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Swift Trust in Distributed Ad Hoc Teams

by:

Barbara D. Adams, Sonya Waldherr, Jessica Sartori and Michael Thomson

Humansystems® Incorporated
111 Farquhar St.,
Guelph, ON N1H 3N4

Project Manager:
Barbara D. Adams, Ph.D.
(519) 836 5911

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as represented by
Defence Research and Development Canada Toronto
1133 Sheppard Avenue West
Toronto, Ontario, Canada
M3M 3B9

DRDC Scientific Authority
Dr. Megan Thompson
(416) 635-2040

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Author

Dr. Barbara D. Adams
Humansystems Inc

Approved by

Dr. Megan Thompson
Scientific Authority – Collaborative Performance and Learning

Approved for release by

K.M. Sutton
Chair, Document Review and Library Committee

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Abstract

Swift trust is trust developed quickly even without direct and personal experience with another person and has been increasingly posited in the literature to be one way in which members of ad hoc teams can quickly form trust (Meyerson, Weick & Kramer, 1996). This pilot study explored whether the regimental identity of teammates could influence levels of “swift” trust within teams. The secondary focus of this experiment was the impact of potential trust violations.

Twenty-four teams of Canadian Forces (CF) reservists each conducted four tactical assault missions in a first-person gaming laboratory. Each 4-person team was composed of 2 CF personnel and 2 confederate researchers (purported to be CF personnel). Members of the team worked in a simulated distributed environment (separated by partitions), and were initially introduced to each other only using a 1 page written profile that described their background and operational experience. Their task in the computer game was to operate as 2 separate fire teams approaching the target area from 2 different sides in order to engage and destroy terrorists. Teammates communicated via radio only but interacted within the simulated mission area through their computer avatars. In order to manipulate regimental identity, the 2 confederate members of the newly formed and distributed team were reported to come from either the same regiment or a different regiment as the actual CF participants. In addition, to investigate whether trust violations affected the development of trust over the four missions, in half of the missions, a confederate team member performed a behaviour that could put the team at risk. Questionnaires assessed the impact of regimental identity and potential trust violations on levels of team trust before the mission began (pre-mission), during a mission freeze (about 5 min into the mission) and at the end or post-mission.

Results showed that even with only indirect knowledge about teammates’ regimental affiliation, team trust was significantly higher in distributed teams that apparently shared a common regimental identity. However, initial levels of team trust were relatively high in both teams. This suggests that a perceived shared regimental identity promoted swift trust at the very early stages of working as a team. Moreover, before even meeting one’s teammates, team members expected to accrue fewer casualties when working with team members from their own regiment than from a different regiment. At the mission freeze, however, shared regimental identity had no impact on team trust although the perceived skills of team members were influenced by violations. At the post-mission stage, team trust measures showed very weak impacts of regimental identity. Team trust as a whole increased slowly over the course of the mission, regardless of regimental identity or the occurrence of a trust violation. These findings show that while regimental identity can influence immediate judgements of team trustworthiness, these effects may be relatively temporary. Moreover, the impact of swift trust on team process and performance over time will require more study.

However, this pilot study represents a good first attempt at understanding these relationships. Possible theoretical accounts of these findings and lessons learned are explored and future research and training implications are addressed. Understanding the swift trust construct will be critical as the CF moves toward increasingly dynamic, diverse and distributed operations.

Résumé

La confiance instantanée est une confiance qui se manifeste immédiatement, même envers quelqu'un qu'on ne connaît pas personnellement. Cette notion est de plus en plus utilisée dans les ouvrages spécialisés pour expliquer comment les membres des équipes spéciales parviennent à établir rapidement des relations de confiance (Meyerson, Weick & Kramer, 1996). L'étude-pilote résumée ici examine si l'identité régimentaire des coéquipiers peut influencer le niveau de confiance instantanée à l'intérieur d'une équipe. Accessoirement, l'étude-pilote examine l'impact des éventuels abus de confiance.

Dans un laboratoire de jeu à la première personne, 24 équipes de réservistes des FC ont effectué, chacune de leur côté, quatre missions simulées d'assaut tactique. Chaque équipe était composée de quatre personnes : deux membres des FC et deux chercheurs complices (censés être des membres des FC). Les membres de l'équipe travaillaient dans un environnement réparti simulé (séparés par des cloisons), et au départ, ils n'ont été présentés l'un à l'autre qu'au moyen d'un profil d'une page décrivant leurs antécédents et leur expérience opérationnelle. Dans ce jeu électronique, ils étaient divisés en deux équipes de tir distinctes qui devaient s'approcher de la zone cible de deux côtés différents, puis attaquer et détruire un groupe de terroristes. Les coéquipiers communiquaient par radio seulement, mais ils pouvaient interagir, dans la zone de mission simulée, par l'intermédiaire de leurs avatars électroniques. Pour jouer sur l'identité régimentaire, les deux membres complices de l'équipe nouvellement formée et répartie étaient décrits comme provenant du même régiment que les deux membres des FC, ou d'un autre régiment. De plus, pour examiner l'impact des abus de confiance, dans la moitié des missions, un membre complice a adopté un comportement susceptible de mettre l'équipe en péril. Des questionnaires distribués aux participants ont permis d'évaluer l'impact de l'identité régimentaire et des abus de confiance sur le niveau de confiance au sein de l'équipe juste avant la mission, pendant la mission (environ 5 minutes après le début de la mission), et après la mission.

Les résultats montrent que même lorsque l'affiliation régimentaire des coéquipiers n'est connue que de façon indirecte, le niveau de confiance est beaucoup plus élevé dans les équipes réparties dont les membres proviennent apparemment du même régiment. Cependant, le niveau de confiance initial était relativement élevé dans toutes les équipes. Ces résultats semblent indiquer que le sentiment de partager une même identité régimentaire a suscité une confiance instantanée dès que l'équipe a été constituée. De plus, avant même d'avoir rencontré leurs coéquipiers, les membres de l'équipe s'attendaient à subir moins de pertes s'ils travaillaient avec des membres de leur propre régiment. Pendant la mission, cependant, le fait d'appartenir au même régiment n'a pas eu d'impact sur le niveau de confiance au sein de l'équipe, bien que les abus de confiance aient influencé la perception du niveau de compétence des différents membres de l'équipe. Après la mission, la mesure du niveau de confiance a montré que l'identité régimentaire avait très peu d'impact. Le niveau de confiance au sein de l'équipe a eu tendance à augmenter lentement tout au long de la mission, quelle que soit l'identité régimentaire ou l'incidence des abus de confiance. Ces résultats montrent que l'identité régimentaire peut influencer la perception initiale de la fiabilité des autres membres de l'équipe, mais que cet effet n'est que temporaire. De plus, l'impact de la confiance instantanée sur le travail et la performance de l'équipe à long terme devra faire l'objet d'études plus poussées.

Cependant, l'étude-pilote représente un beau « premier effort » pour comprendre ces relations de confiance. L'étude cherche une explication théorique des résultats obtenus, elle examine les leçons apprises et leurs incidences sur les programmes de formation, et elle envisage de nouvelles pistes de recherche. Comprendre le concept de confiance instantanée sera essentiel dans les années à venir, lorsque les FC s'engageront dans des opérations de plus en plus dynamiques, diverses et réparties.

Executive Summary

Swift trust is conceptualized as a feeling of confidence in another person or group of people that exists even without direct and personal experience with other team members. It has been increasingly posited in the literature to be one way in which members of ad hoc teams can quickly form trust (Meyerson, Weick & Kramer, 1996). The current pilot study explored whether the regimental identity of teammates would be one of those factors that would influence levels of “swift” trust within teams. The secondary purpose of this experiment was to explore the impact of potential trust violations.

Twenty-four teams of CF reservists conducted four tactical assault missions in a first person shooter gaming laboratory. The teams, each composed of 2 CF personnel and 2 confederate researchers (purported to be CF personnel), worked in a simulated distributed environment, as they were all in the same room, but physically separated by partitions. Their task was to operate as 2 separate fire teams (comprised of 1 CF participant and 1 confederate) approaching the target area from 2 different sides to engage and destroy terrorists. All four team members were introduced to each other using a written profile that described their background and operational experience. The 2 confederate members of the newly formed and distributed team were reported to come from either the same regiment or a different regiment as the actual CF participants. Teammates communicated via radio only but interacted within the simulated mission area through their computer avatars. The impact of varying regimental identity on initial swift trust and subsequent team trust, as well as team performance, was explored. In addition, to explore the impact of trust violations, a violation occurred in about half of the missions, in which a confederate team member performed a behaviour that could put the team at risk. Other missions had no such violation.

Questionnaires assessing trust and other team measures were administered at several points in each mission. The first administration occurred before team members had met each other at the pre-mission stage. A second administration occurred during a mission “freeze” at around 4-5 min into each mission, and explored team trust and the impact of the violation that had occurred to this point. Finally, post-mission questionnaires were administered after mission completion. The questionnaires explored team trust, trust in specific team members, ratings of the skill levels of team members, estimates of team performance, perceptions of teamwork, indicators of team performance, and after the violation, assessments of the impact of the violation that had occurred were also taken.

Results showed that initial levels of trust were quite high overall. Nonetheless, with only indirect knowledge about teammates’ regimental affiliation, team trust was immediately and significantly higher in distributed teams that apparently shared a common regimental identity. This suggests that shared regimental identity promoted swift trust at the very early stages of working as a team. Moreover, before even meeting one’s teammates, team members rated it more likely that at least 1 member of their team would be killed when working with team members from a different regiment than from the same regiment. By the time of the mission freeze, however, shared regimental identity had no impact, but the violations that had occurred did impact on the perceived trustworthiness of specific team members. At the post-mission stage, team trust measures showed only weak impacts of regimental identity. Team trust as a whole increased slowly over the course of the mission, regardless of regimental identity or the occurrence of a trust violation. These findings show that while regimental identity can influence immediate



judgements of team trustworthiness even in the absence of direct experience with other teammates, the effects may be only temporary.

Although team trust ratings were initially impacted by regimental identity, ratings of the skills and trustworthiness of specific teammates were not typically affected by regimental identity. This suggests that although regimental identity initially impacted on perceptions of the team as a whole, it did not carry over to judgements of individuals. The violations that occurred during the mission temporarily decreased the perceived skills of violators soon after they occurred, but were not influenced by regimental identity.

Possible theoretical accounts of these findings are explored and lessons learned, future research and implications for CF training are addressed. Better understanding the swift trust construct will be critical as the CF moves toward increasingly dynamic, diverse and distributed operations.

Sommaire

La confiance instantanée est une confiance qui se manifeste immédiatement, même envers une personne ou un groupe de personnes qu'on ne connaît pas personnellement. Cette notion est de plus en plus utilisée dans les ouvrages spécialisés pour expliquer comment les membres des équipes spéciales parviennent à établir rapidement des relations de confiance (Meyerson, Weick & Kramer, 1996). L'étude-pilote résumée ici examine si l'identité régimentaire des coéquipiers peut influencer le niveau de confiance instantanée à l'intérieur d'une équipe. Accessoirement, l'étude-pilote examine l'impact des éventuels abus de confiance.

Dans un laboratoire de jeu à la première personne, 24 équipes de réservistes des FC ont effectué, chacune de leur côté, quatre missions simulées d'assaut tactique. Chaque équipe était composée de quatre personnes : deux membres des FC et deux chercheurs complices (censés être des membres des FC). Les membres de l'équipe travaillaient dans un environnement réparti simulé : ils étaient tous dans la même salle, mais séparés par des cloisons. Ils étaient divisés en deux équipes de tir distinctes (composées d'un membre des FC et d'un chercheur complice) qui devaient s'approcher de la zone cible de deux côtés différents, puis attaquer et détruire un groupe de terroristes. Au départ, les quatre membres de l'équipe n'ont été présentés l'un à l'autre qu'au moyen d'un profil d'une page décrivant leurs antécédents et leur expérience opérationnelle. Les deux membres complices de l'équipe nouvellement formée et répartie étaient décrits comme provenant du même régiment que les deux membres des FC, ou d'un autre régiment. Les coéquipiers communiquaient par radio seulement, mais ils pouvaient interagir, dans la zone de mission simulée, par l'intermédiaire de leurs avatars électroniques. L'étude a mesuré l'impact de diverses identités régimentaires sur la confiance instantanée initiale et le niveau de confiance au sein de l'équipe par la suite, et sur la performance de l'équipe. De plus, pour examiner l'impact des abus de confiance, dans la moitié des missions, un membre complice a adopté un comportement susceptible de mettre l'équipe en péril. Dans les autres missions, il n'y a pas eu d'abus de confiance.

Des questionnaires conçus pour évaluer le niveau de confiance et d'autres facteurs ont été distribués aux participants à plusieurs étapes de chaque mission : avant la mission, lorsque les membres de l'équipe ne s'étaient pas encore rencontrés; pendant la mission (4-5 minutes après le début de la mission), pour évaluer le niveau de confiance au sein de l'équipe et l'impact des abus de confiance commis jusque-là; et enfin, après la mission. Les questionnaires portaient sur les éléments suivants : niveau de confiance global au sein de l'équipe; confiance envers chacun des autres membres de l'équipe; perception de la compétence des autres membres de l'équipe; estimation de la performance de l'équipe; perception du travail d'équipe; indicateurs de performance; et évaluation de l'impact de l'abus de confiance.

Les résultats montrent que le niveau de confiance était très élevé au départ. Néanmoins, même si l'affiliation régimentaire des coéquipiers n'était connue que de façon indirecte, le niveau de confiance initial était beaucoup plus élevé dans les équipes réparties dont les membres provenaient apparemment du même régiment. Ces résultats semblent indiquer que le sentiment de partager une même identité régimentaire a suscité une confiance instantanée dès que l'équipe a été constituée. De plus, avant même d'avoir rencontré leurs coéquipiers, les membres de l'équipe estimaient plus probable qu'au moins un d'entre eux serait tué pendant la mission s'ils travaillaient avec des membres d'un autre régiment. Pendant la mission, cependant, le fait d'appartenir au même régiment n'a pas eu d'impact, mais les abus de confiance ont influencé la



perception de la fiabilité de certains membres de l'équipe. Après la mission, la mesure du niveau de confiance a montré que l'identité régimentaire avait très peu d'impact. Le niveau de confiance au sein de l'équipe a eu tendance à augmenter lentement tout au long de la mission, quelle que soit l'identité régimentaire ou l'incidence des abus de confiance. Ces résultats montrent que l'identité régimentaire peut influencer la perception initiale de la fiabilité des autres membres de l'équipe même lorsque les coéquipiers ne se connaissent pas personnellement, mais que cet effet n'est que temporaire.

Malgré son impact initial sur le niveau de confiance au sein de l'équipe, l'identité régimentaire n'a eu aucun effet sur l'évaluation de la compétence et de la fiabilité de tel ou tel membre de l'équipe. Il semble donc que l'identité régimentaire, bien qu'elle ait influencé initialement la perception de l'équipe dans son ensemble, n'a eu aucune répercussion sur la façon dont les individus sont perçus. Et les abus de confiance commis pendant la mission ont nui temporairement à la réputation de leurs auteurs, mais ils n'ont pas été influencés par l'identité régimentaire.

L'étude cherche une explication théorique des résultats obtenus, elle examine les leçons apprises et leurs incidences sur les programmes de formation, et elle envisage de nouvelles pistes de recherche. Mieux comprendre le concept de confiance instantanée sera essentiel dans les années à venir, lorsque les FC s'engageront dans des opérations de plus en plus dynamiques, diverses et réparties.

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1 Relevant Literature

This study investigates the construct of ‘swift trust’, conceptualized as the quick emergence of trust in teams with little or no personal contact (Meyerson et al., 1996) within ad hoc teams. We explore these issues in ad hoc Canadian Forces teams as a function of regimental identity, and in relation to potential violations of trust that occur within a simulated tactical assault mission. In order to examine the theoretical underpinnings of this research, however, the literature related to trust in teams and to the impact of trust violations is briefly reviewed.

1.1 Introduction

The importance of trust is underscored by the fact that it has been studied from a variety of perspectives and by diverse academic disciplines (Adams, Bryant, & Webb, 2001). Although defined in a number of ways, trust is typically characterized as “*the willingness of a party to be vulnerable to the outcomes of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party*” (Mayer, Davis, & Schoorman, 1995, p. 712). Trust helps to predict and to understand others - specifically the need to believe that others will behave consistently and positively toward us (Adams et al., 2001). Trust is especially critical in situations with risk, vulnerability, and uncertainty and those that require interdependence with other people (Costa, Roe, & Tailleau, 2001; Rousseau, Sitkin, Burt, & Camerer, 1998).

The most familiar form of trust, person-based trust (Lewicki & Bunker, 1996) is argued to be predicated on two major factors, time and direct, personal contact (Jarvenpaa & Leidner, 1998; Rempel, Holmes, & Zanna, 1985; Wilson Strauss, & McEvily, 2006). Person-based trust develops by being increasingly able to predict what another person will do (Rempel, Holmes, & Zanna, 1985). Over time, individuals obtain information regarding the disposition, motives, and values of others which allow them to make decisions about others’ trustworthiness (Kramer, 1999).

A less familiar but increasingly identified form of trust is called category-based trust. Category-based trust is defined as “trust predicated on information regarding a trustee’s membership in a social or organizational category” (Kramer, Brewer, & Hanna, 1996, p.577). It emerges *a priori* as a product of an individual’s membership in groups or categories that we have come to trust, or from shared membership with others in groups that are important to us. As such, category-based trust can provide a presumptive basis for trust even without history or direct contact.

Category-based trust relies on two processes, categorization and identification. Categorization is common in social environments where time, opportunity, or motivation to form a personalized view of another person is not possible (Brewer, 1988). Knowledge about the groups to which a given individual may belong often gives rise to specific beliefs, feelings, and expectations about this person. For example, knowing that a person is a physician may give rise to very different *a priori* beliefs and expectations about this person than would the knowledge that the person was a drug user (Adams et al., 2001). Even without the opportunity to interact with them, the categories to which people belong can carry information that reduces uncertainty about them, and makes their behaviour more predictable. Thus, this information can also influence judgements about their potential trustworthiness. Following from the above example, even without any personal knowledge, one might be more inclined to trust a physician than a drug user. In many societies, for example, negative racial stereotypes are examples of categories that can present significant barriers



to trust development and categories that carry positive information can promote presumptive trust (Kramer, 1999). Thus, information provided by the categories to which people belong can influence trust expectations either positively or negatively.

Category-based trust can also emerge as a product of identification, said to be a deeper process occurring when categorization reflects *shared* categories or perceived similarities between individuals (Adams et al., 2001; Kramer et al., 1996). Trust in another person can also be associated with the degree to which one feels connected with another person or group (Kramer, 1996). Meyerson, Weick and Kramer (1996) assert that *ad hoc* team members can immediately assume a common group identity through their shared goals. This shift away from a personal identity to a group identity allows them to use substitutes and proxies for conventional person-based trust (Meyerson et al., 1996). This common group identity augments feelings of similarity and can promote higher levels of trust. Seeing oneself as similar to other people (or as part of a common group or category) provides a basis for assuming that these individuals have similar values and will therefore behave in similar and predictable ways. This assumed ability to predict others' actions, motives, and intentions can reduce the perceived risk of trusting them. The promise of category-based trust, then, is that it is not predicated on interaction and experience, but occurs instantaneously as a simple product of the categories to which people belong or to shared membership in those categories. This is true in individual relationships, as well as within teams and even organizations.

1.2 Trust in Teams

Increasing attention has been devoted to understanding the impact of trust within teams, and some important theoretical and empirical knowledge has already been gained. For example, trust has been argued to facilitate primary team processes such as communication, coordination, and cooperation among team members (Priest, Stagl, Klein, & Salas, 2006). It is also argued to facilitate performance (e.g., Costa, Roe, & Tailleau, 2001; Dirks, 1999), increase team morale and cohesion (e.g., Ben-Shalom, Lehrer, & Ben-Ari, 2005), and support healthy interdependence among team members (Adams et al., 2001; Wilson et al., 2006). Conversely, an absence of trust may contribute to poor time and resource allocation due to excessive monitoring of each other's work (Holmes, 1991; McAllister, 1995). Thus, the literature suggests that trust is extremely critical in the context of teams.

As has been noted in the team literature, however, the nature of teams has radically changed over the last two decades (Bowers, Salas and Jentsch, 2006; Priest, Stagl, Klein and Salas, 2006). Contemporary teamwork is increasingly dynamic (Priest, Stagl, Klein and Salas, 2006). Often *ad hoc*, teams may be brought together for a single purpose, project, or task (Meyerson et al., 1996). In short, they assemble, complete their task and are reconstituted into other teams. These teams do not typically share any history and do not expect to have long term interactions or to have time to build trust relationships in traditional ways. Teams are also not even necessarily co-located – they may work in different countries, have little or no face-to-face interactions and rely exclusively on technology to communicate. Lastly, teams are much more diverse than in the past. They may come from different areas of expertise or from different nations, have different training and experience, and are required to work together despite cultural gaps, differing belief systems, and often unfamiliarity with the perspectives of other teammates.

Obviously, if person-based trust emerges as the result of time and direct face-to-face interaction, teams with a longer history of working together may have better opportunities to develop trust than teams that are less stable. In relatively fixed teams, for example, members often work together on

tasks for extended periods of time. This provides the potential for observing each other face-to-face and in a variety of circumstances, becoming increasingly able to predict and rely on each other as a direct result of the instances (Rempel et al., 1985).

As many of the opportunities known to promote person-based trust are less available within the distributed, diverse and adhoc teams of today (and, indeed, of the future), some people have asked whether these teams are likely to be perpetually disadvantaged in their efforts to develop and maintain high levels of trust. For example, theoretical work by McKnight, Cummings, and Chervany (1998) argues that the most critical time frame for trust is at the beginning of a relationship. Essentially, this perspective argues that if trust does not emerge at the start of the relationship, trust levels are likely to remain low throughout the duration of a relationship.

Similarly, co-located teams have often been argued to have many advantages over distributed teams in building relationships based on trust. Co-located teams, by definition, function together in a common geographical area (e.g., the same area of an office) and have more opportunity for direct interaction (Fiol & Connor, 2005; Zolin & Hinds, 2004). Thus, distributed teams are generally expected to have challenges in building trust, as they may have little or no face-to-face contact and therefore experience minimal social interaction (Jarvenpaa & Leidner, 1999). Moreover, having to rely on technology-mediated communication may reduce the transmission and reception of subtle and non-verbal communication cues that are used to convey interpersonal subtexts, many of these potentially critical to trust (Jarvenpaa & Leidner, 1998). Relationships are generally expected to take longer to develop in distributed teams, and the time needed for teams to “gel” is also higher (e.g. Hung, Dennis and Robert 2004). One of the implications of this is that short-term and distributed teams may never be able to develop adequate levels of trust (Walther, 1995). This is problematic because of the perceived benefits of trust in terms of both team process and performance.

1.3 Trust in Diverse, Distributed and Ad Hoc Teams

With these changes in teams, then, it is perhaps not surprising that increasing effort and attention has been devoted to exploring and understanding forms of trust that do not rely on direct and personal contact. Indeed, researchers and theorists are now exploring alternative ways in which such teams can generate and sustain high levels of trust. If members of dynamic, distributed and diverse teams can find alternative ways to trust each other, then the absence of direct and personal contact may not necessarily be an impediment to team process and performance. At least two different lines of theory and research argue that trust may emerge in teams even when the development of conventional person-based trust is challenged.

1.3.1 Swift Trust

The first theoretical description of “swift trust” is credited to Meyerson, Weick and Kramer (1996). Swift trust emerged as an explanation for the somewhat surprising finding that some teams seem immediately adept at showing high levels of trust that allow them to function in high risk, high vulnerability situations. Swift trust was first identified in ad hoc or temporary teams formed to address a common task with a finite life span (e.g., film crews, theater and architectural groups, presidential commissions, senate select committees, and cockpit crews; Meyerson et al, 1996). Such teams have been noted to consist of members with diverse skills, with a limited history of working together, and with little prospect of working together again in the future. The tight deadlines under which these teams work leave little time for relationship building. Moreover, in



teams shown to exhibit swift trust, team members are argued to originate from many different organizations, have only periodic face-to-face meetings, and to report to a single individual. Another critical feature of these teams is that team members have been selected by an expert contractor. Thus, the selection process is seen to be the result of conscious and careful deliberation on behalf of the contractor, and ensures that chosen members have the necessary qualifications and experience (Meyerson et al., 1996). The reputation of the contractor is a category-based conduit to trust, in that if all team members have surpassed the “barriers to entry” (see Kramer, 1999) that the contractors’ high standards present, they are likely to be trustworthy by association.

Because time pressure hinders the ability of team members to develop expectations of others based on first hand information, members import expectations of trust, in part, based on categorical information such as reputation and role (Meyerson et al., 1996). Swift trust within these teams is also predicated on clear role divisions among members with well defined specialties. Each member of the team knows and understands both their own role and that of their teammates. Inconsistent role behaviour and blurring of roles are generally recognized as eroding trust (e.g. Kramer, 1999). Other social and “cognitive” mechanisms, such as unrealistic optimism and positive illusions also promote the emergence of swift trust by reducing feelings of vulnerability (Meyerson et al., 1996).¹

Within teams facing such time pressure, then, swift trust can develop readily because members of temporary teams rely more on category-driven processing (category-based trust) than evidence-based (person-based trust) processing. These categories, Meyerson et al. (1996, p. 182) caution, “disproportionately reflect local organizational culture, industry recipes, and cultural identity-based stereotypes”, which shape members’ construals of other teammates, and their expectations of competence and benevolence. The emergence of category-based trust, then, enables less monitoring and assessing of another member’s intentions and behaviours, and allows for attention to be focused on the task rather than on worrying about other teammates’ abilities. However, it should be noted that there is also potential for category-driven processing to overlook evidence that reflects negatively on one’s teammates or which disconfirms a priori expectations (Meyerson et al., 1996).

After the team has begun to interact, the swift trust that quickly emerges is maintained by a “highly active, proactive, enthusiastic, generative style of action” (Meyerson et al, 1996, p. 180). Action strengthens trust in a self-fulfilling fashion as it helps to maintain members’ confidence that the team is able to manage the uncertainties, risks, and vulnerabilities. Yet, the conveyance of action is also argued to be dependent on communication about individual activities that are dependent on trust. In essence, whereas traditional conceptualizations of trust are based strongly on interpersonal relationships, swift trust de-emphasizes the interpersonal dimensions and emphasizes the power of broad categorical social structures and, over short periods of time, action.²

Since the introduction of the swift trust construct, a good deal of theory (and some research) espouses the importance of “swift trust” in environments where conventional trust would otherwise be difficult to develop. For example, a recent paper explores the potential mechanisms of swift trust

¹ Clearly, ignoring evidence that a teammate is behaving in untrustworthy ways may be problematic within teams that function in high risk environments.

² It should be noted that this description of swift trust seems to blur the already difficult distinction between person-based trust and category-based trust. Once the team is actually interacting, from our perspective, it is likely to be less influenced by existing categories and more by individuating information relevant to the trustworthiness of other teammates. As such, in our view, this description indicates the subtle shift from swift, category-based trust to person-based trust.

in the context of the Arab-Israeli conflict (Ben-Shalom et al., 2005). Observing that Israeli combat units' morale and discipline remained high despite frequent dissolution and reorganization, Ben-Shalom et al. (2005) suggested that swift trust had occurred. Given the tight deadlines under which the teams had to work together, little time was left for building relationships, socializing, courtship, and other types of communication (Ben-Shalom et al., 2005). Under these circumstances, members had to "import expectations of trust from other settings with which they [were] familiar" (Ben-Shalom et al., 2005, p.74). Therefore soldiers and commanders may have applied known reputations and stereotypes in their first interactions with others. These reputations may have allowed the *ad hoc* units to work together based on a set of common, given assumptions argued to be indicative of swift trust (Ben-Shalom, et al., 2005). It is critical to note, however, that this description of "swift trust" seems to follow a somewhat less stringent definition of swift trust (in terms of composition and formation of the teams) than that advanced by Meyerson et al. (1996).

As a construct, "swift trust" has also been used interchangeably with the term "virtual trust" (e.g. Jarvenpaa et al., 1998). Virtual teams are argued to lack a shared social context that many trust theorists have considered vital to the existence of trust. A recent paper reviewed the literature relevant to virtual teams (Powell, Piccoli and Ives, 2004). This work defined virtual teams to be:

1. Geographically, organizationally and/or time dispersed with a malleable structure
2. Brought together by information or telecommunication technologies
3. Assigned to accomplish one or more organizational tasks

Although more an emergent than a core feature of virtual teams, such teams were argued to typically assemble to complete their tasks quickly. A specific variant of the virtual team noted is the global virtual team, which "draws in members that work and live in different countries and are culturally diverse" (Powell, Piccoli and Ives, 2004, p. 8). Global virtual teams, as defined by Jarvenpaa and Leidner, are separated by space (often working in different locations and/or even countries), time (as all communication is computer mediated and is both asynchronous and synchronous), and often by culture. Such teams typically have a short life span, no common past or future, and communicate only electronically. Within these teams, however, many category-based processes (e.g., reputation, identification) are argued to promote the emergence of category-based trust (e.g., Powell, Piccoli and Ives, 2004).

For example, a study by Jarvenpaa and Leidner (1999) conducted in the context of global virtual teams involved teams of 4 to 5 business students, each from a different country, who worked collaboratively using only email communication on a 6-week assignment. Teams worked on two predefined project tasks involving the development of Internet web sites, and worked together to create one paper addressing the project tasks. Participants completed a survey assessing early trust in the team, and again at the end of the project. Data was collected from the messages that team members sent by email during the course of the project.

Results showed that some teams did exhibit high levels of trust even at the very beginning of the project. Analysis of emails showed that members of high trust teams began the collaboration process with "confidence and optimism" even though they had no direct evidence of the trustworthiness of other team members. This work suggests that trust can emerge even in situations where team members are geographically distributed and limited to electronic communication. In such situations, teams form "virtual trust" (another variation of category-based trust), which enables them to base their judgements of the trustworthiness of others not on interaction or experience, but on common group membership.

