

**Interorganizational Collaboration and Professional Diversity: A Mixed-Methods
Investigation of Disagreement in the Context of Disaster Risk Management**

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Abstract

Disasters such as major floods and heat waves are taking an increasing toll on societies. Like other pressing policy issues, they are complex and cut across sectors, jurisdictions, and professional fields. Addressing these problems requires interorganizational collaboration between heterogeneous organizations and thus, interactions between representatives who may have different professional views and identities. Successful collaboration partly hinges on their capacity to integrate perspectives and develop sustainable working relationships despite differences. This thesis aimed to improve our understanding of the role played by professional differences in perspectives and identities in public-sector interorganizational collaboration. Three specific objectives were pursued in a multilevel approach: 1) To document the role of professional diversity for interorganizational collaboration when considered outside of sectoral or jurisdictional differences; 2) To investigate how salient differences in professional identity affect perceptions and reactions following task disagreement; and 3) To investigate the cognitive and relational pathways by which emotions, conflict perceptions, and information processing can predict decision quality and relationship quality following disagreement. Study 1 examined the experience of interorganizational collaboration in disaster management based on qualitative interviews with professional- and executive-level public servants from relevant Canadian federal organizations. Findings suggested that professional diversity was not by itself a salient issue. The most disempowering type of diversity was differences in mandates, especially when combined with differences in expertise or identities. Study 2 examined whether group composition based on professional identity was associated with differential perception of and reaction to disagreement during interorganizational problem solving. It was based on a small sample of experienced senior risk managers involved in a quasi-experimental simulation. In terms of

disagreement perception, nonparametric analyses indicated that interprofessional teams *reported* more disagreement than homogeneous ones even if *observed* disagreement did not differ. In terms of reaction, disagreement showed consistent negative associations with reported measures of effectiveness, performance, and relationship quality in homogeneous teams. In contrast, these associations were either positive or nonsignificant in interprofessional teams. Study 3 experimentally tested in a disciplinary-defined university sample whether salient group professional composition affected how people perceived and reacted to a scripted task disagreement. Findings indicated that after experiencing the exact same task disagreement, participants in interprofessional teams were significantly more satisfied with their team than those in homogeneous teams. Path analyses supported the two hypothesized pathways linking emotion following disagreement to integrative decision making and satisfaction: a) a cognitive pathway whereby surprise predicted beneficial outcomes through increased reported task conflict and increased information processing and b) a relational pathway whereby negative emotions predicted detrimental outcomes through increased reported relationship conflict and decreased information processing. As a whole, the thesis improves our understanding of the cognitive and relational roles played by professional diversity in interorganizational collaboration. It provides evidence on the beneficial effects of salient diversity for group cohesion in the face of disagreement. It documents intervening cognitive and relational processes predicting performance and relational quality following task disagreement. Finally, it proposes research avenues whereby social psychology can be leveraged to support the adaptation of public-sector organizations to contemporary challenges in public policy.

Keywords: Interorganizational collaboration, disaster risk management, public sector, professional diversity, social identity, intragroup conflict, emotions.

Résumé

Les désastres naturels tels que les inondations et les vagues de chaleur posent des défis croissants dans nos sociétés. À l'image d'autres enjeux publics actuels, les désastres sont complexes et impliquent différents secteurs, juridictions et domaines professionnels. S'attaquer à ces problèmes requiert des collaborations entre organisations hétérogènes et par conséquent, nécessite des interactions entre des représentants pouvant avoir différentes visions et identités professionnelles. Le succès de telles collaborations repose en partie sur la capacité de ces représentants à intégrer des perspectives différentes et à développer des relations de travail viables malgré cette hétérogénéité. Cette thèse vise à mieux comprendre le rôle de la diversité professionnelle en contexte de collaboration interorganisationnelle dans le secteur public. Trois objectifs sont poursuivis en adoptant une approche multi-niveaux : 1) Documenter le rôle de la diversité professionnelle pour la collaboration interorganisationnelle en l'absence de différences intersectorielles ou interjuridictionnelles; 2) Examiner l'effet des identités professionnelles sur les perceptions et les réactions suite à des désaccords; 3) Étudier les mécanismes cognitifs et relationnels par lesquels les émotions, les perceptions de conflits et le traitement de l'information prédisent la qualité décisionnelle et la qualité relationnelle suite à un désaccord. L'Étude 1 a examiné l'expérience de collaborations interorganisationnelles à partir d'entrevues qualitatives avec des professionnels et des cadres travaillant pour des organisations fédérales canadiennes impliquées dans la gestion des risques de désastres. Les résultats ont indiqué que la diversité professionnelle n'était pas un enjeu saillant en soit. La diversité des mandats entre les organisations fédérales était un défi plus prégnant, particulièrement lorsque cette diversité est combinée avec des différences d'expertises ou d'identités. L'Étude 2 a examiné la relation entre la diversité professionnelle et les perceptions et réactions liées aux désaccords lors de la

résolution de problème interorganisationnelle. Elle était basée sur un petit échantillon de cadres en gestion de risque impliqués dans une simulation quasi-expérimentale. En ce qui concerne les perceptions, les analyses non paramétriques ont montré que les désaccords *rapportés* étaient plus élevés dans les équipes interprofessionnelles que dans les équipes homogènes. Ceci, même si les niveaux de désaccords *observés* étaient similaires. En termes de réactions, les désaccords rapportés ont montré un patron d'associations négatives consistantes avec les mesures auto-rapportées d'efficacité, de performance et de qualité relationnelle dans les équipes homogènes. A contrario, ces relations étaient positives ou non-significatives dans les équipes interprofessionnelles. Utilisant un devis expérimental, l'Étude 3 a testé auprès d'étudiants de différentes disciplines si la composition de groupe professionnel influence les perceptions et les réactions face aux désaccords. Les résultats montrent que, suite à l'exposition à un désaccord identique, les participants des équipes interprofessionnelles étaient significativement plus satisfaits de leur équipe que ceux des équipes homogènes. Des analyses acheminatoires ont validé la plausibilité de deux mécanismes liant les réactions émotionnelles à la performance et la satisfaction suite aux désaccords: a) un mécanisme cognitif par lequel l'expérience de la surprise liée aux désaccords prédit des résultats bénéfiques via une perception accrue de désaccord et une augmentation du traitement de l'information; b) un mécanisme relationnel où les réactions émotionnelles négatives aux désaccords prédisent des résultats néfastes via une perception accrue de conflit interpersonnel et une réduction du traitement de l'information. Dans son ensemble, la thèse améliore notre compréhension des rôles cognitifs et relationnels joués par la diversité professionnelle dans la collaboration interorganisationnelle. Elle augmente nos connaissances sur les effets bénéfiques de la diversité pour la cohésion de groupe en contexte de désaccords. Elle documente les mécanismes cognitifs et relationnels impliqués dans la

performance et la satisfaction après un désaccord. Enfin, elle propose des pistes de recherche permettant à la psychologie sociale de soutenir l'adaptation des organisations publiques aux défis contemporains que présentent les politiques publiques.

Mots-clés : Collaboration interorganisationnelle, gestion de risques de désastres, secteur public, diversité professionnelle, identité sociale, conflits de groupe, émotions.

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Chapter 1:
Conceptual Foundations and Context

Chapter 1: Conceptual Foundations and Context

Many policy and planning problems faced by public-sector organizations are complex and multifaceted (Aldrich, 1977; Rittel & Webber, 1973; Trist, 1977). Disasters such as pandemics, wildfires, and floods are beyond the capacity of any single organization. They require interorganizational collaboration across traditional boundaries defined by area of expertise, sector, or jurisdiction. Yet, collaboration is itself a complex phenomenon. The heterogeneity inherent in these problem domains creates challenges for its performance and sustainability.

Despite an increased recognition of the importance of interpersonal dynamics in interorganizational collaboration, the social psychological processes underlying these endeavours remain understudied. Professional diversity is an ubiquitous feature in this type of work and contributes to the diverse perspectives and identities that organizational representatives bring to the table. These differences may be beneficial when they increase the range of information, resources, and networks available to collaborators. However, they may also become detrimental when divergences escalate into animosity, conflict, polarization, or withdrawal. Understanding the conditions under which professional diversity is beneficial or detrimental to collaboration is required to inform effective interventions.

This thesis examines the role of professional diversity in interorganizational collaboration in the context of disaster risk reduction as a complex multidimensional issue. Its overarching aim is to improve our understanding of the role of professional differences in identities and perspectives for public-sector interorganizational collaboration. Three main questions drive our inquiry: 1) What are the benefits and challenges of professional diversity for collaboration between public organizations outside of intersectoral or jurisdictional sources of differences?

2) How do differences in professional identity affect how people perceive and react to disagreement? 3) Following disagreement, what are the affective and cognitive processes predicting performance and relationship outcomes? To answer these questions, three studies document a) the broader set of facilitators and barriers to collaboration as described in qualitative interviews with Canadian federal public servants involved in disaster risk reduction; b) team perception and reaction following disagreement in an emergency simulation involving senior risk managers; c) the impact of salient group composition (homogeneous vs. interprofessional) on perception of and reaction to a scripted disagreement in an experimental study.

To guide our conceptual framework, two main bodies of literature provide background considerations. On the one hand, public administration research examines public-sector interorganizational collaboration mainly from the angle of collaborative public management and collaborative governance. On the other hand, social psychology examines the cognitive and relational dimensions of professional diversity, social identity, conflict, and collaboration from the perspective of teamwork. The issue of member heterogeneity in collaboration is thus approached from different angles, at different levels of analysis, and sometimes with different assumptions. Our framework is an attempt to situate and integrate them in a multilevel system view of interorganizational collaboration.

Heterogeneity Challenges in Complex Public Problems

Since many contemporary policy problems cut across disciplines, jurisdictions, and sectors, they require collaboration between heterogeneous stakeholders which may not have collaborated before. This recognition has spurred interest for interorganizational collaboration in public organizations and public administration research during the past 40 years under such

terms as collaborative governance, collaborative public management, or interorganizational networks (Agranoff, 2006; Bryson et al., 2006; Gray, 1985).

Calls for collaboration come from a system perspective that focuses on problem domains rather than single organizations (Trist, 1977). They consider the system of interrelated organizations operating within these domains (Wood & Gray, 1991). The assets required to tackle complex issues are most often distributed across stakeholders (Lemyre et al., 2009; Paquet, 2004; Wilson, 2011). These must contend with the distribution of power and authority because “no one’s in charge” (Paquet, 2009, p. xvii) but “many are somewhat in charge” (Rocan, 2018c, p. 3). The volume and range of resources required are well beyond what any organization can provide. Finally, due to the multifactorial nature of these issues and the multiple interdependencies between organizations, the knowledge required to understand these problems is most likely distributed as well. Hence, collaboration is a strategy to pool assets and tackle an issue in a way that would not be possible by working in siloes. Given the uncertainty created by distributed knowledge, collaboration is required to build understanding about the system of networked interdependencies influencing a problem domain and individual organizational goals. Finally, collaboration may be needed to avoid the perverse consequences of misaligned actions and enable organizations to fulfill their own individual mandates. For these reasons, interorganizational collaboration has been described as a problem-solving mechanism and a form of social learning especially critical in the context of cross-cutting societal issues (Lemyre et al., 2009; Paquet & Wilson, 2011; Weber & Khademian, 2008).

Disaster Risk Reduction (DRR) as a Complex Public Issue

One complex and highly topical public issue requiring interorganizational collaboration is disaster risk reduction (DRR). Disasters are multifactorial and well beyond what any single

organization can tackle. The scope of their negative consequences is determined by multiple interdependent factors and negative feedback loops. They are interdisciplinary, interjurisdictional, and intersectoral with consequences on human lives, livelihoods, economies, and more. Natural disasters are expected to increase in frequency and intensity over the coming decades because of climate change and other risk drivers.

Defining Disaster Risk

According to the United Nations Office for Disaster Risk Reduction (2020a), a *disaster* can be defined as:

“[a] serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts”.

Although the terms “disaster”, “emergency”, or “crisis” are sometimes used as synonyms, the term disaster has a larger scope and includes slow- and rapid-onset events, small- and large-scale ones, as well as frequent and infrequent ones. Disaster *risk* refers to the probability that a hazard will have negative consequences on people, systems, or assets (United Nations Office for Disaster Risk Reduction, 2020b). In formal terms, risk is the product of the probability of hazard occurrence (e.g., extreme summer heat wave) and the probability of negative consequences (e.g., deaths). These two terms are influenced by vulnerability factors which are distributed unequally in the population: exposure (e.g., living in an urban heat island), sensitivity (e.g., having chronic health problems), and access to protective measures (e.g., having air conditioning).

DRR and the Need for Collaboration

Over the past decades, the field of disaster risk management has evolved from *disaster* management to disaster *risk* reduction (DRR). Historically, it emerged from the field of emergency management, which focused on response and rescue after a hazard has occurred plus some elements of preparedness to increase response capacity and effectiveness (Public Safety Canada, 2019). As a strategic approach to risk management, DRR expands the field to a wider scope of considerations and a longer timeline. It aims at effectively reducing disaster risks upstream rather than managing the consequences of disasters when they occur (United Nations, 2015). The United Nations Sendai Framework for Disaster Risk Reduction (United Nations, 2015) stresses the need for all-of-state, multi-hazard, and multi-sectoral approaches and the need for policy coherence across policy arenas. Collaboration and knowledge integration are central to this approach. The framework's first two priorities for action are "understanding disaster risk" and "strengthening disaster risk governance to manage disaster risk". These require integrating and using risk information so that policies take multi-dimensionality into account. Strengthening governance requires collaboration across wide ranges of stakeholders to achieve coherence and effectiveness of global risk management efforts.

The field of DRR is thus a highly current and important example of a complex public problem requiring interorganizational collaboration. Effective DRR requires us to understand the factors supporting successful interorganizational collaboration.

Heterogeneous Collaboration As a Requirement

Member heterogeneity is a reality of many interorganizational domains surrounding complex public problems. These issues cross traditional boundaries defined by sectors, jurisdictions, or areas of expertise. Thus, the organizations that are – knowingly or not –

interdependently working in these problem domains will also come from different horizons. System change requires a systemic approach mobilizing stakeholders across diverse networks. Systemic approaches connect the needs, resources, and networks of the system as a whole (Edwards, 2013; Mayer & Kenter, 2016). Hence, the field of risk management advocates for “whole community” approaches to community resilience (Edwards, 2013). Reviews by public administration scholars also stress the need to ensure broad participation and adequate representation of members (Mattessich & Johnson, 2018). Failure to do so is cited as an explaining factor for many collaboration failures (Ansell & Gash, 2007).

Heterogeneous Collaboration As a Challenge

However, stakeholder heterogeneity is also a challenge for collaboration. At the organizational level, differential assets often reflect differences in purpose, priorities, professions, and power/status (Huxham & Vangen, 2005). In disaster response operations and collaborative governance more generally, organizations may have different societal roles and spheres of responsibility, be accountable to different levels of jurisdiction, and have competing ambitions over areas of authority (Bourgault, 2002d; Ödlund, 2010). They may have different organizational cultures, structures, interests, mandates, frames, operational conditions, and sectoral or institutional logics (Bourgault, 2002d; Huxham & Vangen, 2005; Kapucu & Garayev, 2011; Mattessich & Johnson, 2018; Ödlund, 2010). As observed by Ödlund (2010) in the disaster response context, societal roles may seem in normal circumstances unrelated and even incompatible. Hence, although collaboration is necessary, “it is not always clear for those involved why and how” (p. 100).

Given the above, it is unsurprising that stakeholder heterogeneity can challenge successful interorganizational collaboration. Competition, conflict, and animosity are cited as

common occurrences (Comfort, 1990; Huxham & Vangen, 2005; Kapucu & Garayev, 2011; Rocan, 2018b). Heterogeneity and conflict have been identified as factors in the disbanding of collaboratives (Mattessich & Johnson, 2018; Rocan, 2018b). Thus, even though lack of heterogeneity can prevent collaborations from achieving intended results, heterogeneity itself is a major challenge for interorganizational collaboration.

Professional Diversity

Differences stemming from professional background are likely to be widespread in interorganizational collaborations. The multifactorial nature of problems means that stakeholders from different professions, areas of expertise, or functions will be involved in the problem domain. Indeed, Huxham and Vangen (2005) have observed that professional diversity is of particular significance for interorganizational collaboration because it is “generic to all collaboration and because it is less obvious” (p. 63). It can bring differences in knowledge, assumptions, language, and professional values that may not be recognized. Even though heterogeneity among representatives can stem from various sources, professional diversity appears likely to be found in many collaborations.

In sum, reaping the benefits of stakeholder heterogeneity and preventing its pitfalls are inherent and challenging dimensions of addressing complex public problems through interorganizational collaboration. Professional diversity is one source of heterogeneity that is widespread and often unrecognized. It is important to understand the circumstances under which heterogeneity in general, and professional diversity in particular, can be beneficial or challenging for successful collaboration. This is the central issue on which this thesis will focus. Before examining this question further, we define collaboration and member heterogeneity.

Interorganizational Collaboration as a Dynamic Multilevel System

Collaboration is a construct that can be considered at different levels of analysis and in different contexts. Using psychologist Uri Bronfenbrenner's socioecological framework (Bronfenbrenner, 1979), we can conceptualize interorganizational collaboration as a socioecological system where components located at different levels of analysis influence one-another. At a macrosystem level, collaboration takes place in a given historical, cultural, political, and societal context. Nested in the macrosystem is the mesosystem, which refers to the characteristics of organizations, their roles and mandates, their constraints and assets, their homogeneity or heterogeneity, and the history of their relationships. Within the mesosystem, the microsystem level refers to interactions between people, such as organizational representatives responsible for carrying out the collaboration. Finally, the ontosystem represents the individual organizational representatives and their characteristics (e.g., demographics, personal history, professional background, personality, attitudes, competencies). This system is dynamic and evolves over time through cycles of interactions happening at the meso and micro levels (Ilgen et al., 2005; Marks et al., 2001; Vangen & Huxham, 2003).

Echoing the multilevel perspective often used in organizational science, this framework rooted in psychology is useful to go beyond individual factors in the study of work phenomena. It enables us to investigate the circumstances under which heterogeneity may be beneficial or challenging for successful collaboration.

Defining Collaboration

Conceptualizing collaboration as a multilevel system generates the need for a definition of collaboration that is applicable at different levels of analysis. Based on a systematic review of collaboration across levels of analysis, Bedwell and colleagues (2012, p. 130) propose to define

collaboration as “an evolving process whereby two or more social entities actively and reciprocally engage in joint activities aimed at achieving at least one shared goal”. The “social entities” collaborating can be defined as individuals, teams, organizations, or other social groups.

However, the notion that shared goals are a defining feature of collaboration has been criticized on practical grounds for overlooking the reality of many real-life initiatives (Huxham & Vangen, 2005; Kahane, 2017; Paquet & Wilson, 2015). As depicted by Huxham & Vangen (2005) and Kahane (2017), collaboration between social groups involves ecologies of goals (e.g., individual, organizational, interpersonal, interorganizational). Some of these may be shared, others complementary and compatible, and others incompatible. In fact, collaboration is one of the strategies available to resolve differences, which some parties may prefer over adversarial ones (Gray, 1985). For these reasons, this thesis adopts Huxham and Vangen (2005)’s perspective, which proposes that *managing* diversity of aims, rather than *agreeing* on shared ones, constitutes a more representative feature of collaboration. In this view, the extent of goal commonality vs. divergence contributes to the heterogeneity of a collaborative group.

Consequently, we adapt Bedwell and colleagues (2012)’s proposition and define collaboration as *an evolving process whereby social entities actively and reciprocally engage in joint activities aimed at solving a set of shared problems or achieving a set of goals among which some are considered compatible*. This defines collaboration independently from the skillfulness with which it is executed or its degree of success. Activities can include the sharing and pooling of information, resources, or power (Gray, 1985; Lemyre et al., 2009) and the subprocesses of communication, synchronicity, and coordination (Chiocchio et al., 2012).

Understanding the conditions under which stakeholder heterogeneity is beneficial or detrimental for successful collaboration also requires us to define successful collaboration.

Two Aspects of “Successful” Collaboration: Performance and Sustainable Relationships

There is no definite answer to what constitutes “successful” interorganizational collaboration (Kenis & Provan, 2009; Nowell et al., 2017). However, authors stress the need to consider both outcome (performance) and process (relationship development) to define success (Mandell & Keast, 2008; Nowell & Steelman, 2013). This parallels the distinction between performance and affective outcomes in team research (e.g., DeChurch et al., 2013).

Performance. Performance is the ability to create desired outcomes either for the network as a whole or its member organizations. One short-term indicator of success can be found in the quality of the decisions taken by the member organizations, either jointly or separately. Decisions that consider the multidimensionality of a problem and the network interdependencies are more likely to address core factors and limit detrimental ripple effects. Improved coordination between organizations is another aspect of performance (e.g., decreased misalignments/negative interference/gaps, new synergies). End-goal performance can be defined as the improvement of key indicators of an issue or improvement in organizations’ ability to reach their own goals through collaboration.

Relationship Development. Collaboration is a dynamic phenomenon influenced by relationship development processes (Cropper & Palmer, 2008). When members do not know each other or have a negative history of interactions, time and relationship building may be needed before a collaborative can be effective (Mandell & Keast, 2008). Hence, some argue that evaluations should consider relationship development as a success indicator (Mandell & Keast, 2008). In the immediate, group affective outcomes such as increased trust and satisfaction with the collaboration could be considered as indicators of the quality or viability of the relationships

being developed. In the longer-term, some authors cite increased social capital as both an outcome and a facilitator of collaboration (Mayer & Kenter, 2016).

Defining Heterogeneity

Based on this multilevel view of collaboration, members heterogeneity can be defined as the presence of differences between either 1) the organizations involved in a problem domain or 2) the individuals comprising these organizations. The term diversity is also used by scholars (e.g., Mayer & Kenter, 2016; Williams & O'Reilly, 1998). This broad definition is based on Social Identity Theory (Tajfel, 1974) and particularly on the social categorization approach (Turner et al., 1987; cf., Williams & O'Reilly, 1998). Social identity is defined as the sense of sharing membership to a social group and the socio-emotional and cognitive importance linked to this membership (Tajfel, 1974). Social categorization is the cognitive process of classifying the self or others into groups or categories, especially in terms of ingroup (same group as oneself) or outgroup (other group than oneself; Turner et al., 1987). Almost any characteristic can trigger social categorization and be used to define groups as homogeneous or heterogeneous – even if the underlying social psychological processes themselves are common across situations. As a group composition variable serving as input to interactions (e.g., Ilgen et al., 2005), member heterogeneity can be latent or manifest, actual or perceived. This may change during the course of a collaboration.

At the interorganizational level, heterogeneity can be categorized across three dimensions: area of expertise (e.g., health, national security), sector of activity (public, not-for-profit, private), and target geographical area or jurisdiction (e.g., local, provincial/territorial, national, international).

At the interpersonal level, organizational diversity scholars differentiate between deep-level and surface-level diversity (Milliken & Martins, 1996). Deep-level diversity (sometimes called cognitive diversity) refers to underlying or less visible differences in attributes between members. Examples include personal history, knowledge, attitudes, abilities, or personality. In contrast, surface-level differences refer to easily observable or detectable attributes. The most studied types of surface differences are visible sociodemographic ones (e.g., age, gender, ethnicity; van Knippenberg & Schippers, 2007) but surface differences include any salient characteristic potentially triggering social categorization (e.g., salient professional membership).

Social Psychological Dynamics in Interorganizational Collaboration

Despite the recognized importance of interactions for interorganizational collaboration, research in interorganizational collaboration tends to focus on organizations and to overlook the role of individuals (Amsler & O’Leary, 2017). In practice, interorganizational collaboration between organizations is often realized through interactions between individuals acting as their representatives (Amsler & O’Leary, 2017; Keyton et al., 2008; Williams, 2012). Scholars have thus called for increased attention to the role of individuals and the social psychological dynamics underlying interorganizational collaboration (Amsler & O’Leary, 2017; Schruijer, 2008; Williams, 2012). Such a gap is echoed in emergency management by Steigenberger (2016, p. 69) who identifies the need for a “clearer understanding of the cognitive and affective underpinnings of multiagency coordination”. It is also echoed by Rocan (2018b) who stresses the need for more research on conflict and conflict management strategies in interorganizational collaboration.

