

Trust in Small Military Teams

Barbara D. Adams, Ph.D. and Robert D.G. Webb, Ph.D.¹

Humansystems Incorporated,
111 Farquhar Street,
Guelph, Ontario
N1H 3N4
(519)836-5911

badams@humansys.com

Abstract

Despite relevance for military operations, little work has examined trust in military research and theory. This work first reviews the literature on the development of interpersonal trust, where two distinct forms of trust are considered. *Person-based trust* develops over time, and is based on direct experience with another person [Rempel, Holmes, and Zanna, 1985]. *Category-based trust* emerges in the absence of direct experience and contact with others, and is based on assumptions about the category to which others belong [Kramer, 1999]. Secondly, the relevance of both forms of trust to the development of trust in small military teams is explored.

The effects of trust on team processes and performance are also considered. Existing research and theory suggests that trust affects communication processes, the monitoring of other team members, and also impacts on the ability of teams to work cooperatively.

With increasing technological demands in the military, trust in automation and relevant research and theory are also considered. The paper concludes with a discussion of an ongoing research program that is examining trust among members of small military teams.

1. Introduction

The purpose of this paper is to provide a broad overview of existing trust research and to explore the nature of trust, the factors affecting trust, and the consequences of trust within the small team military context (for a full review, see Adams, Bryant and Webb, 2000). Existing theory and research primarily deals with trust at an organizational level and in close dyadic relationships, rather than trust in small work teams of three or more people. None of the research found explicitly looks at trust within a small team military context. This work will also consider how trust in automation relates to trust in the interpersonal domain.

A generally accepted definition of trust has yet to emerge but one that has been influential is based on the literature on close relationships. Boon and Holmes [1991] define trust as:

“a state involving confident predictions about another’s motives with respect to oneself in situations entailing risk”.

A more recent definition of trust from the work of Costa, Roe and Taillieu [2001] is:

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Trust is a psychological state that manifests itself in the behaviours towards others, is based on the expectations made upon behaviours of these others, and on the perceived motives and intentions in situations entailing risk for the relationship with these others.

Although these definitions (and other definitions of trust) emphasize somewhat different aspects of trust, trust theorists and researchers with various conceptualizations of trust generally agree that trust has several distinctive features [Bigley and Pearce, 1998; Rousseau, Sitkin, Burt and Camerer, 1998].

First, trust is based on our expectations about how others are likely to behave in the future. Trust develops as we become increasingly able to predict the actions of another, as a result of our experiences and interactions with that person. Such interactions provide information and knowledge about what the person is likely to do in specific situations, and this information becomes increasingly elaborated into views of what this person is likely to do on a consistent basis [Rempel, Holmes, and Zanna, 1985]. Trust is also associated with feelings about others, and developing trust can also involve coming to see others as personally motivated by sincere care and concern to protect our interests [Lewis and Weingert, 1985; McAllister, 1995]. In this sense, trust is a psychological state related to our understanding of others.

Second, trust is also an important predictor of how we will behave toward others. Trust behaviour can be described from two different theoretical perspectives:

- Trust may be based on a purely rational choice, in which one has completed a cost/benefit analysis, by comparing the cost of not trusting to the benefits of trusting. In many business relationships, for example, there are both potential benefits from trusting another person, and possible costs if one's trust is betrayed. In these situations, trust behaviour can be seen as a purely rational decision, based on whether the benefits of trusting are higher than the possible risks of misplaced trust
- Alternatively, trust behaviour may be relational, and based more on our knowledge and expectations or assumptions about another person or about the category to which this person belongs.

As a whole, trust is depicted as both a psychological state, involving expectations and feelings that lead to judgements about the trustworthiness of others, and as either rational or relational choice behaviour that puts these expectations and feelings into observable action.

1.1 The Need To Trust

In many contexts, the need to trust other people arises from the need to be able to predict and understand others. Trust has been described as "*the reduction of complexity*" [Luhmann, 1988]. More specifically, the need to trust stems from the need to believe that others will behave consistently and/or be positively motivated toward us on a consistent basis. It is impossible to accurately predict the actions and motivations of others, and to know what they are likely to do in every situation. This inability puts us at risk of undesirable outcomes. Without trust, theorists have argued, people would need to be consistently vigilant, constantly watching for violations of one's expectations and predictions about how others are likely to behave in varying situations. Trust simplifies and reduces the complex set of expectations that we use to predict how people

will behave. In deciding to trust, we decide to believe that others will be predictable and will act in our best interests on a consistent basis.

The need to trust is seen as increasing in the presence of specific situational antecedents. Issues of trust come into play in situations that contain risk, vulnerability, uncertainty and interdependence. Interdependence is a critical antecedent to trust, because there would be no need to trust without one's own outcomes being in some way dependent on another person. As one can never completely know the actions of others, one is at risk if these actions are not predictable. The same, of course, is true for the closely related issues of uncertainty and vulnerability. Without uncertainty, there is no need to trust – as knowledge is always incomplete, trust is necessary in order to deal with uncertainty. Similarly, vulnerability is also an important precursor to issues of trust. One must face the risk of incurring some sort of loss (that is, must be vulnerable to another person). Without this, there would be no reason to trust. These antecedents are seen as necessary within any given situation for issues of trust to come into play.

