



British and American aviators (from left to right) Sgt. Aaron Page, Capt. Ed Swingler, Chief Warrant Officer 2 Edward Chaisson, Lt. James Kelly, and Capt. R. Davidson work through a joint planning process 23 October 2019 during Dragoon Ready 20 at Hohenfels Training Area, Germany. (Photo by Maj. Robert Fellingham, U.S. Army)

Factor Analysis

A Valuable Technique in Support of Mission Analysis

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We don't have as many resources as the Americans, so we have to think harder.

—Anonymous Australian Army officer

Anyone having experience with the British Army's combat estimate (seven questions), NATO's comprehensive operations planning, the U.S. military's joint planning process, or the U.S. Army's military decision-making process will notice that the British and NATO systems seem to generate more collaboration and critical thinking than the U.S. systems, especially when it comes to analysis of environmental and situational factors.¹ (The factors include facts and assumptions, operational limitations, specified tasks, guidance and directives, and considerations such as doctrinal tenets and principles.) Some of this can be attributed to U.S. joint doctrine's aversion to prescribing specific techniques and procedures. Justified or not, this gap provides an opportunity for joint professional military education (JPME) institutions to fill it by introducing and debating the utility of our allies' techniques for factor analysis.

A look into Joint Publication 5-0's (*Joint Planning*) mission analysis discussion shows part of the problem.² The text is definitionally deep but somewhat shallow on the purpose, analysis, and linkages of the various factors that contribute to understanding and planning. Even the paragraph headings from the mission analysis section—

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Determine Known Facts and Develop Planning Assumptions; Determine and Analyze

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Operational Constraints; and Determine Specified, Implied, and Essential Tasks—imply that “determining” and listing the factors is the objective rather than drawing conclusions from them.³ Additionally, this “determining” and listing of factors without the critical analysis as to what they mean is unintentionally reinforced in the suggested mission analysis brief format and in JPME curriculum, where the emphasis is on listing and briefing the lists rather than conclusions.⁴

The reason we determine factors is to analyze and draw conclusions from them that promote understanding and advance the planning effort. Understanding requires a critical analysis of all the operational factors and considerations. Moreover, the selection of the factors for analysis is paramount to supporting the other steps of the planning process and identification of requirements.

Factors can include information available about adversaries and friendlies, geography and oceanography, population demographics, infrastructure, economy, culture, and other relevant considerations that help define the operational environment. Gathering and, more importantly, understanding these factors and their implications sets the foundation on which mission analysis builds and the rest of the planning process relies. While planners are typically very good at determining and listing factors, they too often overlook the analysis because doctrine and JPME curriculum underemphasize factor analysis.

An illustration of the lack of factor analysis is how joint planning groups (JPG), in both actual and educational planning, organize themselves. Due to time constraints and not realizing the purpose of factor analysis, JPGs often assign separate teams or individuals to develop factor lists. One team will do facts and assumptions, another will do implied and essential tasks, while yet another does operational limitations. This type of organization results in stovepiped lists, degraded understanding, and missed linkages. Whereas the British and NATO systems bring the JPG, both the core and functional subject-matter experts (SME), together for a more collaborative discussion and even a debate of the deductions and conclusions from factor analysis.⁵

Understanding Factor Analysis

In the British and NATO systems, factor analysis is one of the most important steps in mission analysis.⁶ It

is actually a simple tool that uses three simple questions: What is the relevant factor? What is its significance for our operation? What should or can we do about it? The answers to these questions contribute to identifying required changes in the operational environment. In other words, factor analysis identifies “stepping-stones” that will take us from the unacceptable situation to the desired end state (the acceptable situation). More simply, factor analysis assists in identifying the conditions to be established and associated effects. It helps clarify what must be done, the mission, and how to accomplish it.

Additionally, factor analysis assists in shaping the plan by identifying a range of other requirements such as actions/tasks, effects, decision points, information requirements, force capabilities, limitations and risks, etc., which will shape the next steps of planning leading to course of action development.

