giving out messages, as the context of what you are doing is not immediately clear to the recipient. Even if the intent is important, one should not pay too much attention to detailing one's message (p. 217) to be sure of no misunderstandings stemming from overanalyzing your message. The most effective way of sharing intent, through messages is in Klein's (pp. 217-218) view to be sure that you both share the same concepts, ideas, and situational awareness, in other words "teammate expertise" that was previously discussed is of great value when sharing messages. A layer of trust will grow between people when they interpret messages in the correct way leading to the need for less and less concrete messages. "If we can work with people who understand the culture, the task, and what we are trying to do , then we can trust them to read our minds and fill in unspecified details." (Klein, 1998, p. 219). When giving out messages or orders, one could instead of actually telling someone the process that you expect rather give the desired intent and goals (p. 222) This increases improvisation, and hurries the process at hand, where the recipient is encouraged to take further action as he knows the intent and goal, instead of waiting for a further detailed command. To be able to truly take advantage of capabilities given through orders, Klein (1998, p. 226) explains the importance of reiterating the messages to ensure the correct interpretation of them.

Situational Awareness

To be able to use pattern recognition in any meaningful way, one would need to be aware of one's surroundings. It is first when one recognizes that things are out of order, one can use their expertise to make intuitive and good decisions. Situational awareness is therefore a big part of the terms of naturalistic decision making "situation awareness can be formed rapidly, through intuitive matching of features, or deliberately, through mental simulation" (Klein 1998, p. 90). Klein suggests here that attaining situational awareness could be both a deliberate process when mentally simulating the situation (I.e what has happened before, and what is bound to happen). Or it could be an intuitive process enfolding as you go. The

establishment of situational awareness is often difficult for novices. There is plenty of information that has to be categorized and analyzed to attain a sense of what is going on in one's surroundings. This process becomes easier the more experienced an actor is, as experienced actors more often are able to put cues into known prototypes (p. 152) through recognizing patterns. The prototypical categorization eases the mental strain on the decision maker, and thereby hurries the decision. When a non-expert is put up against the same task, it is often the case that they suffer from information overload, leading to huge mental strain, and the need to employ system 2 thought processes to effectively make sense of the information. Without the analysis there is a large chance of decision paralysis in novices who suffer from too much conflicting information.

Big Picture

The big picture approach in this thesis surrounds situational awareness on a higher level. It is important for decision makers, especially in high risk situations, to understand their position in regards to other friendlies, the campaign as a whole, etc. To effectively solve problems arising in difficult situations one has to be absolutely sure about what skills you have at hand through yourself and your teammates. It is important to be familiar with individual skills and weaknesses of each member of the group, and the group as a whole. To combat issues that might arise from big picture issues, it is of great gravity to be aware of these problems so that one can hash them.

To properly respond to a situation there is the absolute need for a big picture approach, where one has to see the consequences of actions through the lens of all around them, (Klein, 1998, p. 156) as well as keeping close relations to future engagements. A commander of a platoon would need to win the battle he is in, but not at the hest of the next one, nor at the price of losing the objective. At the same time, the commander has to be able to understand the overall intent of the engagement, and what resources are allotted. This means he has to have intimate knowledge of other friendly missions, and plans, as well as knowledge of where and when contact with the enemy is probable. An experienced leader has to keep some point in mind when challenged with difficult situations.

- The future (What happens after this crisis, will there be more battles).

- The past (what has happened, and why did it lead to this).
- Teammate expertise (what are the skills, and weaknesses of my men, and how might they be implemented).
- Big picture (overall campaign, other friendlies and their missions)
- Adversaries point of view (What are their goals, why are they here, where are they, who are they, what capabilities do they have, how do they perceive you) (Klein, 1998, pp. 148-149)

Expectancies of a situation are made through a combination of intuition and situational awareness. An expert normally uses their surroundings to probe for how a situation is supposed to unfold. This is done by mentally simulating the situation, when expectancies are broken in a situation, the decision maker has to take a step back to assess the situation and regain situational awareness, to once again make a new mental simulation (Klein, 1998, p. 32).

A way to train up the pattern recognition that people use in these types of crises would be through training, including participants in more and more complex problems. One could also increase the effectiveness of pattern recognition by including decision makers in real situations either as observers or as participants in the resolution of those situations. (Klein, 1998, p. 42) The third way that Klein entails one can train for recognition is to compile difficult situations and how decision makers solve the problems, especially focusing on situations where the wrong decision might have been made, and which decision should have been made instead (p. 43). As a working group develops through cooperation over time, there should be an emphasis on learning through discussions within a group (pp. 244-245). Through the active participation in discussion events, teams learn how to improve their performance and internalize others' experiences and opinions to their own prototypes.

Teammate Expertise

Experts in a field have innate knowledge of all or most areas surrounding their field of expertise. They know how tasks are supposed to be performed (Klein, 1998, p. 152), who should do them, and what logistical challenges might arise in each situation. Through extensive training, and previous knowledge they know the interconnectedness of the mission

at hand. This is then another place where novices and experts differ quite a bit. A situation in a crisis situation is almost always extremely complicated and contains multiple moving parts. However the experts' innate knowledge gives them the opportunity to mentally simulate the process of the mission. This means they have an intuitive sense of who should be where in a set situation, as well as what types of equipment might be necessary (p. 153). The knowledge of the situation also entails great amounts of trust between members of the same unit. This trust gives each member of a team the understanding of the other members roles, expertise, and weaknesses. When a team is sufficiently conjoined one will be able to use this to one's advantage. One might encounter a problem that was not expected, and if there then lies a groundwork of knowing your teammates intimately one could call upon them to finish the task. This would also be important for noticing anomalies and admissions from how the plan is supposed to work out. One should in these situations be extremely familiar with all roles on the field, so as to know when something did not happen which might lead to continuing errors in the future.

Teammate expertise might also lead to teams that function better than the sum of their parts. When a group of individuals has a high degree of trust, and knowledge of each other's strengths and weaknesses. A symbiotic relationship forms, where everyone knows what to do, with little communication (Klein, 1998, p. 233). The interpretation of non-verbal cues also goes drastically up when people know each other to a sufficient degree.

Inward View.

An expert is not only good at keeping an eye over the larger picture and his fellow men, but also keeping a view on his own shortcomings. Klein (1998, pp. 158-159) suggests that expert decision makers often cycle in areas of "big picture" into their minds, to be critically aware of what their actions are doing towards big picture happenings. While a novice might become hyper fixated on their mission, the expert decision maker is repeating the commander's intent, other plattoons actions, the knowledge of his men and so on.

The most important reason for the focus on the big picture in naturalistic decision making is in Klein's (1998, pp. 168-169) view to increase the expertise of all members of an organization as quickly as possible. Klein suggests that there has historically been a large focus on the training of procedures, rules and regulations to increase expertise in technical training in the

U.S. While this has changed in later years to envelop more on the job training (p. 173). A main difference between how an expert defines outlook over big picture situations is the lack of something happening. While a beginner in a field might be aware of anomalies in the form of something going wrong. The expert on the other hand is more aware of when an expected event is not happening (Klein, 1998, p. 151).

3. Mission Command

No plan of operations reaches with any certainty beyond the first encounter with the enemy's main force. (Helmuth Von Moltke the elder, Kriegsgechichtliche Einzelschriften, 1880, in Ratcliffe, 2016)

In this section I first discuss the general ideas behind mission command, and its historical origins, through Prussia, and the early German state. After this, I present the first complete form of mission command through Auftragstaktik used by the Wehrmacht during the second World War. Thirdly, I present the Norwegian form of mission command, through doctrines, and public documents. I then discuss the philosophy of mission command in the American Army. Thereafter, I discuss the problems that might arise through development of doctrine, and its contrast to practical implementation. To conclude, I explore similarities and differences between the three different interpretations of mission command. Culminating in synthesized terms to be used in further analysis.

Mission command has through the last ≈200-years gone by many names, spanning decades and multiple languages. It started with auftragstaktik, described by Von Moltke the elder in the later part of the 18th century, advocating, for the increased autonomy of lower level troops, acting after the chiefs intent, to increase the dispersal of troops, and thereby surprising the enemy (Widder, 2002, pp. 4-5). tradition had a major impact on german warfare, and is stated (Balsamo, p. 247) to be the determining factor of german successes during the First and Second World wars. Similar systems, or systems planning to achieve the same goals, have since the second World War been employed with varying successes in modern militaries, such as Israels (Shamir, 2011, pp. 89-93) extremely successful employment of the philosophy during the Six-Day War and the Yom Kippur War, focus on decisive action, and keeping pressure on the enemy. The English who long have had a strong adherence to discipline,have traditionally had a hard time following doctrine (Shamir, 2011, pp. 67-68). The officer corps in England has relied on the buying of commissions, one would therefore be dependent on the right people buying the right commissions. Often leading to rich aristocrats buying their way into the officers corps without proper military merit. (Trevelyan, 1867, pp. 16-17). This has led to an officer corps who often were novices in skills needed, which then again made the abidance to rules of set doctrines difficult, as they simply did not understand them. This

problem has continued to plague the British Army in modern day (Shamir, 2011, p. 80) where some commanders practice mission command, and some revert back to detailed command.

The German Auftragstaktik was invented as a response to the hardships Napoleon caused to the rest of Europe,with the advent of levee en masse[2], and peoples armies. A commander would no longer control a small professionalized force on the battlefield, but rather be in charge of enormous armies of citizens turned soldiers. One commander could in the past overlook and deal out commands to a majority of its forces. This was no longer possible when the armies fighting consisted of millions of troops, and the frontlines spanned hundreds of kilometers (Storr, 2003, p. 121). The original idea of intention-based leadership originated from need, where large armies were impossible to micromanage. The modern type of mission command started as a force multiplier, where small forces in Europe could deal large amounts of damage to Soviet infrastructure and personnel while not being in contact with military leaders but rather fighting on their own (Matzenbacher, 2018, p. 63). The philosophy was deemed a good direction for the American Army doctrine after repeated failures in using peer-to-peer conflict tactics during the Vietnam war showing a desperate need for change (Johnston, 2000, p. 33). Although the U.S. Army has troubles with the implementation of MC, Ancker (2013) argues that the seeds of similar institutions as mission command have been growing in the U.S. since the American civil war (p. 43), with multiple attempts to implement the philosophy throughout modern history, but few succeeding in any great fashion.

This has been the general consensus where great armies with huge amounts of resources peaked in the age of sail, where closed order formations and strict rules were key to winning wars. These nations often have troubles with implementing changes as new forms of warfare arrive. The resistance of including more autonomy in their armies has been a self-enforcing concept, as these huge armies have such an amount of resources that they generally have not experienced defeats large enough for a rewrite of their organizational culture. While there has been an admiration for the Prussian way of war and its effectiveness, western armies have had a hard time actually implementing MC themselves, leading to worse outcomes than the possibility permitted. Kohn (1991) suggest that the british army during the Second World War simply was not up for the task:

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[2] Mass conscription

> The British army in the Second World War was not very good[.] [...]Staff work was rigid. There was little encouragement of initiative, or devolution of responsibility. An absolute distinction was made between officers and other ranks; and as the war went on, there was an increasing reluctance to run risk (Kohn, 1991, p. 379)

This quote is about the British Army in particular, still we see similar opinions when in the ranges of other traditionally large western armies, like the American, the French and the Russian, all being known for strict hierarchical systems with little autonomy.

3.1 Historically

Strict military discipline with a hierarchical organizational form has long been stereotypical; be there Greek hoplites supporting each other's shields during a phalanx (Viggiano, 2013, p. 114), or Napoleonic infantry holding their fire to defend against a cavalry attack in a karré. A strict order would be necessary to keep the formation, requiring a high degree of interdependence between troops. Although there have been acts of war and skirmishes with more individual autonomy throughout history,the arrival of more accurate gunpowder weapons in the late 19th and early 20th century, promoted the individual and smaller groups' autonomy as an important ideal, to achieve effective leadership on the battlefield (Nelsen, 1987, p. 22). At the same time, the battles increased ten fold in size, from small battles with just a few hundred people, into large battlefields stretching hundreds of kilometers and containing upwards of a million men in the same battles. At the same time, the length of the battles stretched from hours into days and weeks. The earlier tradition of commanders leading from the front and having control over what was happening over the whole battlefield was just not possible anymore.

3.1.1 Auftragstaktik

As Napoleon ravaged through Europe with his giant army of conscripts mixed together with professional soldiers (Britannica, 2020), the previous great powers of Europe suddenly saw themselves inferior to this new way of war. This led to the Prussian Army developing intense organizational trauma, leading to the development of mission command.

Vandergriff (2017, p. 50) states that mission command is not a system, nor is it a doctrine in and of itself. Mission command is an ideology, and a philosophical system, it relies on the extension of civilian spirit, transforming into an esprit de corps, where all individuals work towards a greater good. Mission command has its roots in Prussian military tradition. With Vandergriff (2006, p. 32) proposing the swift education and quality of Prussian officer candidates, an important part of Prussian military success in the 1800s.

Vandergriff explains the importance of giving the officer candidates practical real-life examples as training. As well as letting the cadets solve the problems presented themselves. Another way the Prussian cadets were challenged was by changing the original situation or order in the middle of the training exercise (Vandergriff, 2006, p. 33). This made the recruits face the choice of challenging orders from a direct superior or following through with orders that were wrong based on the situation at hand. The rigorous training on decision making made the Prussian officers quick thinking, and adaptive, which showed great success in the coming wars of the mid to late 1800s such as the Austro-Prussian War, or the Franco-Prussian War. Von Moltke the elder is said to proclaim during a bout of war games, "as a rule an order should contain only what the subordinate for the achievement of his goals cannot determine on his own" (Muth, 2011). The outrage came from Von Moltke assessing that one does not have time in a war to discuss the small details surrounding the order given, nor does the commander sit with enough information to reckon the right call. The Prussians had managed to develop an institutional culture (Vandergriff, 2017, p. 50, 52), spanning all officers, NCOs, and soldiers alike. A focus on ends, and not means, later being championed as what we now know as Auftragstaktik.

The full effectiveness of the philosophy first showed itself during the Second World War. James Corum (in Vandergriff, 2017, p. 53) notes how the early World War 2 German armies' successes are often wrongly explained by major technological advances over their peers. A statement that is simply untrue. The German army during the opening of the second World War, was larger than it had been since the first World War, because of huge military build up during the later parts of the 30s, but it was still a horse-drawn army with equipment that was relatively out of date compared to the rest of Europe (Balsamo, 1991, p. 266). The employment of excellent command and control (C2) systems and the philosophy of mission command is therefore often overlooked as a part of Nazi-Germanies successes during the early parts of the Second World War. When looking at the Wehrmacht's composition during

the war one finds that they were for the most part technologically inferior in relation to their adversaries (Balsamo, 1991): The Germans were employing over 2.7 million horses throughout the Second World War, while the opponents in the allies contained almost purely mechanical armies. Their legendary tank armies rolling through Europe during the invasion of Poland were made up of 70% obsolete Panzer 1s, and Panzer 2s, light tanks (Balsamo, 1991, pp. 267-268). Although there were instances of German technological superiority like their radios, and machine guns (p. 273-274) The German early war success could not be accredited to any magical technological advantage (p. 268). Corum (in Vandergriff, 2017, p. 53) puts decisive weight on german military culture, training, and leadership accounting for the success of the German army, who in general had a 50% higher kill rate than their adversaries in Europe and even higher in Russia (Balsamo, 1991, p. 273). While the German army during the war suffered losses, it is not possible to base the losses on the competency of the German army, who retained effective unit cohesion (p. 274) until the very end of the war.

The Wehrmacht simply continued the now long tradition of Auftragstaktik that had naturally developed throughout the 1800 and early 1900s. The leadership in every part of the organization was set as the highest priority. The art of war was deemed threefold, first speed, with decisive action and reaction, was important on all levels of organization (Nelsen, 1987, p. 23). In a multipolar European system, Germany was in need of swift victories without the interference of other nation states. This was supposed to be achieved through decisive tactical victories over adversaries, all the way down to troop level, forcing the enemy to become reactionary, and overwhelmed. Secondly, the Wehrmacht did not believe in extensive planning of engagements, with the plan often falling through at first sight of problems. Seeing war as in a classical Clauzewitsian state as a battle of wills, where both actors in the battle are trying to use the maximum amount of force, to throw off the opponent and incapacitate him so that he cannot force his will on you (Clausewitz, 2007, p. 13). War is also seen in Clausewitzian eyes as something that is inherent chaos, and no matter how rational a plan and an actor might be, the act itself involves huge amount of feelings (Clausewitz, 2007, p. 15):

> If war is an act of force, the emotions cannot fail to be involved. War may not spring from them, but they will still affect it to some degree, and the extent to which they do so will depend not on the level of civilization but on how important the conflicting interests are and on how long their conflict lasts. (Clausewitz, 2007, p. 15)

The philosophy was therefore to nurture Clausewitz's theory of friction in war (Nelsen, 1987, p. 23). All the small things not going according to expectations add up to a weakening of a force's will to fight. Clausewitz (2007, p. 68) "[Friction] is the force that makes the apparently easy so difficult". The Wehrmacht turned friction into a weapon by giving deliberate autonomy to leaders so that they could quickly turn up the pressure on the opposing force (Nelsen, 1987, p. 23). Thirdly the german point of view saw all situations as unique in time of war, there are no set rules, or regulations that encompass all matters of activities. Battlefields are confusing places, the circumstances surrounding the fighting change on a minute-to-minute level, and the leaders have to accommodate for this. During a battle, or war, leaders have to make intuitive decisions on further action based on conflicting and missing information on a strict time limit.

In summary, the German military's focus and philosophy in leadership can be broken down into five parts as demonstrated by Nelsen (1987):

- **Speed**
  Decisive action was the most important factor in the German leadership philosophy. "Leaders were cautioned against waiting to gather more information so as to reach a perfect decision, or even the best decision possible." [...] a decent plan carried out immediately was superior to a superb plan carried out much later." (Blumentritt, 1948, p. 6 in Nelsen, 1987, p. 24)

- **Risk-taking**
  Taking decisive action in the face of uncertainties and lack of information involves a great deal of risk. This risk-taking behavior was cultivated in the Wehrmacht by shaming idleness and inactivity, making independent action a duty for leaders in a difficult situation. At the same time failures that came to through faulty decisions were not reprimanded, but rather seen as a natural part of the war.

- **Clear orders**
  Orders were supposed to be given briefly and often verbally (p. 24), allowing soldiers to use initiative as they saw fit. The core of order giving was the commander's intent. Subordinates were to be informed of the goals of the mission, (commander's intent) as well as limitations and coordinated action with others. The commander was then to

provide adequate resources so that the troops might accomplish their tasks.

- **Mentorship**

   Senior leaders were supposed to keep close one-to-one relationships with their subordinates, to ensure mentoring during training exercises and strenuous challenges. A senior leader was not supposed to train one's subordinates on what to do in given situations, but rather educate them on how to think. The relationship made sure that there was mutual trust between the hierarchical levels of the military. Where the subordinate would take nonverbal cues regarding the commander's intent easier, making for a better mutual understanding. The Commander would on the other hand have a greater chance to predict what the subordinate will do given initiative. (pp. 25-26)

- **Mutual knowledge**

   The German military tradition had at that point been developed over many decades, leading to a force-wide shared knowledge of tactical maneuvers, specific military terms, and language. This ensured that the men had trust in each other's knowledge and could in large part predict how initiative would take place in a given situation, as well as facilitating for more precise order giving. (p. 26)

3.2 Modern Mission Command

Auftragstaktik has clearly been effective in the organization of the Prussian and later German militaries, shown as a positive factor for successes in war. The German army in opposition to the U.S. army was more uniform in its creation (Talbot, 2003, p. 336) giving it a flexibility that one did not see in many of the other militaries at the time. While the flexibility of the German organization was acknowledged also in other countries, there was trouble with implementing them. The U.S for some time during the second World War tried implementing a matrix organized structure to mimic the German flexible structures. This was discarded before the end of the war with the U.S. military, citing problems adhering to the system, and difficulties breaking the traditional form of management (p. 337).