1.3.2 Social Identity Model of Deindividuation Effects

An older model addressing relationships in distributed team environments is also relevant to the emergence of category-based trust in teams. Specifically, the SIDE model (Social Identity model of DEindividuation effects) has argued that the social relationships that emerge in workgroups can be just as rich even when teams are limited to computer-mediated communication, depending on the shared social identity that this communication activates (Walther, 1995, 1997). In short, this model argues that a lack of co-location does not necessarily mean a lack of social presence. As people are argued to have multiple social identities, the identity that is active at a given moment in time will be most influential. However, in situations where the transfer of personal information is limited (e.g. in computer-mediated environments), the SIDE model argues that the impact of an activated identity will be greater in environments that are less rich in information, as is the case in computer-mediated environments. Put simply, with less information in play, any information that is salient will tend to be more influential. So, when identity is shared with another person in a computer-mediated interaction, this shared identity will create higher levels of social presence, even without actual face-to-face contact. Conversely, interpersonally rich environments may, in fact, undermine group identity. This model could easily be extrapolated to the trust domain, to help explain how trust can be high even in distributed teams with limited ability to communicate. The emergence of shared identity, of course, is one of the processes that facilitate category-based trust.

The SIDE model has been shown to be effective in predicting the emergence of social presence in a range of environments. For example, Rogers and Lea (2005) conducted a case study with students from the University of Manchester and the University of Amsterdam who participated in collaborative work through a web-based conferencing environment. In order to increase the salience of group identity, communication during the initial web-based group meeting was anonymous (thereby reducing individuating cues for specific participants). In addition, throughout the collaborative process, the group performed a number of tasks that were designed to enhance the salience of their group identity. This involved including a comparison task whereby the group compared their work and progress with those of other groups. This research showed that the salience of group social identity increased over time, especially after the first meeting (Rogers & Lea, 2005). Moreover, social identity salience was also positively related to group cohesion, such that groups with a stronger group identity also showed stronger cohesion. Therefore in order to develop trust in distributed teams, Rogers and Lea (2005) suggest that shared group identity, rather than personal identity, be made more salient. From our perspective, then, the more closely teammates identify with the team, the more likely swift trust is to emerge.

Other research exploring the emergence of trust in distributed teams, however, shows somewhat conflicting results. Zolin and Hinds (2004) conducted a study with Master's degree candidates attending American, European, and Asian universities, drawn from three disciplines including architecture, engineering, and construction management. The students worked in globally distributed three-person teams for a period of four months in order to design a multi-million dollar building. After an initial project launch meeting at which all participants were present³, two members from each team were geographically co-located, but one member was distributed. During the study, co-located members could communicate through computer-mediated means and face-to-face, but distributed members could only communicate through computer-mediated means.

³ Zolin and Hinds (2006) did not indicate whether or not participants had the opportunity to meet their teammates at this meeting, or whether they knew at that point who their teammates would be.

Two measures of trust were developed using self-report questionnaire items rated on 5-point Likert scales. First, general trust was measured using items concerning how often participants monitored their team members. Second, perceived trustworthiness was measured using items concerning three trust factors, benevolence, ability (competence), and integrity. Zolin and Hinds (2004) also measured predictability with items reflecting perceived follow-through of teammates. Measures were taken at one month into the project and three months into the project.

Zolin and Hinds' (2004) findings were equivocal and depended on how trust was measured; according to the behavioural measure of trust (i.e., monitoring)⁴, co-located and distributed teammates' trust did not differ at either measurement time. However, distributed teammates indicated lower perceived trustworthiness on items related to benevolence, ability, and integrity as the end of the project approached (month 3). These results suggest that trust, as measured by monitoring behaviours, develops similarly in co-located and distributed teams, whereas perceived trustworthiness develops differently, with distributed teams falling behind in trust somewhat as time passes⁵. Based on their results, Zolin and Hinds (2004) argued that the conventional trust development process may be more difficult in distributed teams, but that category-based trust may be possible. Nevertheless, the findings of this study are inconsistent; while one trust measure suggested that distributed teams experienced a distinct disadvantage in terms of trust development, another trust measure found no such disadvantage.

Another study by Wilson et al. (2006) compared trust development in co-located and distributed teams. University undergraduates were randomly assigned to three-person teams. The teams undertook a 3 week team-centric resource exchange activity involving the purchase of imaginary stocks. Individual team members could decide whether to maximize the team's collective earnings or their own earnings. By design, teams had the opportunity to "meet" to discuss the resource exchange activity each week, and teams were randomly assigned to one of 4 conditions: three face-to-face meetings (FFF), one face-to-face meeting followed by two computer-mediated meetings (FEE), three computer-mediated meetings (EEE), or one computer-mediated meeting followed by two face-to-face meetings (EFF). Trust within the teams was measured at the end of each of the 3 weeks using a modified version of McAllister's (1996) trust questionnaire with subscales related to cognitive trust, affective trust, and monitoring/defensiveness. Cooperation, the choice to donate stocks to the team rather than keeping them for themselves, was used as a behavioural measure of trust. This research, then, aimed to understand patterns of team trust in teams that were fully co-located, fully distributed, or that started co-located before being distributed (or vice versa).

The results indicated that cognitive trust in the FFF and FEE teams was relatively high even at the start of the study, and remained relatively constant throughout. However, trust increased significantly over the course of the study for the wholly distributed teams (EEE) and the initially distributed teams (EFF). Thus, by the third week "trust in both the EEE and EFF teams increased to the same levels" (Wilson et al., 2006, p. 23). Teams that were initially distributed before being co-located showed the most improvement in trust over time. Similar results were obtained for affective trust and for the cooperation indicator of trust. Wilson et al. (2006, p. 30) concluded that "the

⁴ As we have noted in earlier work, using only behavioural measures (rather than psychological state measures) as indicators of trust may be problematic. In this case, for example, it is unclear whether trust would necessarily be the only reason that one might be motivated to monitor one's teammates.

⁵ Although it seems possible that the monitoring behaviour itself was not the issue, but rather the underlying reasons for the monitoring behaviour, the attitudinal measures were not significant in this study. Thus, it is not possible to comment on the actual motivations for the monitoring behaviour which may have been something other than trust-related motives. Nevertheless, monitoring behaviour has been shown throughout the literature to be an indicator of lower trust.

development of trust in distributed teams is not impossible” with the passage of time, and that “over time, trust in computer-mediated teams rose to levels that met or exceeded the levels of trust in the face-to-face teams” (Wilson et al., 2006, p. 27). Although the trust development pattern may differ between co-located and distributed teams, distributed teams may not be perpetually disadvantaged in their efforts to have good levels of team trust.

As a whole, then, the literature related to trust in teams has gradually shifted focus in the last few years to understanding trust in co-located teams to exploring the factors that influence trust in more complex team environments. Although the literature is not consistent, it does argue that category-based trust is one way in which distributed teams may be able to experience trust. Thus, for the current study, distributed teams in which members shared common categories were expected to show higher levels of trust than teams in which members did not share common categories.

1.4 Trust Violations

Although trust can develop and flourish, it can also become eroded under some circumstances. Such deterioration can happen when one party fails to fulfil promised obligations, or, in other words, when trust is violated (Robinson & Rousseau, 1994). Trust violations are common occurrences in professional relationships despite the apparent benefits of trust (Robinson & Rousseau, 1994). Trust violations have been shown to be associated with negative effects within teams such as low levels of citizenship behaviours and job performance (Tomlinson et al., 2004), low job satisfaction (Robinson & Rousseau, 1994), and high turnover intentions (Robinson & Rousseau, 1994; Tomlinson et al., 2004), revealing the very serious effects of trust violations both in organizational contexts, as well as in the context of small teams. Given their potential importance, in addition to exploring the development of trust as it evolves as teams form and gel, the current study is also designed to explore the impact of trust violations on attitudes and performance within teams.

One factor that has been shown to impact on the outcomes of trust violations is the nature of the violation. For example, the outcomes of trust violations have been shown to vary based on whether they relate to an individual’s competence or integrity. As competence-based trust is defined as “the trustor’s perception that the trustee possesses the technical and interpersonal skills required for a job” (Butler & Cantrell, 1984; cited in Kim, Ferrin, Cooper, & Dirks, 2004, p.106), a competence violation would suggest that a trustee lacks necessary skills. Alternatively, as integrity-based trust refers to “the trustor’s perception that the trustee adheres to a set of principles that the trustor finds acceptable” (Mayer, Davis & Schoorman, 1995; cited in Kim, et al., 2004, p.106), an integrity violation would suggest that a trustee holds unacceptable values. Researchers posit that individuals tend to weigh positive information about competence more heavily than negative information, such that a single successful performance is a reliable indicator of competence while a single poor performance can be discounted as an indicator of incompetence (Kim et al., 2004). This would suggest that a single demonstration of incompetence has less impact on trust calibration than does a single instance of competence. Conversely, researchers have proposed that individuals weigh negative information about integrity more heavily than positive information, suggesting that a single dishonest behaviour can be interpreted as a reliable signal of low integrity (Kim et al., 2004).

Comparatively, there is also evidence that a competence violation may be less severe than the outcome of an integrity violation. Explanations for this phenomenon have included the theory that individuals tend to compartmentalize competence information, but generalize integrity information; in other words, a trustor assumes that a lack of knowledge or skill is isolated to a specific context or ability, but that dishonest behaviour extends across a wide spectrum of contexts (Kim et al.,

2004). Indeed, as competence relates to specific skills, a competence violation may be seen as less critical than an integrity violation because trustors can expect that individuals may be able to amend competencies through effort. However, as integrity relates to core values, trustors may assume that this is a relatively fixed character trait (Kim et al., 2004). Nevertheless, it appears that different trust violations are perceived uniquely.

1.5 The Repair of Trust Violations

Understanding the potential importance and long-term effects of trust violations, research has also begun to explore those strategies that are least and most effective in the repair of trust once violated. Although Lewicki and Bunker (1996) seem to argue that apologizing is typically the best reconciliation strategy, other research has explored this issue more fully. According to Kim et al. (2004), the effectiveness of a reconciliation strategy may depend on finely balancing the costs and benefits of reconciling and not reconciling, based on the nature of the violation. A competence violation may be seen to be amenable to increased effort. As such, assuming responsibility for a competence violation may not impact greatly on how one is perceived as a person, and apology in this case offers potential for redemption. On the other hand, according to these researchers, apologizing for an integrity violation may be more problematic, because integrity violations are more likely to be seen to indicate that a person's core values are suspect. If this is the case, Lewicki and Bunker suggest that it may be better to deny an integrity violation, but to apologize for a competence violation. To explore this, participants were asked assume the role of a hiring manager. The participants viewed video-taped interviews of fictitious job candidates, depicting the applicant as having been involved in an accounting-related trust violation in their previous job. This violation was manipulated as either being competence-based (filing the incorrect tax return due to lack of knowledge) or integrity-based (intentionally filing the incorrect tax return). When asked about it during the staged interview, the candidates responded by either apologizing or denying responsibility. Results showed that trust was repaired more successfully when the job applicants apologized for competence violations, but denied responsibility for integrity violations. Kim et al. (2004) theorized that the effects of an apology are not always positive because apologizing involves the acknowledgment of guilt, which is especially costly for integrity-based violations. Moreover, denial is not always an effective strategy if an individual truly is at fault, which is especially costly for competence-based violations. This suggests that competence and integrity violations may require different reconciliation strategies in order to be forgiven.

Kim, Dirks, Cooper, and Ferrin (2006) expanded this research by examining different forms of apology and their effectiveness in reconciling competence-based versus integrity-based trust violations. Kim et al. (2006) suggested that there are other ways of mitigating guilt rather than denying that the violation occurred, such as a violator apologizing (admitting some involvement) but attributing the cause of the violation to sources outside of him- or herself. Research has shown that situational factors, such as ambiguity, pressure from authority figures, and exposure to others' opinions can influence individuals' attitudes about right and wrong behaviour (e.g., Blanchard, Crandall, Bringham, & Vaughn, 1994; cited in Kim et al., 2006). At least in some situations, it may be possible to attribute actions to either internal or external factors outside of the guilty party's control. As such, this research explored reconciliation attempts using either apology with an internal or external attribution after either a competence- versus integrity-based violation. Kim et al. (2006) used the same research paradigm as in their 2004 study (described above) which involved students viewing videotaped scenarios of an accountant being interviewed for a job. However, in this study, the candidates used trust reconciliation strategies of apologizing with an external attribution and apologizing with an internal attribution. The results showed that trust was

repaired more successfully for competence violations when the violator apologized and accepted personal culpability, but apologized with an external attribution for integrity violations. Thus, it appears that different trust violations have distinct consequences (Kim et al., 2004) that are best repaired with distinct reconciliation strategies (Kim et al., 2006). All of these accounts of trust violation and repair, however, focus on person-based characteristics, on the direct actions or behaviours that might mitigate the impact of violations.

1.5.1 The Influence of Category-based Factors on Trust Violation and Repair

Given the literature reviewed earlier, it is also important to consider the potential for category-based factors to mitigate the negative influence of perceived trust violations. Does seeing oneself in the same category as another person make one more likely to make positive (e.g., discounting) attributions about violations that occur? Unfortunately, none of the available literature accessed for this brief review spoke directly to the issue of trust in teams after a perceived violation. However, there is a good body of research that might be relevant to understanding the relationship between category-based trust and violations of that trust.

First, the literature is fairly clear that category-based processes like identification are often associated with positive feelings of similarity and connectedness (Kramer, 1996; Meyerson et al., 1996) to other parties. Moreover, although very inconsistent, many researchers in the team diversity domain have argued that similarity among team members can increase teamwork and productivity, whereas dissimilarity among team members can increase tension and conflict (Bowers et al., 2000; Horwitz, 2005). From this, it might be possible to speculate that when violations occur, teams that see themselves as more similar and united may be better able to manage these violations in a positive way.

However, whether common identity makes the impact of these violations better or worse is somewhat unclear. There is some research suggesting that identification may help to buffer the negative impact of violations. A wide range of studies have shown that when people identify with others, they tend to discount negative information about their in-groups (that is, people with whom they identify), but highlight negative information about out-groups (e.g., Fein & Spencer, 1997; Kunda & Sinclair, 1999). This may occur because people are typically motivated to maintain positive views of people and groups with whom they identify, and because “derogating out-groups and their members can make the self look better by comparison” (Kunda and Sinclair, 1999). According to this account, then, identifying with another teammate (which is likely to promote category-based trust) may also assist the process of managing violations of that trust.

On the other hand, when someone with whom one identifies violates that trust, this could also be even more of a violation because of the shared identity and in-group. The magnitude of the violation could be perceived to be even larger, because it was committed by someone, for example, possessing common values and driven by common norms. The violation literature provides some evidence of this potential effect as well, showing that violations committed by those responsible to guard against specific harms (e.g. a security guard who robs the jewellery store where he is employed) are perceived to be even more serious because of the violators’ status as protector (Koehler and Gershoff, 2003). Similarly, having shared team identity has also been shown to exacerbate perceived violations even in teams with a very short life span. In research by Moreland and Minn (1999; reviewed in detail in Sartori, Adams & Waldherr, 2007), for example, team members with a very short history of working together continued to feel a sense of loyalty toward their team members even after the team was dissolved, and were hurt and bothered more when betrayed by previous team (or in-group) members than by other people.

This research suggests that perceived violations of trust may be important to understand in the context of both long-term and short-term teams. When teams are required to work together, it is important to understand whether category-based trust will buffer or exacerbate the impact of violations that may occur.

1.6 Overview of the Current Study of Relevance to CF

Integrating the questions underlying the previous literature review, the current study explores the phenomenon of swift trust in *ad hoc* distributed teams in conditions where team members have a pre-existing shared identity versus conditions where they do not have a shared identity. Specifically, this experiment will investigate the emergence of trust (both person-based and category-based), as well as the impact of trust violations in *ad hoc* distributed teams of soldiers participating in simulated tactical assault missions.

As noted earlier in this review, the nature of teams is changing, and these changes will impact on CF teams of the future. With the increasing emphasis on diverse teams (e.g. a unified fighting force with all elements, JIMP), distributed teams (e.g. teams that are network-enabled and rely on complex technology), and on teams that function within an increasingly chaotic battlespace, it is critical to examine the implications of these changes for trust within teams. While it is accepted within the military community that trust is fundamental (e.g., VanderKloet, 2005), how distributed ad hoc teams with people from diverse backgrounds will actually establish and maintain trust has not been adequately explored. Moreover, even existing research cannot speak to the high risk, high vulnerability environments likely to be faced by military teams.

How trust is enacted within these teams, and whether they are able to form “swift trust” when distributed is one focus of this research. This, however, is likely to be influenced by the categories that are most salient when they interact. When CF members are interacting with another soldier from a different country, for example, their “Canadian” identity may be highly salient to them. When working as an Army member in a team with CF personnel from different elements (e.g. Air Force, Navy), one’s elemental background may be more salient simply because of it differs from that of one’s teammates. As such, the “Army” category might naturally be more prominent than would otherwise be the case. Similarly, when working in a multinational team, one might identify more with a fellow teammate from a North American country than from another country, and this shared identity may facilitate positive expectations that promote higher levels of trust. In attempting to understand trust processes within CF teams, then, there is good evidence that the information provided by categories, and/or perceptions of shared identity would quickly facilitate trust even in quickly assembled ad hoc teams with little opportunity for direct interaction.

One particularly salient category within the CF context is regimental affiliation. A regiment is a military unit, typically consisting of battalions and commanded by a colonel. Within the CF, members often identify each other through regimental affiliation, individual regiments having rich cultures built on history and tradition that are distinct from other regiments (Duty with Honour: The Profession of Arms in Canada, 2003). Army regiments keep separate garrisons and wear individualized badge insignia, and are distinguished by battle honours, mottos, march songs, nicknames, and regimental allies, all of which are a source of group pride and loyalty to members of the regiment. For example, in the Regular force infantry, The Royal Canadian Regiment’s (RCR) motto is ‘Pro Patria’ (For Country) and their nickname is ‘Royal Canadians’, whereas the Royal 22nd Regiment’s motto is ‘*Je me souviens*’ (I Remember) and their nickname is ‘Van Doos’ (Vingt Dieux).

These regimental backgrounds follow CF personnel throughout their careers. The Reserve force or Militia has a similar regimental structure, with equally strong traditions and legacies. The power of the regiment within the CF is reflected in the following:

“In the British and Canadian armies, ‘the regiment’ is an extended family that reaches backward in time and outwards in space to encompass those soldiers who have come to identify with its collective memories and traditions. Each regiment develops a culture that is partly rooted in the place from which it draws its members and partly in a set of values and mores that have been created for the sole purpose of making it different from other regiments... For the most part, their [the soldiers] life and loyalty centre on the regiment – not on the army.” (Bercusson; cited in Capstick, 2003).

This quote suggests that regimental background may provide a strong basis for shared identity. And, given that identification is argued to be a factor influencing category-based trust, shared regimental identity may also promote the emergence of category-based trust. As such, although members of the CF are hopefully united by the fact that they share a common commitment to the profession of arms (Duty with Honour: The Profession of Arms in Canada, 2003), they may presumptively trust some CF personnel more than others, simply because of the categorical information that they have about these personnel. Recognizing that a new teammate is a member of the same regiment may provide a rich source of expectations about this person. Even in the absence of personal information about this person, then, one may be more inclined to presume that a new teammate is likely to be competent and trustworthy, based on knowledge about the training and reputation of this person’s regiment. As such, it is important to explore the potential power of salient and meaningful categories (such as regimental background) on swift trust.

However, just as shared identity may promote swift trust in quickly assembled teams (or category-based trust more generally), a divergent identity base (e.g. varying regimental identities within a team) could, in theory, present barriers to category-based trust.⁶ For example, some have argued that strong identification at the regimental level may promote unnecessary rivalry among varying regiments, as well as promote unhealthy loyalty to the regiment, perhaps to the detriment of loyalty to the broader military system. Within Canada, Winslow (1998) has argued that regimental identity may have been a key contributor to several breakdowns in discipline in the Canadian military around the time of the Somalia crisis.⁷ Winslow (1998) argues that strong regimental identities within a given military system may manifest as exclusive subcultures that build barriers between members of different regiments. In a military context, these subcultures can have devastating consequences. Thus, while shared regimental identity can be expected to aid in swift trust emergence, divergent regimental identities may create a significant barrier to trust development within teams. As such, regimental identity could contribute both positively and negatively to the emergence of swift trust.

This pilot study explores the emergence of swift trust in diverse and distributed ad hoc military teams. Given the existing literature, then, when shared regimental identification is salient, judgements about the trustworthiness of other teammates may be affected. The impact of this identification on trust assessments will be examined by experimentally manipulating whether

⁶ It should be clear here that unshared regimental identity would not necessarily be expected to promote distrust but simply that trust may be better within teams when identity is shared than when it is not shared.

⁷ In this case, however, it is important to note that regimental culture per se was not identified (or argued) to be the sole culprit in problematic situations, but that this culture combined with a breakdown in leadership that seemed to have allowed the strong (and typically positive) effects of in-group identification to spiral out of control.

distributed teammates believe that their team is composed of soldiers from their own regiment or of teammates from a different regiment. More specifically, we predict that teammates who believe their team is composed entirely of soldiers from their own regiment will initially show higher trust (i.e. will exhibit swift trust); whereas those who believe their team is composed of personnel from different regiments will show lower levels of trust. In addition, as noted earlier, existing research does suggest that experiencing a trust violation by a team member may be perceived as more of a violation than when violated by someone from another team (e.g., Koehler & Gershoff, 2003; Moreland & Minn, 2003). Thus, given the importance of their regimental identity category described earlier, it seems possible that CF personnel might view trust violations committed by teammates from their own regiments more negatively than those committed by soldiers from a different regiment. However, given the lack of research directly investigating trust violations in military contexts, at this stage this work is exploratory. In general, then, this research explores swift trust and team process and performance in teams of varying regimental identity in which teammate members sometimes violate other team members' expectations.



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2 Method

All of the following research procedures and questionnaires were reviewed and approved by the DRDC Human Research Ethics Committee.

2.1 Testbed Facility

The testbed facility or 1st Person Gaming Network has been developed to achieve a virtual mission environment where collective infantry tasks can be undertaken by a team of soldiers in real time. The gaming network comprises eleven PC computer workstations connected by a local area network to a PC server. This network configuration enables these workstations to be linked together in a multi-player virtual mission environment. Each workstation can be assigned to any number of friendly (or enemy) teams within a given mission depending on the software gaming environment chosen for the experiment.

There were eight participant workstations, a communications data PC logger, two PC servers/controller workstations, and one extra PC in case of a breakdown. The lab also contained a stereo receiver in order to broadcast a whisper track intended to help immerse participants in the game and to make it impossible to communicate other than through the radio communication system.

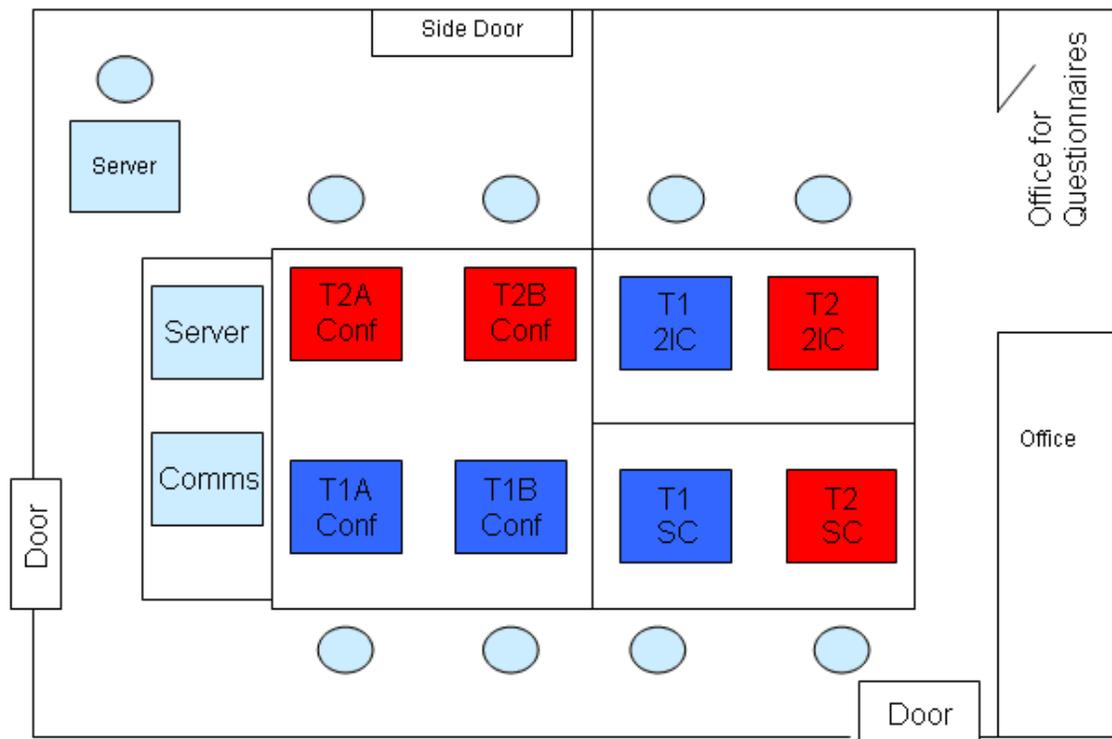


Figure 1: Setup of 1st Person Gaming Laboratory

In order to simulate distributed teams, the laboratory was configured such that team members did not have any visual contact with each other. To accomplish this, artificial barriers were situated

between team members in Figure 1. A barrier was placed separating CF participants from confederates (purported to be their team members) and a second barrier separated the two CF participants assigned to be the leaders of the team.

2.1.1 Communications Network

A computerized communications network was developed to track and log all radio voice communications during each mission. The communications network is comprised of a central PC server connected to a microprocessor driven switchboard unit, which manages the radio communication traffic of four voice networks for ten intercom units. Each gaming workstation includes one intercom unit with four network ‘push-to-talk’ buttons.

Prior to the start of any experiment, all participants were assigned membership to a radio network in order to enable communication with the other three members of their team. As there were two teams participating simultaneously, each team was assigned to their own network. Thus, each participant could communicate with and receive communication from only members of their own team.

To talk to other members of a network, a participant depressed the appropriate button and spoke into the boom microphone integrated into the gaming headphones. The switchboard detected and transferred the voice communication to one of four soundcards resident in the PC server. The server then logged the time, sender, and network (thereby identifying the list of listeners), and stored a digital record of the communication in a WAV file. All team members could hear voice communication from any one member, but only one person could talk at a time.

The ambient noise from the gaming network (e.g., footsteps, rain, rifle fire, explosions, etc.) was ported from the workstations to the headphones, simultaneously providing gaming audio and any radio voice communications.

2.1.2 Rogue Spear

For this experiment, Rogue Spear (Urban Operations package) was used as the software gaming environment (see Figure 2).



Figure 2: Rogue Spear Screenshot

Rogue Spear renders a rich and highly realistic simulation environment with a variety of mission maps and a range of operational conditions (e.g., rain, snow, sun, indoors, night, etc.). Participants in the game view the simulation environment from a first-person perspective through the eyes of their computer avatar, and can observe the actions of other participants on their team in real time. The clothing, weapons, body armour, and characteristics of each participant in the game can be standardized or modified as necessary. Rogue Spear can also track and record individual and team performance data, such as the number of shots fired, the number of hits, the number of casualties, accuracy, etc.

The four mission maps selected for this experiment consisted of urban terrain with a combination of urban streets and in-building activities. Maps were chosen such that they were large enough to create a sense of realism, but not excessively large that dispatching the enemies would be impossible. In addition, maps also had to offer a reasonable level of cover for enemies. In the end, four mission maps already used in previous work in the 1st person gaming laboratory (Sartori, Adams, and Thomson, 2004) were selected based on their suitability for the needs of the experiment.

For this experiment, the goal for teams was to eliminate all enemies while incurring minimal casualties. Enemy in the study were computer generated plain clothes terrorists carrying AK-47's. While we could not directly control their movements, we were able to control their number and level of artificial intelligence through computer settings prior to the start of each mission. More intelligent enemies are somewhat faster in their movements and more accurate when shooting their weapons. The friendly fire option was not disabled in order to increase realism. However, previous research had shown that death from friendly fire of a C7 was uncommon, but that death by friendly fragmentation grenade was very common. Frequent and early death of participants was not desirable due to the corresponding reduction in potential data, thus, participants retained C7 assault rifles, but were issued only smoke grenades and flash bangs rather than fragmentation grenades.

2.2 Approach and Background Measures

At the beginning of each day of data collection, participants were briefed on:

- the broad objectives of the study,
- its relevance and potential benefit to the military,
- the nature of their participation (i.e., format of the study, time commitment)
- the risks related to simulation

Participants were also informed about the nature of the relationship between the researchers and DRDC, that their responses during the study would be kept strictly confidential, and that only aggregate results (i.e., with no identifying information) would be reported.

Participants were told that the study explored factors that influence the effectiveness of distributed teams. They were informed that they would be working as a team with two other CF members that they would not meet in order to simulate working as a distributed team.

Participants were asked to complete a consent form which provided detailed information regarding the study. In order to ensure that they were truly volunteering, it was made explicitly clear to them that they would be viewed as having fulfilled their obligation to participate even if they decided not to continue further in the study. Signed informed consent was obtained from those who wished to



continue. After signed consent was received, they completed a background questionnaire which provided demographic information and which tapped regimental identity.

Background measures included the following:

- Demographics: date of birth, official first language, country of origin
- Experience: rank, regiment, length of service, operational experience (by theatre), experience conducting section assaults, experience with urban operations, experience with 1st person shooter games
- Propensity to Trust scale (Adams, Bruyn and Chung-Yan, 2004).
- Regimental Identity

After completing the consent form and background questionnaires, training in the 1st person gaming laboratory commenced.