Lastly, after defining trust more closely, it is also important to explore what trust is not. Although frequently confused in trust research and theory, trust and cooperation are distinct concepts. Certainly, we are more likely to be motivated to cooperate with people that we trust. On the other hand, cooperation cannot be equated with trust, as there are many different reasons that we cooperate with others. We may, for example, choose to cooperate with another person because we deem it in our best interests to do so. This cooperation can occur even with a complete lack of trust in this person. It is also important to point out that the trust literature (and the scientific literature generally) has often used the terms trust and confidence interchangeably. Certainly, trust and confidence are closely related in both meaning and in common usage. In our work, however, we have chosen to adopt the distinction made best by Muir [1994] in the trust in automation literature, which distinguishes between trust and confidence by labelling confidence as *“a qualifier which is associated with a particular prediction”*. This definition of confidence suggests that confidence indicates certainty about a specific prediction, whereas trust is associated with a more global and broader form of prediction. At a conceptual level, then, it is important to distinguish between trust, cooperation and confidence.

With the antecedents of trust explored, it becomes even more evident why trust is an important issue within military contexts. The military context, in many ways, is the ultimate forum for issues of trust, as this context gives rise to the highest forms of risk, vulnerability and uncertainty. At the same time, high levels of interdependence are also required and the cost of one's trust being violated could well be fatal. Moreover, the demands on one's resources (both cognitive and physical) are so high as to preclude the constant monitoring of the actions of one's teammates. In short, one does not always know for sure what others are likely to do. Because of this, one must make assumptions about the competence of their actions and about the positivity of their intentions. Within the military context, trust can be a critical survival tool. As such, it is important to understand how trust is likely to develop, and to identify the factors that influence the development of trust.

2. Models of Trust Development

Our everyday understanding of trust typically evolves around the notion of relationships with other people, and around the positive expectations and beliefs that develop as we come to know other people. Although this form of trust has various names in the trust literature, we have

chosen to use the term “*person-based trust*”, as it best emphasizes the idea of trust conferred directly on a known person, as a result of direct interaction with this person.

The literature also indicates growing interest in a different form of trust conferred on another person in the absence of a history of direct and personal contact. This is “*category-based trust*”, and can emerge in two ways. Category-based trust can emerge as the product of the perceived membership of the other person in a group or category of people that we have come to trust. The second way is from shared membership in a group with another person. We may be more likely, for example, to trust people from the same culture than we are to trust people from a different culture, independently of their personal qualities.

To understand the development of trust within military teams, it is necessary to consider both person-based and category-based trust.

2.1 Development of Person-Based Trust

There are no current models of person-based trust that specifically explain trust within teams, but two models are relevant to understanding trust in the small team context. Rempel, Holmes and Zanna [1985] provide a comprehensive account of the trust development process in intimate relationships. This work has been influential in understanding the trust development process in a wide range of settings, even including trust in automation [Muir, 1994]. Work by Lewicki and Bunker [1996] has extended a similar model of trust to the realm of work relationships.

In both models, the development of person-based trust is seen as a hierarchical process, in which our views of others become increasingly elaborated as we accumulate information about them. Rempel, Holmes and Zanna [1985], for example, argue that individuals come to trust others by watching their interactions, looking for consistent patterns of positive behaviour. Recurrent patterns of behaviours are used to judge the likelihood of similar behaviour in the future. Predictability reduces the risk and uncertainty inherent in a relationship, and makes one less vulnerable to negative and unexpected outcomes. Thus, the early stages of trust development involve assessing the predictability of another person, using behavioural evidence to gauge trust. If the other person is seen as predictable, trust is more likely to develop.

At the next stages of relationships, these observations are combined into a more global judgement of trustworthiness of another person. Rather than using just behavioural indicators, people begin to form attributions about another person’s motives and intentions in making judgements about dependability and trustworthiness. These attributions speak not just to what a person is likely to do in a given situation, but extend to what they are likely to do in general as a product of their disposition. At this stage of trust development, then, discrete behaviours are integrated into a coherent system of knowledge about a person, and come to be understood as the product of a person’s true motives. This stage of trust has been called knowledge-based trust [Lewicki and Bunker, 1996].

Both models of person-based trust argue that fully developed trust can develop beyond mere prediction and attributions of dependability. The highest forms of trust are predicated on what has been called “a leap of faith” [Rempel, Holmes and Zanna, 1985]. As it is clearly not possible to assess the motives and abilities of other people in every possible domain, it is necessary in some situations to place one’s trust in another person, even though the outcome of this action is not always clear. Faith reflects an ability to “*go beyond the available evidence*” with assurance that the trust partner is motivated to behave consistently and with positive intentions. Other trust

theorists have argued that the highest form of trust is based on identification with another person's desires and intentions [Lewicki and Bunker, 1996]. As relationships develop, increasing knowledge of another person and information about their behaviours, preferences and motives lead to identification with this person, that is, to seeing oneself and another person as belonging in the same group. Increased trust is a product of this identification.