3.2.1 Norwegian Doctrine

The Norwegian form of mission command, known as *Oppdragsbasert ledelse* has long traditions in Norway. Krabberød (2017, p. 17 - 18) exclaims the founding of MC in Norway as a reactionary measure taken after the Vassdal incident where 16 Norwegian soldiers were killed by an avalanche. Although this is true in sorts, one can also see that the tradition has deeper roots. NOU 1991:19 (Forsvarsdepartementet, 1991) designed to tackle the problems that had risen after the incident at Vassdal discusses leadership doctrine in Forsvaret. The document highlights (p. 10) how Forsvaret has in its *Grunnsyn på ledelse* [The Commanders View of Leadership] in 1983, already emphasized the term auftragstaktik. Intending for the Norwegian armed forces to continue the use of Prussian tradition. Stating that detailed command of individual units is highly detrimental for the intent of orders, contextualizing the importance of a mission being given so that the receiver may have the greatest possible freedom in solving the mission, as he seems fit. The document (p. 26) also pays attention to earlier publications and doctrine back to 1952, stating that orders are supposed to be handled after the chief's intent, showing that MC goes far back in Norwegian military doctrine.

Today the Norwegian military states the use of *oppdragsbasert ledelse* [mission command] as their official leadership Philosophy.

> The purpose of mission command is to decentralize decision making authority. Mission command is used effectively to manage quick changes in the environment, maintain speed, and take advantage of opportune moments by promoting initiative and decisive decision making at multiple levels of the organization.. Leadership at different levels is done by designating the appointed goal, and why this is the goal (Chiefs intent - goal - purpose) The intent is given in direct conjunction with the assignment. The leadership process is not fully effective before the intention is discussed, understood and the individual feels personal ownership to it. (Forsvarssjefen, 2020, p. 13)

Although mission command in Forsvaret emphasizes autonomy within the chief's intent, the same document states that this does not mean that the individual soldier can carry through with full autonomy and creative freedom to do whatever he/she feels like. There might be reasons for closer detail oriented control of the soldier in some situations, and the document states that acting under chiefs intent, does not mean the withdrawal of obedience towards leadership.

The Norwegian document on leadership in the armed forces (Forsvarssjefen, 2020) States mission command as its official leadership philosophy. Hereunder they explain six vital conditions for the employment of good military leadership (p. 14):

- **Situational awareness**
  Decisive for the collective adherence to goals, and to ensure accommodation for decentralized decision making.

- **Adaptability**
  A military leader has to be adaptable enough to be able to make difficult decisions in the face of powerlessness, emotional turmoil and adversity. The leader's behavior when dealing with difficult matters, and subsequent robustness inspires soldiers, troops, and whole brigades to stay robust, and adaptive, ensuring morale in the face of uncertainty.

- **Credibility**
  Is about creating a system of mutual trust founded on the basis of personal skills, and attributes, as well as being considerate towards others, mistakes or shortcomings.

- **Robustness**
  Military leadership is dependent on robustness both on the individual as well as on the group level. A military leader often has to make difficult decisions, with a high degree of emotional stress.

- **Unity**
  Mutual trust and unity within the organization is necessary if Forsvaret is going to function as an effective and robust coherent unit.

- **A trustful leadership culture**
  Leadership in the armed forces demands officers, and NCOs capable of creating teams, and units who effectively work together and communicate. The unit's organizational culture and work environment is the most important factor binding the whole organization together, creating favorable conditions for good leadership. Open

honest communication and discussion should be encouraged to create situational awareness, ownership, and co-responsibility for the mission at hand.

3.2.2 U.S. Army Doctrine

The United States Army has been one of the most powerful institutions in the world during the last century. Starting in the Second World War, where huge amounts of civilians had to dress up in uniforms, and act like soldiers overnight. They were obviously not career soldiers but rather civilians with a short amount of training. The U.S. officers thus had to find a way to effectivize an exceedingly large amount of unskilled labor to fight a war (Vandergriff, 2017, pp. 104-105) The ways of using unskilled labor effectively got institutionalized in the U.S. military, even when the organization later got filled with better trained individuals. The military successes the U.S. has had since ensures that there has not been any drastic changes in organizational culture, even if the official doctrines have tried to achieve this.

Army regulation 600-100, the Army Profession and Leadership Policy, gives clear guidelines for the use of mission command as the official leadership doctrine of the U.S. Army.

> The Army seeks to execute mission command, both as a philosophy of command and as a warfighting function. As defined by Army Doctrinal Publication, mission command is the exercise of authority and direction by the commander using mission orders to enable disciplined initiative within the commander's intent to empower agile and adaptive leaders in the conduct of unified land operations. (Department of the Army, 2017, p.3)

The document emphasize the necessity of a high degree of trust between members of the service, and its officers are the keys to enabling decentralized decision making ADP 6 - 0 (Department of the Army, 2019, pp. 6-7, section 1) sets 7 principles of mission command. These principles are quite similar to the earlier german principles and are as follows:

- **Competence.**
  Technical and tactically competent soldiers and officers are the backbones of MC. This competency is achieved through realistic training in units, which also bolsters unity within teams. Leaders are expected to supplement learning through theoretical studies. Subordinates are always assessed on their level of competence, thereby commanders

can analyze which level of decentralized command is acceptable, and what level creates too large a risk. (p. 7)

- **Mutual trust**

"Mutual trust is shared confidence between commanders, subordinates, and partners that they can be relied on and are competent in performing their assigned tasks" (p. 7) Trust is gained through shared experiences and is a two way street where subordinates need to trust superiors and vice versa. To enable successful mission command, in addition, all parties need to trust their peers, that being other allies, commanders, or the like. Trust is further gained through the respect of one's soldiers, assuring proper welfare, and mutual respect. (pp. 7-8)

- **Shared understanding.**

Common knowledge of situations is all-encompassing in an organization. It starts by receiving the same education in plans, and doctrines, and is reinforced by collaborating with peers, and superiors as well as keeping the information flowing on all levels of command. A commander should seek to listen to even novel ideas from all parties in one's unit, and thereby create an environment that opens up for discussion about intent, and goals, in a group. (pp. 8-9)

- **Commander's intent.**

"The commander's intent is a clear and concise expression of the purpose of the operation and the desired military end state that supports mission command" (p. 10) The intent should not be focused on the the reason for the mission, but rather describe the detail around one units plans in relation to the others on the battlefield. " During execution, the commander's intent establishes the limits within which a subordinate may exercise initiative." (p. 10)

- **Mission orders.**

Order giving should be concise, simple and understandable, and contain no more information than the recipient needs to know, but it should contain all the information necessary to carry out a mission. The order should be given out in a standard five point structure (who, what, when, where and why) with a special emphasis on *why* as it conveys the chief's intent. Further on, the order should "state the mission, task

organization, commander's intent and concept of operations, tasks to subordinate units, and minimum essential coordinating instructions" (p. 11). The order should never repeat parts of a standard operating procedure, nor should it ever tell the recipient how to do something.

- **Disciplined initiative.**
  All levels of command are obligated in duty to take initiative within the given restraints to achieve the chief's intent. When a plan is no longer valid, an opportunity arises, or a challenge appears every member of the operation is counted upon to seize the opportunity to take initiative. The main question a subordinate is to consider regarding initiative is the aspect of time. If there is any time to spare at all one should always confer with one's commander, informing them of the change in the situation, and recommending a course of action. (p. 12)

- **Risk acceptance**
  Risk in a military operation can never be avoided, the loss of life, and resources are always a threat. Therefore some risk is always accepted, the point of interest is how much risk one should accept. Commanders should avoid caution and risk aversion in difficult situations. Accepting risk is not considered a gamble as long as the commander has a reasonable level of information, so that they can analyze the potential risk and decide if the reward is worth the risk. Gambling on the other hand is not acceptable. (pp. 13-14)

3.2.3 Doctrinal Dissonance

The U.S. naturally like all other militaries, and organizations have always been seeking the most effective way of organizing its military. The U.S. sent military advisors to Germany in the late 1800s to learn from the Germans and their successes in recent wars, against enemies regarded as peers as well as superiors in resources and military power. Vandergriff (2017, pp. 52-53) claims that there developed schisms in military organization around the start of the century with Germany focusing on MC, and the U.S. putting their weight behind the classical organizational theorist, i.e. Max Weber's bureaucracy to achieve maximum efficiency.

This has led to problems changing the organizational culture, as the organization is large, sudden change is often deemed impossible, and change needs to be implemented slowly (Mahoney & Tellen, 2009, pp. 1-4). When U.S. advisors stayed in Prussia during the Franco-Prussian war they saw the effectiveness of the Prussian military, both in battle but also in logistics with fantastic train lines, communications between units, medical help for wounded etc. the American advisor saw this effectiveness as a well oiled machine stemming from good implementation of scientific management. Where the top commander is the "great man" leader, while the rest of the military are present to support him and do his bidding. (Sibul, 2018, p. 110). This seemed to have been a misinterpretation to support more traditional U.S. management theories, in line with classical management theory. The truth is this is far from correct. The Prussian general staff had evolved during the later part of the 1800s to take more of a supporting role. The general staff were not elevated or put on a pedestal, but were rather seen as equals there to support the individual commanders and soldiers (Sibul, 2018, p. 108 - 109), The Prussian style of MC was quite relations oriented.

Much time has been spent since the 1980s on refocusing the U.S. military organizations into maneuver warfare based armies. The doctrines have been changed multiple times throughout history to accommodate for this (Anker, 2013). But still there seems to be a dissonance between the doctrines written down and how the army functions in practice. Mission command, and the commander's intent became all the rage in the U.S. military academics during the 80s. This makes direct contrast to traditional American ways of war (Johnston, 2000, p. 33). The traditional American way of war is based upon overwhelming material superiority, and superior firepower, leading to systematic defenses, taking up defensive positions, focusing on attrition of the enemy (Doughty, 1979, pp. 42-43,49). The doctrine has guided the U.S.' Military members towards MC for quite many years now. Still there seems to be difficulty to actually achieve what the doctrine says. Johnston (2000)

> It is not enough to write new doctrine, if the purpose is to change the way an army will fight. Ultimately, an army's behavior in battle will almost certainly be more a reflection of its character or culture than of the contents of its doctrine manuals. (Johnston, 2000, p. 35)

Institutional change is quite difficult to achieve. Where the changing of a whole institution's organizational structure is embedded closely in the organization itself, and demands an abrupt disruption like a major defeat, or other crisis to be able to change (Johnston, 2000, p. 34).

The U.S. system is especially hierarchical (Talbot, 2003, p. 333.). With clear Napoleonic inspirations, this means that few units in the United States military are considered peers, where most are staged in clear hierarchical positions to each other. This together with the rampant careerism in the U.S. Army (Labarbera, 2017, p. 4) results in a general dissatisfaction with lower level leaders taking autonomous action. As autonomous action, and interpreting the chief's intent is an elementary part of MC, one would therefore risk subordination if one effectively employs the system at lower levels of management. Labarbera (2017, pp. 3-5) points out how the U.S. Army institutionally limits itself away from mission command, where MC is based upon trust, the very foundation of the U.S. Army officer corps is centered around insecurity, careerism, and a mythological sense of "leadership" causing leaders to abstain from trust in their colleagues and subordinates, in fear of not reaping all the benefits that a successful mission might entail. This is equally important at the other end of the spectrum where "leader accountability" means one gains credit from positive actions done by your men. At the same time one has to face the consequences if your men fail, or make mistakes. While failure should be an accepted component of MC (Nelsen, 1987, p. 24), Brender, (2018, pp. 24-25) implies that the American officer might risk their entire career as well as their retirement if as much as one evaluation of them ends up not reaching top grade. In effect this means that officers in the U.S. Army are unable to trust their subordinates out of fear of reprimand.

General McChrystal (King, 2017, pp. 12-13) tells about the development of a new style of mission command during the invasion of Iraq, where the most important factor is, shared consciousness between upper management, he further dismisses the role the lower level soldiers, and management play in decision making. Although this "new" style of decision making does not fit in with traditional MC paradigms, the focus on situational awareness is an important factor in all decision making. Simon (1997, pp. 80-81) confers with the importance of understanding what the original plan is before a decision is made as well as which choice the other players around the table are going to choose. The importance of situational awareness in this respect is to combat the fog of war.

Desert storm was for many the "proving ground" of the U.S. doctrinal change towards maneuver warfare and mission command. Where some saw the action in Desert Storm, as well as the decisive victory gained by the coalition parties, as a sign of success for the

doctrinal change (Hughes, 1995). Most argue that the U.S. continued its traditional form of attrition warfare, that the success would mostly be explained by the massive technological, resource and moral superiority of the coalition forces (Johnston, 2000, p. 34) and that MC was simply not present in ground fighting infantry, nor armor. Hooker (1993) explains how the U.S. Army simply did not comprehend the concepts of mission command, dismissing the doctrinal change, and reverting back to cultural values embedded in the army.

> At the tactical level Americans seem to have performed in the traditional manner. [...] prov[ing] themselves as masters of the art of coordinating fire support, movement, and logistics. [...] they have not absorbed maneuver warfare at division level and below. Command and control remain rigidly centralized. (Hooker, 1993, p. 36)

The consensus is that the United States Army did not actually achieve a significant level of Mission command during Desert Storm. Even if this is the consensus, there are some in the U.S. Army who believe otherwise. Hughes (1995, p. 27, 29) claimed that the new U.S. doctrine was a near ideal interpretation and integration of German auftragstaktik. I believe that the confusion might arrive from lack of understanding for what MC entails. Hughes (1995, p.31) is a good example of what is meant by this lack of understanding. He exclaims that MC was undeniably the leadership philosophy used during the ground operations in Desert storm. Later stating that MC was used because there was quick movement of troops on the ground, as well as causing mayhem and confusion for the enemy through decisive strikes towards effective points. The problem then arises in that Mission command is so much more than moving quickly. In addition to this the quick tempo upheld during the battles where in large part explained by the attrition of forces and moral resulting from the bombing raids made earlier in the campaign (p. 32). Hughes himself admits multiple trends in theater that are the complete antithesis of MC. The detailed control and synchronization of troops (p. 33) leaves little room for disciplined initiative and is in that sense more akin to the traditional American way of detailed command. "Independence of action took a back seat to centralized control but was not absent completely" (Hughes, 1995, p. 37). Independence of action and personal autonomy to relay the commander's intent is the very backbone of MC although there are situations where one would use detailed orders. The rule of thumb should be to uphold a large state of individual autonomy. The Norwegian Chief of Command (Forsvarssjefen, 2020) explains the balance between detailed command and mission command.

> Mission command can also encompass the use of detailed orders, and control measures. There will be situations where the superior instance needs an increased level of control. The fluctuation between detail-oriented orders and decentralized freedom of action has to be flexible and needs to be refined through extensive practice. (Forsvarssjefen, 2020, p. 13)

The determining factor on when to use, MC, Detailed command, or when to use control measures are given in a simple directive (Forsvarssjefen, 2020, p. 8), Command should be used in situations pertaining to relational issues, while control measures should be employed in structural, and formal questions. Command is thereafter divided into detailed, vs. MC (p. 9) where Detailed command should be used in known routine tasks, MC should be of focus when there are new or unknown challenges presented. Whilst the U.S. Army was a formidable force during Operation Desert Storm, one would have a hard time convincing anyone on how the operation was a routine task for individuals in the Army. If the force really had a cultural change stemming from the doctrinal changes, one would see the use of autonomous action as the norm during the operation, and not as an exemption (Hughes, 1995, p. 37)

Friction

> Mission command is a complex, elusive and multifactorial phenomenon not easily quantified or measured. Therefore, any conclusions regarding its implementation must be taken with a grain of salt. (Shamir, 2010, p.668)

The three theoretical concepts of mission command here presented are defined quite similarly in theory, although not all of the terms are exact matches. The conceptual framework for mission command seems to be similar in all of the traditions. Through table 3.1 I compare these terms.

Historically	Norway	U.S. Army	Combined terms
Mutual knowledge	Credibility / Situational awareness	Competence / Shared understanding	Mutual knowledge
Speed	*Discussed but not part of summarized points*	*Discussed but not part of summarized points*	Autonomy of action
Mentorship	A trustful leadership culture / Unity	Mutual trust	Cohesion
Clear order giving	*Discussed but not part of summarized points*	Mission orders / Commander's intent	Commander's intent
	Adaptability	Disciplined initiative	Autonomy of action
Risk taking	Robustness	Risk acceptance	Risk acceptance

Table 3.1, Comparison of mission command terms.

As seen in table 3.1 the terms used in the three different definitions, are quite similar in their core appeal. There does seem to be some clear differences here discussed in the different ones. It's natural to use the auftragstaktik model as base work for comparing the other two as they are both derived from this model.

Speed and decisive action seems to be the primary element of the Wehrmacht's form of auftragstaktik following from the increased scattering of troops with increased individual lethal power because of new technology. The concept of speed was therefore the most

important part of the model (Nelsen, 1987, p. 22). Further on, the concept of speed and decisive action is a response used to combat the uncertainty of war shown in Clauzewitsian thinking. Where friction is what separates war on paper from real war (Clausewitz, 2008, pp. 66-67) describes friction as challenges that may arise and cannot be synthesized into manageable data points, one therefore has a short window to take decisive action. The focus on speed as the primary goal of mission command has in some ways changed in the two modern forms we are now exploring. With the American document mentioning speed as a positive addition to mission command (Department of the Army, 2019, p. 5, section 1,) in multiple parts of the document. The Norwegian document on the other hand (Forsvaret, 2020) does not mention speed at all, but rather focuses on friction in and of itself (p. 6).

The Wehrmacht idea of mission command was to be developed and integrated into the organizational culture of the military. Embedding this cultural identity into each and every member. The culture had a high focus on interpersonal trust and relationships, both between peers, but also crossing the hierarchical lines (Nelsen, 1987, p. 26). Forsvaret seems to be a keen follower of the Human relations type of organization pioneered by the Wehrmacht. Putting Relationships and personal considerations as the Norwegian primary element of how to achieve mission command, stating that all humans have an inherent value in and of themselves, regardless of background, skills, or achievements (Forsvarssjefen, 2015, p. 7). Putting emphasis, on diversity (Forsvaret, 2020, p. 6), being a role model (p. 10), and good trusting and considerate relationships, between leaders, commanders, soldiers and the organization itself (p. 11) This is also shown in their, terms of mission command, emphasizing personal, and holistic skills and traits, instead of instrumental, analytical approaches.

The U.S. in their guidebook on mission command, the ADP 6-0 (Department of the Army, 2019) of course puts careful consideration into all factors we have previously discussed, including the relationships between different levels. At the same time, there seem to be issues in the way different concepts are worded in the ADP 6-0, hinting towards a stricter hierarchical structure, as well as analytical factors being valued. There are some examples; Commanders should emphasis mission orders when risk is low, to learn what subordinates are capable of, but provide guidance, and supervision, when needed (p. 11) also putting stricter restrictions on when subordinates should employ autonomous leadership and make decisions on their own, providing a guide to when they *can* implement their own actions instead of showing when they can not (p. 12). This can be seen in stark contrast to the Wehrmachts form

where one was expected to as good as always work in under the commander's intent not expecting any order to survive contact with the enemy, going as far as disobeying a superiors direct intent, to achieve successes based on intents of a higher level (Simpkin, 1985, p. 35). The differences are minor, and there are contradictions within the document, but the theme of commanders struggling to transfer command to subordinates is a recurring concept in the ADP 6-0.