The emerging subfield of behavioural public administration also reflects this growing need to study “micro-foundations” in public organizations. Grimmelikhuijsen and colleagues

(2017) reviewed psychological studies in public administration between 1996-2015. They found that the overwhelming majority of psychological applications (83%) were related to public management (e.g., public service motivation, leadership) and only 6% examined networked or complex governance settings. The authors noted the striking contrast between this dearth of psychological studies on this latter topic and the large space it occupies in public administration research. This research gap on the social psychological dimensions of public-sector interorganizational collaboration is also an opportunity to investigate the external validity of psychological models (Grimmelikhuijsen et al., 2017) such as those explaining collaboration.

Relevance of Teamwork Models for Interorganizational Collaboration

If collaboration has isomorphic features across levels of analysis, frameworks targeting collaboration within teams should be relevant for studying collaboration between organizations. On the other hand, although extensive evidence has accumulated in teamwork and organizational diversity research, an important proportion of this evidence comes from laboratory settings, private-sector organizations, or health services organizations. Even when teamwork models target “fundamental” social psychological processes, directly translating them from one setting to another may not always be appropriate (van Meerkkerk & Edelenbos, 2018). For example, cases studies by Piercy and colleagues (2013) on the application of cross-functional teams in public organizations identified that critical requirements for their success did not entirely overlap with those documented by private-sector studies. More research is needed to help differentiate the contexts in which these frameworks may be applied.

To support the application of team frameworks to interorganizational collaboration in public-sector organizations, we must also consider how the institutional (macro-level) and interorganizational (meso-level) features of this setting could influence their applicability and

effectiveness. Interorganizational collaboration is often characterized by distributed power and goal diversity. In contrast, most intraorganizational teamwork is nested within a centralized organizational authority structure. Clear and common team goals can be defined from above and are a recognized determinant of team effectiveness (Wageman et al., 2012). The assumption of common team goals can be natural in teamwork scholarship (e.g., Homan, 2019), but problematic in interorganizational settings.

Another likely difference between settings is the range of potential interventions available to improve collaboration. In the type of complex problem domains in which we are interested, heterogeneity of partners is either a requirement for legitimacy and system change or at minimum inevitable. The partners are who they are; stakeholders must contend with the representatives in place, their personality, and demographics. Interventions thus need to focus on modifiable micro characteristics (e.g., attitudes, skills, knowledge, relationships) and meso-level characteristics (e.g., interorganizational structures, task design). Given this practical reality and our interest for applied organizational interventions, this thesis focuses on modifiable factors in collaboration.

Finally, the context of existing research on interorganizational collaboration must also be considered. The need for public institutions to engage with other jurisdictions and sectors is a pressing issue for effective governance in contemporary liberal societies (e.g., Bryson et al., 2015; Paquet & Wilson, 2016). Collaboration in disaster risk management faces similar requirements (Comfort, 1990; Kapucu & Demiroz, 2017). Thus, the collaboration settings that are of most interest for public administration scholars often compound various layers of heterogeneity, such as differences in areas of expertise, sectors, or jurisdictions. Challenges attributed to professional diversity could in fact stem from sectoral or jurisdictional differences.

To understand the role of professional diversity in public-sector interorganizational collaboration, we need to look at it from an intra-sectoral and intra-jurisdictional perspective. Furthermore, we must document the socioecological contexts that characterize collaboration happening *between* rather than *within* organizations to situate the applicability of teamwork and organizational diversity models to interorganizational collaboration.

Heterogeneity Challenges at the Interpersonal Level: Professional Diversity, Disagreement, and Social Identity

Differences in perspectives and identities have a number of potential pitfalls for interorganizational collaboration. In particular, the disagreements that can arise may escalate into animosity and conflicts and be detrimental for performance and sustainability. One strategy that can be considered promising at first glance is the development of a shared identity to improve cooperation and trust (e.g., Kapucu & Demiroz, 2017). However, there is research to suggest that such a strategy could actually reduce resilience to disagreement in collaborative groups (Carter & Phillips, 2017; Srikanth et al., 2016). Thus, observational research is needed to test the impact of salient group composition on how people perceive and react to task disagreement. Furthermore, there is a need to document the intervening cognitive and relational processes leading to performance and relationship outcomes when disagreement arises.

Differences in Perspectives and Disagreement

Difference in perspective can take forms such as the presence of diverse information, problem frames, personal or professional backgrounds, professional jargons, goals and priorities, habits and preferences, professional or ethnic cultures, approaches to decision making, or views on power sharing (Gray, 2004; Huxham & Vangen, 2005; Kapucu & Demiroz, 2017; Kapucu & Garayev, 2011; Mattessich & Johnson, 2018; Mayer & Kenter, 2016; Nowell, 2010; Ödlund,

2010; Steigenberger, 2016). Disagreement is a potential and likely consequence of differences in perspectives. Given different backgrounds, representatives may come to different interpretations of the same information or events (Huxham & Vangen, 2005; Kalkman et al., 2018; Rosenthal et al., 1991; Steigenberger, 2016). In the disaster response context, they may have different perceptions of what constitutes a threat or when prompt action is required (Rosenthal et al., 1991). Although these types of differences can be ascribed to various sources, professional diversity must be considered given its widespread presence in interorganizational collaboration.

In the social psychological literature on organizational diversity, professional background is also the type of deep-level diversity that has received most attention. It is typically conceptualized as variety (Harrison & Klein, 2007) and measured based on educational diversity or functional diversity (i.e. cross-functional teams whose members represent different functional departments in an organization; van Knippenberg & Schippers, 2007). Professional diversity is generally posited to lead to greater task disagreement, although empirical findings based on self-reported measures show inconsistencies (Jehn et al., 1999; Lovelace et al., 2001; Pelled et al., 1999; Simons et al., 1999).

Disagreement is defined as when individuals have divergent views or favour different actions or outcomes (De Dreu et al., 2007; Weingart et al., 2015). Research on disagreement is generally regrouped under the construct of intragroup conflict and differentiates between at least three types of conflict based on its content. The two first conflict types are task-related: *task conflict* (divergence on the substantive task) and *process conflict* (divergence on task processes and division of roles). The third type is *relationship conflict* (interpersonal incompatibilities linked to differences in personalities, norms, or values; e.g., De Dreu & Weingart, 2003; Jehn, 1995). More broadly, the term “conflict” often evokes an emotionally hostile social context or

defined as competition between parties with incompatible goals or interests (e.g., Pondy, 1967; cf., Tjosvold et al., 2014). It is useful to differentiate between initial disagreement and the animosity that, in some circumstances, can ensue. Hence, we use the term *task-related disagreement* to refer to task-related divergences that may or may not involve negative/hostile emotions or perceived/actual competition.

Consequences for the Success of Collaboration

Managing task disagreement during interpersonal interactions is an interface challenge between organizations. As representatives also represent the collaboration back to their own organizations, the increased knowledge or animosity resulting from these interactions may also impact intraorganizational representation.

Performance. The positive consequences of disagreement or “conflict” for performance (or relationship quality) are elusive in interorganizational collaboration research. This may reflect the connotation of antagonism associated with conflict. On the other hand, Kalkman and colleagues (2018) have observed that, despite conflict being an oft-cited issue in emergency management, little empirical evidence actually exists on the interaction processes by which representatives manage or exacerbate divergences. If researchers rarely observe divergences directly, only negative consequences may have transpired as a result.

During disaster response, disagreement can slow down decision making, which can increase negative consequences and distress for communities (Comfort, 1990; Kapucu & Garayev, 2011). In long-term collaboration initiatives, Nowell (2010) also documented that collaboratives where members have different problem frames tend to show reduced long-term performance. An exception to this negative view is found in Rosenthal (1991) who contends that divergences can improve the quality of decisions if there is enough time to overcome them.

In contrast, task conflict has been posited to have beneficial potentials for team performance. This, by triggering greater elaboration of task information, deeper processing of information, and consideration of different alternatives (cf., Mannix & Neale, 2005; van Knippenberg et al., 2004). Disagreement is posited to be one of the mechanisms linking information diversity to improved performance (e.g., Schwenk, 1990), although the accumulated body of research has nuanced this view. Meta-analyses have found no overall association between task conflict and performance (de Wit, Greer, et al., 2012) and between task conflict and team innovation (Hülsheger et al., 2009; O'Neill et al., 2013). Two meta-analyses found a significant positive association between task conflict and performance measured as decision quality (de Wit, Greer, et al., 2012), performance of decision-making teams (O'Neill et al., 2013), or financial performance (de Wit, Greer, et al., 2012). To Rosenthal (1991)'s above point, if disagreement is to be beneficial for collaboration performance, it is more specifically in complex cognitive tasks requiring the consideration of multiple perspectives. However, large credibility intervals and unexplained variance for some effects (de Wit, Greer, et al., 2012; Hülsheger et al., 2009; O'Neill et al., 2013) suggest that moderators could be at play (cf., Koslowsky & Sagie, 1993).

Conflict Escalation and Sustainability. When divergence escalate into conflict, engender negative emotionality, and damage group cohesion, they can lead to disengagement and even to disbanding of the collaborative group. Tensions can arise as a consequence of the stress and the conflicts caused by divergences (Huxham & Vangen, 2005). Divergent goals can lead to a more competitive decision-making environment (Kapucu & Garayev, 2011). According to Huxham and Vangen (2005, p. 110), these issues “may occur in a ‘normal’ group but are particularly salient and significant in a multi-organizational collaboration”. Conflicts on one

dimension (e.g., operations) can also spillover and influence interactions on other dimensions (e.g., strategic policy; Rosenthal et al., 1991). Rocan (2018b) noted how internal conflicts in interorganizational collaboration and the absence of effective strategies to address them “can easily lead to break-downs” of initiatives and is one of the factors explaining the “high failure rate of collaborations” (p. 190). Thus, an important risk for the success of interorganizational collaboration is when divergences escalate into animosity and directly threaten the sustainability of an endeavour.

These risks are directly echoed in the literature on intragroup conflict. Reported task conflict and relationship conflict are often correlated, potentially due to task conflict being misattributed to, or transformed into relationship conflict (Simons & Peterson, 2000). This can be consequential, as meta-analysis findings indicate that high relationship conflict predicts a negative association between task conflict and performance as well as satisfaction (de Wit, Greer, et al., 2012). Relationship conflict itself has a clear negative association with performance, trust, cohesion, commitment, and group identification (de Wit et al., 2012).

Furthermore, relationship conflict is a relational stressor. It can negatively impact the individual well-being and health of organizational representatives and increase turnover (Spector & Bruk-Lee, 2008). The incivility that can trigger and accompany conflict escalation can also exacerbate stressor-strain relationships (Oore et al., 2010) and predict reduced commitment and increased turnover intentions (Laschinger et al., 2009). This may be detrimental for organizations but also for the collaboration initiatives affected by increased turnover of representatives.

Of note, the negative emotionality triggered by task and relationship conflicts should also be considered to understand their impacts on performance and relationship quality. The most commonly used self-reported relationship conflict scale also taps on negative emotionality

(Bendersky et al., 2014). Some of the above dynamics could be due to, or exacerbated by, the extent of negative or hostile emotions associated conflict. Research is thus needed to clarify the relative roles of emotions and relationship conflict in disagreement trajectories.

In sum, the above findings highlight the potentials and pitfalls of differences in perspectives for successful collaboration. A key question is to understand which features of the relational context of disagreement could favour escalation trajectories characterised by relationship conflict or negative emotions. Attention has been given to the role of conflict expression and conflict management approaches to prevent this escalation (Pruitt, 1983; Tjosvold, 1986; Weingart et al., 2015). These can be targeted as a primary prevention strategy in conflict resolution interventions (Oore & Dolan, 2017). Another aspect, which has received less attention, is the second dimension of interpersonal heterogeneity: differences in identities. Social identities represent another powerful and potentially relevant feature of the relational context surrounding disagreement.

Differences in Identities in Interorganizational Collaboration: Current Questions

Representatives engaged in interorganizational collaboration will likely represent different *identities*. Different organizational identities are inevitable and different professional identities, probable. In an action research study on a health services collaboration, Beech and Huxham (2003) found that the two main social categories used by representatives to define their identities were role and location. Representatives often presented themselves in terms of their job title, professional training, and work experience. Furthermore, representatives will likely have simultaneous identities (Beech & Huxham, 2003; Bourgault, 2002a) and a double accountability: one to the home organization and another to the initiative (cf., van Meerkerk & Edelenbos, 2018; Williams, 2012). Based on 13 case studies on public-sector interorganizational collaboration

initiatives, Bourgault (2002b) observed that representatives represent their organization or constituency to the collaboration initiative and serve as specialist to the diverse collaborative group. They also become teammates to other representatives, representing that collaborative to their own organization and sometimes to the broader public. Representatives face a tension between being professionally different from other representatives (representing their organization and bringing unique resources) and having a similar identity and role (being part of an initiative and representing it to other stakeholders). Interorganizational collaboration is thus both an intergroup and an intragroup phenomenon.

In social psychology, differences in identities and salient social categories have been mostly studied from the lenses of social identity theory and similarity-attraction perspectives (Williams & O'Reilly, 1998). Social identity participates to a person's sense of self and self-esteem and can lead to processes of social comparisons and intergroup competition (Lemyre & Smith, 1985; Tajfel, 1974). Historically, this line of research has largely focused on the negative effects of social categorization and similarity-attraction processes on group functioning.

Debate on the Benefits of Shared Identity in Interorganizational Collaboration

There is a debate in research on interorganizational collaboration on the benefits of developing a collective identity (cf., Ungureanu et al., 2020). On the one hand, if the assumption is that social categorization is detrimental for group cohesion and that social categorization will occur, a potential solution is to develop a superordinate identity (Srikanth et al., 2016). Emergency management researchers have portrayed shared identity as a way to bring heterogeneous organizations to work together (Kapucu & Demiroz, 2017; Ödlund, 2010; Steigenberger, 2016).

On the other hand, other authors have questioned the feasibility of this strategy. Social identity and trust formation are closely linked in collaborations (Beech & Huxham, 2003). Trust is sometimes called as a prerequisite for collaboration, but collaboration is often needed where trust is low. Given the heterogeneous nature of collaborations, the authors suggest that a strong shared identity in the conventional sense is unlikely to be built. Trust and shared identity may also be bound to remain fragile in many collaborations because of turnover and shifting membership dynamics. Thus, collaboration may also be needed where shared identity is low.

Moreover, some case studies suggest that shared identity may result *from* collaboration and that fixing a common identity prematurely can present risks. In their study of the response to the Columbia space shuttle disaster, Beck and Plowman (2014) documented that trust and collective identity emerged *from* actions and shared successes. They did not constitute a precondition *for* action. The potential risks of precipitating shared identity are highlighted in a case study by Ungureanu and colleagues (2020) on collaboration for regional innovation. They documented that building a “swift collective identity” (p. 173) before differences had been surfaced and negotiated had helped start collaboration. Reification of this identity also led to a “misalignment crisis” (p. 204) later on when the rigidity of the swift identity could not accommodate emerging differences. In this case, partners changed the contents of the reified identity. However, the authors also cited cases where similar situations led to conflict, disappointment, and disengagement among members in a collaboration.

A Social Psychological Perspective. A similar questioning is present in social psychological research on group diversity. Social identity research provides evidence on the potential detriments of ingroup-outgroup distinctions. Salient social categories can activate biases, negative stereotypes, and lead to intergroup conflict and competition (e.g., Tajfel, 1974).

However, researchers also question the assumption that strong shared identity is necessarily beneficial. For example, Turner and colleagues (2011) have proposed to reconceptualize the popular concept of groupthink (extreme concurrence seeking in a cohesive group leading to poor decision making) in terms of social identity processes. They reviewed evidence suggesting that concurrence seeking may be a process of social identity maintenance enacted by groups whose positive group identity has been threatened. Research also suggests that it can be detrimental not to recognize subgroup identities and only common ones (Hornsey & Hogg, 2000; Huo et al., 2005).

In team research, the information-processing and social identity dimensions of group diversity have been traditionally studied separately (Williams & O'Reilly, 1998). More recent frameworks integrate information-processing, social categorization, and similarity-attraction perspectives into an overarching view where these aspects of diversity interact to influence group outcomes – for better or for worse. Carter and Phillips (2017) propose a dual pathway model of the effect of group diversity on performance. Once salient cues cause diversity to be recognized, diversity can engender one of two pathways. The first, detrimental pathway is more relationship oriented and linked to intergroup conflict behaviours. It takes precedence when intergroup bias is activated, leading to animosity, problems of communication, reduced trust, and decreased problem-solving ability. The second, beneficial pathway, is more cognition oriented and linked to the task resources potentially afforded by deep-level diversity. It takes precedence when biases are not activated, helping groups expect other differences, focus more on the task, engage in deeper information processing, and eventually attain better problem-solving performance. Srikanth and colleagues (2016) have questioned the parallel nature of these effects and highlighted their potential sequential effects. Despite this debate, both dual pathway and

temporal perspectives lead to the proposition that social category diversity can play a beneficial role for information processing in groups. This, by increasing awareness of potentially divergent views and increasing information elaboration (Carter & Phillips, 2017; Srikanth et al., 2016). In contrast, social category homogeneity could increase the tendency of groups to focus on shared information and prevent the information elaboration needed to benefit from diverse perspectives (Lu et al., 2012; e.g., Stasser & Titus, 1985). As a result, Homan (2019) notes in a review that interventions targeting the creation of a superordinate identity could create conformity pressures and hamper groups' ability to benefit from differences.

Thus, current group diversity models suggest that social category homogeneity could make groups less resilient to task disagreement by influencing how group members react and process them. In line with this proposition, experimental studies have found that people expect to agree with teammates with whom they share similar salient characteristics (Phillips, 2003; Rink & Ellemers, 2007). When these expectations are violated, individuals experience emotions such as disappointment (Rink & Ellemers, 2007), surprise, and irritation (Phillips, 2003). Experimental findings indicate that incongruence between surface- and deep-level features can lower one's sense of clarity about one's teammates (Rink & Ellemers, 2007), increase relationship focus at the expense of substantive task focus (Loyd et al., 2013), reduce decision quality (Loyd et al., 2013), and reduce commitment towards collaboration (Rink & Ellemers, 2007).

Given that building a common superordinate identity is sometimes proposed as a strategy to overcome heterogeneity challenges, research is needed to investigate claims on the potential negative impacts of perceived group similarity (Srikanth et al., 2016). However, only a handful of studies have looked at deep-level characteristics relevant to work settings (e.g., Phillips, 2003;

Rink & Ellemers, 2006, 2007). To our knowledge, only one study has used professional background as a salient social category and examined its impact on reaction to task disagreement (Phillips, 2003). Finally, few studies have looked at the simultaneous effects of cognitive and surface diversity on both performance and affective outcomes during group problem solving.

In sum, the scholarship reviewed above highlights three key research gaps on the role of professional diversity for performance and relationship quality during collaboration.

Summary and Research Gaps

Public problems such as disaster risk reduction are characterized by complexity, uncertainty, and heterogeneity. Collaboration is needed to address these issues. However, the heterogeneity inherent in complex problem domains creates challenges for successful collaboration. While interpersonal collaboration is recognized for its importance in interorganizational collaboration, the social psychological dynamics of collaboration remain understudied. There is a need to understand the role of member heterogeneity, and especially professional diversity, and how it affects successful collaboration in terms of performance and network sustainability. More specifically, from the above literature review, three research gaps emerge:

First, existing research often focuses on settings that compound different layers of heterogeneity. There is a need to understand the role of professional diversity separate from that of sectoral and jurisdictional differences. Furthermore, documenting the multilevel context of public-sector interorganizational collaboration would provide a better picture of how inter-organizational collaboration may be similar or different from intra-organizational team settings.

Second, professional diversity can lead to differences in perspectives and engender disagreement. These are part of the heterogeneity challenges that representatives must overcome

during their interactions. As observed in a recent review of workgroup diversity interventions (Homan, 2019), studies examining how contextual factors and moderators simultaneously affect performance and relational outcomes are rare. There is a need to examine how professional social categories could impact perception of and reaction to task disagreement and simultaneously affect subsequent performance and relationship quality following disagreement.

Third, there is a lack of research on the interpersonal processes by which representatives actually manage differences and resolve disagreement. There is a need for more observational research on task conflicts in group problem-solving situations to better understand the factors that may influence decision and relational outcomes. More precisely, there is a need to investigate the role of emotions, conflict perceptions, and information processing in the cognitive and relational pathways predicting these outcomes during problem-solving interactions.

Thesis Aim and Objectives

In view of the above gaps, the aim of this thesis is to improve our understanding of the role of professional diversity for public-sector interorganizational collaboration, especially as pertains to differences in perspectives and identities. Using the context of disaster risk reduction, three complementary objectives define the research agenda. The first objective has a broader, organizational, and experiential perspective while the two others narrow the focus on the specific functional dynamics of group problem-solving situations. Objective 1 is to document the experience of professional diversity in interorganizational collaboration within the same jurisdiction and sector. Objective 2 is to test more specifically how differences in professional identity affect perceptions and reactions following task disagreement. Objective 3 is to investigate, in the context of disagreement, the role of emotions, conflict perceptions, and information processing in decision quality and relationship quality.

These objectives will be pursued in two research streams, which will provide complementary lights on the role of professional diversity in public-sector interorganizational collaboration. Study 1 will address the experiential objective based on a series of qualitative interviews with federal public servants from different departments and agencies relevant to interorganizational collaboration in disaster risk reduction. In parallel, Study 2 and Study 3 will examine the functional objectives through observational designs. Study 2 will inform objective 2 using a simulation of interorganizational problem-solving with seasoned risk managers, whilst Study 3 will experimentally test the role of salient professional identity on perception of and reaction to disagreement in a controlled task disagreement situation. Finally, Study 3 will also investigate objective 3 by looking at how individual variations in emotions following task disagreement predict conflict perceptions, information processing, decision quality, and relationship quality through cognitive and relational pathways. The results of these two streams are integrated in the final chapter of the dissertation, the general discussion.

Chapter 2:

Study 1 - Professional Diversity in Public-Sector Interorganizational Collaboration:

A Qualitative Investigation in the Canadian Federal Disaster Risk Reduction Context

Professional diversity in public-sector interorganizational collaboration:**A qualitative investigation in the Canadian federal disaster risk reduction context**

The heterogeneity of stakeholders that characterizes complex public problems creates challenges for interorganizational collaborations and for the representatives involved in carrying out these partnerships (Kapucu & Demiroz, 2017; Mayer & Kenter, 2016). Among other sources of differences, professional diversity is a widespread feature in collaboratives and can create problems for communication, knowledge integration, and relationship building (Huxham & Vangen, 2005; Mayer & Kenter, 2016). However, research documenting heterogeneity challenges in public administration is often based on initiatives that compound many layers of differences, such as areas of expertise, sectors, or jurisdictions. This limits our ability to parse out the source of difficulties, such as those linked to professional diversity. Drawing on team collaboration research may be useful in this regard, but the specifics of interorganizational contexts must also be considered. Thus, to support public-sector interorganizational collaboration in heterogeneous contexts, we must understand the circumstances under which professional diversity could facilitate or impede its success.

In this study, we examine the role of professional diversity for public-sector collaboration outside of jurisdictional or sectoral differences by focusing on the Canadian federal jurisdiction. We examine the case of federal efforts in disaster risk reduction, which is a complex public issue of national concern for Canada. Based on interviews with public servants from different fields of expertise (environment, health, security) we document the perceived factors affecting interorganizational collaboration and we contextualize the role of professional diversity among them. By investigating the multilevel system of collaboration in this public-sector setting, we also seek to document how interorganizational collaboration may be similar or different from

intra-organizational team settings. The results contribute to a multilevel view of the contexts in which professional diversity can benefit or challenge interorganizational collaboration.