These existing models of trust address the process by which person-based trust develops. In both models, the accumulation of information plays a key role in the development of person-based trust. Both models suggest that working to predict the behaviour of others, and attributing positive and unselfish motives to others are critical steps in building trust. As both models and other theoretical work show [e.g., Mayer, Davis and Schoorman, 1995], there is overwhelming agreement that the development of person-based trust is historical. In general, trust is seen as developing over the course of time, as gradually building through progressive stages as relationships become more elaborated and interdependent, and is typically seen as reaching a more stable but constantly dynamic level as relationships mature. According to both models, then, developing trust in another person requires the time to interact, to develop a personal history, and to see that this person's behaviour is consistent and reliable, and motivated by genuine concern. Note that one base for person-based trust is cognitive, as trust development involves the exchange and processing of relevant information. However, trust is also predicated on feelings of security and confidence in another person, so another base is affective or emotional.

2.2 Factors Influencing Person-Based Trust

As these models of person-based trust argue, people work to understand the extent to which another person is predictable and dependable. It is also clear that decisions about predictability and dependability are also influenced by several other factors within the person being trusted (qualities of the trustee), by pre-existing levels of trust within the trustor, and by the content and quality of the interactions between the trustee and the trustor. Each of these sets of factors is considered in the next section.

Within the trust literature, *competence* is typically seen as the most influential factor in judgements of trust. Competence has been characterized as having three main components, including expert knowledge, technical facility, and everyday routine performance [Barber, 1983]. The *benevolence* of other people, as well as their *integrity* can also play a key role in judgements of trust. People who are viewed as benevolent toward us are generally seen as positively motivated to act in our best interests. Trust theorists argue that judgements of trust are typically based on consideration of all three factors [Mayer et al., 1995]. Believing that a team member has a high level of competence may not influence trust unless that person is also seen as having integrity.

The relative weight given to competence, benevolence and integrity in making judgements about others is influenced by the situation and its inherent risks. Highly developed technical skills in another person may be considered to be extremely important when assembling an explosive device, but secondary to highly developed benevolence and integrity. The context of a relationship and the demands of the situation will determine which dimension(s) are most salient and which most strongly influence judgements of trust [Mayer et al., 1995].

The qualities of the person doing the trusting will also influence the development of trust. Some people, by their very nature, may be more likely to trust (or distrust) others. This generalized propensity to trust is seen as the product of developmental experiences, and is consistent across time and across situations [Rotter, 1967].

Several factors related to the quality of the interaction between trustor and trustee are also seen to influence the development of person based trust. These factors relate to communication, perceptions of similarity, and the existence of shared goals and values. These factors, and their proposed impact on trust in small teams are listed in the chart that follows:

Category of Factors	Factors Influencing Person-Based Trust	Description	Impact on Trust
Qualities of the Trustee	Competence	Possessing the skills, characteristics, and abilities to allow us to meet the demands of a given situation	Competent people are more likely to be trusted because they possess skills and abilities which lessen the risk of negative outcomes [Mayer et al., 1995]
	Benevolence (Positive Motivation)	The extent that a trustee is seen as wanting to do good to a trustor, independent of their self-interests	Highly benevolent people are more likely to be trusted – believing that others are well intentioned reduces risk and uncertainty
	Integrity	Credible communications, a strong sense of justice, and consistency of word and action (Mayer et al., 1995).	Integrity increases trust, as it provides consistency of word and action, and makes people's behaviour more predictable
Qualities of the Trustor	Propensity to Trust	Tendency to trust others, often cited as a product of developmental experiences, and seen as consistent across time and across situations	Propensity to trust can influence both whether people engage in relationships with others, and the attributions that they makes within these relationships
	Trust History	Past history of trust interactions with other people	A positive trust history makes trust in future relationships and situations more likely
Qualities of the Interaction	Communication	Both the exchange of information and the openness with which the information is exchanged	Open communication (e.g. sensitive and/or unsolicited information) provides evidence about another's trustworthiness [Lewicki and Bunker, 1996] and can facilitate trust. Information exchanged provides evidence of goodwill and a desire for deepened relationships [Das and Teng, 1998].
	Shared Values and Goals	Values: " <i>general standards or principles that are considered intrinsically valuable ends (e.g., honesty, reliability)</i> " [Jones and George, 1998]. Goals are desired end states.	Shared values provide standards by which to judge whether another person can be trusted [Jones and George, 1998]. Knowing a person's goals provides information about future behaviour. This increases their predictability and enhances trust.
	Similarity	Similarity may include age, sex, marital status, as well as cultural or ethnic background, life experiences, attitudes, technical background, training, etc.	People may be attracted to people who are similar [Mayer et al., 1995] and this may lead to more global positivity about all of their qualities, including trustworthiness. Similarity may provide a basis for assuming that other's behaviour will be similar to one's own [Kramer, Brewer, & Hanna, 1996].

Table 1: Factors Influencing Person-Based Trust

2.3 Emergence of Category-Based Trust

Although recognizing that person-based trust is crucial to many social interactions, trust theorists and researchers have become increasingly interested in how trust can exist in situations that do not offer the opportunity for the development of person-based trust. This section explores a less familiar form of trust, called category-based trust. As its name suggests, category-based trust is conferred on an individual on the basis of their membership in a particular group or category [Kramer, 1999] and perceptions of the trustworthiness of that group. Trusting another person because this person is a member of a specific ethnic, religious, or occupational group is an example of category based trust.