The main sources of information for factor analysis are the commander’s initial guidance and/or higher headquarters planning directives, a current joint intelligence preparation of the operational environment, and staff estimates. Together, they provide planners a point of departure for embarking on the factor analysis. The planning directives hint at what “unacceptable” looks like and state what “acceptable” looks like. For example, it sets the boundaries for the potential operation such as end state, limitations, provisional mission statements, etc. The unacceptable conditions can be viewed as the problems to be solved, while the acceptable conditions (defined by the end state) can be seen as the results we seek.

The identification of key factors is not difficult. It just requires a thorough investigation of the planning documents, the joint intelligence preparation of

the operational environment, and relevant estimates, along with the application of critical thinking. These factors are often facts and assumptions, operational limitations, and tasks, just to name a few. However, planners must sort relevant factors from nonrelevant factors. The mission or problem statement is a very good indicator of what defines relevancy at the operational level, but it may need to be investigated further to identify tasks and actions.

The PMESII (political, military, economic, social, information, and infrastructure) framework provides

one methodology for conducting factor analysis at the operational level, determining relevancy, and framing deductions. Other frameworks such as ASCOPE (area, structures, capabilities, organizations, people, and events) or METT-TC

(mission, enemy, terrain, troops, time, and civilian considerations) may be more appropriate for the tactical level depending on the situation. However, planners should not be fixed to the notion that they have to find factors within each of the framework’s domains. The important thing is first to identify key factors and then to apply the PMESII (or other appropriate framework) to the subsequent analysis.

The three basic questions are more colloquially known as “the what,” “the so what,” and “the therefore.” Figure 1 depicts these questions in a three-column factor analysis format using the more formal factor, deduction, and conclusion terminology.⁷

The first column only states the factor, “the what.” It is a simple statement of fact without any judgment. Therefore, do not state the impact on the operational environment in this column, only the simple factor such as “X-faction is conducting ethnic cleansing.”

Factor	Deduction	Conclusion
<p>The “what”</p> <p>A significant statement (factual or assumed to be true) that has operational implications.</p> <p><i>What is the current state of affairs or trends?</i></p>	<p>The “so what”</p> <p>The implications, issues, or considerations, derived from factors that have operational significance.</p> <p><i>So what are the significances of the factor?</i></p>	<p>The “therefore”</p> <p>The outcome or result reached that requires action in planning or further analysis.</p> <p><i>So what can or should be done?</i></p>

(Figure from the Joint Operation Planning Group Handbook, 2019)

Figure 1. The “What,” “So What,” and “Therefore”



A paratrooper assigned to 2nd Battalion, 503rd Parachute Infantry Regiment, 173rd Airborne Brigade, takes some time to plan for an upcoming training event 11 March 2021 as part of Exercise Rock Topside II at the Joint Multinational Readiness Center in Hohenfels, Germany. (Photo by Sgt. Amanda Fry, U.S. Army)

In the second column, planners state the factor's impact on the operational environment (often negative but can also be positive). This is the "so what," where judgment and evaluation first come into play. Each factor can have several associated deductions. One way to frame and identify possible deductions is to apply the PMESII framework by asking how this factor influences the operational environment within each of the PMESII domains. (Depending on the level of war and particular planning process used, other appropriate frameworks may be applied.) If using PMESII, for example, this could generate a minimum of six deductions per factor, but then again, each factor may or may not impact each domain. Similarly,

there may be more than one deduction within a single domain. While we are the military instrument and our focus should be on the military domain, do not ignore the other domains as they will help us to identify requirements that need to be met by other instruments of power (comprehensiveness).

The third column, conclusion, is the most important and will shape course of action development. This is the "therefore." Each of the deductions must be accompanied by at least one conclusion—and if the PMESII framework has not been applied yet, now is the time to do it.

To maintain visibility on the logic flow and linkages and avoid recording chaos, a numbering system that links each conclusion to a specific deduction and back to

the factor is desirable. Having such a system facilitates collaborative staff work across the planning group and allows other staff members to track and see the relevancy of conclusions. It also avoids the risk of relying on a critical few who understand the whole picture. Figure 2 shows an example of what the three-column factor analysis could look like at the end of the analysis.⁸

The conclusions gained from this analysis are critical to shaping the rest of the planning process. However, the conclusions must be relevant and useful in determining the military and other requirements and specific operational conditions that must be established with respect to forces/actors and time and space.