Professional Diversity in Public-Sector Interorganizational Collaboration

Previous research has documented some of the challenges that professional diversity can pose for interorganizational collaboration aimed at complex public problems. Professional diversity is widespread in collaborations (Huxham & Vangen, 2005) and constitutes a resource to understand multifactorial problems such as disaster risks (Comfort, 1989; Weichselgartner & Pigeon, 2015). Yet, members may be unaware of its presence or its effects on collaborative processes (Huxham & Vangen, 2005). It can create communication problems and misunderstandings due to different jargons, the presence of disagreement, negative stereotyping, reduced trust, or even conflict (Huxham & Vangen, 2005; Mayer & Kenter, 2016). Different professional and organizational cultures and values can clash (Huxham & Vangen, 2005; Ödlund, 2010). Researchers also note the difficulty of sharing and integrating knowledge among members with diverse knowledge embedded in experience and practice (Curşeu & Schruijer, 2017; Edmondson & Harvey, 2018; Weber & Khademian, 2008).

In team collaboration research, the challenges of professional diversity are particularly mentioned in the context of cross-functional teams, where members represent different functional divisions of an organization (cf. Horwitz, 2015 for a review). For example, Cronin and Weingart (2007) documented the conflicts and misunderstandings that can result from “representational gaps”, when members have different fundamental assumptions about the nature of an issue and the potential strategies that can be used to solve it. Comparing cross-functional teams and interorganizational initiatives based on a series of case studies on interorganizational collaboration, Bourgault (2002b) noted that interorganizational initiatives have to contend with

more diversity and more adversity. They tend to be less established, receive less organizational support, and regroup organizations from different sectors, jurisdictions, or cultures. They will often start without a clear and common goal and members face a dual accountability. More wayfinding is thus required to develop group cohesion and shared solutions. The challenges of professional diversity may therefore be compounded by the difficult conditions faced by interorganizational collaborations.

The role of professional and expertise differences in collaboration may vary depending on sectoral or jurisdictional setting. Researchers have emphasized the highly contextualized nature of interorganizational collaboration (Bourgault, 2002c; Huxham & Vangen, 2005; Paquet & Wilson, 2016; Rocan, 2018c). In public administration, heterogeneity challenges have been largely studied in the context of highly heterogeneous collaborations combining areas of expertise, levels of government, and sectors of activity. Each sector or jurisdiction has features that can shape how professional diversity may or may not be an influencing factor. In intersectoral or interjurisdictional settings, other factors can also covary with professional differences. For example, some types of expertise and professional experiences are more common in some sectors or jurisdictions than others. In inter-sectoral collaborations, communication problems and misunderstandings resulting from different institutional logics (Mattessich & Johnson, 2018) may also be misattributed to professional diversity. The direct applicability of frameworks based on intra-organizational or private-sector settings may also need to be nuanced (Bourgault, 2002b; Piercy et al., 2013; van Meerkerk & Edelenbos, 2018).

Thus, in the current state of interorganizational collaboration research, it is difficult to determine whether the collaboration challenges ascribed to professional differences reflect differences in area of expertise and knowledge, working cultures, sectoral/institutional logics, or

even issues of jurisdictional scope and authority. To better understand the role of professional diversity in a public-sector interorganizational context, studies of interorganizational collaboration within one sector and jurisdiction would be needed.

Collaboration at the National Level: The Case of the Federal Public Service of Canada

Collaboration between Canadian federal organizations is an example of such an intra-sectoral and intra-jurisdictional setting. In public bureaucracies, mandate areas differentiate organizational spheres of activities along broad disciplinary lines (e.g., health, environment, public safety). Even if representatives from different organizations are part of a general professional group (public servants), they are also accountable for different subject-matter areas and have traditionally addressed different disciplinary “slices” of cross-cutting issues in silos.

Since the 1990s, interorganizational collaboration has been increasingly encouraged in the Canadian Public Service (Bourgault, 2014). However, this setting also entails notable challenges for collaboration. The Canadian Public Service follows the Westminster system of parliamentary democracy based on the principle of ministerial responsibility (Treasury Board of Canada Secretariat, 2005). Although ministers are collectively accountable to Parliament, each minister has ultimate authority and accountability for the organizations in their portfolios (Treasury Board of Canada Secretariat, 2005). Vertical chains of commands ensure democratic accountability and prevent “government by the unelected” (Treasury Board of Canada Secretariat, 2005, p. 13). At the same time, vertical structures also create the “silos” that limit horizontal and diagonal interactions and information flows (Okros et al., 2011).

Scholars have described the traditional bureaucratic logic as favouring departmental corporatism, exclusive spheres of legal authority, competition, dominance approaches, and conflicts between organizations, with organizational units trying to protect and expand their turf

and resource pool (Bourgault, 2002d). In this context, some consider horizontal collaboration between federal organizations as no less than a “counter-cultural approach” (Bourgault, 2002b, p. 31). In the early 2000s, reports depicted major collaboration challenges in federal organizations, such as a management culture built on command and control, lack of adequate accountability frameworks, and lack of central coordination mechanisms (Bakvis & Juillet, 2004; Office of the Auditor General, 2005). Case study reports by Bakvis and Juillet (2004) noted that individual departmental mandates (ministerial responsibility) tend to be most salient for public servants while government-wide responsibilities (collective accountability) are more likely to be forgotten or misunderstood. They also highlighted a limited capacity for departments to overcome their differences in situations of high interdepartmental disagreement.

To our knowledge, the federal context for collaboration has received limited attention since these reports as broader issues of collaborative governance across sectors and jurisdictions have taken precedence in public administration research. Yet, implementing horizontal, networked, and “whole-of-government” strategies enabling integrative and innovative policies remain core themes in public service renewal strategies (Clerk of the Privy Council, 2013; Privy Council Office, 2019). For social psychologists seeking to understand the role of professional diversity for intra-jurisdictional and intra-sectoral collaboration, the Canadian federal public service is a relevant study context.

The Disaster Risk Reduction Policy Arena in Canada

Studying interorganizational collaboration at the federal level is also important in the specific context of disaster risk reduction (DRR). Dramatic increases in federal liabilities due to major disasters in the past 10 years are projected to continue (Public Safety Canada, 2019). Collaboration is a key component of Canadian national policies on DRR and climate change

(Government of Canada, 2016; Public Safety Canada, 2008). Legal authority for many aspects of risk management rests at the provincial/territorial or municipal levels and Canada's National Disaster Mitigation Strategy is inherently inter-jurisdictional (Public Safety Canada, 2008). Despite this, government-wide accountability means that coherence in DRR policies and programs at the federal level is still required to maximize the effectiveness of federal resources. Hence, substantial efforts have been invested by the federal government to coalesce various domains of mandates and responsibilities and to generate the need for interorganizational collaboration among DRR-relevant departments and agencies. Documenting how member heterogeneity with its differences in expertise and professions plays in federal interorganizational collaboration is a much-needed contribution to Canadian DRR.

Present Study

In view of current needs, this study investigated the role of professional diversity, and of member heterogeneity more generally, in public-sector interorganizational collaboration between organizations differing in expertise but not in sector or jurisdiction. It focused on Canadian federal organizations working in DRR as a case representing this type of collaboration setting. Within a multilevel socioecological framework (Bronfenbrenner, 1979), the study was guided by two research questions: 1) How do federal public servants describe the factors facilitating or impeding federal departments' capacity to engage in interorganizational horizontal collaboration? 2) In this context, what are the reported challenges and opportunities associated with professional diversity, and member heterogeneity more generally?

Methods

Design and Participants

The study followed a qualitative methodology based on semi-structured interviews to document the experience of public-sector interorganizational collaboration in Canadian DRR. It focused on federal departments from three general expertise areas related to DRR and climate change adaptation: a) Environment and natural resources (hereafter referred to as Expertise E), b) Health (Expertise H), and c) Safety and security (Expertise S). Approximate department size ranged between 1,200 and 12,000 employees.

Purposefully and evenly distributed across expertise areas, eighteen (18) interviews were conducted with federal public service managers and professionals (6 interviews from each expertise area). Efforts were made to recruit a balanced sample in terms of gender (7 women, 11 men), language (7 francophones, 11 anglophones), and location (11 participants from the National Capital Region; 7 from the other regions and balanced across Quebec, the Atlantic provinces, and the Prairies and British-Columbia). Roles were also balanced between policy development and program delivery. All participants had a graduate university degree. The average experience in the federal government was 19 years (range: 10 to 40) and the average work experience related to disaster risk reduction was 17.2 years (range: 5 to 25). Average interview duration was 67 minutes (range: 39 to 123 minutes).

Materials and Data Collection Procedure

The interview guide was developed based on study question and previous research on collaboration and mental models in risk management. We obtained feedback from a subject-matter expert in DRR and tested the interview guide in a practice interview. Interviews had two main sections. The first part covered federal DRR efforts, including the roles of the federal

government and of the participant's organization as well as current collaboration needs between departments. The second directly targeted facilitators and barriers to collaboration in the federal government (see Appendix A).

Ethics approval was obtained from the University of Ottawa Research Ethics Board and the consent form is provided in Appendix B. The interviews took place between March and August 2018. Participant recruitment drew on contacts made in previous research projects or at recent Canadian DRR-related events, on snowballing techniques, and on consultation of governmental directories to identify relevant participants. Interviews took place either by phone or in person at the participant's organization or the University of Ottawa. All interviews were audio-recorded with participants' consent and transcribed. Throughout the data collection process, the main author wrote high-level summaries shortly after each interview and practiced memoing to reflect on emerging themes.

Qualitative Data Analysis Procedure

The analysis strategy followed a pragmatist realist approach and the thematic analysis techniques outlined by Miles, Huberman, and Saldaña (2014). Transcriptions were coded using NVivo. The first author coded all transcripts and a second coder recoded a subset to establish validity. The analysis proceeded in inductive and deductive stages. First, the detailed summaries informed an a priori coding scheme. During coding, all mentions of factors depicted as facilitating or hindering interorganizational collaboration, communication, or policy integration were coded. Emerging codes were added to the grid. These codes were progressively regrouped in broader sets in an effort to identify categories that meaningfully summarized participants' descriptions in relation to research questions. Segments were coded under the different categories they discussed (simultaneous coding) to capture links between them during data

retrieval. Strategies to ensure the trustworthiness and reliability of findings included a peer audit process with a second coder. This verified clear definition of concepts and reliability of key coding decisions in a two-step process: 1) For identification of relevant segments, the second coder coded one interview at the paragraph level to identify those that described facilitators/barriers to interorganizational collaboration. Agreement was 91% and adjusted kappa for marginals, κ_n , was .82 (Brennan & Prediger, 1981; Gwet, 2014)¹. Final agreement was 100% after discussion. 2) For the coding of facilitators/barriers described by participants, percent agreement on 154 coding decisions was 55% and κ_n was .53. Among coding conflicts, 82% involved four categories. Post-discussion agreement was 100% and other interviews were revised accordingly. In addition to peer audit, the trustworthiness of analysis was supported by: triangulation of findings with ongoing readings on past research findings and comparison of different participants' accounts on the same issues; ongoing search for disconfirming evidence on emerging conclusions; and finally, use of memoing throughout data collection and analysis to support reflexivity and keep record of the analytical process (cf. Lincoln & Guba, 1985). Appendix C presents the detailed coding grid.

Findings

We present findings on factors affecting collaboration (Question 1), followed by those on the role of member heterogeneity (Question 2). For anonymization, participant numbers are used and indicate area of expertise: E (environment, natural resources); H (health, including public health, regulation, food inspection); and S (safety, security). French quotes are translated.

¹ The Brennan-Prediger kappa is the same as the Prevalence and Bias-Adjusted Kappa (Byrt et al., 1993) but for more than two categories. It is interpreted like a Cohen's kappa (Gwet, 2014).

Question 1: Factors Influencing Interorganizational Collaboration in the Canadian Public Service

Facilitators and barriers were identified across four main categories within the multilevel interorganizational collaboration system: A) Institutional factors (national, institutional, and problem context); B) Inter-organizational factors; C) Intra-organizational factors; and finally, D) Person factors. These main categories regrouped a total of 19 subcategories from the coding grid. Of note, categories B and C each encompass interpersonal elements as well as broader (inter)organizational ones because the entwinement of micro- and meso-level elements in participants' accounts made their separation difficult.

A) Institutional Factors

All interviews mentioned institutional factors, which were mostly collaboration barriers.

A1. Geography. First, *Canadian geography* can make federal collaboration difficult because of geographical distance and diverse local realities. Nation-wide approaches are complicated since “*each community has very specific risks and specific demographics and a very specific context*” (P10-S).

A2. The DRR Problem Space in Government. Participants discussed *features of the DRR problem space* that can influence collaboration. Organizational priorities are more likely to clash in long-term planning efforts. This can complicate federal collaboration because federal roles tend to be long term. Conversely, collaboration is easier during disaster response as “*it's always easier for everyone to sort of pull their socks up and work together when there's a crisis or an emergency*” (P21-S). The highly political nature of climate change has made funding priorities more variable across past government mandates.

A3. Jurisdiction. Jurisdictional authority can shape collaboration. Since many DRR policy levers are outside federal responsibility, inter-jurisdictional (vs. intra-jurisdictional) collaborations appeared to take precedence. Hence, a participant noted the absence of “*a truly integrated [federal] approach [...] we still really, really work in silos*” (P01-E). Intra-federal collaboration can also be delicate for issues that are outside federal authority.

A4. Bureaucratic Structure. Seventeen interviews described features of the federal bureaucracy. A recurring barrier is the siloed organizational structures and compartmentalization of policies, funding, and incentive structures. One participant stressed as a major point that implementing, and not developing, integrative solutions is the most important barrier to system change: “*the solutions are never a sufficiently close fit to the systems in which they need to be implemented*” (P19-S). *Incentive structures* were cited as a major impediment, creating a “*cultural problem within the federal civil service*” (P22-S) and a “*strong disincentive [to collaborate] unless the collaboration is maximally fast*” (P19-S). Participants’ accounts depicted the paradoxical role of *departmental mandates* or a tension between the need for top-down direction/resources and the need for bottom-up flexibility/innovation. Too much differentiation can leave “*big gaps in the middle that nobody’s responsible for*” (P19-S). A participant called for “*improved hybridization [...] between health and environmental mandates] so that the collaboration is more seamless. The mandates are more in line with each other*” (P05-H). However, mandate overlap can also create a “*tragedy of the commons*” (P22-S) and reduce investment in shared policy issues. Conversely, absence of mandate can provide more leeway to entrepreneurial public servants looking to collaborate and innovate. One described that without “*shackles [...] legacy rules and regulations to be able to go and hold us back... we do things differently and that’s the reason for like our partners*” (P15-E). Rules and procedures were

described as another issue limiting collaboration. A participant's self-stated main message was that “[w]e’ve basically lost the ability to meet face-to-face” (P05-H) in regions outside the NRC because of federal rules. To them, this was a major barrier to both intra- and inter-jurisdictional collaboration (the latter being the participant's biggest concern).

In terms of facilitative solutions, some participants called for greater leveraging of vertical authority to create shared accountability. While a participant observed that it has become “almost a requirement [that] programs be developed jointly” (P06-E), others suggested that “consolidating the delivery of program funding” (P21-S) or creating a “Climate Change Secretariat” (P05-H) or a “Resilience Secretariat” (P21-S) would help greater federal coherence. This, to push departments to propose integrated proposals. At present, one noted “a disconnect there in the responsibility for emergency management in Canada.” (P20-S). Another solution was the adoption of complementary “Special Forces models” (P19-S) like in the military. Finally, overarching DRR frameworks (e.g., Sendai framework, Canadian Emergency Management Framework) help create “strong references” and “coherence” across stakeholders (P18-S). However, a participant suggested the need for improvement of current frameworks to integrate disciplinary areas across DRR phases, since “we lack a conceptual model that would integrate different functions linked to disaster risk reduction” (P23-H).

B) Interorganizational Factors

This level described structures and processes between organizations or between their representatives.

B1. Formalized Supports. All interviews stressed formal elements that support collaboration. Having a *network coordinator* helps to overcome silos and differences. Because of silos, a participant explained that “you need to be able to integrate all of this [...] if you don’t

have anyone able to make all the links [...] it becomes a major obstacle” (P01-E). Coordination roles included network curation, convening/facilitating, information brokering, helping standardization and clarity of goals, developing *“a common look and feel, a common language”* (P08-H), and navigating differences/preventing tensions. Thus, coordination appeared to support other facilitators like opportunities for interactions, networks, and integration. Second, the *“governance system” between top executives* (P01-E) plays a role in initiating and articulating collaborations. For example, a participant indicated that the creation of interorganizational teams with shared accountability by top management had been key for a successful initiative: *“you really were building teams, and you were building teams that had a common goal [...] by defining the program outcome in a fairly detailed way and having all of this, call it management oversight around it”* (P04-E).

Third, 15 interviews highlighted the benefits of *formal structures and opportunities for interactions*. These included interorganizational events, committees, and teams as well as dedicated liaison personnel (regional representatives, employees dispatched in partners’ offices). Stable and formalized structures facilitate communications. Lastly, *established information/data sharing mechanisms* were important for collaboration. Yet, two participants warned against overreliance on *“collaboration between computers”* vs. *“human to human collaboration”* (P03-E) because of the potential losses in rich communications and understanding of partners.

B2. Communication. The importance of rich and frequent interactions/communications was cited in 17 interviews. This included *“maximizing face-to-face” interactions* (P18-S) and two-way *“conversations”, “discussions”, “dialogue”, “exchange”*, as well as joint planning and emergency preparedness exercises. Discussing respective goals, identifying areas of disagreement, understanding different realities, and engaging in joint evaluations to ensure

partnerships fulfill respective mandates were cited as important topics. Such exchanges facilitate understanding of partners, relationships, and integration (building shared perspectives and solutions). As described by a participant: *“the more conversation you have with these various organizations and the more I’ll call it face time – and I don’t mean [managerial] face time, I just mean the organization’s face time – creates the relationship”* (P07-E).

B3. Interorganizational Networks. Relationships were a key collaboration asset and outcome. In terms of *density*, connections *“at all levels”* (P06-E) are needed. Relationships can increase understanding of why collaboration is needed – making staff more *“responsive”* to partners (P07-E). Relationships from past collaborations have carry-over benefits for future ones. While informal networks were put as *“a key to ensuring that collaboration happens”* (P21-S), they can also increase vulnerability to turnover. Established communities of practice can also reinforce siloed issue definitions and prevent extending collaborations. In terms of *quality*: trust and belief in a target’s willingness to share power, versus *“suspicion”* (P22-S), supports members’ willingness to collaborate. Quality also includes the belief that partners’ contributions will be useful, especially the *“credibility”* (P18-S) achieved through demonstrating added value. According to a participant, *“what fuels credibility, it’s also delivering results. [...otherwise] well we can be super nice and friendly and everything, I’m not sure that it really serves us that much.”* (P18-S). Conversely, a partner perceived as *“more of an obstacle and hindrance”* (P22-H) can bring hostility and resistance.

B4. Integration as Facilitator, Process, and Outcome. In 16 Interviews, integrated/ common perspectives, strategies, and actions emerged as a central collaboration asset, process, and outcome. Integration can differ from *“sameness”* and is not always a starting point such as in heterogeneous contexts. As a process, it included developing shared understanding of goals,

roles, language, combining expertise into something new, and developing strategies or products that fulfill different members' mission/goals. As an outcome, it was enabled by rich communications, relationship-building, frameworks, and coordination. As an asset, previous integration developed over time facilitates future collaboration and coherence of actions. For example, a participant discussed the benefits of joint plans and continued interactions: *"having developed this plan a few years ago, and then by revising it from time to time, we see our roles, our responsibilities, especially our interdependencies"* (P08-H).

B5. Quality and Continuity of Membership Assets. Membership and continuity considerations emerged in 14 interviews. Participants described elements of *quality*, including adequate expertise, experience, legitimacy, and delegated authority. Size was also an issue, as conveners must balance between *"concertation, inclusion, and results"* (P18-S). Two thirds of interviews discussed the negative (positive) impacts of *turnover (continuity)* of membership. A participant explained how continuity of representatives had benefited a collaboration initiative: *"the relationships they built up created trust, created common understanding, created a willingness to try to solve problems and overcome issues."* (P04-E). Conversely, turnover can cause loss of *"organizational memory"* (P01-E), of above-cited expertise/experience (potentially affecting organizational credibility), of communication channels, relationships, and trust. Because of its impact on top-down supports, management turnover appeared as especially detrimental when new managers lack understanding of the complexity making collaboration necessary. A participant pointed to this as an issue in some departments: *"we have a lot of rotation of people that step in the minister level and so forth. [...] The senior managers do not stay in those departments long enough to fully maybe appreciate some of these things"* (P22-S). When this is a systematic occurrence at the top of organizations, it can limit a field's ability to

evolve. *Factors that make collaborations more resilient to inevitable turnover* were cited: strong interorganizational groups to train newcomers, openness to adaptation, having reference documents, avoiding long consultation processes, dispatching representatives with adequate expertise/experience, and multiplying points of contact between organizations.

B6. Stakeholder Differences and Similarities. Finally, participant described the role of differences and similarities between organizations or between their representatives. This will be developed below (Question 2).

C) Intra-Organizational Factors

This level included managerial practices and intraorganizational processes and interactions.

C1. Top-Down Directives and Supports. All interviews cited the need for support coming down the organizational authority structure. They described the determining influence of organizational mandates, (competing) priorities, resources invested in collaboration, and managerial directives. Participants highlighted how managers contribute to defining and interpreting priorities, deciding for/against collaborative strategies. Managers help collaboration by being “*visionaries*” (P01-E), establishing institutional supports (e.g. teams), helping to “*overcome those rules*” hindering progress (P04-E), or supporting employees striving to fulfill difficult mandates. Conversely, they can direct their staff “*not to cooperate*” (P22-S) or concentrate resources on other priorities. However, a participant contended that top-down authority is not sufficient to ensure collaboration when not accompanied by other strategies like relationship-building between organizations. This was illustrated by the following quote:

[R]elationship building [...] it has to be established at all levels in the organization. If it doesn't happen, then there's very little that [the management] can do to get [the

organization] to be more responsive. [...] they don't understand the relevance of it, 'why do we need to do it', et cetera. But you need to establish this sense. (P07-E)

C2. Intra-Organizational Collaboration. Interviews described how intra-organizational collaboration supports inter-organizational collaboration. On the horizontal plane, collaboration and coherence between units can help the quality of outside relationships, both in terms of credibility and trust. The importance of internal coherence for external credibility is illustrated by a participant: *"sometimes the central administration can have contacts, relationships with our partners here in the region and it's our regional partners that will inform us [...] this also affects credibility. [...] if the department is coherent, it strengthens credibility"* (P18-S).

Interviews depicted the importance of collaboration between hierarchical levels to nurture, steer, and empower what seemed to be a "bottom-up" source of collaboration. Collaboration was described as often a *"bottom-up process"* (P24-H) or *"something that happens in the field, that is more operational"* (P23-H). When organizations invest in interface personnel or put staff on interorganizational tables, these employees hear of partners' needs, codevelop policy content, and acquire networks: the *"closer you get to the field, the more people know each other"* (P08-H). Vertical functioning can enable organizations to leverage these resources. For example, a participant described how their organization's dedicated interface personnel brings information about partner needs, which are passed up between levels and contribute to the development of new initiatives:

They act like a transmission belt. [...] the directors lead files, but it's often something that will have been brought by [the interface personnel]. They will come to the directors and say 'well, people are asking us for this, it would be important' and 'how could we

develop a project?’. So then these are things that will be developed, but...it’s at all levels.