Category-based trust may be based on different kinds of categories. Social roles, for example, are specific categories that provide information about the people that occupy the role. Category-based trust may be based on the training and experience known to be associated with certain roles. A surgeon may promote trust in others, for example, not because of direct evidence of personal competence, but because the role of “surgeons” is typically associated with information about the general competence and effectiveness of surgeons. As Kramer et al. [1996] argue, the category to which a person belongs can serve as a proxy for personalized knowledge. Similarly, a leader starting command of a new unit can trust his soldiers even without ever having seen them perform in combat if he believes that his soldiers are representatives of a system of military training and expertise that has produced soldiers shown to be worthy of trust for generations. The reverse, of course, is also true – soldiers may trust their leaders because of the position of authority granted to these leaders by the military system. In short, category-based trust can emerge even in circumstances that preclude the development of person-based trust i.e. where there has been no opportunity to learn from personal interaction.

Categories, and the information associated with categories, develop over time. Categories are sometimes the result of direct experience with a member of the category. Many other factors, including socialization and cultural context, also impact on the information that comes to be associated with categories. Once established, social categories are used to simplify the interpersonal environment, and to manage the vast amount of information about other people available during interactions. Impression formation theorists have argued that categories are often activated in response to a lack of time, opportunity or motivation to form a personalized view of another person [e.g. Brewer, 1988]. When confronted with an unfamiliar person, it is more efficient to use a category-based representation of this person in order to understand them and to make assumptions about how this person is likely to behave. Taking the time to evaluate each individual piece of information about this person (e.g., appearance, traits, or behaviours) takes much more time and effort.

In some cases, categorization may also lead to *identification*. It is possible to not only categorize a person as belonging to a particular group, but also to categorize this person as belonging to one’s own group. This process is called identification. Kramer et al. [1996] argue that in organizational settings, “*the willingness of individuals to engage in trust behaviour in situations requiring collective action is tied to the strength and salience of their identification with an organization and its members*”. In short, identification is an important key to category-based trust.

Kramer et al. [1996] argue that identifying with another person, and categorizing this person as a member of one’s own group may influence how much trust is placed in this person. This may

occur because identifying with another person changes the way that decisions are made in a choice situation. In normal choice situations involving other people, we typically calculate the benefits the costs and benefits of our actions with reference to our own personal outcomes. When we identify with another person, however, decisions are no longer made on an individual level, but on a collective level, as identification makes the impact of decisions the same for both parties. This shift from a personal identity to a collective or group identity makes people more likely to trust others who share membership in the same group or category.

The preceding analysis suggests that trust can exist even in situations that preclude the development of the more common person-based trust. Direct and extended interaction with other people, and exploring shared values and experience, are not the only ways to come to trust others. Category-based trust allows people to confer trust on others as a sole product of the categories and groups to which they are perceived to belong. The emergence of category-based trust can enable people to trust each other implicitly and immediately.

2.4 Factors that Affect Category-Based Trust

A number of factors, all related to categorization and identification, influence the emergence of category-based trust. This section explores several factors that affect the emergence of category-based trust in the context of interpersonal relationships. The processes of shared membership, ingroup bias, stereotypes and attribution processes are very closely related, and speak to a variety of different ways in which categorization and identification may occur. Rules and roles are also potential factors but have typically been understood within a broad organizational context. All of these factors may influence category-based trust.

Factors Influencing Category-Based Trust	Description	Impact on Trust
Shared Membership - Ingroup Bias	Belonging to the same social group or category - preferential treatment toward people belonging in their own social groups.	Both enhance the degree to which people see themselves as similar to other members of the group [Tajfel, 1982]. Similarity provides some basis for assuming that others will behave in ways similar to oneself.
Stereotypes	Cognitive structures containing beliefs, feelings and expectations about members of another social group [Kunda, 1999]	Stereotypes that contain information about the trustworthiness of specific group members (e.g. lawyers are opportunistic) may increase or decrease category-based trust.
Attribution Processes	Causal inferences made about others	Categorising others in the same group as oneself can impact attributions about other's behaviour (e.g. see ingroup more positively than outgroup)
Roles	Position that a person occupies	Roles provide information person's trust-related intentions and capabilities. Roles also promote trust when performed in environments with accountability mechanisms and controls in place
Rules	Rules are explicit and tacit understandings regarding transaction norms, interactional routines, and exchange practices [Kramer, 1999].	Rules enforce ethical standards within groups, and allow people to function in a group-oriented context [Jones and George, 1998]. People are more likely to be trusted when their behaviour is seen as governed by rules, because rules make one's behaviour more predictable.

Table 2: Factors Influencing Category-Based Trust

3. The Development of Trust in Small Teams

The focus of interest for this work is the development of trust in small military teams and its antecedents and consequences. Trust in other team members is particularly valued in the military context because of the need to depend on the performance of others in interdependent team tasks in a wide variety of high risk, high tempo, mentally and physically demanding situations, sometimes under conditions of extreme discomfort and fatigue. Furthermore, these tasks must often be performed independently with little or no supervision.