The three frameworks for mission command I have detailed here differ some in their wording but the main concept of mission command is similar: create an intent for the mission, trust your subordinates to make decisive choices leading to achieving the commander's intent in an effective fashion. The Original form of mission command in the Wehrmacht had its primary objective being Speed. Thereafter the Norwegian model builds upon some parts of the Wehrmachts definition, leading to its primary focus being Human relations. The United states Army on the other hand, seem to have used their previous leadership philosophy of detailed command, keeping the traditional american way tradition of warfare (Johnston, 2000, p. 33) and thereafter pivoting the model and culture towards increased use of mission command, not really relying on the direct continuation of auftragstaktik, but rather integrating concepts into previously learned culture, keeping some of the mainstay thoughts and ideas they traditionally used such as a greater reliance of analytical thinking, as well as strict hierarchical models. The Norwegian and Wehrmacht style of MC are clearly closely related, and can be described as such, they also seem to be more closely related to the human relations schism in organizational theory. The doctrine of the U.S. Army on the other hand seems to hold on to some of their previous traditions, and even though the official doctrines have changed the same can not necessarily be said about the organizational culture.

3.3 Terms of Mission Command

I have synthesized the terms that are required to be implemented for effective mission command to take place. These five interconnected terms are similar to the three previously discussed frameworks of MC, but differ some in their descriptions. These five terms are:

Cohesion

Vandergriff (2017, pp. 3-7) implies cohesion both in units and between them as one of the requirements for mission command going as far as saying: "[t]o execute *Mission command* without a culture of cohesion at the unit and institutional levels is like trying to build a house without a foundation". Cohesion makes its appearance through mutual trust between all members of the organization. Personal connections between leader and subordinate are of utmost importance to achieve MC.

Autonomy of action

The defining factor of MC is the ability and obligation for all or most levels of management and leadership to take action as they see fit in uncertain situations. This means that the commander and other upper management, must be able to completely concede their decision making ability, transferring it in full to their subordinates.

Risk acceptance

All military actions and operations carry with them a degree of risk. "A military leader must be prepared to put his own life on the line on behalf of King and Country, as well as deciding to end others' lives, and putting subordinates' lives in danger" (Forsvarssjefen, 2020, p. 6). As a term of mission command, one should be absolved of sanctions and heavy scrutiny for making the wrong decision, if the decision was within the commander's intent, and seemed to be the best option under given conditions. Without this exemption from sanctions one would encourage a culture, where justification for all actions are needed. Leading to slowing down

one's decision making process, in favor of making analytically sound choices that can stand up to later scrutiny. Taking action should in most cases be preferred over complacency.

Mutual Knowledge

An important part of trusting your fellow allies and combatants, lies in that you trust that they will perform in the correct way in a pressing situation. The trust here is developed by having similar knowledge of the same things, such as maneuvers, enemy vehicles and weapons, or plans in a mission. This knowledge is obtained by having systems for educating new members of the organization, as well as the sharing of knowledge between members in a war zone. In an active operation one has to count on the fact that others have the same knowledge of the situation as you, so that one can cooperate effectively to achieve the commander's intent.

Commander's Intent

The commander's intent for both the mission as well as the larger objectives of the whole campaign, should always be clear for each member of the military organization. Autonomy of action is inherently dependent on that the subordinates have internalized the commander's intent and the objective of the campaign. It is therefore of utmost importance that the subordinates show how they understand the intent, this can amongst other ways be proved by encouraging open discussion between peers and commanders - soldiers.

Part II: Qualitative Systematic Literature Review

In part II I first present my hypothesis, research question and subquestions. Later in chapter 5, I explain the methodological choices used in search of data. In chapter 6 I present the results collected through the systematic literature search. Chapter 6 is a test of the hypothesis, research question and subquestions. Finally, this part ends in the discussion of findings against the theoretical framework presented in part 1.

4. Hypothesis and Research question

During this first part of the thesis, I have arranged the factors of mission command as well as the terms of naturalistic decision making. This has shown me amongst other things that both of the military organizations explored have a clear intent of using mission command as their command philosophy, they also have some of the same thoughts and ideas on doctrinal implementation of mission command. Still, as we have seen there exists a large difference in how these two organizations perform mission command. While the traditional mission command in the Wehrmacht valued speed over all other things (Nelsen, 1987, p. 22) they also put an emphasis on the implementation of mission command in the whole of the armed forces. This was to be done by (p.26) making the organizational culture compliant with the terms of mission command. This meant that trust is one of the most important parts of the original form of MC. This has been continued by Forsvaret who value trust, role models, and diversity in their ranks (Forsvarssjefen, 2015, p. 7,10, 11) The U.S. Army on the other hand seems to have trouble delegating work and responsibility to others (Department of the Army, 2019, pp. 10-13) This is further emphasized in Labarbera (2017, p. 4) that cites careerism as one of the biggest problems with the implementation of MC in the U.S. Army.

As the tenets of naturalistic decision making are quite similar to those of mission command, there seems to be a natural relationship between these two theoretical frameworks. I therefore expect that there has to exist NDM for MC to be implemented.

Hypothesis:

Mission command as a leadership philosophy is closely related to intuitive decision making. With naturalistic decision making being in large part a descriptive version of the prescriptive mission command. I believe that there is a correlation between mission command and naturalistic decision making, and that the presumably higher degree of attaining missing command in Forsvaret results from its closer association with Naturalistic Decision Making than in the US army.

To test this hypothesis I have to find out if there exists a correlation between the two terms.

Research question:

Does there exist a correlation between the decision making model, naturalistic decision making and the leadership philosophy of mission command?

Sub questions:

If there exists a correlation is this correlation stronger in the Norwegian Forsvaret, than in the U.S. Army?

Is there a difference in correlations on the micro level, vs. the macro level?

5. Methods

The main objective of this second part of the thesis, is to test whether situations where mission command is utilized, also contain parts of naturalistic decision making. Both MC and NDM consist of multiple key elements as explained in part one. I therefore seek to explore the correlation between the two, by measuring the correlation coefficient, graded on percentage of coding inside of each file.

To keep the data gathered relevant I have seen it necessary to limit the date of the contributions, to modern times that would be from 1975 - Today.

I expected to find reports of mission command being used, or analysis of mission command in the two different militaries. These cases would make it possible for me to analyze the material in two rounds. First in what kind of degree the alleged mission command would actually be "mission command" in accordance with the terms given in the first part of the thesis. The second round of analysis would seek to analyze the same documents for signs of naturalistic decision making, and after this find out if there is a correlation between the two concepts.

5.1 Search Strategy

The process is as follows:

1. Searching for keywords, in abstract and title, on databases: Web of Science, United States Army War College University Press [USAW, and Forsvarets Høgskole Brage [FHS Brage] excluding certain categories, and focusing on the period of time from 1975 and upwards.
2. Reading through titles to refine and cut articles that are not relevant. I.e. Historical pieces, or international ones, not about the two selected militaries[3].
3. Take note of duplicates, and delete them from the list.
4. Reading through abstracts further revising the library and deleting further irrelevant sources.

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[3] the metadata from these are saved and transferred to a different library.

5. Downloading and organizing full-text articles.

6. Transferring these to NVIVO

7. Reading through and coding full-text articles based on Codes developed through the first part of the thesis., discarding texts that do not answer my research question.

8. Analyzing results, checking for correlation between Codes for NDM and codes for MC This is done by exporting the raw data from NVIVO, into R-studio where I clean up the data for analysis, before running a correlation script on the dataframe, and various visualizations.

Simplified:

Search (with exclusions) → Refine: title→ Refine: Duplicates → Refine Abstract → Downloading full text and organizing → Import to NVIVO → Coding → analysis

The preliminary search in Web of Knowledge yielded a total of 363 hits containing 195 duplicate articles resulting in 168 individual articles searching in the database of Web of Science core collection. The search thereafter went through the first round of qualitative filtration based on title, where I filtered out a total of 101 hits surrounding themes not deemed relevant, such as engineering and computer science. I ended up with 67 individual articles for the next filtration process. After the second distillation process, reading through the abstracts I ended up discarding 23 of the articles, I am therefore left with 33 expected relevant results after the two filtration processes, in cases where I was unsure of if the article was relevant for the thesis after reading the abstract, I kept the article, so that it could potentially be sorted out during the coding process. The articles were excluded based on three categories, research area (108), country (44), and timeline (7). In addition to these there were eleven contributions (mainly conference speeches) that I did not manage to find neither online nor in the University library; it was therefore excluded.[4]

The search netted me quite a few articles which were semi-relevant but few which could fully answer my research questions. I hoped for reports and analysis of combat situations either on a case by case basis, or in a larger set. A few of the articles found were very relevant in that

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[4] The different exclusion criterias add up to 160 excluded hits which exceeds the number of articles that were discarded after removing duplicate articles in the first search. This is because some of the articles are rejected on behalf of multiple exclusion criterias, i.e. one article pertained, the research of sports, in the historical period of pre 1975, in Spain.

sense, and contained aspects of what I was looking for, such as; *Dangerous feelings: Checkpoints and the perception of hostile intent* (Gregory, T. 2019) or *British and American military operations in the Battle of Helmand, 2006-2011* (Griffin, C. 2013). Most of the articles, problematized aspects of MC, such as time, risk, adaptation, communication or situational awareness. Even though the articles are interesting (and some of them are cited in part one of this thesis) the corpus as a whole struggles to capture all the information, key to answering the research question. Consequently, there was a need to expand the search.

It was a clear need to alter the search to include more relevant results. While searching for the original 33 articles, I often found other works in the "related" column on sites that seemed much more relevant for my thesis. The data I sought clearly existed, but I needed a better way to access it. I discovered that other search engines besides Web of Science were more reliable sources of documents related to the subject of the thesis.

In the end I found several search engines with register data from multiple data sets that guided me in the right direction. These were found by reverse searching relevant articles found through the Web of Science, Google Scholar, and ORIA. Through the reverse searches I found indexing of the articles on relevant sites. This netted me 4 search engines that repeatedly gave me relevant results through preliminary searches, these were: United States Army War College University press [USAW], The Defense Technical Information Center [PubDefense] (later exchanged for Science.gov), Forsvarets Høgskole [Brage] and Publications Forsvarets Forskningsinstitutt [FFI]. I ran preliminary searches through all of these websites, and ended up discarding 2 of the 4 sites, while keeping the data collected from Web of Science. The reason for rejecting two of the search engines is twofold. Firstly, the scope of the thesis in time and resources, searching and categorizing large sets of literature is an extremely time consuming activity, which i am constricted on during this project. Secondly, I found that they were not elemental to answering my research questions. The FFI archive mostly seems to focus on hard sciences, with Brage taking up much of the responsibility of publicizing the Norwegian Army's Research on Soft Sciences. The final data set included 116 documents from across the first three databases. This seemed a reasonable number of documents based in terms of being large enough to enable analyses of general patterns while being small enough to be doable within the course of a master's thesis. And more importantly, each document was directly related to the main research question driving this thesis.

I found the search function in the U.S. Army War College Press to be quite substantial. The searches netted a multitude of results, both official from the U.S. Government, but also large amounts of grad student papers and similar works from universities across the U.S. In addition to giving the corpus a wider grounding, the sources gathered through these databases are open source, which gives the thesis an increased opportunity to be recreated or scrutinized, as much of the data is publicly available. A problem which arose here in contrast to the searches made in Web of Science, is that the user interface and usability of the database is better through Web of Science. The search function has less options, specifically I missed the option of simple exclusion of terms and categories. This made the gathering of data through these sources much more troublesome. To make the manual filtration of documents systematic enough I kept a simple document in parallel to keep track of what criteria forced exclusions in the searches.[5]

5.2 Coding

The extensive searches ended up giving me 116 different hits of literature to analyze. This is a huge number for the scope of the thesis. I expected it to go down slightly when reading through the full articles as I had kept all documents where I was unsure of relevance for full text reading and judgment at a later point. I ended up discarding 79 articles for lack of relevance in answering the research question, for reasons such as, wrong theme (engineering or similar), wrong country (Australia, Sweden) or wrong military branch (U.S. Navy, Air Force, cyber defense), as well as 3 duplicates and normative documents outlining how the forces should adapt to mission command in the future. Thus, giving me a final tally of 34 documents to analyze.

All of the literature gathered contains not only relevant data, but also text regarding irrelevant information, such as; forewords, other themes, literature etc. Many of the documents refer to the same background and theory material, sourcing from authors such as Weber, Creveld, Boyd, Von Moltke, etc. I have noticed that the use of references such as these skew my results heavily in favor of longer documents, and documents directly pertaining to mission command. Therefore I decided to focus on sections of the documents pertaining qualitatively relevant information. In other words I glanced over, but in most situations did not code methods sections, forewords, background etc. I concentrated on parts such as; discussion, analysis,

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[5] See Appendix A for a detailed list of search criteria and exclusion criteria..

findings, data etc. The exclusion of parts within documents were not meticulously documented as they were quite diverse, and I do not see the work needed to do this as an effective use of time as it would not be relevant for the thesis, nor for further research on this topic. To ensure that I did not fall into a repeated pattern of using the same codes over and over, I took care of moving the position, and colors of the different nodes in NVIVO.

After assembling the data for analysis and importing it into NVIVO, I started coding the material, as I have made a framework for coding through theory in the first part of this thesis. I started the coding process with a set coding frame, this deductive approach ensures closeness to the theory the thesis aims for (Linneberg & Korsgaard, 2019, p. 13). At the same time I have coded emergent themes when they have arrived, this mix of inductive and deductive coding, called blended coding gives me a chance to be true to the source documents as well as giving a connection towards the structural and theoretical framework (p. 14) the thesis aims to research. I started out the coding process focusing on deductive coding. The five components of mission command, given earlier, (cohesion, "autonomy of action", "risk acceptance", "mutual knowledge" and "commanders' intent") as well as four overarching themes from the theory about naturalistic decision making ("big picture", "intuition", "mental simulation" and "situational awareness"). Beneath these codes I have additional sub-codes, to help myself classify the different subjects, these are e.g. "simulating past" under the mother node of "mental simulation"[6]

It is often thought to be beneficial to maintain a cyclic coding process (pp. 15-17), where Linneberg & Korsgaard (2019, p. 16) advices for the use of at least two cycles of coding. The first cycle has a high level of abstraction showcasing general themes in the source material during inductive coding, and the second explores the "child nodes" by coding finer details of data. The process done here took shape through three cycles to ensure relevancy towards the research question. I first skimmed through all the documents, coding the documents under five different themes. Originally "mission command", and "naturalistic decision making", but I found during the process that I had to add three more nodes to ensure capturing relevant themes. These were "opposite of mission command", "negative towards MC" and "positive towards MC". During the first cycle I discarded all documents which were not possible to code using this framework, and which did not appear often enough to commend their own set

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[6] Full list of nodes and child nodes can be found in appendix B

of themed nodes. There was also a categorization of the material based upon two different types of classification during the first cycle. These were based on nationality i.e. U.S. Army, or Forsvaret. The second class of categorization pertains to the level of decision making, and the discussions made about MC on micro (analysis of individual decisions), and macro (discussion of MC as a whole). The literature ended up being divided into 9 documents containing data from Forsvaret, and 25 documents about the U.S. Army. Further, most of the articles were on a macro level of analysis, with 24 documents being macro and 10 being micro. A problem that arises with this is that macro level discussions seldom discuss the parameters of actual decision making in a MC context, and therefore it shows less parameters of NDM than one would expect actually goes on in a decision making process. The micro level discussions involve decision making on individual level, and therefore often contain parts of MC as well as parts of NDM. A problem that has come up with the data on micro level is that most of the articles are experiments aiming to explore one small facet of decision making. This makes it difficult to discover other parts of decision making that would be beneficial and might have been easier to spot in naturalistic observational studies.

The second cycle of coding was structured and aimed to find the child nodes of the two main themes of the thesis. During this cycle of the coding process I realized there was a need for additional codes to expand upon the themes I had written up in the code-frame. This was done in vivo where I deemed there to be a trend going across different articles. The emergent themes that came up during the process are:

- "*Mission command*"
  - Speed,
  - "Creating friction"
- "Opposite of "mission command"
  - "Lack of trust",
  - "Lack of shared intent",
  - "Laissez Fairez"
  - "Classical warfare"
    - "Detailed command"
    - "Detailed planning"
    - Synchronization
- Negative towards mission command

- Positive towards mission command

When noticing a new theme going across multiple documents I made a code for them, and wrote all the new codes down in addition to which documents that had received them. The third cycle of coding was therefore simply going back to all documents not receiving the inductive codes in the second cycle, and coding them accordingly.

There was one theme in particular that made itself known quite often, that did not receive its own set of code, and that would be expertise. The theme of expertise is set as a prerequisite for both NDM and MC, and is therefore not a code in the thesis. Most of the articles are also exploring situations where experienced individuals (upper level officers) are the research subject. The expertise of these people are implicit in their status, and job titles.

5.3 Analysis

The data processed in this thesis is of qualitative nature as I have coded the documents presented in accordance with themes present in the documents. Preparing the data for analysis required compiling a robust dataframe.

I first had to quantify the data. NVIVO lets users extract raw data from the program,where one can choose variables. I ended up choosing the variables of "document name", "code name", "words coded", "words in each document" and "attribute values". The extraction netted me 5358 observations spread over the five mentioned variables, making the data difficult to process, as it contained too many variables and was not properly organized. The data had to be made more manageable through multiple processes. The figure below shows the dataframe when first imported into R. On the far left column we see observation 1-5 while the full document continues this line from 1 to 5358 observations.

	Document_name	Code_name	words_doc	words_code	attribute_value
1	21st-Century Challenges of Command. A View from the Fiel...	Autonomy of action	30064	5	Macro
2	21st-Century Challenges of Command. A View from the Fiel...	Autonomy of action	30064	17	Macro
3	21st-Century Challenges of Command. A View from the Fiel...	Autonomy of action	30064	24	Macro
4	21st-Century Challenges of Command. A View from the Fiel...	Autonomy of action	30064	31	Macro
5	21st-Century Challenges of Command. A View from the Fiel...	Autonomy of action	30064	32	Macro

Figure 5.1. excerpt from first DF

To make analysis of the data possible I had to summarize the variables of "words_code" that were contained by the same node. After this I compared the "words_doc" with each of the summarized nodes (I.e. "autonomy of action", "mission command" etc.) Finding the percentage of the total document coded with each code. In addition I had to summarize the child nodes in both MC and NDM to attain a "theme" node for these two terms. This gave me the new variables of "percentage_of_doc", "mission command" and "naturalistic decision making". The "percentage_of_doc" variable granted me the opportunity to rank the different nodes, as well as giving me a new dataframe with 1090 observations.

Below, In the fourth column we can see the "Percentage_of_doc" representing the percentage of a document coded in different nodes. The mutation of the words into percentage of data and thereby categorizing the data as ratio data, made it simpler to rank the data as ordinal for a correlation test in the later analysis. At this point the data is showing 1 to 1090 observations.

	Document_name	Code_name	attribute_value	Percentage_of_doc
1	21st-Century Challenges of Command. A View from the Fiel...	Autonomy of action	Macro	0.0129723257
2	21st-Century Challenges of Command. A View from the Fiel...	Autonomy of action	USA	0.0129723257
3	21st-Century Challenges of Command. A View from the Fiel...	Big picture	Macro	0.0193587014
4	21st-Century Challenges of Command. A View from the Fiel...	Big picture	USA	0.0193587014
5	21st-Century Challenges of Command. A View from the Fiel...	Classical warfare	Macro	0.0235830229

Figure 5.2 excerpt of second df

The dataframe was still too large to efficiently analyze. At this point, each observation was counted many times, as each code name and each attribute value attained its own observation, for each document. Therefore, I assigned the values of "document name", "code_name", "attribute_value" and "percentage_of_doc " before spreading the "percentage_of_doc" variable across the nodes giving me a new dataframe once more with a total of 34 observations over 33 variables. This made my final dataframe for analysis, which also made it quite easy to perform sub-analysis on the attribute values.