Once the analysis is done, the conclusions should be brought forward into other planning products. Examples include essential tasks, priority information requirements (PIRs), decision points, requests to higher headquarters, requirements statements, and risk matrices. Some conclusions will even find their way directly into the subsequent concept of operations and/or operation plan. It is important that these conclusions are worded as stand-alone statements that do not require excessive explanation.

The ultimate purpose of factor analysis conclusions is to advance the planning effort. Planners need to operationalize each conclusion using a commonly understood planning terminology. A way to do this is to mark each conclusion with a category that describes its “operationalization.” The idea is to easily classify each conclusion with a label that identifies its role in planning. Figure 3 (on page 70) is a suggested

list of categories along with associated abbreviations.⁹ The list is not exclusive and other categories can be added to it.

Who Does Factor Analysis?

The JPG should conduct factor analysis using all the available SMEs. However, if the available time dictates a split of responsibilities, the core JPG may have to do the initial factor analysis in isolation while the functional staff sections or SMEs conduct their respective estimates separately. Notwithstanding this, sufficient time must be allocated to come together as a complete JPG to share the results. The reason is that the functional staffs and SMEs have supporting inputs to the conclusions made by the core JPG or vice versa, bearing in mind that different staff sections will look at a certain problem set from different perspectives. Additionally, many conclusions will often fall out of a single functional area’s factor analysis, hence the mandatory requirement to share and merge all the outputs from the staff sections and SMEs. This merging of the core and function-

al staffs and SMEs is critical for completeness and validation of the factor analysis. It also provides for a common understanding before going into course of action development.

A Factor Analysis Technique

The following is a factor analysis technique used at the NATO School Oberammergau for its operational level planning that should be considered for U.S. JPME curriculum. Begin with a short statement describing the

Factor	Deduction	Conclusion
1. Factor	1.1 Deduction #1	1.1.1 Conclusion
		1.1.2 Conclusion
		1.1.3 Conclusion
		1.1.4 Conclusion
2. Factor	1.2 Deduction #2	1.2.1 Conclusion
		1.2.2 Conclusion
		1.2.3 Conclusion
2. Factor	2.1 Deduction #1	2.1.1 Conclusion
		2.1.2 Conclusion
	2.2 Deduction #2	2.2.1 Conclusion
		2.2.2 Conclusion

(Figure from the *Joint Operation Planning Group Handbook*, 2019)

Figure 2. Numbering System Example

BP—Branch plan

C2R—Command and control requirement

CC—Critical capability

CCIR—Commander’s critical information requirement

CNMA—Complementary nonmilitary action

CR—Critical requirement

CV—Critical vulnerability

Dec Pt/DP—Decision point

DP/DC—Decisive point or condition

FC—Force capability

IR—Information requirement

IT—Implied tasks

OBJ—Objective

OE—Operational effect

OL—Operational limitation

OR—Operational risk

ROE—Rules of engagement

SC—Strategic communications

T/OA—Task or operational action

(Figure from the *Joint Operation Planning Group Handbook*, 2019)

Figure 3. Conclusion Categories

factor (a fact known to be true or an assumption that has an operational implication). To confirm or disqualify, assumptions must always be accompanied by the commander’s critical information requirements. Again, the factor is a simple stand-alone statement without lengthy explanation. This is the “what.” Assign sequential numbers to each factor (one for the first factor, two for the second factor, etc.).

Next, make a deduction that is the implication, issue, or consideration from the factor that has operational significance. This is the “so what.” The use of a framework such as PMESII or other appropriate framework serves as a mental checklist and promotes critical analysis of the factor and its implication to the framework’s domains. Identify each deduction using the factor’s number with sequential decimal numbers and indicate which framework domain it relates to. For example, if using PMESII, 1.1 (S) for factor #1, first deduction, social domain.