(P01-E)

Other participants discussed how collaboration is facilitated when the upper levels value collaborative approaches and delegate sufficient authority to act as a representative. The role of trust is mentioned by a participant who described how executives are “*in the collaboration chain [...] we provide recommendations, we provided analyses and everything, but in the end, we must trust the decisions they will take*” (P06-E). This, even though decisions do not always support their proposals. The following quote illustrated another aspect of trust where feeling they can count on a supportive intra-organizational environment enables representatives to engage with partners:

you have to kind of be willing to almost give up control and authority to some degree which is, you know, you have to sort of do that in an environment which you can feel that you’re not going to be punished in the end because you’ve not kept tight control of things

(P22-S)

Problems in the quality of the vertical chain also arise. On the structural side, some participants described the openness to collaboration they sense at the working level, while incentive structures tend to disincentivize collaboration for middle management. This creates “*collaboration friction points*” or a “*breakdown of interface*” (P19-S) between levels and hinders the development of systemic solutions. Given the inertia of organizational structures, a participant expressed that “*it’s really incumbent upon the public servant at the working level to... just to go and do that, to make sure those things happen*” (P21-S). On a more relational side, a participant described that “*many can sometimes feel misunderstood or not really well served by top executives*” (P06-E) when they do not understand upper-level decisions. This sense

was echoed by a participant explaining how they “*try not to become too demoralized*” (P24-H) despite seeing projects be abandoned due to changing organizational priorities.

C3. Organizational Learning and Service Orientation. Fourteen interviews highlighted the learning that takes place for representatives engaged in collaboration, the role of organizational memory, or that of strategies to increase collaboration capacity over time. Learning between representatives increases effectiveness of interorganizational groups over time. A particularly detrimental effect of turnover seemed to be losing understanding of issue complexity, of stakeholders, and networks. Continuous loss of organizational memory at the top could be especially detrimental. Participants discussed organizational strategies to develop the subject-matter and collaboration expertise among staff and improve organizational capacity and value as a partner. These included training, human resource policies to recruit and promote staff with collaboration competencies, partnerships with universities, continuous improvement, and strategic outreach units to contribute to connections, training, and increase system awareness among staff.

if you have teams where there's high turnover [...] you can't develop an organizational memory [...] they don't know other organizations' mandates [...] how the articulation happens [...] this becomes a major obstacle. Because we're always reinventing the wheel (P01-E)

if [the bureaucracy] doesn't understand the proper skill sets you need and it does not select and hire those people, you're never going to get to a situation where you can build a trust and have the necessary leadership and vision (P22-S)

C4. Work Well-being. Although only mentioned by two participants, this factor stood out because it tends to be underrepresented in existing literature. Work well-being was described

as influencing other factors that are themselves well-documented, such as collaborative stances, the quality of interorganizational dynamics between representatives, and turnover.

the managers working with us that care about ensuring that everyone is well in their work. [...] when it's repeated in each department [...] it takes organizations that have a governance... institutions that work well so that afterwards there can be good collaboration (P06-E)

well of course sometimes collaboration is difficult and then what happens is that [...] people can afford to change jobs. 'I don't like my job, I'm going elsewhere'. [...] So you have a quick turnover. People don't have time to learn. [...] The impression you have is like a wheel turning on ice. The car isn't doing well [...] it's not moving forward.

(P24-H)

D) Person Factors

This level included factors observed at the individual level and reported by interviewees when discussing persons. Of note, these factors can be shared by groups and/or may be driven by structural determinants, since individuals also embody to some extent their institution and organization, especially when they act as representatives.

D1. Collaborative Attitudes. Fourteen interviews described the need for attitudes (including “cultural” ones) that favour collaboration, such as “*willingness*” and “*openness*” to collaborate, including to “*share information talk about challenges and needs and gaps*” (P21-S), “*get out there [...] actually try to understand [...] the partner organizations*” (P04-E), “*to considering all sides or aspects of something*” (P15-E), to “*a coevolution with the different stakeholders*” (P23-H). Second, they cited *respect and recognition* for people and organizations, their autonomy, different perspectives, and other’s contributions (including sharing credit). Trust

can be built where it was weak by consistently manifesting and embodying these attitudes. A risk is conserving a hierarchical logic in a horizontal (e.g., cross-jurisdictional) situation. Disregard for partners' autonomy or capacity can reduce their collaborative attitudes and damage relationships. Feeling the need to *"be in charge"* can create *"dominance tensions [...] a lot of friction and to some degree even animosity"* (P22-S). Same with a saviour attitude (*"I'm from Ottawa, I'm here to help."*; P16-E). Some mentioned that willingness is not enough to override barriers like disincentives for collaboration or lack of top support and coordination.

D2. System Understanding. All interviews depicted the benefits (pitfalls) of people having (lacking) a system understanding of issues, interdependencies, partners/stakeholders, and networks. This included *having* system knowledge (echoing the notion of "situational awareness") and a more malleable aspect of *adopting* a system perspective. A system understanding emerged as a determinant of collaborative attitudes and of collaboration across differences: when considering the bigger picture *"then suddenly your self-interest changes [...] you have some mutual self-interests because we're working together to help Canadians rather than supporting our individual departments' mandates"* (P05-H). Understanding the complexity of an issue and interdependencies brings one to *"respect what our partners bring to the table."* (P15-E). A participant recounted a *"cultural shift"* (P17-H) when colleagues started seeing their work in the broader picture and how it could contribute to others. At the opposite end are the bureaucratic and jurisdictional *"silos"* (P01-E, P05-H, P17-H) or *"stove-piped approach to life"* (P22-S). Interviews discussed the need to understand networks and partners, their needs, language, and circumstances to be an effective collaborator. Implicit in this is the presence of differences between stakeholders. Lack of system understanding can decrease the quality of one's outputs for partners or unintentionally harm them: *"you can be extremely competent but*

not be able to develop something that's worked as relevant [...] you can't manage unintended consequences if you can't see beyond your own context" (P05-H). A participant described how catching on to differences in staffing levels between federal and local organizations enabled federal representatives to *"[make] sure that we deal with them consistently so that we're not sort of tearing them in too many directions"* (P17-H). System understanding facilitates integration of efforts in joint projects that meet diverse stakeholder needs and can prevent damaging relationships with different others. Understanding of stakeholder networks appeared crucial to ensure coordinators convene the right players and broker convergence despite heterogeneity.

we don't know other departments' needs as well. So when we want to develop a project together, it's important to make the effort to understand: why do the others want this given project or this given component? Why? (P06-E)

nothing really takes place of being able to work and understand what the outcomes are [...] who's got what mandates, and what decisions are being taken. And from a client service perspective then we can work with those entities to provide the best [...outputs]. (P04-E)

appreciating the constraints, circumstances, realities of everyone [...] to bridge, you need to appreciate the realities of both organizations (P18-S)

D3. "Good Partnering Skills". Participants cited the importance of *"good partnering"* (P04-E) and *"teamwork"* (P16-E) skills and behaviours. These included integrative and collaborative conflict management skills to support the convergence and integration of stakeholders' different perspectives and interests through *"negotiation"* (P04-E) and *"compromise"* (P16-E). Collaborative attitudes in diversity management also meant *"being able to be respectful of the circumstances of each party"* (P16-E). Communication skills included the

ability to adapt messages to stakeholders, translate knowledge, communicate uncertainty, explain reasons behind positions, and being an open and skillful listener. A participant cited *“the ability to listen to other people’s arguments is a competency that’s required. And also an ability to explain your own assessment”* (P10-S). Network leadership and functioning skills were cited, especially for network coordination positions, such as the ability to work on an equal plane (outside hierarchical relationships), facilitation skills, and the ability to convince and influence. This, because *“when you’re managing by network, you’re managing relationships, you’re convincing people. So it’s power of persuasion.”* (P22-S). Echoing the importance of system understanding, skills included *“strategic thinking”* and *“client focus”* competencies (P03-E). Taking a diversity mindset, a participant observed that one cannot expect this of everyone as some are simply *“not hired to do that”* (P17-H).

D4. Entrepreneurial Engagement. Fifteen interviews illustrated the passion and efforts that must be invested by organizational representatives to be proactive, work towards change and innovative solutions, overcome inevitable barriers, create connections, and nurture collaborative relationships. First, they depicted striving for results, or that *“you’ve got to care”* (P15-E), to be *“[s]howing initiative, being action oriented”* (P09-H), that a cultural change towards collaboration had been facilitated by *“me being a nag”* (P17-H), and that (interprofessional) collaboration is easy in a context where *“we’re all passionate people”* (P01-E). Innovation and creativity are needed to overcome barriers, such as searching for *“ways to collaborate”* and *“creative ways to access existing resources”* (P05-H). At the opposite, risk aversion, *people that “don’t like change”* (P03-E) or refuse to step outside their narrow professional expertise were mentioned as a source of difficulties. Second, many illustrated the need for engagement towards partners, proactiveness, *“reaching out”* (P17-H). This, to learn about, anticipate and adapt to

partners' needs and to create and maintain relationships (including thinking in terms of consequences in risk communication). They illustrated how this engagement is linked to learning and developing system understanding.

it took quite a bit of discussion to try to convince [the province] that this was their priority, a priority enough to be able to move forward to develop a cohesive plan with the partners (P15-E)

So it's going pretty well. Why? Because we took the initiative... of doing training together [...] not being shy to go and present our roles and responsibilities (P08-H)
it's establishing your network, maintaining it, and then having a continuity [...] saying, 'yes, we exist. Yes, we want to hear you, we're going to listen, what's your reality like?' (P24-H)

people engaging together and maintaining relationships and adjusting along the way. [...] people have taken that time. [...] They're proactive, always proactive about reaching out, providing [information] and having the relationships built. (P04-E)

D5. Personality. Seven interviews mentioned the influence of personality dimensions on collaboration. They referred to the “*personality-dependent*” (P24-H) aspects of spontaneous interpersonal connections or antipathy at any levels – from professionals to the Cabinet table. Extraversion seemed to facilitate constant nurturing of partnerships. Collaboration was thought to be harder for “*introverted*” people (P18-S). Common personality traits seemed to make things easier, such as in a group of “*similar outgoing and personable folks* (P17-H). Echoing the role of system understanding, participants stressed that this is “*something that we need to consider*” (P03-E; P18-S); that for some, *picking up the phone and calling someone is more difficult*” (P03-E) and that one may need to adapt in the sense that “*if you have a group of introverted persons*

on the other end, you might need to scratch a little bit more to get your information” (P24-H).

This suggest that sensitivity to these types of differences can also be helpful for anyone involved in collaborations. Finally, a participant highlighted as a key competency the role of moral traits such as being “*honest*” and “*trustworthy*” (P15-S) for developing and maintaining good partnerships. Table 2.1 summarizes the facilitators and barriers to collaboration.

Question 2: Perceived Role of Member Heterogeneity and Professional Diversity

Differences between organizations or their representatives were not among the most salient influencing factors to interorganizational collaboration. Contrary to assumptions, interprofessional differences also were not the most challenging differences. Differences in mandates and goals appeared the most disempowering. They illustrated the constraints to collaboration found in a compartmentalized bureaucratic context. Interviews also depicted the interplay between types of differences and with other factors.

Differences in Expertise or Perspectives as Assets if Integrated

Differences in expertise and perspectives were generally cited as an asset. In DRR planning, participants expressed that “*for it to function... you need to have teams that are really... multidisciplinary*” (P1-E), cited instances where “*there was a multitude of perspectives. So that diversity is good.*” (P20-S) or indicated that it would be “*a useful thing to have people with different backgrounds*” (P21-S). Cross-jurisdictional preparedness planning cannot be done “*each in our own little house* (P08, H). Communication between people having the perspective of different “*altitudes*” (on the ground, at different levels of government; P05-H) is also needed for effective response. In contrast, similarities of views on the workings of collaboration can be facilitating. A participant cited that contacts could be facilitated if connections were made by

Table 2.1*Main Factors in Collaboration Based on Content Analysis of Interviews*

A. Institutional factors
1. Geography challenges (-)
2. Increased conflicts at DRR planning stages (-)
3. Shared powers across jurisdictions favour cross-jurisdictional collaboration (-)
4. Bureaucratic structures as powerful barriers * (-)
 B. Inter-organizational factors
1. Formalized supports to build and articulate bridges between silos * (+)
2. Rich and frequent communication * (+)
3. Interorganizational networks as asset and outcome * (+)
4. Integration as asset, process, and outcome (+)
5. Quality and continuity of membership assets (+)
6. Stakeholder differences and similarities (+/-)
 C. Intra-organizational factors
1. Top-down directives and supports bring resources and prioritization* (+)
2. Intraorganizational collaboration supports interorganizational collaboration (+)
3. Organizational learning and service orientation to increase collaborative capacity (+)
4. Work well-being (+)
 D. Person factors
1. Collaborative attitudes * (+)
2. System understanding supporting desire and ability to collaborate * (+)
3. Good partnering skills * (+)
4. Entrepreneurial engagement for innovation and service (+)
5. Personality facilitators (+)

* Categories most mentioned across participants; (+) facilitator; (-) barrier.

“dedicated [strategic outreach] shops [...] available in the different departments [...] in part] because then it’s like-minded people, right? It’s folk that sort of do this” (P17-H).

Interactions. The benefits of differences in expertise were often cited in conjunction with assets enabling integration. Having a system understanding was echoed in the role of *“transdisciplinary”* understanding to avoid losing time in disagreement and *“battling over definitions”* (P01-E). Its effect on collaborative attitudes was again reflected: having *“more all-around education [...] is] important in collaboration because you have to be quite open to considering all sides or aspects of something”* (P16-E). In contrast, a participant described how different and non-overlapping conceptions of what constitutes a risk combined with *“a total lack of mutual awareness [...] led to] two different types of federal entities talking two different sets of language when it comes to the same concepts”* (P20-S) and to disengagement.

Differences in Mandates and Goals

Differences in mandates and goals were the most cited and seemed the most disempowering differences. They hamper initiation of collaboration. Organizations are difficult to mobilize as they *“may not be on the same timeline as far as a priority is concerned”* (P15-E). Different mandates and priorities create *“lanes”* (P20-S) across which one may be less likely to reach. Conversely, synergies when *“mandates are different, but they connect”* (P06-E) are facilitating – also echoing the idea of shared accountability mechanisms. Second, they can limit achievement of integrated solutions or efforts across organizations. It can be *“almost impossible”* to *“uniformize”* efforts between departments or even units despite the possibility of being proactive and trying to *“become closer to one-another”* (P24-H). A participant also described instances of *“conflict”*, *“ongoing dynamic conversations”* in an initiative (P19-S). Beyond the federal context, a participant cited how *“different approaches, abilities”* or

“planning horizons” (P22-S), even within an area of expertise and sector, can hamper common frameworks for evaluating risks and negotiating joint measures.

Interactions. In terms of buffering factors, here again, system understanding and communication to develop it were cited. *Understanding “the audience you’re serving”* (P07-E), interdependencies and roles helps to make *“relevant”* (P05-H) contributions. Collaborative attitudes and communication to understand needs are central for *“negotiations”* (P06-E) during joint project development and for ongoing work articulation between partners.

We’re multidisciplinary, but I take care of health. I can’t, in joint agreement with myself, decide to take an action that could have an impact at the environmental level or on Transport Canada or on other departments (P08-H)

so there’s sometimes a bit of complications between how they want things done as compared to how I have to do things. [...] If things work out, each side has to work, but that comes with respect and caring about what the other has to do and has to be done as well. (P16-E)

Compartmentalized Versus Collective Identities

Participants cited the role of collective identities. One cited that people often identify with their department, branch, or unit rather with the government as a whole, which seemed to reduce system understanding: *“there is a very almost tunnel vision view”* of employers, which is *“detrimental because that means that people can’t get their head out of the sand”* (P21-S). Another reported how communicating a collective identity is a key strategy for them: *“I never, ever think about us being the federal government and I work for Organization X with my partners. I consider them to be part of my team [...] And I tell them that. ‘We’re on the same team’.”* (P15-E).

Interactions. The contrast between these two participants' reflections also illustrated the role of collaborative stances for communicating collective identities. Despite the potential "*communication requirement*" (P21-S) needed for building a government-wide identity, the first warned of potential suspicion if top executives communicated a collective identity but it was perceived as imposed or instrumentalized. The other specified that sincerity of intentions to actually act as a team contributes to the success of team identity building.

"that might just come across as propaganda and there could be like a backlash to that [...] it might just be seen as... being forced upon people or have a political tone to it rather than a non-partisan tone that the public service is supposed to maintain." (P21-S)

And I really believe that. I'd say about 90% of the time that works and everybody buys into it [...] I think that it's genuinely been a heartfelt and received by our partners that that's the way that we function [as a team]." (P21-S)

Organizational "Cultural Differences"

Finally, cultural differences between organizations and professional groups were also cited as a challenge. One participant described willingness to share information (part of collaborative attitudes) as a point of "*friction*" (P23-H). During incidents, security professionals may privilege protecting information because of investigations while health organizations require and value rapid sharing to protect the population. This participant nuanced that when organizations are aware of interdependencies (system understanding), they tend to share information. Another tension (also touching on collaborative attitudes) was that security or military organizations may be "*a little less respectful of diversity*" (P23-H) than other disciplines that are "*much more open, where opinions are respected [...] seen as a good thing*" (P18-S). According to a participant, this is "*definitively a factor causing an initiative to be completed, to*

be successful, or fail part way” (P18-S). Finally, a particular challenge arises when professionals used to operational/tactical situations still revert to a hierarchical logic by looking for “*who’s the boss*” even when this logic is no longer applicable because “*nobody’s in charge [...] everyone has a piece of the puzzle*” (P18-S). In these situations, operational organizations may “*have trouble seeing the big picture [...] while organizations that are more strategic or have more general mandates will be better able to understand and adhere to concertation and coordination concepts*” (P18-S). Here, greater system understanding seemed associated with more favourable attitudes towards collaboration. Despite being expressed as ‘cultural differences’, the challenges seemed partly ascribable to gaps in system understanding and (resulting) lower collaborative attitudes among some players. Supporting this interpretation, a participant described how greater system understanding was partly responsible for the “*mutual softening of attitudes*” (P21-S) between the security/safety departments and the social sciences and health departments in the last 15-20 years since: “*we realize that these problems are just a lot more complex than adding physical security to things*” (P20-S).

Interactions. Skilled facilitation and coordination were stressed as crucial in these situations. Collaboration may require “*leadership and high-calibre facilitation to ensure that different stakeholders, departments’ inputs are obtained*” (P23-H).

Interplay Between Heterogeneity Dimensions

Interviews depicted interactions between types of differences.

Expertise and Goals. Interdepartmental mandate differences tend to co-occur with expertise differences. In interprofessional work when “*you’re aiming for the same thing*” (P1-E), a participant specified that integration efforts are not about negotiation but about pooling information. Common goals reduce the hurdles of integrating expertise. In contrast, different

professional readings of an issue combined with divergent priorities on what a joint process should address make integration challenging – even limiting goal attainment:

I found that the differing mandates made coming to a consensus really difficult, regardless of what that consensus was [...] the more you were touching on people's areas of expertise, the more in the weeds the discussions got and then the less other groups were interested in the details [...] the heterogeneous stakeholder group construct didn't quite work out for us in the way that we thought it would. [...] I think we missed out on some of our key objectives [...] it wasn't an effective use of time having like those high value experts in the room arguing about process, which I saw more than 50% of the time” (P20-S)

Contextualizing this type of issue in the broader set of facilitators and barriers, another participant stressed that the biggest challenge was not integrating divergences since facilitation can be leveraged: *“all of these sort of challenges [...] they're all perfectly resolvable, just with like some pretty straightforward large group method, facilitation methodologies” (P19- S).*

Identities and Goals. Interviews discussed the interplay between differences in identities and goals. Below, a participant highlighted with a cross-jurisdictional example that collective identity can be hindered by different priorities. When there is no central authority, “working it out” is needed. In the federal government, an authority structure exists. Another participant’s call to use central authority to ensure federal DRR coherence highlighted how this can naturally evoke a collective “federal body” narrative. A similar remark was made by a participant recounting how, by clearly defining shared accountability, managers *“were really building teams”* (P04-E). Using authority to mandate collaboration and evoke identity contrasts with the above-cited approach of using authority to impose identity and evoke collaboration.

“there have been times where, you know, whether it be provincial, territorial or an NGO, they have a priority that doesn’t perhaps maybe synch with ours. And, you know, we work it out. That’s the only time you know that you’re not on the same team sometimes”

(P15-E)

“it’s good to have a department [...] to say ‘this is the federal government response’, and ‘we’re going to take the federal approach as a single body rather than a collection of federal departmental mandates’.” (P05-H)

Yet another path is illustrated in the following quotes: leveraging a bottom-up route to collaboration by fuelling convergence (“like-mindedness”) on a system understanding (common mission to serve citizens), thereby jointly evoking collective identity and collaborative attitudes.

“from [Organization X] what I need are partners that are like-minded and able to work on this file as well. I work with great scientists [...] who want to develop tools. [...] but they don’t really think about how it impacts the citizen.” (P05-H)

“having like-minded people who care about the big picture, who care about improving resilience and reducing disaster risk writ large rather than just from a single department’s perspective [...] really it’s the Government of Canada that did that. So having that bigger picture perspective and that bigger, and having the confidence, I would say, and the willingness and the openness to say like ‘we’re all on the same team, we’re all doing the same thing’. Like let’s figure this out together and pool our resources rather than kind of not sharing information” (P21-S)

Completing this portrait, an example pointed to potential problems when salient similarity and different goals co-occur with lack of system understanding. A participant recounted how false assumptions of goal similarity between similar organizations (same sector

and field of activity) resulted in hostile sentiments, damaged relationships, and collaboration failure.

“they have very different objectives. [...] They just assumed that they have the same goals. [...] it caused friction and animosity. [...] it was only quite a long way through the process [that they understood], and by that time a lot of suspicion had been built up between the two organizations... then it becomes once you’ve lost that trust, or you haven’t built the trust. So clarity on goals.” (P22-S)

Extreme Heterogeneity. Finally, a participant cited how collaboration can become especially “complex”, and progress stalled, when players are numerous and compound layers of heterogeneity. They explained the current need and “gap” of an integrated water policy.

We’re not making progress because it’s too complex [...] there are too many stakeholders, too many departments that have needs or perspectives. Not only departments [...] organizations, peoples, First Nations [...] So the perspectives are very different. There’s all the provinces. [...]so] it doesn’t evolve. It’s stuck. (P05-E)

Discussion

This study investigated the reported experience of collaboration in disaster risk reduction (DRR) within the same sector and jurisdiction, the Canadian federal public service.

Summary of Findings

Influencing Factors for Interorganizational Collaboration in Canadian Federal DRR

First, three main themes summarize the emerging factors across levels of analysis.

Institutional Challenges for Collaboration. At the institutional level, interviews depicted institutional barriers to collaboration compared to what could be observed in other

countries, sectors, jurisdictions, or policy arenas. As previously described (e.g., Bakvis & Juillet, 2004; Bourgault, 2002c), the bureaucratic structure is a powerful collaboration barrier.

Psychosocial Facilitators of Collaboration. At the interorganizational level, psychosocial facilitators included having or developing integration between organizations, interorganizational networks, and frequent and rich communications. At the person level, psychosocial facilitators included collaborative attitudes, system understanding, and partnering skills. Previous research has highlighted the role of collaborative attitudes and system understanding factors when focusing on the interorganizational space (Ansell & Gash, 2007; Emerson et al., 2012; Mayer & Kenter, 2016). This study documented collaborative attitudes, system understanding, and partnering skills as person assets which reflect multilevel dynamics. Since they partly embody their institutional constraints, representatives' collaborative attitudes and system understanding are influenced by interorganizational factors, but also by intra-organizational as well as institutional ones. For example, the ability of an organization to “dispatch” representatives with high collaborative attitudes, system understanding, and partnering skills may reflect *intra*-organizational factors such as top-down supports (e.g., prioritization, resource investment), intraorganizational collaboration (e.g., information flows, supportive organizational environment), organizational learning and service orientation (e.g., organizational memory systems that maintain system understanding despite turnover, training), or work well-being (e.g., which may reduce turnover). In return, employees may be more effective organizational representatives in the interorganizational space; they may be better able to manage differences, learn about partners, build and maintain interorganizational networks, or develop integrative solutions that fulfill different organizational mandates. Finally, they may also represent the collaboration more effectively in their own organization.

Thus, the multilevel perspective highlights the permeability between intra-organizational, interorganizational, and person dynamics. Interpersonal interactions between organizational representatives cannot be solely regarded as interpersonal phenomena, but also as an embodiment of institutional norms and organizational practices.