The final dataframe shown below (figure 5.3) is measuring the percentage share of the total words in each document taken up by the different nodes[7]. Spread over 33 variables (columns), and 34 observations (rows).

	Document_name	attribute_value	Autonomy of action	Big picture
1	21st-Century Challenges of Command. A View from the Fiel...	Macro	0.012972326	0.0193587014
2	21st-Century Challenges of Command. A View from the Fiel...	USA	0.012972326	0.0193587014
3	Agent-Based Simulation of Time to Decide Military Comma...	Micro	0.012149764	0.0127696504
4	Agent-Based Simulation of Time to Decide Military Comma...	USA	0.012149764	0.0127696504
5	Army Doctrine and Modern War_ Notes Toward a New Editi...	Macro	0.000000000	0.0000000000

Figure 5.3 excerpt from final df

After arranging a robust dataframe for further analysis, it is recommended (Soetewey, 2020) to visualize the data to search for outliers, and to visually inspect relationships to see if there is a monotonic or linear correlation. I plot a visualization showing a scatterplot with linear regression for the values of NDM and MC.
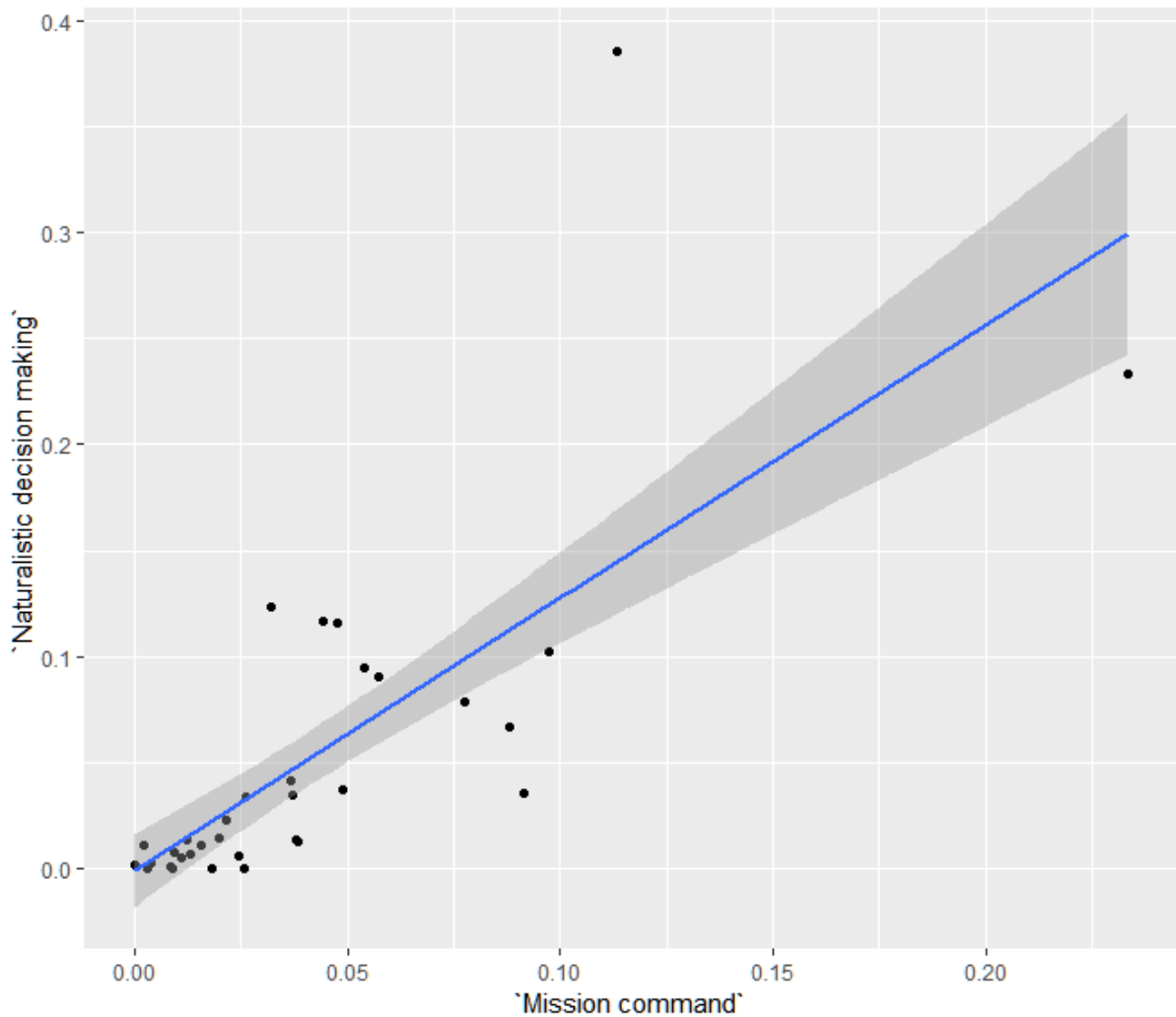
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[7] Measured here as variables

Figure 5.4 Linear regression

As we see in figure 5.4. There at least visually seems to be a linear correlation between NDM and MC. After running a correlation test, this shows to be true, with NDM and MC having a linear correlation coefficient of 0.74 on the Pearson scale. The scale is a continuous rating of linear correlation ranging from -1 to +1 with positive correlation between two variables marked with a positive number and vice versa. The closer to zero a value is, the less the two variables correlate in a linear fashion. Frost (n.d.) recommends running a linear regression first, so one can visually inspect the linearity of your correlation. If it looks like the correct model for the dataframe one should still run the data through a nonlinear regression to possibly include outliers.

Another way to measure correlation is through the Spearman Rho. Similar in use to Pearson's correlation coefficient, but different in that the Spearman Rho measures monotonic relationships between ranked variables instead of linearity. A Monotonic relationship is explained as the dependency of two values on each other that are not necessarily linear

(Ramzai, 2020). This means that one variable has a trend of increase/ decrease at the same time as the other one but they are not guaranteed to change the same amount as each other.

As there seems to be a possibility for there to be a different relationship in the data material than straight linear correlations i ran a non-parametric (loess) regression to visualize if the dataframe would benefit from using Spearman's Rho instead of Pearson correlation analysis.
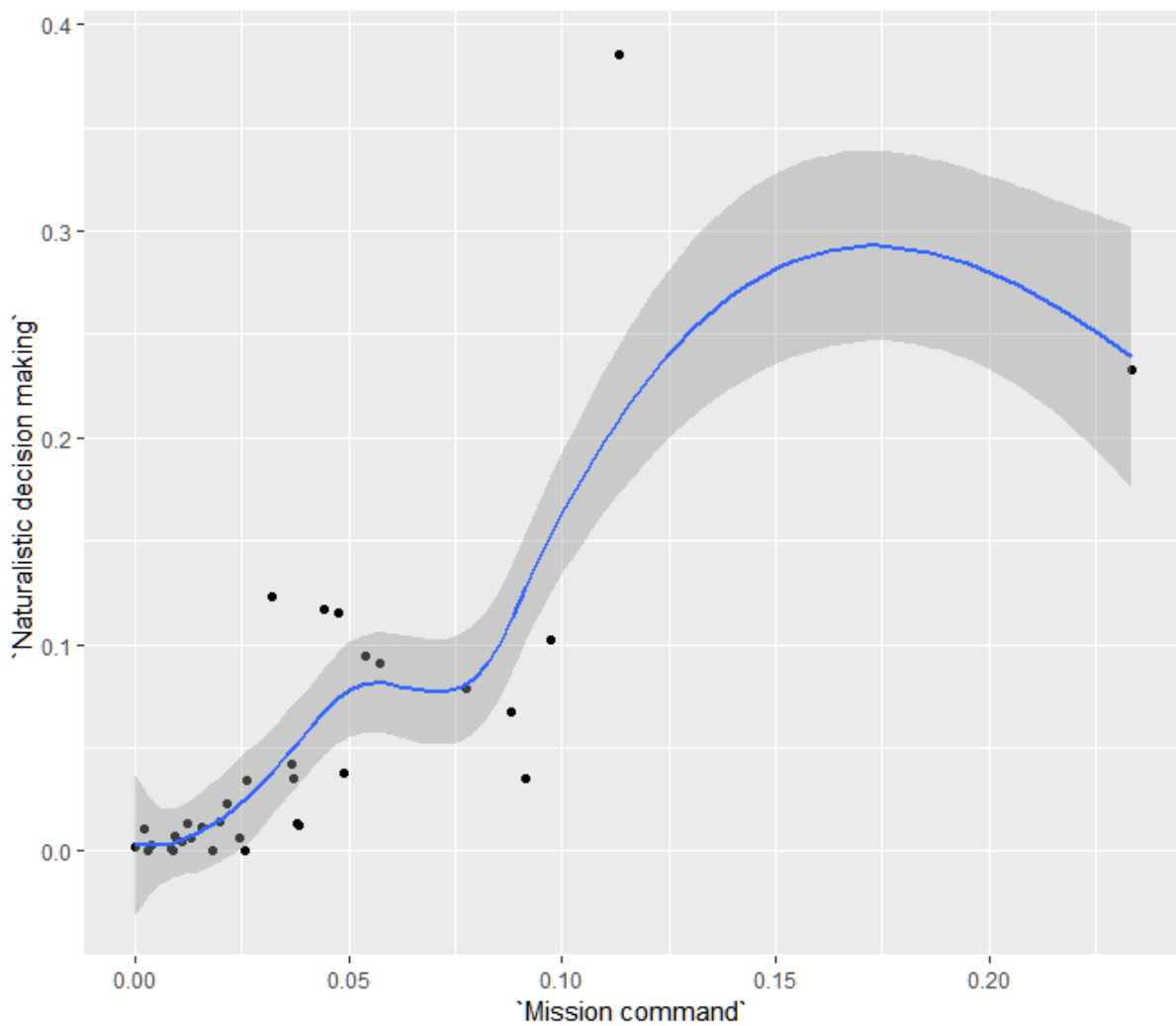

Figure 5.5 Loess regression

As we see in figure 5.5 the non linear regression overlaid over the scatterplot indicates a monotonic relationship between the two variables, that is not linear. There are two distinct curves that indicate that the use of Spearman's Rho is the correct one, as the data is monotonic and not linear. When measuring using Spearman's method to measure the correlation between

NDM and mission command we get a Spearman's Rho of 0.83, as this is higher than the Pearson coefficient this supports the choice of going with Spearman's Rho for the rest of the analysis[8].

p-value

It is normal in statistical analysis, as correlation tests to perform after a set significance value called the *p-value*. This *p-value* is important in rejecting the null hypothesis (H0). The null hypothesis states that the correlation is by chance, and that there is no significant correlation to be had between the variables. The dataframe is small with n=34, and for the sub-analysis it goes down all the way to n=8. The small dataframe means that it is not possible to achieve a statistical significance value of 0.95 as is usual in social sciences. In smaller dataframes such as the one worked on in this thesis, it is possible to achieve a high correlation coefficient while still being possible to not achieve a prominent significance value.

The dataframe stems from qualitative coding, which means we look for trends in the data material, where a single observation can be as important as statistical significance.

> Frequencies are rarely important in qualitative research, as one occurrence of the data is potentially as useful as many in understanding the process behind a topic. This is because qualitative research is concerned with meaning and not making generalised hypothesis statements (Mason, 2010, p. 1)

The revelation of trends, are what is focused upon in qualitative data. Achieving a saturated statistical significance therefore takes the backseat. I have in this thesis continued to show p=0.05, which gets fulfilled at some points. Most of the time these are visible but it is not commented upon, nor is the statistical significance questioned.

6. Presentation of Results

The final data after analysis is visualized in this chapter. Firstly, I present the themes for the whole dataset, and then delve into the child nodes. After presenting the figures containing the

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[8] The analysis using Pearson is included in appendix XX

whole dataframe, I split the data into two pairs of attributes; country and level of analysis. I discuss the findings at theme level, before moving on to the child nodes of mission command and naturalistic decision making. By child nodes I mean the sub-categories for mission command and naturalistic decision making which I have used in my research. Lastly, I discuss the variations that exist between the pairs and their significance.

6.1 Main Analysis

6.1.1 Themes

The hypothesis set out in this thesis has been if there is a correlation between NDM and MC. Through my research, there seems to be evidence suggesting this is correct. The non-parametric correlation coefficient between NDM and MC is 0.83, suggesting a strong correlation. I have illustrated my results in the following figure (6.1).
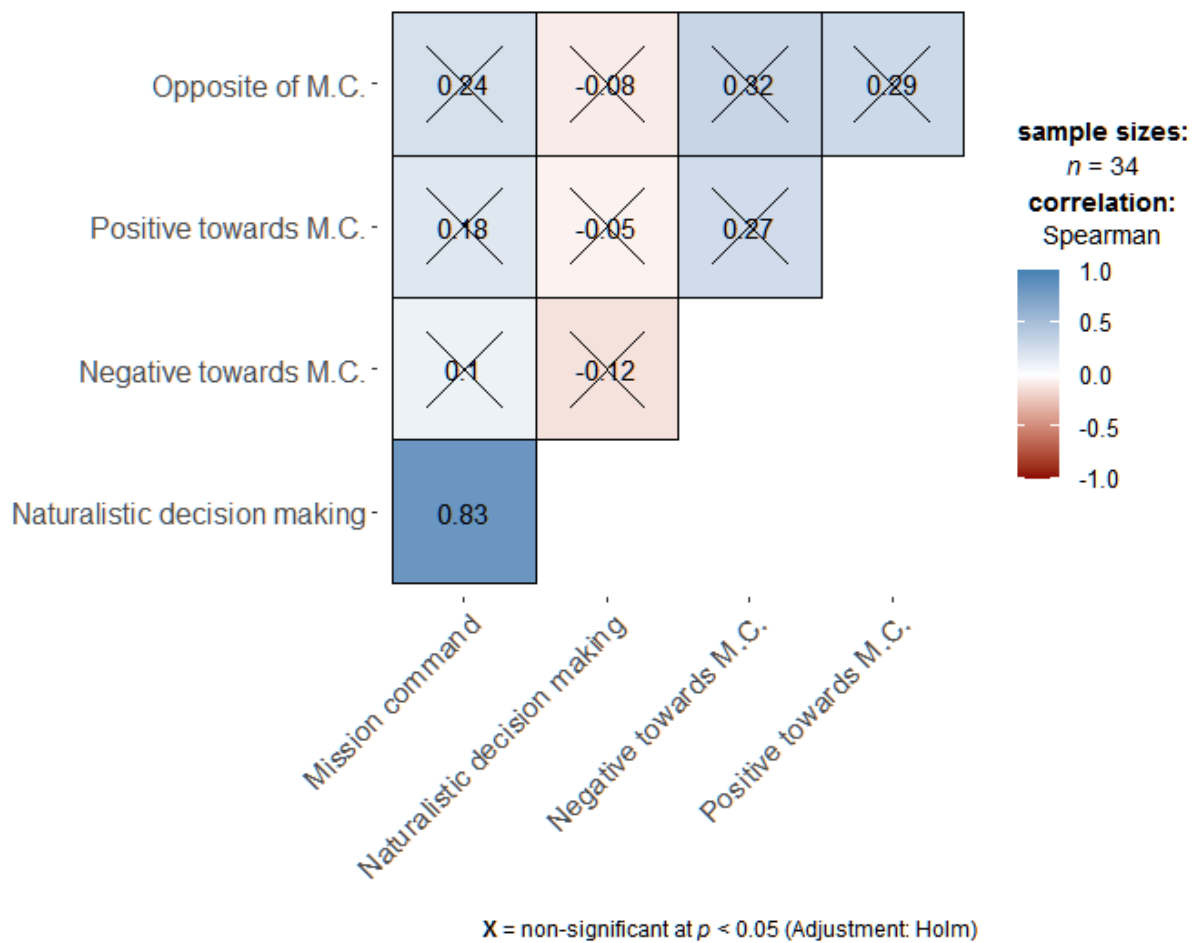
Figure 6.1 Main analysis themes [9]

We also see a low correlation between the terms of the negative or positive opinions of MC, and opposite of MC. That might seem strange at first sight. However, the correlation can be explained through the data material. The data in the thesis is compiled of documents directly discussing MC. They thereby have a tendency to go into meta discussions about all aspects of MC.

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[9] Explanation of correlogram (figure)
The correlogram shows the spearman's correlation coefficient in each square. While the color visually represents the coefficient value (from -1 to 1), with stronger colors representing a higher correlation (red for negative correlation, blue for positive correlation). The X's represent when there is a lower than 95 significance. There are quite a lot of X's, as previously stated this is because the dataframe is small, and it is therefore difficult to achieve high enough *p-value*. The x's are not commented on in the analysis.
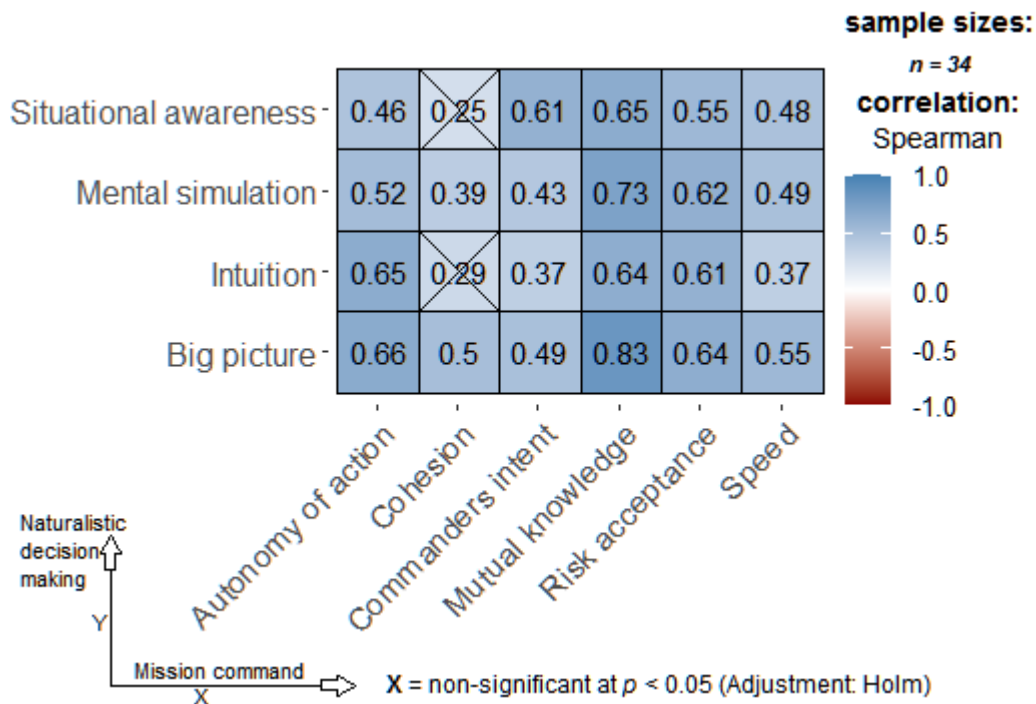
6.1.2 Child Nodes

Figure 6.2 Main analysis Child nodes

In this figure (6.2) I illustrate my results in regards to the child nodes (sub-categories) relevant to naturalistic decision making in the Y-axis and mission command in the X-axis. This figure offers a visualization of the sub-categories of the nodes mission command / naturalistic decision making shown in 6.1

The correlation matrix showing the child nodes of mission command and naturalistic decision making show generally high correlations throughout. The highest group of correlations belong to the term "mutual knowledge". The high values of this variable is expected, as the naturalistic decision making model is dependent on the prerequisite of experts, it would be difficult to be able to effectively coordinate one's own actions towards effectively solving tasks without having control over your teammates expertise. The highest value here is the one between mutual knowledge and the big picture, these two variables are quite similar in their descriptions and would therefore naturally be closely correlated.