2.2.1 Training

Participants trained on the gaming system as a group at the beginning of the day. Training focused on learning how to move, shoot, and speak on the communications system. Training was comprised of individual and group exercises. Individual training included instruction and practice in movement and posture in the Obstacle Course, and target engagement skills in the Shooting Range. They were encouraged to ask questions and two assistants walked around participants giving guidance where needed.

Participants were then required to apply the skills they had learned during training in a mission context by attempting scenarios involving terrorist elimination. Thus, they had to combine their movement and weapons skills in order to dispatch all enemy in a building. Each participant was required to get through the ‘Kill house’ scenario before advancing to team training.

Group training comprised experience with both team interaction and coordination in the Rogue Spear environment, and the use of radio voice communications. Group training (i.e., four-person Assault Group) involved practice missions against computer-generated enemy using mission maps that were different from the experiment maps. To gain familiarity with the voice network, soldiers were encouraged to use the system liberally to gain insight into the best means of employing the radio network prior to data collection. Soldiers were informed that only one member of the team could use the communications at a time. Thus, if they heard a buzz upon depressing the button, this indicated that the communications network was busy, and they had to wait until it was free. Participants were trained in teams of 4 until they could complete a single mission successfully.

2.3 Experimentation Stage

During the experiment, a maximum of four teams (2 in the morning and 2 in the afternoon) were run each day over 7 days, for a total of 19 teams.

Each simulated tactical assault mission was conducted by a 4-member assault team. Each team consisted of 2 actual CF personnel and 2 other participants purported to be “Army guys” who had been tasked to help out in this study, but who were actually confederate members of the research team. Employing confederates was necessary to ensure an adequate level of experimental control. The confederates had been previously trained to be proficient in the gaming laboratory, learning to use common military language and phrasing (e.g., proper radio procedure) and to be familiar with standard Army operating procedures. The cover story was that these Army personnel had been

tasked to participate in our study because a previous laboratory malfunction had prevented them from participating in the gaming lab study on a previous day. They were, however, stated to be trained and anxious to participate in the gaming research.

Each CF participant completed 4 missions, 2 consecutive missions with the first set of confederates and 2 more missions with the second set of confederates. CF personnel were always assigned to be fire team leaders (either Section Commander or Second in Charge, 2IC) and confederates were paired in fire teams with either the SC or 2IC. To minimize running time, each of 2 teams (each with 4 members) were “run” simultaneously in the gaming laboratory but participated in different missions.

In order to promote the need for team coordination, teams were mandated to work in 2-man fire teams. However, preliminary testing for this study showed that even with explicit researcher instruction, teams did not necessarily work together. For example, during pilot testing, one of the CF participants adopted a “lone wolf” approach, and set off to destroy enemy terrorists without a fire team partner. If this had occurred during the actual experiment, it could undermine the team aspect of this study. However, initial testing had also shown that limiting the available ammunition was one means by which to heighten the need for coordination and interdependent work. As such, the Rogue Spear game settings were changed to limit each player in the game to only 25 rounds of ammunition, for a total of 100 rounds within the team. This would provide more than enough ammunition for team members taking aimed shots to dispatch the 5 enemy terrorists, but would force teams to progress slowly and deliberately through the mission area as two coordinated fire teams.

The primary swift trust manipulation of this study was regimental identity. To explore this, the regimental composition of the teams was systematically varied, by pairing actual CF participants with confederate team members purported to be from specific regiments. Because the teams were distributed, team members were told that they would only be able to read profiles of their 2 “new” team members before working with them during tactical assault missions. These profiles were presented using the background information sheet that the CF participants had completed at the very start of the day. These profiles had been constructed by researchers to present teammates from either the same regiment as CF participants, or from a different regiment than the CF participants.⁸ The latter elements of information were carefully matched to ensure that the average ‘strength’ of the team members depicted in the profile was consistent. This was done to ensure that characteristics other than regimental identity (e.g., rank or experience) would be unlikely to influence trust judgements. Of the 4 missions that the actual CF participants undertook, two were with 2 confederate team members purported to be from the same regiment, and two were with 2 confederate team members purported to be from a different regiment.

The secondary dimension of this study related to trust violations. In order to understand the potential impact of trust violations that occurred during missions of ad hoc teams, confederates had been tasked to perform behaviours likely to violate trust. Violations were constructed such that they would be noticed, and that they would be likely to impact negatively on judgements of trust in their teammates without strongly affecting the team’s actual ability to complete the mission successfully. Preliminary testing identified the best possible violations and the experimental violations used consisted of two different types.

⁸ It is important to note that the implications of specific regimental affiliations were not explored in this research, as the critical question related only to regimental affiliation that was either the same as or different from one’s own.

The first violation involved an ostensibly accidental discharge of a firearm. This violation involved having the confederate shoot their leader (either the SC or 2IC) in the leg. Shooting one's leader in the leg would demonstrate a lack of competence, which according to theory, would lower one's perceived trust in the individual. The second violation involved unnecessarily discharging one's weapon under limited ammunition supply. At the beginning of each mission, participants were informed that their ammunition would be constrained. As such, unnecessarily discharging one's weapon would once demonstrate a lack of competence. And, given the importance of having full control of one's weapon at all times, CF members would be likely to perceive this as a trust violation. More details about how and when the experimental violations occurred are discussed in the upcoming "Mission" section.

2.3.1 Pre-Mission

During the pre-mission phase, team members were provided with a quick mission brief describing the following:

- The mission objective.
- The time limit to complete the mission (20 min).
- The mission map (see Annex A). The maps were two-dimensional graphical representations of the building or terrain into which teams were inserted. These maps indicated their insertion point and relevant landmarks (e.g., doors, stairs, etc).

Participants were told that they would have an opportunity to learn about the respective members of their team. First, the two team leaders reviewed each other's background information, and they would be asked to work independently to form a provisional plan, which they would then work out together (as leaders) and communicate to the rest of their team.

In order to strengthen the cover story, the other team members (actually confederates) were then brought into the laboratory on the other side of the tarp. An experimenter briefed each of them on the mission they were about to undertake. Once briefed, they were provided the opportunity to review the background information of their team leaders (SC and 2IC), and the new team member profiles were taken to the leaders. As noted earlier, fire team members' profile information (e.g. experience, rank) varied somewhat (for plausibility), but were consistent overall, so that the only difference among profiles in the "same" vs. "different" missions was regimental identity.

After having read the profiles about their prospective teammates, team members completed a pre-mission questionnaire.

Pre-mission measures included the following:

- Perceptions of the team members' skills
- Perceptions of trust in team members
- Estimates of how the team would perform in the mission
- Questions related to number of team members from one's home unit (manipulation check), and the number of team members that they had met before

Prior to each of the four missions, team leaders formulated and communicated their mission plan to their respective team members. The planning was performed via the communication network and all communications were recorded.

2.3.2 Mission

Once the pre-mission questionnaires were completed and mission planning was completed, the mission commenced. Both servers (one for each team) were initiated simultaneously as were two separate stopwatches (one per team). Teams were inserted at default locations within their respective mission maps and they completed their missions independently. Order of the experimental conditions (e.g. regiment identity, violation) and the intended “victim” (team SC/2IC) of the experimental violation were all counterbalanced.

Each team was required to move tactically throughout the map in order to eliminate all enemy with as few casualties as possible within the allotted time. In general, this required teams to clear several floors of an objective building by engaging and destroying enemy terrorists as they were encountered, while being mindful of the location and status of their team members. Throughout each mission, performance and all radio communication were logged and archived.

As noted earlier, one of the intentions of this study was to systematically vary whether or not trust violations occurred during the missions.⁹ Trust violations were enacted in two of the four missions that each team undertook, and were targeted to impact on either the Section Commander (SC or IC) or his Second in Command (2IC) who was the leader of the other fire team. To manipulate trust violations, one confederate committed a violation during the mission. Using a set of communication cards, confederates were given a signal by supervising researchers to prepare for committing a trust violation at the 4 minute mark of the mission, and were tasked to complete the violation as close as feasible to the 5 minute mark of the mission. The 4 minute warning provided confederates with the time required to get into the appropriate position to perform a violation (e.g. in order to appear to “accidentally” shoot one’s fire team partner). The mission freeze was initiated only after the violation had been executed, or, in the case of no-violation missions, 5 minutes had elapsed, and it was feasible to pause the game.¹⁰ During the mission freeze, participants stopped playing the game and were instructed to complete a set of questionnaires. The mission freeze questionnaire assessed whether participants (and particularly the “target” of the violation) had actually experienced a trust violation, their trust judgements of each of their teammates at that time, and their estimates of responsibility for potential mission success or failure.

Mission Freeze measures included the following:

- Ratings of whether team members had performed as expected
- Identification and description of potential trust violations that had occurred
- Perceptions of team members’ skills
- Perceptions of trust in team members
- Predicted member responsibility for mission outcomes

2.3.3 Post-Mission

The mission ended when all the enemy terrorists or all the team members were dead. When all enemies were dead, the mission ended, and the soldiers received a “Mission Success” message on their monitors. If all team members were killed before the enemies were dispatched, the mission ended, and they received a “Mission Failure” message. Finally, if the time limit expired before the

⁹ But see Section 3.1 for a discussion of the problems related to the attempted trust violations.

¹⁰ A mission freeze could only occur when AI terrorists were not visible or likely to be in close proximity.



mission ended, the servers were halted and the soldiers were informed that they had exceeded their time limit. These situations were recorded as failed missions as well.¹¹ When and if individual team members were killed during the mission, they saw themselves fall to the ground, they received a “Mission Failure” screen message, and the researchers asked them to remove their headsets so that they would not participate further in the scenario. When the mission was complete, they were invited to proceed immediately to the post-mission questionnaire(s).

Participants once again rated the trustworthiness of their team members, as well as their perceptions of the mission. These measures included self-report teamwork ratings of how well the team performed, in general, and in relation to other teams.

Post-Mission questionnaire measures included the following:

- Perceptions of team members’ skills
- Attributions of responsibility for mission outcome
- Ratings of skill, luck and effort for each team member
- Perceptions of trust in team members
- Estimates of team performance
- Trust in Teams scale (Adams and Sartori, 2006)
- Teamwork: A questionnaire pertaining to teamwork consisting of nine items (e.g. “My assault group coordinated well in completing this mission” and “Our assault team showed a poor level of cooperation during this mission” (reverse coded).

The inclusion of these measures allowed an exploration of how swift trust may affect perceptions of team performance.

After the second mission, participants were given a short break and were reconfigured in a different team comprised of team members with the opposite regimental background. As noted earlier, each participant completed a total of 4 missions.

For each team, team performance and mission outcome data was also unobtrusively collected throughout the mission. This allowed exploration of how swift trust might relate to actual team performance. These measures included the following:

- Kills: numbers of enemy targets killed;
- Firing Accuracy: % of rounds fired to target hits
- Rounds Fired: numbers of rounds expended by each member of the team; and
- Hits Taken: number of rounds incurred by each member of the team;
- Health at Mission Completion: no injury, injury, incapacitated, dead
 - Mission outcome: success or failure

¹¹ As the location of the artificial intelligence (AI) terrorists could not be controlled, there were odd occasions during pilot testing in which a single remaining terrorist could not be found, despite excellent team efforts to find the terrorists, and adequate time to do so. In these rare cases (N=2), these missions had to be called due to time limits, but were scored as a success, and the performance data adjusted accordingly.

2.4 Participants

Thirty-eight CF Army personnel (38) actively serving as Reserve force personnel agreed to participate in this study. At the start of the study, participants completed a questionnaire containing background information probing demographic information as well as relevant military experience.

Table 1 shows the demographic information of participants. .

Table 1: Demographic Information

Variable	Category	N	%
Age			
First Language (n=38)	English	35	92.1
	Other	3	7.9
Country of Birth (n=38)	Canada	29	76.3
	Other	9	24.7
Rank (n=38)	Corporal	23	60.5
	Private	11	28.9
	RFN	2	5.3
	SPR	2	5.3
Military Occupation (n=37)	Infantry	33	89.2
	Field Engineer	4	10.8

The majority of respondents had English (92.1%) as their first language and were born in Canada (76%). In terms of rank, the majority of participants were Corporals (60.5%) whose military occupation was infantry (89.2%). Respondents were from primarily infantry regiments in Toronto and surrounding areas.

Table 2 shows the military status of experience of participants.

Table 2: Relevant Experience

Variable	Category	n	%
Time Served in Military	Less than a year	1	2.6
	1-3 years	19	50
	3-5 years	11	28.9
	5-10 years	5	13.2
	10-15 years	1	2.6
	More than 15	1	2.6
Operational Experience	No	32	84.2
	Yes	6	15.8
Experience/training in section assaults	None	0	0
	Some	8	21.1
	Moderate	27	71.1
	Extensive	3	7.9
Experience/training in urban operations	None	1	2.6
	Some	13	34.2
	Moderate	21	55.3
	Extensive	3	7.9
Experience in 1 st person shooter games	None	0	0
	Some	10	26.3
	Moderate	16	42.1
	Extensive	12	31.6

The majority of participants were fairly new to the military, such that half of the respondents had served between 1 and 3 years in the Canadian Forces Reserve. The majority of respondents (84.2%) had no operational experience, had moderate training in section assaults (71.1%) and moderate training in urban operations (55.3%). Due to the fact that the participants were all relatively young, it was not surprising that most of the participants had moderate (42.1%) to extensive (31.6%) experience in 1st person shooter games.

3 Results

Overview

First, as a pilot of initial ideas about swift trust, many different measures were included in the current study in order to provide a strong base for future work. Given the number of analyses, it would normally have been standard to control alpha levels. However, as an exploratory pilot study, this was seen as less critical, and p-values for significant analyses are provided.

Second, given the complexity of the design and the results, we provide a quick overview of the structure of this chapter. The first part of the chapter (3.1) explains necessary alterations to the analysis plan based on lessons learned during the study and in preliminary data analysis. The second section explores several measures mostly completed before the study began (3.2). Subsequent sections (3.3 to 3.10) show analyses for questionnaires administered before, during and after the study, performance indicators (3.11) and additional analyses (3.12). All the questionnaires administered (and the sections where relevant results are located) are shown in Table 3.

Table 3: Questionnaires Administered and Location of Results

	Pre-mission	Mission Freeze	Post-mission
Team Trust – single item	✓ Section 3.3.1	✓ Section 3.3.2	✓ Section 3.3.2
Trust in Specific Team Members	✓ Section 3.4.1	✓ Section 3.4.2	✓ Section 3.4.2
Ratings of Team Member Skills	✓ Section 3.5.1	✓ Section 3.5.2	✓ Section 3.5.2
Estimates of team performance	✓ Section 3.6		
Expectations of other team members		✓ Section 3.7	
Attributions about team member performance		✓ Section 3.8.1	✓ Section 3.8.2
Team Trust Scale (Adams & Sartori, 2006)			✓ Section 3.9
Ratings of teamwork			✓ Section 3.10



3.1 Alterations to the Analysis Plan

Our original plan was to compare trust in the experimental violation missions with those in the “no violation” missions. As the experiment was originally designed to have 2 within factors, regimental identity (same or different regimental background) and violation conditions (violation or no violation) with each team completing 4 missions, repeated measures analytic procedures would be possible, hence strengthening the power of the study.

During preliminary data analysis, it was critical to test the assumption that the planned experimental trust violations intended to impact on trust in specific team members were actually perceived as violations by the target of these violations (always CF participants). Whether CF participants noticed and/or were affected by the planned trust violation was identified in two ways. First, during the mission freeze, participants had been asked to identify whether any team members had performed any actions that might have put the team at risk. If so, they were required to identify the team member. If the participant identified a member of their team that had performed a specific risky action, and if this description (and the violator) matched the intended violation, the planned experimental violation was deemed to have been successful. If this was not the case, the log that confederates had completed during each mission was the next source of information. In this log, confederates had indicated the violation that they had performed and the exact target victim response (e.g., whether or not the victim said anything that directly acknowledged the planned violation that had been delivered). If either of these indicators showed that given participant had perceived a violation (i.e. by a specific reference to or acknowledgement of the violation), the planned experimental violation was deemed to have been successful.¹² Of course, whether this violation actually impacted on perceptions of trust within the team was an empirical question.

However, although our initial expectation was that participants would only report planned experimental violations, this was not the case. In actuality, participants’ responses on the mission freeze questionnaire indicated that other unanticipated and unplanned trust violations occurring during the missions were perceived by some of our participants and thus could have impacted on trust perceptions. As such, it seemed important to attempt to analyze the data in terms of planned as well as unplanned trust violations. This was done by examining each unplanned violation, and identifying whether the perceived perpetrator was from one’s own regiment or from a different regiment. These violations and the person(s) blamed were also analyzed by regiment (see Annex A for a full listing). This analysis showed that some participants reported violations involving more than one person (or more than one violation) occurring before the mission freeze. In such a case, it would be difficult to parse out which person would be seen as most responsible. Hence, the impact of the violation could not be determined. Moreover, some violations in the different condition identified violators with mixed regimental identity, but logically, this option was not available in the same condition missions. These cases (N = 12) were removed. Similarly, as the focus of this study was on the performance of confederates, violations performed by other leaders (N = 2) and instances where participants blamed themselves (rather than teammates) for not performing properly (N = 9) were also removed. The types of trust violations reported varied, but were typically framed in terms of other team members not performing as expected, either by failing to anticipate their movements or doing things that put the team at risk.

A manipulation check was also undertaken to explore whether participants had properly attended to the information about regimental affiliation provided by their teammates. Specifically, the pre-

¹² This analysis showed that there were 5 missions in which an experimental violation had been attempted, but was not successful. These cases were excluded.

mission questionnaire had asked participants to indicate the number of team members who were from their own regiment, and they were provided with options ranging from 0 to 3. Participants were intended to consider all three other members of their team excluding themselves (i.e. the actual CF participant they had seen, and the two ‘new’ team members they had not met).

In the “same” condition, participants were expected to indicate that all three team members were from their own regiment, whereas in the “different” condition, they were expected to indicate that one team member (the actual CF participant from their own regiment) was from the same regiment, and that the two team members (actually confederates) were from a different regiment. Frequencies are shown in Table 4.

Table 4. Number of teammates from my home unit

Number of teammates from home unit	Regimental Identity		Total
	Different	Same	
0	3	0	3
1	<i>51</i>	20	71
2	4	5	9
3	5	<i>41</i>	46
Total	63	66	129

The italicized values (51 in the different column and 41 in the same column) show that participants were most often correct in reporting the number of team members from their own regiment and from different regiments. However, there were also several other responses in which participants did not accurately report the regimental identity of their teammates. This might be problematic if it indicated that participants simply did not attend adequately to the profile information that they had read. The key issue here, however, is whether participants truly did not know the regimental identity of their teammates in a given mission, or simply misunderstood what the question was asking.

Looking further at this issue suggested that some participants seemed to have misunderstood what was being asked in this question. For example, there were 20 occurrences of participants in the same condition reporting only 1 member of their team to be from the same regiment. At this early point in the experiment, however, although they had interacted with the other actual CF participant (always from their same regiment), the new distributed team members (known only through profiles) were not yet “real”. That is, participants had no contact at all with them at this point in the experiment. As such, participants may have considered only the team members that were most real or salient to them when answering the question. On the other hand, some participants seemed to have done the opposite in the same condition. Five (5) participants in the “same regiment” condition reported having only 2 team members from their own regiment, suggesting that they might have seen the question as relating to new team members rather than to known team members (the other CF participant). As they had met their counterpart (the actual CF participant) always



from the same regiment at the beginning of the day, this suggests that they misunderstood the question, and considered only the “new” team members when answering this question.¹³

Some of the observations in the different condition are also problematic. There were three observations (two different participants) in which participants indicated that none of their team members in the lab that day were from their home unit. Most problematic are the five observations in the different condition arguing that there were three team members from their own home unit, and four identifying two people from their home unit. In both cases, of course, they should have reported only one person from their home unit or regiment. It was important to explore whether these results might indicate that participants were suspicious, and questioned whether their distributed team members were actually from a different unit.

Another question may help to disentangle some of these issues. Participants were also asked how many team members they had previously met (i.e. before the day of data collection). As CF participants were always paired with a person from the same regiment, these two team members were likely to be familiar with each other. As such, in both conditions, we expected that participants would most often indicate that they had met one other member of their team previously (the other CF participant). In the different condition, however, they would be much less likely to believe that they could identify members of other regiments, as there are many different regiments in the area. Results for this question are shown in Table 5.

Table 5. Number of teammates I have met before

	Regimental Identity		Total
	Different	Same	
0	3	2	5
1	<i>54</i>	<i>43</i>	97
2	1	3	4
3	5	18	23
Total	63	66	129

Again, participants most frequently indicated that they knew only one of their team members (the other CF participant), as shown in bold and italics.

If the regimental manipulation was successful, however, in the “same” condition, some participants might also guess that they actually knew the distributed team members on the other side of the tarp. In fact, if they believed that they could identify the team members based on the limited information given in the fake profiles, they could indicate that they recognized up to three team members in the same missions. In fact, 18 participants indicated that they had met all three other members of their “same” team before, and three indicated that they had met two members of their “same” team before. This is good evidence of participants believing the cover story. Additional observations made during the study also confirmed the power of the regimental identity manipulation. Some

¹³ Closer examination of this issue showed that the frequency of errors was exacerbated by the fact that the error of a participant is often identified twice in the data (due to repeated measures design). As such, 13 participants who might have misunderstood the question were represented by 26 observations.

participants seemed happy that their prospective teammates were from the same regiment “Hey – these are our guys!” and many made specific efforts to interact with them.

In the “different” condition, 5 participants identified themselves to have previously met 3 members of their team, and one participant indicated having met 2 members of their team previously. Importantly 5 of these 6 observations were made by participants who also indicated the wrong number of team members from their home unit in the previous question. This indicates that these participants may have believed that they knew the teammates that they were about to play with, and perhaps that these teammates were even from their own regiment. This suggests that the 9 participants in the different condition who had indicated that they know 2 or 3 of their teammates (see Table 5) may have been suspicious. As such, these 9 participants were removed from subsequent analysis. For future research, these questions will need to be defined more clearly.

Table 6 shows the frequency of remaining cases categorized by whether individuals reported having personally experienced a violation or not.

Table 6. Revised Experimental Matrix

Regimental Identity	No Violation	Violation	Total
different	32	22	54
same	31	35	66
Total	63	57	120

However, it is also critical to note that this revised analysis strategy also changes some of the underlying assumptions of the study. The first implication is that unscripted violations (conceived as occurring only before the mission freeze) may have occurred before the 5 minute mark of the mission, rather than at the designated time of approximately 5 minutes into the mission. As this was only the case for the experimental violations, the impact of other violations may have depended to some extent on when during the first 5 minutes the violation actually occurred.¹⁴ Given the unexpected and unplanned violations, a potential problem is that post-mission measures of trust could potentially be contaminated with any violations that occurred after the mission freeze. Nonetheless, there would be little reason to expect that these unscripted violations would have impacted differentially in the same vs. different regiment groups.

3.2 Initial Measures

Prior to engaging in the mission, participants were asked to complete questionnaires assessing their propensity to trust other people. It is important to understand participants’ “baseline” levels of generalized trust in other people, as this could influence their trust in their teammates.

¹⁴ As some of the violations were not originally intended when the study was conceived, the exact timing of these violations was not recorded.

Table 7. Propensity to Trust*

	Valid N	Mean	StdDev.
I am generally a trusting person. (completely disagree = 1, completely agree = 7)	33	5.64	1.04
I typically think the worst of someone until they prove me wrong.**	33	5.51	1.31
When I first meet people, I am suspicious of their motives (rev).	33	5.17	1.49
People are usually just out for themselves.**	33	4.42	1.72
I believe that people are basically good.	33	4.82	1.14
I tend to distrust people.**	33	5.39	1.28
I usually have faith in other people.	33	4.76	1.16
I think people are trustworthy.	33	4.58	1.05
Propensity to Trust Index	33	5.03	.83

** Indicates reverse scored item.

Propensity to trust ratings, then, were relatively high.

At the same time, participants were asked to complete questionnaires that assessed the strength of their regimental identity. To the extent that regimental identity was strong for a given participant, this might promote a sense of shared identity when paired with members of the same regiment but not when paired with members from a different regiment. Participants provided information pertaining to their regiment, such as battle honours, description of badge and their motto. Participants were also required to describe the battle honours of their regiments, and what was depicted on their regiment's armorial badge. This information was then coded and scored.

Table 8. Regimental Identity

	Valid N	Mean	StdDev
I feel honoured to be in the regiment I am in. (completely disagree = 1, completely agree = 7)	32	6.3	0.8
Being a member of my regiment is an important part of who I am.	32	5.7	1.2
The traditions of my regiment really matter to me.	32	5.7	.9
I am proud of the significant achievements of my regiment in combat operations.	32	6.4	1.0
Regiment's battle honours (number of correct examples)	32	2.6	2.4
Depicted on regiment's armorial badge (number of correct examples)	32	3.1	1.6

As Table 8 shows, participants showed a high level of regimental identity, and good knowledge about the battle honours and traditions of their regiments. In addition, participants were also asked to describe the motto of their regiment, and 87.9% of respondents (29 of 33) did so correctly.

A question administered at the end of each mission explored participants' level of involvement in the game (ranging from not at all involved=1, very involved=5). If participants were differentially engaged during missions with team members from the same or different regiment, this could influence the results. Ratings of involvement are shown in Table 9.

Table 9. Ratings of Involvement

	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
N = 120	No Violation	Violation	No Violation	Violation
Involvement in the Game	4.4 ± 1.1	4.7 ± 0.9	4.6 ± .8	4.4 ± 1.2

A 2 (regiment: same or different) x 2 (violation: violation or no violation) between group ANOVA was conducted, and showed no significant differences among involvement ratings in the 4 conditions. This suggests that participants were highly involved at a consistent level.

3.3 Team Trust Results

During the pre-mission phase of the scenario, team members received their mission orders and mission maps. At this point they were also presented with background profiles of their distributed team members. These profiles contained information pertaining to their team member's regimental identity as well as other information related to their teammates' experience. As noted earlier, the information related to teammates' experience and background was systematically varied but reported training and experience overall was consistently similar in the "same" vs. "different" conditions. Based on this information, team members were asked to make ratings of the trustworthiness of their teammates as a whole.

3.3.1 Pre-Mission Ratings of Team Trust

The first hypothesis of this experiment was that in the absence of other information about them, regimental identity might influence team members' perceptions of the probable trustworthiness of other team members. Specifically, seeing their new teammates as belonging to the same regiment should promote the activation of a shared regimental identity, and team members should show more swift trust in team members from the same regimental background than in team members from a different regimental background. The means and standard deviations for the two groups are shown in Table 10.

Table 10. Team Trust - Pre-Mission

	Same Regiment (Mean,StDev)	Different Regiment (Mean,StDev)
N = 120		
Team Trust	87.4 ± 14.4	81.1 ± 15.8

A one-way between-group ANOVA showed that although both means were high, participants did rate their overall trust in their team significantly higher when working with teammates from the same regiment than from a different regiment, as shown in Figure 3.

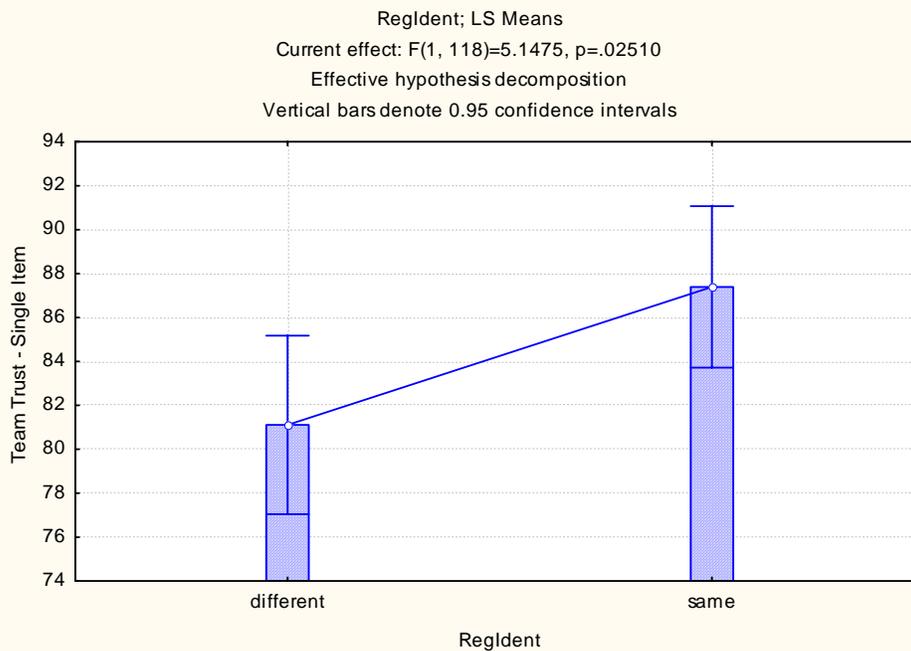


Figure 3. Trust in Team by Regimental Identity – Pre-Mission

Team members who had simply read about prospective team members showed differential trust in their team as a whole as a function of their regimental identity. Thus, while team trust was high for both groups, pre-mission team trust was significantly higher when participants believed their team mates were from the same regiment than when they believed their team mates were from a different regiment. This suggests that their “swift trust” in fellow teammates well may have been influenced by their regimental affiliation.

3.3.2 Mission Freeze and Post-Mission Ratings of Team Trust

It was important to assess how participants’ ratings of the trustworthiness of their teammates changed over the course of the mission. Did participants rate their trust in their team members differently if a violation had occurred? And, was the impact of the trust violation influenced by regimental identity? Team trust at the mission freeze (completed around the 5 minute mark of the mission) and after mission completion are shown in Table 11.