Top-Down and Bottom-Up Routes to Collaboration. Across levels, findings depicted two routes to collaboration. The *top-down route* operates through formal hierarchies, leveraging authority and using central design strategies. It was described in the factors of Bureaucratic structure (i.e., factor A4, see Table 2.1 above), Formalized supports (B1), Top-down directives and supports (C1), and also to some extent under Quality and Continuity of Membership Assets (B5). Even though it is a source of bureaucratic siloes, it provides accountability, clear mandates, resources, prioritization, and can design effective structures that support interorganizational work. Many factors cited by participants paralleled documented conditions of team effectiveness (Hackman, 1987; Wageman & Lowe, 2019), such as building an interorganizational team with shared mandates, ensuring that representatives have the necessary expertise and experience, and providing adequate organizational supports. In this sense, it appeared that the more an interorganizational group resembles a traditional team, the easier it will be for members to be effective. Yet, findings also suggested that top-down authority may not suffice to ensure organizational responsiveness.

The *bottom-up route* emerges from entrepreneurial engagement and strategies to leverage this resource. It was described in Entrepreneurial engagement (D4), Intraorganizational collaboration (C2), Organizational learning and service orientation (C3), and Work well-being (C4). Past research has also described innovation across public service hierarchies (Borins, 2000), the role of “champions” for collaboration, and the need to develop organizational systems

for innovation (Hopkins et al., 2001; OECD, 2018). Within a multilevel perspective, this study documented some of the intra-organizational factors that could contribute to such systems.

The Role of Member Heterogeneity and Professional Diversity According to Context

The role of member heterogeneity was also nuanced by the multilevel context in which it occurred. Member heterogeneity at the interpersonal level did not play a salient role in participants' accounts on collaboration. When mentioned, *differences in professional perspectives* were framed as an asset, and their benefits (or pitfalls) were often cited in conjunction with the presence of other resources. Without these, differences could lead to communication problems, process loss in disagreement, and disengagement that hinder collaboration. *Differences in mandates and goals* were the most salient or disempowering differences. Mandate differences contributed to siloed organizational structures and echoed institutional barriers. Participants cited the negative impact of compartmentalized *organizational identities* on system understanding and, in contrast, the benefits of a collective (team) identity for approaching collaboration with heterogeneous stakeholders. Institutional compartmentalization was thus reflected in interpersonal goals and social identities. As such, differences between representatives are not necessarily a reflection of their individual characteristics; they also reflect what they carry from their own organization or institutional context.

Finally, *cultural differences* were cited as a barrier to collaboration between highly operational organizations and those with a more general or strategic mandate. However, these challenges seemed partly ascribable to gaps in system understanding and lower collaborative attitudes. To this extent, findings support Okros and colleagues (2011)'s hypothesis that poor collaboration is sometimes *misattributed* to "differences in cultures". Although more research is needed, this phenomenon may be more modifiable than an attribution to culture suggests if

organizational interventions can be used to target system understanding as a lever to improve collaboration.

Interplay Between Types of Differences. In interdepartmental work, *differences in expertise and mandates* tend to co-occur. When this leads to differences in professional perspectives and goals, it can challenge integration, engender process loss, and decrease performance. *Identity and goals* also interacted. Different priorities can hinder the development of a collective identity. Salient similarity may also spur false assumptions of goal similarity and eventually engender animosity, damage relationships, and end a collaboration. This echoed findings on the impact of expectancy violations on emotions and reduced commitment to teams (Rink & Ellemers, 2006, 2007). However, the role of goal diversity in these dynamics may not be adequately accounted for in team diversity models that assume common team goals (e.g., Homan, 2019). In that respect, interorganizational collaboration may have greater parallel with mixed-motive situations such as those targeted by negotiation research. Finally, collaboration can become especially complex when players compound layers of differences like expertise, jurisdictions (including Indigenous ones), and sectors.

Interaction with Other Factors. Interviews also contextualized the role of differences in the broader network of influencing factors. They illustrated the recurring role of system understanding and its link with collaborative attitude to prevent pitfalls of diversity. They depicted the role of communication to acquire knowledge and negotiate differences. These results echo the documented importance of “mutual understanding” in interorganizational collaboration (Mattessich & Johnson, 2018) and research on the moderating role of “intrapersonal functional diversity” (Bunderson & Sutcliffe, 2002) or “trans-specialist knowledge” as a performance enabler in professionally diverse teams (Horwitz, 2015; Mitchell

et al., 2017). The importance of system understanding for collaborative attitudes echoes findings from previous research on interprofessional and interorganizational collaboration indicating that perceived team interdependence can predict work role performance through increased confidence in the benefits of collaboration and increased collaboration, participation, and knowledge sharing (Markon et al., 2017). The role of communication and collaborative attitudes as a way to increase understanding and find mutually agreeable solutions echoes the literature on collaborative conflict management and the role of information exchange in integrative negotiation (DeChurch et al., 2013; Pruitt, 1983; Thompson, 1991). The usefulness of a coordinator/facilitator to provide these assets reflected findings on the role of leadership for collaboration (Mayer & Kenter, 2016). Interviews suggested that communication can serve to build a collective “team” identity, with its implication of shared power, if the recipients perceive that collaborative intentions are sincere. Identity communicated by an authority figure may feel imposed – thereby contradicting implied collaboration and arousing suspicion. Lastly, interviews depicted potential indirect levers to collective identity through mandated or perceived goal commonality.

Interpretation of Findings. Findings on the low salience of professional diversity in general and compared with mandate differences contradicted initial assumptions based on previous research. One explanation is that our context had lower heterogeneity compared to more typical studies on collaborative governance. The prominence of institutional barriers to collaboration among federal organizations may also override other potential barriers. Mandate differences may prevent the initiation of collaboration, in which case professional differences do not come into play. The presence of a coordinating organization in the federal DRR network can help manage differences, but structural barriers to implementation remain. The study also operationalized disciplinary expertise as departmental mandate areas. In effect, such large

organizations regroup different professions. The most determining difference is mandate.

Another explanation suggested by Edmondson and Harvey (2018) drawing on the work of Carlile (2002, 2004) on knowledge in organizations is the “thickness” of knowledge boundaries. Public servants share a broader professional experience despite differences in expertise – likely making knowledge boundaries relatively thin. This may reflect an important contextual differences between the type of collaboration studied here and that of cross-functional new product development teams where professional diversity seems more salient and challenging (e.g., Cronin & Weingart, 2007; Horwitz, 2015). It also suggests that the thickness of knowledge boundaries in collaborative governance contexts may not always come from expertise itself, but from other differences that covary with disciplinary ones. Examples include institutional logics, professional routines, and values. They include lack of collaborative stances due to perceived professional status differences (Huxham & Vangen, 2005; Mattessich & Johnson, 2018), which are also a manifestation of social identity dynamics (Tajfel, 1974; Turner, 1975). Alternatively, the challenges ascribed to differences could come from other sources entirely.

Contribution

This study improves our understanding of the role of member heterogeneity and professional diversity in public-sector interorganizational collaboration. With a socio-ecological approach, it analyzed the multilevel factors influencing interorganizational collaboration within the same jurisdiction and sector and documented the role of professional diversity in this context. The study brings support to the transferability of team collaboration models highlighting the importance of intrapersonal functional diversity and perceived interdependence, but also raises the need to integrate considerations of goal diversity. It highlights the value of drawing on negotiation and conflict management models in this respect.

The study also contributes to integrate social identity in a socio-ecological model of collaboration. The study outlined the immersive nature of institutions and organizations, which can be embodied in individuals' professional identity and in interpersonal diversity. In a socio-ecological framework, the influence of broader group identities on how representatives interact can be viewed as a cross-level process. Meso-level factors influence micro-level dynamics. This study details some organizational and interpersonal conditions under which attempts to communicate a collective identity may be more likely to succeed. It also identifies alternative strategies to foster collaboration.

The socio-ecological perspective adopted complements studies that have looked at the psychosocial dynamics of collaboration within the interorganizational space. By framing system understanding and collaborative attitudes at the person level, it highlighted their role as organizational assets.

The role of work well-being for interorganizational collaboration also seems to have gathered less attention from interorganizational collaboration research and was only mentioned by a few participants. This factor was described in van Meerkerk and Edelenbos (2018)'s recent review of boundary-spanning. The authors also highlighted the dearth of public-sector research on this phenomenon. This study also indicates a need to further examine this factor.

Practical Implications

Findings suggest two routes to collaboration that can be simultaneously leveraged. The top-down route can be powerful to push progress on targeted issues where collaboration needs to be prioritized. As all needs for collaboration and interorganizational adjustment cannot be foreseen or specified, nurturing the bottom-up route to collaboration may also help support adaptation of the federal bureaucracy as a complex system. To support this route, managers can

view themselves as part of the vertical “collaborative chain” and adopt strategies such as clearly signaling openness to ideas coming from lower levels, passing them up the hierarchy, and explaining negative decisions to lower levels. Findings also depicted the benefits of system understanding for collaboration, especially in heterogeneous contexts. They pointed to its potential for increasing collaborative attitudes. Opportunities and structures for interactions foster rich and frequent communication, learning, relationship building, and system understanding. Strategies to build and maintain assets like system understanding, collaborative attitudes, and networks despite inevitable turnover should accompany investments in collaboration. Attention to work-wellbeing may also help sustain entrepreneurial engagement and reduce turnover. Collective identity is sometimes proposed as a strategy to increase collaboration. Findings suggest that to be successful when communicating a collective identity, communicators’ collaborative attitudes must be sincere and perceived as such. Other strategies, such as increasing system understanding and perceived goal commonality, could be used to fuel collaborative attitudes.

Limitations

Study findings must be interpreted in light of their limitations. First, the multilevel nature of our problem space hampered the establishment of a coding grid with high reliability. The grid was multi-dimensional, meaning that different frames of references were used to generate codes. This increases coding difficulty (Guetzkow, 1950). The impact of this limitation is reduced since code frequencies themselves were not used as data. Second, one of the study aims was to investigate the role of differences in disciplines by “isolating” these from other sources of differences such as jurisdictions and sectors. However, an unforeseen consequence of our recruitment strategy ensuring a diverse and balanced sample (different Canadian regions and

DRR stages) was that some participants' collaborative work also included significant interjurisdictional or intersectoral experiences, especially for those working outside the National Capital Region. Whenever possible and relevant, the analysis made a distinction between these two contexts. All interviews still represented federal public servants' experiences of interorganizational collaboration. Interviews also represented participants' own accounts on collaboration dynamics, which could have been affected by contextual factors that we could not observe or consider. Finally, the qualitative methodology does not allow conclusions on the generalizability of findings. The approach provided rich data on a variety of public servants' perspectives on interorganizational collaboration in federal DRR. The findings provide hypotheses on relationships that could be tested using other designs.

Future Research Directions

Future research should test some of the relationships documented by the study. For example, they could study the interplay between types of differences, such as in perspectives, goals, and identities, in influencing collaborative attitudes, integration, and relationship development during collaboration. Given the role of system understanding for collaboration among heterogeneous members, studies should investigate ways to support development of this asset during interactions.

More research would be needed to inform strategies that can be used to leverage the bottom-up route to collaboration in public-sector bureaucracies and among heterogeneous stakeholders. A first start could be to further examine the role of organizational memory for resilience to turnover or the relationship between intra- and inter-organizational collaboration.

Finally, targeted investigations are required to clarify the aspects of "professional differences" that can create disagreement or conflict and prevent successful collaboration under

specific circumstances. Knowledge boundary thickness, values, professional routines, institutional logics, norms, and the underlying nature of “cultural differences” require greater attention. As salient similarity could increase the risk of false assumptions on perspective similarity, the role of social categorization processes should also be examined. Observational data is required since people can be reluctant to discuss negative events such as conflicts (Rocan, 2018b). To isolate the role of professional/disciplinary differences for public sector or federal collaboration, future research should target specific initiatives involving only federal departments, target initiatives with shared mandates, or use more controlled experimental designs. In all, research is needed to inform interventions that can target actionable factors and facilitate improved collaboration despite heterogeneity challenges.

Conclusion

This qualitative study used a socio-ecological framework to examine the contextualized role of stakeholder heterogeneity and professional diversity for interorganizational collaboration in federal DRR – as lived and experienced by senior civil servants. The role of professional diversity in this setting was less salient than in other contexts, which provided hypotheses on potential conditions to this influence. In particular, it highlighted how differences at other levels can manifest themselves in representatives’ roles within a problem-solving encounter. It suggested the need for more targeted investigations on how types of diversity interact together and with other contextual factors in collaboration, notably in the specific context of task disagreement. The study proposes research avenues to help public-sector organizations adapt to their changing networked roles.

Chapter 3:

Study 2 - Professional Diversity and Disagreement in Interorganizational Collaboration:

An Expert Simulation of Disaster Response Problem Solving

Professional diversity and disagreement in interorganizational collaboration:

An expert simulation of disaster response problem solving

Disaster response requires by scope and definition a distributed organization, often characterized by considerable interorganizational heterogeneity (Schraagen & van de Ven, 2011). In the past decades, high-profile disaster response failures, such as 9/11 or Hurricane Katrina, as well as disaster response case studies have shown the inadequacy of siloed approaches and stressed the need for collaboration when responding to multifaceted events (Comfort, 1990; Kapucu & Garayev, 2011). In fact, research has shown that the most frequent sources of ineffective disaster response are inadequate coordination, decision making, and communication between the multiple organizations involved to protect the public (Schraagen & van de Ven, 2011).

During the response to complex emergency events, a now common practice is to form temporary meta-organizations regrouping professionals from different organizations. These serve to share information and coordinate response across different actors (Curnin et al., 2014; Lemyre et al., 2009; Uitdewilligen & Waller, 2018). In this context, disagreements are likely to arise. One commonly recognized challenge for stakeholders is “translating knowledge into action” (Comfort, 1990, p. 89) despite organizational differences and challenging circumstances. Intraorganizational conflict and competitive relations can arise – causing delays in response, increasing the negative consequences for populations, and damaging disaster network relationships (Comfort, 1990; Kapucu et al., 2013; Schraagen & van de Ven, 2011).

Despite the recognized challenges that disagreement and conflict pose for disaster response, little direct evidence is available on how they are managed or on how they escalate into conflict – especially beyond case-studies on high-profile cases (Kalkman et al., 2018). Limited

observational data are available on the contextual factors that influence conflict perception, the development of group tension, and their association with group outcomes. One contextual factor that may impact disagreement perception as well as subsequent attitudes and behaviours is whether members identify themselves as part of the same group or of different ones (cf., Carter & Phillips, 2017; Phillips & Apfelbaum, 2012; Srikanth et al., 2016). Given current research gaps, this study aimed to examine the role of salient professional group composition for the perception of and reaction to task-related disagreement among experienced disaster response professionals. It used observational measures in a semi-experimental, interorganizational problem-solving simulation about disaster risk management. The results provide greater evidence on how group identity processes influence disagreement trajectories in problem-solving groups.

Member Heterogeneity, Disagreement, and Conflict in Disaster Response

Interpersonal interactions between representatives in temporary meta-organizations is one of the chain links to successful interorganizational collaboration and effective disaster response (Curnin & Owen, 2014; Kapucu & Garayev, 2011). In a response network, representatives may come from organizations with different societal roles. These can be linked to different spheres of expertise, responsibility, jurisdictions, and sectors (e.g., Kapucu & Garayev, 2011; Ödlund, 2010; Rosenthal et al., 1991; Steigenberger, 2016, 2016). As individuals, professionals may have different goals and priorities, language, information, background, perceptions of what constitutes a threat, or thresholds for when prompt action is required (Berlin & Carlström, 2011; Kapucu & Garayev, 2011; Ödlund, 2010; Steigenberger, 2016).

During their interactions, disagreements are likely to arise. Exchanges in meta-organizations are needed to share information, resolve differences between disciplines,

organizations, and jurisdictions, avoid misunderstandings, and prevent coordination problems (Comfort, 1990). Disagreement and debate have the potential to improve decision quality when there is enough time to sort them out (Rosenthal et al., 1991). When decisions are taken with limited information, ‘good’ decisions can have bad consequences (Lemyre et al., 2009).

Therefore, critical debate can ensure that a decision is sound and withstands ulterior evaluations – even if the resulting intervention is unsuccessful (Rosenthal et al., 1991). However, reconciling differences is also a challenge. Disagreement can slow down the decision-making process in already time-sensitive crisis situations (Comfort, 1990; Kapucu & Garayev, 2011). During disasters, this challenge is compounded by novelty, uncertainty, imminent threats to people and communities, as well as considerable stress and fatigue for professionals. Moreover, representatives may have never worked together and may not even trust each other (Kapucu & Garayev, 2011). Unsurprisingly, conflict is a “well-recognized problem” in emergency management (Comfort, 1990, p. 89).

Current best practice is to develop interorganizational planning ahead of time and resolve differences before disaster strikes (Curnin et al., 2014; Kapucu & Garayev, 2011). Still, all divergences cannot be resolved in advance. When disagreement does arise, it must be managed to limit potential disruptive effects and reap potential benefits in terms of the added information and critical analysis they can provide. Suppressed disagreement in novel and high-risk circumstances in favour of action can lead to premature consensus. It can also perpetuate misunderstandings and lead to mistakes in responses. Hence, it is important to understand what can help interorganizational groups react constructively to disagreement, increase decision quality, and protect interorganizational relationships across the response network.

Disaster management research is increasingly considering human factors that shape disaster response – especially in terms of the cognitive aspects of disaster coordination (e.g., Ödlund, 2010; Schraagen & van de Ven, 2011). However, as Kalkman and colleagues (2018) have recently noted, crisis management scholarship tends to assume that divergent views are a source of conflict, but little direct evidence is available on *how* these divergences take place and are managed by organizational representatives during interactions. More research is needed to understand the processes and circumstances that influence how task divergences escalate into conflictual animosity. Social psychological models of collaboration, conflict, and identity provide a framework and hypotheses to pursue this question.

Salient Group Composition as a Context for Disagreement

Salient group composition contributes to the social context of disagreements. A task disagreement occurs when individuals have divergent views or favour different actions or outcomes regarding a work task (De Dreu et al., 2007; Weingart et al., 2015). From a multilevel socio-ecological perspective (Bronfenbrenner, 1979), interpersonal disagreement between representatives is nested within a broader meso-level system encompassing representatives' organizations and institutions, the other social groups to which representatives belong as well as the relationships between these social groups. Representatives involved in interorganizational disaster response will have salient social characteristics such as organizational, professional, or sector membership as well as sociodemographic features such as gender, age, or ethnicity. Salient group composition is thus one manifestation of the meso (inter)organizational system within which interpersonal interactions take place. These may or may not map onto (be congruent with) individual positions and views.

Social identity research documents how people use social categories to make sense of social groups (Tajfel, 1974; Turner et al., 1987). Social identity, the sense of sharing membership to social groups and the affective value linked to this membership, participates to a person's sense of self and self-esteem. Social similarity is usually validating and people tend to be more attracted to similar others in valued groups (cf., Williams & O'Reilly, 1998). Groups sharing similar salient categories will often be perceived as more internally homogeneous and more different from other groups sharing another salient category. This phenomenon is documented even in situations where salient category is explicitly randomly attributed and completely irrelevant for the substantive task at hand – i.e., a so-called “minimal” group (Lemyre & Smith, 1985). Perception of relative homogeneity and heterogeneity between the same actors may therefore change depending on context. This social sensemaking based on social categorization is a powerful force shaping individual and group behaviour and could influence the expression and perception of disagreement as well as subsequent reactions during collaboration.

Classic hypotheses in the social categorization perspective based on intergroup conflict research (e.g., Tajfel, 1974) predict that salient social category differences in professionally heterogeneous groups will activate negative stereotypes, intergroup biases, and competition. This can transform disagreement into intergroup conflict. Indeed, people in homogeneous groups tend to report greater cohesion and cooperation (van Knippenberg & Schippers, 2007; Williams & O'Reilly, 1998). However, some group scholars have highlighted that these same forces could also be detrimental for group performance and functioning (for reviews, see Carter & Phillips, 2017; Phillips & Apfelbaum, 2012; Srikanth et al., 2016). Social categorization processes in heterogeneous groups do not automatically trigger intergroup biases. When biases are not triggered, social categorization may actually facilitate group problem solving. This, by raising

members' awareness of potential cognitive differences (divergent views) and reducing expectations of agreement. This could in turn help members share unique information and engender more problem-focused reactions to disagreement (Carter & Phillips, 2017; Srikanth et al., 2016). Since the development of a shared identity is sometimes considered a beneficial strategy to facilitate disaster response among heterogeneous stakeholders (e.g., Kapucu & Demiroz, 2017) the role of this contextual factor must be carefully examined.

Social Identity and Observed vs. Perceived Disagreement

Given that professionally diverse groups have less overlapping knowledge and experiences, it is likely that they should manifest increased task disagreement. Some research suggests that professionally diverse groups indeed report higher levels of task disagreement (Jehn et al., 1999; Lovelace et al., 2001), although other authors have found a significant relationship only after controls, but no direct correlation (Pelled et al., 1999), or even no relationship (Simons et al., 1999). However, professionally diverse groups may vary in terms of the salient characteristics they use to define themselves and the level to which members see themselves as similar or different. Social identity dynamics may in fact come into play in determining the expression and perception of task disagreement.

Some evidence suggests that salient group composition can influence the *expression* of disagreement. Gaither and colleagues (2018) conducted experimental studies on minority dissent in group decision making using Ash's classic conformity paradigm to examine the impact of salient group heterogeneity on conformity. They found that the simple presence of surface diversity can increase observed dissent (reduce conformity) when the majority opinion in a group is making a judgment error (Gaither et al., 2018). In line with this, Phillips and Loyd (2006) conducted an observational study on minority influence in group decision making. They found

that in the presence of disagreement, salient homogeneity (vs. diversity) decreased the panel-rated confidence and persistence of social majority group members in defending their correct minority opinion. The above suggests that surface-level homogeneity could decrease the likelihood of disagreement expression and even increase the likelihood that gross errors of judgment remain unchallenged. In the case of disaster response operations, a reduced likelihood that valid yet dissenting judgements will be expressed could engender severe costs to a population.

Concurring evidence is provided by research on intragroup conflict, with the caveat that this research is mostly based on self-reported measures of task disagreement (e.g., de Wit, Greer, et al., 2012; cf. Phillips & Apfelbaum, 2012 for review). Meta-analytical findings document a negative association between (reported) group identification and (reported) task conflict ($\rho = -.30$; de Wit, Greer, et al., 2012). This meta-analysis framed group identification as a group outcome. However, a longitudinal study by Hobman and Bordia (2006) found that, in fact, initial group identification predicted later self-reported task conflict, whereas initial task conflict did not predict later group identification. High group identification has therefore been associated with reduced *reporting* of task disagreement.

As it has been evidenced, lower reported disagreement can result from lower *expression* of task disagreement. On the other hand, studies have also noted that reports of team task conflicts tend to vary between members of the same team (e.g., Jehn et al., 2010), suggesting that contextual factors may influence how people *perceive* disagreement. Therefore, as suggested by Phillips and Apfelbaum (2012), stronger identification with one's team may also reduce one's *perception* of the disagreement expressed by teammates. In complex tasks, such as disaster response operations, where detecting and resolving discrepancies between perspectives may be

of crucial importance, such a tendency could be highly detrimental. However, without observational evidence on observed and perceived disagreement in different group identification contexts, these factors cannot be differentiated.

Social Identity and Reaction to Disagreement

Social category homogeneity could also affect disaster response problem solving by influencing how group members *react* to expressed task disagreement. This, in terms of negative emotions, perception of interpersonal problems, attention to substantive task information, and subsequent performance and relational outcomes.

First, when disagreement happens between surface-similar others, it may be more likely to engender negative emotional reactions. People use salient features of a group as a heuristic to form expectations about the level of agreement between its members; they tend to expect and perceive more agreement between people who appear similar. Experimental studies have found that violated social expectations were associated with increased reports of emotions such as irritation, surprise (Phillips, 2003), disappointment (Rink & Ellemers, 2007), and increased physiological threat responses (Mendes et al., 2007).

