

Technical Report 1439

Shared Mental Model Development in Army Small Units

Alissa C. Fleming
Cassie A. Berry
U.S. Army Research Institute

Kristina Wright
Consortium of Universities of Washington



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**United States Army Research Institute
for the Behavioral and Social Science**

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**SCOTT B. SHADRICK, Ph.D.
Acting Director**

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Technical Review by

Darin L. Galyer, U.S. Army Research Institute
Nicole T. Harrington, U.S. Army Research Institute

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14. ABSTRACT Small Army units face frequent turnover as a result of personnel reassignment, separation, and promotion. As teams receive new members and return to full strength, Squad Leaders are faced with integrating the new member into the team and maintaining the shared knowledge already developed to sustain Squad readiness. Although the importance of shared understanding is specified in Army doctrine, Squad Leaders do not receive formal training on how to effectively and efficiently share information with new Soldiers. This report reviews the benefits that shared mental models have on team effectiveness and describes development of a research product to provide Squad Leaders with ways to quickly integrate new members and maintain shared understanding within existing Squads.					
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**Alissa C. Fleming
Cassie A. Berry**
U.S. Army Research Institute

Kristina Wright
Consortium of Universities of Washington

**Foundational Science Research Unit
Stefanie P. Shaughnessy, Chief**

**Emerging Research Unit
Alok Bhupatkar, Chief**

January 2024

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SHARED MENTAL MODEL DEVELOPMENT IN ARMY SMALL UNITS

EXECUTIVE SUMMARY

Research Requirement:

The U.S. Army operates using a large system of interconnected teams, which face frequent turnover due to planned moves, separations, and other factors. The recurrent churn of Soldiers moving into and out of teams can create problems for the transfer of knowledge. For example, lower levels of shared understanding of new members can produce challenges as units build and work to maintain readiness. Nonetheless, the Army's thorough in-processing and strong training approach offer many opportunities to quickly build shared understanding after a new member joins the team. The Army would benefit from a tool to assist Squad Leaders with capitalizing on opportunities to quickly and efficiently create shared understanding within their Squads following membership change.

Procedure:

Researchers conducted a literature review to gain a comprehensive understanding of shared mental models. Then, experienced Squad Leaders participated in focus groups. Focus group participants provided best practices and suggestions for integrating new members in a Squad and details about the types of information shared with Soldiers new to a unit in the Army. They also provided information about how shared information is useful for achieving mission completion. Data from the focus groups were synthesized and used to create a trifold summarizing suggestions and best practices.

Findings:

Focus group participants discussed a variety of frequently occurring activities that could be used to help build shared understanding such as participation in Warrior Skills Level 1 training, receiving performance feedback, and Sergeant's Time Training. Participants also emphasized the importance of sharing the *why* behind an action to provide context and motivation for new Soldiers and providing opportunities for social activities with the Squad.

Utilization and Dissemination of Findings:

Findings were synthesized, summarized, and used to create a trifold handout for Squad Leaders. In addition to suggestions and best practices provided by Squad Leaders, the trifold includes a section about general knowledge management and the importance of developing shared understanding. Novice Squad Leaders and Team Leaders preparing to become Squad Leaders can use this guide to help identify occasions to use frequently performed activities to strengthen shared understanding within their Squads.

SHARED MENTAL MODEL DEVELOPMENT IN ARMY SMALL UNITS

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Shared Mental Model Development in Army Small Units

A shared understanding of tasks, procedures, and team member capabilities, termed shared mental models in the academic literature, helps teams accomplish tasks. As mental models can differ in the type of knowledge they hold as well as what is shared (e.g., Cannon-Bowers & Salas, 2001; Cannon-Bowers et al., 1993; Salas et al., 1994), researchers have used different terms to identify various types of mental models or team cognition (e.g., team mental models, transactive memory systems). For example, Mohammed et al. (2010) define team mental models as “organized mental representations of the key elements within a team’s relevant environment that are shared across team members” (p. 876). Individuals and teams hold mental models. Overlap and consistency in individual mental models creates a stronger shared mental model at the team level. In this report we use the term shared mental models¹ to refer generally to shared understandings between team members.

Shared mental models have a role at all points in the team lifecycle, including formation in new teams and maintenance on existing teams. A team experiencing member change will need to integrate new members into the team’s existing shared mental model along with potentially revising the shared mental models that exist among current members. Indeed, the U.S. Army considers creating a shared understanding to be a critical component of team-building. Having a shared understanding allows mission success through a common understanding of the strategies being used and the role that each member will play in accomplishing the task (Army Techniques Publication [ATP] 6-22.6; U.S. Department of the Army, 2015). Moreover, Army doctrine posits that developing shared understanding is a way to quickly develop a team.

The U.S. Army has recognized the importance of shared mental models as well as the role leaders can play in developing them. Working on a team brings together a group of individuals, each with unique characteristics, experience, and expertise, to accomplish a shared goal. Leaders can help in orienting individuals on a team and fully utilizing each member’s ability to better accomplish the team’s goals. This requires shared mental models, including learning, situational understanding, and knowledge of who holds what expertise on a team (ATP 6-22.6; U.S. Department of the Army, 2015). Leaders can be more effective by anticipating their teams’ needs, values, reactions to various leader behaviors, and shared understanding of team goals (ADP 6-22; U.S. Department of the Army, 2019). This report includes a broad overview of important shared mental model concepts, with a focus on development, and describes the design of a product to assist Squad Leaders with integrating new members into their Squad.

Shared Mental Model Functioning

Teams use shared mental models to coordinate and achieve goals. Shared mental models allow team members to assess which tasks and actions are important for team performance and functioning. Individuals draw upon their knowledge and their team members’ knowledge to coordinate actions to achieve tasks and goals (Mathieu et al., 2000; Salas et al., 1994). Furthermore, shared mental models allow for the prediction and explanation of team behavior

¹ A note about terminology: At times we also refer to shared mental models as team mental models to match the source being cited. Note that team mental models may also refer to shared mental models that contain team content (Cannon-Bowers et al., 1993), which we refer to as a type of shared mental model.

and actions so that team members can anticipate how others on the team will react to a task or situation. Thus, shared mental models function as a tool to predict task demands and allow team members to coordinate activities (Cannon-Bowers et al., 1993; Salas et al., 1994).

Shared mental model functioning has been shown to decrease over time (Hamilton, 2009; Levesque et al., 2001; Mathieu et al., 2000). Some have theorized that this decrease in functioning is a result of a lack of developmental feedback given to the team once the beginning stages of development have passed. These findings suggest the need for continual training throughout a team's lifespan (Mathieu et al., 2000).

Formation and Development

The process of mental model formation begins when a team is initially created or when a new member joins the team; further development of these shared and individual mental models occurs throughout the lifespan of the team. Generally, similar processes and factors influence both the initial formation and subsequent development of mental models, namely team member interaction and communication, team training, and individual-level characteristics.

Shared mental models are formed through collaborative information processing in groups. Groups have more information storage capability than individuals, due to the ability of each member within a group to encode, store, and retrieve information (Hinsz et al., 1997). This allows information to be processed and shared amongst team members creating group-level knowledge. Group-level knowledge is beneficial for the functioning of the group though some efficiency may be lost due to the need to collaborate (Hinsz et al., 1997). In order to maximize the benefits of knowledge sharing in groups, the group must develop mechanisms to distribute the information gathered, such as that held in shared mental models (Levine et al., 1993). Individuals have their own set of mental models that are combined with those of their team members as they begin working together in a team setting (McComb, 2007). Some research has noted that shared mental models form through a combination of various factors, such as individual characteristics, demographics, and team interactions (Cannon-Bowers et al., 1993; Glickman et al., 1987; Hinsz et al., 1997; Langan-Fox, 2003; Levine et al., 1993; McComb, 2007; Van den Bossche et al., 2011). Other factors can enhance the formation of shared mental models and lead to improvements in team performance, such as the influence of leadership and team learning behaviors (Glickman et al., 1987; Van den Bossche et al., 2011).

During formation, norms and expectations are laid out so that team members can begin to understand how the team functions and the ways in which the individuals work together (Klimoski & Mohammed, 1994). For instance, when a new team member is introduced to a team, the team members are motivated to share norms and practices, and the new member is also motivated to learn how things operate within the team. This willingness to learn allows them to be open to the team's explanations of expectations (Levine et al., 1993). Additionally, previous research has noted ways in which to accelerate the processes of shared mental model formation. These processes include pre-selection, self-selection, understanding early team failures or successes, and formal training (Klimoski & Mohammed, 1994; Louis, 1980). However, finding ways in which to accelerate shared mental model formation is beneficial to the functioning of a team only if the shared mental models are of high quality (Mathieu et al., 2005).