For working purposes, a small team is taken to be larger than three but not more than eight members. Examples include armoured vehicle crews, infantry assault groups, artillery teams, crews of larger aircraft, surveillance teams, sensor or warfare teams on warships, among others. While larger military groups such as army platoon and company size groups and above are beyond the present scope, temporary teams such as command or planning teams of four or five people fall within the working definition of a small team. In terms of the development of trust, though, such teams differ from the more permanent small teams outlined above in several significant ways. These include the duration of the team's existence, the degree to which team members know each other (personally and professionally), the period of time over which the team members have been part of the same parent organization, and the diversity of technical backgrounds that team members represent. Because of these differences, what might be called military management teams have also been excluded.

The chosen team of interest has been the crew of an armoured vehicle. Current research is in its early stages and, so far, is limited to preliminary interviews and focus groups with about 14 military members of vehicle crews representing a cross section of positions in the crew. Vehicle crews are small (3-4 persons), have well defined tasks within the vehicle, and tend to remain together as a crew and within the same larger parent unit for prolonged periods. An armoured vehicle crew may remain together from a few months to 1-2 years; and individuals are likely to remain within the parent regiment (with absences for training courses or temporary postings) for several years. New members of a vehicle crew may be introduced as a recent recruit into the army after basic training, or as a result of a lateral posting to fill a vacancy as a result of a promotion, posting, or injury. For all crews, most time is spent in garrison with only limited amounts of time spent on field training exercises, or in actual operations.

3.1 Person-Based Trust in Military Teams

The small team military context has many features that are conducive to the development of person-based trust. Person-based trust is based on experience, and involves predictions about how others are likely to behave and to be motivated with respect to oneself and to the team. Within many military teams, relationships with other team members at this level are often extremely close, as team members spend long amounts of time together and are highly interdependent. Military team members need to cooperate on many team tasks, and have the opportunity to see other team members in a variety of contexts, in the course of both everyday life and high-risk situations. It is clear that many of the factors seen in the literature to influence trust are also likely to affect trust within the small team military context. Competence, integrity, communication, shared goals and values, and perceived similarity, for example, are all likely to affect trust within small military teams.

Within small military teams such as armoured vehicle crews, the standards used to gauge trust may be more demanding than would be the case in most other contexts. Although the trust

literature speaks to trust developing over the course of time, within small military teams, the development of trust is linked not just to time, but to the ability to observe trust-relevant behaviours within a specific sort of context. Even long periods of acquaintance with other team members under garrison conditions are unlikely to generate the insights required for accurate estimation of whether other team members can be trusted under operational conditions. Experience as a team during prolonged field exercises will likely be more relevant to building person based trust, because training exercises require each team to live together cooperatively for long periods under difficult conditions. The field experience is likely to add significant insight into the ability of other team members to perform their respective tasks, as well as into their motivation to do so. However, even during long field exercises, the aspect of high risk present during actual operations will still be largely absent. Actual operations seem most likely to test trust among team members, as only this context provides the maximal levels of risk, uncertainty and vulnerability needed to fully test the boundaries of trust. At the same time, the experiences needed to build trust within this context are certainly the most difficult for teams to acquire.

The development of person-based trust within small military teams also faces several other challenges, depending on the varying situations within which such teams operate. Due to the time needed to develop trust, for example, high levels of turnover are likely to hinder the ability of some military teams to build person-based trust. Person-based trust requires time, effort and direct contact in order to develop. Moreover, although many of the tasks of military teams are performed in direct contact with other team members (e.g. in armoured vehicle crews, who perform their work in close proximity), some operations require teams which are geographically distributed across a wide area. Geographical distribution, and the lack of shared social context will likely preclude the typical development of person-based trust within some military teams. Lastly, although members of military teams can be similar in many ways, team members are likely to face some forms of diversity within their team, and in the larger military environment of which they are a part. Members of small military teams are likely to encounter a vast range of skills, education and experience as they come into contact with other teams with different specialties (e.g., artillery soldiers or engineers). With increasing diversity within Canadian society generally, members of small military teams may face diversity (e.g., life experience, gender, age, as cultural, personal values) both within their own team, in interacting with other military teams, and in the course of operations generally. As perceived similarity and shared values and goals are seen to promote trust, it could be argued that the types of diversity encountered by many small military teams may present challenges to the development of person-based trust. This analysis speaks to the importance of developing trust within teams as a preparatory activity even before teams are involved in operations.

3.2 Category-Based Trust in Military Teams

Although the contexts within which many military teams function pose unique challenges, these contexts do not preclude the emergence of trust. There is also theoretical agreement that category-based trust can develop even when direct and personal contact is not possible. Category-based trust is seen to emerge as a product of categorization and/or identification. Such trust can emerge as the result of categorizing another person in a group seen to be associated with trust (e.g. judges are trustworthy), or by identifying oneself as belonging to a common group with another person or group of people.