Second, disagreement between surface-similar members may also lead to decreased performance and relationship quality. In an experimental study, Phillips (2003) found that incongruence between salient similarity and divergent individual positions predicted reduced group decision quality and reduced relational outcomes. Experimental studies have also found such incongruences to predict reduced commitment towards future collaboration (Rink & Ellemers, 2007) and decreased perceived group efficacy (Phillips, 2003). Therefore, salient group composition could also influence reactions and outcomes following disagreement when it arises.

The Effects of Negative Emotions and Relationship Focus on Group Outcomes

Studies on salient group composition and disagreement have notable parallels with group conflict research. First, both literatures highlight the potential ambiguity of task disagreement. As suggested by Simons and Peterson (2000), task disagreement can be an ambiguous interpersonal situation, especially when one is unclear on the intentions of the person expressing the disagreement. Rink and Ellemers (2007) found that differences with a surface-similar partner decreased the sense of clarity that participants had about partners (and also reduced commitment to collaboration).

Second, both literatures evoke the possibility that task conflicts may increase focus on the relational (vs. substantive) dimension of task interactions. One potential consequence is reduced performance. Loyd and colleagues (2013) found in a series of experimental studies that when people expected to interact with someone from the same (versus different) social group who disagreed with them, they increased their focus on the relationship at the expense of substantive task information – which in the end predicted lower decision quality. Experimental studies have also found that physiological threat states – which can result from social expectancy violations (Mendes et al., 2007) – reduce receptivity to disagreeing positions and decision quality in decision-making tasks (de Wit, Scheepers, et al., 2012). Increased attention to the relational dimension of a task situation can reduce performance by decreasing attention to substantive task information.

Another potential consequence is personalization of disagreement and the escalation of task conflict into relationship conflict. Social ambiguity around task disagreement may increase perception of relationship conflict when members resolve ambiguity by attributing others' behaviours to hostile intentions (Simons & Peterson, 2000). As found in experimental studies,

perceived and experimentally manipulated relationship conflict (de Wit et al., 2013) can reduce the use of substantive task information and decision quality. More broadly, meta-analysis findings suggest that the co-occurrence of task conflict with high relationship conflict predicts decreased performance and satisfaction (de Wit, Greer, et al., 2012). As measures of relationship conflict often capture emotional tension (Bendersky et al., 2014), negative emotions could also explain part of these associations.

Summary and Current Gaps

In summary, in complex time-sensitive disaster response contexts, the rapid and effective resolution of task disagreement and the prevention of conflictual animosity are instrumental to response effectiveness. Social identity research suggests that salient group heterogeneity could increase the likelihood of disagreement expression and the likelihood of disagreement perception. Both these factors could impact decision performance in a disaster response context. Research also suggests that salient professional diversity could reduce the chances that dissent, when expressed or perceived, will be detrimental for group performance and viability. Potential intervening factors include reduced negative emotional reactions to disagreement and decreased personalisation of group challenges. To examine these hypotheses, observational studies on the role of salient group composition for the expression of, perception of, and reaction to disagreement are needed in naturalistic disaster management settings.

Present Study

In view of current research gaps, this study examined in a quasi-experimental setting the team-level associations between salient group professional composition, task disagreement, team processes, and team outcomes during interorganizational disaster response problem solving. We used secondary analysis of data collected among senior risk management professionals during an

experimental simulation on interorganizational decision making during extreme events (Lemyre et al., 2010). This experimental data provided both observational and self-reported measures of professional group composition, disagreement, team functioning, and problem-solving outcomes in a sample with high ecological validity. This outbalanced the limitations associated with a small sample size. This naturalistic subject matter expert study served as a sort of case study or small sample clinical study designed to observe unique and hard-to-access special populations.

Aim and Research Questions

The aim of this study was to investigate, at the team-level, whether salient group professional composition (interprofessional or homogeneous teams) was associated with differential expression of, perception of, and reaction to disagreement. More specifically, it examined three research questions: 1) Is team professional diversity associated with team levels of observed and reported disagreement during team problem solving? 2) Do homogeneous and interprofessional teams differ in the association between observed and reported disagreement? 3) Do homogeneous and interprofessional teams differ in the associations between disagreement and group tension, group effectiveness, performance outcomes, and relational outcomes?

Methods

Design and Sample

The present study was based on secondary analysis of data from a previous study (Lemyre et al., 2009). We examined the effects of its team composition manipulation (interprofessional vs. homogeneous) on team perception and collaboration behaviours.

The sample included 10 interorganizational teams representing a total of 27 active and experienced senior disaster and emergency management officers (age: $M = 49.7$ years, $SD = 6.0$ years; experience in emergency management: $M = 15.6$ years, $SD = 11.78$ years; gender: 20

males, 6 females). Participants came from three types of professions: 1) the military ($N = 9$); 2) first responders (e.g. fire department, police services; $N = 10$); and 3) public service professionals (e.g. public health, public safety; $N = 8$). They were recruited based on invitations distributed by their organization. Ethics approval was received from the University of Ottawa and Appendix D provides the participant consent form.

The 10 interorganizational teams, designed to be triads, were divided between two experimental conditions: 1) *interprofessional teams*, where each team member came from a different professional area; 2) *homogeneous teams*, where all team members belonged to the same professional area (i.e., all from the military, all from emergency response services, or all from government organizations). Due to experimental attrition (no show), there were actually 6 homogeneous sessions and 4 interprofessional sessions. Team size varied ($M=2.7$, $SD = 0.7$) ranging between two participants (4 groups), three participants (5 groups), and four participants (1 group). Albeit sample size was small, team size, proportion of women in the team, mean age, mean experience, and the representation of each professional group did not differ between conditions (age: $p > .10$; other variables: $p > .48$).

Procedures

Participants came to the laboratory on campus for a half-day session. Data collection was carried in different sessions, each involving 2-3 teams at a time. The sessions started with a briefing where the study procedure was explained to participants. Teams (called ‘pods’ during the simulation) were then brought to separate rooms. In the homogeneous group condition, each team represented a different professional group. In the interprofessional group condition, all teams were mixed. Team composition was salient to participants as they introduced themselves to the group and some participants even wore their work uniforms.

Team rooms were equipped with a computer, walkie-talkies, and a videoconferencing system. After a 15-min video presenting the simulation scenario, teams performed the first of the two tasks described below. They later watched a second 7-minute video giving them an update on the scenario and performed the second task. The session ended with a debriefing.

Teams in each condition performed two decision-making tasks based on an extreme risk event simulation scenario relative to a complex disaster event (radioactive bomb) in a fictional mid-sized Canadian town. The scenario resembled a table-top exercise, which is a common training format in emergency management and was a familiar context for participants. Prior to the study, an advisory committee of independent senior risk management experts rated the complexity of the scenario on an extensive grid and participated in a pretest of the simulation procedures. This ensured the scenario's ecological validity and adequate complexity level.

The teams performed two tasks in the following order: 1) A public communication task where participants were required to choose two priority messages to be delivered to the public; 2) A responder health and safety task where participants decided on the two most important health and safety issues faced by emergency intervention workers in the scenario. Each task lasted 35 minutes. For the first ten minutes, participants communicated mostly within their teams but were allowed to chat or communicate via walkie-talkies with other teams. For the remaining 25 minutes, teams communicated together via videoconferencing. After each task, participants filled self-reported questionnaires indicating the task decision and their perceptions of the group effectiveness and team dynamics (both intra-team and inter-team).

All task interactions were video recorded, and the verbal communication transcribed. The analyses focused on the within-team part of the tasks and self-reported data.

Analysis Strategy

We investigated our research questions at the team level using between-group comparisons and within-group correlations. Because of our small sample, non-parametric tests were used as they do not rest on assumptions of normality. Given sample size and the nature of the experiment, we report results at the .05, .10, and .20 significance levels to identify key trends.

Measures

At the end of each task, participants filled a questionnaire rating their level of agreement with self-reported items on Likert-type scales going from 0 (strongly disagree) to 4 (strongly agree). As disagreement is a team-level phenomenon, teams constitute the unit of analysis, using team aggregates when appropriate.

Disagreement

Two types of disagreement measures were derived at the team level: observer-coded and self-reported.

Observer-Coded Disagreement. The transcript sections involving within-team discussions were divided in thought units and coded by two researchers (including the first author). A thought unit was defined as a sequence of communication by one person that contained one identifiable communication act. Unitizing reliability was calculated on 10% of data and was acceptable with a Guetzkow's *U* of .07 (Guetzkow, 1950) indicating 93% interrater agreement. Coding indicated whether or not units were disagreements. Reliability was calculated on 25% of data yielding a prevalence-adjusted and bias-adjusted kappa of .93 (Byrt et al., 1993), indicating high interrater agreement. There were 106 disagreement statements to code in total. Both coders also coded whether disagreement statements were task-content or task-process disagreements (adjusted kappa of .90).

We calculated three team-level measures of disagreement: the total percentage of disagreement statements, the percentage of task-content disagreement, and the percentage of task-process disagreement. These indicated the frequency of disagreement statements over total number of statements, thus controlling for the total amount of communication. For this variable and all others, we averaged tasks 1 and 2 scores to obtain a single team score that maximized reliability and statistical power (Goulet & Cousineau, 2019).

Reported Disagreement. Each team member rated the perceived presence of frequent disagreement within their team by indicating their agreement with the item “The people within my pod had frequent differences of opinion”. The team being the study’s unit of analysis, we derived the team-level measure using the group mean. As participants rated team-level phenomena (i.e., a "referent-shift" conceptual model of the team-level construct; Chan, 1998), we assessed within-group agreement (r_{wg}) to verify the validity of the team measure. Following procedures outlined by Lebreton and Senter (2008), we calculated the r_{wg} based on a null random distribution ($r_{wg[null]} = .80$) and a slightly skewed random distribution ($r_{wg[skewed]} = .70$), which both indicated strong agreement.² Values of r_{wg} over .70 represent strong agreement (LeBreton & Senter, 2008). The level of shared variance was also assessed using intraclass correlations ($ICC[1] = .06$; $ICC[2] = .15$).

For all referent-shift constructs (except one), $ICC(1)$ values were above zero, indicative of non-independence in the data and within the typical range found in organizational studies. $ICC(2)$ values were also low, but this was to be expected with small group sizes and small $ICC(1)$ values (cf., Bliese, 2000). While low $ICC(2)$ values could have reduced our ability to detect emergent team-level relationships, inter-rater agreement remains the critical validity

² The reported r_{wg} values correspond to the mean r_{wg} across the 10 teams.

requirement for referent-shift models (Chan, 1998). Across referent-shift constructs, average r_{wg} values indicated moderate to strong inter-rater agreement (cf., LeBreton & Senter, 2008), which supported the construct validity of our measurement model.

Group Tension

Frustration with Disagreement. Participants indicated their level of frustration with disagreement by rating the item “I was frustrated by differences of opinion within my pod during the task.”. The construct of interest was the total amount of frustration experienced within the team calculated using the group mean. Examination of within-team distributions confirmed that group means were a valid additive index (Chan, 1998).

Personality Interference. Participants indicated the presence of team-level interpersonal challenges by rating the item “Personality styles within my pod got in the way of completing the task”. Based on a referent-shift model, the group mean served as the group-level construct ($r_{wg[null]} = .90$; $r_{wg[skewed]} = .85$; $ICC[1] = .07$; $ICC[2] = .17$).

Group Effectiveness

Idea Generation. Participants rated team-level generation of ideas with the item “The people in my pod generated various alternative ideas.”. The group-level construct was represented by the group mean based on a referent-shift model ($r_{wg[null]} = .82$; $r_{wg[skewed]} = .73$; $ICC[1] = -.06$; $ICC[2] = -.17$). As with all other measures, we averaged tasks 1 and 2 scores to obtain a single team score.

Usefulness of Disagreement. Participants indicated the level to which intra-team disagreement had been useful for team decision making by rating the item “The differences of opinion within my pod helped us reach better decisions during the task.”. The group-level construct used the group mean based on a referent-shift model ($r_{wg[null]} = .71$; $r_{wg[skewed]} = .57$;

ICC[1] = -0.24; ICC[2] = -1.10). The negative ICC values for group effectiveness measures reflected larger intra-group variance compared to inter-group variance. Negative values are possible when ICCs are calculated based on a one-way ANOVA, but have no theoretical significance (Bliese, 2000).

Performance Outcomes

Panel-Rated Decision Quality. The quality of participants' final task decisions was rated by a panel of three researchers using a five-item scale targeting five aspects of quality: 1) the level of priority/significance of the issues addressed by the messages; 2) the novelty of the approach; 3) the feasibility of implementing the decision given the context; 4) the level of effectiveness in mitigating the risks; and 5) the anticipation of indirect consequences (see Appendix E). Judge ratings were averaged to yield the panel-rated decision quality score. In task 1, inter-rater agreement between the three judges rating individual participant responses was $r_{wg(j)[null]} = .87$, $r_{wg(j)[skewed]} = .88$. The agreement in task 2 was $r_{wg(j)[null]} = .87$, $r_{wg(j)[skewed]} = .72$. The team-level construct was conceptualized additively and indexed by the group mean. Examination of team distributions confirmed the validity of this additive index. As with all other measures, we averaged team scores across tasks 1 and 2 to obtain a single team score.

Reported Integration of Team Inputs. Team members rated the level to which they perceived that the final task decisions integrated all team members' perspectives with the statement "The outcome of the task reflects the input from all the people in my pod.". The group-level construct used the group mean also based on a referent-shift model ($r_{wg[null]} = .93$; $r_{wg[skewed]} = .89$; ICC[1] = .08; ICC[2] = .19).

Relational Outcomes (Self-Reported)

Satisfaction with Process. Participants rated how satisfied they were with the process using the item “I am satisfied with the opportunities I had to provide input.”. The group-level construct was conceptualized additively as the total amount of satisfaction, indexed with the group mean (which validly represented within-team distributions).

Trust in Team. Participants reported their level of trust in their teammates by indicating their level of agreement with the statement “I trust the other people in my pod.”. The group-level construct was conceptualized additively as the total amount of trust, indexed with the group mean (which validly represented within-team distributions).

Group Identification

Team Belonging. Participants reported their level of intra-team belonging by indicating their level of agreement with the statement “I felt a sense of belonging within my pod.”. They indicated their level of inter-team belonging by rating the item “I felt a sense of belonging with the other pods.”. *Team belonging* was measured using the first item. *Ingroup-outgroup distinction* was measured by calculating the difference between participants’ intra-team belonging and inter-team belonging. The team-level constructs of interest were conceptualized additively (Chan, 1998), as the total level of team belonging and ingroup-outgroup distinction within each team. These were indexed using the group means. Examination of within-team distributions confirmed that group means were a valid additive index (Chan, 1998).

Results

Manipulation Check

We verified that interprofessional teams reported lower group identification compared to homogeneous teams. Mann-Whitney group comparisons (one tailed-tests) on team data indicated

that interprofessional teams reported significantly lower levels of team belonging ($Mdn = 2.67$) compared to homogeneous teams ($Mdn = 3.33$, $U = 2.50$, $z = -2.04$, $p_{\text{one-tailed}} = .02$, $r = -.64^3$). They also reported significantly lower levels of ingroup-outgroup distinction ($Mdn = -0.08$) compared to homogeneous teams ($Mdn = 0.29$, $U = 1.00$, $z = -2.39$, $p_{\text{one-tailed}} = .01$; $r = -.76$).

Main Effect of Professional Group Composition

Nonparametric Mann-Whitney group comparisons were used to compare group conditions on study variables. Contrary to expected, the *observed* frequency of disagreement was not higher in interprofessional teams ($Mdn = 3.06$) compared to homogeneous teams ($Mdn = 4.35$, $p_{\text{one-tailed}} = .76$). To the contrary, in this sample, median and mean observed disagreement were higher in homogeneous teams. In contrast, *reported* frequency of disagreement was significantly higher in interprofessional ($Mdn = 1.25$) compared to homogeneous teams ($Mdn = 0.84$, $p_{\text{one-tailed}} = .01$), with a substantial effect size. Table 3.1 presents descriptive statistics and results for all comparisons except follow-up analysis on observed disagreement subtypes, which are reported in the text. Figure 3.1 presents comparative boxplots for observed and reported disagreement in each condition.

³ Effect sizes for Mann-Whitney comparisons are r coefficients calculated based on z value (Field, 2013).

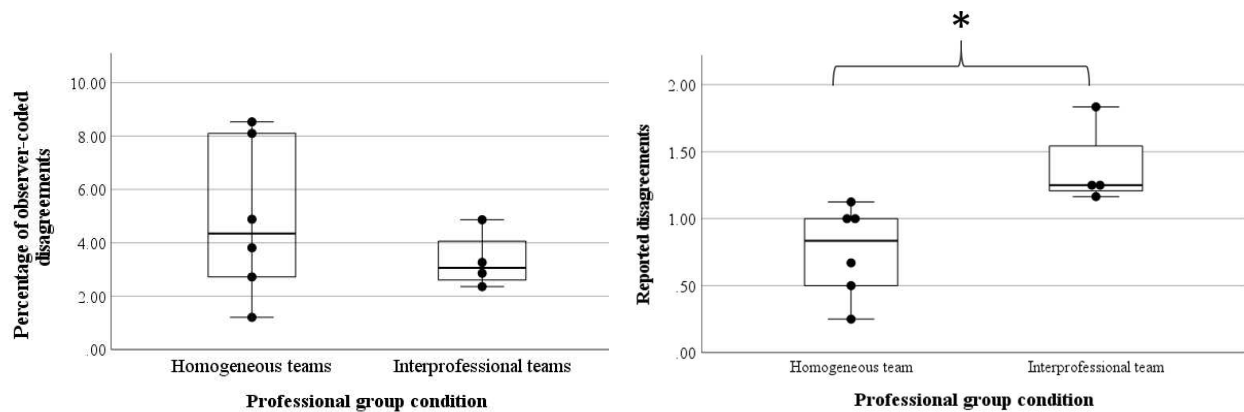
Table 3.1*Descriptive Statistics and Results of Mann-Whitney Group Comparisons*

	Homogeneous teams		Interprofessional teams		Mann-Whitney group comparisons ^a				
	Mean (SD)	Median	Mean (SD)	Median	H ₁	U	Z	Effect size ^b	sig.
A) Task-related disagreement									
Observed frequency of disagreement	4.88 (2.93)	4.35	3.34 (1.08)	3.06	<	8.00	−0.85	−.27	
Reported frequent disagreement	0.76 (0.34)	0.84	1.38 (0.31)	1.25	<	0.00	2.57	.81	**
B) Group tension									
Frustration with disagreement	0.55 (0.36)	0.67	0.88 (0.51)	0.96	N/A	7.50	0.96	.30	‡
Personality interference	0.48 (0.34)	0.46	0.58 (0.36)	0.54	<	10.50	0.32	.10	
C) Group effectiveness									
Team idea generation	3.09 (0.42)	3.08	3.08 (0.17)	3.00	<	10.00	−0.46	−.14	
Usefulness of disagreement	2.65 (0.30)	2.59	2.52 (0.47)	2.54	<	9.50	−0.54	−.17	
D) Performance outcomes									
Panel-rated decision quality	1.99 (0.77)	2.19	1.99 (0.52)	1.90	>	10.50	−0.32	−.10	
Reported integration of team inputs	3.44 (0.31)	3.42	3.17 (0.19)	3.17	>	6.00	−1.29	−.41	‡
E) Relational outcomes									
Satisfaction with process	3.41 (0.32)	3.33	3.19 (0.14)	3.21	>	6.00	−1.29	−.41	‡
Trust in team	3.56 (0.24)	3.50	3.15 (0.10)	3.17	>	0.00	−2.57	−.81	**

^a Mann-Whitney tests, one-tailed for tests with directional hypotheses;^b Effect sizes for Mann-Whitney tests correspond to *r* coefficients (Field, 2013);H₁: Directional hypothesis, when applicable (homogeneous vs. interprofessional);‡ $p < .20$; † $p < .10$; * $p < .05$; ** $p \leq .01$

Figure 3.1

Comparative Boxplots for Observed and Reported Disagreement in Homogeneous and Interprofessional Teams



a. Percentage of *observer-coded* disagreement

b. *Reported* disagreement ratings

* $p < .05$

Follow-up analyses on observed disagreement subtypes indicated that the majority of observed disagreement statements were task-content disagreements. Despite significantly higher *reported* disagreement, interprofessional teams did not display higher frequencies of *observed* task-content disagreement ($Mdn = 2.86$) compared to homogeneous teams ($Mdn = 4.18$; $U = 8.00$, $z = -0.85$, $p_{\text{one-tailed}} = .76$, $r = -.27$). In this sample, task-content disagreement was actually less frequent in interprofessional teams compared to homogeneous ones (mean and median). Similarly, interprofessional teams did not display higher frequencies of task-process disagreement ($Mdn = 0.21$) compared to homogeneous teams ($Mdn = 0.55$; $U = 10.00$, $z = -0.44$, $p_{\text{one-tailed}} = .62$, $r = -.14$).

In sum, observed and self-reported measures of disagreement frequency offered different perspectives. Interprofessional teams had significantly higher levels of *reported* disagreement even though there were no significant differences in *observed* disagreement (overall measure and subtypes). To the contrary, *observed* disagreement in this sample were actually higher in homogeneous teams (overall measure, task-content subtype, and task-process subtype).

Group Comparisons on Other Variables

Performance Outcomes. Professional diversity is thought to improve the quality of group decisions in contexts where members have enough time to surface and integrate their nonredundant perspectives (Rosenthal et al., 1991). In this time-sensitive task where participants had only 10 minutes to reach a decision, we expected interprofessional teams to show lower performance. Contrary to this, panel-rated decision quality was not significantly lower in interprofessional teams ($Mdn = 1.90$) compared to homogeneous teams ($Mdn = 2.19$, $p_{\text{one-tailed}} = .40$). As expected, interprofessional teams ($Mdn = 3.17$) did report on average lower integration of team inputs compared to homogeneous ones ($Mdn = 3.42$, $p_{\text{one-tailed}} = .12$). Thus,

this study compares homogeneous and interprofessional teams in a situation of equivalent externally-rated decision quality.

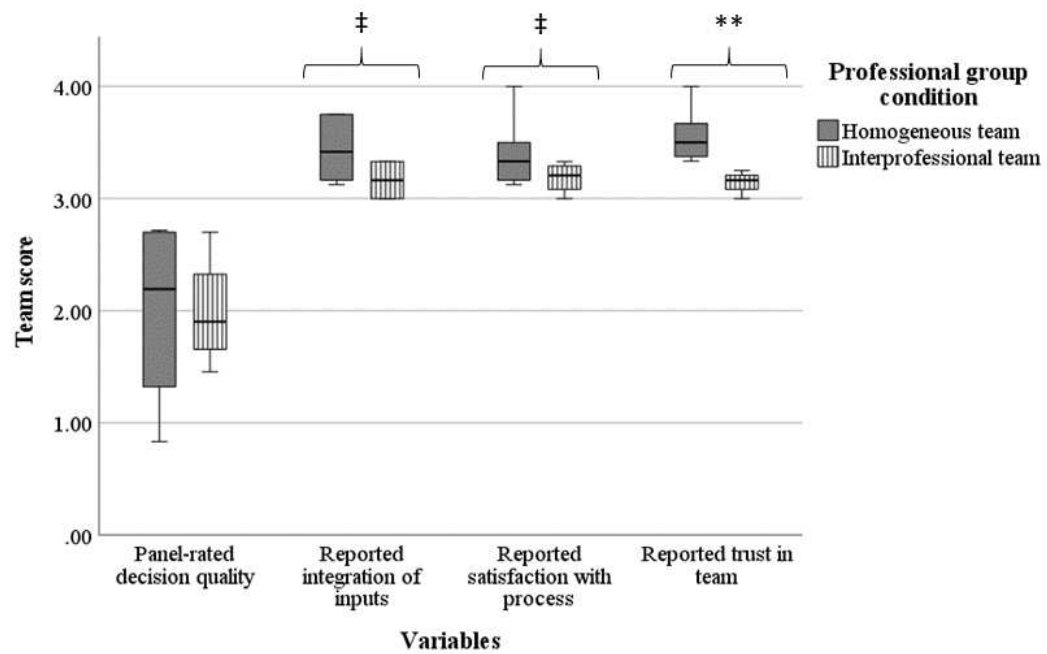
Relationship Quality Outcomes. As hypothesized, interprofessional teams reported significantly lower relationship quality compared to homogeneous teams. They reported lower satisfaction with process ($Mdn_{Hom.} = 3.33$, $Mdn_{Inter.} = 3.21$, $p_{one-tailed} = .12$) and lower trust in teams ($Mdn_{Hom.} = 3.50$, $Mdn_{Inter.} = 3.17$, $p_{one-tailed} = .01$). Figure 3.2 presents comparative boxplots for performance and relational outcomes in each condition.