Shared mental models change and develop throughout the lifespan of a team as a result of the group's continued interactions and functioning over time (Langan-Fox, 2003). Interactions such as communication amongst team members are critical for developing shared mental models (Klimoski & Mohammed, 1994; Langan-Fox, 2003; Pearsall et al., 2010). As a team communicates, individual team members learn and incorporate new information and skills into their team mental model (Langan-Fox, 2003). Moreover, team member interactions allow team members to understand each other's roles and responsibilities. This understanding leads to role identification behaviors that aid in shared mental model development (Kozlowski et al., 1999; Pearsall et al., 2010). The ability for team members to understand not only their role, but also the roles of others on the team, facilitates the development of shared mental models. Additionally, research has shown that individual cognition can be affected by the presence of others (Levine et al., 1993). For instance, when an individual believes that they will need to share information with others, their cognitive structure becomes more organized and distinct than if they were to keep the information to themselves. This process is called anticipatory cognitive activity (Levine et al., 1993). Thus, shared mental models have structures and functions that benefit from continual development over the lifespan of the team. Through training and adaptation, teams have been shown to improve not only their shared mental models, but also their individual mental models (Marks et al., 2000; McComb, 2007; Uitdewilligen et al., 2013).

Antecedents to Shared Mental Model Formation and Development

Previous research has identified individual, team-based, organizational, and environmental antecedents to shared mental model formation and development (Klimoski & Mohammed, 1994; Kraiger & Wenzel, 1997; Levine et al., 1993; Marks et al., 2000; McIntyre & Foti, 2013; Rentsch & Klimoski, 2001; Uitdewilligen et al., 2013). Individual antecedents to shared mental model formation and development are the most proximal to shared mental models, meaning that they play a significant role in shared mental model creation (Kraiger & Wenzel, 1997). An individual's personality traits, like cooperation and agreeableness, have been found to be predictive of mental model formation and relate to the development of mental model similarity over time (Kraiger & Wenzel, 1997; Resick et al., 2010).

Team-based antecedents of shared mental models include team composition and task characteristics. For example, more homogeneous team compositions, such as shared expertise or experiences, will often produce similar shared mental models (Klimoski & Mohammed, 1994). Specifically and importantly, previous studies have shown that gender and age similarities amongst team members have positive outcomes for shared team cognition (Rentsch & Klimoski, 2001). Conversely, teams that have more racial diversity amongst team members are less likely to have mental model similarity (Fisher et al., 2012).

Task characteristics, such as the complexity of a task, as well as process characteristics, like coordination and communication, are all antecedents to a team's ability to develop effective shared mental models (Kraiger & Wenzel, 1997). Studies have shown that teams that have greater cohesion can share and collaborate in ways that facilitate shared mental model development (Klimoski & Mohammed, 1994). Teams that plan together have also been shown to develop more effective shared mental models (Sartori et al., 2006). Additionally, the prior success of a team can contribute to shared mental model development. Research highlights that a

team that has learned how to function and work together has learned the skills and techniques needed to form and develop shared mental models for future action (Kraiger & Wenzel, 1997). Moreover, studies have found that in teams that have limited experience working together, the cognitive ability of team members is an important factor in the emergence of mental model accuracy and similarity (Resick et al., 2010).

Lastly, organizational and environmental antecedents prompt shared mental model formation and development. For instance, the organizational culture that a team is nested within shapes shared mental model development through systems in place to oversee the functioning of the team and overall organizational structures that the team must work within (Kraiger & Wenzel, 1997). Organizational features such as reward systems, support, and training have been shown to be related to shared mental model development within a team (Kraiger & Wenzel, 1997). Leadership is another factor that is associated with team mental model development. McIntyre and Foti (2013) found that shared leadership was beneficial to the accuracy of team mental models and team performance overall due to the perceptions of reciprocal leadership. Environmental conditions such as social factors are also related to team members' cognition and processing, which in turn is related to shared mental model development (Levine et al., 1993), because the social factors create the environment and space in which shared mental models are formed and allowed to grow.

Shared Mental Model Structure and Content

Shared mental models are structured as collections of knowledge organized into meaningful patterns. Shared mental models are often assessed in terms of their similarity between team members (i.e., how similar team members' mental models are to other team members, also called convergence) and their accuracy (i.e., how well the shared mental model represents the task environment; DeChurch & Mesmer-Magnus, 2010a). The intricacy of shared mental models may depend on multiple factors within a team and task, like the complexity of content to be included in the mental model (Kraiger & Wenzel, 1997), the type of cross-training used to help establish shared mental models (Marks et al., 2002), and the interdependence of tasks (Maynard & Gilson, 2014). Moreover, team members' individual differences may also affect the form and function of shared mental models (Edwards et al., 2006; Klimoski & Mohammed, 1994). Shared mental models with intricate structures allow teams to adapt in order to continue to meet performance expectations. For example, military teams need to be able to predict how others will act in complex and dynamic environments. Therefore, the structure of their shared mental models must change and develop as situations arise in these complex environments (McComb, 2007). To allow for this, shared mental models are structured hierarchically to achieve better performance when solving complex problems (Eylon & Reif, 1984).

To better understand mental model structure, scholars have categorized types of mental models in a variety of ways. Different shared mental models are created in order to represent specific types of knowledge that can be shared. For example, a model may include declarative knowledge, which includes concepts in the area of interest and how these concepts are connected. Other models include procedural knowledge, which includes information about the steps necessary to complete tasks or activities and the order in which they must be completed.

Lastly, some models contain strategic knowledge, which includes information that allows teams to solve problems by having a shared knowledge structure. This knowledge structure makes strategizing more efficient because members have more accurate expectations about other team members (Salas et al., 1994).

One conceptualization of *types* of shared mental models includes an equipment model, a task model, a team interaction model, and a team model (Cannon-Bowers et al., 1993). Equipment mental models include information about how equipment functions, including limitations, and how equipment may fail. The contents of this type of mental model are very stable. Team members who know about equipment can use that knowledge to complete tasks. When completing tasks, team members will need an understanding of how to complete the task, including requirements of many different situations and strategies for dealing with limitations (task model). In order to complete a task, team members may have to interact with others on the team. Thus, they need an understanding of what part(s) of the task they hold responsibility for and how information flows between team members (team interaction model). Both task and team interaction models have moderate stability (Cannon-Bowers et al., 1993). The fourth type of model refers to a team member's knowledge of the knowledge, skills, and abilities of their teammates (team model), which has low stability (Cannon-Bowers et al., 1993). Having an understanding of that information will allow a team member to capitalize on those skills and complete tasks more effectively. Although four types of mental models are often described (e.g., Cannon-Bowers & Salas, 2001), they can often be collapsed into taskwork and teamwork mental models (Mohammed et al., 2010).

The need for overlap between different mental models to take full advantage of the shared knowledge means that multiple types of models may be present in a team at any given time (Cannon-Bowers et al., 1993; Klimoski & Mohammed, 1994; McComb, 2007; Orasanu & Salas, 1993). These different types of mental models are specific to the type of task (Cannon-Bowers et al., 1993). However, the different types of mental models are not necessarily related to each other (Mathieu et al., 2000). Measuring shared mental models and connecting them to outcomes can be difficult. Refer to Appendix A for an overview of shared mental model measurement and the relationship between shared mental models and outcomes.

Training Shared Mental Models

Because of the benefits that shared mental models can offer teams, organizations may seek ways to foster their development. Indeed, individuals can be trained to develop shared mental models that incorporate knowledge that aligns with the organizational structure (Cannon-Bowers et al., 1993). Not only does training allow individuals to develop a shared mental model, but it also allows for refinement of existing mental models through formal instruction about procedures or declarative knowledge (Klimoski & Mohammed, 1994). Specific types of mental models are improved by different types of training (Hamilton, 2009). Teams with existing shared mental models can apply newly acquired mental models to new tasks. This allows these teams to perform well on the new task in comparison to teams that did not have previously established mental models (Espevik et al., 2011). Training can also accelerate the development of a shared mental model (Klimoski & Mohammed, 1994). Moreover, training for shared mental models may be used to strengthen mental models when there are unfavorable conditions, like stress, that cannot be alleviated (Ellis, 2006).

The composition of training, as well as the techniques used in training have been shown to be a factor in the overall success of shared mental model development. Past research has found team training to be more beneficial than individual training because it allows team members to gain a more holistic understanding of team needs (Sartori et al., 2006). With sufficient training, even teams that are heterogeneous in experience or expertise can develop successful team mental models (Klimoski & Mohammed, 1994). However, training design should consider the type of team completing training. For instance, when training non-experts, it is important to focus on a simple version of the material rather than getting into specific details (Kaplan, 1990). Moreover, training with non-experts should provide plentiful concrete examples to demonstrate the breadth and boundary conditions of the knowledge (Kaplan, 1990). Methods introduced in training should have guided practice and incorporate feedback mechanisms (e.g., debrief sessions) to solidify what has been learned (Cannon-Bowers et al., 1993). Training outcomes are also strengthened by including strategies for sharing or distributing knowledge (Cooke et al., 2007).