Within the small team military context, trust is likely to be influenced by categorization. In the military context, there are many salient categories that may lead to trust being extended, or

withheld, in whole or selectively. Categories such as “officers”, “sergeant majors”, or “recruits” may have distinct implications for trust. A “recruit” for example, is likely to be less trusted, on average, than a seasoned soldier would be trusted. Membership in categories related to rank, gender, age, service experience and even seeing a person as belonging a specific regimental unit all have the potential to affect the emergence of category-based trust. These categories provide information about the people belonging to the category, and may influence the extent to which these people are likely to be seen as trustworthy. Within small military teams, a key factor affecting category-based trust in a new teammate is reputation. As individuals tend to move through different positions within the same regimental system, their reputation (e.g. related to competence) often precedes them when they move to a different team. This factor, although noted in the trust literature [e.g. Kramer, 1999], has not been given a prominent position in descriptions of the factors influencing category-based trust.

Trust within small military teams is also likely to be influenced by identification. Identification may influence the ability to place trust in new team members. To the extent that a fellow teammate is viewed as the product of a shared system of training and expertise, one may be more likely to confer some degree of trust, even in the absence of direct evidence of the teammate’s competence or motivation. Similarly, sharing a regimental history and values may also provide a basis for some trust between new teammates. In short, emergence of category-based trust can enable people to trust each other implicitly and immediately. At the team level, then, category-based trust can play a key role in facilitating the ability of team members to manage risk and uncertainty.

3.3 Overview of Trust Development in Military Teams

This analysis suggests that building a common basis of identification within small teams and within the military system as a whole may be an important way to promote trust, even in the difficult and chaotic environments faced by many small military teams. We would suggest that trust in the military team context is likely to be simultaneously determined by both person-based factors, as well as category-based factors. For a person new to the team, salient categories may provide an initial estimate of a person’s likely trustworthiness, based on appearance, rank, or operational experience. Moreover, reputation within the larger parent unit is likely to influence judgements of trust even before a person actually joins the team.

Over time, however, trust may change as the result of with direct experience of the new team member. Existing team members may actively seek information about the range and depth of the new team member’s trustworthiness, or simply withhold trust to some degree until more is known. This may occur by limiting task assignments or increased monitoring of task performance, until having had the opportunity to gauge trustworthiness within a more realistic context. Having the time and opportunity to assess the competence and the motivation of a person over time will impact on the level of trust between team members.

As a whole, then, the development of trust within small military teams is dependent on factors related to the person, on the categories to which this person is seen to belong, and on the situational factors of risk, vulnerability and uncertainty. An important implication of this is that study of trust needs to be tailored to the military context, rather than assuming that the factors which influence trust in other settings are necessarily equally influential within the military context. In fact, trust within a small team military context appears to be distinctive in several ways. One key distinction between trust in other contexts and trust in a military context is the

conditionality of trust within the context most frequented by small military teams. In garrison, for example, the ability to make predictions about how another teammate is likely to perform in a high risk, high stress situation is very limited. As such, judgements about the trustworthiness of other teammates are always somewhat conditional. In the course of field operations, teammates are able to form more elaborated expectations about the trustworthiness of their teammates. As such, trust may only have the potential to develop fully in the context of actual operations.

4. The Effects of Trust in Small Teams

Once developed, trust is argued to have a range of impacts on a variety of important social processes. It is, for example, seen to reduce the need to defensively monitor others for signs that they are adhering to our expectations. Defensive monitoring may include behaviours such as making requests for information ahead of the time it is needed, or drawing upon multiple sources of information [Currall and Judge, 1985]. Defensive monitoring occurs in relationships where trust is in question, and is used to protect oneself from the opportunism of others [Holmes, 1991]. Defensive monitoring is potentially a hazard, as it has the potential to direct attention away from the main task at hand, leaving fewer resources available to accomplish primary work objectives [McAllister, 1995]. Similarly, trust is also posited to reduce the need for formal controls, or mechanisms that regulate and guide organisational behaviour. There is some empirical evidence suggesting that trust also facilitates cooperation [Messick, Wilke, Brewer, Kramer, Zemke and Lui, 1983], as people are more likely to show restraint in using resources when they expected others to do the same. Moreover, trust has also been shown to facilitate communication by freeing up the transmission of information. O'Reilly [1978] has shown that when trust was high between superiors and subordinates, subordinates were more likely to transmit even information that reflected unfavourably on them but when trust was low, subordinates showed a tendency to suppress unfavourable information. Trust has also been shown to decrease conflict in work settings [Simons and Peterson, 2000]. When trust is low within a work group, ambiguous information that would typically be seen as related to conflicts about how to perform a specific task is more likely to be interpreted at a personal level, and as representing more sinister interpersonal motives. On the other hand, when trust is high, team members are more likely to see conflict about work tasks as purely task conflict, and less likely to see conflict as a personal attack or hidden agenda.

Lastly, trust is also expected to impact at a broader level on both group process and performance. There is some empirical evidence that trust improves group effectiveness, both directly [Friedlander, 1970], and indirectly through impacting on how group members channel their efforts [Dirks, 1999], and by affecting both conflict and task processes [Porter and Lilly, 1996].

The table that follows summarizes the most frequent effects of trust explored in the existing literature.