The only two correlations that are somewhat different from the others by being less than moderately correlated, are the correlations of situational awareness/ cohesion(0.25) and intuition/ cohesion(0.29). They both have a low correlation which means they are still

positively correlated. The correlation is expected as all three have natural dependencies on each other as one would need to retain cohesion both to develop a situational awareness as well as to use intuition to figure out a group's options in a situation.

6.2 Sub-analysis

As a sub-questions I sought to find out if there exists a difference in correlation and in use of NDM and MC in the U.S. Army vs. in the Norwegian Forsvaret, and if the difference exists in micro, and macro level documents. I then use a similar strategy, as during the main analysis to analyze both the themes, and the child nodes thoroughly. In this part I go through the two pairs of sub analysis. First I will look at the level of analysis done in the dataframes documents (macro, micro). Then I explore the country of origin (Norway, USA). The findings are presented and discussed in two cycles, first the main themes are explored, before I move on to the terms of mission command, and naturalistic decision making.
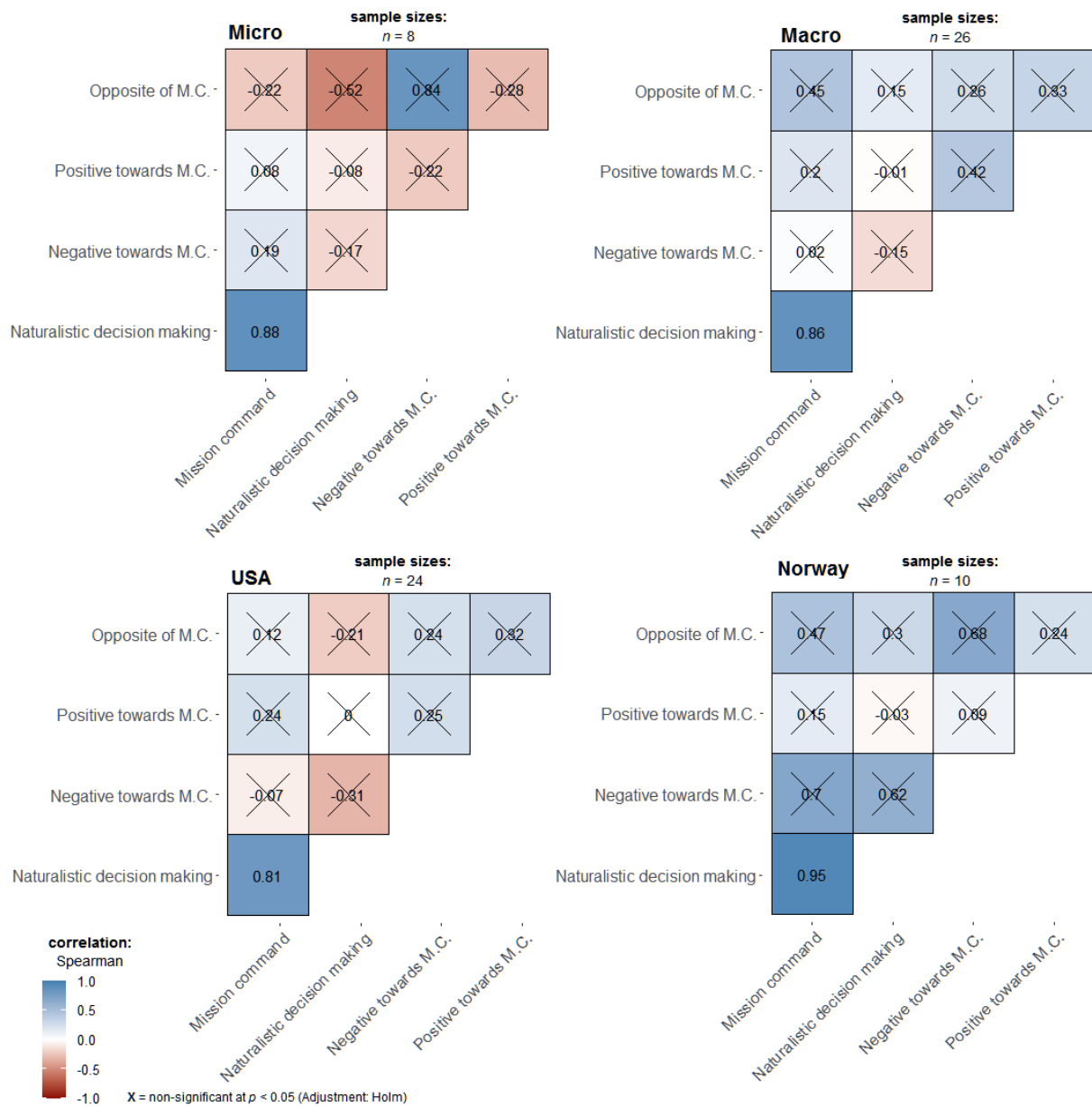
6.2.1 Themes

Figure 6.3 Sub-analysis main themes

In figure 6.3 I have illustrated the results of the correlation analysis as in fig. 6.1 but divided over the five attributes of micro, macro, Norway and USA. The figure gives us an overview over the main themes explored in this thesis, and their correlation between each other. The interesting part in the subanalysis is not only the correlation itself, but also the difference between the correlation coefficient spread over the attributes. I therefore mostly pay attention

to the values that differ majorly between each of the two variable pairs. I started out comparing the values of micro and macro.

Macro / Micro

Most of the values here are close to identical, or close enough in similarity to each other to not be significant. The more interesting value to look at is the difference between the value of "opposite of MC" in the micro level analysis where there is a weak - intermediate trend of negative correlation between almost all of the other variables, except "negative towards MC." The macro level on the other hand has a weak-intermediate positive correlation between the same variables. The difference can be explained with the level of analysis that exists in these documents. The macro level naturally explores more of the questions surrounding the concept of mission command as a whole, hence it questions both when MC is performed as well as when it is not. The opposite can be said of the micro analysis, where the general negative correlation will coincide with the research aims of the documents analyzed. Most of the documents contained in the attribute value of "micro" are experiments, with the research aim to prove aspects of MC or NDM, which also explains the strong positive correlation between "negative towards MC." and "opposite of MC" shown in the micro attribute. Documents that research parts of MC that were negative of MC would then often discuss the opposite of MC in their research. The intermediate positive correlation between negative, and positive towards MC in the macro attribute would be because of meta discussions in the chosen documents.

Norway / U.S. Army

There are some similarities between the two, with the Norwegian documents generally having a higher positive correlation coefficient at 0.95 than the US at 0.81. The most important difference we see between these two is the positive correlation between mission command and naturalistic decision making. My sub question was that there existed a closer correlation between mission command in the Norwegian Forsvaret than there did in the U.S. Army, which could be some of the reasons why Forsvaret is generally seen as a more proficient advocate for the mission command philosophy. This showed to be correct as there exists a 14. point difference in the correlation coefficient between these two. Although they are both high,

showing a general correlation between MC and NDM, the Norwegian one is almost a one-to-one correlation.

The correlation between naturalistic decision making, and opposite/negative of MC are quite different in the two groups. In Norway there is a general trend of positive correlation between the negative and opposite of MC values, this might be explained by meta discussions The Norwegian documents, do to a higher degree than the others, contain documents directly discussing the use of MC in specific situations, meaning that there would naturally be more discussions of what does not work about MC, as well as negative connotations surrounding the philosophy performed in the Norwegian group. The U.S. group however shows the opposite by having a weak negative correlation between these variables. This could be explained by the negative attitudes existing in the U.S. Army regarding the changing of a command philosophy that has shown acceptable results earlier.

6.2.2 Child Nodes

The thesis surrounds the correlation between NDM and MC. The terms of NDM and MC are further possible to analyze by exploring the child nodes (sub-categories) that are contained within the two terms. The table under (figure 6.4) goes through the variables of "situational awareness", "mental simulation", Intuition and "big picture". Comparing them to "autonomy of action", cohesion, "commander's intent", "mutual knowledge", "risk acceptance" and speed.
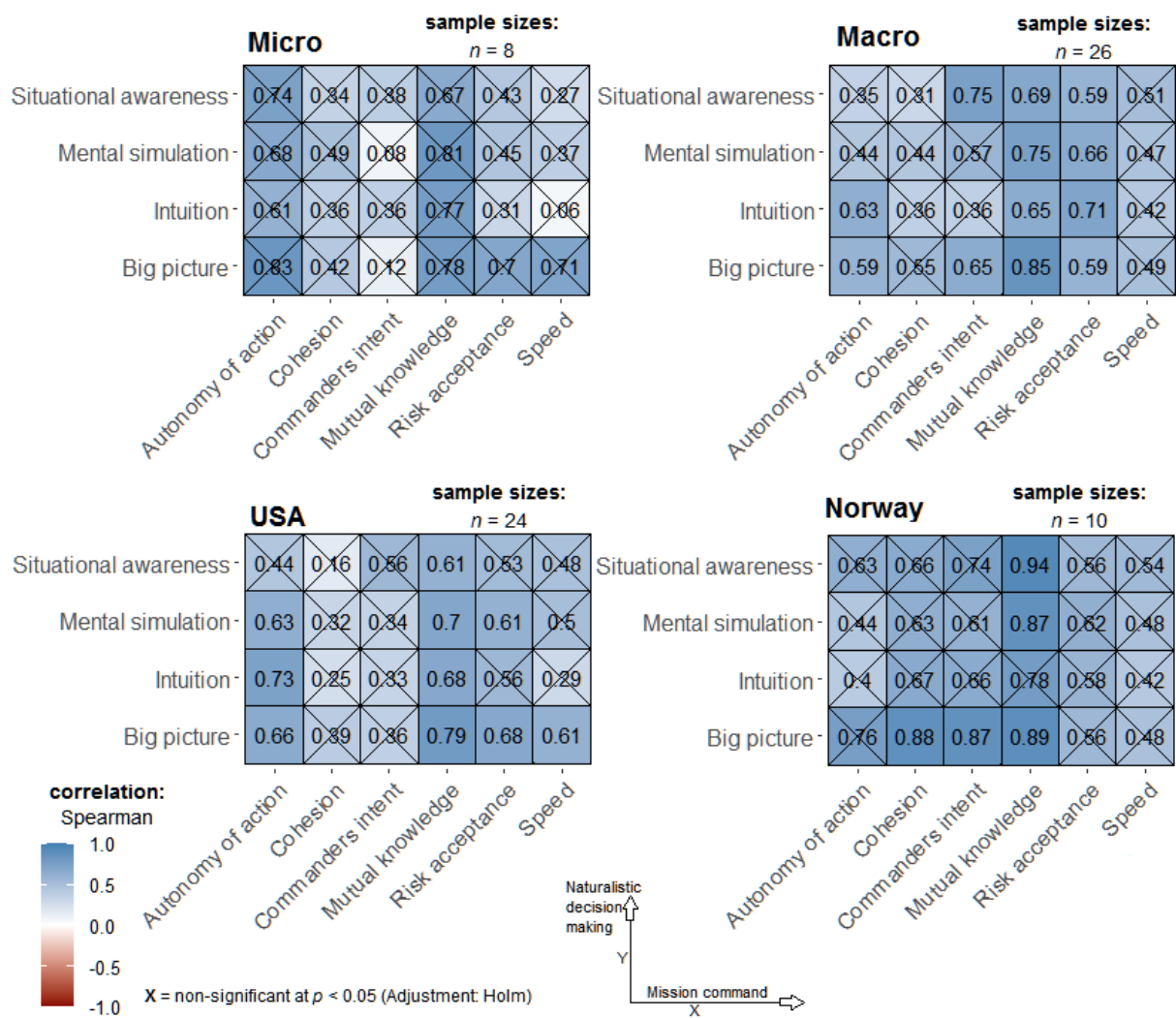
Figure 6.4 Sub-analysis Child nodes

Macro and Micro

At the attribute "level of analysis" there is a trend of "micro" level generally having lower correlation coefficients than its opposite. This rings true in every category except for "autonomy of action" which contains considerably stronger correlations than its macro counterpart. The differences can predominantly be explained by the discussion had in the two different attributes. Although both are supposed to contain descriptive information, a macro level view would more often become prescriptive. Macro level discussions are therefore more likely to discuss more of the values surrounding mission command. The micro level on the other hand, would need to stay descriptive as it describes what happened in one specific instance. This general difference also accounts for the strong correlations in the group of

"autonomy of action" and "mutual knowledge" as these are more focused on "one human being" than many of the others.

We do see some strange findings at first glance. There are three correlations that are so low that they're counted as insignificant, these are mental simulation/ commander's intent, big picture/commander's intent and intuition/ speed. The first two can be explained by the type of documents contained in the micro level analysis. These are for the most part experiments, where there would naturally be little in the form of correlation, regarding the commander's intent, as experiments are performed in closed loops and are therefore controlled with clear starts and finish points, one would therefore seldom need to envision the consequences ones action has on the bigger picture, and what the "commander" seeks to accomplish with the task.

Norway and U.S. Army

The differences presented in figure 6.4 between the NDM and MC in the U.S. Army and Forsvaret contain one large trend. Forsvaret seems to be slightly more correlated throughout the different terms with the differences mostly being small but erring on the side of more positive for Forsvaret. While the general trend shows one thing, there are some noteworthy results that differ from the trend. The groups of "commanders intent" and cohesion have significantly lower correlation coefficient values in the U.S. than in their counterpart of Forsvaret. The correlation is still positive so it follows the outline of the trend, still the lower values might hint towards a different style of MC in the U.S. Army where decisions are made on a more individual level, that does not imply cooperation in the same way as it does in Forsvaret. The variable of "autonomy of action" supports this argument as the correlations between intuition and mental simulation are higher than their Norwegian counterpart in the U.S. The correlation between intuition and speed in the U.S. is also lower than their norwegian counterparts. This implies the possible use of analytical instead of intuitive decision making processes.

6.3 Discussion

In this chapter I will discuss the two research questions based on the data extracted from the analysis.

The goal of this research project was to test the hypothesis whether there is a correlation between mission command and naturalistic decision making, and checking if this correlation is stronger in Forsvaret than in the U.S. Army, as well as checking for differences in correlation between micro and macro.

The study demonstrates that there is a correlation between naturalistic decision making and mission command. With a correlation coefficient of 0.83 there is little chance that the correlation is random. This means that the hypothesis is accepted, and that there exists a correlation between the two.

The second part of the hypothesis claims that Norway performs more in line with mission command because it in a larger degree than the U.S. uses NDM in conjunction with MC. This analysis supports the theory that Forsvaret has a stronger correlation between MC and NDM , with a 0,14 point difference in correlation coefficient between the two groups. This also means accepting part two of the hypothesis.

The third part of the hypothesis aims to see if there exists a difference between the correlation of MC and NDM when filtering data based on level of analysis (micro, macro). The results indicate that there exists little difference between these two on a theme level. There are however exciting results in the data that imply a difference in what terms of MC bear weight. The third part of the hypothesis is therefore rejected.

The sub-analysis of the child nodes in figure 6.4 shows a trend supporting the theory (Sibul, 2018, p 110), that the U.S. style of MC traditionally has been more individually oriented than holistic. This can be noticed in the results by how the variables of cohesion and commander's intent correlate less (ranging from 0.16-0.56) than expected with NDM. These results hint towards a lesser focus on teamwork in the U.S. downplaying interpersonal relations, in favor of individuality. This individuality also shows in the data where intuition and mental simulation correlate strongly with autonomy of action, while situational awareness (0.44), and

big picture (0.66) have weaker correlations compared to the Norwegian result. The Norwegians, on the other hand, have high correlations on autonomy of action and situational awareness (0.63) and big picture(0.76). This is supported in theory (Forsvarssjefen, 2015, p. 10) emphasizing human relations, and being good role models for subordinates. The link between mental simulation, intuition and autonomy of action is lower in Forsvaret than in the overall results from the U.S. sub-analysis confirms the theoretical groundwork stating that individual careers are often deemed more important by individual officers than the mission, or the men at risk (Labarbara, 2017, p. 4) as shown in the variable of risk acceptance - big picture.

On sub-analysis of the main themes there exists an intermediate negative correlation (-0.52) between the variables opposite of MC and NDM at micro level. This negative correlation is supporting the argument that there is a strong correlation between MC and NDM. This variable has a higher value than the others because of the attribute micro, as it is the most fitting attribute to use when exploring this variable. The attribute of micro consists of data where a single decision making process is described. It would be the most realistic attribute to explore with the descriptive model of NDM. The attribute of micro therefore bears some qualitative weight in the correlation, outside of what the original analysis entails, which supports the main-argument of the hypothesis.

The data from the analysis of themes showed that negative towards mission command, and opposite of MC, were quite strongly correlated (0.88) with MC (0.70, 0.47) and NDM(0.62, 0.3) in the sub-analysis attribute of Norway as seen in figure 6.3. These correlations might seem strange at first glance. I argue that they support the sub-argument in the hypothesis where Forsvaret has a stronger form of MC than the U.S. The openness of discussion is an important step in building trust and mutual knowledge between parts of the organization in MC (Nelsen, 1987, pp. 25-26), where superiors and subordinates used much of their time together, discussing (p. 26). Through the relation centric approach we see in Forsvaret (Forsvarssjefen, 2020, p. 14), where the discussing, and testing of thoughts, interpretations, and options, are a necessary part of leadership in the armed forces, to ensure proper situational awareness, and co-responsibility to tasks.

An unexpected result from reading the data in the themes analysis, was the presence of negative opinions towards mission command in Norway (0.70, 0.62, 0.88). Most of the data

coded under the term of negative towards MC are meta-discussions as described in the last paragraph. On the other hand there were some negative opinions that shined through when relating to the use of MC. While MC is generally seen as quite useful in realistic situations, there are some issues stemming from the balance needed between MC and detailed command in day to day operations:

> "[...] in normal peacetime operations it would be possible to employ a more detailed approach to management, which would give me a larger amount of control over how things are done, and on the resources allotted. They justify this [...] with it feeling artificial when more control is not exerted in day to day operations. OBL [mission command] in daily operations make processes take more time [.] (Greve, 2021, p. 40)

Whitford (2018, p . 242) states that this is a common pitfall, when a unit goes from being in active deployment, to transferring back home. The feeling comes from fewer chances of getting evaluated, as there are less resources, and fewer exercises leading to commanders striving towards perfection the few times they get to show off their men and skills.

Although the main leadership philosophy of these two militaries are deemed as MC there are times where mission command could be difficult to employ. During the late 1990s western armies had to pivot from focusing on fighting a peer enemy, towards UN peacekeeping operations (Halvorsen, 2008). The change in role for military personnel meant that UN soldiers had to implement routines based on detailed command in peacekeeping operations (pp. 60-65). Because of problematic relationships between civilians, and other friendlies in the area this can also be seen in the child-node analysis at figure 6.2. Stating the relatively low correlation between situational awareness and cohesion, as seen in an example from the data where a respondent in a study struggled to achieve situational awareness in Afghanistan:

> It is an extremely complex area to operate in because there are all kinds of decision makers and international actors in the area [...] Everyone who has anything to do with this is parading around inside of the area you are expected to defend which is a challenge in itself. This gave me headaches.(Trettenes, 2009, p. 46)

While these situations might suggest that detailed command is preferable in some situations, it could also be an example of MC not thoroughly being institutionalized. Leland (2017, pp. 214-215) suggests that organizations that handle crises often develop a means over end syndrome, where "red tape" restrains the decision maker, and thereby limits trust and

cohesion between members heeding the same goal. We see that in both Trettenes (2009) and Halvorsen (2008) that some of the problems relating to mission command can be explained by the red tape restraints, and "mean" focus detailed in Leland (2017). Where problems relating to coordinating others led to problems in hitting mission goals.