A common training method used to develop shared mental models in a team is cross-training. Cross-training aims to improve the understanding of others' roles and responsibilities within a team and focuses on how team members know, observe, or perform the duties of their teammates (Marks et al., 2002). Cross-training might involve providing declarative, procedural, or strategic knowledge to some or all members of the team to increase understanding of team roles (Marks et al., 2002). Cross-training has also been found to enrich the development of shared team interaction models by providing opportunities for coordination (Espevik et al., 2011; Marks et al., 2002). As a result of cross-training, team members may begin to develop a shared cognition due to performing role identification behaviors. Role identification behaviors refer to team members engaging in actions to understand their teammates' roles and responsibilities (Kozlowski et al., 1999; Pearsall et al., 2010). This has been shown to increase accuracy of team interaction mental models and to increase team performance (Pearsall et al., 2010). Importantly, cross-training need not always involve positional rotation, or performing a teammate's job, to gain a better understanding of the teammate's role; positional clarification and positional modeling may also be effective. Positional clarification raises awareness of the roles of other team members while positional modeling involves a verbal discussion and observation of a teammate's role (Marks et al., 2002).

In addition to cross-training, other training methods have been established to improve and develop shared mental models. Some of these methods include team coordination training (Hamilton, 2009) and team-interaction training, as well as training team leaders to foster shared mental models (Cannon-Bowers et al., 1993; Klimoski & Mohammed, 1994). In practice, training has been used with military groups to develop or improve shared mental models. Specifically, over the years, military teams have been used to study the development of and improvement upon shared mental models in various settings (e.g., Tossell, 2008). For example, U.S. Army units used structured-simulation based training to develop shared mental models (Shlechter, 2000). Another type of training, staff grouper training, focuses on developing shared mental models at the leadership level within Army brigades (Shlechter, 2000).

Project Purpose

As described above, the academic literature on shared mental models includes a great deal of research on training to build and maintain shared mental models. Because of the impact various factors have on shared mental model convergence, training has been viewed as a mechanism to encourage and foster convergence. Well-designed training and motivation practices should accelerate the convergence process, increasing the likelihood of forming shared mental models (Cannon-Bowers, 2007; Mohammed et al., 2010).

Individuals who hold a leadership role can shape expectations and model behaviors that are desired or need to be shared in order to function and achieve goals. Training individuals who lead to create space and time for shared mental model formation and development facilitates team behaviors and formation of shared mental models (Cannon-Bowers et al., 1993; Klimoski & Mohammad, 1994). Team members communicate, cooperate, give suggestions, and even criticize in order to find what works for the team. They learn what behaviors are effective and conducive to teamwork and the task and then continue to perform these behaviors (Glickman et al., 1987; Van den Bossche et al., 2011). For some, these team learning behaviors may occur naturally, but for others, training and leadership direction are needed to encourage these behaviors.

Squad Leaders spend a great deal of time with their teams and have a part in training for collective task accomplishment. Because Squad Leaders spend so much time with their Squads, they have a unique opportunity to build and maintain shared mental models during frequently performed activities and as part of the integration process for new team members.

The purpose of this project was to develop a tool to (1) assist Squad Leaders with developing a shared mental model among their Squad after a new member joined the unit and (2) help maintain a comprehensive shared mental model by leveraging daily and frequently performed tasks to share knowledge. The remainder of this report describes the process used to gather information from subject matter experts (SMEs) on best practices for integrating new Soldiers and sharing knowledge, the development of a research product for Squad Leader use, and implications for how building and maintaining shared mental models is important in unit development.

Method

Focus Groups

Researchers interviewed 16 Squad Leaders with at least one year of experience in a series of seven virtual focus groups. Participants came from both combat arms (e.g., 11B) and support (e.g., 88M, 36B²) military occupational specialties (MOS) in FORSCOM locations. Participants were asked questions in four sections over the course of an hour-long focus group. The first section included questions about how new junior enlisted Soldiers learn the ropes upon joining a Squad (e.g., what are the formal and informal mechanisms that promote learning). In the second

² These identifiers refer to the military occupational specialties of participants. 11B refers to Infantryman. 88M refers to Motor Transport Operator. 36B refers to Financial Management Technician.

section, researchers asked questions about the type of knowledge that Soldiers need to share and who needs to share that information. In the third section, participants answered questions about membership turnover and its impact on shared understanding with a Squad. The fourth and final section included questions about how the process of bringing a new Soldier onto a Squad might be improved. See Appendix B for the focus group protocol. Focus groups were audio recorded, transcribed, and verified.

Thematic Analysis and Product Development

The analysis largely followed the process laid out by Braun and Clarke (2012) for thematic analysis. Three researchers independently reviewed the transcripts for themes, making note of recurring ideas in whatever method they saw fit. Next, researchers met to share themes and discuss similarities and differences. After discussion, there were three general categories of information that emerged. These categories were general Army knowledge (e.g., uniform standards), task-related information that would be in a Squad shared mental model, and team-related information that would be in a Squad shared mental model. General ideas and points of interest from each researcher's review of the transcripts were synthesized and organized into these three categories.

As participants shared both content of and mechanisms for building shared understanding, researchers looked for common patterns within and across the three sections, resulting in a theme reorganization of 10 themes. Researchers worked to condense the content from bullet points and phrases into actionable recommendations that reflected best practices and tips shared during the focus groups. Next, researchers identified quotes that illustrated the best practices. Researchers then reframed the information to make it more digestible for Squad Leaders. Specifically, the content was reviewed and sorted into different occasions when Squad Leaders could use the best practices shared during the focus groups to help new members establish a shared mental model quickly and efficiently. These times included during integration counseling, on-the-job training, and physical training (PT). Additional content was added to a miscellaneous section to make sure as many best practices were included as possible. References to Army doctrine were added, and quotes were gathered to illustrate suggestions in practice. However, quotes were removed from the final draft of the research product due to space constraints. The information was formatted into a trifold pamphlet (Appendix C) that Soldiers would be able to easily carry with them for reference.

Researchers gathered feedback on the trifold draft from two sources. First, an academic professional with experience studying shared mental models and developing products to improve shared mental models reviewed the trifold and provided written feedback. Second, a convenience sample of four Squad Leaders with an Infantry background and at least eight years of military tenure provided feedback about the trifold during two focus group sessions. One session had less experienced Squad Leaders (one year in role), and the second session had more experienced Squad Leaders (two and a half years to three and a half years in role). Squad Leaders reviewed a physical copy of the trifold draft before providing feedback about the content and format. Following feedback from SMEs, researchers made edits to the trifold to address participant concerns and suggestions.

Results

Focus Group Themes

Researchers assembled a variety of themes from the focus group transcripts to be included in a research product. The excerpts of participant utterances below illustrate the 10 themes describing content important for shared understanding and mechanisms for developing shared understanding in the Army. The information in these themes was recategorized into frequently occurring occasions and incorporated into the trifold research product.

Integration Counseling

Their initial integration into the Army is going to be an important part of really the rest of their career because it's going to shape essentially their basic knowledge and everything from there has to change or improve or maybe it improves what's around him.

– Participant 1³

I think most initial counselings are fairly boilerplate. It's just kind of setting very basic standards that are universal across the Army. Timeliness and uniform, and standards and discipline sort of stuff. Expectations when it comes to PT. That sort of thing. And it doesn't really get into the nuts and bolts too much of what the Soldier's specific job is. That kinda comes afterwards, at least in my experience.

– Participant 2

For the integration counseling I tell them what I expect from them. The first thing that I do is listen to what they want like, why did they join the Army, what do they want to get out of the Army, what are their goals. So I tell them, okay what are you here for and what is your plan? And once they tell me that like why they joined the Army and what their plan is, or maybe they'll be like, I don't have a plan I just joined the Army, that's okay.

Next, I'll go over my expectations. My first expectation is that I don't expect them to know everything. Why? Because they just came in the Army. But I do expect them to be willing to learn. ...

– Participant 3

It's essentially just the most basic expectations like timeliness, ensuring that they're in the correct uniform, ensuring that they're performing during PT. Basic standards and discipline when it comes to customs and courtesies with NCOs⁴ and officers. ... And it's all about just kind of setting the groundwork for expectations that, really the Army has of them as individual Soldiers.

As I said earlier, it's really very boilerplate. A lot of the initial counselings can be very much copied and pasted from one Soldier to the next with very few minimal editing to make it specific. ...

– Participant 2

³ Participant numbers are assigned in order of presentation in this report.

⁴ Non-commissioned officer.

These quotes illustrate that Squad Leaders use integration counseling as a way to convey basic information to their Soldiers. When Squad Leaders share information, they incorporate both general Army information and unit-specific information. This information helps form both task-related and team-related mental models for new Soldiers.

Army Regulations

Participants acknowledged that there were Army regulations that pertain to counseling (U.S. Department of the Army, 2014; ATP 6-22.1), but that there was not always a formal guideline for how to conduct an initial counseling. That is, sometimes the integration counseling was seen as something set out by the Army that had to be done rather than always being an effective step in the process of bringing on a new Soldier.

So there are Army regulations that pertain to counseling. It doesn't specify in initial counseling, you must hit A, B, and C.

– Participant 2

[continued dialogue] I think to kind of go off of that, like he said there is a regulation that kinda outlines, hey this is counseling and breaks it down for you, but it's more of a you have someone like myself who's been in for a while versus a young Sergeant that just got a team let's say, or even a younger Corporal, Specialist. It's more of a, hey I'm gonna Google initial Army counseling, basically go on Army Writer or whatever website and copy-paste it and kind of tailor it a little bit towards the Soldier and a little bit towards the unit. I would say more towards the unit because every unit's standards are different so that's kind of the gist of how that process works.