Table 11. Team Trust - Mission Freeze and Post-Mission

	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
Team Trust – Mission Freeze (N = 104)	84.0 ± 21.2	86.5 ± 17.9	87.4 ± 17.9	83.3 ± 22.2
Team Trust – Post-Mission (N = 120)	91.1 ± 12.5	89.7 ± 16.5	88.8 ± 15.6	83.4 ± 20.2

These two indicators of team trust were first explored separately. At the mission freeze, a 2 (regiment: same or different) x 2 (violation: violation or no violation) between group ANOVA showed that neither regimental identity nor the violations that had occurred to that point in the mission had a significant effect on team trust. The initial impact of regimental identity at this point had either faded or was obscured by their generally high levels of trust before the missions began.

Similar analyses for the post-mission indicator of team trust showed a very weak effect for regimental identity, as shown in Figure 4.

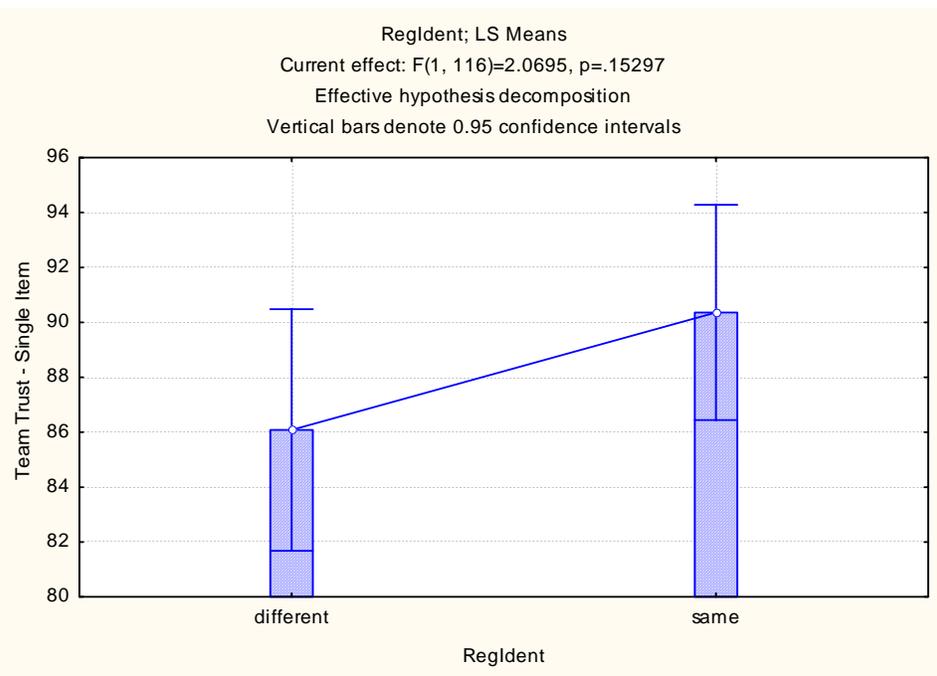


Figure 4. Trust in Team by Regimental Identity – Post-Mission

Specifically, after completing the mission, mean levels of team trust were only slightly marginally lower when other team members were from a different regiment than from the same regiment. However, violations that had occurred during the first stage of the mission did not have a significant impact.¹⁵

¹⁵ Again, it is only fair to note that other violations after the mission freeze could have affected team trust, but these were not captured. For future research, capturing all violations that occurred during the course of a mission would be critical, or perhaps controlling violations by an automated script might be a possibility.

To explore team trust at the mission freeze and post-mission stages simultaneously, a repeated measures ANOVA with regiment (same or different) and violation condition (violation or no violation) as between group factors was conducted, as shown in Figure 5.

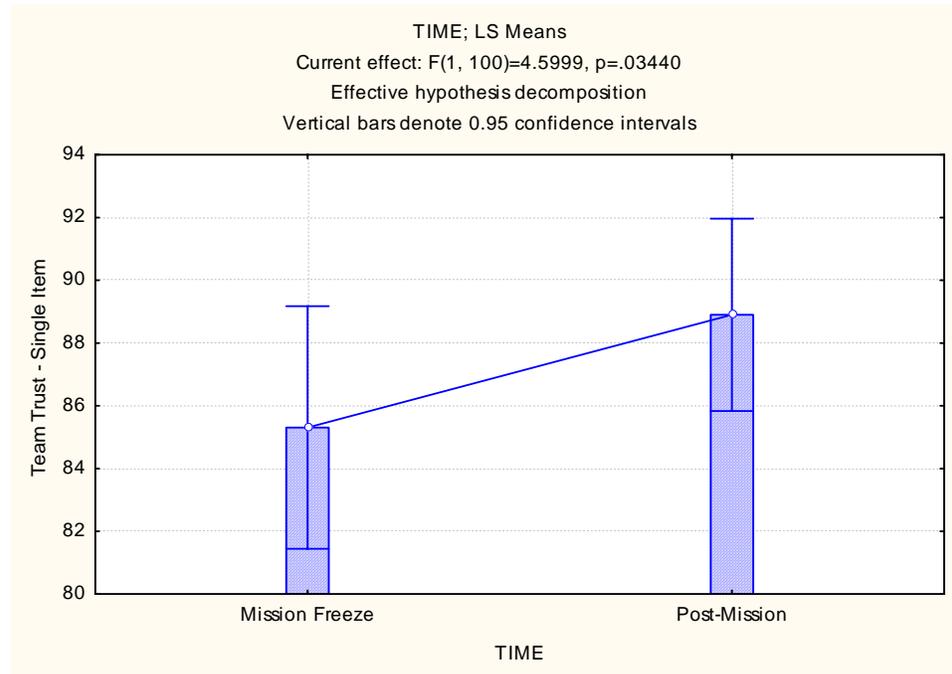


Figure 5. Trust in Team - Mission Freeze and Post-Mission

This analysis showed only a significant main effect of time, confirming that team trust ratings were significantly higher at the end of the mission than at the mission freeze. Throughout the entire mission, then, the team trust mean started at about 85 at the pre-mission phase before any interactions with the new team members, stayed at 85 (even after trust violations in half of the missions) and rose to 89 at the post-mission stage after having worked together. There were no other significant effects.

However, when violations occur, one might expect that the actual victim of the violation might have a stronger reaction than would another teammate who is aware of the violation but does not personally experience it. Additional analyses compared the team trust of both victims and non-victims of a violation at the mission freeze and post-mission stages, as shown in Table 12.

Table 12. Trust in Team – Victim Status - Mission Freeze and Post-Mission

Smallest N = 104	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	Victim	Not Victim	Victim	Not Victim
Team Trust – Mission Freeze	85.7 ± 15.6	87.7 ± 21.2	81.4 ± 26.9	86.6 ± 10.7
Team Trust – Post-Mission	87.5 ± 19.9	91.1 ± 14.2	83.6 ± 22.7	83.1 ± 15.8

Both analyses showed that victims did not rate their team trust any differently than non-victims. Moreover, the violation that had occurred seemed to have had little impact on trust at the mission freeze.

To this point, then, results for the single item indicator of team trust suggest that teams had differential levels of team trust based only on knowledge about the regimental affiliation of distributed teammates. Moreover, this trust level did not appear to be affected by potential violations of trust, but grew steadily over the course of the simulated tactical assault mission.

It seems plausible to argue, however, that the impact of a trust violation may be based more on perceptions of a specific person than on perceptions of the team as a whole. To examine this possibility, analyses shown in the following two sections explore trust in specific team members and the perceived skills of specific team members.

3.4 Trust in Other Team Members

3.4.1 Pre-Mission Ratings of Specific Team Members

At this point, we have seen that judgements of one’s team as a whole were at least initially influenced by regimental identity. However, it is also important to determine the degree of specificity or sensitivity of trust assessments within the team itself. Thus we also sought to explore trust ratings of specific team members. Participants had rated their confidence in both themselves and each of their teammates on a scale ranging from 1 (not at all confident) to 100 (extremely confident). These means are shown in Table 13.

Table 13. Trust in Specific Members – Pre-Mission

Smallest N = 119	Same Regiment (Mean,StDev)	Different Regiment (Mean,StDev)
Trust in Me	86.0 ± 13.5	86.7 ± 12.2
Trust in My FTP	79.4 ± 15.4	76.9 ± 18.0
Trust in Other Leader	86.5 ± 13.3	87.2 ± 12.3
Trust in OFTM	78.3 ± 17.2	73.0 ± 16.5

There were no significant differences in the perceived trustworthiness of oneself, one’s own fire team partner, the other leader or the other fire team members. However, the pattern of means shows that one’s own trustworthiness and that of the other leader were rated slightly higher than trust in the 2 fire team members.

This finding is very interesting as it suggests that during the pre-mission stage, regimental identity was used to gauge the trustworthiness of the team as a whole, but was not used to judge the potential trustworthiness of specific teammates.

3.4.2 Mission Freeze and Post-Mission Ratings of Specific Team Members

Ratings of the trustworthiness of specific team members were also completed at the mission freeze and post-mission. Table 14 shows the means and standard deviations for trust ratings of oneself, one’s own FTP, the other team leader, and the other FTM at the mission freeze.

Table 14. Trust in Specific Members - Mission Freeze

Smallest N = 103	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
Trust in Me	81.3 ± 23.3	91.0 ± 9.28	83.6 ± 19.3	85.0 ± 21.7
Trust in My FTP	77.8 ± 26.4	81.0 ± 18.9	86.6 ± 17.6	80.7 ± 17.5
Trust in Other Leader	83.2 ± 24.2	87.2 ± 16.2	86.1 ± 21.1	87.2 ± 17.1
Trust in OFTM	82.2 ± 18.7	80.7 ± 23.5	81.34 ± 21.0	77.4 ± 17.6

As can be seen in Table 14, ratings of specific team members at the mission freeze were uniformly positive, and were not affected by varying regimental identity or by whether a violation had occurred or not.

Table 15 shows the ratings of trust in specific team members at the post-mission phase.

Table 15. Trust in Specific Members - Post-Mission

Smallest N = 116	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
Trust in Me	86.8 ± 15.3	90.0 ± 11.3	82.0 ± 18.9	90.3 ± 10.4
Trust in My FTP	83.3 ± 17.9	80.6 ± 20.0	84.2 ± 16.1	81.0 ± 18.8
Trust in Other Leader	88.4 ± 13.7	85.3 ± 17.6	84.7 ± 17.1	89.0 ± 16.4
Trust in OFTM	84.3 ± 17.4	80.4 ± 19.6	77.2 ± 20.5	75.9 ± 20.0

Analyses on these items showed only a marginal main effect of violation on ratings of one's own trustworthiness, as shown in Figure 6.

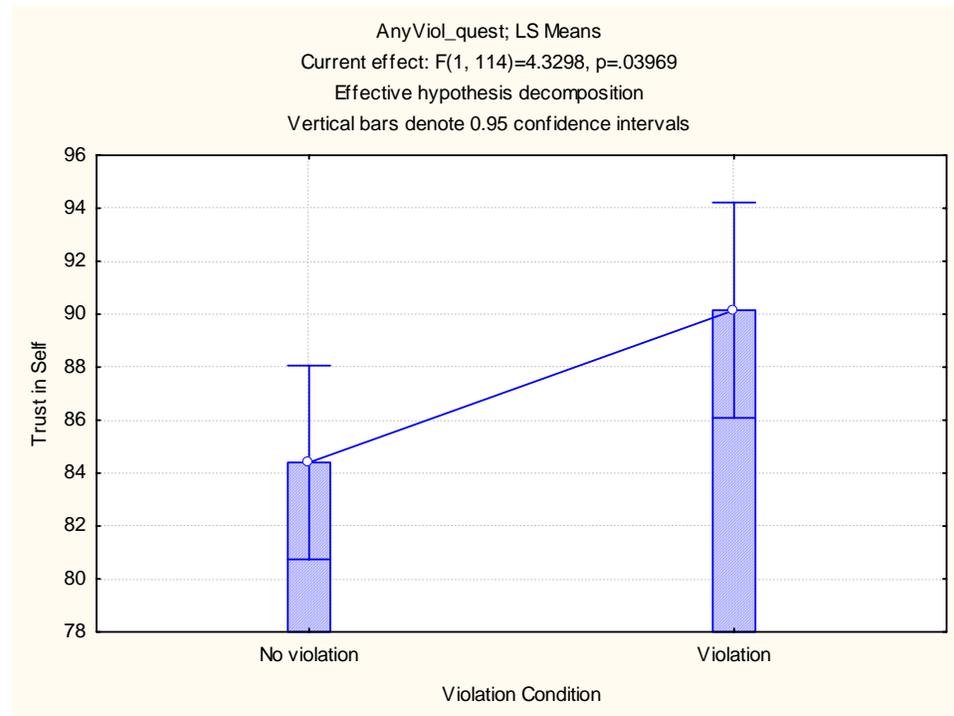


Figure 6. Trust in Self by Violation Condition - Post-Mission

Specifically, this pattern suggests that team members rated themselves more positively when their team had encountered a violation than when it had not. While this result was not anticipated, it may be that participants may have given themselves credit after overcoming obstacles within their missions. This issue will be important to explore further in other analyses, especially in light of the extremely high levels of trust at the beginning of the study.

There were no differences for analyses for trust in one’s fire team partner and in the other leader. However, there was a marginal main effect of regimental identity on the perceived trustworthiness of the other fire team member, as shown in Figure 7.

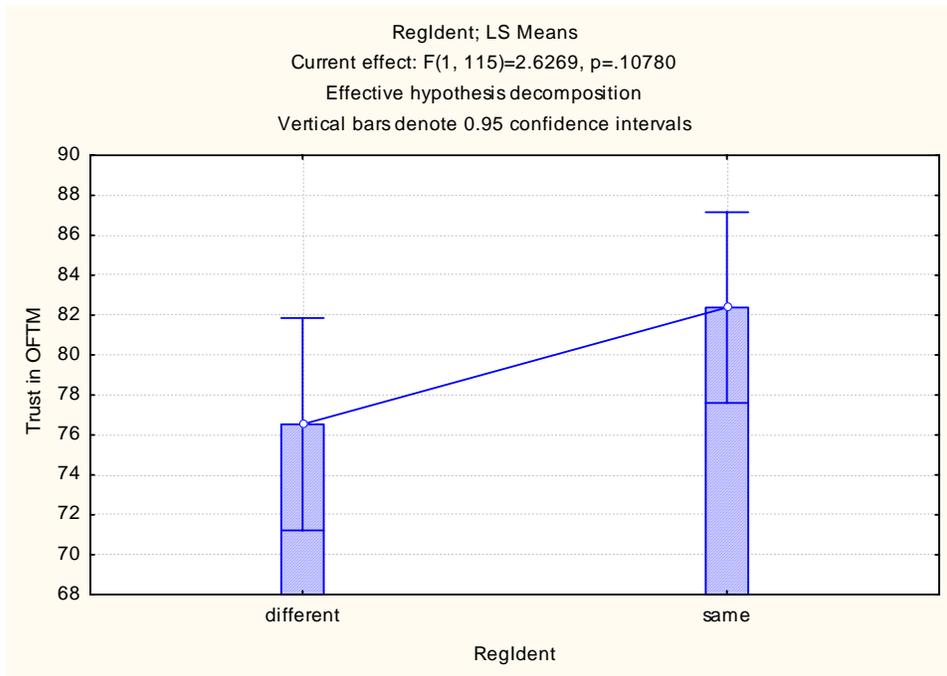


Figure 7. Trust in OFTM by Violation Condition - Post-Mission

Trust in the other fire team member was lower when from a different regiment than from the same regiment. Although only marginally significant, this finding suggests that the category of regimental identity may have continued to exert impact when the leader of the opposing fire team did not have the opportunity to directly witness the skills of the opposite fire team member.

Overall, then, these results suggest that regimental identity had little impact on perceptions of specific teammates, either before meeting them, or after observing them at work. This again suggests that even though the regimental affiliation category carried information that impacted on broader team-level attributions, these were not specifically applied to individuals. The violations that were reported in the early stage of the mission appeared to have had little impact on judgements of the trustworthiness of specific teammates throughout the rest of the mission. This suggests that the impact of a violation may have been relatively constrained. Even if these violations did not impact on broader trust judgements, however, they might have influenced perceptions about the teammates in a more limited way. Ratings of specific team member's skills are explored in the next section.

3.5 Team Member Skill Ratings

Even if violations did not influence trust judgements, they might have influenced perceptions of the skills of other teammates. This was explored by examining team member skill ratings before, during and after the mission.

3.5.1 Pre-Mission Skill Ratings

Participants were also asked to rate the skill of themselves and of their teammates, based only on the demographic information provided in the profile about their teammates. Skills likely to be

critical to a tactical assault mission are exercising discipline, following orders, ensuring coordination with team, situation awareness, tactical skills, hand/eye coordination, skill in covering each others' backs, wayfinding ability, and maintaining stealth, all rated on a scale ranging from 1 (poor) to 6 (excellent). Results for the indexed skill item are shown in Table 16.

Table 16. Skill Ratings – Pre-Mission

N = 118	Same Regiment (Mean,StDev)	Different Regiment (Mean,StDev)
My Skill	5.3 ± .6	5.1 ± .6
My FTP Skill	4.9 ± .8	4.7 ± .9
Other Leader Skill	5.3 ± .7	5.1 ± .7
Other FTM Skill	4.8 ± .8	4.6 ± .9

At the pre-mission stage, skill ratings were slightly more favourable when working with team members from the same regiment rather than a different regiment, but the only marginal difference was seen for ratings of the other fire team member, as shown in Figure 8.

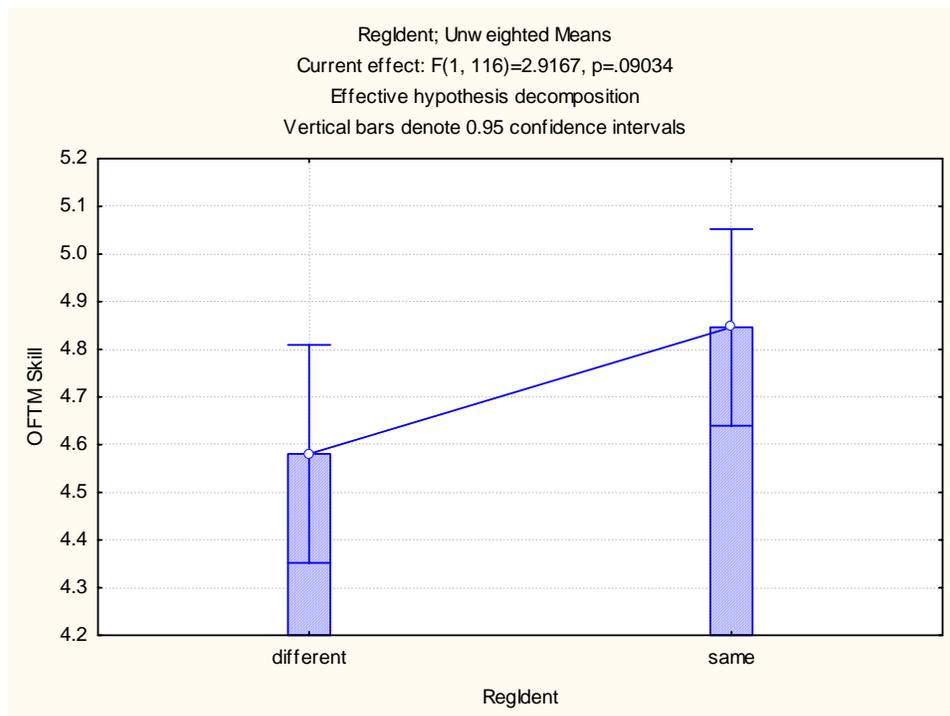


Figure 8. OFTM Skill by Violation Condition - Pre-Mission

This finding suggests that regimental identity may have impacted somewhat on perceptions of the other fire team member even before directly interacting with this member.

3.5.2 Mission Freeze and Post-Mission Ratings

Participants’ perceptions about the skills of their fire team partners were also gathered at the mission freeze phase. To save time, only data for the fire team partner and the other fire team member were gathered at this stage because, according to the original experimental protocol, only they were seen to be potential violators of trust.¹⁶

Table 17. Skill Ratings – Mission Freeze

Smallest N = 101	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
My FTP Skill	5.0 ± .8	4.8 ± .8	5.2 ± .6	4.8 ± .8
Other FTM Skill	5.0 ± .9	4.7 ± .9	5.1 ± .8	4.6 ± 1.2

The skills of both team members were rated relatively highly, averaging between 4 and 5 on a 6 point scale. For one’s own fire team partner, there was only a significant main effect of violation, as shown in Figure 9.

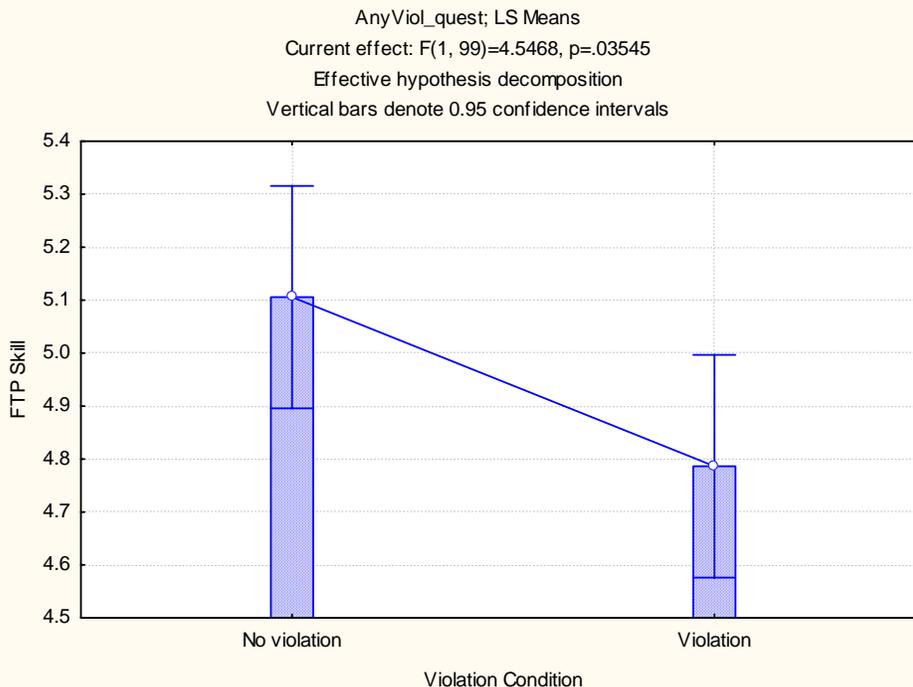


Figure 9. FTP Skill by Violation Condition – Mission Freeze

For missions in which a violation had occurred, the FTP was rated as significantly less skilled. The same was also true of the skill ratings of the other fire team partner, as shown in Figure 10.

¹⁶ As noted earlier, this assumption was incorrect. For future research, it would be advantageous to have ratings for all team members.

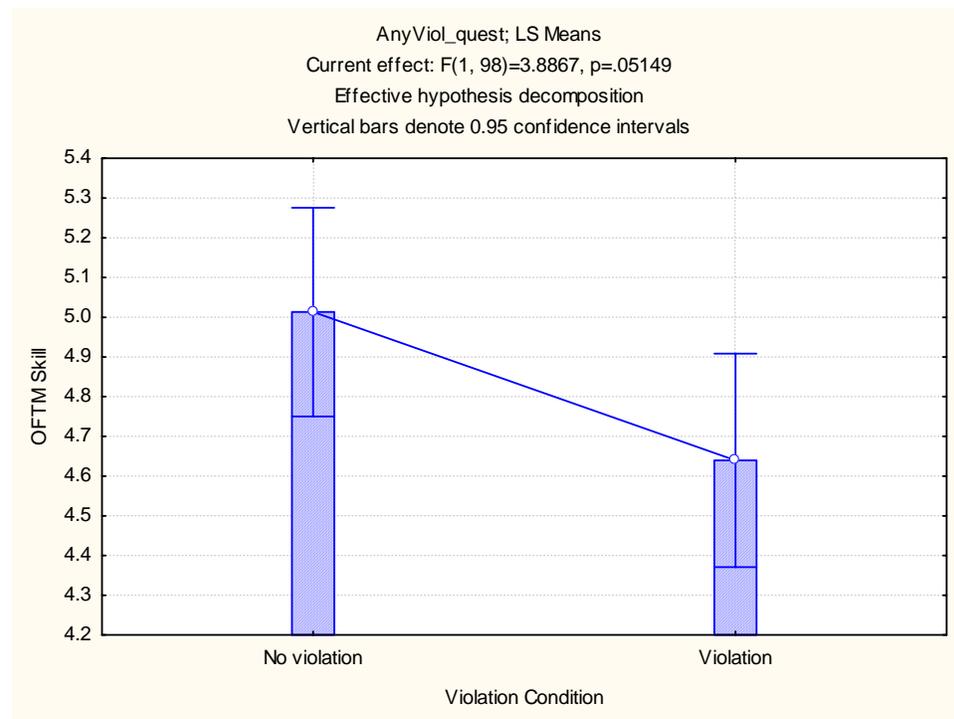


Figure 10. OFTM Skill by Violation Condition – Mission Freeze

These results show that when a trust violation occurred within a team, it negatively influenced how both one’s own fire team partner’s skills and the skills of the other fire team member were perceived. This is perhaps not surprising, given that these were the team members who committed the violation.

These results, of course, were only on the skill index, in which many different skills relevant to tactical assault missions were averaged. Additional analyses explored the specific skills that made up the skill index. For one’s own FTP, ratings of discipline, tactical skills and stealth skills were the only skills that were negatively impacted by the trust violations, whereas for the OFTM, these dimensions as well as hand-eye coordination showed a significant decline in missions with violations.

Indexed skill ratings at the post mission phase are shown in Table 18.

Table 18. Skill Ratings - Post-Mission

Smallest N = 112	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
My Skill	5.1 ± .7	5.2 ± .6	5.0 ± .8	5.1 ± .7
My FTP Skill	5.3 ± .5	5.0 ± .7	5.3 ± .6	5.1 ± .7
Other Leader Skill	5.2 ± .6	5.1 ± .8	5.2 ± .7	5.2 ± .8
Other FTM Skill	5.1 ± .7	5.1 ± .8	4.9 ± .9	5.0 ± .9

At the post-mission stage, although there were no significant differences in perceptions of one’s own skills, there was a marginal effect of violation on perceptions of one’s own fire team partner’s skills, as shown in Figure 11.

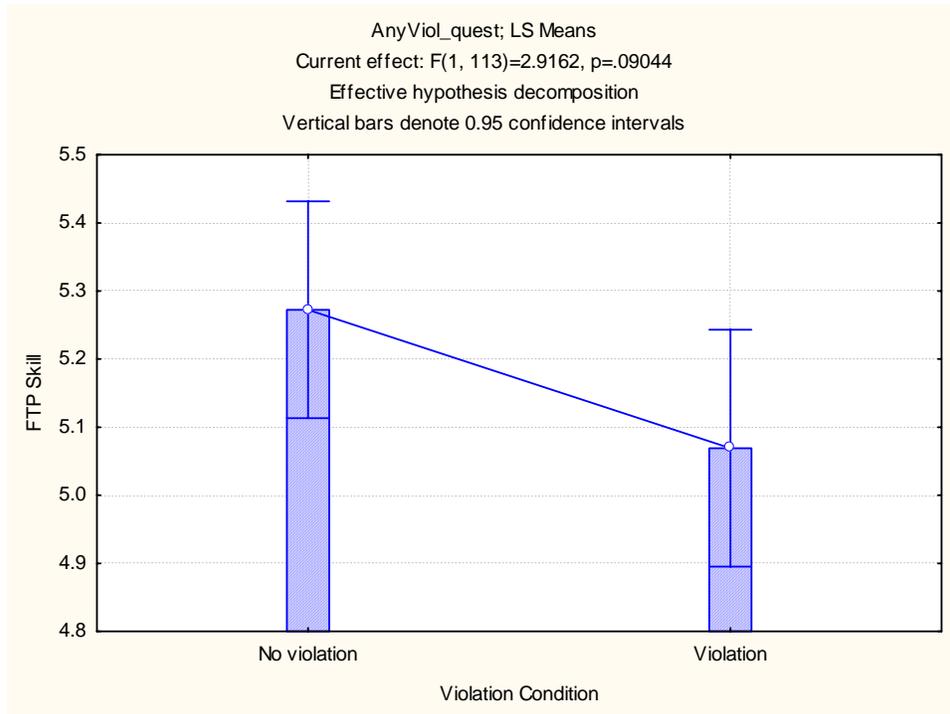


Figure 11. FTP Skill by Violation Condition – Post-Mission

However, there were no significant effects for the other leader or the other fire team member.

As such, it was important to ask whether these differences stemmed from lowered skill ratings given by victims when violations occurred, or whether non-victims also rated team member skills negatively. These analyses showed no differences on skill ratings for FTP and OFTM by victims and non-victims at both the mission freeze and post-mission stages.

Repeated measures analyses were also conducted to explore skill ratings of the FTP and OFTM over time. The FTP analysis showed 2 significant main effects. The first was a main effect of time, as shown in Figure 12.