Suggestions for Further Research

Expertise is regarded as a prerequisite for both MC and NDM. I have therefore not chosen to pay much attention to this variable during my analysis. An interesting further study on the subject would be to explore how well MC works within the confines of people not being experts in their field. This might be fresh recruits or reserves such as *Heimevernet*, consisting of previous conscripts and military employees who are currently living civilian lives. The reserves are supposed to help the armed forces by providing knowledge of local communities and areas, but they are not necessarily proficient in military skills. The individuals in Heimevernet are both used as independent units, as well as advisors to more professional standing units. It would be interesting to research how the requirement of "expertise" factors in when the use of non-experts are required to attain a comprehensive understanding of the local circumstances.

The study puts forth a framework that could easily be reused in later research. To include other research methods such as ethnography, interviews, etc. The population of this study is quite limited in scope; to expand on the paper one could issue the same methods focusing on non-academic accounts, such as biographies, or blog posts, or one could choose to perform naturalistic studies describing how the population makes decisions in the field..

Limitations

I have chosen to focus my thesis on two rather different militaries, where the population of the two subjects of analysis are quite different. The two groups: the United States Army, and the Norwegian Forsvaret. There is obviously a difference in that the U.S. Army is just one branch of the entire U.S. military, while the Norwegian Forsvaret encompasses the entire Norwegian Armed Forces. Still, I believe the information and discussions in this thesis will not be affected by this difference. The U.S. Army is a very large organization, and the discussions here would easily be transferable to the other branches of the U.S. military, who share much of the same or very similar points of organizational culture with the U.S. Army.

As the dataset is quite small (n=34) ,with the sub-analysis population even smaller, and the data is of qualitative nature, the statistical significance of the results are not guaranteed.

However through the thorough selection of data, and further coding of the data I believe I have gathered a representative corpus based on the universe of data that exists on the subject.

Summary

The research aimed to find out if there exists a correlation between the leadership philosophy of mission command and the decision making model of naturalistic decision making. The results showed that there is a correlation between the two terms. In addition the results showed that there existed a difference in correlation in Norway, and the U.S. Army, where Forsvaret contained a near perfect correlation between NDM and MC. The study found that there existed a difference between terms in the sub-analysis. The results show a trend that might imply that there exists more discussion surrounding MC itself at the level of macro, and in Norway, which hints towards a more fulfilled form of MC.

There existed a gap in the theory, when it came to comparing NDM and MC. As the two concepts are quite alike, differing in large part by being a descriptive (NDM) and normative (MC) version of each other, I expected a strong correlation between the terms. The results matched these expectations in large showing that the correlation was indeed strong.

Careerism seems to be the limiting factor in the implementation of MC in the U.S. Army. To further institutionalize the philosophy of mission command in the U.S. Army, the results imply a need for systemic change in the organization. One can argue that the focus on evaluations would need to be reworked, to further empower trust between members. Additionally there seems to be a lack of possibility to openly discuss problems, orders etc. Finally my results suggest that the focus would need to change for every member of the organization from a *me* first standpoint towards a mission first standpoint. This can be done by following the lead of Forsvaret prioritizing human relations over classical management.

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Appendix A:

Search registry

The information I am seeking:	Articles stating the use of Mission command, mission command, and decision making, or related terms.
Global settings:	Limiting the period from 1975- and upwards, to encapture the modern take on the term mission command, after the Vietnam War. Excluding irrelevant categories such as Engineering, comp sci, biology, etc.
Specific Settings Web of Science:	Inclusion criteria for Web of Science: **International Relations** or **Government Law** or **Psychology** or **Sociology** or **Area Studies** or **Social Sciences Other Topics** (Research Areas) and **Psychology** or **Social Sciences Other Topics** or **International Relations** or **Sociology** or **Area Studies** (Research Areas) and **International Relations** or **Social Sciences Interdisciplinary** or **Psychology** or **Psychology Multidisciplinary** or **Behavioral Sciences** or **Psychology Applied** or **Sociology** or **Political Science** or **Management** or **Psychology Social** or **Area Studies** or **Public Administration** (Web of Science Categories) and **English** (Languages)
Specific settings USAW:	NOT subject:**Engineering** NOT subject:(**Medicine and health science**s) NOT subject:**Education** NOT document_type:**image** NOT subject:**Law** NOT subject:**accounting**
Specific settings BRAGE:	NOT type: Bachelor thesis

Database	Search terms	No. of results	Comments on results	Date of search
Web of Science Core Collection	ALL="mission command"	26 (10 Relevant)	Multiple results on other countries.	29.03-2022
Web of Science Core Collection	ALL=Auftragstaktik	4 (3 Relevant, all duplicates)		29.03-2022
Web of Science Core Collection	ALL="mission type tactics"	0		29.03-2022
Web of Science Core Collection	(ALL="Command and control" OR ALL=C2)	882	Many results need to narrow it down, refining search (Not included in tally)	29.03-2022
Web of Science Core Collection	(ALL="Command and control" OR ALL=C2) AND (ALL="Decision making" OR ALL=Autonomy)	92 (41 relevant)	Added to terms, good search, many relevant results	29.03-2022
Web of Science Core Collection	(ALL="Command and control" OR ALL=C2 OR ALL="Mission command") AND ALL=autonomy	13 (2 relevant, 2 duplicates)	All duplicates	29.03-2022
Web of Science Core	(ALL="Command and	3 (all duplicates)	All duplicates	29.03-2022

Collection	control" OR ALL=C2 OR ALL="Mission command") AND ALL= "naturalistic decision making"			
Web of Science Core Collection	(ALL="Command and control" OR ALL=C2 OR ALL="Mission command") AND ALL=Klein	2 (one relevant, duplicate)	All duplicates	29.03-2022
Web of Science Core Collection	(ALL="Command and control" OR ALL=C2 OR ALL="Mission command") AND ALL="Option awareness"	0		29.03-2022
Web of Science Core Collection	(ALL="Command and control" OR ALL=C2 OR ALL="Mission command") AND ALL="decision making"	82	All duplicates	29.03-2022
Web of Science Core Collection	ALL="Naturalistic decision making" AND ALL=military	12 (10 relevant, 2 duplicates)	Very good results	29.03-2022
Web of Science Core Collection	ALL=intent AND ALL=decision AND (ALL=military OR ALL=ARMY OR	32 (5 relevant, 1 duplicate)		29.03-2022

	ALL=Marines OR ALL=NAVY OR ALL="Air force" OR ALL=War)				
Web of Science Core Collection	ALL="battle command"	1	All duplicates	29.03-2022
Web of Science Core Collection	ALL="battle management"	8 (3 relevant)		29.03-2022
Web of Science Core Collection	ALL="oppdragsbasert ledelse"	0		29.03-2022
United States Army War College Press [USAW]	"Mission command"	336	Very interesting results, needs exclusions to find more relevant hits	26.04-2022
United States Army War College Press [USAW]	"Mission command"	64 (6 relevant)	Adde new exclusions NOT subject:Religion NOT subject:(Physical Sciences and Mathematics) NOT subject:Christianity NOT subject:(Practical Theology) NOT subject:(Computer Sciences) NOT subject:(Biblical Studies) NOT subject:(Missions and World Christianity) NOT subject:(Religious Thought, Theology and Philosophy of Religion) NOT subject:Business NOT institution:(Daily Eastern News) NOT institution:(Student newspaper) NOT institution:(	03.05.2022

			B.G. News) NOT institution:(BG News) NOT institution:(Bowling Green State University) NOT newspaper NOT PDF NOT image NOT (image gallery) NOT conference	
United States Army War College Press [USAW]	Auftragstaktik	43 (11 Relevant, 1 duplicate)	Mainly Masters thesis'	26.04-2022
United States Army War College Press [USAW]	"mission type tactics"	2 (1 duplicate)	None relevant	26.04-2022
United States Army War College Press [USAW]	("Command and control" OR C2)	76963	Huge amount of hits, need to refine	26.04-2022
United States Army War College Press [USAW]	("Command and control" OR C2) AND ("Decision making" OR Autonomy)	8567	Huge amount not refined enough	26.04-2022
United States Army War College Press [USAW]	("Command and control" OR C2 OR "Mission command" AND autonomy)	75 (1 duplicate, 7 relevant)	Engineering and space as main results.	26.04-2022
United States Army War College Press [USAW]	("Command and control" OR C2 OR "mission command" AND "Naturalistic decision making")	4 (3 duplicates, 1 relevant)		26.04-2022
United States Army War College Press [USAW]	("Command and control" OR C2 OR "mission command") AND author:(	170	Needs to include First name	26.04-2022

	Klein)			
United States Army War College Press [USAW]	("Command and control" OR C2 OR "mission command") AND author:(Gary Klein)	5 (0 relevant)	Wrong Gary Klein	26.04-2022
United States Army War College Press [USAW]	("Command and control" OR C2 OR "mission command") AND "Option awareness"	2 (0 relevant)		26.04-2022
United States Army War College Press [USAW]	("Command and control" OR C2 OR "mission command") AND "decision making"	9796	Way to large of a subset	26.04-2022
United States Army War College Press [USAW]	"Naturalistic decision making"	194	Very interesting results, but needs refinement	26.04-2022
United States Army War College Press [USAW]	"Naturalistic decision making" AND "mission command"	4 all duplicate	Need to widen	26.04-2022
United States Army War College Press [USAW]	"Naturalistic decision making"(AND military OR Navy Or Marines OR Army OR "Air force")	152 (8 relevant)		26.04-2022
United States Army War College Press [USAW]	"Battle command"	140 (12 relevant)		26.04-2022
United States Army War	"Battle Management"	118 only relevant if too	Many hits in math so	26.04-2022

College Press [USAW]		few sources.	added NOT subject=Physical Sciences and Mathematics	
United States Army War College Press [USAW]	"Oppdragsbasert ledelse"	0	Naturally no hits in the database focusing on U.S. Data.	26.04-2022
Forsvarets høgskole (Brage)	"Mission command"	84 (23 relevant)	Very good results	27.04-2022
Forsvarets høgskole (Brage)	auftragstaktik	39 (2 relevant)	Mostly duplicates	27.04-2022
Forsvarets høgskole (Brage)	"Mission type tactics"	1 (duplicate)		27.04-2022
Forsvarets høgskole (Brage)	"Battle command"	5 (2 relevant, rest duplicates)		27.04-2022
Forsvarets høgskole (Brage)	"Battle management"	12 (0 relevant)	Only airforce	27.04-2022
Forsvarets høgskole (Brage)	"oppdragsbasert ledelse"	109 (8 relevant)	Mostly duplicates	27.04-2022
Forsvarets høgskole (Brage)	"Command and control" or C2	1129	Needs refinement	27.04-2022
Forsvarets høgskole (Brage)	("Command and control" OR C2) AND ("Decision making" OR Autonomy)	501	Needs refinement	27.04-2022

Forsvarets høgskole (Brage)	"Command and control" OR C2 OR "mission command" AND autonomy OR "decision making"	74	Only duplicates	27.04-2022
Forsvarets høgskole (Brage)	"naturalistic decision making"	11 (3 Relevant)		27.04-2022

Appendix B: Codebook

Name	Files	References
Mission command	33	438
Autonomy of action	27	96
Cohesion	22	71
Commanders intent	22	71
Creating friction	6	12
Mutual knowledge	17	59
Risk acceptance	20	40
Speed	24	56
Naturalistic decision making	29	440
Big picture	24	127
Expectancies	13	27
Teammate expertise	18	59
Intuition	25	129
Pattern recognition	22	86
Metaphors and analogues	13	24
Spotting small differences	15	27
Mental simulation	19	101
Storytelling	18	71

Appendix B: Codebook

Simulating future	10	19
Simulating past	8	10
Situational awareness	21	69
Negative towards M.C.	10	17
Opposite of M.C.	26	255
Classical warfare	22	171
Detailed command	16	52
Planning	16	39
Synchronized	10	17
Lack of shared intent	6	21
Lack of trust	14	43
Laissez Faire	6	9
Positive towards M.C.	13	23