– Participant 4

Counseling lays out a guideline. But I think for most Soldiers it's not, it can be effective, but it's not really, I wouldn't say formal, I wouldn't say it's a formal guideline for them to understand. I think it's more getting them out there doing the things that they [TRAILS OFF]. Like learning their scope of daily duties. I think that's more of a hands-on experience, and I would say the formal part of it – counseling – yes, that does help certain individuals but I think most people in the Army see a counseling as a tool to, more of just a, okay I gotta do this because the Army's telling me to do it, not something that's truly effective.

And that's not saying counseling's bad because you can get to some people, but that's just not, the tool is not good for at least seventy-five percent of the Soldiers in the military.

– Participant 4

Squad Leaders acknowledged that there are Army regulations that provide general guidance for counseling. Some Squad Leaders tailor this information to be unit-specific or specific to the Soldier. Not all Soldiers benefit to the same degree from integration counseling, some Squad Leaders noted. Soldiers would benefit from a more thorough understanding of what information to share during counseling. Squad Leaders may benefit from training about how to convey information to build mental models, as past research has shown that to be effective (Cannon-Bowers et al. 1993; Klimoski & Mohammed, 1994).

Counseling Activities

Besides sharing basic information about the Army and expectations, participants said they also discussed topics like family and/or financial issues. As part of counseling, Squad Leaders may also ask a Soldier to set goals that they could review progress on together in the future, and introduce the Soldier to others within the Platoon or Company.

Financial fitness, ensuring that, for a lot of these kids it's their first real job, they're fresh from home so they start getting their paychecks for the first time, and they start going out and blowing it on things they shouldn't be.

– Participant 2

I usually will have my Soldiers [INAUDIBLE] walking around the whole company, show them where everything is, all the locations of the unit, company, and introduce them to the platoon itself as well as the squad they'll be interacting with and ask them any questions they may have ...

[A]ny financial issues they may have that they need to bring up, same thing with family issues. And what time to be, the right place, the right time, the right uniform, what we expect of them, for their rank as well. And their job and any issues they may have for them to come on and talk to their leadership so we can try to assess the situation.

– Participant 5

So an integration counseling, I'll sit down with them. I'll give them, first I'll introduce myself, make sure they're okay. I'll talk to them first, see how they're actually feeling, how they feel about their first time being away from home if it's a new Soldier. Then I'll get to the paperwork side of things of, hey these are the policy letters, the on and off post establishments, my phone number, my information. Also I'll give them the call roster for the platoon.

– Participant 6

On day one I take the Soldier with a sponsor and I introduce him to everybody there and then the NCO support channel and straight up from there all the way from platoon sergeant to battalion commander. ... usually like Sergeant Major he'll sit down with the Soldier and ... will tell the Soldier his backstory ... And usually when you see a Sergeant Major, you're like, oh wow he's a Sergeant Major. When he tells you how he started, he's like, hey I started just as you. I started as an E1, a Private with no rank, that was me [INAUDIBLE]. I feel like that kind of motivates the Soldiers. They're like, hey my Sergeant Major did it, he was just an E1 so I can do it too. So that's one of the things I forgot to mention about my unit does as well.

– Participant 3

As part of integration counseling, Squad Leaders work to find out about Soldier concerns related to family or financial issues as well as personal and professional goals the Soldier has. This information helps the Squad Leader develop an understanding of what the new team member needs for them to be successful (building their team interaction shared mental model). Squad Leaders may also engage in information sharing by walking around the unit with the new

Soldier to introduce them to others within the unit. Walking around to meet others in your unit can help with building a team interaction shared mental model as the new member learns about who knows what and puts a face to names.

Peer Imitation

Interacting with team members allows new Squad members to watch and copy their peers. Sometimes the new Soldier is assigned a mentor of sorts, which allows the new Soldier to probe the mentor's knowledge, ask questions, and develop their own knowledge. This mentor may be a Specialist, which reduces the potential power distance barrier of interacting with an NCO.

I immediately assign them a sponsor which is typically a Specialist but occasionally it'll be an E5 team leader or a very responsible PFC [Private First Class]. I assign them a role model...

– Participant 1

So as an 88M go through the PMCS [preventative maintenance checks and services] process, teach them about the truck. I feel like it's easier for them to be with a Specialist than an NCO just because they might be intimidated, might be a little bit of an intimidating factor. Feel like it's easier to learn in a stress-free environment. They should show them what we do every day and then just PMCS portions of the truck and maybe some secrets not everybody knows.

– Participant 6

[T]aggin' along with your battle buddies, ya know? ... [T]he last thing I want is to throw one of my Soldiers into a task that they don't know anything about. For example, we do Motor Pool Mondays, okay now you have to go PMCS, like inspect the vehicle. They're gonna be like, well how do I do that? I always try to, like the other NCO was saying, I always try to tag them along with a battle buddy who knows what they're doing. ... So every time we do something different if we are at the motor pool, I try to put them with somebody who I know is really good at that.

– Participant 3

[T]hey're gonna stay with that sponsor right on his hip at least for a couple weeks until he has a grasp on what the day-to-day battle rhythm's gonna look like.

– Participant 1

They try to find a sponsor that is a similar rank and similar living situation to the incoming Soldier. So we'll try to pair married Soldiers with married Soldiers. Single Soldiers with single Soldiers. E5s with E5s. E6s with E6s. Just so that a married Soldier would be able to provide another married Soldier with the information that they need to possibly get a child in school, or get a house on post or off post. Whereas if you assigned a single Soldier to a married Soldier, that single Soldier sponsor may not know exactly how to apply for on post housing or how to enroll a child into a daycare or school or doesn't know any of that information. We try to give them the best sponsor possible.

– Participant 7

Squad Leaders noted the importance of placing a new Soldier with a well-matched mentor. Research has shown that demographic similarity can be beneficial for team cognition (Klimoski & Mohammed, 1994; Rentsch & Klimoski, 2001). Having someone who is similar to them makes it easier for the new Soldiers to ask their mentor questions about unit-specific information and information relevant to their personal life, such as enrolling their children in local schools.

Learning Mechanisms

Participants shared a variety of mechanisms that allow new Soldiers to learn information. These examples included reception and integration counseling, active participation in Warrior Skills Level 1 tasks (including regular daily activities), and receiving performance feedback.

I think the Army is kind of a unique career. It's very based in customs and traditions and being shown how to do things first-hand. Yes, we go through initial training – basic combat training and Advanced Individual Training – but that all only shows you the basis of what your job is as a Soldier and what your technical job is depending on what your MOS is. So, a lot of things we can't just give them a booklet or piece of paper or whatnot and expect the Soldier to understand. So, a lot of the know-how is shown to them first-hand and I think that's why the Army has that sponsorship program.

Something else that I do that's a little bit more informal is I choose some of the new Soldiers to shadow me for a day and I give them a lot of information throughout the day. I do check on learning and kind of like, see one, teach one, right. Once I teach them something I do a check on learning and if it seems satisfactory to me then I take them on and say, okay now you show me how it's done and walk me through all of the steps on this particular part of your job.

– Participant 8

And I think the squad training is the fastest and most efficient way of integrating a new Soldier. Obviously things like PT and making time during the day will get them so far, but if we could go back to having one dedicated day a week where we're not touched and it's the squad in its whole getting to get after training together I think that is the ideal way to integrate Soldiers faster.

– Participant 1

We begin cross-training as soon as that Soldier is with the company and with the platoon. We immediately start training. We never know exactly when we might end up going to a heavy weapons range, an M4⁵ range, so we begin cross-training as soon as possible. As soon as they get in the platoon they get a cheat sheet with the basic understanding of the M4 max distances for weapons systems. That cross-training begins immediately.

– Participant 9

So Sergeant's time is a designated block of time during the work week where the squad leader and team leaders are able to teach a class. Like set up a class, teach a class, do a practical exercise on that class, be with their entire squad working on that task rather than anything else. Like everything else just gets put to the side. You don't have to worry about getting called to come do inventories, or do any sort of random details. It's just supposed to be uninterrupted training time with your squad.

– Participant 7

[continued dialogue] Yeah I'll usually have my own class or two in mind and then I also assign my team leaders classes on a similar topic. And then ideally I would have time leading up to this day where I can proof the team leaders and ensure their class is to my standard. Then they can present to their Soldiers so it's kind of a double training. I get to train the team leaders on leading their men and teaching classes and sharing their knowledge. But I also get to ensure that the Soldiers are getting quality training together, and we can get that aspect of team-building at the same time.

– Participant 1

When discussing how new Soldiers learn information, a common sentiment was the importance of actually performing the task (e.g., rehearsing a battle drill) with the rest of the Squad. Engaging in these tasks as a team builds an individual's task shared mental model because they are learning what others are doing when they are performing their task. During this time, new members are communicating and interacting with other team members, which are good activities for developing shared mental models (Klimoski & Mohammed, 1994; Langan-Fox, 2003; Pearsall et al., 2010). Task training may also occur as classroom training, Sergeant's Time Training, or cross-training.

Shared Hardship

One thing that helps new Soldiers learn more quickly is “shared suffering” or trial-by-fire in high stress environments, which points to the importance of on-the-job training for quickly building a shared mental model. Some participants noted that just having someone show you how to do something can be an effective way to learn how to complete a task.