Group Tension. We did not have a directional hypothesis for the main effect of group composition on frustration with disagreement because of a potential interaction. As described in the introduction, we expected interprofessional teams to have higher *levels* of disagreement, which could lead to higher levels of frustration with disagreement compared to homogeneous teams. On the other hand, we expected that interprofessional teams would show a weaker *association* between disagreement and frustration with disagreement, which could lead to either similar or lower levels of frustration compared to homogeneous teams.

Results of the two-tailed group comparison indicated that interprofessional teams did not report significantly different levels of frustration with disagreement compared to homogeneous teams ($Mdn_{Hom.} = 0.67$, $Mdn_{Inter.} = 0.96$, $p_{two-tailed} = .39$). We hypothesized that interprofessional teams would report higher levels of personality interference. Contrary to expected, interprofessional teams did not report significantly higher personality interference than homogeneous teams ($Mdn_{Hom.} = 0.46$, $Mdn_{Inter.} = 0.54$, $p_{one-tailed} = .40$).

Figure 3.2

Comparative Boxplots for Group Performance and Relational Outcomes in Homogeneous and Interprofessional Teams



‡ $p < .20$; ** $p < .01$;

Group Effectiveness. Contrary to expected, interprofessional teams did not report higher levels of idea generation ($Mdn_{Hom.} = 3.08$, $Mdn_{Inter.} = 3.00$, $p = .62$) or usefulness of disagreement ($Mdn_{Hom.} = 2.59$, $Mdn_{Inter.} = 2.54$, $p = .69$) compared to homogeneous teams. Figure 3.3 presents comparative boxplots for group tension and group effectiveness variables in each condition.

In sum, as expected, interprofessional teams exhibited significantly lower reported relationship quality and significantly lower reported performance (integration of inputs). However, conditions did not differ in terms of panel-rated performance (decision quality), reported group tension, and reported group effectiveness.

Association Between Observed and Reported Disagreement

Nonparametric Kendall tau correlation analyses were used to examine associations between variables in each condition. In both group conditions, the correlation between *observed* disagreement and *reported* disagreement was positive but nonsignificant (Inter.: $\tau = .18$, $p = .72$; Hom.: $\tau = .41$, $p = .25$). Power may have been insufficient. Table 3.2 presents correlations between study variables for each group condition.

Follow-up analyses were performed on subtypes of observed disagreement. The correlation between observed task-content disagreement and reported disagreement was also positive but not significant in both groups (Inter.: $\tau = .55$, $p = .28$; Hom.: $\tau = .41$, $p = .25$). Observed task-process disagreement and reported disagreement had a negative but nonsignificant correlation in interprofessional teams and showed no association in homogeneous teams (Inter.: $\tau = -.59$, $p = .44$; Hom.: $\tau = -.07$, $p = .85$). Again, statistical power may have been an issue.

In sum, observed and reported disagreement were not as highly correlated as expected and appeared to measure two different constructs. In this sample, their (nonsignificant) association seemed mostly explained by task-content (vs. task-process) disagreement.

Figure 3.3

Comparative Boxplots for Group Tension and Group Effectiveness Indicators in Homogeneous and Interprofessional Teams

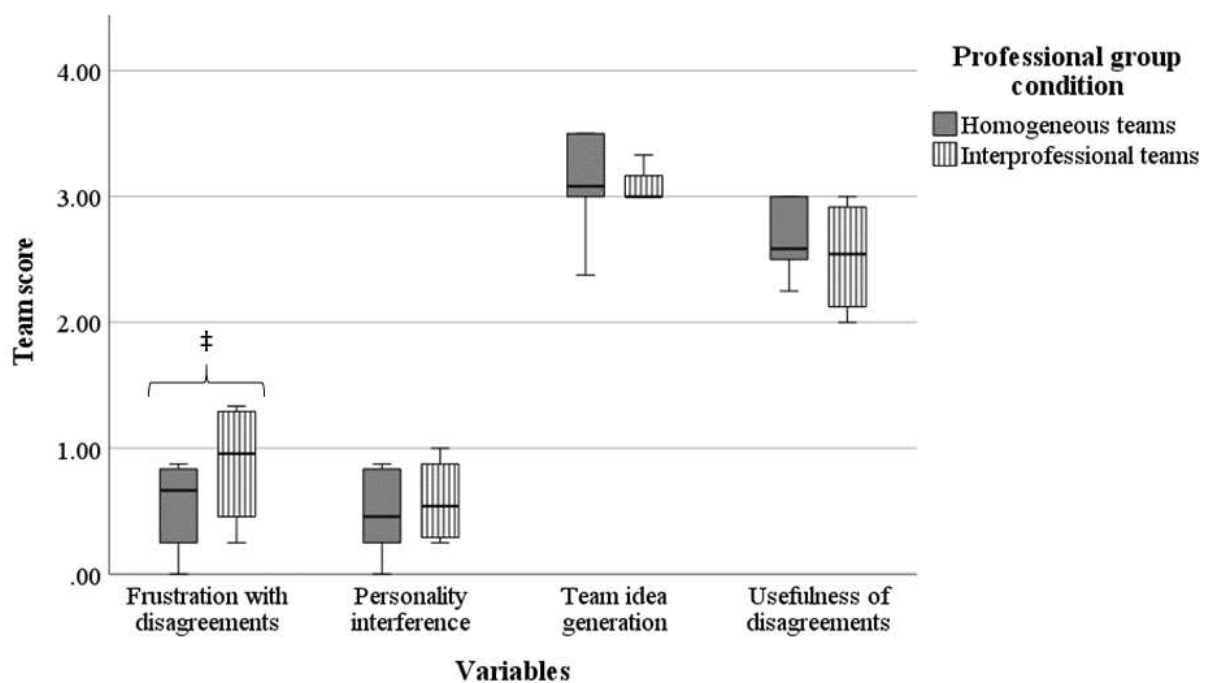


Table 3.2*Kendall Tau Correlations by Group Condition*

Homogeneous teams		1.	2.	3.	4.	5.	6.	7.	8.	9.
A) Disagreement	1. Observer-coded disagreement									
	2. Reported disagreement	.41								
B) Group tension	3. Frustration with disagreement	.33	.69 [†]							
	4. Personality interference	.20	.83 [*]	.87 [*]						
C) Group effectiveness	5. Idea generation	-.50 [‡]	-.96 ^{***}	-.65 [†]	-.79 [*]					
	6. Usefulness of disagreement	.21	-.15	.07	-.07	.23				
D) Performance outcomes	7. Panel-rated decision quality	-.47 [‡]	-.28	-.60 [†]	-.47 [‡]	.36	-.07			
	8. Reported integration of team inputs	-.50 [‡]	-.96 ^{***}	-.65 [†]	-.79 [*]	1.00 ^{**}	.23	.36		
E) Relational outcomes	9. Satisfaction with process	-.47 [‡]	-.69 [†]	-.87 [*]	-.73 [*]	.65 [†]	-.21	.47 [‡]	.65 [†]	
	10. Trust in team	-.55 [‡]	-.50 [‡]	-.14	-.28	.59 [‡]	.30	.00	.59 [‡]	.28
Interprofessional teams		1.	2.	3.	4.	5.	6.	7.	8.	9.
A) Disagreement	1. Observer-coded disagreement									
	2. Reported disagreement	.18								
B) Group tension	3. Frustration with disagreement	.33	.55							
	4. Personality interference	.33	.55	1.00 [*]						
C) Group effectiveness	5. Idea generation	.71 [‡]	.78 [‡]	.71 [‡]	.71 [‡]					
	6. Usefulness of disagreement	.33	-.18	.33	.33	.24				
D) Performance outcomes	7. Panel-rated decision quality	-1.00 [*]	-.18	-.33	-.33	-.71 [‡]	-.33			
	8. Reported integration of team inputs	.82 [‡]	.00	.41	.41	.58	.82 [‡]	-.82 [‡]		
E) Relational outcomes	9. Satisfaction with process	.67 [‡]	.55	.00	.00	.71 [‡]	.00	-.67 [‡]	.41	
	10. Trust in team	-.18	.00	.55	.55	.00	.18	.18	.00	.55

[‡] $p < .20$; [†] $p < .10$; ^{*} $p < .05$; ^{**} $p \leq .01$

Associations Between Variables According to Group Composition

Association Between Disagreement and Other Variables

Nonparametric Kendall tau correlation analyses examined the associations between disagreement (observed and reported), group tension, group effectiveness, and group outcomes.

Group Tension. Only *reported* disagreement (and not observed disagreement) correlated with group tension indicators and the associations were positive in both conditions. In homogeneous teams, reported disagreement showed strong positive and significant associations with frustration with disagreement ($\tau = .69, p = .06$) and reported personality interference ($\tau = .83, p = .02$). In interprofessional teams, although nonsignificant, these correlations were also positive and of notable size ($\tau = .55, p > .20$, same for both variables). The difference in significance could have reflected the smaller number of interprofessional teams.

Observed disagreement did not predict group tension indicators in either group (positive small correlations, $p > .20$). Follow-up analyses on observed disagreement subtypes indicated no significant associations.

Group Effectiveness. Group conditions showed opposite trends in the associations between disagreement and team idea generation. Homogeneous teams showed detrimental associations while interprofessional teams showed beneficial ones. In homogeneous teams, high observed disagreement and high reported disagreement were both significantly associated with *lower* idea generation (respectively: $\tau = -.50, p = .17$; $\tau = -.96, p = .01$). Conversely, in interprofessional teams, high observed disagreement and high reported disagreement were both significantly associated with *higher* idea generation (respectively: $\tau = .71, p = .18$; $\tau = .78, p = .16$). The associations between disagreement (observed and reported) and usefulness of

disagreement were similar and small in both groups ($p > .20$). Idea generation and usefulness of disagreement were not correlated.

Follow-up analyses on observed disagreement subtypes showed a similar inverse pattern for task-content disagreement. The correlation between task-content disagreement and idea generation was significant in both groups, but negative in homogeneous teams ($\tau = -.50, p = .17$) and positive in interprofessional teams ($\tau = .71, p = .18$). There were no other significant associations.

Performance Outcomes. Only observed (vs. reported) disagreement was associated with panel-rated decision quality. In both conditions, higher observed disagreement was associated with lower decision quality (Inter.: $\tau = -1.00, p < .001$; Hom.: $\tau = -.47, p = .19$). This association was particularly strong in interprofessional teams.

Disagreement and integration of inputs showed opposite associations across conditions. Homogeneous teams showed detrimental associations and interprofessional teams showed beneficial ones. Higher observed disagreement ($\tau = -.50, p = .17$) and higher reported disagreement ($\tau = -.96, p = .01$) both correlated with *lower* reported integration of inputs in homogeneous teams. Higher observed disagreement ($\tau = .82, p = .12$) was associated with *higher* integration of inputs in interprofessional team. Reported disagreement and integration did not correlate in interprofessional teams ($\tau = .00$).

The following associations were noted in interprofessional teams: higher reported usefulness of disagreement correlated with higher integration of inputs ($\tau = .82, p = .12$), while higher integration correlated with lower decision quality ($\tau = -.50, p = .12$). These variables were not associated in homogeneous teams.

Follow-up analyses on observed disagreement subtypes indicated that the negative association between observed disagreement and panel-rated decision quality was explained by task-*content* disagreement (Inter.: $\tau = -.67, p = .17$; Hom: $\tau = -.47, p = .19$). In homogeneous teams, task-*content* disagreement also explained the negative association between observed disagreement and integration of inputs ($\tau = -.50, p = .17$). This association was positive but nonsignificant in interprofessional teams. Task-*process* disagreement did not correlate with performance outcomes ($p_s > .20$).

Relationship Quality Outcomes. Again, we observed contrasting trends between group conditions in the associations between disagreement and relational quality. Homogeneous teams showed detrimental associations and interprofessional teams showed beneficial ones. In homogeneous teams, higher observed and reported disagreement were both associated with *lower* satisfaction with process (observed: $\tau = -.47, p = .18$; reported: $\tau = -.69, p = .06$) and *lower* trust in team (observed: $\tau = -.55, p = .12$; reported: $\tau = -.50, p = .17$). In interprofessional team, higher observed and reported disagreement were both associated with *higher* satisfaction with process (observed: $\tau = .67, p = .17$; reported: $\tau = .55, p > .20$), although the association was significant only for observed disagreement. In interprofessional teams, reported disagreement and trust in team were not correlated.

Follow-up analyses on observed disagreement subtypes indicated that higher task-content disagreement correlated with *lower* satisfaction in homogeneous teams, but with *higher* satisfaction in interprofessional teams (Inter.: $\tau = 1.00, p < .001$; Hom.: $\tau = -.47, p = .19$). The association between task-content disagreement and trust was similarly negative in both groups, but significant in homogeneous teams only (Inter.: $\tau = -.55, p = .28$; Hom.: $\tau = -.55, p = .13$). In interprofessional teams only, task-*process* disagreement correlated with relationship outcomes.

The association was negative for satisfaction with process ($\tau = -.91, p = .07$) and positive for trust ($\tau = .80, p = .13$).

Association Between Group Tension and Other Variables

Frustration with disagreement and personality interference were positively correlated in both groups (Inter.: $\tau = 1.00, p < .001$; Hom.: $\tau = .87, p = .02$). However, the associations between group tension and other variables showed contrasting trends across conditions. Homogeneous groups tended to exhibit more negative associations than interprofessional teams.

Group Effectiveness. In homogeneous teams, frustration with disagreement ($\tau = -.65, p = .08$) and personality interference ($\tau = -.79, p = .03$) both showed significant negative associations with idea generation. In interprofessional teams, frustration with disagreement ($\tau = .71, p = .18$) and personality interference ($\tau = .71, p = .18$) both showed significant positive associations with idea generation. In both groups, associations with usefulness of disagreement were small and nonsignificant.

Performance Outcomes. Group conditions also showed contrasting trends for performance outcomes. In homogeneous teams, frustration with disagreement and personality interference both had significant negative correlations with panel-rated decision quality (frust.: $\tau = -.60, p = .09$; pers.: $\tau = -.47, p = .18$) and integration of inputs (frust.: $\tau = -.64, p = .08$; pers.: $\tau = -.79, p = .03$). In interprofessional teams, group tension indicators and performance outcomes were not correlated.

Relationship Quality Outcomes. Yet again, group conditions showed contrasting trends for relationship quality outcomes. In homogeneous teams, frustration with disagreement ($\tau = -.87, p = .02$) and personality interference ($\tau = -.73, p = .04$) both had significant negative

associations with satisfaction with process. These associations were null in interprofessional teams. Group tension indicators and trust were not correlated.

Discussion

Given reported challenges associated with member heterogeneity in interorganizational disaster response, this study examined in a semi-experimental setting how salient professional group composition could influence expression and perception of disagreement. In terms of reaction, it also examined whether homogeneous and interprofessional teams showed similar associations between disagreement, group tension, group effectiveness, and group outcomes.

Main Findings

Observed and Perceived Disagreement

First, contrary to the assumption that professional diversity should lead to greater task disagreement, interprofessional teams did not exhibit more observed disagreement than homogeneous teams. However, interprofessional teams did *report* significantly higher disagreement. Observed and reported disagreement were not significantly correlated in either group. Furthermore, observed and reported disagreement showed different correlations with other study variables.

These differences may reflect that the observed and reported disagreement measures targeted different aspect of disagreement frequency (observed frequency of disagreement statements vs. reported presence of frequent disagreement). Other factors than frequency may have determined participant evaluations on whether their team had frequent differences of opinion during the task (e.g., intensity, perceived resolution potential, how disagreement was expressed; Bendersky et al., 2014; Bradley et al., 2015). Expectations, attributions, or social desirability effects could also have affected the willingness to endorse this team descriptor.

Nevertheless, results are consistent with meta-analysis findings showing a positive correlation between reported identification and reported task conflict (de Wit, Greer, et al., 2012). In addition to the result of Hobman and Bordia (2006)'s longitudinal study, they support the idea that identification predicts reported task conflict rather than the opposite. Results also highlight the need for caution in assuming that professional diversity leads to more frequent expressions of task disagreement, even when team professional diversity predicts higher self-reported task conflict. More generally, researchers may want to apply caution when interpreting the results of intragroup conflict studies based on self-reported measures. Some researchers have documented asymmetric perceptions of disagreement in teams (Jehn et al., 2010). Our findings concur with the idea that contextual and behavioural factors could influence disagreement perceptions and reports.

Group Differences

Interprofessional teams reported lower integration of inputs ($p < .20$), lower satisfaction with process ($p < .20$), and lower trust in team ($p < .01$) compared to homogeneous teams. However, groups exhibited similar objective performance (panel-rated decision quality), reported personality interference, idea generation, and usefulness of disagreement.

On the one hand, results are contrary to the hypothesis that interprofessional groups would have more difficulty performing in time-limited tasks because of the added need to manage differences. On the other, this allowed us to compare homogeneous and interprofessional groups in a situation of equivalent performance.

Association Between Disagreement and Other Variables

As reflected in Table 3.2 above, only observed disagreement correlated with panel-rated decision quality. This was linked to task-content (and not task process) disagreement. This

association was particularly strong in interprofessional teams. Reports on the presence of frequent disagreement did not predict decision quality. Meta-analysis findings have shown large credibility intervals for the relationship between task conflict and performance (de Wit, Greer, et al., 2012). This is a further support to the need for more observational studies on the role of task disagreement in teams.

In interprofessional teams, the pattern of correlations painted a rather positive portrait around disagreement. Observed disagreement was positively associated with idea generation, integration of team inputs (i.e., the reported extent to which the task outcome reflected all team members' input), and satisfaction with process. Integration of inputs was positively associated with reported usefulness of disagreement and negatively associated with panel-rated performance. Even though interprofessional teams had higher reported disagreement, reported disagreement showed no association with performance and relationship outcomes (only a positive correlation with idea generation). Disagreement and trust in team were not associated. Group tension and group outcome were also not significantly correlated. This general portrait suggests that in interorganizational teams, disagreement was likely to be associated with perceived or actual informational benefits and that integration efforts may have reduced final performance on the time-sensitive task. Findings support the importance of collaboration in planning stages of disaster management, when stakeholders have the time needed to integrate their different perspectives (e.g., Comfort, 1990; Kapucu & Garayev, 2011).

In contrast, homogeneous teams showed a more detrimental dynamic around disagreement. In homogeneous teams, disagreement (observed and reported) negatively correlated with idea generation, integration of inputs, satisfaction with process, and trust. Teams with high reported disagreement tended to report high group tension (frustration and personality

interference). Group tension was negatively associated with panel-rated decision quality, integration of input, and satisfaction with process.

These results are consistent with previous experimental studies suggesting that divergences with surface-similar others lead to higher reported frustration (Phillips, 2003), higher disappointment (Rink & Ellemers, 2006, 2007), and higher relationship focus (Loyd et al., 2013). They are consistent with the hypothesis that groups with salient professional diversity could be more resilient to disagreement than surface-homogeneous groups.

However, findings are also consistent with studies showing that disagreement may be more valuable and satisfying in interprofessional contexts because it is more likely to enable the acquisition of new information (Todorova et al., 2014). Finally, we cannot eliminate the possibility that disagreement may have been more disruptive in homogeneous teams simply because it so happened that in this sample, participants placed in the homogeneous team condition were less skilled collaborators than those placed in the interprofessional condition. More research would be needed to disentangle these potential explanations and replicate the results in a larger sample. There is a need for more direct investigations of the mediating role of frustration in the associations between disagreement and performance, especially in relations to salient group composition.

Limitations

Results from this study must be interpreted in light of its limitations. This was an observational study with subject matter expert senior risk managers allocated to experimental conditions and performing in a standardized, validated scenario. While the design inevitably faced sample size limitations due to the constrained availability of potential participants, the high ecological validity counterweighted for the minimal statistical power. Even if some associations

had very large effect sizes ($r > .90$), the probability of a type I error was compounded by the level of significance considered and the many comparisons performed. Considering that the goal of this study was not confirmatory, this study constituted an instructive demonstration of observed versus reported disagreement in a high external validity context.

Second, self-reported constructs were based on one-item measures. This is a legitimate approach in situations where time is limited and repeating similar questions could decrease the face validity of a questionnaire (such as during a simulation during work hours with senior risk managers; e.g., Wanous et al., 1997). While reliability could have been reduced for some variables, studies on one-item measures of job satisfaction have found them to have acceptable reliability compared to multi-item scales (Dolbier et al., 2005; Wanous et al., 1997). Averaged scores across the two tasks also provided a way to maximize reliability in this context (Goulet & Cousineau, 2019).

Third, confounding factors could have affected results. Our measures of disagreement, observed and reported, did not consider the intensity or nature of disagreement. Our measure of reported disagreement did not differentiate between task-content and task-process disagreement. We did not control for other sources of diversity such as gender or age or other features of potential relevance. We did not assess how disagreement was expressed (e.g., Weingart et al., 2015) or the amount and type of information shared in conjunction with disagreement. The negative reactions to disagreement in homogeneous teams could have simply reflected lower informational benefits.

The study context involved time pressures (teams had only ten minutes to problem solve together in that specific phase of the simulation). Actual and perceived time pressures have been shown to decrease openness to alternative viewpoints (De Dreu, 2003). Although all teams had

the same time to perform the task, we did not record whether teams reinforced these time pressures and how this could have affected our results.

Finally, negative reactions to disagreement among homogeneous stakeholders in time-sensitive crisis response situations may be functional and adequate. Stakeholders in similar professions, especially uniformed ones such as first responders and military personnel, tend to have clear and common guidelines for disaster response. Failure to agree on these guidelines can be indicative of problematic group functioning. Our analyses did not consider this aspect.

Contributions

This study provided rare observational evidence on the role of task disagreement during group problem solving. To our knowledge, this is also one of few professional diversity studies to have simultaneously considered performance and relational outcomes. Moreover, this was done using a semi-experimental design where a sample of experienced professionals were divided between two balanced experimental conditions and performed standardized interorganizational problem-solving tasks in a naturalistic, expert-validated scenario.

Based on this data, the study underlines that even when professionally diverse teams *report* higher team disagreement, this does not mean that they actually *express* more disagreement. In fact, this study supports the notion that reported and observed disagreement should not be equated and should both be studied. Furthermore, the study offers support for the hypothesis that salient professional diversity vs. homogeneity could predict more beneficial (or less detrimental) reactions to disagreement – particularly in terms of information elaboration, integration of team inputs, and relationship quality. It suggests potential caveats of shared identity interventions in disaster risk management collaborations. Importantly, it demonstrates the importance of further pursuing this line of investigation.

Future Research Directions

Future research should further evaluate the role of salient group composition for perception of and reaction to disagreement in a larger sample with sufficient power and more controls. Observational studies in actual disaster contexts are needed – or studies ensuring that the same sense of urgency and threat is felt by everyone. On the other hand, the same question should also be investigated at other phases of the disaster cycle where there is more time to integrate differences, such as in planning and mitigation phases.

Experimental designs controlling for many variables, albeit less realistic, are also important. Many factors can influence disagreement trajectories, such as information gains, cross-categorization, or the way disagreement is expressed. Experimental studies controlling for these factors are needed to disentangle the effect of salient professional group composition on perception of and reaction to disagreement. More precisely, there is a need for an experimental test of the impact of salient group professional composition on performance and relational quality following disagreement. This, controlling for the actual informational benefits of the disagreement, other potential sources of social categorization, and disagreement expression. The intervening role of emotional reaction, conflict perception, and information processing should also be investigated.