Appendix C: Pearson analysis
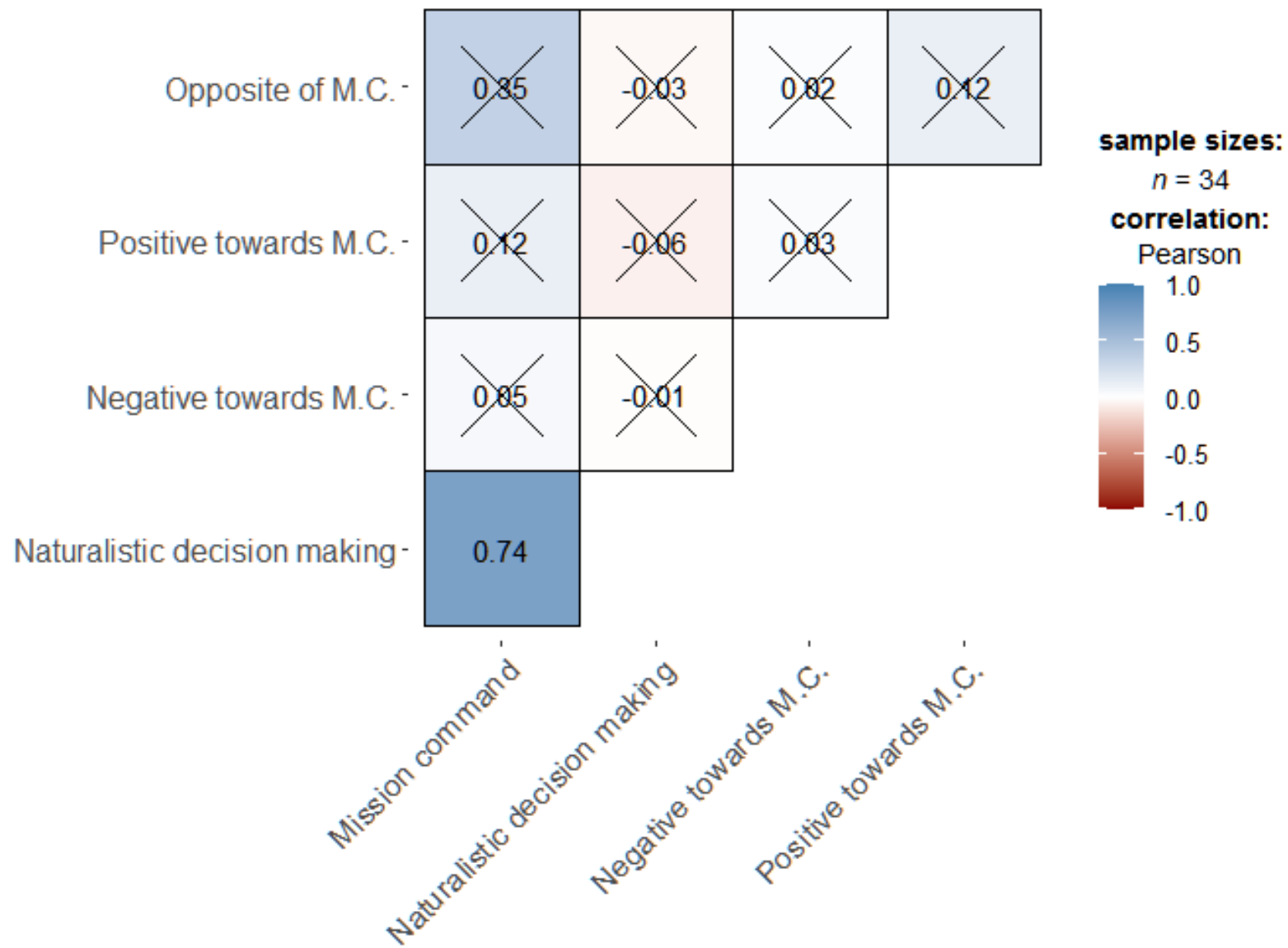
X = non-significant at *p* < 0.05 (Adjustment: Holm)
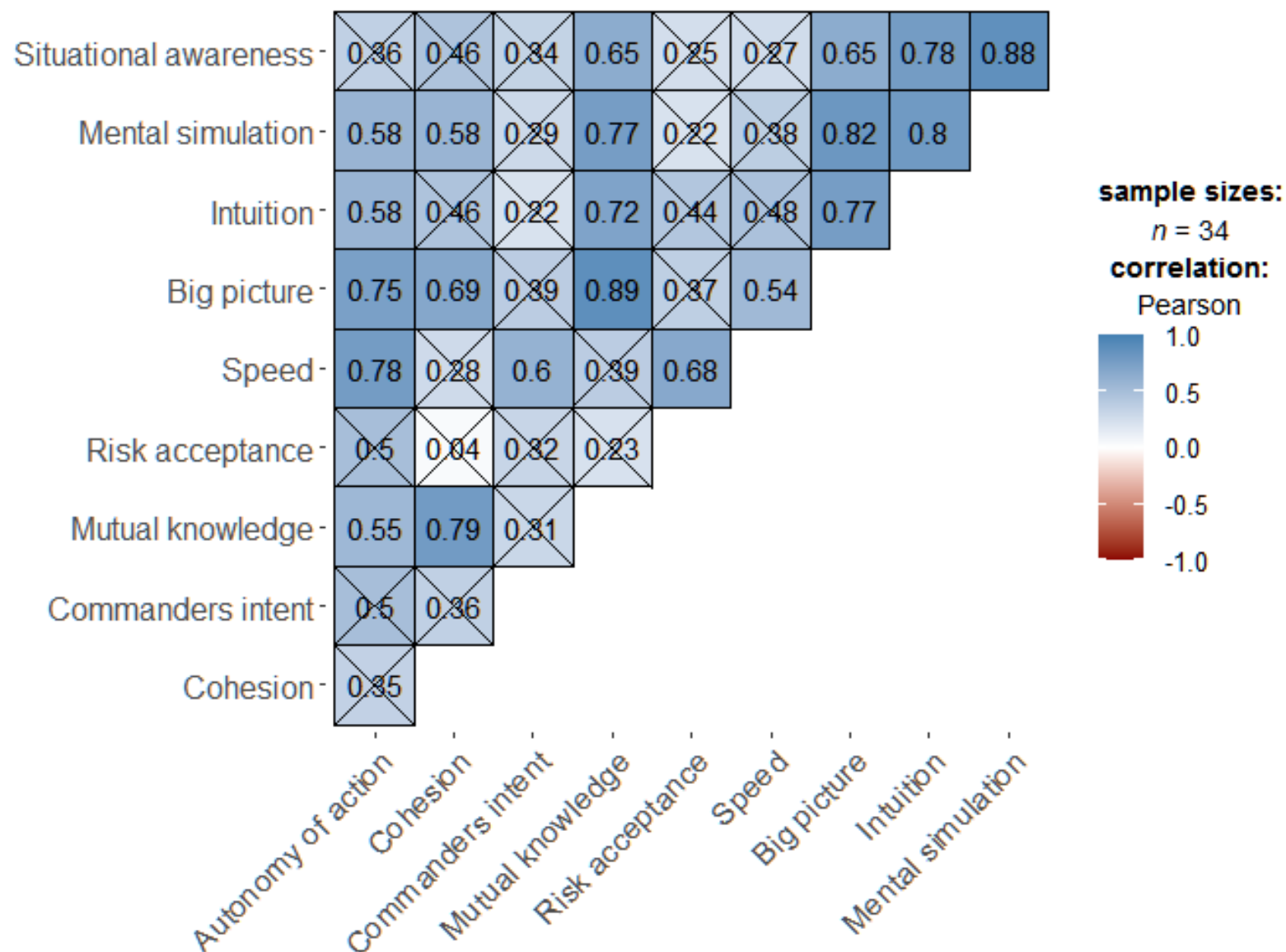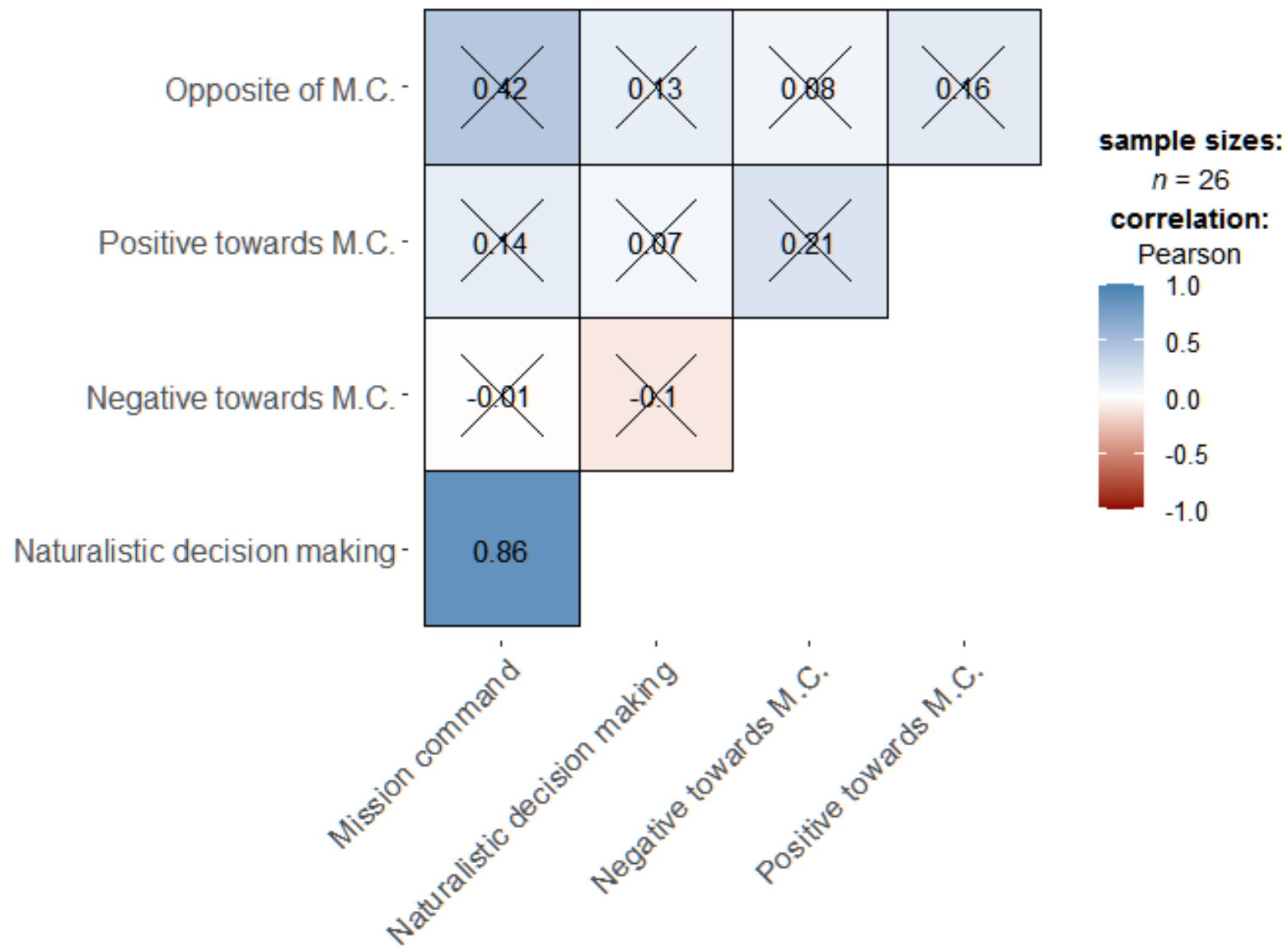
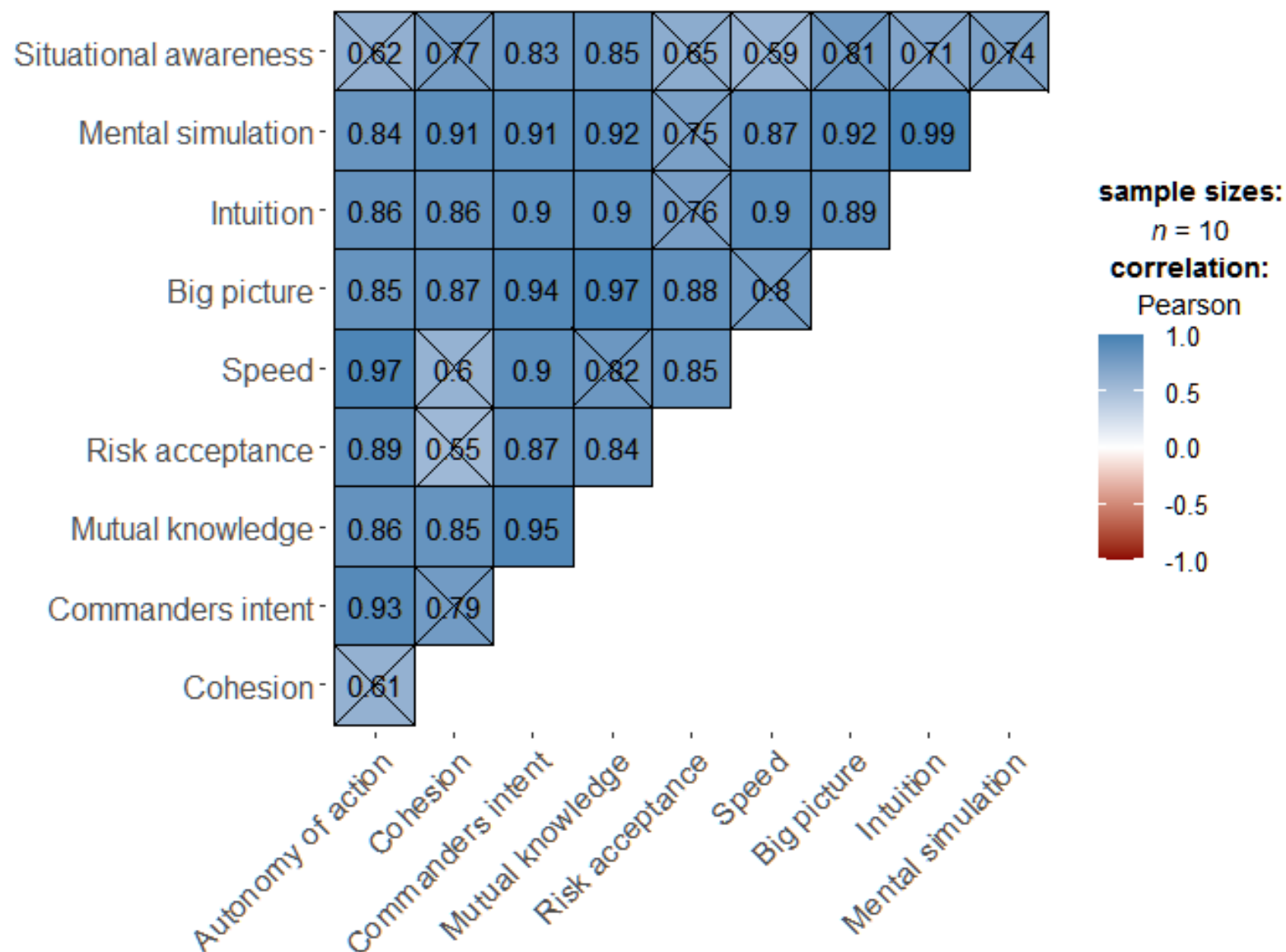X = non-significant at *p* < 0.05 (Adjustment: Holm)

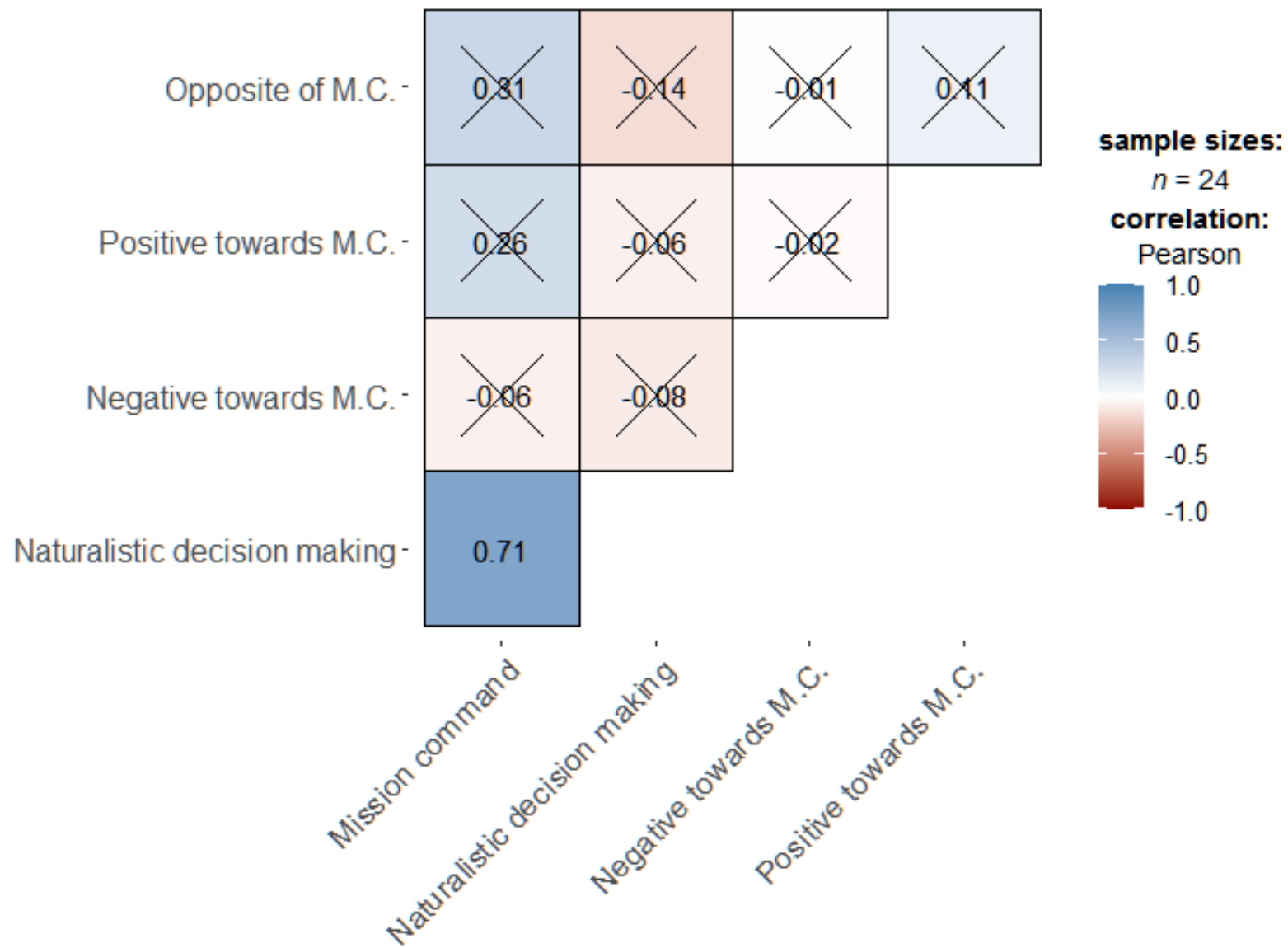X = non-significant at $p < 0.05$ (Adjustment: Holm)
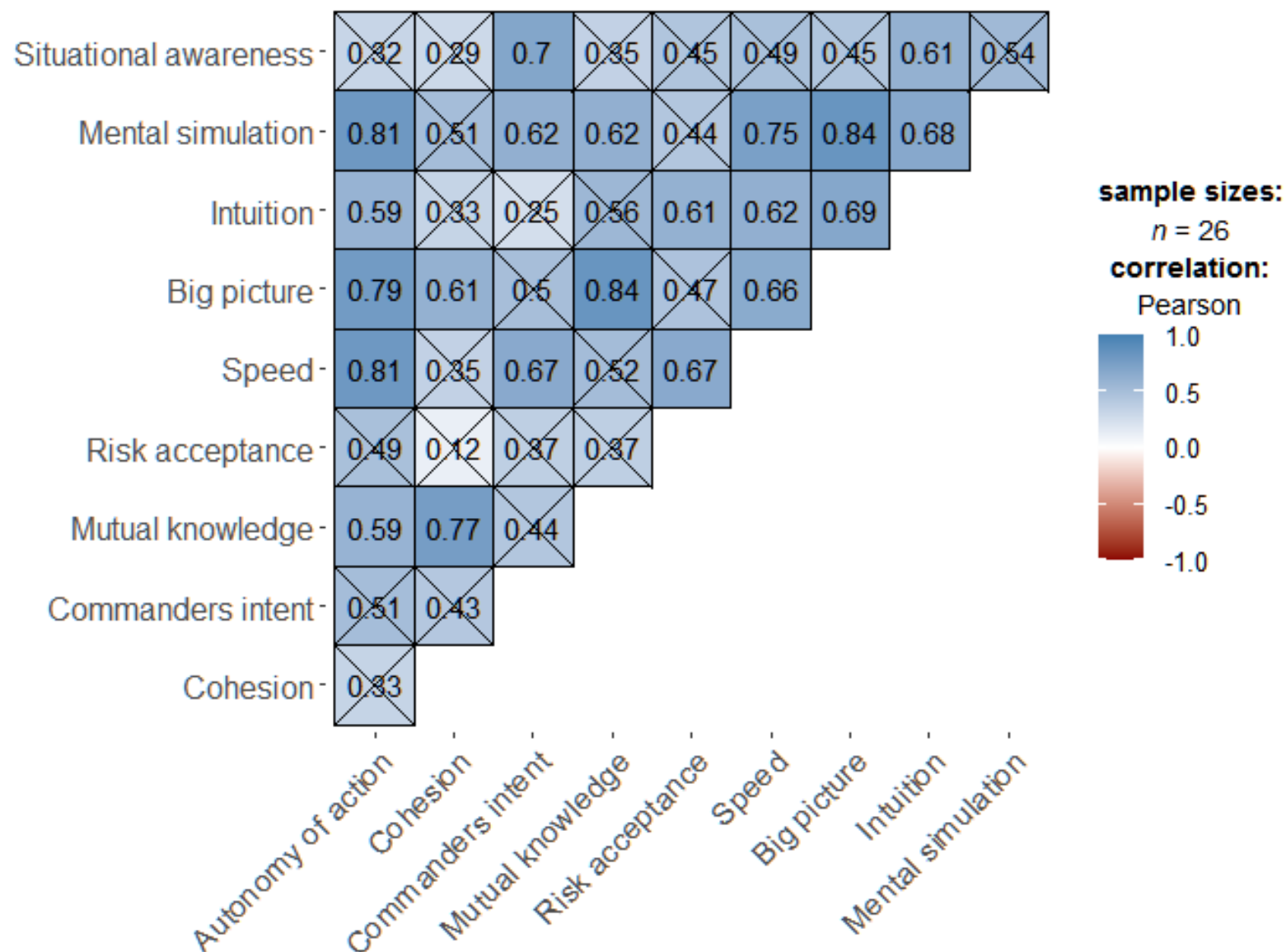
X = non-significant at $p < 0.05$ (Adjustment: Holm)
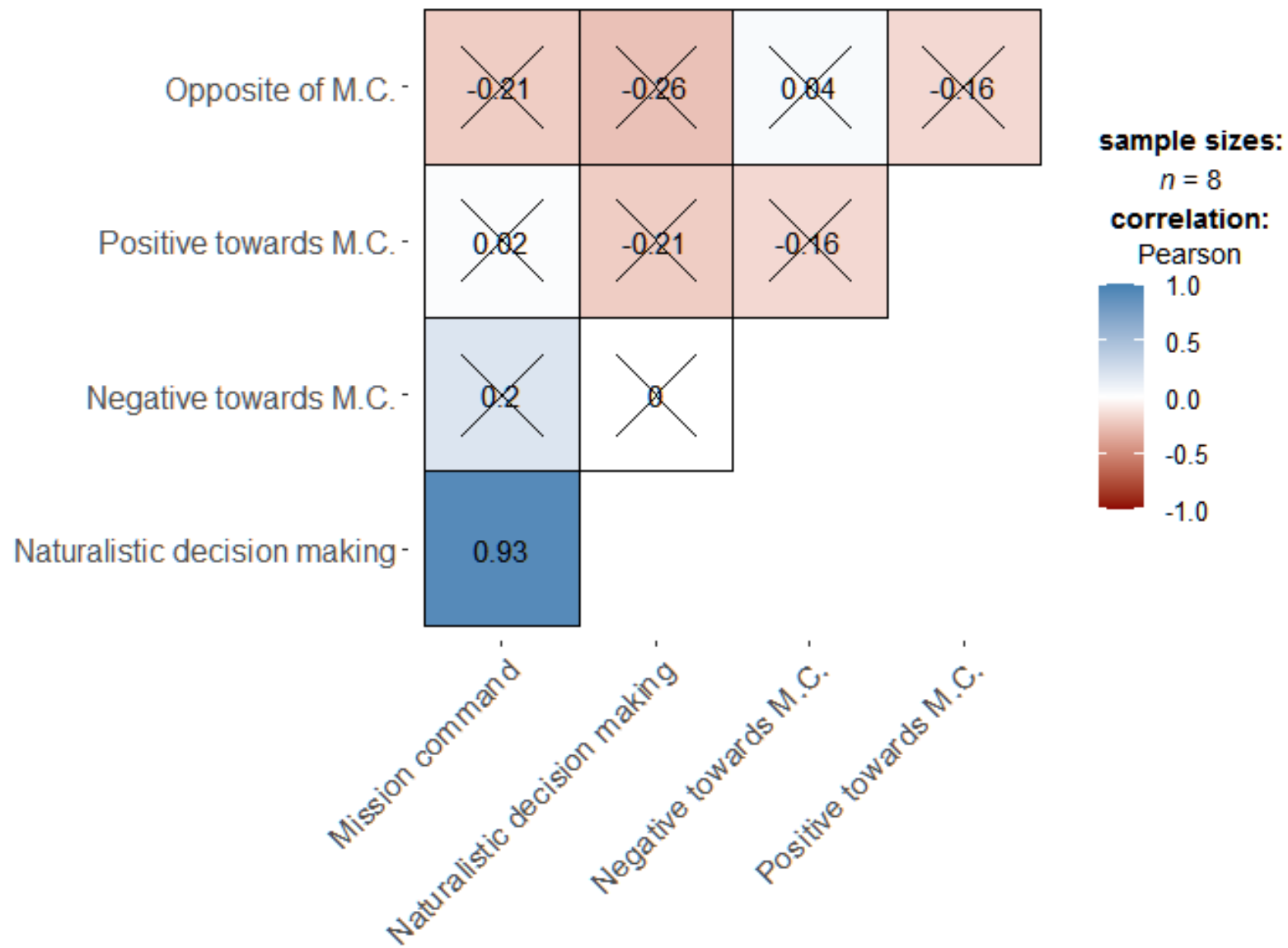
X = non-significant at $p < 0.05$ (Adjustment: Holm)
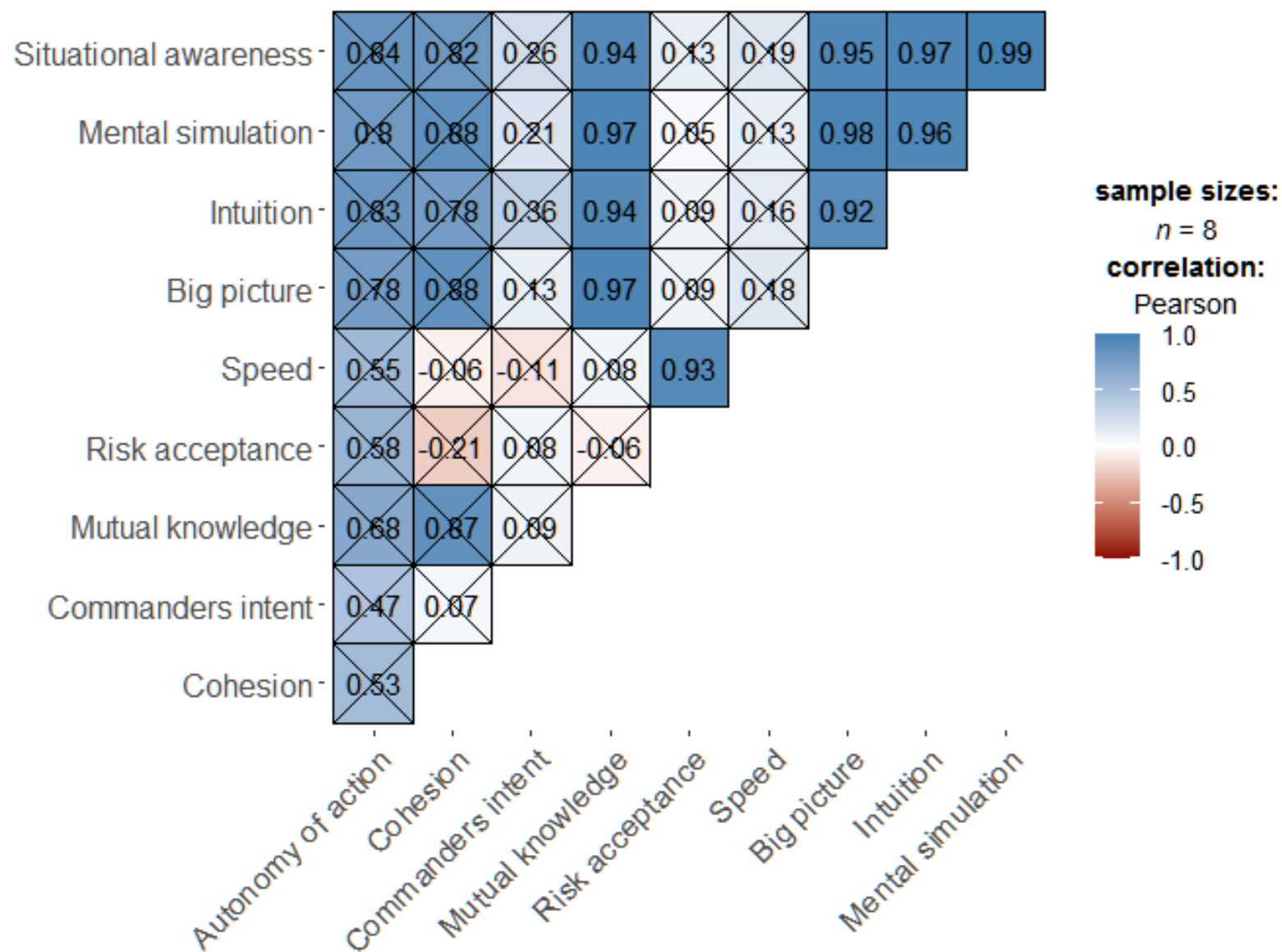
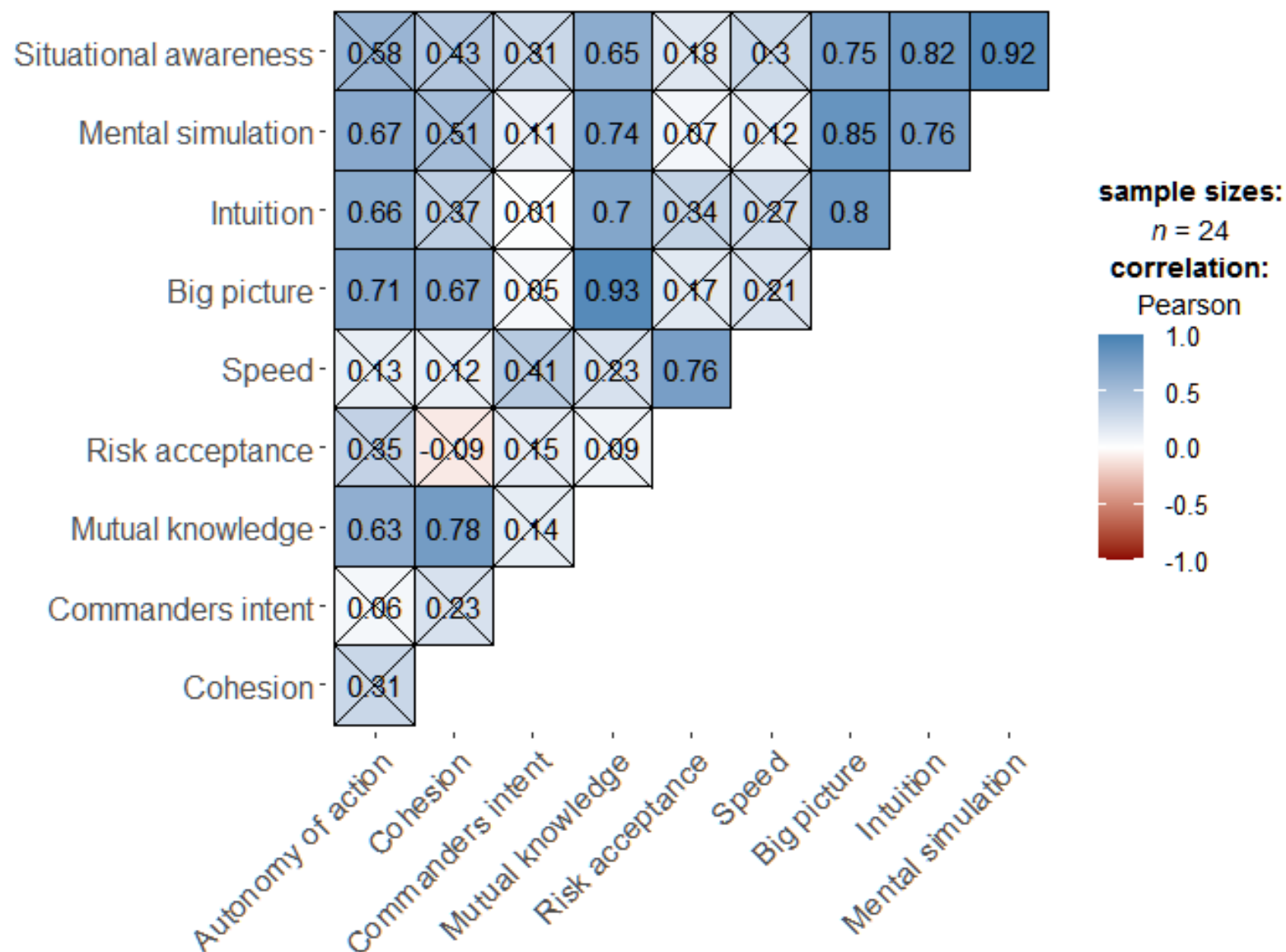X = non-significant at $p < 0.05$ (Adjustment: Holm)
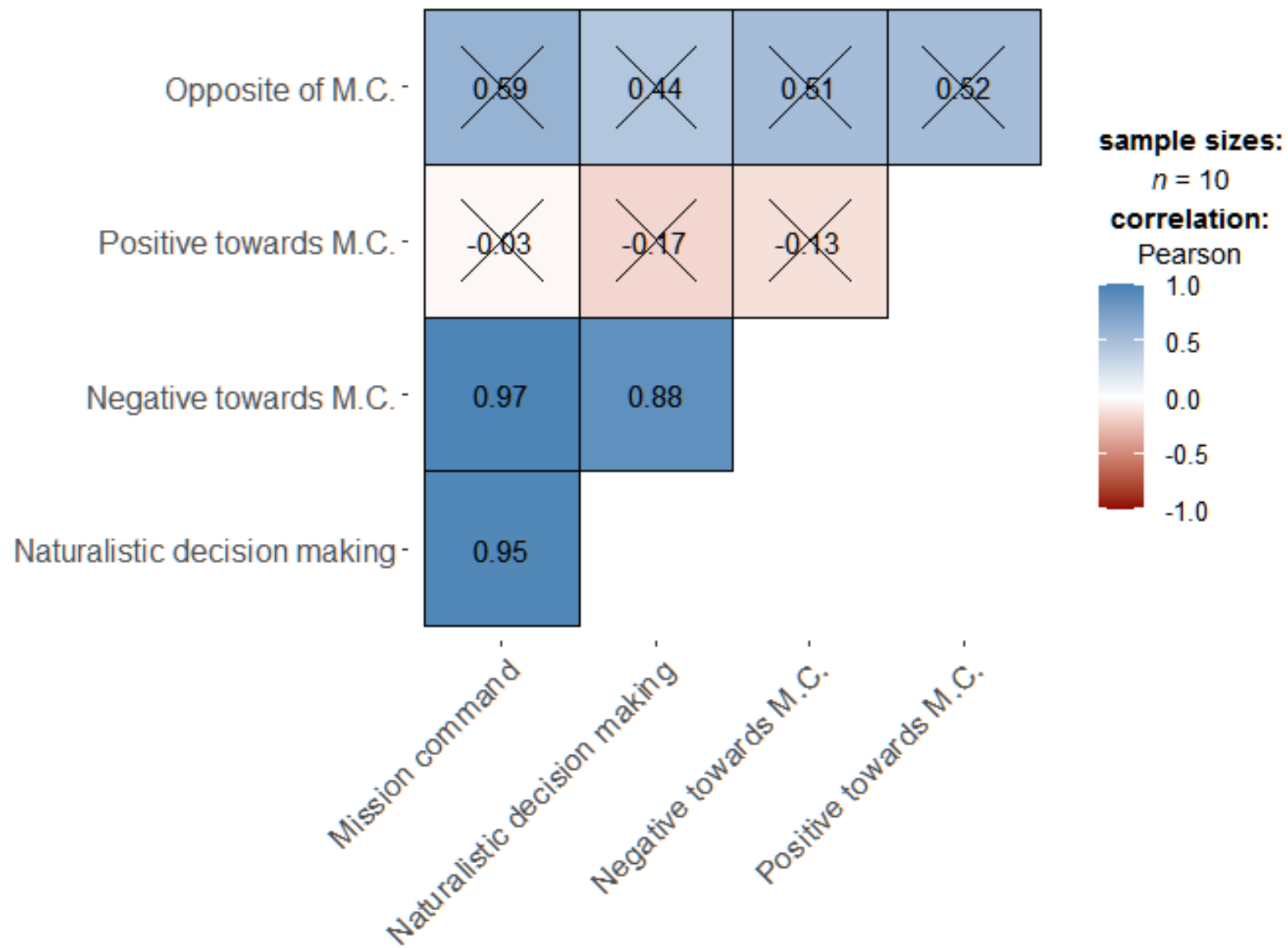
X = non-significant at $p < 0.05$ (Adjustment: Holm)