⁵ M4 carbine rifle.

So Soldiers that go into a bunch of field problems are gonna find themselves integrated and learning the ropes much faster because they're, it's trial-by-fire, and they're gonna pick that stuff up by default because they're suffering the same hardships as everybody else and expected to do these tasks in high stress environments where, with little sleep, and so they're going to naturally pick these things up faster whereas somebody who kinda shows up and there's not much going on with the training cycle and it's a lot of admin stuff and mopping floors and stuff like that, it's gonna take them longer because they're just not doing the things that the other guy was doing.

– Participant 2

[A] good way to integrate and get cohesive within the team is just shared hardship in the field. So if they come in in the middle of a training cycle then they go straight to the field they may not be tactically where we want them, but they typically through shared experiences in the field they kind of open up a little bit easier and you know open up and share details about themselves and talk to people through that shared hardships [sic].

– Participant 10

I'm a weapons squad leader. Most new Soldiers coming straight from their Initial Entry Training have never worked as a gun crew for a 240⁶ or anything like that, running through various gun drills and operating the gun as part of a weapons squad. So the only way you can really pick those things up is by physically doing them. And so running through various battle drills whether as in a rifle squad or gun drills in a weapons squad and just repeating them ad nauseam to allow them to become something they can do very easily without needing to think about it so that way as stress and other factors begin to play into breaking their concentration, they're able to still operate.

– Participant 11

Participants discussed experiencing shared hardship as a factor that brought team members closer together and built cohesion. Research has shown that this is helpful for building shared mental models (Klimoski & Mohammed, 1994). Immediately becoming involved in field training once arriving to a unit allows Soldiers the opportunity to quickly learn skills and become a fully functioning member of the Squad.

Making Mistakes

Participants noted the importance of allowing new Soldiers to make mistakes and providing opportunities for more formal information sharing. Moreover, mechanisms like classroom training, or additional certifications that Soldiers need when they arrive to a unit (for example, a driver's training course for a different type of vehicle), can be beneficial and necessary. Information is also shared through standard operating procedures (SOPs).

My expectations for a new Soldier is [sic] that obviously they will make mistakes, but I expect them not to make the same mistake twice. Everyone's gonna mess up, but they need to grow from those mistakes.

– Participant 1

⁶ M240 Machine Gun.

I truly believe they learn through executing by actually doing it and learning through failure and training events and all that stuff. They can always kind of revert back to that doctrine that they learned that built that foundation. And ultimately, they're not going to really excel until they actually do it.

– Participant 12

Depending on what the task is, some tasks we start off in the classroom, teaching classroom, and then we slowly progress to actually accomplishing it out in the field. ... Go over in class the task, conditions, standards which we talked about before. We go over what they're going to learn. They're taught it and then within a week we try to get out to the actual field and do that task. ... You discuss it and then you walk the Soldier through it so they understand it. And you continue to build that memory and have them repeat it until they are proficient in it.

– Participant 1

We have standard operating procedures for almost everything that we do. Every battle drill or task that we're doing out in the field or during training we have these standard operating procedures and it's important that everybody knows those SOPs so that they have sort of a guideline to go off of. Because not every situation is gonna be perfectly how it's laid out in the SOP⁷. But, as long as you know those SOPs it's easier to adapt to the minor changes to accomplish whatever task it is that you're trying to accomplish.

– Participant 7

Squad Leaders recognize the value of allowing Soldiers to make mistakes as a learning mechanism. With oversight from the Squad Leader, allowing a Soldier to figure something out on their own gives them the chance to learn about doctrine and have their knowledge tested. Reviewing mistakes made as part of an After Action Review can create shared awareness among the entire team and strengthen mental models.

Social Interactions

To help a Soldier learn more quickly, participants suggested ensuring that the new Soldier feels like a member of the Squad rather than alienating them. Squad members should regularly interact on a social level (e.g., PT competitions, Squad meals together). A Squad Leader may also set up other team-building activities (e.g., paintball) to facilitate building Squad camaraderie.

And it can be very standard stuff to conducting battle drills, or gun drills, or whatever to team-building exercises like taking the squad and organizing – going through all the approval process – but organizing paintball or something like that. And you can work training into that sort of stuff but that's also fun and team-building and stuff and whatnot. Not everything needs to be a boring event. It can be fun and team-building and educational at the same time.

– Participant 2

⁷ Standard Operating Procedure.

Any sort of fire team or squad you're building up, any sort of that training, is gonna reinforce teamwork in that sense. And going back to informal, I didn't mention, during lunch I usually excuse my squad from normal work early for lunch so they can go get an additional PT session in together. I've found that that's helped them, one, keep each other motivated, but also build that comradery by working out at an additional time each day.

– Participant 1

[T]raining and whatnot that occurs almost every day. I'm in a weapons squad and so we'll do things like gun drills quite often where we'll set a time or we'll try to set up the guns as fast as we can and then we'll try to beat that time. Just team will compete against team to see who can get through the entire gun drill the fastest. That happens quite often.

– Participant 7

We also are very competitive when it comes to physical training in the morning so every day we do our physical training and towards the end of every PT session we try to incorporate some kind of competitiveness between the squads. There will be two or three different teams competing against each other, everybody's motivated and that makes the new Soldier feel like they can be integrated into that little team that they're competing with. We also have internal company competitions ... we motivate the new Soldiers to participate in these monthly company competitions and they really feel like they're a part of the team, especially when we come out as the winners of course.

– Participant 8

Outside of task-focused activities Squad Leaders often incorporate social activities as a way to integrate new Soldiers into a team. Activities may include Squad or unit competitions, social gatherings, or team-building activities. Spending time together doing these activities can build cohesion in a Squad and they engage in a lot of social interaction, which are good for mental model development (Klimoski & Mohammed, 1994; Langan-Fox, 2003;).

Sharing Rationale Behind Task

Squad Leader participants spoke of the importance of sharing as much information as possible with their Soldiers to help them understand how things work. Particularly important is sharing *why* a task is being completed. Sharing the purpose helps provide context and motivation for task completion.

I would say as much as possible, not withholding, and I know we as leaders, this is across the board, I'm guilty of it myself at times too, just being busy and all...but I think more is better even at upper echelons of how stuff works and the reason *why*. The more you can get a Soldier to understand that, I think it helps him understand his role and it's not just, hey you go be a worker bee, mop the floors, sweep the motor pool, or get your truck online ... Kind of breaking it down for them and just having them have a really good understanding of *why* things work. And like I said, more is better. All of it should be shared, it shouldn't be withheld.

– Participant 4

I believe heavily in giving every Soldier a task and purpose with everything that we do especially in the field. You'll see spirits plummet when they don't know what the task and purpose is. You just have them out there walking for an unknown distance, they don't know where they're going. They don't know how far. Their spirits will plummet. But if we give them a task and purpose with everything, it actually can bring up their spirits, they know exactly what they're doing, they know how far they're going, they know *why* they're doing it, which is very important, so sharing that task with everybody in the squad is extremely important because it improves morale and their spirits.

– Participant 7

Helping Soldiers understand *why* I think is really important when human beings in general understand the purpose behind something that they're doing, they tend to be a little bit more invested in it, and you'll get better results as a result. I think any kind of experience is worth sharing. And even those without experience, I don't think should be absent a voice within the squad.

– Participant 2

I think the answer to that is, the two biggest ones is, going to be purpose and direction. Why are they doing it and what is the significance behind that. If you provide purpose and direction, then Soldiers will move mountains for you. Because if they don't know why they're doing something and they think that it's pointless then they're not really going to go out of their way to do a significantly good job. But as long as you provide the reason why this is important then they can jump on board with that and knock that task out. And with that obviously the conditions and standards that need to be met for that task.

– Participant 10

In general, Squad Leaders try to share as much information as possible with their Squad. Many Squad Leaders noted the importance of sharing the rationale behind why a task was being completed to increase investment in the task and to increase understanding of the role the Soldier is playing. All of this information that is shared by Squad Leaders can give the individual a more complete picture of the task, which can benefit task-related mental models.

Other Factors

Squad Leader participants also spoke about factors that change the process for a new Soldier to be brought up to speed. For example, factors such as personality, drive, and personal background can alter the time it takes for a Soldier to become integrated into a Squad. Environmental factors, such as training cycle, also play a role in how quickly a new Soldier is integrated. If a unit is in the amber cycle, where they are doing more training to prepare to deploy, someone new to the Squad would have many opportunities to engage in task training and more quickly come to a shared mental model for tactical tasks and procedures. Conversely, if a new Soldier was assigned to a unit that just returned from a deployment and was in a red cycle, there would be a greater focus on completing more administrative tasks. Thus, Soldiers would be more rapidly develop SMMs for administrative work and more slowly develop SMMs for

tactical tasks and procedures. Estimates of how long it takes for a new Soldier to become fully integrated into a team varied widely from a few weeks to one year.

[T]here's a couple kids in my platoon that are from the Philippines so it was important that we had a Soldier with a similar cultural background to try and bring them into the unit, make them feel more at home than if I was to give them someone with a completely different personality and background.