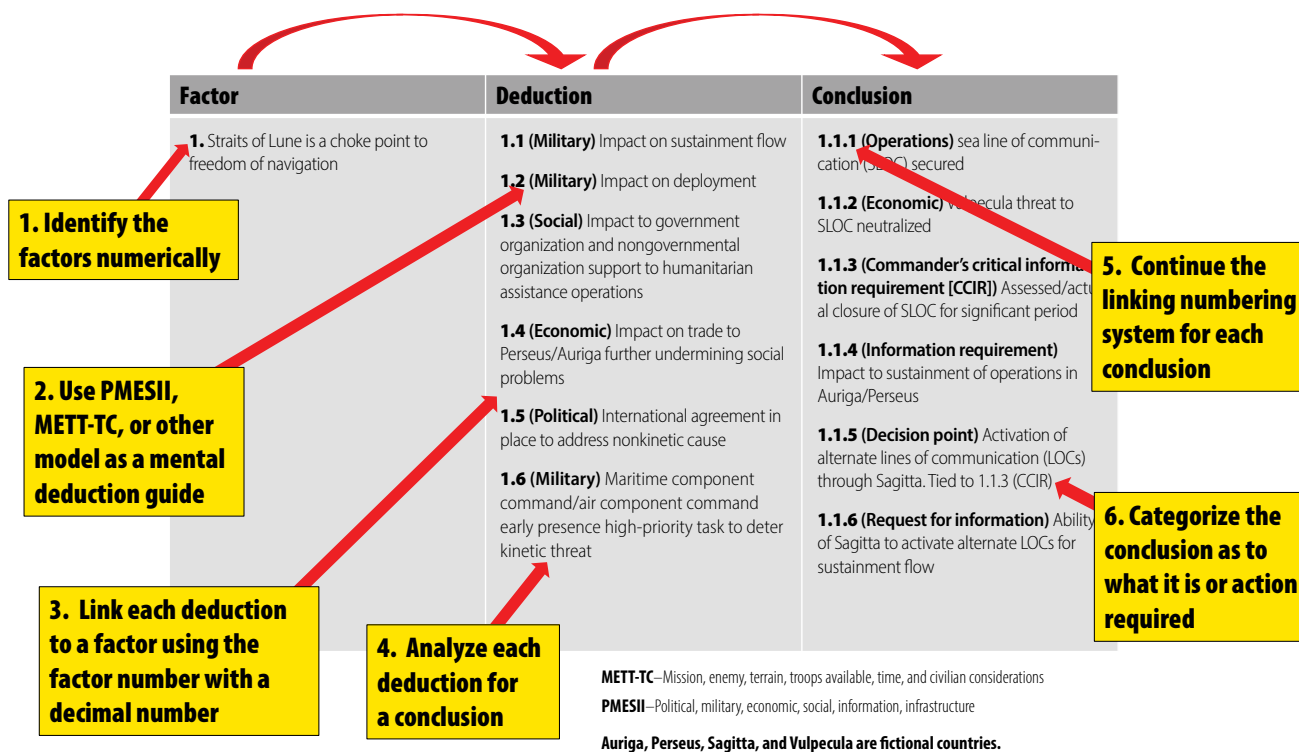
The last step is to make a conclusion that is the result of the analysis that requires action in planning or further analysis. This is the “therefore.” The conclusion should be a short, concise statement, not a paragraph-length analysis. Continue with the numbering and decimal sequencing that links the conclusion to a deduction and a factor. This provides an audit trail and ensures linkages in the analysis. Next, identify the category (see figure 4, page 71, for an example) that the conclusion supports or requires. This translates the conclusion into a planning action or requirement, or as information that can be used later in the plan. For example, 1.2.1 (PIR) is factor #1, the second deduction, and the first conclusion category is for a PIR.

This analysis process should be repeated for each factor type such as facts, assumptions, center of gravity analysis, operational limitations, specified tasks, guidance and directives, and other considerations such as doctrinal tenets and principles. We recommend that each factor, regardless of type, have a unique sequence number. This avoids confusion by keeping each factor and its conclusions numerically identifiable and unique.

At the end of this process, rather than having sterile, stove-piped lists of factors devoid of analysis, planners will have lists of actions and requirements drawn from conclusions that can be quickly references, audited, and crosswalked.