X = non-significant at $p < 0.05$ (Adjustment: Holm)

X = non-significant at $p < 0.05$ (Adjustment: Holm)

X = non-significant at $p < 0.05$ (Adjustment: Holm)

Appendix D: R code

```r
library(readxl)
library(tidyverse)
library(dplyr)
library(ggplot2)
library(ggstatsplot)
library(GGally)
library(lares)
df <- read_excel("C:/Users/adde731/Downloads/skole/master/NVIVO/export R test/Extract_MC.xlsx")

#Changing names of variables, and picking out the variables i need, as well as forcing a numeric value on "name
doc"
df <- df %>%
  mutate(Document_name = Name...1,
       Code_name = Name...4,
       attribute_value = `Attribute Value`,
       words_doc = as.numeric(Words...2),
       words_code = as.numeric(Words...5))%>%
  select(Document_name, Code_name, words_doc, words_code, attribute_value)

#Creating new variable percentage "words" of whole document summarized by groupand filename
df_summary <- df%>%
  mutate(Percentage_of_words = words_code/words_doc)%>%
  group_by(Document_name, Code_name, attribute_value)%>%
  summarise(Percentage_of_doc = sum(Percentage_of_words, na.rm = TRUE))%>%
  ungroup()

#Spreading columns making the codename variables instead of observations
df_wide <- df_summary%>%
  spread("Code_name", value = "Percentage_of_doc", fill = 0 )


#Creating mission command value
df_wide <- df_wide%>%
  mutate(`Mission command` = `Autonomy of action` + `Commanders intent` + `Mutual knowledge` + `Risk
acceptance` + `Speed` + `Cohesion`)

#Creating NDM value
df_wide <- df_wide %>%
  mutate(`Naturalistic decision making` = `Big picture` + `Intuition` + `Mental simulation` + `Situational
awareness`)


#full correlation matrix of all values - attribute value
df_wide[-1] %>%
  select(-attribute_value) %>%
  distinct()%>%
  cor()

# Choosing nodes, as variables in new DF
Correlation_matrix <- df_wide %>% select(`Mission command`, `Naturalistic decision making`,
                         `Negative towards M.C.`, `Positive towards M.C.`,
                         `Opposite of M.C.`)%>%
  cor()
Correlation_matrix


  #scatterplot linear regression
  scatter_plot <- ggplot(df_wide, aes(`Mission command`, `Naturalistic decision making`))
```

```r
scatter_plot + geom_point() + labs(x = "`Mission command`", y = "`Naturalistic decision making`") +
  geom_smooth(method="lm")

#scatterplot LOESS
scatter_plot <- ggplot(df_wide, aes(`Mission command`, `Naturalistic decision making`))
scatter_plot + geom_point() + labs(x = "`Mission command`", y = "`Naturalistic decision making`") +
  geom_smooth(method="loess")




#corellogram
ggstatsplot::ggcorrmat(
  data = df_wide [-c(1)] %>%
    filter(attribute_value!="Macro",
           attribute_value!="Micro") %>%
    select(`Mission command`, `Naturalistic decision making`,
           `Negative towards M.C.`, `Positive towards M.C.`, `Opposite of M.C.`),
  type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"),# change default colors
  sig.level = 0.05)


ggstatsplot::ggcorrmat(
  data = df_wide %>%
    filter(attribute_value!="Macro",
           attribute_value!="Micro") %>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
           `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
           `Intuition`, `Mental simulation`, `Situational awareness`),
  type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"), # change default colors
  sig.level = 0.05)


#Sub-analysis
#Macro
ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Macro")%>%
    select(`Mission command`, `Naturalistic decision making`,
           `Negative towards M.C.`, `Positive towards M.C.`,
           `Opposite of M.C.`),
  type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"), # change default colors
  sig.level = 0.05)

ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Macro")%>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
           `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
           `Intuition`, `Mental simulation`, `Situational awareness`),
  type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"), # change default colors
  sig.level = 0.05)



#Micro
ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Micro")%>%
    select(`Mission command`, `Naturalistic decision making`,
           `Negative towards M.C.`, `Positive towards M.C.`,
```

```
      `Opposite of M.C.`),
   type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
   colors = c("darkred", "white", "steelblue"), # change default colors
   sig.level = 0.05)

ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Micro")%>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
   type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
   colors = c("darkred", "white", "steelblue"), # change default colors
   sig.level = 0.05)

#Norway
ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Norway")%>%
    select(`Mission command`, `Naturalistic decision making`,
        `Negative towards M.C.`, `Positive towards M.C.`,
        `Opposite of M.C.`),
   type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
   colors = c("darkred", "white", "steelblue"), # change default colors
   sig.level = 0.05)

ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Norway")%>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
   type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
   colors = c("darkred", "white", "steelblue"), # change default colors
   sig.level = 0.05)

#USA
ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "USA")%>%
    select(`Mission command`, `Naturalistic decision making`,
        `Negative towards M.C.`, `Positive towards M.C.`,
        `Opposite of M.C.`),
   type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
   colors = c("darkred", "white", "steelblue"), # change default colors
   sig.level = 0.05)

ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "USA")%>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
   type = "nonparametric", # parametric for Pearson, nonparametric for Spearman's correlation
   colors = c("darkred", "white", "steelblue"), # change default colors
   sig.level = 0.05)


#Pearson correlation


#corellogram pearson
ggstatsplot::ggcorrmat(
  data = df_wide [-c(1)] %>%
    filter(attribute_value!="Macro",
```

```
        attribute_value!="Micro") %>%
    select(`Mission command`, `Naturalistic decision making`,
        `Negative towards M.C.`, `Positive towards M.C.`, `Opposite of M.C.`),
    type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
    colors = c("darkred", "white", "steelblue"),# change default colors
    sig.level = 0.05)


ggstatsplot::ggcorrmat(
    data = df_wide %>%
      filter(attribute_value!="Macro",
        attribute_value!="Micro") %>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
    type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
    colors = c("darkred", "white", "steelblue"), # change default colors
    sig.level = 0.05)


#Sub-analysis
#Macro
ggstatsplot::ggcorrmat(
    data = df_wide %>% filter(attribute_value == "Macro")%>%
      select(`Mission command`, `Naturalistic decision making`,
        `Negative towards M.C.`, `Positive towards M.C.`,
        `Opposite of M.C.`),
    type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
    colors = c("darkred", "white", "steelblue"), # change default colors
    sig.level = 0.05)

ggstatsplot::ggcorrmat(
    data = df_wide %>% filter(attribute_value == "Macro")%>%
      select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
    type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
    colors = c("darkred", "white", "steelblue"), # change default colors
    sig.level = 0.05)


#Micro
ggstatsplot::ggcorrmat(
    data = df_wide %>% filter(attribute_value == "Micro")%>%
      select(`Mission command`, `Naturalistic decision making`,
        `Negative towards M.C.`, `Positive towards M.C.`,
        `Opposite of M.C.`),
    type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
    colors = c("darkred", "white", "steelblue"), # change default colors
    sig.level = 0.05)

ggstatsplot::ggcorrmat(
    data = df_wide %>% filter(attribute_value == "Micro")%>%
      select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
    type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
    colors = c("darkred", "white", "steelblue"), # change default colors
    sig.level = 0.05)
```

```
#Norway
ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Norway")%>%
    select(`Mission command`, `Naturalistic decision making`,
        `Negative towards M.C.`, `Positive towards M.C.`,
        `Opposite of M.C.`),
  type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"), # change default colors
  sig.level = 0.05)

ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "Norway")%>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
  type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"), # change default colors
  sig.level = 0.05)

#USA
ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "USA")%>%
    select(`Mission command`, `Naturalistic decision making`,
        `Negative towards M.C.`, `Positive towards M.C.`,
        `Opposite of M.C.`),
  type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"), # change default colors
  sig.level = 0.05)

ggstatsplot::ggcorrmat(
  data = df_wide %>% filter(attribute_value == "USA")%>%
    select(`Autonomy of action`, `Cohesion`, `Commanders intent`,
        `Mutual knowledge`, `Risk acceptance`, `Speed`, `Big picture`,
        `Intuition`, `Mental simulation`, `Situational awareness`),
  type = "parametric", # parametric for Pearson, nonparametric for Spearman's correlation
  colors = c("darkred", "white", "steelblue"), # change default colors
  sig.level = 0.05)
```