– Participant 1

I feel like that is dependent on the person. So it could be a week. It could be a month. It just depends on that person's personality. If they come in really willing to learn and they're confident, it can take a week. If they come in and they're super shy they're hesitant to learn new things because they're just new to the environment and scared, then it could take a little bit of time and you have to coax them out of their shell.

– Participant 10

I think maybe one thing that would make integration kind of hard, and that's just due to timing, is if they show up to the unit as we're getting ready to go to the field. Either they stay back and the company leaves for the training event so then they're back here floating. They don't know who anyone is. They don't know who the leadership is yet, or they go out to the field with us and instead of focusing on integrating them we're focusing on training and we don't really get that time to develop them before their first field event. So that just comes down to timing and when they get to the unit.

– Participant 10

[A] big motivating factor is pride in the squad. I like to think I built a culture of we want to be the best in everything we do. As long as everyone has that same mindset, they're gonna either find or make a way that's more efficient than what others are doing.

– Participant 1

When discussing new Soldiers integrating into their Squad, Squad Leaders noted that there are a variety of factors that alter how that integration occurs. Circumstances like time in the unit's training cycle and factors like individual personality and background can alter how quickly a new Soldier is integrating into a Squad.

Trifold

Synthesis of Squad Leader best practices for building and maintaining shared understanding were compiled in a trifold handout (Fleming et al., 2024; Appendix C). Content was tied to Army doctrine and training publications; specific references were included to direct the Soldier to additional information, if desired. Two sections of the handout provide basic background about the purpose of the trifold, including instructions for how to use the trifold, and the importance of integration and developing understanding. The inside of the trifold includes a series of tips broken out by when the best time would be to use them. These sections include During Reception and Integration Counseling, During Sergeant's Time Training, and On-the-Job Knowledge Sharing. The trifold also includes a section that lists miscellaneous other suggestions

for making integration more effective and a reminder that the best way to integrate a new Soldier varies because of individual differences and situational factors.

SME Trifold Feedback and Edits

Overall, SME feedback about the trifold was positive and encouraging. SME comments included the comprehensive and straightforward nature of the trifold content. Army SMEs commented on the easy-to-read format and liked that the trifold could be put in a pocket. They also noted the large amount of text on the inside of the trifold and how that could be intimidating. However, the Army SMEs remarked that the reading level of the text was appropriate. For distribution, the Army SMEs mentioned that Team Leaders would benefit from a resource like the trifold as they prepare to assume a Squad Leader role. Other suggestions for distribution included handing the trifold out in a course such as the Basic Leader Course (BLC) or at the end of Basic Training so that a new junior enlisted Soldier would know what to expect upon arriving to a unit. To address SME concerns, edits were made to the trifold including transition sentences and updated phrasing to improve understandability.

Discussion

Shared mental models have been shown to have benefits, including improved performance (Cooke et al., 2003), for teams across a variety of settings (e.g., Mathieu et al., 2009; Rentsch & Klimoski, 2001). Groups use shared mental models to predict task demands and allow for coordination between group members (Cannon-Bowers et al., 1993; Salas et al., 1994). Training has been shown to improve the development and refinement of shared mental models (Klimoski & Mohammed, 1994). Moreover, the Army has recognized the importance of developing shared mental models (ATP 6-22.6; U.S. Department of the Army, 2015) as a component of team-building. When new members join a unit, it is important for them to successfully integrate into the existing shared mental model of their team. It is particularly important for teams where there is member turnover to ensure that everyone maintains a sense of shared awareness. Levine and colleagues (1993) suggested that groups are motivated to share norms when a new member joins, and the new members are motivated to learn the group's norms and expectations. For example, in Army teams, the frequent movement of Soldiers in and out of a team requires regular re-training to ensure everyone is knowledgeable about team and unit tactics and processes. This training is part of a slew of regular activities that can serve as excellent opportunities to build and maintain shared understanding following the addition of a new member.

Squad Leaders in focus groups provided numerous best practices for how to develop and sustain shared understanding within their Squad. Some suggestions provided by focus group participants are supported by empirical research. Squad Leader participants spoke of the wide variety of information they share during integration counseling and as they integrate a new member of the team. As part of the Army Regulations theme, participants noted that, although there is doctrine that provides a guideline for how to conduct a counseling session, Squad Leaders do not necessarily receive training on how to conduct counseling. Because past research has shown that training team leaders is an effective way to train shared mental models (Cannon-Bowers et al., 1993; Klimoski & Mohammed, 1994), providing more tools (like the trifold

developed from this project) could further increase the effectiveness of shared mental models in the Army. The Army has started to introduce tools that can help with interpersonal effectiveness such as the Counseling Enhancement Tool and the Talk Like a Leader training (Sanders et al., 2023).

The information that Squad Leaders share with new members spans multiple types of mental models described by Cannon-Bowers and colleagues (1993). Utterances categorized under the Counseling Activities theme primarily center around the team interaction and task types of shared mental models. For example, as part of development of the team interaction model, Squad Leaders share information about others in the unit. Squad Leaders also provide information about administrative taskings and expectations for task completion (e.g., showing up at the right time, at the right place, and in the right uniform). As part of their duties for developing shared understanding within a team, Squad Leaders spoke about the importance of providing a sponsor who was similar to a new Soldier. This sponsor provides the new member with additional resources to integrate with fewer issues. Academic research supports the notion that demographic similarity with team members is beneficial for team cognition (Klimoski & Mohammed, 1994; Rentsch & Klimoski, 2001). This pairing with a similar peer to improve integration of a new Soldier and shared understanding on teams was described within the Peer Imitation theme.

The Learning Mechanisms theme describes examples of means used to develop shared understanding, including the importance of learning by actually completing the task with the rest of the Squad. An important component of that process is learning and training as a team rather than individually. Sartori and colleagues (2006) found that team-level training resulted in better performance and improved mental model development compared to individual-level training. Training as a team allows team members to develop a more complete understanding of the team's requirements. Additionally, training as a team allows for communication and interaction between team members, which are crucial in the development of shared mental models (Klimoski & Mohammed, 1994; Langan-Fox, 2003; Pearsall et al., 2010). Training also occurs in classrooms, during Sergeant's Time, or by cross-training. Cannon-Bowers (2007) highlighted the importance of training as the primary mechanism for team members to develop shared mental models. Delivering well-designed training at the appropriate stage can accelerate the development of shared mental models. Contextual factors, such as stress, can have detrimental effects on the development of shared mental models. Training can be used to overcome these detrimental effects when those factors are present.

The Learning Mechanisms theme also describes the value of cross-training, which is supported by empirical findings. Having new members learn about other positions on the team prompts improved coordination (Espevik et al., 2011) and understanding of team roles (Marks et al., 2002). Teams with members who understand the task from other positions and have shared understanding have improved performance (Cooke et al., 2001; Cooke, et al., 2003). Moreover, in the Army, Soldiers are always training for other roles within their team in case they have to step into that position, making cross-training a frequent event to use as a way to build shared understanding. The convergence between Squad Leader-provided best practices and the empirical literature for shared mental model development suggests that leveraging daily activities, whether in the Army or outside the Army, would benefit groups with member

turnover. Many opportunities for quickly integrating a new member often occur through daily tasks and activities.

As part of the regular training that takes place, one reason that Squads are able to build shared understanding is because of the cohesion that they develop when they are placed in high stress environments or situations that are trying (e.g., rain during a field training exercise), as reflected in the Shared Hardship theme. Some research has shown that teams with higher cohesion are better equipped to share and collaborate to nurture shared mental model development (Klimoski & Mohammed, 1994). As part of training that builds cohesion, Soldiers also have the ability to commit errors, as shown in the Making Mistakes theme. When those situations occur, it provides opportunities for activities such as After Action Reviews that the entire Squad can benefit from through a formal sharing of information about what can be done to improve, further reinforcing a shared mental model.

Utterances in the Social Interactions theme describe non-task-related situations where Soldiers spend time together and get to know each other. Activities included meals together as a Squad and team-building sports such as paintball. During these experiences, Soldiers engage in a lot of social interaction where they are also increasing cohesion within their Squad. Past research has shown that team interactions can promote the development of shared mental models (Hinsz et al. 1997; Langan-Fox, 2003). Moreover, these opportunities for building cohesion also facilitate shared mental model development (Klimoski & Mohammed, 1994).

Squad Leaders have noted that a variety of factors were at play in determining how quickly a new Soldier integrates into a team. The utterances in the Other Factors theme mirror factors in academic research known to be related to shared mental model formation and function, such as personality (Edwards et al., 2006; Resick et al., 2010). The utterances under this theme show that Squad Leaders take cultural background, personality, and motivation into account when considering the best way to integrate a new Soldier into a Squad.

Given the findings from Squad Leaders in this study, integration counseling presents a significant opportunity to create shared understanding for new team members. However, integration counseling could be better utilized to improve the efficiency of developing shared mental models. Squad Leaders reported a lack of specific guidelines for integration counseling, which may result in less shared understanding than could otherwise be possible. Guidelines that focus on integration counseling best practices and procedures with more consideration of specific strategies to develop shared understanding during onboarding of new team members could help improve team effectiveness and performance.