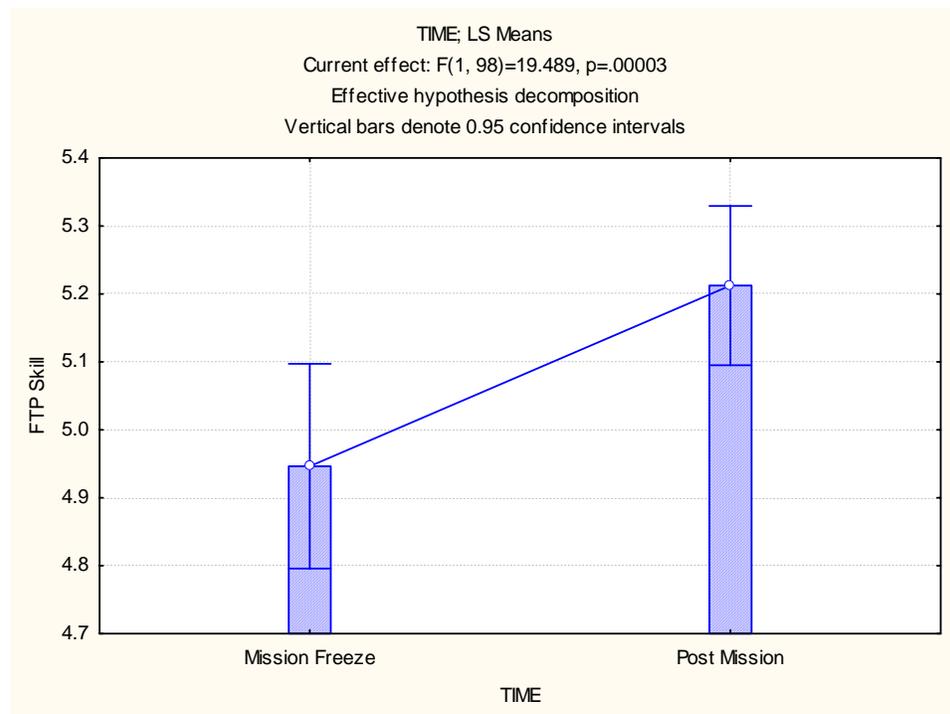


Figure 12. Skill Ratings of Fire Team Partner Over Time - Time

Perceptions of the FTP’s skill increased significantly over the course of the mission. The second significant effect was a main effect for violation, as shown in Figure 13.



Figure 13. Skill Ratings of Fire Team Partner Over Time - Violation

Ratings of the skills of the FTP were significantly lower when violations occurred than when they did not.

Similar analyses were also undertaken for the OFTM. This showed a significant effect of time, as shown in Figure 14.

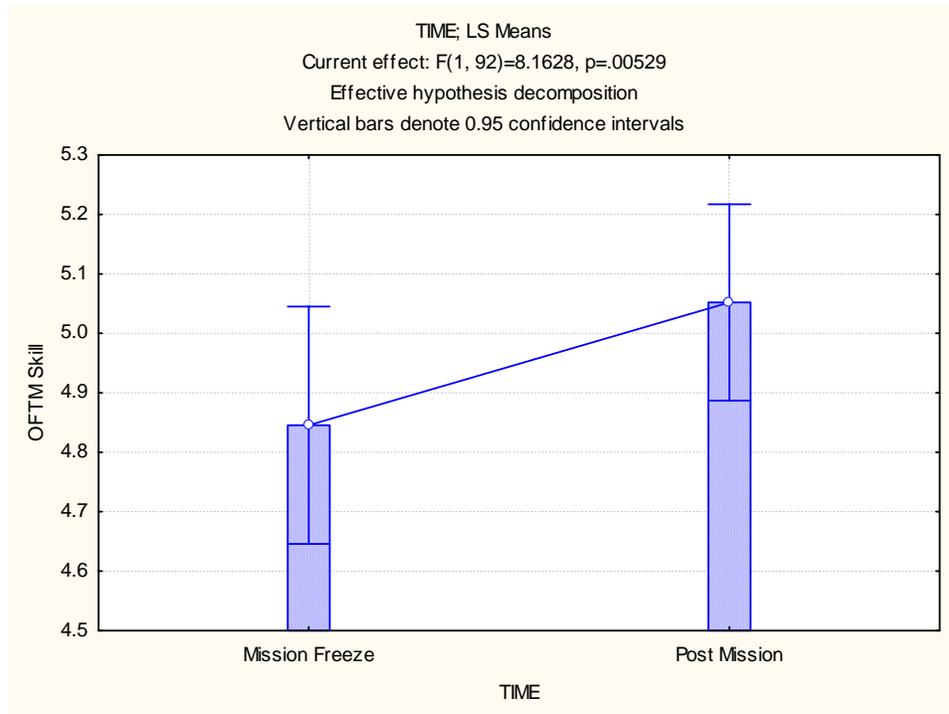


Figure 14. Skill Ratings of Other Fire Team Member Over Time - Violation

Clearly, ratings of the skills of the OFTM increased significantly during the mission freeze to post-mission stage. There was also a significant interaction between time and violation condition, as shown in Figure 15.

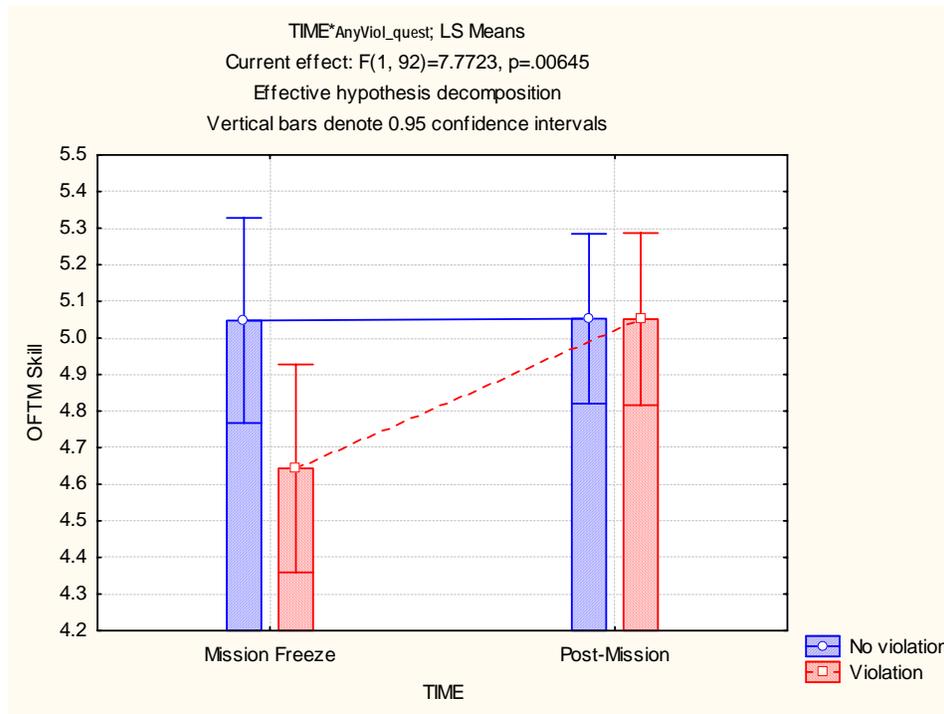


Figure 15. Skill Ratings of Other Fire Team Member Over Time – Time by Violation

At the mission freeze, then, the OFTM was rated as less skilled when a violation had occurred. However, by the end of the mission, skill ratings were similar whether a violation had occurred or not.

These analyses seem to best reflect the impact of the violations that occurred during the experiment. The impact of violations that occurred temporarily negatively affected perceptions of the skills of other teammates at the mission freeze, but had a weaker impact by the end of the mission. Even this temporary impact on the perceived skills of violators did not generally carry over to expectations of the trustworthiness of the specific team member, or to perceptions of the trustworthiness of the team as a whole. Moreover, even though violations did impact temporarily on the perceived skills of teammates, CF personnel (tasked to be leaders) did seem to be responsive to the information that they received about the skills of their teammates, whose performance throughout the mission was consistently very good. This suggests that although violations did have an impact, views of teammates’ skills were open to reconstrual after displays of competent performance. In this sense, the high trust evident within teams at the beginning of the study may have acted as a protective factor, keeping trust high even in the face of a violation.

3.6 Estimates of Team Performance – Pre-Mission

Based on the limited amount of information that they had available at the time, participants also made estimates during the pre-mission phase about how well their teams would perform during the mission. As they had rated their team members as a whole to be less trustworthy when from a different regiment, might they also make less optimistic predictions about their team’s success when working with a diverse rather than homogeneous team?

Two items addressed time estimates, both actual number of minutes likely to be required to complete the mission and an estimate of the time that one’s own team would need to complete the mission in comparison to other teams. Participants also rated the probability that at least one member of their team would be killed during the mission, as well as the number of casualties that they expected their team would accrue during the mission. Table 19 shows these results.

Table 19. Team Expectations – Pre-Mission

Smallest N = 117	Same Regiment (Mean,StDev)	Different Regiment (Mean,StDev)
Time to Complete Mission (minutes)	16.6 ± 6.1	17.1 ± 6.4
Compared to Other Teams ¹⁷ (less = 1, equal=2, longer=3)	2.2 ± 0.7	2.0 ± 0.8
Probability of at least 1 casualty	65.6 ± 31.1	75.2 ± 28.9
# Casualties	1.4 ± 1.0	1.6 ± 0.7

Team members rated the time to complete the mission similarly when working with members from the same regiment and different regiments, and expected that their team would perform no differently than other teams, and have an equal number of overall casualties. However, when working with a team from a different regiment (as opposed to the same regiment), teammates felt it marginally more probable that their team would incur at least one casualty during the mission. This result is shown in Figure 16.

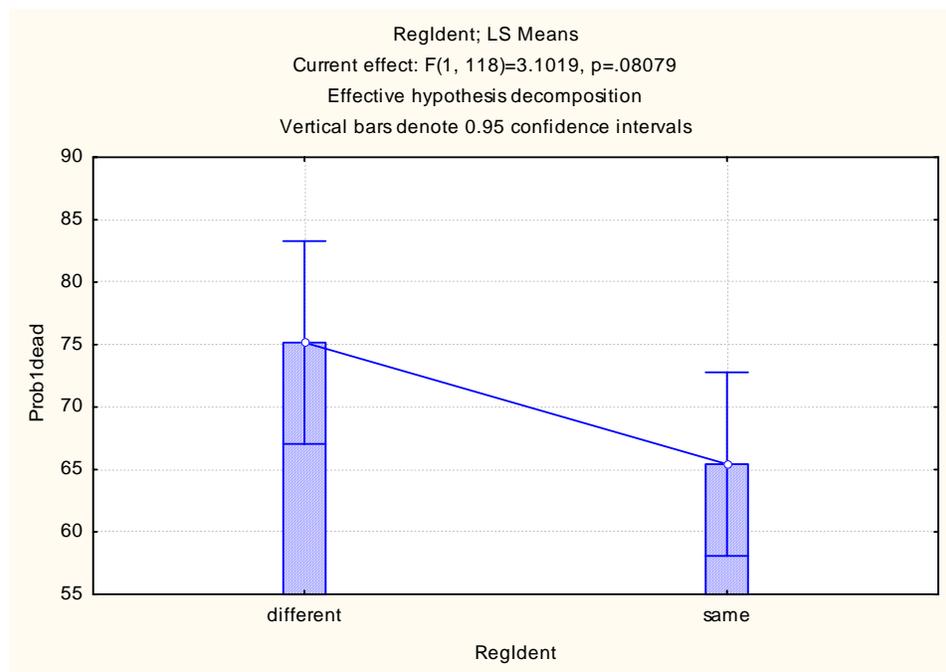


Figure 16. Probability of 1 Casualty Estimate

¹⁷ Data for 12 participants who checked “don’t know” for this question was excluded.

Although only this indicator of estimated team performance showed a marginal difference, the belief that their team would be more likely to incur casualties when working with teammates from different regiments is an important one to explore in future research.

3.7 Expectations of Specific Team Members – Mission Freeze

During the mission freeze, participants were asked to indicate whether their own performance and that of their team members was as expected on a 7-point scale, ranging from worse than expected (1), as expected (4) or better than expected (7). These means are shown in Table 20.

Table 20. Expectations of Specific Team Members – Mission Freeze

Smallest N = 111	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
Expected of Me	4.4 ± 1.8	5.3 ± 1.3	4.0 ± 1.8	5.0 ± 1.7
Expected of My FTP	5.0 ± 1.5	5.1 ± 1.5	5.2 ± 1.5	5.1 ± 1.9
Expected of Other Leader	5.2 ± 1.5	5.1 ± 1.6	5.1 ± 1.3	4.7 ± 1.7
Expected of OFTM	5.2 ± 1.2	5.0 ± 1.7	5.2 ± 1.4	4.7 ± 1.6

Between-group analyses looked at whether these ratings differed across regiment and in the presence of a violation. The first analysis looked at participants’ expectations of themselves. There was some evidence that having experienced a violation positively influenced participants’ view of how they had performed during the mission, as evidenced by a main effect of violation, shown in Figure 17.

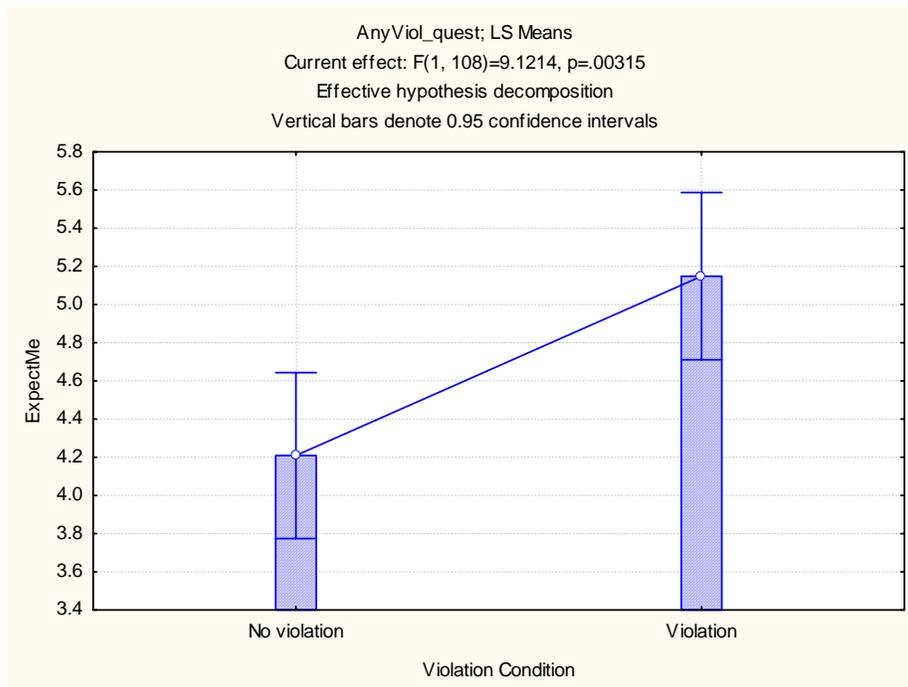


Figure 17. Expectations of Self by Violation – Mission Freeze

Specifically, participants rated themselves as having performed better than expected when their team had experienced a violation. Similar analyses were also undertaken exploring expectations about one’s own FTP, the other FTM, and the other leader. These showed no significant differences in expected performance for the other team members associated with the occurrence of a violation. This suggests again that the violations that had occurred did not have a very strong impact on more generalized construals of even the violators.

Analyses were also conducted examining whether the participant’s role as victim (or not) had an effect on their responses. Results showed a marginal main effect of victim status on participants’ expectations about their own performance, as shown in Figure 18.

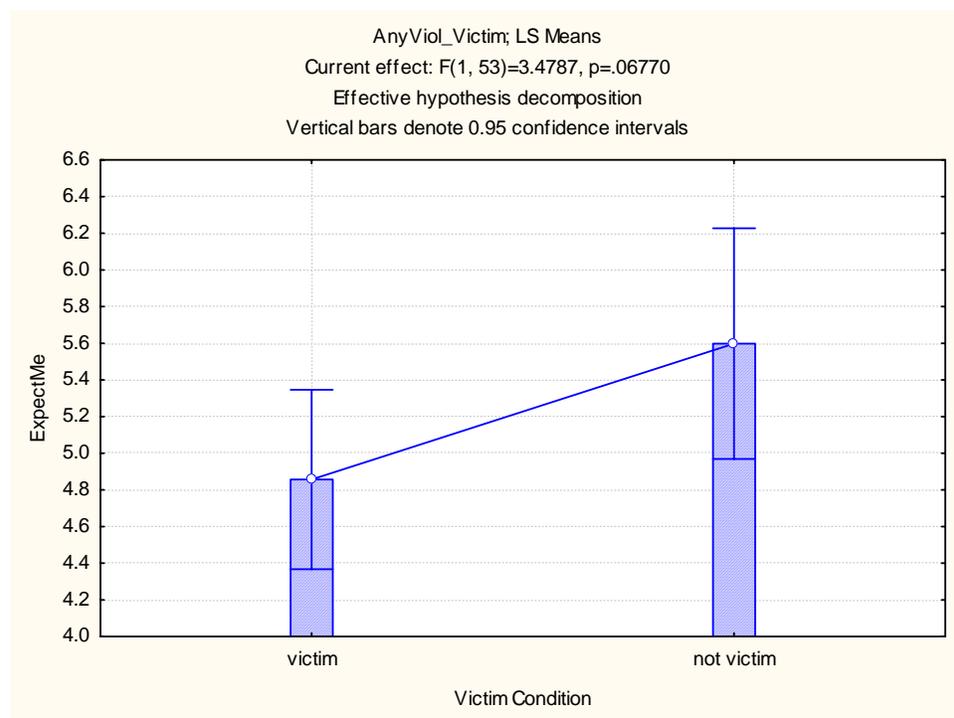


Figure 18. Expectations of Self by Victim – Mission Freeze

As Figure 18 shows, when the participant had been a victim, they rated themselves as having performing only as expected. When not a victim, they rated themselves as having performed marginally better than they had expected.

The only other significant effect emerged on expectations of the OFTM, as shown in Figure 19.

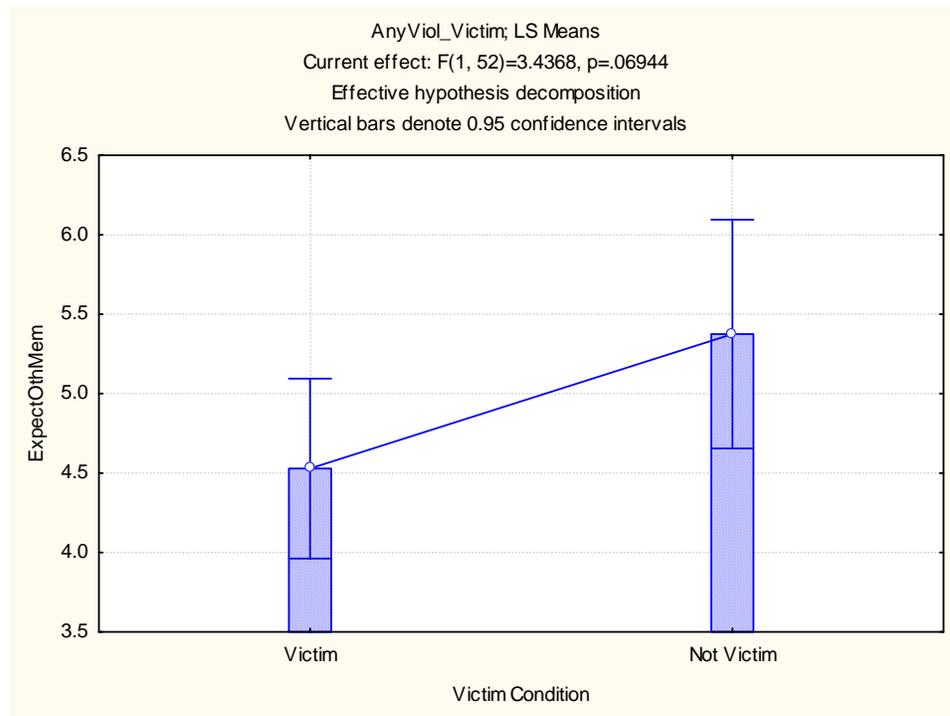


Figure 19. Expectations of OFTM by Victim – Mission Freeze

Non-victims of a violation rated the other fire team member to have significantly exceeded their expectations, whereas victims were somewhat less generous. However, for both parties, the other fire team member performed better than they had anticipated.

As a whole, then, these analyses suggest that participants exceeded their expectations of themselves when they had encountered violations. Moreover, these expectations were high whether a victim or not, but having been a victim increased perceptions of having exceeded one’s goals.

3.8 Attributions of Responsibility

3.8.1 Mission Freeze Attributions

At the mission freeze, participants also rated the extent to which they believed that each member of their team would be responsible for the eventual success or failure of their team’s mission, rated on a scale ranging from 0 (not at all responsible) to 100 (extremely responsible). These ratings were included to explore whether regimental identity and the violations that had occurred during some missions would influence the “credit” or “blame” assigned to one’s teammates. These means are shown in Table 21.

Table 21. Attributions of Responsibility for Success – Mission Freeze

N = 103	Same Regiment (Mean, StDev)		Different Regiment (Mean, StDev)	
	No Violation	Violation	No Violation	Violation
Me Responsibility	61.1 ± 31.9	71.6 ± 25.8	74.0 ± 27.5	57.0 ± 33.8
My FTP Responsibility	61.2 ± 30.5	68.6 ± 28.7	73.3 ± 27.9	52.0 ± 31.8
Other Leader Responsibility	67.5 ± 28.5	74.8 ± 27.4	81.2 ± 22.6	65.7 ± 32.1
OFTM Responsibility	65.4 ± 27.9	68.2 ± 28.8	70.8 ± 27.3	62.5 ± 31.5

Interestingly, all team members were rated as fairly highly responsible for the potential success of the team in completing its mission. Formal analyses showed a marginal interaction between regimental identity and violation condition for responsibility ascribed to oneself. Participants rated themselves as more likely to be responsible for mission success when they had not experienced a violation and were paired with teammates from a different regiment, than when they had experienced a violation and were paired with teammates from the same regiment, as shown in Figure 20.

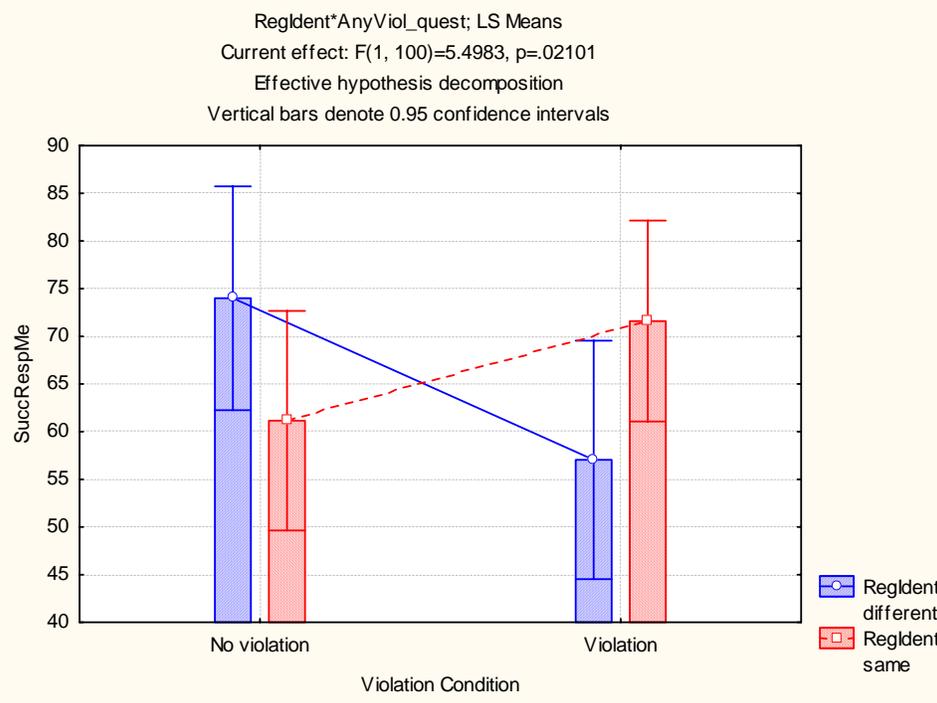


Figure 20. Self Attribution of Responsibility – Mission Freeze

A similar but stronger pattern of results was seen for the perceived responsibility of one’s own FTP if the mission had succeeded as shown in Figure 21.

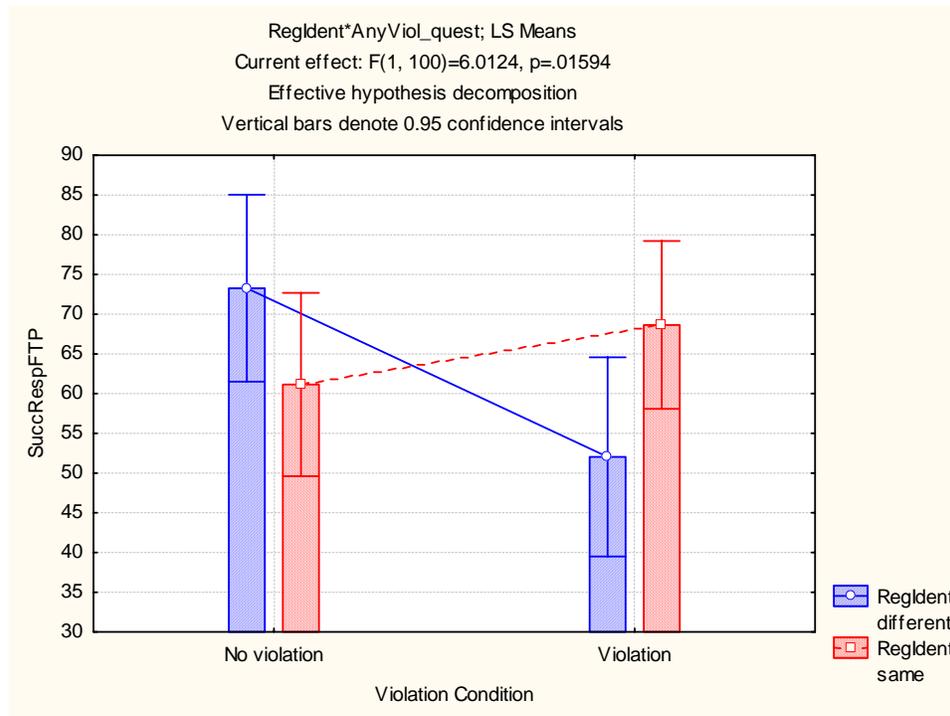


Figure 21. FTP Attribution of Responsibility – Mission Freeze

Again, when from the same regiment, one's fire team partner was seen as more likely to be responsible for mission success in missions with a violation, but when from a different regiment, this partner was rated as likely to be less responsible in missions with a violation.

There was also a marginal effect for the perceived responsibility of the other leader, as shown in Figure 22.

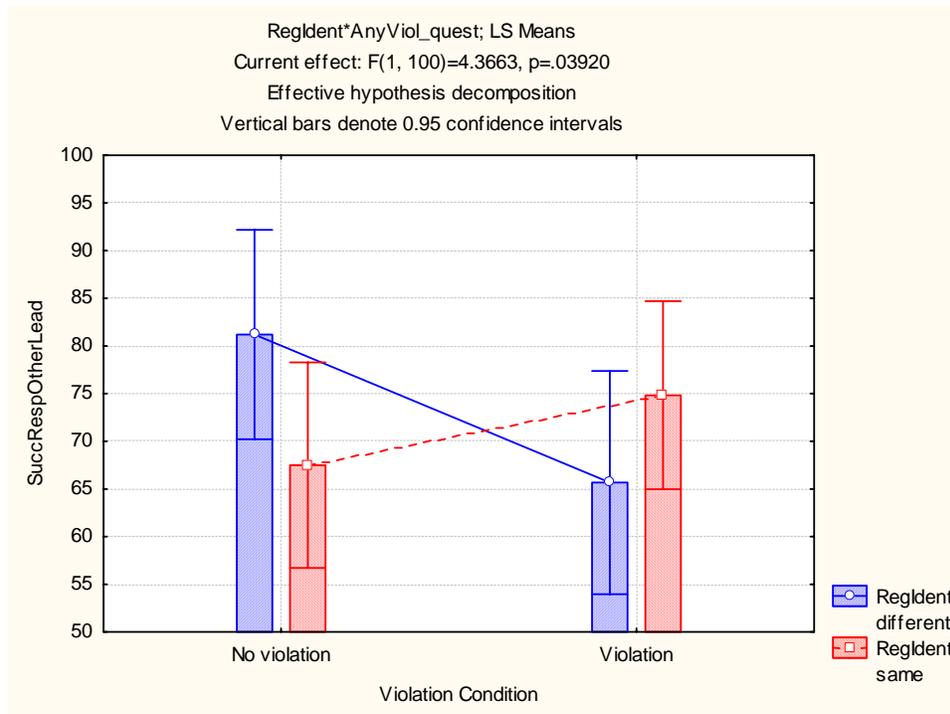


Figure 22. OFTL Attribution of Responsibility – Mission Freeze

However, there were no effects for the other fire team member.

It is unclear what this consistent pattern might represent, but it seems to suggest that violations increase optimism when working with team members from the same regiment, but diminish it when working with members from different regiments. Indeed, the buffering impact when working with teammates from one’s own regiment could be the product of in-group processes.

In terms of attributions of blame for prospective mission failure, means are shown in Table 22.

Table 22. Failure Attributions of Responsibility – Mission Freeze

N = 101	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
Me Responsibility	57.5 ± 29.8	63.7 ± 29.5	73.1 ± 28.3	68.8 ± 30.0
My FTP Responsibility	42.7 ± 30.9	49.5 ± 30.4	48.8 ± 32.5	51.1 ± 37.2
Other Leader Responsibility	46.9 ± 29.3	60.2 ± 30.0	58.5 ± 35.7	54.8 ± 33.6
OFTM Responsibility	46.3 ± 30.3	52.7 ± 28.2	51.5 ± 32.7	47.4 ± 32.2

Again, participants viewed themselves and the other team leader to be somewhat more responsible for mission success or failure. However, the only effect was a marginal one for attributions of responsibility on oneself, as shown in Figure 23.