Capturing the Analysis

Using current joint doctrine and most JPME planning curriculum, imagine this situation: someone is giving a mission analysis brief and the commander asks, “What are the potential economic implications of this operation?” Experience suggests the briefer will pause, search his or her memory, and come up



(Figure adapted from the *Joint Operation Planning Group Handbook*, 2019)

Figure 4. Factor, Deduction, and Conclusion Example

with a few plausible economic implications and hope the recorder is writing them down so they can revisit them later.¹⁰ The commander nods in agreement. The briefer panics when the commander asks, “So what are we doing about them?” The briefer scans the room looking for help. Seeing none, he or she mumbles a few possibilities that popped into his or her head and states that the JPG is still looking at the issue. But what if the JPG used factor analysis and captured the analysis using identifying numbers and categorization?

Now imagine an alternative situation: “Major Smith, what are some the potential political implications that we need to think about?” “Sir, I can show you that.” The briefer nods to the information manager who pulls up the factor analysis database spreadsheet and does a sort/search for “political” in the deductions column. “Sir, as you can see, we identified X number of factors that have political implications, and in this column, we have captured possible planning requirements or actions we can take to address those implications.” The former scenario is the result

of “determining factors” and the latter of factor analysis. It should be obvious which is preferred.

The NATO School has its students record the factor analysis in a database rather than on slides. By using columns/fields for factor numbers and titles, deduction numbers and description, framework domain, conclusion numbers and descriptions, and categorization, they created a searchable and sortable database that is available to all planners (see figure 5, page 72). Such an easily accessible and used database facilitates efficient staff planning and collaboration by allowing individual planners to access the information and sort through it for analysis relevant to their particular action. For example, intelligence planners can quickly sort for PIRs, find them, and see their relevance. Additionally, the spreadsheet provides the ability to audit and crosswalk factors with actions and identify gaps or oversights.

Recommendations

The factor analysis technique taught at the NATO School, while not explicitly in U.S. joint doctrine, is

Factor number	Factor description	Deduction number	Deduction description	Framework— political, military, economic, social, infor- mation, infrastructure (PMESII)	Conclusion number	Conclusion description	Category
1	XXX	1.1	XXX	Military	1.1.1	XXX	Commander's critical information request
		1.2	XXX	Political	1.2.1	XXX	Economic
					1.2.2	XXX	Task
		1.3	XXX	Information	1.3.1	XXX	Information requirement

(Figure adapted from the *Joint Operation Planning Group Handbook*, 2019)

Figure 5. Example Database

within the intent of the U.S. joint and service doctrine. JPME institutions that teach the joint planning process or service planning processes should seriously consider adding NATO-style factor analysis as a technique to their discussion of mission analysis. JPME instruction in factor analysis can shift the current mission analysis discussion from simple determination of factors and creations of lists to actual analysis of those factors

and place the correct emphasis on conclusions. After all, it is the conclusion and resulting actions, not the simple listing, that are the most valuable. Additionally, adoption of factor analysis will contribute to the closer harmonization of planning process with our multinational partners. Lastly, joint and service doctrine should consider a discussion of factor analysis to help shift the focus away from determination to analysis of factors. ■

Notes

Epigraph. Paraphrased from an Australian Army officer at the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, in 2020.

1. Statement based on Eikmeier's experience: several iterations of the United States/British Exercise Eagle Owl between 2018 and 2020; operational-level planning in Combined Forces Command, Republic of Korea, U.S. Central Command, and Multinational Forces Iraq; teaching Joint Planning 2001–2020 at the U.S. Army War College and U.S. Army Command and General Staff College; and serving as a guest instructor at the NATO School in 2019.

2. Joint Publication 5-0, *Joint Planning* (Washington, DC: U.S. Government Publishing Office, 1 December 2020), III-17–III-20.

3. *Ibid.*, V-8.

4. Eikmeier's experiences.

5. Iova's experience as lead instructor for the Strategic Operations Planning Course and Comprehensive Operations Planning Course delivered by the NATO School.

6. *JOPG (Joint Operation Planning Group) Handbook*, Comprehensive Operations Planning Course (Oberammergau, Germany: NATO School, 2019), sec. 21.

7. *Ibid.*

8. *Ibid.*

9. *Ibid.*

10. Eikmeier's and Iova's experiences.