Although the best practices for the trifold were collected from SMEs in both combat arms and support MOSs, the sample included limited technical skill diversity and limited team structure diversity. For example, the participants came from a transportation unit and an infantry unit. Army small units can have as few as four individuals and as many as 12 individuals. Moreover, the structure of the teams varies widely. Thus, some best practices might apply to certain occupations more than others. Squad Leaders should evaluate which suggestions will work best for their MOS and unit structure and continue to look for other opportunities to build shared understanding in their team. This effort developed a trifold to increase shared

understanding within Squads but did not include a validation study to determine the effectiveness of the intervention. Future research would do well to complete a validation study to test the effectiveness of this intervention.

The goal of this effort was to create a tool for novice Squad Leaders (and Team Leaders as they prepare to become Squad Leaders) to improve the pace at which new members become integrated members of a Squad. Using a tool like this should increase the potential for high-quality shared mental models, which have been shown to increase the effect that shared mental models have on team processes (Mathieu et al., 2005). Having a shared understanding should improve Squad readiness and contribute to enhancing team effectiveness in the U.S. Army.

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Appendix A

Additional Shared Mental Model Information Overview

Measurement of Shared Mental Models

Measurement continues to present significant challenges to the empirical study of shared mental models. Measuring mental models is difficult in part because they take various forms (that is, mental models can have different types of content; Cannon-Bowers et al., 1993) and are dynamic (Klimoski & Mohammed, 1994). Moreover, the degree to which mental models change depends on the team and the team's environment (Langan-Fox, 2003). For example, a team with frequent turnover will have a highly dynamic team mental model, as information gets updated and adapted to new team members. Conversely, a team with stable membership is likely to have a relatively stable team mental model. Because shared mental models are highly context-dependent, at present there is no comprehensive and broadly applicable measurement tool to assess them (Mohammed et al., 2010).

One concern for measuring shared mental models is that different measures may lead to divergent findings (Mohammed et al., 2010). For example, DeChurch and Mesmer-Magnus (2010b) found that the relationship between processes and mental model sharedness was moderated by measurement method. Most studies of shared mental models use a single method of measurement, given the labor-intensive nature of many measurement methods. Alternate measures have been found to reveal different patterns of results in studies comparing multiple techniques concurrently. For instance, measures including an assessment of structure (paired comparison ratings/PathFinder) were more strongly related to team performance than questionnaires assessing only content (Cooke et al., 2001; Cooke et al., 2003). Moreover, when shared mental models were indexed in terms of agreement (i.e., the degree to which respondent ratings agree on the exact magnitude of the rating), Smith-Jentsch and colleagues (2005) found no significant interactions between shared mental model agreement and team performance. However, when mental models were indexed in terms of consistency (i.e., the degree to which respondents assigned the same relative importance to ratings), shared mental models were significantly related to outcomes.

Shared mental models are operationalized for measurement based on three distinct characteristics: elicitation, structure representation, and representation of emergence (DeChurch & Mesmer-Magnus, 2010b). Elicitation methods capture knowledge content; structure representation techniques capture the structure of the relationships between components (DeChurch & Mesmer-Magnus, 2010b; Mohammed et al., 2000); and the representation of emergence concerns how the individual team members' mental models are aggregated to the team level. Representation of emergence is typically assessed by determining the degree of similarity between the mental models of team members. DeChurch and Mesmer-Magnus (2010b) found that shared mental models predict team performance across measurement techniques, but only predict team process when the type of method used assesses the structure of the mental models. Knowledge content and knowledge structure are captured to varying degrees by different methods used to measure mental models, making the choice of measurement technique particularly important.

Other methods to assess and analyze shared mental models include cause map analysis (Weick & Bougon, 1986), network analysis (McComb, 2007), and using multidimensional scaling

to construct concept maps to understand gaps in team knowledge and experience (Rentsch & Klimoski, 2001). Additionally, to address some of the limitations of the concept map method, Marks et al. (2000) developed an updated concept map technique, which they called “team-interaction concept maps.” Wildman et al. (2014) conducted a review of mental model constructs as well as the techniques commonly used to measure them and built a flowchart to enable researchers to choose an appropriate measurement technique based on theoretical considerations. For additional research describing the strengths and weaknesses of various measurement approaches, see Mohammed et al. (2010) and Langan-Fox et al. (2000).

The Shared Mental Model-Performance Relationship

A variety of research studies have shown that shared mental models are related to team performance and team effectiveness (Cannon-Bowers et al., 1993; Klimoski & Mohammed, 1994; Kraiger & Wenzel, 1997; Mohammed et al., 2010). Both taskwork and teamwork mental models predict important outcomes; however, some of these outcomes are stronger than others due to their temporal nature (Mohammed et al., 2010). For example, team performance is more proximal to shared mental models than team effectiveness, leading to a stronger relationship (Kraiger & Wenzel, 1997). Some research has found mixed support for the relationship between mental models and performance (Hamilton, 2009; Mohammed et al., 2010); however, it is clear that having identical mental models is not necessary for teams to perform well.

The relationship between shared mental models and team processes has not received as much attention as the relationship between shared mental models and team performance. Nonetheless, research has shown that the similarity of mental models predicts team process performance (Mathieu et al., 2000). For example, both mental model similarity and accuracy had small positive correlations with communication processes (Marks et al., 2000). In one study, task mental model similarity had small non-significant relationships with team processes, but team mental model similarity had positive correlations with team processes (Mathieu et al., 2000). Another study found support for the link between team model similarity and team processes (Mohammed et al., 2010). Previous research has also found relationships between shared mental models and team processes, such as coordination, team planning, adaptability, and communication (Sartori et al., 2006).

Operationalizations (e.g., similarity or accuracy) of shared mental model constructs predict performance differently. For example, the similarity of a mental model is more important for predicting performance than the accuracy of the mental model (Marks et al., 2000). Elicitation methods (the techniques used to determine the content or components of a model; Mohammed et al., 2000) exhibit a positive relationship between shared mental models and team performance, with the strongest relationships involving cognitive mapping and content analysis (DeChurch & Mesmer-Magnus, 2010b).

Appendix B

Focus Group Questions

The purpose of this project is to understand how new Soldiers learn their role and responsibilities on the squad, including how and what new Soldiers learn to be able to predict actions of their teammates. We hope to use this information to create a guide for helping new Soldiers become an effective team member more quickly.

The first set of questions will ask information that will help to ground us in understanding how Squad members learn the ropes upon joining the Squad.

- A junior enlisted Soldier is joining your squad as their first assignment. How does that new Soldier learn the ropes of the squad?
 - What are the formal mechanisms which promote this learning?
 - What are the informal mechanisms which help Soldiers learn this information?
 - You mentioned _____. Who teaches _____ to a new Soldier? When do they typically learn it?
 - How do new Soldiers learn about squad tasks (and their roles and responsibilities within them)?
- How do new Soldiers learn about teamwork and working with their new teammates?
 - What are the formal mechanisms which promote this learning?
 - What are the informal mechanisms which help to transmit this information?
- How do you conduct an integration counseling?
 - What information do you ask about or share?
 - (IF MORE THAN 1 MOS ON CALL, ask of each MOS.)
- What expectations do you have for a new Soldier in your squad?
 - How do Soldiers in your squad learn about those expectations?

The next two questions will touch on the type of knowledge that is important for squad members to share and who needs to share that information.

- What information or knowledge about tasks needs to be shared between all squad members for the squad to be successful?
 - To what extent does that information or knowledge need to be shared?
 - How is that information shared among squad members?
- What information or knowledge about how the team operates needs to be shared between all squad members for the squad to be successful?
 - To what extent does that information or knowledge need to be shared?
 - How is that information shared among squad members?
- What information or knowledge does only one or two squad members have?

This next group of questions will focus on how membership turnover changes the squad's way of how the team operates.

- Think about the situations you've seen where a Soldier was able to easily integrate into a squad. What made the integration process easy?
 - What do you think were the most effective strategies that were used?
 - Why do you think they were effective?
 - What things make it easier for a Soldier to integrate into a squad?
- Think about the situations you've seen where a Soldier had a difficult time integrating into a squad. What made the integration process difficult?
 - What things make it more difficult for a Soldier to integrate into a squad?
- How is the process of learning the ropes different for junior enlisted Soldiers versus NCOs that come from a different unit?
 - How does a Soldier's previous unit impact their integration?
- How can you tell when a new Soldier has become an integrated member of the squad?
 - What are the signs that indicate that a Soldier has become integrated in a squad?
 - How do you tell a Soldier is integrated based on task performance?
 - How do you tell a Soldier is integrated based on their interactions with others?
 - How long does it typically take for a new Soldier to become an integrated member of the squad?

This last question focuses on how the process might be improved.

- What do you think could be done differently to increase the pace at which new Soldiers come to understand how the squad functions?
 - Are there formal activities that could help new Soldiers develop a shared understanding faster?
 - Are there informal activities that could help new Soldiers develop a shared understanding faster?
- Do you have anything else about what happens when a squad integrates new Soldiers that you'd like to share?

That concludes the focus group, and you are released and can hang up. If you have any questions about the project, let us know and we'll do our best to answer them. Thank you for your participation! We really appreciate your insights.