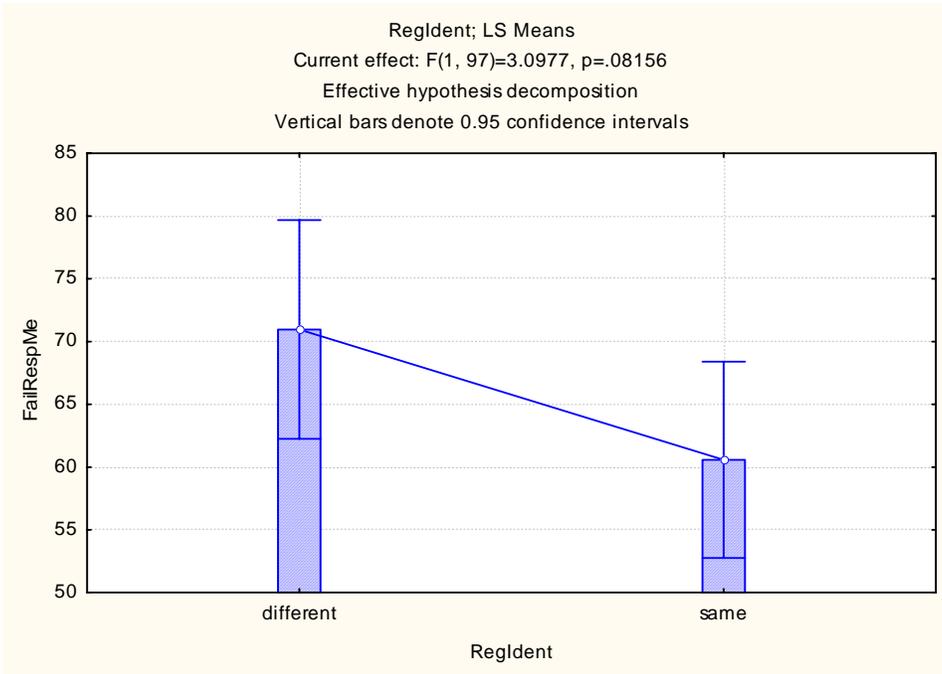


Figure 23. Own Attribution of Responsibility for Failure – Mission Freeze

In short, participants ascribed marginally more responsibility to themselves when their teams failed when working with teammates from a different regiment than when working with teams from the same regiment. Overall, however, the pattern of means suggests a positive team environment, where team members are likely to be given more responsibility for mission success than for mission failure.

3.8.2 Post-Mission Attributions

After completing the mission, then, participants also rated the extent to they held team members responsible for the outcome of their teams’ mission (either its success or its failure). Means when teams were successful are shown in Table 23.

Table 23. Attribution for Success – Post-Mission

Smallest N = 92	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
Me Responsibility	56.2 ± 32.1	69.7 ± 29.6	58.5 ± 36.2	73.9 ± 29.1
My FTP Responsibility	62.7 ± 24.4	66.4 ± 29.7	67.3 ± 31.1	65.7 ± 32.3
Other Leader Responsibility	67.1 ± 25.3	71.6 ± 31.0	67.9 ± 29.9	72.9 ± 31.4
OFTM Responsibility	60.8 ± 28.1	71.0 ± 29.2	61.5 ± 32.2	75.0 ± 25.8

When teams were actually successful on the mission, participants rated their own contribution to the team’s success to be significantly higher when a violation had occurred during the mission than when it had not, as shown in Figure 24.

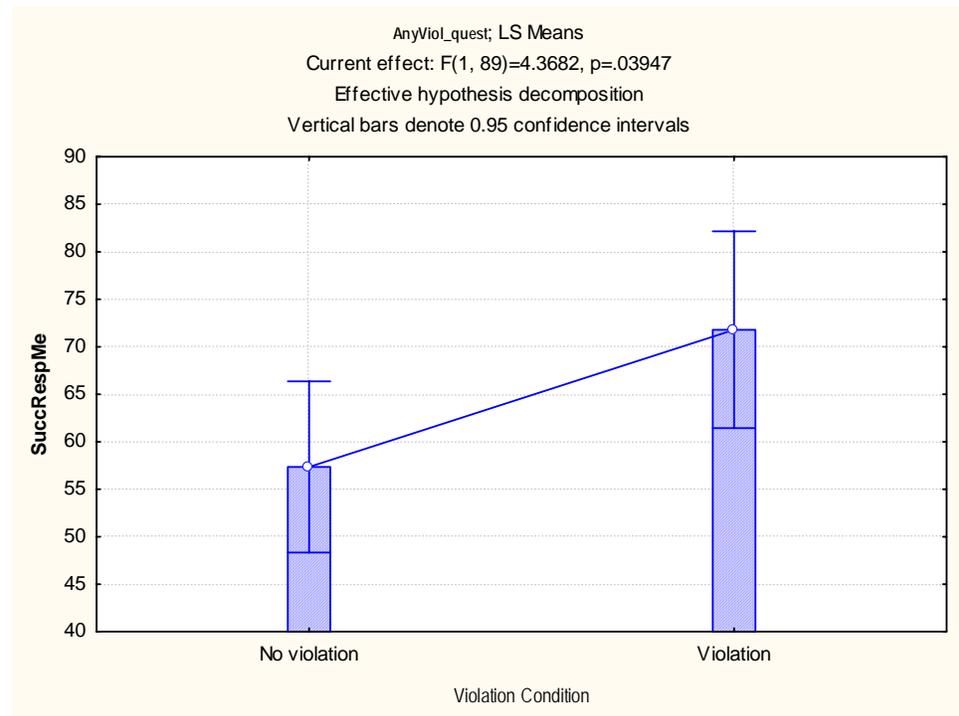


Figure 24. Self Attribution of Responsibility – Post-Mission

Consistent with earlier analyses, then, team members might have seen their overcoming a violation as having made a significantly positive contribution to their team’s performance.

Other analyses showed a marginal effect of violation on success credited to the other fire team member, as shown in Figure 25.

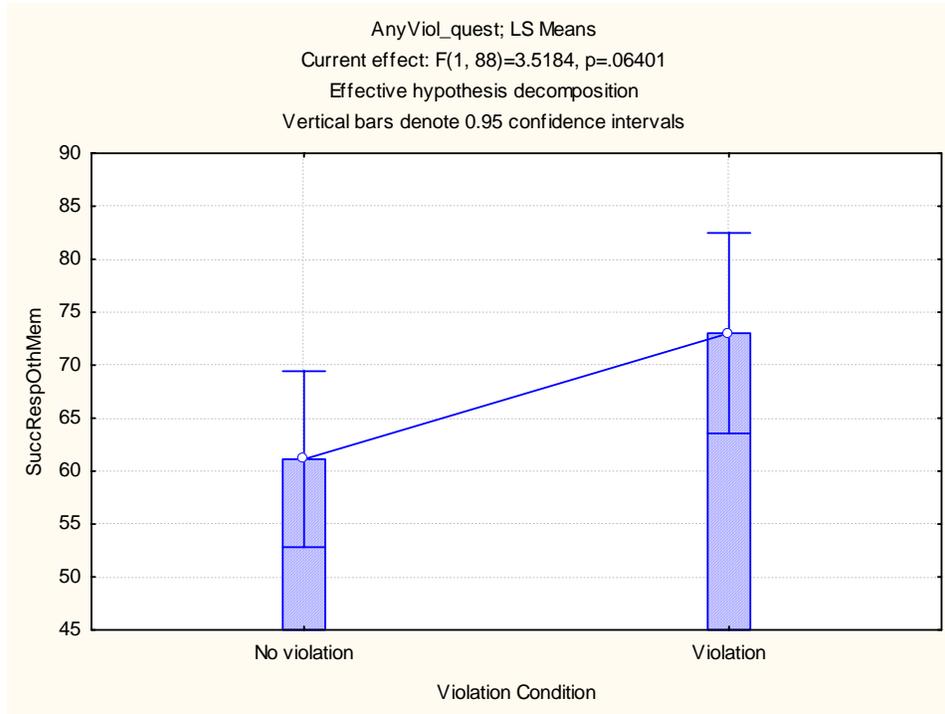


Figure 25. OFTM Attribution of Responsibility – Post-Mission

Specifically, in missions where a violation had occurred, the other fire team member was rated as having contributed marginally more to the team’s success than when a violation had not occurred. Given that the other fire team member committed some of the violations and violations would typically be seen to detract from a team’s success, this finding is somewhat puzzling.

Means for attributions of responsibility in teams that actually failed to complete the mission successfully are shown in Table 24.

Table 24. Attribution for Failure – Post-Mission

Smallest N = 25	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
	No Violation	Violation	No Violation	Violation
Me Responsibility	58.0 ± 33.5	55.8 ± 31.7	74.3 ± 31.4	72.9 ± 34.5
My FTP Responsibility	47.0 ± 38.7	49.2 ± 38.0	38.6 ± 32.9	53.6 ± 46.3
Other Leader Responsibility	54 ± 34.4	55.8 ± 32.9	70.7 ± 20.9	68.6 ± 41.4
OFTM Responsibility	44 ± 35.6	52.5 ± 34.6	37.1 ± 35.0	52.9 ± 47.2

Analyses showed no significant differences as a product of regimental identity or violations. However, it is important to note that these analyses have very low power due to the relatively low occurrence of failure within the teams. However, it is important to note that leaders (both oneself and the other fire team leader) were seen to be more responsible for teams’ failures than were non-leader team members, but were particularly responsible when working with team members from the same regiment.

After mission completion, participants were also asked to make attributions about the relative contributions of skill, luck and effort in either mission success or mission failure. These results are shown in Table 25.

Table 25. Skill/Luck/Effort Attributions – Post-Mission

		Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)	
		No Violation	Violation	No Violation	Violation
Me	Skill	51.8 ± 17.1	51.8 ± 21.7	45.6 ± 21.1	53.8 ± 20.0
	Luck	19.4 ± 16.1	17.6 ± 11.7	21.7 ± 15.8	18.0 ± 20.5
	Effort	28.8 ± 14.7	31.1 ± 16.4	33.5 ± 16.4	28.2 ± 15.5
My fire team partner	Skill	50.0 ± 18.1	46.8 ± 21.1	46.6 ± 19.0	48.8 ± 21.3
	Luck	18.1 ± 15.2	20.2 ± 14.4	18.3 ± 17.0	17.7 ± 21.4
	Effort	31.9 ± 13.3	33.6 ± 16.2	35.6 ± 15.1	33.6 ± 18.1
Other FTL	Skill	53.5 ± 15.7	49.2 ± 17.3	52.7 ± 17.7	49.8 ± 21.1
	Luck	13.8 ± 11.1	21.3 ± 13.3	16.5 ± 13.7	19.0 ± 21.0
	Effort	32.7 ± 16	30.1 ± 14.5	31.3 ± 13.0	31.2 ± 15.1
OFTM	Skill	50.2 ± 17.6	45.3 ± 18.5	46.3 ± 18.7	48.4 ± 18.4
	Luck	16.3 ± 12.3	25.2 ± 15.3	19.1 ± 15.8	17.0 ± 18.3
	Effort	33.5 ± 14.5	31 ± 15.6	35.2 ± 16.0	34.6 ± 14.4

It was important to explore whether participants made differential attributions about the contribution of skill for all team members. Repeated measures analyses were undertaken comparing skill attributions for all team members simultaneously. For the skill items, there were two significant effects. Figure 26 shows the highest order interaction between role and violation condition.

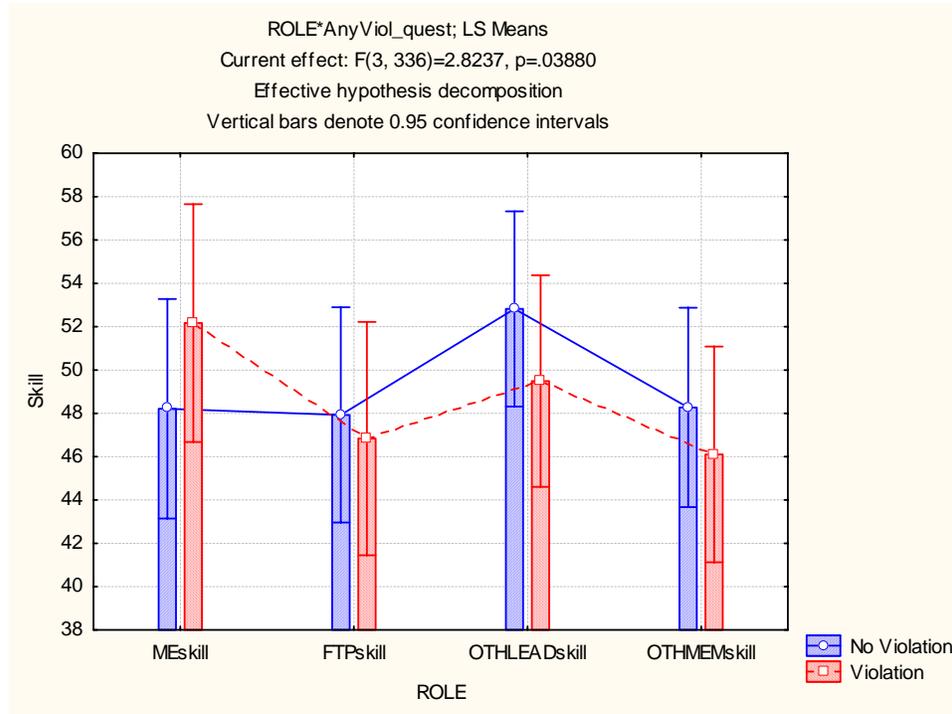


Figure 26. Skill Attributions by Role and Violation Condition

This interaction again shows the benefit on one’s self construals that result from having faced a violation. In this case, overcoming violations led to higher ratings of one’s skills. The other team leader was also rated as being more skilled than other team members, especially when a violation had not occurred. There was also a main effect of role, as shown in Figure 27.

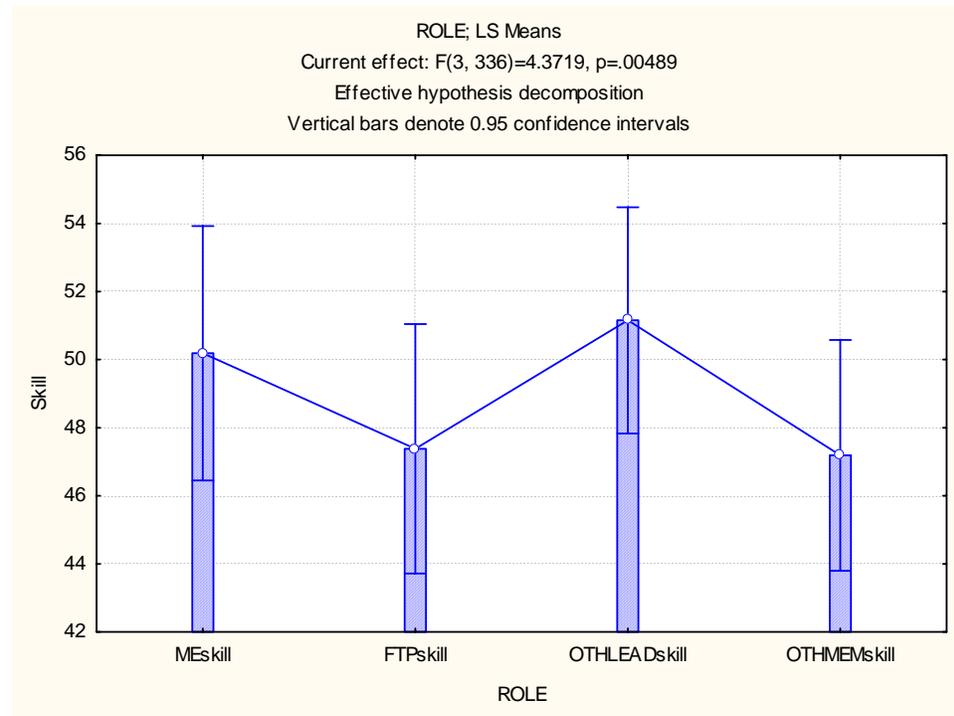


Figure 27. Skill Attributions by Role

There were no other significant effects.

For the luck items, there was also a significant interaction between role and violation, as shown in Figure 28.

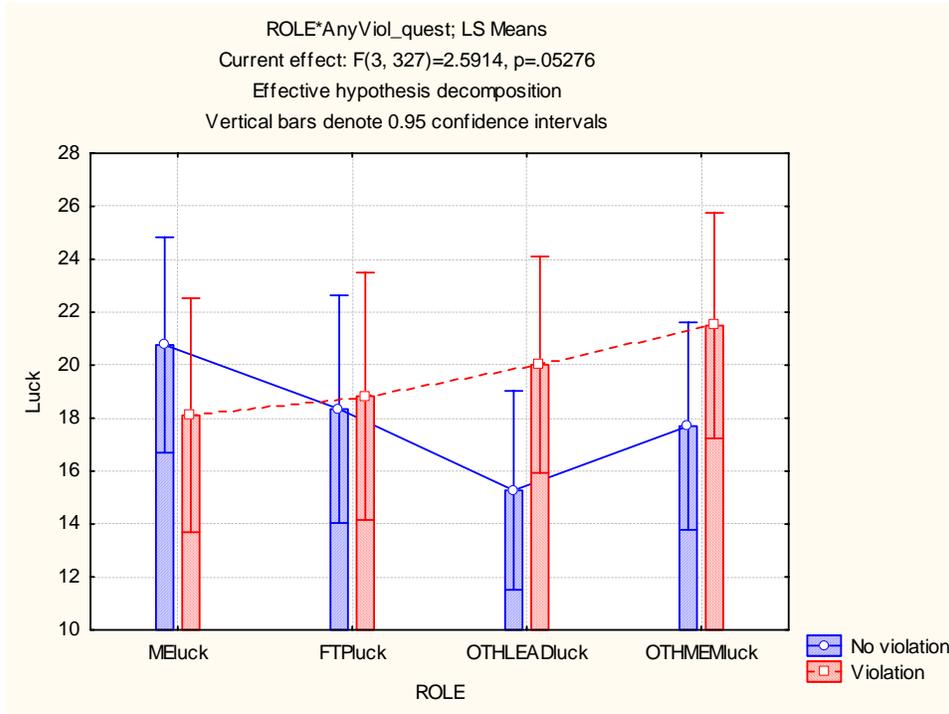


Figure 28. Luck Attributions by Role and Violation Condition

Here, participants rated themselves personally as having had the highest levels of luck when they faced no violation. Team members in all other roles were rated as having had more luck in missions with violations. For the effort item, there was only a marginal effect of role, as shown in Figure 29.

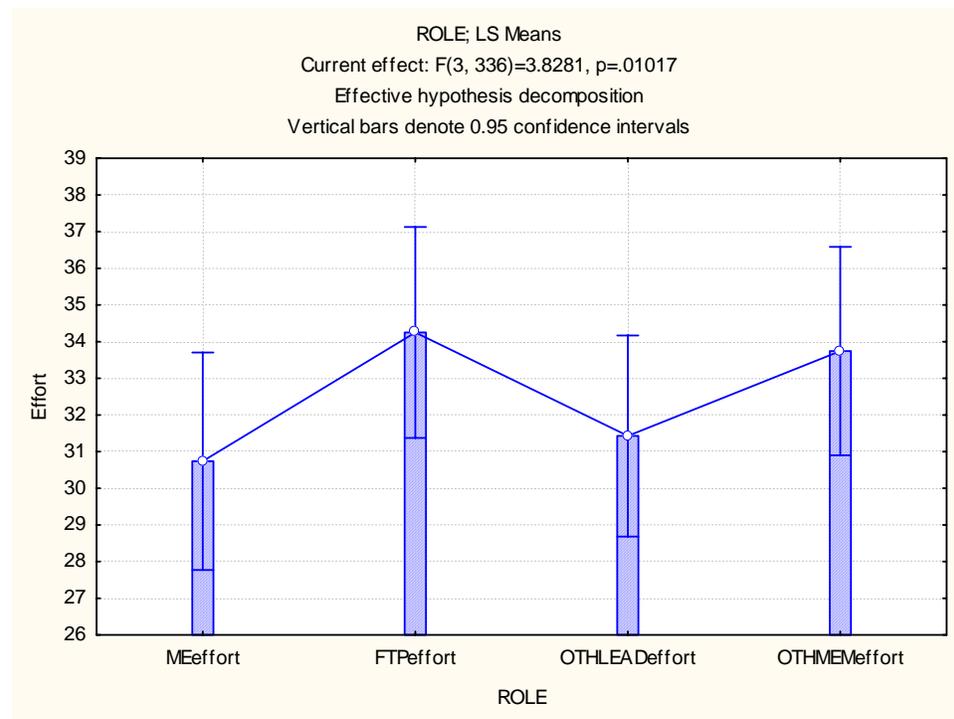


Figure 29. Effort Attributions by Role

Perhaps surprisingly, the fire team members who were experimental confederates (rather than leaders) were rated as having exerted the highest levels of effort, regardless of regimental identity or violation condition. This supports the competence of the confederate researchers, and their motivation to play their roles well. Unfortunately, as will be discussed in more detail in the discussion, this competence may have undermined the impact of the violation manipulation.

3.9 Trust in Team Scale (Adams and Sartori, 2006) – Post-Mission

In addition to the simple one-item rating of team trust, participants also completed the Team Trust Scale (Adams and Sartori, 2006) at the post-mission phase of the study.¹⁸ This scale required participants to respond to 30 items, on a scale from 1 (completely disagree) to 7 (completely agree). Ratings were averaged into a single index of team trust, and were also calculated separately for each trust dimension (i.e., competence, benevolence, etc.). This allowed exploration of participants’ overall trust in their team, as well as identification of the trust specific dimensions that contributed to overall trust perceptions.

¹⁸ Although it would have been ideal to have pre to post-mission comparisons, the person-based nature of this scale was believed to be inappropriate for exploring trust in teammates that one had not met.

Table 26. Team Trust Scale – Post-Mission

Smallest N = 120	Same Regiment (Mean, StDev)		Different Regiment (Mean, StDev)	
	No Violation	Violation	No Violation	Violation
Team Trust	6.0 ± 0.7	5.8 ± 0.9	5.9 ± .6	5.7 ± 0.8
Competence	6.3 ± 0.7	6.0 ± 0.8	6.0 ± .7	5.8 ± .9
Predictability	6.0 ± 0.8	5.8 ± 0.9	5.7 ± .7	5.5 ± 0.9
Benevolence	5.9 ± 1.0	5.7 ± 1.1	5.8 ± .7	5.8 ± 1.0

Additional analyses exploring the various dimensions that influence team trust (using the subscales) were also completed. The team trust index showed that team trust was consistent in teams with varying regimental identities and whether teams experienced violations or not. However, for the competence subscale, there was a marginal main effect of violation as shown in Figure 30.

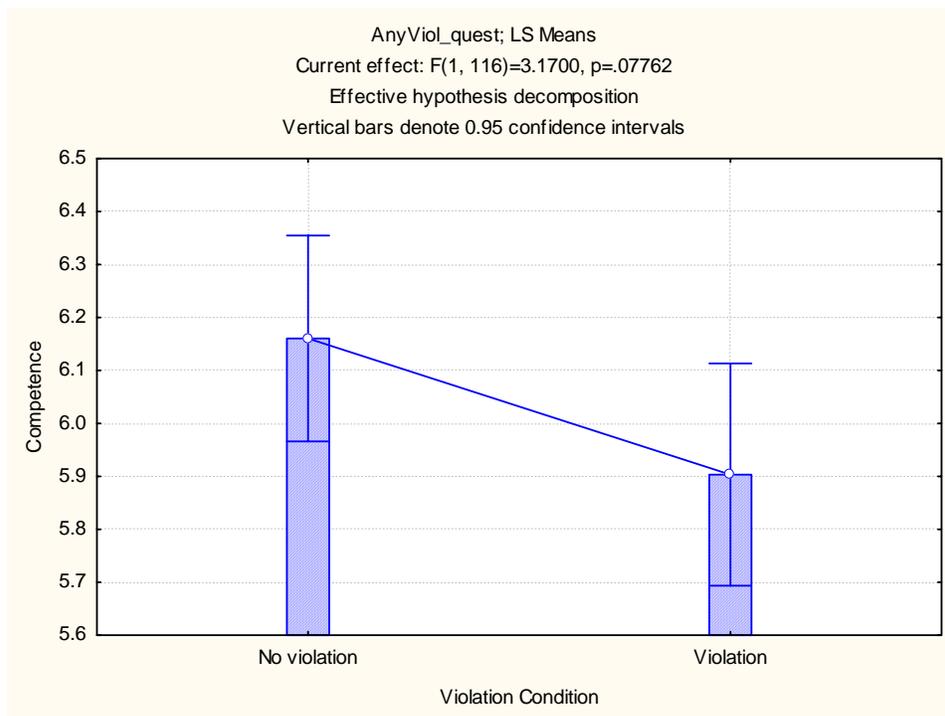


Figure 30. Competence and Regimental Identity – Post-Mission

Competence is the team trust dimension likely to be most influenced by the violations that occurred during the mission. That is, within the tactical assault mission, the issues that violate trust are simply more likely to be competence-based, as survival seems more predicated on the timely performance of discrete skills than, for example, on telling the truth or being consistently fair (i.e. typical indicators of integrity).

There was also a significant main effect of regiment on the Predictability subscale, such that participants rated the predictability of their teammates significantly lower when working with team members from a different regiment than from the same regiment, as shown in Figure 31.

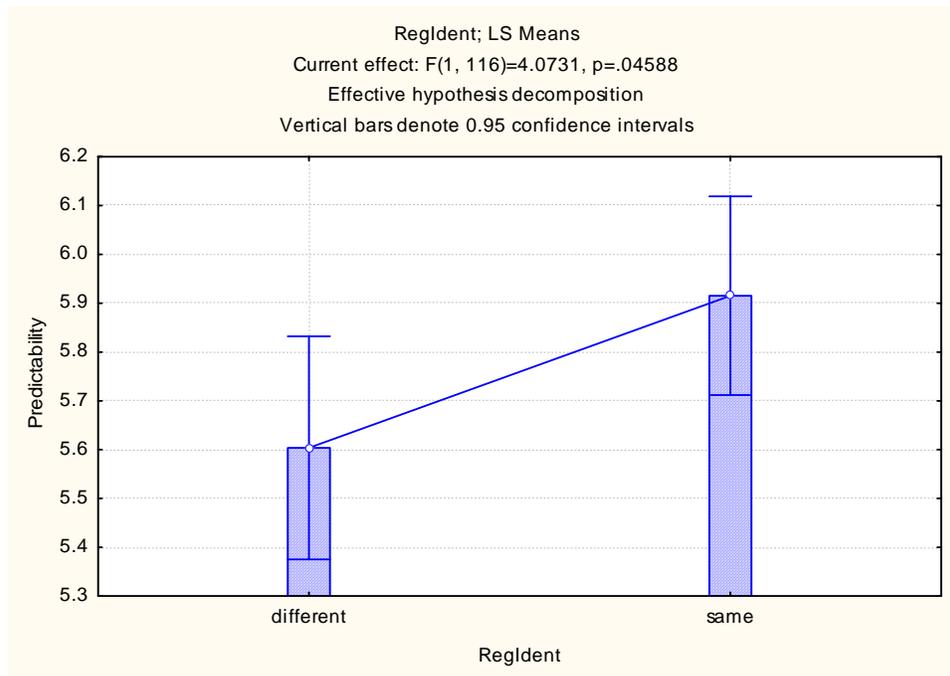


Figure 31. Predictability and Regimental Identity – Post-Mission

This suggests that one of the key dimensions of team trust within this context involves knowing how members of different regiments are likely to behave. There were no significant effects for Benevolence.

Although much stronger, the predictability analyses are consistent with the weak pattern noted for the single-item measure of team trust, namely that varying regimental identity within a team impacted somewhat negatively on perceptions about one’s team at the post-mission stage. A marginal main effect of violation was noted for the competence dimension, despite the consistently low impact of violations throughout the rest of the findings.

3.10 Teamwork Ratings – Post-Mission

Participants also completed ratings of teamwork at the end of the mission on a scale ranging from 1 (completely disagree) to 7 (completely agree). These items were intended to tap the ability of the team to work together, as shown in Table 27.

Table 27. Teamwork Ratings – Post-Mission

	Same Regiment (Mean, StDev)		Different Regiment (Mean, StDev)	
	No Violation	Violation	No Violation	Violation
N = 117				
Teamwork Index	6.2 ± .8	6.0 ± .7	5.9 ± .8	5.7 ± 1.1

As shown in Figure 32, team members rated their team as having exhibited marginally better teamwork when team members were from the same regiment than from a different regiment.

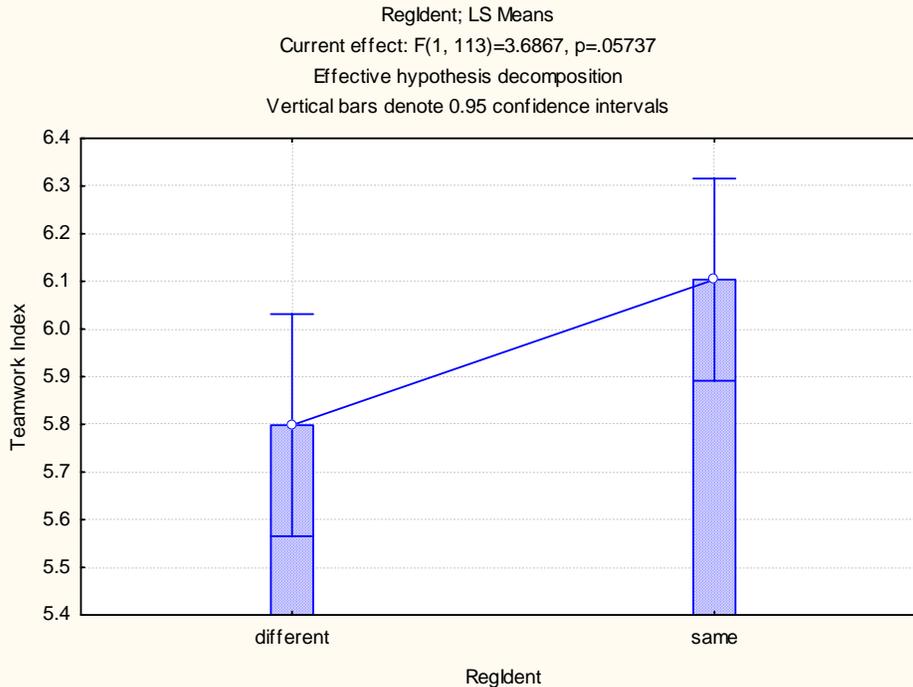


Figure 32. Teamwork and Regimental Identity

There were no other effects. The fact that perceptions of teamwork did not differ as a function of the violation again shows that violations had less of an effect on team dynamics than did varying regimental identity. As teamwork measures were completed at the end of the mission, this suggests that regimental identity issues may have re-emerged somewhat by the end of the mission.