Effect of Trust	Description	How trust within a team impacts
Defensive Monitoring	Observing others' actions to assess whether they are matching one's expectations (e.g. requests for help ahead of when needed, or drawing on multiple sources of redundant information [Currall & Judge, 1995]).	Trust enables less defensive monitoring of others [McAllister, 1995; Currall and Judge, 1995]
Need for Controls	Controls: mechanisms that guide or regulate systems.	Trust in upper levels of command reduces the need for hierarchical control.
Co-operation	Working together	Trust promotes co-operation by increasing predictability & expectations of reciprocity. High trust teams are more likely to co-operate.
Communication	Sharing of information, Openness of interaction	High trust teams likely to share more information with less need to filter unfavourable information, and to distribute information more effectively
Conflict	Friction and dissent	High trust teams will show lower levels of conflict overall. When conflict does occur, high trust teams are more likely to interpret this conflict as task conflict, and less likely to interpret it as relationship centred conflict [Simons and Peterson, 2000]
Group Process and Performance		In general, trust improves the performance of workgroups. There is disagreement about whether this effect is direct or indirect. High trust teams will show better group processes and better group performance

Table 3: The Effects of Trust

Existing empirical work potentially relevant to understanding trust within small teams is still at a relatively early stage of development, and has a number of limitations that will need to be addressed by future research. On the whole, the available trust literature suggests that although there is some evidence that trust enhances how people interact, and how they perform, this assertion has yet to be convincingly established in a non-artificial setting. Moreover, few of the available studies show how trust affects pre-existing teams rather than groups of unfamiliar people assembled to work together solely for experimental purposes. It will be impossible to truly understand how trust affects team process and performance until real teams performing realistic tasks are used in trust research. This issue remains an important question for research to explore in more naturalistic settings and is of special relevance in the military domain. Success of military operations is predicated on team members working cooperatively and effectively often under conditions of high risk and high stress.

5. Trust in Automation

Within an increasingly technological military battlespace, the use of technology such as sophisticated expert systems and automated decision aids gives rise to questions about how much automated systems are trusted (and should be trusted) by the people who use them. Trust in such systems, of course, is seen as a critical factor in the actual use of such systems. This section provides a broad overview of trust in automation theory and research.

Trust in automation has been explored in contexts ranging from function allocation, adaptive automation and decision making. Automation can be defined as:

“any sensing, detecting, information, processing, decision-making, or control action that could be performed by humans, but is actually performed by machine [Moray, Inagaki and Itoh, 2000].

Both overutilization and underutilization of automated systems have been argued to be related to several tragic errors and accidents [Parasuraman and Riley, 1997]. Too much trust can lead operators to rely uncritically on automation without properly monitoring systems, and too little reliance lessens the ability of automated systems to contribute optimally, leaving higher room for human error.

The only theoretical model of human trust in machines has been developed by Muir [1994]. This model follows on the person-based model developed by Rempel, Holmes and Zanna [1985], and argues that trust in machines is also based on predictability, dependability and faith. Within the human/machine realm, predictability is seen as having a number of dimensions, including:

- The actual predictability of the machine’s behaviour
- The operator’s ability to predict the machine’s behaviour
- The stability of the system in which the machine operates

Dependability is also seen to be an important dimension in the human/machine relationship, as attributions will be increasingly pushed toward more elaborate tests of the predictability of the machine. Muir also argues that in the absence of complete knowledge about the ability of the machine to perform under every circumstance, the operator must make a “leap of faith” beyond the behavioural evidence, and believe that the machine will perform reliably even in previously unseen circumstances. In addition to these factors, Muir and Moray [1996] also argue that competence, reliability and responsibility are also key factors in trust in automation, and propose that an additive model may best represent trust in automation. In keeping with person-based theories of trust, Muir’s theory of trust in automated systems also argues that the development of trust is iterative, and that conferring trust on an automated system will only occur if trust is consistently validated. The task of the operator, Muir [1994] argues, is to calibrate their trust to the true properties of the machine. This notion of the calibration of trust, then, is evident within both the human and the human-machine realm.

Importantly, much of the trust in automation research also recognizes the distinction between trust as a psychological state (typically measured by operators’ ratings of trust in the automated systems) and trust as choice behaviour [e.g. Moray et al., 2000]. Within this context, however, trust behaviour is conceptualized in terms of the allocation of tasks to automated systems [e.g. Lewandowsky, Mundy and Tan, 2000], or on the operator’s acceptance of advice provided by the automated system.

To date, research and theory related to trust and automation has focused primarily on the effects of varying levels of trust in automation. Perhaps the earliest research on trust in automation placed participants in control of a simulated plant, recording their trust in the automation as it progressed through various iterations [Muir, 1989, reported by Muir and Moray, 1996]. Initial fault-free iterations were followed by several malfunctions of the automated system, and subjective ratings of trust were measured at several different points. These subjective ratings of trust were meaningfully related to the performance of the automated system. When the system worked reliably, operators’ ratings indicated a good level of trust in the automation. But, when the system malfunctioned, trust declined quickly. Moreover, there was a strong relationship

between the supervisor's trust and use of the automation. After the equipment malfunctioned, operators were more likely to take over manual control. When performance was reliable, operators again gave back control of the plant to the automated system. This suggests that judgements of competence, as well as the predictability and dependability of the automation can dominate the use of automated systems [Muir and Moray, 1996].