Appendix C

A Guide for Enhancing Squad Shared Understanding: Squad Leader Tips

Check out the inside for tips from experienced Army Squad Leaders about how to build shared understanding.

HOW TO USE THIS GUIDE

During focus groups, seasoned Squad Leaders provided important insights on how Squad Leaders can leverage daily activities to bring new squad members up to speed quickly. Many of these suggestions can also be applied to ensure existing Squads maintain shared understanding. This guide includes suggestions for how to use regular activities to help facilitate integration of new Soldiers.

Developing shared understanding is one way to facilitate knowledge management. "The goal of knowledge management is to make information easier to find, which can make teams more productive and effective." (ATP 6-22.6) As a leader, you have the ability to guide and shape knowledge management within your Squad (ATP 6-01.1). Use the tips in this guide to foster a knowledge-sharing environment within your Squad to facilitate learning (ATP 6-01.1 1-49).

THE IMPORTANCE OF INTEGRATION

Integration = how fast a new Soldier becomes a true member of your Squad

When new Soldiers join a Team, Crew, or Squad there is a lot of information that needs to be shared to bring them up to speed. One of the purposes of reception and integration counseling is to familiarize new squad members with organizational standards, roles, and assignments (ATP 6-22.1 1-8). To preserve and maintain effectiveness, creating a shared understanding is especially important when Squad membership changes (ATP 6-22.6 4-4). Therefore, it's important to integrate new members quickly.

New squad members must quickly learn information about how the Army functions, about how to complete Squad collective tasks, and about what to expect from their fellow squad members. This knowledge can increase a unit's effectiveness and performance.

As a Squad Leader, you take responsibility for making sure the new squad member becomes an integrated member of your Squad through training them and mentoring them. To help with this responsibility, ensure you keep up-to-date on any professional development opportunities (e.g., Talk Like a Leader training) that may help you integrate new squad members.

Why develop shared understanding?

Shared understanding is a key component of Army Team Building (ATP 6-22.6). Development of a team begins with creating a shared understanding (FM 6-22 1-20). Squad Leaders should encourage collaboration and dialogue among their Squad to promote knowledge sharing and shared understanding (ATP 6-22.6 1-59). "This exchange increases shared understanding of the enemy, and the operational environment, problems to be solved, and approaches to solving them," contributing to the overall Army knowledge base (ATP 6-01.1 1-48). It is important to develop shared understanding after Squad membership change as well as maintain shared understanding within an existing Squad.

Shared understanding includes sharing of two different types of knowledge — explicit knowledge and tacit knowledge.

According to ATP 6-01.1, **tacit knowledge** is what individuals know, a unique personal store of knowledge gained from life experiences, training, networks of friends, acquaintances, and professional colleagues. **Explicit knowledge** is codified or formally documented knowledge organized and transferred to others through digital or non-digital means.

Sharing both tacit and explicit knowledge enables the Army to share knowledge and work together to support the mission (ATP 6-01.1 1-24).

Working together as a Squad during training can help develop effective units. There are two relevant characteristics of effective teams (FM 6-22) when establishing shared understanding within your Squad:

- Hold a shared vision about operating as a team
- Share information that may be useful to other team members

Teams that hold a shared understanding of the vision and purpose have better coordination and less conflict than teams that do not have a shared understanding (ATP 6-22.6 1-42).



Alissa C. Fleming, Ph.D.
U.S. Army Research Institute
alissa.c.fleming.civ@army.mil



A Guide for Enhancing Squad Shared Understanding: Squad Leader Tips

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Check Out these Tips from Squad Leaders for Developing Shared Understanding

DURING RECEPTION AND INTEGRATION COUNSELING

Integration counseling is the first and best opportunity to get a new Soldier up to speed. This is an important step in integrating a new squad member (ATP 6-22.6 2-6).

- Consult ATP 6-22.1 when preparing materials for counseling. Section 1-9 includes a list of content that should be included during the session. You can ask someone in your unit to share the resources they use. In most cases the process is similar for everyone, but you can take time to tailor the information to include unit-specific information (ATP 6-22.6 2-8).
 - Provide a call roster or other resource with information about how to contact leadership and others in the Platoon.
- Share information about the unit's mission during integration counseling (including how it relates to higher echelons and big Army) (ATP 6-22.6 3-7, 3-42) and universal Army standards like expectations for timeliness, uniform, PT, and rank and responsibilities (ATP 6-22.6 2-9, 2-11).
- Consider introducing new Soldiers to unit leadership and other squad members as part of integration counseling.
- Get to know the experience level of Soldiers during integration counseling. This time can be used for Soldiers to share what they know about equipment and share what positions they may have held previously. Knowing what skills Soldiers new to your Squad have will allow you to design a more effective cross-training plan (ATP 6-22.6 4-4, Table 4-1, A-4).
- Incorporate setting goals (both Army and non-Army) into integration counseling. For example, a Soldier may have goals of obtaining a college degree and/or advancing in rank.

REMEMBER

Integration depends on situational factors and Soldier factors. Situational factors include installation or unit OPTEMPO and command climate. Soldier factors include personality and past experiences. Because of all the factors present, remember that an effective method for integrating one Soldier may not be effective for integrating another Soldier (ATP 6-22.6 3-38).

Photo Credit

Top: Featured Photos. U.S. Army Flickr. SGT Seth LaCount. 16 NOV 2019.
Bottom: Spot the Enemy. U.S. Army Flickr. Paul Hughes. 17 OCT 2018.

DURING SERGEANT'S TIME TRAINING

Sergeant's Time Training is an excellent opportunity for new squad members to spend time with seasoned squad members. Below are some suggestions for how to use Sergeant's Time Training to bring new Soldiers up to speed quickly:

- Conduct classes on tactics, techniques, and procedures with new Soldiers. Follow classes with opportunities to train in assigned roles and cross-training opportunities for Soldiers to learn other roles on the team, building shared competence (ATP 6-22.6 3-15, 4-4, Table 4-1).
- Provide Soldiers with an opportunity to learn by allowing them to make mistakes in a safe environment. After a mistake is made, use the opportunity to provide correct instruction (ATP 6-22.6 1-25, 3-1, 3-31, 3-32). Take the time to further develop the new Soldier's shared understanding of the task.
- Use checks for understanding when training. Ensure that the new Soldier understands the task, the processes, and their role (ATP 6-22.6 3-8).
- Consider competitions between teams or team building activities as a way to build cohesion among your Squad. Example team building activities include paintball and rock climbing (ATP 6-22.6 3-41, 4-32).
- Incorporate doctrine and unit SOPs so that new Soldiers build a shared understanding of tasks and mission-related procedures.
- Across a variety of situations, use repetition to build muscle memory. This creates a deep-rooted shared understanding that allows Soldiers to more easily anticipate and react to events in different situations.

OTHER WAYS TO MAKE INTEGRATION MORE EFFECTIVE

- Share as much information as you can with Squad Members unless it's going to make it difficult or confusing for your Soldiers to complete their mission.
- Incorporate explanations when assigning tasks to help motivate Soldiers. For example, when sharing information include why something is being done and how the Soldier is contributing. This can help Soldiers understand the larger vision of the Army and the connections between their tasks to the overall mission (ATP 6-22.6 2-73, 3-6; FM 6-22 1-5).
- Reach out to the Soldier, if possible, before they arrive at the unit to start the process of having the new Soldier get to know you (ATP 6-22.6 2-8, Table 4-1).

ON-THE-JOB KNOWLEDGE SHARING

Initial Entry Training (IET) and Advanced Individual Training (AIT) provide a solid foundation, but cannot cover everything a new squad member needs to know at an operational unit.

- Provide additional MOS, equipment, and task-specific training to new junior enlisted Soldiers once they arrive. Classroom-level training is enough for Soldiers to grasp the needed information for some knowledge. However, some tasks are best learned by doing (ATP 6-22.6 4-4).
- Soldier expertise is valuable if shared with other Soldiers (ATP 6-01.1 1-100). Encourage more experienced squad members with different backgrounds to informally share stories during down time to support understanding and connections between Soldiers. This will help communicate information about different situations and equipment that new Soldiers may encounter throughout their career.
- Give new Soldiers the opportunity to get to know their squad members better and build trust and cohesion (ATP 6-22.6). Bonding experiences make the integration process better for everyone. Although working together on tasks is a great way for squad members to spend time together and get to know one another, informal time spent together is also beneficial. Collaboration allows for establishment of personal connections, which builds shared understanding (ATP 6-22.6 1-60).
- Relate Army activities to real-world experiences to help new squad members understand the purpose of general tasks and the contribution that they make.

- When integrating a new squad member, do not underestimate the effect spending time together as a Squad can have (ATP 6-22.6 3-39, 4-32). Even performing everyday tasks can strengthen bonds, improve morale, and build cohesion when the Squad carries them out together.
- Sit down as a Squad and have the new Soldier share what they know about battle drills and basic knowledge of weapons systems so others on the team have an idea of the existing level of doctrinal knowledge the new Soldier has (ATP 6-22.6 4-4).
- Give your new squad members a Joe sheet, or a new Soldier knowledge sheet.