3.11 Mission Performance Indicators

The actual outcome of all missions was also analyzed. The frequency of mission successes and failures are shown in Table 28.

Table 28. Actual Mission Outcome – Post-Mission

	Same Regiment (Mean,StDev)		Different Regiment (Mean,StDev)		Total
	No Violation	Violation	No Violation	Violation	
Success	18	15	16	12	61
Failure	3	3	6	5	17
Total	21	18	22	17	78

Teams as a whole were relatively successful at completing their missions with about a 78% success rate.

Several other performance indicators were also collected at the team level, including the number of kills of enemy terrorists, the firing accuracy, rounds fired and hits taken, as shown in Table 29.

Table 29. Team Performance Indicators – Post-Mission

Smallest N = 72	Same Regiment (Mean, StDev)		Different Regiment (Mean, StDev)	
	No Violation	Violation	No Violation	Violation
# Enemy Kills	1.3 ± 1.2	1.5 ± 1.3	1.5 ± 1.2	1.4 ± 1.2
Firing Accuracy	38.5 ± 29.4	41.5 ± 24.7	43.7 ± 29.6	35.0 ± 28.4
Rounds Fired	14.2 ± 11.4	13.8 ± 10.6	15.9 ± 10.4	14.3 ± 11.1
Hits Taken	3.6 ± 4.8	7.8 ± 11.4	4.1 ± 4.1	8.5 ± 14.7

Analyses showed that regimental identity and violations did not impact on the number of enemies killed or the firing accuracy of the teams. There was a marginal effect of violation condition on the rounds taken by members of the team during the game, as shown in Figure 33.

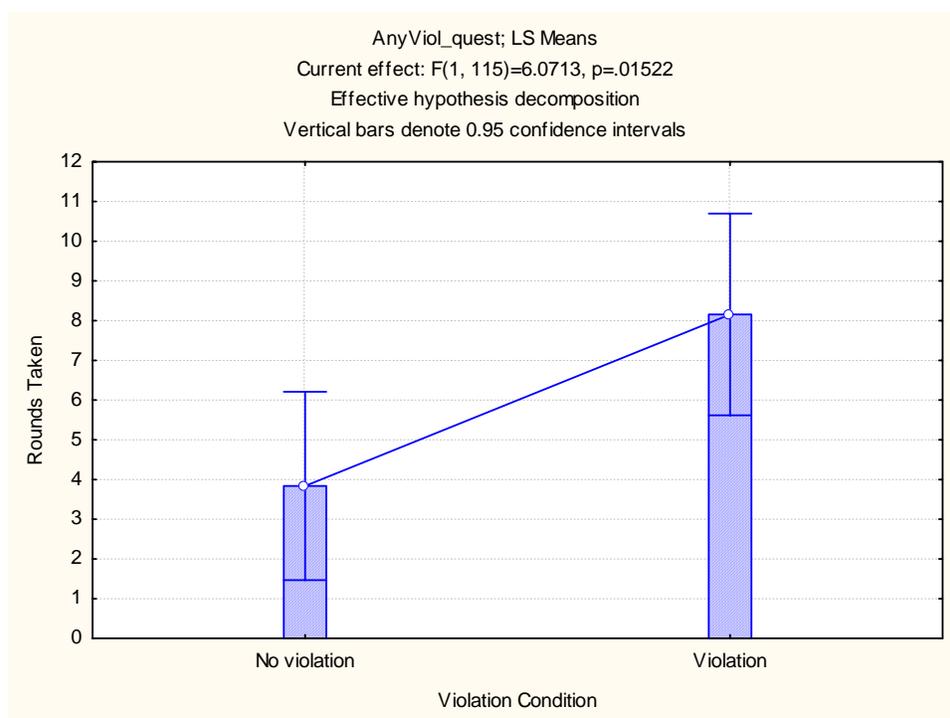


Figure 33. Rounds Taken by Violation Condition

Team members took more rounds during missions with a violation than in missions without a violation. There were no other effects on performance indicators.

3.12 Additional Analyses

Several other additional analyses of particular interest were also undertaken. For instance, it was important to explore whether team trust was influenced by either successful or unsuccessful team performance during the mission. This analysis looked at the single item team trust ratings at the post-mission stage as a function of regimental identity, whether or not a violation had occurred, and the actual mission outcome (that is, whether the team completed its mission or not), as shown in Figure 34.

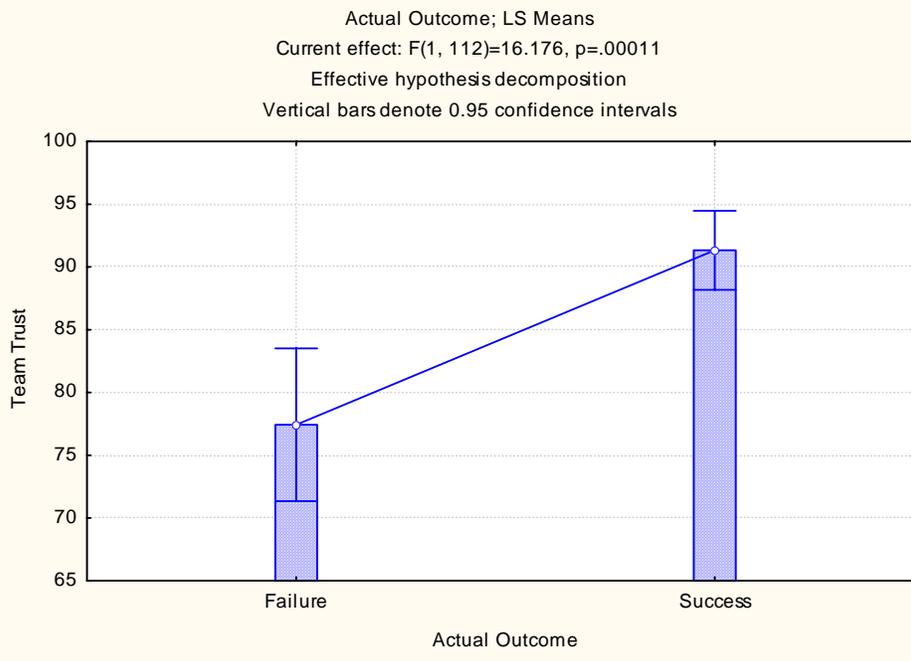


Figure 34. Team Trust by Mission Outcome

This analysis showed a significant main effect of outcome, such that teams that had successfully completed their mission showed higher levels of team trust than those that did not.

Exploring the potential impact of regiment, however, showed only a weak main effect ($p = .16$), such that teams had only slightly higher levels of team trust in the post-mission stage when from the same regiment than from different regiments.

Similar analyses were conducted for the Team Trust Scale index, and showed no significant effects of regimental identity, violation condition and mission outcome.

Given these results for team trust, it was also important to explore whether perceptions of teamwork might have been influenced by the outcome of the mission (combined with regimental identity and violation condition). The teamwork index showed a marginal 3 way interaction, as shown in Figure 35.

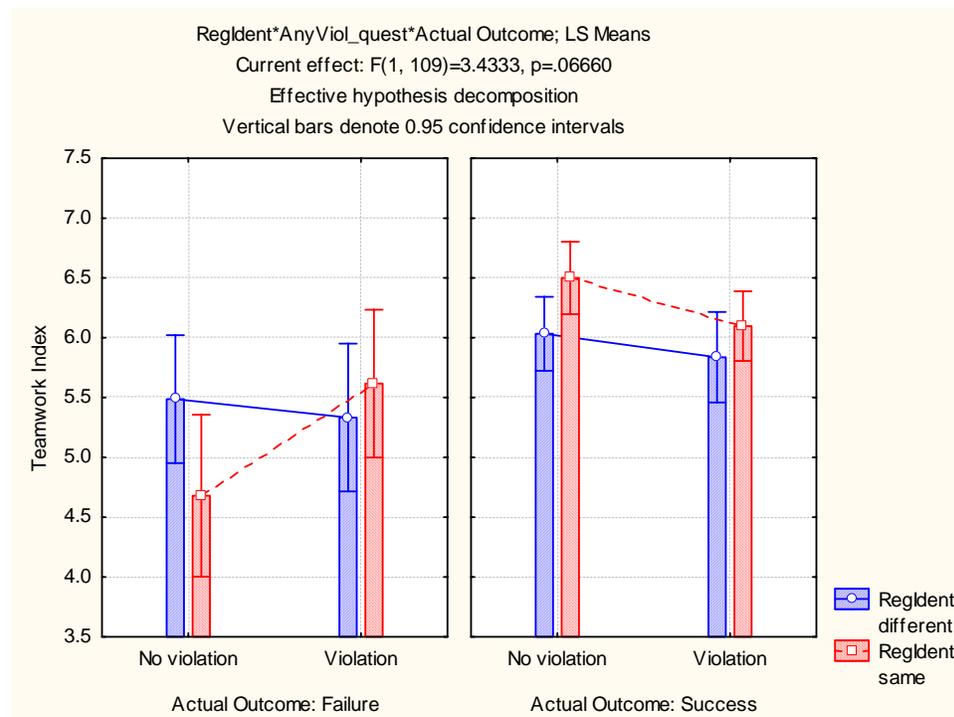


Figure 35. Teamwork by Regimental Identity, Violation and Outcome

Specifically, when teams completed their mission successfully, perceived teamwork was marginally higher in teams from the same regiment and was not strongly affected by violations. However, when teams had failed to complete the mission successfully, perceptions of teamwork depended on both regimental identity and violations. Specifically, when violations occurred, teamwork was only slightly lower within teams with different regimental identity. Without violations, however, teamwork was rated much lower after failure when working with team members from the same regiment.

This pattern of results suggests that when teams succeed, neither violations nor regimental identity appeared to have a big role in perceptions of teamwork. When teams fail, however, teams working with members of the same regiment and that had not experienced a violation rated their teamwork the lowest of all the means. It is important to note that the earlier attribution results in Section 3.8.2 seem to place the blame on the fire team leaders rather than the fire team members. This may suggest that when missions in “same regiment” teams are not successful and when no violation occurs, team leaders may tend to blame themselves and the other team leader that they know.

Moreover, these results suggest that teamwork is more adversely affected when teams fail to perform under optimal conditions (e.g., no violation, same regiment) than when in more challenging conditions (e.g., violation, different regiment).



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4 Discussion

4.1 Key Findings

One purpose of this research was to investigate the relationship between shared identity and team trust in distributed ad hoc teams in a military context. Although the theoretical trust literature assumes that shared identity is likely to facilitate the swift emergence of trust within teams, there is very little research to validate this hypothesis. The current research provides some evidence of the emergence of swift trust within ad hoc distributed teams.

When ad hoc teams were first assembled, they consisted of two participants from the same regiment who were assigned to be leaders, and who had met briefly at the beginning of the experiment but could not see each other once the experiment started.¹⁹ When the two “new” team members were introduced into the team, the team had no opportunity for face-to-face contact with these new members, but learned about these new team members through reading background information sheets about them. These new team members were reported to be either from the same regiment as other participants, or from a different regiment, but the profiles were systematically structured such that team members were reported to have the same mean levels of experience. Based only on this background information, team members then completed pre-mission questionnaires tapping trust in their team as a whole and trust in specific team members.

A summary of the findings is shown in Tables 30 and 31.

¹⁹ Unfortunately, we could not control whether CF participants knew each other before they entered the experiment.

Table 30. Summary of Findings – Trust and Teamwork Indicators

	Pre-mission	Mission Freeze	Post-mission	Other Analyses
Team Trust (single item)	Main effect of regiment – different < same (Figure 3)	No effects	Weak marginal effect of regiment – different < same (Figure 4)	Main effect of time - mission freeze (MF) < Post-mission (Figure 5)
Trust in Specific Team Members	No effects	Main effect of violation on trust in oneself - no violation < violation (Figure 6) Marginal effect of regiment on trust in OFTM – different < same (Figure 7)	No effects	-
Team Trust Scale (Adams & Sartori, 2006)	-	-	No effects for TTS Index. Marginal main effect of violation for Competence - no violation > violation (Figure 30), Main effect of regiment for Predictability - different < same (Figure 31),	-
Ratings of teamwork	-	-	Main effect of regiment on teamwork - different < same (Figure 32),	-
Additional analyses	Team trust (single item) analysis with mission outcome, regimental identity, violation showed main effect of outcome (Figure 34), failure < success, Teamwork analysis with mission outcome, regimental identity, violation showed marginal 3 way (see Figure 35)			

Results revealed that at the pre-mission stage, team trust was quite high both in teams with shared regimental identity and in teams with a different regimental identity. However, when expecting to work with team members from the same regiment, team members rated their team overall to be significantly more trustworthy than when these team members came from a different regiment. It is important to note here that although the means for team trust were somewhat high in teams with both same and different regimental identity (i.e. 89 and 81 respectively), the size of these means is consistent from our studies creating the Team Trust Scale (Adams, Bruyn and Chung-Yan, 2004) and validating it (Adams and Sartori, 2006), as well as in team trust research using a military sample in the Netherlands (VanderKloet, 2005).

However, if swift trust did emerge, this could be explained from at least 2 perspectives. First, it could have been related to the differential knowledge of participants about their own regiments. For example, participants are likely to have more knowledge about the training and standards of their own regiment than those of other regiments. This knowledge alone could promote swift trust because it might make new teammates from the same regiment more predictable, and hence more trustworthy. Or, the heightened swift trust seen could also be explained in terms of simple in-group identity. As noted earlier, a wide body of research has shown that simply sharing a common identity can facilitate positive expectations about in group members (e.g., Brewer, 1988). Either way, this finding suggests that swift trust probably played a role in perceptions of team trust at the pre-mission stage, as it is improbable that all regiments represented in this study are actually more trustworthy than every other. It is important to note, however, that the team trust means in this study are relatively high in both the same and different conditions. This suggests that although team members did show higher levels of presumptive or swift trust for members of the same regiment, they did not necessarily distrust team members purported to be from different regiments but did trust them somewhat less.

At the mission freeze, there were no differences in team trust as a function of regiment. This suggests that the impact of regimental identity may have subsided or was obscured. However, at the post-mission stage, regimental identity marginally impacted perceptions of team trust on the single item measure of team trust (Adams and Sartori, 2006). On the Team Trust Scale (Adams and Sartori, 2006), the indexed item showed no effects, but there was a significant effect of regiment noted for Predictability. The Competence dimension also showed a marginal main effect for violation condition, such that perceptions of competence were somewhat higher in teams when violations had not occurred. This suggests that regimental identity may impact on the ability to predict what other teammates are likely to do.

Regimental identity seemed to exert a big impact at the beginning of the mission, subsided by the mission freeze, and appeared to have re-emerged more weakly at the end of the mission. How then, can the varying effects of regimental identity be explained? From our perspective, there are at least two possible accounts. One possible account for this finding is that teammates in such a situation might attend only to information that is most directly relevant to the demands of the situation. In a tactical assault mission, the key goal is to survive the mission with all members of the team safe. As such, in a high risk situation, person-based or individuating information about one's teammates could quickly become more diagnostic of the probability of getting through the mission than would categorical information about regimental identity. In the present context, information concerning teammates' gaming abilities would be highly salient. Regimental identity, then, might help to predict the quality of average training within the members of a given regiment, but even people with similar training are likely to have different levels of skills. In this situation, then, observable indicators of trustworthiness are likely to become more influential than generalized heuristics derived from category-based information (e.g. "I trust people from the same regiment more"). As



such, observing the performance of other teammates (even in a distributed environment) could provide opportunities to assess the competence of fellow teammates at a more person-based than category-based level.

This account is in keeping with stereotype research showing that categorical information about members of stereotyped groups can have a relatively limited “lifespan” when presented in conjunction with individuating information over the course of prolonged exposure to these individuals (Kunda, Davies, Adams & Spencer, 2002). The current pilot study, unfortunately, could not disentangle the relative impacts of category-based trust (which seemed influential before the start of the mission) from person-based trust, which may have taken on greater importance as the mission progressed. Of course, the weak re-emergence of team trust noted at the post-mission phase could be used to argue against this account, if person and category-based factors were mutually exclusive. Indeed, both category and person-based information could both simultaneously influence judgements of one’s team (or other teammates) at any given moment in time. For future research, however, working to create measures that can tap these two dimensions, as well as working to create more tightly controlled scenarios will be critical.

Of course, there are also other plausible explanations for the decreased impact of regiment identity. Immersion in the game may have made the category of regimental identity much less salient. Perhaps individuating information did not necessarily “push out” categorical information, but an active category simply became temporally less active simply because attention needed to be focused elsewhere. In a sense, then, the mission and overall performance may have provided additional relevant information to participants, reducing the effect of a previously salient category, such as regimental identity.

Unfortunately, the data does not allow strong conclusions about which theoretical explanation is most plausible. At this point, it is impossible to tell whether the swift trust that had emerged before any team interactions occurred faded during the mission to give rise to person-based trust, or whether the impact of regimental identity diminished as the demands of the mission came more into focus. Due to the relative recency of the swift trust construct, existing research does not provide any conclusive answers as to the relative power of swift trust vs. personal experiences that contribute to judgements of trust within teams.

Nonetheless, an optimistic account of this finding is that even activation of the regimental identity category did not lead to team members arbitrarily applying it and interpreting any information that they received about a team member from a different regiment (e.g., a violation) in a negative light. In short, participants may have allowed other teammates’ actual behaviour (rather than their beliefs about different regiments) to guide their perceptions. Given differences in regimental identity, it would perhaps have been easy for teammates to blame teammates from a different regiment for the problems that the teams had experienced during the mission. Similarly, it is also encouraging that when violations occurred they were limited to perceptions of skill in the specific individual, but did not necessarily generalize to perceptions of the overall trustworthiness of the team member, or to perceptions of the team as a whole. Indeed, when categories are active, extrapolating beyond perceptions of the broader category (e.g., team) to the negative actions of a single person (e.g. team member) is very common (Kunda, 2001). Whatever the case, it is critical that the mechanisms that influenced the initial appearance of swift trust and the subsequent team processes throughout the remainder of the mission are better understood.

This is particularly critical because the data suggest that team trust is not the only construct likely to be influenced by shared or unshared regimental identity. Ratings of teamwork at the end of the mission showed that participants also had different perceptions of how well their teams had worked

together. Specifically, teams with a homogeneous regimental identity rated themselves as having been more coordinated and as having shown better teamwork than did teams with a heterogeneous regimental identity. Of course, it is impossible to know whether regimental identity actually enabled more coordinated teamwork, or whether the positive teamwork feelings were simply post hoc judgements about why the mission was successful (or not).

It was also important to explore trust in specific other team members. At the pre-mission level, although there were no significant differences related to regimental identity, the general pattern was that trust judgements in the other fire team partners were higher when these partners were from the same regiment than from a different regiment. Ratings of the trustworthiness of oneself and the other leader were relatively consistent between conditions. At both the mission freeze and post-mission, there were no significant differences in ratings of the trustworthiness of specific team members. However, there was an effect for ratings of oneself such that participants reported themselves to have been significantly more trustworthy when their team had faced a violation, and the other fire team member to have been marginally more trustworthy after teams had faced a violation. This may be attributable to a “triumphing over adversity” effect.

As shown in Table 31, however, the potential effects of regimental identity, were not limited to perceptions about the trustworthiness of one’s teammates. In fact, expectations about team performance at the beginning of the mission may also have been influenced by regimental identity.

Table 31. Summary of Findings – Other Indicators

	Pre-mission	Mission Freeze	Post-mission	Other Analyses
Ratings of team member skills	Marginal effect of regimental identity for OFTM - different < same (Figure 8)	Main effect of violation for FTP - no violation > violation (Figure 9) Main effect of violation for OFTM - no violation > violation (Figure 10)	Marginal effect of violation on FTP - no violation > violation (Figure 11)	For FTP, main effect of time and violation - mission freeze < Post-mission (Figure 12) - violation < no violation (Figure 13) For OFTM, main effect of time and interaction - MF < Post-mission (Figure 14) - interaction (see Figure 15)
Estimates of team performance	Main effect of regiment on probability of 1 casualty - different > same (Figure 16)	-	-	-
Expectations of team members	-	Main effect of violation on self expectations - no violation < violation (Figure 17)	-	Marginal main effect of victim status on self - victim < not victim. (Figure 18), Marginal main effect on OFTM expectations (Figure 19), victims < not victim
Attributions about team member performance - success	-	Interaction for responsibility ascribed to self (see Figure 20). Interaction for responsibility ascribed to FTP (see Figure 21). Marginal interaction for responsibility ascribed to OFTL (Figure 22)	Main effect of responsibility ascribed to self of violation, violation > no violation (Figure 24), Marginal effect of violation on responsibility given to OFTM - no violation < violation (Figure 25),	-
Attributions about team member performance - failure	-	Main effect of regiment on responsibility ascribed to oneself - different > same (Figure 23)	No effects	-
Team performance indicators	-	-	Main effect of violation on rounds taken - no violation < violation (Figure 33),	-

Participants were generally less optimistic about their team's performance in the upcoming mission when working with team members from a different regiment, and were significantly less optimistic about the probability of incurring at least 1 casualty. As a whole, then, these findings suggest that regimental background of the team members may have influenced both the emergence of swift trust as well as team performance expectations. These findings are consistent with the literature that argues one of the features of swift trust is the reduction of vulnerability, and perhaps even unrealistic optimism (e.g., Meyerson et al., 1996).

As the skill ratings seem obvious indicators of person-based skills rather than category-based skills, they might provide a clue as to whether person-based factors have taken on increasing importance. The skill ratings at the pre-mission stage showed no differences in the perceived skills of fellow teammates representing same and different regiments. This is perhaps somewhat surprising, given that there were significant differences in swift trust. However, as noted earlier, the swift trust findings could have been influenced either by differential beliefs about the training and experience of teammates from the same regiment vs. those from different regiments, or as a product of simple in-group identity. This null finding seems to suggest that in-group identity rather than categorical information about training and skills may have been the driver of differing swift trust judgements.

At the mission freeze, however, it is important to note that skill ratings of specific teammates were not affected by regimental identity. However, they were significantly affected by the violations that occurred during the mission. The perceived skills both of the FTP and the OFTM were rated lower when violations occurred than when they did not occur. These differences were shown to relate to discipline, tactical skills, stealth, and to a lesser extent, hand-eye coordination. It is also important to note that this negative impact on perceived skills of team members was not unique to victims, suggesting that perhaps the violations that occurred were seen as accidents, and may have been attributed to the situation that the team had faced. Even though skill ratings were somewhat diminished at the mission freeze after violations had occurred, the impact of these violations was somewhat less pronounced at the post-mission phase, but the FTP's skills continued to show a marginal effect of the violation. However, post-mission analyses did show that skill ratings for both the FTP and the OFTM increased from the mission freeze to the end of the mission. This may stem from the fact that the trained confederates were often more skilled than many of the actual participants in this study. However, the pattern of skill ratings provides some indication that as the missions progressed, teammates may have come to be seen in more person-based than category-based terms.

Participants also rated their expectations of all teammates (at the mission freeze and post-mission), and made attributions of responsibility for what had occurred during the missions. For these responsibility ratings, during the mission freeze, participants were asked to imagine the outcome of the mission, and to then assign responsibility to their team members for each hypothetical outcome. Ratings for the actual single outcome (mission success or mission failure) were also completed immediately after the mission ended. Here again, participants rated themselves as having performed more above their own expectations for themselves when a violation had occurred during the mission.

Overall, the violations that occurred during the missions (both planned experimental and the unplanned violations) did not have a significant impact on team trust as a whole, as evidenced by no differences among conditions at the early stage of the mission (mission freeze). Moreover, the impact of violations was only on perceptions about their skills, and did not generalize to trustworthiness overall. The most parsimonious explanation for the lack of violation effects may be that the experimental context, although intended to simulate a high-risk tactical assault mission, is

still a gaming environment. As such, team members enjoy and are highly motivated to participate in a relatively fun task. This, on its own, could account for the lack of violation effects, as even somewhat negative events that occur may detract only minimally from “the fun”. Alternative explanations, however, could include a team ethos in which team members may expect for things to go wrong. When this does occur, they may recognize that they, themselves, could have committed an error, or that they could have violated their teammates’ expectations. Indeed, the true ethos of a team is that mistakes will happen, and that it may be unfair to be “down” on other teammates just because they make mistakes. This account presents an optimistic account of the impact of violations. On the other hand, as we asked only about fairly specific skills, it might also be that such skills simply allow less “poetic license” when making judgements about other people. Perhaps asking about a more ambiguous behaviour or task would have yielded differences in estimates of abilities (e.g. “how much integrity would this person be likely to show?”). People clearly try to at least appear rational when judging others (Kunda, 1990), and often only do so to the extent that they at least appear unbiased. In the end, however, only future research will show whether violations can be constructed to have more impact on trust within this environment.

Despite these issues that need to be addressed in future research, this pilot study makes a useful initial contribution to the existing literature. This study combines both swift-trust (at the beginning of a mission, once the ad hoc team has been initially formed) and person-based trust (as experience which each team member occurs throughout the missions). This study suggests that trust in distributed teams initially may be influenced by the categories (such as regimental identity) that might be activated when encountering new team members. It is important to note that although this study relies on a common in-group/out-group effect related to regimental identity, one potential problem for the CF teams of the future is that the categories that are likely to impact on judgements of trustworthiness could be either common or idiosyncratic. There is no guarantee, for example, that the categories that trigger positive trust judgements for some teammates are necessarily shared by other members of a team. In some ways, this study yields a somewhat hopeful finding. Even though team members initially rated the trust of other members of their ad hoc team somewhat lower in cases where an ad hoc team has a diverse regimental identity, they did not extrapolate beyond this identity to make strong predictions about the probable trustworthiness of these specific teammates.

4.2 Lessons Learned

Many important research lessons were learned while conducting this study. These lessons can provide valuable insight into conducting similar future work in the laboratory and beyond.

The first important lesson relates to the idealistic assumption that the planned experimental violations would be consistently perceived as trust violations by participants. In retrospect, within a dynamic and not totally controlled gaming environment such as this, these assumptions may have been somewhat naïve. The experimental violations were intended to be seen as having put the team at risk, but without actually significantly compromising the performance of the team and their ability to complete the mission successfully. This was important because it would be impossible to understand trust levels if the participant was no longer active in the mission, or to fairly assess the impact of a violation if teams that were violated were always unsuccessful in completing the mission. However, this research showed that while being shot by one’s teammate may diminish participants’ perceptions of their teammates skills, it is not necessarily uniformly perceived as a trust violation.

This may be a limitation of the simulation environment. The simulation environment used for this study is not wholly realistic, as even having being shot in the leg by a teammate or seemingly accidentally wasting rounds may not have a substantive impact on one's own survival in the game. As such, even though being shot in the leg would be a problem in real life, it may be much less of an issue here because participants could still continue to "play the game" and to continue to be immersed in a very engaging task. As such, the violations that occurred within the missions may not have been strong enough to have influenced overall perceptions of the trustworthiness of other teammates. To be fair, then, the data suggest that the violations that occurred in these missions cannot necessarily accurately be called trust violations, simply violations. It would have been very advantageous to interview teams about the potential problems that had occurred during the mission, and to understand why experimental violations were not necessarily perceived as violations. However, this would have been difficult to do in the current study, as it may have raised suspicion to have focused on the potential violations that may have occurred during the mission, particularly when using a repeated-measures design. For the future, it will be important to attempt to quantify the perceived magnitude of the violation from the perspective of the participant, rather than just assessing whether or not a violation had occurred.

Another lesson learned was that unplanned violations that occur during a mission also have the potential to impact on team dynamics. The assumption that only teams that had experienced an experimental violation would perceive a violation was incorrect. In the future, then, it would be critical to create questionnaires that intentionally tap both planned and unplanned violations that might occur during missions and get participants to rate the importance of the violation. An alternative approach would be software that might offer much greater control over the existence of errors and violations.

One possible conclusion of this research is that some violations that occur within teams may not impact on trust judgments, but do impact on perceptions about the discrete skills of other teammates. However, future research should also include an item related to the overall skill of the team as a unit (rather than as individuals), in order to tap the same level of analysis as that used for team trust ratings. This would help to ensure that the effects seen in this study were not a product of varying levels of analysis. At the same time, however, the fact that violations had a relatively limited impact may suggest that high levels of trust within teams may take more than a single incident to be eroded. If so, the lack of violation impact may be a hopeful finding.

In retrospect, there is perhaps also some reason to worry that the overall competent performance of confederates may have undermined the intended impact of violations. For example, even though violations occur during a mission, they may not necessarily override the many other positive things that teammates do. As such, even if one's teammate makes an error during the mission (e.g. failing to cover their arcs, etc.), this is often preceded and followed by competent performance. This could have unintentionally buffered the negative impacts of the experimental violations and have given teammates more reason to discount other teammates' previously negative performance. The trust literature, including past results within our own program of research, suggests that competence is likely to have a very strong influence on team trust in this kind of context. This suggests that it might be advantageous in future research to coach confederates to perform in a more lacklustre or mediocre way. To have more effective violations, it may also be necessary to show confederates as not only as lacking specific competencies, but as also having more intention in committing a violation. As we have argued in other work, perceptions of incompetence gain much more power when paired with malevolent (or negligent) intention (Adams and Sartori, 2005) or with breaches of integrity rather than competence (Kim et al., 2004). For the future, then, extending beyond



simple competence may be another way by which to increase the power of an experimental violation manipulation.