Trust in automation, however, can also be influenced by several other factors. Operators' trust in the automation that they use may be dependent on their trust in the designers of the automated systems [Muir, 1994]. An operator who believes in the ability of the automated system designer may be more likely to confer trust even without direct experience with the system. Similarly, the very design of automated systems may be dependent on the system creator's perception of the relative capabilities of a human operator versus the abilities of an automated system [Muir, 1994]. Trust in automation is also affected by the current state of the person operating the system. There is some evidence, for example, that trusting automation can also be dependent on the self-confidence of the operator [Lee and Moray, 1994]. Operators in control of an automated system that experienced intermittent faults used the automated system when their level of trust exceeded their self-confidence, but took over manual control of the system and relied on the automation when their self-confidence exceeded their trust. This suggests that trust in automation is dependent on the qualities of the automated system, related to both the performance of the system (e.g. reliability and consistency), as well as being extended to the very origin of the system (e.g. the maker of the system). Trust in automation is also likely to be related to several qualities of trustor, including self-confidence as well as propensity to trust automation.

All of the similarities between trust in the human context and trust in automation may lead to the conclusion that trust is the same construct across varying contexts. There is some evidence, for example, suggesting that the dimensions used to understand trust in general, trust between people, and trust in automation are common [Jian, Bisantz, and Drury, 2000]. The components of trust seen to be important in the human context and the human-machine context showed considerable convergence: the words "trustworthy" and "reliability" and "loyalty" were common in both contexts. This suggests that trust may be predicated on similar dimensions in these contexts. This work, however, addresses trust as a generalized construct, rather than trust in specific persons or objects. It is unclear whether trust within specific human and human-machine relationships actually has the same dynamic. Even though trust in these contexts may share many common features, it is yet to be shown at an empirical level that a single conceptualization of trust can be meaningfully applied in all of the diverse contexts.

One of the challenges faced by theorists and researchers within this area, moreover, is that the fact that trust in automation appears to be sometimes confused with the use of automation. The mere use of automation may or may not imply trust in the automation. For research and theory within this area to progress, more refinement in what is meant by "trust in automation" seems necessary. The notion of automation complacency [Parasumaran, Molloy and Singh, 1993], for example, appears to be correlated with issues of trust in automation. When operators believe that an automated system will behave competently, they may be less likely to monitor the system. It is, of course, unclear whether operators only fail to monitor a system rigorously because they trust the system, or because other contextual factors (e.g. workload) play a role. As such, it is important to have a conceptual clarity in the term "trust in automation" for future work.

Nonetheless, in an increasingly sophisticated environment, such as in the military context, it is possible to provide technology. This analysis, however, suggests that even the most sophisticated technology will not be helpful if people do not trust it enough to use it. There is good reason to believe that trust may be a key factor in how people interact with automation. Understanding the extent to which people trust the automation around them could have serious consequences for the use of technology, and ultimately for the human performance that the technology is designed to enhance.

6. Discussion

The goal of this literature review was to explore the status of trust research and theory and to examine its application within small military teams. This paper addresses issues concerning the development of trust within small teams. Trust within small teams is likely to be affected by both person-based trust, trust which is based on direct and personal experience with other teammates, and by category-based trust, based on assumptions about the groups or categories to which team members belong. Person-based trust develops as a product of seeing others as both competent for the situation in question, and motivated to act in our best interests. In many small team contexts, however, direct and personal experience with other team members is not always possible, and team members must confer trust pre-emptively in order to manage risk. In these situations, category-based trust can emerge as a product of two related processes: categorization and common group membership or identification. This paper also identifies several possible effects of trust on team performance. Although it seems likely that trusting other members of one's team will result in performance benefits (e.g. in terms of efficiency, conservation of attentional resources), this assertion has yet to be widely tested, and has not been explored in non-artificial setting with intact working teams. Understanding the effects of trust within small teams is an important goal of future research.

This review is part of a larger project exploring trust within military teams. We believe that our research offers a unique opportunity to take a more global view of the issue of trust in teams. Existing models of person-based trust and theories about category-based trust present compelling portrayals of how trust develops, but trust models as a whole have not yet been empirically validated. Moreover, the important issue of trust in automation also presents itself as an important area of study, in light of the increasing use of technology within military contexts. There may be considerable benefit in working to establish these models more firmly in the context of military teams. Such a perspective would provide a strong framework within which to understand trust not just within small teams, but also within military teams with varying levels of diversity (e.g., multinational operations).

As a first step toward these goals, work directed at building and validating a model of trust between a military leader and followers is ongoing. A preliminary model has been designed and an informal validation of the model has been conducted through focus group interviews with members of armoured vehicle crews in the Canadian Forces. These interviews provided a rich source of data, and indicated considerable agreement with the trust development process indicated in the preliminary model. In addition, the small military team members in these focus groups also emphasized the importance of several factors in the trust development process which are critical within the military context, but which have been less emphasized in the existing trust literature. These interviews will be used to further refine the model, in preparation for formal efforts directed toward empirical validation.

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