It would also be helpful to do research that offers a fully distributed team simulation environment. In the current experimental simulation, of course, team members are distributed in the sense that they cannot physically see each other, but also somewhat co-located in the sense that they interact through the person of their computer avatar. This simulation environment, then, may blur the line between co-located and distributed somewhat. It also may not reflect the realities of distributed military teams, who may not always be able to see each other, even though they may be working toward the same mission goal. For the longer term, it might be helpful to explore different types of gaming software in which the line between co-located and distributed is clearer. And, in anticipation to moving trust research to other areas, such as the joint, interagency, multinational and public (JIMP) context, it would also be helpful to see if there are applications more suited to distributed operations at the tactical, operational or strategic level.

However, this research did show the continued promise of using the 1st person gaming laboratory to investigate team trust. Despite the many challenges faced in conducting this research and the limitations of the laboratory, this context is still infinitely more realistic than the vast majority of other contexts in which team trust research has been conducted. One need only look at important and influential research in this domain such as Dirk's research (2000) to compare the very artificial task of building a block tower as a team with the experimental task employed in this research (i.e. the tactical assault mission). Certainly, there are limitations to what the laboratory can provide in terms of data capture and realism, and it will be important to work to iron out many of the challenges confronted in this research. For future research, having increased control of the scenario, and specifically, being able to control the actions of computer avatars may be important. The implication of this is that it will be important to decide what exact aspects of the gaming environment would need to be altered in an ideal world, and to plot this against the level of effort required to complete these alterations. It is important to note that HSI[®] (Justin Frim and Jeff Bennett) has advanced experience with the gaming engine used to "drive" Rogue Spear, and has completed several projects requiring advanced knowledge of programming for this gaming engine. The first project involved using Rogue Spear to create a training simulation, by building an exact replica of a Halifax class frigate that could be used to provide situation awareness of the ship and training rehearsal. Another project involved using Rogue Spear to build a scenario for New Zealand that had computer avatars walking around, interacting, and performing different actions during several 20 minute scenarios. These scenarios were used during the course of a 24-hour sleep deprivation experiment and tested cognitive skills (e.g. attention) several times during the continuous task.

Thus, all things considered, we believe that the gaming laboratory still provides a very good balance of experimental control and validity, and extensions of this research could make a valuable contribution to the literature as well as to the Canadian Forces. Although much continues to be written about trust in teams, there is little research available that provides as strong a test of many of the theoretical ideas related to trust as this research. As such, attempts to work to capture trust in a more realistic environment are valuable and capable of providing unique insights that could not otherwise be attained. If the antecedents of trust within teams can be better established in terms of both category-based and person-based trust, critical input to both training and future research could be realized.

4.3 Future Research

This study gives rise to a number of other research questions and issues that could be addressed in future research.

This initial study shows promise of shedding light on the swift trust construct and provides some initial evidence that regimental identity may influence the at least initial expectations of trustworthiness that one has about other teammates. Although this work focused on regimental identity, many other categories are likely to be prominent in CF teams of the future. In increasingly diverse teams, categories that could impact include those related to national culture, gender, and even social roles (Kramer, 1999) in judgements about the trustworthiness of other people. Promoting the highest possible level of effectiveness in diverse CF teams, then, will require more understanding about the many categories that have the potential to impact on the expectations (trust and otherwise) that teammates have about other teammates. In terms of future research, then, it will be important to explore the many other categories that might influence trust judgements in ad hoc teams. Of all the possible categories that could impact, then, cultural diversity seems to hold the most promise and to be directly relevant to the CF as it will be increasingly required to field diverse and multinational teams. Understanding the conditions under which both swift trust and person-based trust are likely to be facilitated and hindered in diverse CF teams would be an important contribution.

For future research, however, there is good reason to believe that the impact of many social categories on trust judgements may be very difficult to establish. When exploring categories with negative implications, for example, social desirability presents an obvious obstacle. It is not always socially acceptable to publicly espouse negative views about people in some social categories. Another potential challenge is that people are often not even aware of how their views of other people can be influenced by the categories to which these people belong. This implies that it may be difficult to get strong results using questionnaire measures (unless these measures more indirectly tap the issues of interest), but suggests that behavioural measures may be an avenue to explore further. Although not empirically tested in this research, the impact of regimental identity on team trust judgements was not necessarily even known to participants. They may not even have realized that they had rated their teammates to be less trustworthy as a product of their regimental affiliation. The power of categorical information, in fact, is that it can exert both conscious and automatic influence (e.g., Chen and Bargh, 1997). In future research, then, indirect rather than direct indicators of attitudes may be a more effective way to understand the attitudes and beliefs toward members of some categories. It will also be critical to work to understand the time course of “swift trust” and how much impact it may have on perceptions of teammates after some exposure to them. At the mission freeze, for example, one can only guess whether judgements about the trustworthiness of other teammates were based on category-based trust or whether they were primarily based on person-based trust (or some combination thereof). As such, it will be important to work toward being able to disentangle these two forms of trust.

As noted in the earlier section, however, more exploration of the impact of trust violations could be possible with refinement of the violations in order to make them have more of an impact. In addition, including both stronger experimental violation manipulations (derived from pilot testing) and ensuring more stringent control over the “delivery” of these violations (e.g. each participant experiences the exact violation if the scenario and actions of the team member avatar could be scripted) may ensure that violations have more of an impact. However, this would be one possible way to better understand the impact of violations during each mission.

A number of other research questions emerge from the broader trust literature. One of the potential benefits of trust that is commonly highlighted in the trust literature, for example, is that it enables higher levels of willingness to risk, to put one's own life on the line, and to believe that a trusted person will "cover my back" (Adams, Bryant and Webb, 2001). As trust is most often discussed in very general terms in the literature, there is little obvious distinction between the consequences of person-based trust and category-based trust. In fact, in the absence of such discussion, one might reasonably assume that swift trust might offer the same potential benefits of person-based trust, in terms of team process and performance. However, although willingness to risk may emerge as a product of direct and personal experience with another person and repeated instances of this person "coming through" for us, there is no obvious evidence that speaks to the issue of whether category-based trust is in any way as robust. At a purely speculative level, there is perhaps little reason to expect that it would be. The emergence of swift trust is predicated on either the categorization of another person in a given category, and/or on the identification of oneself as belonging in the same category (e.g. in a common regiment). However, there is a long legacy of stereotype research which suggests that activation of social categories is not necessarily equivalent with application of these categories (see Kunda, 2001). Similarly, it might also be the case that one might perceive another person to be a member of a negatively stereotyped group, without necessary changes in one's attitudes or behaviour toward this person. Categories carry many different kinds of information that may be differentially diagnostic to the problem at hand. Indeed, some categories may be more helpful than others for making a priori trust judgements. Moreover, the impetus to action of these judgements will also vary. However, there is little available evidence in the literature that has critically examined this implicit assumption. As such, it seems premature to believe that category-based trust has the same properties as person-based trust, but this is a critical issue for future researchers to address.

This suggests that more theoretical development around exactly what "swift trust" is, as well as empirical testing of the construct will be critical. In this sense, then, much of the attention given to the construct of "swift trust" may be predicated on very optimistic expectations yet to be seriously tested in the laboratory or in the field. The reality is that very little is actually known about swift trust as a construct, and many researchers appear to be using the construct without clear recognition of the specificity of the context in which swift trust was originally posited to emerge (as defined in Meyerson et al., 1996). However, in order for research to build systematically, the swift trust construct needs to be more stringently defined, and, at least for the time being, the hope that building trust swiftly will help promote team process and performance needs to be identified as a hypothesis requiring validation.

In our view, although trust of any form is likely better than no trust, it is important that researchers not perceive swift trust as a panacea or "cure-all", as there is very little empirical work that directly addresses swift trust. Even more caution in touting the potential positive benefits of swift trust seems necessary in high risk, high vulnerability contexts such as the military context. Moreover, it is also clear in both the trust literature (e.g., Kramer, 1999) and in the broader social psychology literature (e.g., Brewer, 1988) that there are both benefits and costs to category-based processing. Indeed, using categories to predict and understand the behaviour of other people lends itself to missing disconfirming evidence that could be critical. As such, one obvious area of future research would be examining some of the potential dangers of swift trust.

Despite the promise of the swift trust construct, there may be few "quick fixes" that will make teams likely to presumptively trust each other and risk it all on that basis, and developing adequately robust forms of trust may require mundane time, experience and positive interaction. This is not to say, of course, that swift trust has no potential value in teams, but it is important to

note that it has yet to be shown to provide an adequate presumptive basis for trust in high risk environments.

As a whole, then, there is good evidence in the literature of attempts to create coherent theory that explains the emergence of person-based trust and category-based trust, as well as efforts to test these assumptions. There is also clear evidence of increased and justified attention given to issues of category-based trust. The requirement to build trust in workplace teams (even in the absence of adequate opportunity to do so) appears to have spurred on interest in categorical forms of trust (e.g. virtual trust and swift trust). However, it is critical that researchers have an opportunity to establish the boundary conditions within which swift trust is most likely to occur, and more importantly, how it actually impacts on team process and team performance. Only then will the optimism and “buzz” about the swift trust construct be fully justified.

4.4 Implications for the CF

From the perspective of the CF, then, the important question is whether the regimental identity findings should be cause for concern. Given that CF team members of the future will be working in highly diverse teams, often with team members of different regimental identities, is there reason to believe that the emergence of swift trust may be comprised within diverse teams? First of all, it is important to note that regimental identity will be more likely to impact when it (rather than other categories) is activated and highly salient. This study intentionally manipulated the type of regimental identity. In the normal course of affairs; however, a category like regimental identity may be less salient and thus may play a much less prominent role.

However, although the team trust findings suggest that regimental identity may influence trust judgements of other teammates, the pragmatic impact of these differences remains unclear. Even though teammates had somewhat more positive expectations about team members from the same regiment, their confidence in and willingness to act on these predictions was not assessed. Moreover, although team trust levels showed variance as a product of regimental identity, these levels were high by even conventional standards.

At the same time, however, it is important to note that regimental identity is only one of the many categories that could be active whenever CF teams are created. In some ways, although shared regimental identity can promote higher levels of team trust, it is important to remember that regimental identity may be a more benign identity than many other possible identities because the broad category of a CF member is still invoked, even if one identifies more closely with the members of one’s own regiment. Many other categories (e.g. elemental command, culture, gender etc.) may have even more potential to influence team trust judgements. This suggests that the power of shared identity overall may be much more serious in the teams in which CF members of the future will perform.

It is also important not to trivialize the potential impact of the trust differences seen in this study either. Despite the high levels of trust uniformly reported initially in the study, it was also the case that significantly higher levels of trust were attributed to teammates who participants believed to be from their home unit. Thus, in the absence of the opportunity to display her/his abilities, a new teammate working in a distributed team could, in theory, be seen as less trustworthy, and this may be very difficult to change depending on the opportunities for interaction with other teammates. The task undertaken in this study provided a means by which teams had the immediate opportunity to work cooperatively, so the initially less positive category-based predictions about the new teammates seemed to have been overturned when teams had the chance to work together. However,



as many CF teams of the future could be required to work in wholly distributed environments with a somewhat less interactive quality, the emergence and maintenance of trust has the potential to be problematic.

Moreover, it is also important to note that although regimental identity impacted on perceptions of the team as a whole and some trust-relevant expectations, it did not seem to carry over to judgements about specific teammates. It is also difficult to disentangle the relationship between team trust and mission outcome. However, it is also important to note that trust within a team also did not influence actual team performance on the mission success indicators used in this work. This suggests that when team trust varies but remains at relatively high levels, it may not impact substantively on team performance, at least within this experimental context.

The findings of this research are hopefully relevant to more realistic settings, but it is critical to note that caution should be exercised when attempting to generalize these results to real operational settings. In very real sense, trust within teams is best tested in high risk, high stress environments, and this laboratory study clearly can only simulate the psychology of an actual operation. In situations in which one's life is actually at risk, for example, a violation of that trust (as in the case of the experimental violations presented here) would certainly be much more influential. Even given the ethos to work to stay positive within a team, it is unlikely that a real teammate would not have strong opinions about the trustworthiness of a teammate after having been shot in the leg by him, or indeed even knowing that he or she had accidentally shot someone else in the leg. Similarly, it would also be possible to construe the findings of this study in a uniformly optimistic way; namely, that trust will always increase if teams have the opportunity to work together and to persevere against adversity. Even though trust did increase, it is important to note that this increase in trust might be more a product of the relatively low demands of the simulation environment and is not necessarily an indicator that team trust will always increase under adversity. Perhaps given the nature of the task, and the low cost of variation from one's assigned task, there was simply little cost to the team when individuals performed badly, because other team members were happy to compensate. The gaming laboratory, however, provides a very specialized set of circumstances, and perhaps in the "real world", one would have to make a much less optimistic prediction. As such, although these findings have been shown within the constrained environment of the 1st person gaming laboratory, conclusive statements about how team trust behaves in the "real world" will require testing in real world situations where the costs and benefits of trust (and the actual impact of potential trust violations) can be fully tested. Until then, it is important to recognize the limitations of conducting trust research in simulated environments.

Nonetheless, as documents such as the *CF Strategic Operating Concept* (2005) and, more recently the force employment concept for Canada's 'Army of Tomorrow' (Godfrey, 2007) underscore, the CF will find themselves in missions that are defined by distributed operations and the JIMP framework. Within these joint, interagency, multinational and public contexts, diversity within teams has the potential to have a serious impact on the ability of the team to work together. And the effects of this diversity may well be exacerbated by the effects of dispersed, network-based operations. This research suggests that even a minor difference such as regimental identity can impact on how teams perceive each other, at least initially, and to a limited extent. In a force increasingly challenging itself to be more unified, a better understanding of the many factors likely to influence the ability of teams to work collaboratively with high levels of both person-based and category-based trust seems critical.

5 References

- Duty with Honour: The Profession of Arms in Canada. (2003). Published under the auspices of the Chief of Defence Staff by the Canadian Defence Academy – Canadian Forces Leadership Institute.
- ADAMS, B.D. & SARTORI, J. (2006). Validating the Trust in Teams and Trust in Leaders Scale. *Report to Department of National Defence, DRDC No. CR-2006-008.*
- ADAMS, B.D., AND SARTORI, J. (2005). The dimensionality of trust. *Report to Department of National Defence, DRDC No. CR-2005-204.*
- ADAMS, B.D., BRUYN, L.E., CHUYN-YAN, G. (2004). Creating Measures of Trust in Small Military Teams. *Report to Department of National Defence, DRDC No. CR-2004-077.*
- SARTORI, J., ADAMS, B., AND THOMSON, M. (2004). Trust, risk and communication in military teams. *Report to Department of National Defence, DRDC No. CR-2004-078.*
- ADAMS, B.D., BRYANT, D.J. & WEBB, R.D.G. (2001). Trust in teams: Literature review. DRDC Toronto Report CR-2001-042. Humansystems Incorporated. Guelph, Ontario.
- BEN-SHALOM, U., LEHRER, Z., & BEN-ARI, E. (2005). Cohesion during military operations: A field study on combat units in the Al-Aqsa Intifada. *Armed Forces and Society, 32(1)*, 63-79.
- BOWERS, C. A., SALAS, E., & JENTSCH, F. (2006). *Creating High-Tech teams: Practical Guidance on Work Performance and Technology*. Washington, DC: American Psychological Association.
- BREWER, M. (1988). A dual process model of impression formation. In Srull, T., & Wyer, R. (Eds.). *A Dual Process Model of Impression Formation*. (pp. 1-36). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- CAPSTICK, M. (2003). Defining the culture: The Canadian Army in the 21st Century. *Canadian Military Journal*. Spring 2003.
- CHEN, M. & BARGH, J. (1997). Nonconscious behavioral confirmation processes: The self-fulfilling consequences of automatic stereotype activation. *Journal of Experimental Social Psychology, 33(5)*, 541-560.
- COSTA, A. C., ROE, R. A., & THAILLEAU, T. (2001). Trust within teams: The relation with performance effectiveness. *European Journal of Work and Organizational Psychology, 10(3)*, 225-244.
- DIRKS, K. T. (1999). The effects of interpersonal trust on work group performance. *Journal of Applied Psychology, 84(3)*, 445-455.
- FEIN, S. & SPENCER, S. (1997). Prejudice as self-image maintenance: Affirming the self through derogating others. *Journal of Personality and Social Psychology, 73*, 31-44.
- FIOL, C.M., & O'CONNOR, E.J. (2005). Identification in face-to-face, hybrid, and pure virtual teams: Untangling the contradictions. *Organization Science, 16*, 19-32.
- GODFREY, A. B. (2007). Land Operations 2021 Adaptive dispersed operations. A force employment concept for Canada's Army of Tomorrow. Kingston Ontario: Directorate of Land Concepts and Doctrine, Dept. of National Defence

- HOLMES, J. (1991). Trust and the appraisal process in close relationships. In Jones, W. & Perlman, D. (Eds). *Advances in personal relationships: A research annual*, Vol. 2, (pp. 57-104). London: Jessica Kingsley.
- HUNG, Y., DENNIS, A. & ROBERT, L. (2004). Trust in virtual teams: Towards an integrative model of trust formation. Proceedings of the 37th Hawaii Conference on System Sciences.
- JARVENPAA, S. & LEIDNER, D. (1999). Communication and trust in global virtual teams. *Organization Science*, 10, 791-815.
- KIM, P.H., FERRIN, D.L., COOPER, C.D., & DIRKS, K.T. (2004). Removing the shadow of suspicion: The effects of apology versus denial for repairing competence- versus integrity-based trust violations. *Journal of Applied Psychology*, 89, 104-118.
- KIM, P.H., DIRKS, K.T., COOPER, C.D., & FERRIN, D.L. (2006). When more blame is better than less: The implications of internal vs. external attributions for the repair of trust after a competence- vs. integrity-based trust violation. *Organizational Behavior and Human Decision Processes*, 99, 49-65.
- KOEHLER, J. J., & GERSHOFF, A. D. (2003). Betrayal aversion: When agents of protection become agents of harm. *Organizational Behavior and Human Decision Processes*, 90, 244-261.
- KRAMER, R. (1999). Trust and distrust in organizations: Emerging perspectives, enduring questions. *Annual Review of Psychology*, 50, 569-598.
- KRAMER, R., BREWER, M., & HANNA, B. (1996). Collective trust and collective action: The decision to trust as a social decision. In Kramer, R. & Tyler, T. (Eds.). *Trust in organizations: Frontiers of theory and research*. (pp. 357-389). Thousand Oaks, CA, US: Sage Publications, Inc.
- KUNDA, Z. (2001). *Social Cognition: Making Sense of People*. MIT Press, Cambridge, MA.
- KUNDA, Z. & SINCLAIR, L. (1999). Motivated reasoning with stereotypes: Activation, application and inhibition. *Psychological Inquiry*, 10, 12-22.
- LEWICKI, R., & BUNKER, B. (1996). Developing and maintaining trust in work relationships. In Kramer, R. & Tyler, T. (Eds.). *Trust in Organizations: Frontiers of Theory and Research*. (pp. 114-139). Thousand Oaks, CA, US: Sage Publications, Inc.
- MAYER, R., DAVIS, J., & SCHOORMAN, F. (1995). An integrative model of organizational trust. *Academy of Management Review*, 20(3), 709-734.
- MCALLISTER, D. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38(1), 24-59.
- MCKNIGHT, D. H., CUMMINGS, L. L., & CHERVANY, N. L. (1998). "Initial Trust Formation in New Organizational Relationships." *Academy of Management Review*, 23(3): 473-490.
- MEYERSON, D., WEICK, K., & KRAMER, R. (1996). Swift trust and temporary groups. In Kramer, R. & Tyler, T. (Eds.). *Trust in Organizations: Frontiers of Theory and Research*. (pp. 166-195). Thousand Oaks, CA, US: Sage Publications, Inc.
- MORELAND, R. L., & MCMINN, J. G. (1999). Gone but not forgotten: Loyalty and betrayal among ex-members of small groups. *Personality and Social Psychology Bulletin*, 25, 1476-1486.
- POWELL, A., PICCOLI, G., & IVES, B. (2004). Virtual teams: A review of the literature and directions for future research. *ACM SIGMIS Database*, 35(1), 6 – 36.

- PRIEST, STAGL, KLEIN, & SALAS (2006). Virtual teams: Creating context for distributed teamwork. In C.A. Bowers, E. Salas, & F. Jentsch (Eds.). *Making Effective Work Teams with People, Machines, and Networks*. Mahwah, N.J.: Lawrence Erlbaum & Associates.
- REMPEL, J., HOLMES, J., & ZANNA, M. (1985). Trust in close relationships. *Journal of Personality & Social Psychology*, 49(1), 95-112.
- ROBINSON, S.L. & ROUSSEAU, D.M. (1994). Violating the psychological contract: not the exception but the norm. *Journal of Organizational Behavior*, 15(3), 245-259.
- ROGERS, P. & LEA, M. (2005). Social presence in distributed group environments: The role of social identity. *Behavior & Information Technology*, 24(2), 151-158.
- ROUSSEAU, D., SITKIN, S., BURT, R., & CAMERER, C. (1998). Not so different after all: A cross-discipline view of trust. *Academy of Management Review*, 23(3), 393-404.
- SARTORI, J., ADAMS, B.D., THOMSON, M. (2004). Trust, risk and communication in military teams. DRDC Toronto Report CR-2004-080. Humansystems Incorporated. Guelph, Ontario.
- TOMLINSON, E. C., DINEEN, B. R., & LEWICKI, R. J. (2004). The road to reconciliation: Antecedents of victim willingness to reconcile following a broken promise. *Journal of Management*, 30, 165-187.
- VAN DER KLOET, I. (2005). *A Soldierly Perspective on Trust: A Study into Trust within the Royal Netherlands Army*. Tilburg University: The Netherlands.
- WALTHER, J. (1995). Relational aspects of computer-mediated communication: Experimental observations over time. *Organization Science*, 6(2), 186-203.
- WALTHER, J. (1997). Group and interpersonal effects in computer-mediated communication. *Human Communication Research*, 23(3), 342-369.
- WILSON, J.M., STRAUSS, S.G., McEVILY, B. (2006). All in due time: The development of trust in computer-mediated and face-to-face teams. *Organizational Behavior and Human Decision Processes*, 99, 16-33.
- WINSLOW, D. (1998). Misplaced Loyalties: The Role of Military Culture in the Breakdown of Discipline in Peace Operations. *Canadian Review of Sociology & Anthropology*, 35(3), 345-367.
- ZOLIN, R., & HINDS, P.J. (2004). Trust in context: The development of interpersonal trust in geographically distributed work. In Kramer, R.M. and Cook, K.S. (Eds.). *Trust and Distrust in Organizations: Dilemmas and Approaches*. Russell Sage Foundation: New York.



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Annex A: Cases Removed

Different = 13

Same = 10

RegIdent	Who Blamed	N
different	all	2
different	other FTP, self	2
different	other leader	2
different	other leader, other FTP	2
different	self	4
different	self, other leader	1
different	self, other leader, other FTP	0
same	all	1
same	other FTP, own FTP, self	1
same	other FTP, self	0
same	other leader	0
same	other leader, other FTP	1
same	own FTP, self	1
same	self	5
same	self, other leader	0
same	self, other leader, other FTP	1



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Annex B: Questionnaires



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13. **ABSTRACT** (A brief and factual summary of the document. It may also appear elsewhere in the body of the document itself. It is highly desirable that the abstract of classified documents be unclassified. Each paragraph of the abstract shall begin with an indication of the security classification of the information in the paragraph (unless the document itself is unclassified) represented as (S), (C), (R), or (U). It is not necessary to include here abstracts in both official languages unless the text is bilingual.)

(U) Swift trust is trust developed quickly even without direct and personal experience with another person and has been increasingly posited in the literature to be one way in which members of ad hoc teams can quickly form trust (Meyerson, Weick & Kramer, 1996). This pilot study explored whether the regimental identity of teammates could influence levels of "swift" trust within teams. The secondary focus of this experiment was the impact of potential trust violations.

Twenty-four teams of CF reservists each conducted four tactical assault missions in a first-person gaming laboratory. Each 4-person team was composed of 2 CF personnel and 2 confederate researchers (purported to be CF personnel). Members of the team worked in a simulated distributed environment (separated by partitions), and were initially introduced to each other only using a 1 page written profile that described their background and operational experience. Their task in the computer game was to operate as 2 separate fire teams approaching the target area from 2 different sides in order to engage and destroy terrorists. Teammates communicated via radio only but interacted within the simulated mission area through their computer avatars. In order to manipulate regimental identity, the 2 confederate members of the newly formed and distributed team were reported to come from either the same regiment or a different regiment as the actual CF participants. In addition, to investigate whether trust violations affected the development of trust over the four missions, in half of the missions, a confederate team member performed a behaviour that could put the team at risk. Questionnaires assessed the impact of regimental identity and potential trust violations on levels of team trust before the mission began (pre-mission), during a mission freeze (about 5 min into the mission) and at the end or post-mission.

Results showed that even with only indirect knowledge about teammates' regimental affiliation, team trust was significantly higher in distributed teams that apparently shared a common regimental identity. However, initial levels of team trust were relatively high in both teams. This suggests that a perceived shared regimental identity promoted swift trust at the very early stages of working as a team. Moreover, before even meeting one's teammates, team members expected to accrue fewer casualties when working with team members from their own regiment than from a different regiment. At the mission freeze, however, shared regimental identity had no impact on team trust although the perceived skills of team members were influenced by violations. At the post-mission stage, team trust measures showed very weak impacts of regimental identity. Team trust as a whole increased slowly over the course of the mission, regardless of regimental identity or the occurrence of a trust violation. These findings show that while regimental identity can influence immediate judgements of team trustworthiness, these effects may be relatively temporary. Moreover, the impact of swift trust on team process and performance over time will require more study.

However, this pilot study represents a good first attempt at understanding these relationships. Possible theoretical accounts of these findings and lessons learned are explored and future research and training implications are addressed. Understanding the swift trust construct will be critical as the CF moves toward increasingly dynamic, diverse and distributed operations.

(U) La confiance instantanée est une confiance qui se manifeste immédiatement, même envers quelqu'un qu'on ne connaît pas personnellement. Cette notion est de plus en plus utilisée dans les ouvrages spécialisés pour expliquer comment les membres des équipes

spéciales parviennent à établir rapidement des relations de confiance (Meyerson, Weick & Kramer, 1996). L'étude pilote résumée ici examine si l'identité régimentaire des coéquipiers peut influencer le niveau de confiance instantanée à l'intérieur d'une équipe. Accessoirement, l'étude pilote examine l'impact des éventuels abus de confiance. Dans un laboratoire de jeu à la première personne, 24 équipes de réservistes des FC ont effectué, chacune de leur côté, quatre missions simulées d'assaut tactique. Chaque équipe était composée de quatre personnes : deux membres des FC et deux chercheurs complices (censés être des membres des FC). Les membres de l'équipe travaillaient dans un environnement réparti simulé (séparés par des cloisons), et au départ, ils n'ont été présentés l'un à l'autre qu'au moyen d'un profil d'une page décrivant leurs antécédents et leur expérience opérationnelle. Dans ce jeu électronique, ils étaient divisés en deux équipes de tir distinctes qui devaient s'approcher de la zone cible de deux côtés différents, puis attaquer et détruire un groupe de terroristes. Les coéquipiers communiquaient par radio seulement, mais ils pouvaient interagir, dans la zone de mission simulée, par l'intermédiaire de leurs avatars électroniques. Pour jouer sur l'identité régimentaire, les deux membres complices de l'équipe nouvellement formée et répartie étaient décrits comme provenant du même régiment que les deux membres des FC, ou d'un autre régiment. De plus, pour examiner l'impact des abus de confiance, dans la moitié des missions, un membre complice a adopté un comportement susceptible de mettre l'équipe en péril. Des questionnaires distribués aux participants ont permis d'évaluer l'impact de l'identité régimentaire et des abus de confiance sur le niveau de confiance au sein de l'équipe juste avant la mission, pendant la mission (environ 5 minutes après le début de la mission), et après la mission.

Les résultats montrent que même lorsque l'affiliation régimentaire des coéquipiers n'est connue que de façon indirecte, le niveau de confiance est beaucoup plus élevé dans les équipes réparties dont les membres proviennent apparemment du même régiment. Cependant, le niveau de confiance initial était relativement élevé dans toutes les équipes. Ces résultats semblent indiquer que le sentiment de partager une même identité régimentaire a suscité une confiance instantanée dès que l'équipe a été constituée. De plus, avant même d'avoir rencontré leurs coéquipiers, les membres de l'équipe s'attendaient à subir moins de pertes s'ils travaillaient avec des membres de leur propre régiment. Pendant la mission, cependant, le fait d'appartenir au même régiment n'a pas eu d'impact sur le niveau de confiance au sein de l'équipe, bien que les abus de confiance aient influencé la perception du niveau de compétence des différents membres de l'équipe. Après la mission, la mesure du niveau de confiance a montré que l'identité régimentaire avait très peu d'impact. Le niveau de confiance au sein de l'équipe a eu tendance à augmenter lentement tout au long de la mission, quelle que soit l'identité régimentaire ou l'incidence des abus de confiance. Ces résultats montrent que l'identité régimentaire peut influencer la perception initiale de la fiabilité des autres membres de l'équipe, mais que cet effet n'est que temporaire. De plus, l'impact de la confiance instantanée sur le travail et la performance de l'équipe à long terme devra faire l'objet d'études plus poussées.

Cependant, l'étude pilote représente un beau « premier effort » pour comprendre ces relations de confiance. L'étude cherche une explication théorique des résultats obtenus, elle examine les leçons apprises et leurs incidences sur les programmes de formation, et elle envisage de nouvelles pistes de recherche. Comprendre le concept de confiance instantanée sera essentiel dans les années à venir, lorsque les FC s'engageront dans des opérations de plus en plus dynamiques, diverses et réparties.

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(U) swift trust; violation of trust; Canadian Forces; regimental identity

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4. AUTHORS (First name, middle initial and last name. If military, show rank, e.g. Maj. John E. Doe.) Barbara D. Adams; Sonya Waldherr; Jessica Sartori; Michael Thomson		
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