Conclusion

In conclusion, this semi-experimental observational study with seasoned disaster managers uniquely contributes to our understanding of disaster response collaborations, professional diversity, and group problem-solving dynamics in the face of disagreement. It adds to the empirical evidence on the role of group composition in how teams express, perceive, and react to disagreement in interorganizational collaboration.

The findings indicate that salient group composition can lead to greater reported disagreement even when observed disagreement does not differ. They indicate that salient professional diversity could predict greater task focus and more resilient relationships in the face of task disagreement. The study also highlights the need for more controlled investigations on how identity processes and other features of the relational context influence disagreement trajectories. “Conflict” is reported as a challenge in interorganizational disaster response and developing a shared identity is sometimes proposed as a strategy to facilitate collaboration. Given the current lack of observational evidence on these questions, studies are needed to ensure that proposed interventions can achieve their intended outcomes.

Chapter 4:

Study 3 - Professional Identity and Task Disagreement in Group Decisions:

An Experimental Test of Informational and Relational Pathways

Professional identity and task disagreement in group decisions:

An experimental test of informational and relational pathways

Organizations often use groups to analyze problems, design solutions, and make decisions. In theory, interprofessional groups where members provide different information and perspectives should lead to better decisions. In practice, this is not always the case. Integrating distributed information places high information-processing demands on groups (Hinsz et al., 1997). Disagreements are also likely to arise. Depending on the relational context in which they take place, these can help members share information and expand their initial views. They can also engender tension and lead people to maintain initial positions despite contradicting information. As a result, suboptimal decisions seem to be a common occurrence in groups even when members had access to all relevant facts.

Salient social categories are a powerful aspect of a group context (Tajfel, 1974) and can influence cognitive and relational dimensions of group functioning. Classic findings in the social identity perspectives have highlighted how social category similarity can increase trust and cooperation (Tajfel, 1974; Turner et al., 1987; Williams & O'Reilly, 1998). Promoting a shared super-ordinate identity can seem a promising intervention to improve group cohesion in professionally diverse groups. However, research has also uncovered how social category similarity can reduce a group's ability to surface disagreement and benefit from it (Gaither et al., 2018; Phillips, 2003; Rink & Ellemers, 2006). Few studies have examined these questions in the context of work-relevant tasks or work-relevant social categories. Research is needed to examine how salient professional categories can influence decision making in expertise-relevant tasks.

Accordingly, this study experimentally tested the effect of homogeneous versus interprofessional salient group composition on decision quality and satisfaction with team

following disagreement. It also investigated the mediating role of affective reactions, conflict perception, and information processing in these effects. Albeit with lesser external validity than a naturalistic setting, an experimental design offers an opportunity to disentangle confounding factors influencing group decision-making outcomes.

Group Decision Making in the Presence of Distributed Information

From a cognitive standpoint, group decision making can be portrayed as a group information-processing phenomenon in which group- and individual-level forms of information processing interact (Hinsz et al., 1997). When members bring non-redundant information and perspective to the table, leveraging this information to improve group outputs requires that it be shared and processed (Dahlin et al., 2005; Schulz-Hardt & Mojzisch, 2012; van Knippenberg et al., 2004; van Knippenberg & Ginkel, 2010). At the individual level of analysis, this implies a number of important behaviours: 1) sharing unique information to others; 2) paying attention to new information shared by others; 3) uptake of relevant information to improve previous representations (van Knippenberg & Ginkel, 2010; Wittenbaum & Stasser, 1996; Xiao et al., 2016). However, one cannot assume that such processes necessarily take place (van Knippenberg & Ginkel, 2010). As reviewed by Greitemeyer and Schulz-Hardt (2003), people tend to evaluate new information more favorably when it concurs with their initial preferences (preference consistency effect). In contrast, preference-inconsistent information is more easily dismissed. People also tend to judge their own information as more credible than others' information (ownership bias). As a result, when individuals come to a common problem with different initial preferences and different information, decision outcomes are often suboptimal if the situation requires them to integrate information and change initial preferences.

Opportunities and Risks of Task Disagreement for Group Performance and Cohesion

Task disagreement has the potential to help groups evaluate options better and integrate information (Mannix & Neale, 2005). However, it can also exacerbate group information-processing challenges. Task conflict can be associated with negative emotions (Jehn, 1997). People easily develop a sense of ownership over their views and can perceive disagreement as a threat to the self or their ingroup, especially in contexts where competitive frames are also triggered (De Dreu & van Knippenberg, 2005). Studies have found that psychological threat during disagreement decreases the chances that individuals will use preference-inconsistent information and adjust their initial views (de Wit, Scheepers, et al., 2012). Therefore, when individuals experience task disagreement as not only unpleasant but also threatening, this is likely to impede their processing of new information and increase their chances of maintaining their initial position.

The social context in which task disagreement takes place can shape how people perceive task disagreement and react to it. Task disagreement can be ambiguous, especially when it is unclear whether the critical evaluation extends beyond the views expressed and also applies to the person expressing them. This can lead people to interpret a disagreement as an interpersonal issue when other means of uncertainty reduction are not available (Simons & Peterson, 2000). For example, de Wit and colleagues (2013) found in an experimental study that when task disagreement occurred in the presence of relationship conflict (perceived or experimentally manipulated), individuals reported lower motivation to process information systematically, were less likely to use the information shared by others, and were more likely to hold on to their initial position.

In contrast, Dooley and Fryxell (1999) showed in a survey study of strategic decision-making teams in hospitals that when reported dissent co-occurred with perceptions of loyalty, it was associated with higher decision quality. Similarly, Todorova and colleagues (2014) found that in cross-functional contexts, acquiring new information through reported task disagreement was associated with increased positive emotions and increased job satisfaction.

Overall, meta-analysis findings indicate that when high task conflict co-occurs with high relationship conflict it tends to predict decreased performance and decreased satisfaction (de Wit, Greer, et al., 2012). Relationship conflict also has a strong negative direct association with satisfaction (de Wit, Greer, et al., 2012). However, current conflict research is largely based on self-reported measures that confound relationship conflict with negative emotionality (Bendersky et al., 2014). At present, we cannot disentangle the effects of negative emotions and relationship conflict perceptions.

Salient Group Composition and Reaction to Disagreement

According to social identity theory, social categorization and social identity are deep-seated heuristics that human beings use to make sense of social situations. Social identity is defined as embracing group membership to given social categories (Tajfel, 1974). Salient social category differences have been called surface-level diversity, in contrast to the more cognitive, invisible differences that scholars refer to as deep-level diversity (Harrison et al., 1998). Salient social category differences can have well-documented detriments for trust and cooperation when they trigger intergroup bias and perceived competition (Turner & Reynolds, 2012; van Knippenberg & Schippers, 2007). Yet, recent frameworks also propose that salient diversity could reduce potential negative reactions and detrimental outcomes following disagreement (Carter & Phillips, 2017; Srikanth et al., 2016).

Social Categorization and Affective Reactions Following Disagreement

Existing research suggests that members of saliently heterogeneous groups are less likely to expect that they will have the same attitudes or perspectives (Allen & Wilder, 1979; Phillips, 2003; Rink & Ellemers, 2006). Learning that someone disagrees with oneself may violate common expectations of agreement based on the false consensus effect (Ross et al., 1977), but this may be stronger with an in-group member.

To our knowledge, there exist few controlled studies looking specifically at the influence of salient professional categories on affective reactions to disagreement. An exception is Phillips (2003) who looked at how salient professional diversity could influence reactions to task disagreement in a decision-making scenario. She found that disagreement from a different-discipline (vs. same-discipline) teammate predicted greater reported irritation and surprise. Less related but still in a work-relevant scenario, Rink and Ellemers (2006) manipulated expectations of work goal similarity/difference based on gender similarity/difference. Violated expectations of either similarity or difference led to greater reported disappointment. However, two other studies, which did not involve salient social categories, found that such effects did not generalize to negative hostile emotions (4-item scale tapping anger, irritation, scorn, and hostility) or surprise (Rink & Ellemers, 2007). Thus, past research involving work-related tasks or identities has provided inconsistent results on emotional reactions to expectancy violation.

Psychophysiological studies have also looked at emotional reactions following expectancy violation. These have documented increases in indicators of negative affective states following the violation (vs. confirmation) of social expectations. This was based on physiological threat reactions (Mendes et al., 2007) and measures of negative affect using facial electromyography (Bartholow et al., 2001). Importantly, Bartholow and colleagues observed

reactions as early as 100-300 ms after stimulus presentation, indicating that such reactions can be quite immediate.

Thus, research is needed to bring greater clarity on emotional reactions following disagreement in interprofessional versus intra-professional teams. Scholars studying intragroup conflict have drawn on affective events theory (i.e., Weiss & Cropanzano, 1996) to suggest that people first appraise a conflict situation and then experience emotional reactions as a result of this appraisal (Todorova et al., 2014). An expectancy violation perspective on task disagreement suggests that emotional reactions could also come first and influence latter conflict appraisals.

Decision Quality and Satisfaction Following Disagreement

Past findings also suggest that salient professional diversity (vs. homogeneity) should result in higher decision quality and higher satisfaction following task disagreement.

Decision Quality. Studies based on non work-related social categories suggest that disagreement with someone from the same group should lead to reduced performance. In an experimental study on minority influence where in- and out-groups were based on dormitory membership, Phillips (2003) found that, compared to congruence between salient similarity and individual positioning (ingroup agrees, outgroup disagrees), incongruence (ingroup disagrees, outgroup agrees) led to reduced decision quality on a hidden profile task. Similarly, Loyd and colleagues (2013) performed a minimal group study where disagreeing participant dyads discussed a hidden profile task. Members of the dyads were either from the same salient social category or from different ones (randomly assigned group colours). They found that heterogeneous dyads were more likely to identify the optimal solution than homogeneous ones. However, to our knowledge, the direct effect of salient professional diversity/similarity on decision quality following disagreement has not been tested.

Satisfaction. Research also suggests that disagreement with someone from the same group should lead to reduced satisfaction. Phillips (2003) found that disagreement with a same-discipline (vs. different-discipline) teammate led to lower reported group efficacy. Rink & Ellemers (2006) found that participants in same-gender (vs. mixed-gender) dyads reported lower commitment to collaboration after learning that their teammate's work goal was different from theirs. In experimental studies focusing on expectancy violation more generally, Sun and Yu (2014) found that violated expectations about peer feedback led to lower reported satisfaction, irrespective of whether the feedback meant social acceptance or rejection. Finally, in their experimental studies using confederates, Mendes and colleagues (2007) found that participants interacting with a counter-stereotypical (vs. stereotypical) confederate reported decreased team quality and cooperativeness.

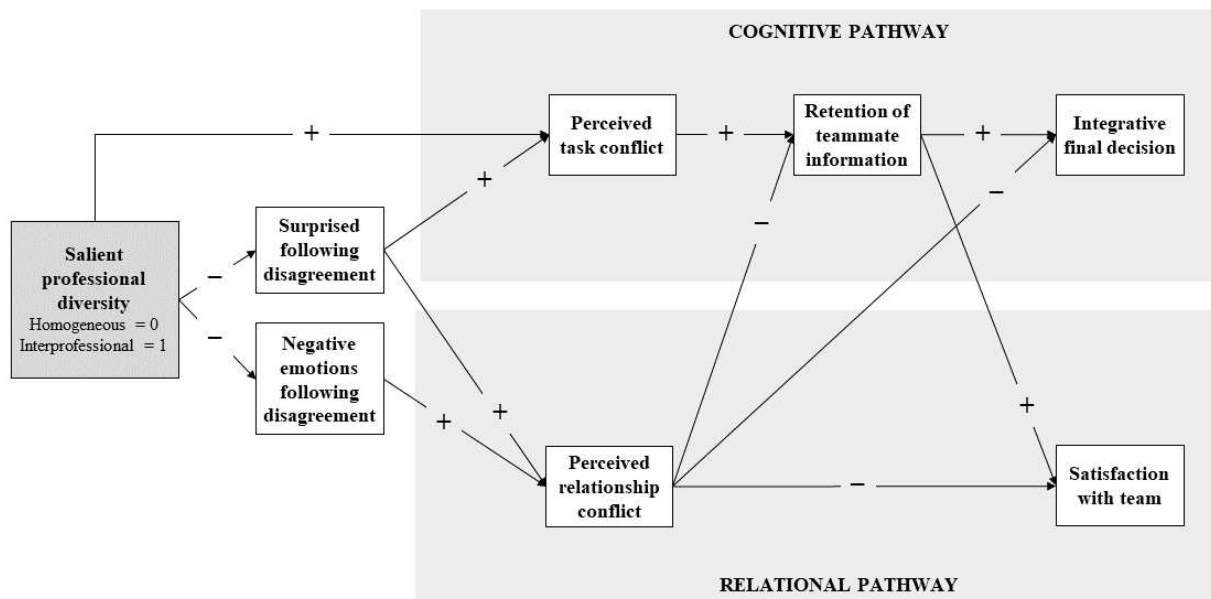
Cognitive and Relational Pathways to Outcomes Following Disagreement

Available research suggests two different cognitive and relational pathways whereby the experience of incongruence between similar social categories and divergent perspectives (disagreement) can influence group performance and satisfaction following disagreement. Following a beneficial cognitive pathway, increased surprise could raise awareness of a task conflict and direct attention to the substantive nature of the disagreement. Research suggests that surprise can shift attention to the source of error prediction (Noordewier et al., 2016). People also have better recall for occurrences that violated expectations, such as words in unexpected fonts (Meyer, 2009) and expectancy-violating statements about social targets (Bartholow et al., 2001). Thus, surprise could increase awareness of a task conflict and turn attention to the substantive information to understand the source of this task conflict. Acquiring new information could increase decision quality and satisfaction.

On the other hand, research also suggests a detrimental relational pathway. Incongruence can shift attention to the person who is incongruent or to one's relationship with this person, thus detracting attention from the substantive task. Experimental studies by Loyd and colleagues (2013) found that when participants expected to interact with an ingroup (vs. outgroup) teammate who disagreed with them, they engaged in less elaboration of task information prior to the meeting. This negative impact of social category similarity on information elaboration was mediated by increased relationship focus (focusing on getting along rather than substantive task performance). Decreased sense of clarity about the interpersonal relationship could contribute to this tendency to focus on the relationship vs. the task, as expectancy violation has been found to predict lower perceived clarity of teammates (Rink & Ellemers, 2006, 2007). Given the social ambiguity in task disagreement, decreased clarity about a partner could increase the propensity to interpret the task conflict as a relationship conflict if other means of uncertainty reduction such as trust are not available (Simons & Peterson, 2000) or if the disagreement has triggered negative emotions. As reviewed above, increased relationship conflict can predict reduced information processing, reduced performance, and reduced satisfaction (de Wit et al., 2013; de Wit, Greer, et al., 2012). However, to our knowledge, no study has directly tested whether salient homogeneity can increase perception of a task conflict as a relationship conflict.

Summary and Current Gaps

In sum, research suggests that integrating distributed information in a group is an information-processing challenge. Perceived task disagreement can increase attention to new information shared by others; however, information processing can be distracted by negative emotions and relationship conflict, which may be triggered by task disagreements. As illustrated in Figure 4.1, available evidence suggests that, in groups with salient professional *diversity*, task

Figure 4.1*Dual Pathway Model of Salient Professional Diversity and Outcomes Following Disagreement*

disagreement should trigger less surprise and negative emotions and be less harmful for decision quality and satisfaction. Intervening mechanism for these effects could be decreased perception of relationship conflict and increased attention to substantive task information.

However, evidence is lacking on whether salient professional diversity does indeed produce these types of effects, on how it could simultaneously influence integrative decision making and satisfaction following disagreement, and on the potential intervening role of emotions, conflict perceptions, and processing of preference-inconsistent information. Therefore, there is a need to investigate the impact of salient professional diversity on perception of and reaction to disagreement and to examine the potential cognitive and relational pathways leading from emotions to interaction outcomes in this context.

Present Study

The central aim of this study was to test in a fully experimental design the hypothesis that salient group professional composition (homogeneous vs. interprofessional) affects how individuals perceive and react to task disagreement in group decision-making situations characterized by distributed information. Accordingly, our first question was: 1) What is the impact of group composition (homogeneous vs. interprofessional) on individual perception and reaction following expressed disagreement? Namely, how do interprofessional and homogeneous groups differ on a) reported intragroup conflict; b) reported emotion; c) processing of information received from others; d) task final decision (integration of all available information); and e) reported satisfaction with team.

Our second question focused on the hypothesized dual pathway outlined in Figure 4.1: 2) Do perceived task conflict, perceived relationship conflict, and information processing play a mediating role in the relationship between emotion and outcomes following disagreement?

Hypotheses

Hence, in an experimental design in which participants were randomly assigned to either homogeneous or interprofessional teams and exposed to the same scripted disagreement, we expected that, compared to the homogeneous team condition, participants in the *interprofessional* team condition would:

H1: Show less reaction to the disagreement, as manifested by lower reported emotion, better processing of preference-inconsistent information, more integrative decision making, and higher satisfaction with team;

H2: Report lower perception of relationship conflict following disagreement.

Second, we hypothesized that cognitive and relational pathways would mediate the relationship between emotions and outcomes, with:

H3: A positive indirect link between surprise and outcomes through increased reported task conflict and increased processing of information;

H4: A negative indirect link between negative emotions and outcomes through increased reported relationship conflict and decreased processing of information.

Methods

Study Design and Scenario Description

This study used a one-way experimental design with the between-group factor of salient group professional composition (homogeneous, interprofessional). Using a task procedure adapted from de Wit and colleagues (2013), participants interacted in writing with two fictitious team members within an online group decision-making scenario. Teammates' areas of expertise were the sole available social categories and served to manipulate salient group composition. The decision-making task consisted of a "hidden profile" structure by which the optimal decision

option can only be identified by pooling the information individually held by each group member. The complete set of relevant information was initially hidden from members. Participants first made an initial decision based on the partial information they had received. Then, through a scripted chat-like group discussion, participants communicated their position to the two fictitious teammates. In their replies, teammates each expressed disagreement with the participant's initial position, stated their own positions (different from one-another), and provided new information that the participant did not originally have. Participants then took a final decision.

The online simulation enabled standardization of the task situation across all participants. The use of computer scripts held the expression of task disagreement and the informational benefits of disagreement constant. Text-based messages were chosen over pre-recorded video or audio messages to isolate the effect of salient professional identity from other social categories that could have confounded results (e.g., gender, visible minority, linguistic background).

The experimental task developed for this study was set in a climate change and community resilience setting involving a prototypical but fictitious North American town, the city of "Gapville". In the scenario, Gapville was implementing a new heat wave program to protect its population from the increasing frequency and intensity of extreme summer heat waves. Participants were asked to make a recommendation on which city district the city should prioritize for program implementation based on the risk and protection factors associated with each district. There were four decision options: Maple, Pine, Birch, and Elm Districts. The study received approval from the University of Ottawa Research Ethics Board and the consent forms are provided in Appendix F.

Recruitment and Sample

Participants were 454 undergraduate students from the University of Ottawa, Canada, aged 18 years or older, who agreed to participate in a study in English, had a permanent residence in Canada, and self-identified with at least one of the following three areas of expertise: 1) science, technology, engineering, and mathematics (STEM) disciplines, 2) health sciences disciplines (HSc), and 3) social sciences disciplines (SSc). Participants were recruited through campus-wide posters and flyer distribution ($N = 267$) and through a course participation platform (Integrated System of Participation in Research – ISPR; $N = 187$) in which students received credits towards their final grade in an introductory psychology or linguistics course.

Campus-wide and course participation samples were pooled after testing homogeneity of variances and covariances across all continuous dependent variables with the Box's test of equality of covariance matrices (Box's $M = 34.99$, $p = .19$).

Through randomization, the sample was balanced across experimental conditions, both overall (Hom. = 49%; Inter. = 51%) and within each subsample (Campus-wide: Hom. = 50%; Inter. = 50%; Student platform: Hom. = 48%; Inter. = 52%; $\chi^2(1) = .22$, $p_{\text{exact}} = .70$). Participants from each area of expertise (STEM, HSc, SSc) were also randomly assigned to experimental conditions, both overall (all homogeneous condition vs. interprofessional condition proportions were between 48-52%; $\chi^2(2) = .09$, $p_{\text{exact}} = .96$) and within each subsample (all homogeneous vs. interprofessional proportions were between 44-56%; $p_s > .75$). After excluding nine participants with outlying age values (> 30 yrs.) for this test, the campus-wide sample was on average 20.4 years ($SD = 2.2$) and the course platform sample was 19.3 years ($SD = 2.4$; $t(443) = -5.02$, $p < .001$). However, mean age did not differ by experimental condition in the final sample

($M_{\text{Hom.}} = 20.4$, $SD_{\text{Hom.}} = 4.33$; $M_{\text{Inter.}} = 20.3$, $SD_{\text{Inter.}} = 3.3$; $t(452) = 0.44$, $p = .66$) and within each subsample ($p_s > .69$). Sample demographics are presented in Table 4.1.

Measures

Dependent Variables

Task Final Decision. The final decision consisted in a dichotomous variable indicating whether a participant did choose the optimal option (i.e., Elm District), coded as 1, an integrative decision given all information received from teammates after theirs, or a suboptimal option, coded as 0.

Satisfaction with Team. Participants' satisfaction with their team at the end of the task was measured using five items adapted from previous research (DeChurch & Marks, 2001; Peeters et al., 2006; Van Der Vegt et al., 2001) and measured on a 9-point Likert-type scale going from 0-Not at all to 8-Extremely (sample item: "I am very satisfied with working in this team."; Cronbach $\alpha = .94$). Appendix G provides the complete list of items for all self-reported measures.

Mediating Variables

Emotions. Three types of emotions were initially assessed based on previous research: 1) surprise; 2) disappointment; and 3) negative emotions linked with hostility and tension. Also in line with previous research (Phillips, 2003; Rink & Ellemers, 2007), we used single items to assess the specific emotions of being surprised and disappointed. For the third category, negative emotions, we used an available, validated 4-item scale measuring negative active emotions (frustrated, angry, annoyed, tense) in conflict situations (Todorova et al., 2014; Weingart et al., 2009). Participants rated the extent to which they agreed with each emotion item on a 9-point Likert scale going from 0-Not at all to 8-Extremely (e.g., "Right now, I feel... surprised").

Table 4.1*Sample Demographics*

Variable	Category	Value		
Gender	Male	30%		
	Female	68%		
	Nonbinary	1%		
	Decline to answer	1%		
Age	Mean (SD)	20.32 (3.82)		
Level of academic training	Freshman (1st year)	40%		
	Sophomore (2nd year)	24%		
	Junior (3rd year)	16%		
	Senior (4th year)	15%		
	Other / decline to Answer	5%		
Professional identity	STEM	44%		
	Health sciences	24%		
	Social sciences	32%		
Faculty of main academic program		<i>STEM^a</i>	<i>HSc^a</i>	<i>SSc^a</i>
	Arts	1%	-	9%
	Education	-	-	1%
	Engineering	25%	-	-
	Health Sciences	2%	92%	1%
	Law	1%	-	1%
	Medicine	1%	3%	-
	Science	69%	6%	1%
	Social Sciences	1%	-	84%
	Other / decline to answer	1%	-	3%
Interdisciplinary training ^b	Yes	20%		
	No	78%		
	Decline to answer	2%		
Employment status	Full-time	3%		
	Part-time	49%		
	Not currently employed	47%		
	Decline to answer	<2%		
Self-identifies as part of a visible and/or ethnic minority	No	61%		
	Yes	37%		
	Decline to answer	2%		

^a Self-identified in STEM, Health sciences (HSc), or Social sciences (SSc) expertise group;^b Has one year or more of training in another discipline or in an interdisciplinary program.

A principal component analysis on the six emotions items indicated one principal component with an eigenvalue greater than one, which explained 61.5% of variance. It indicated a second component explaining 13.07% of variance (eigenvalue = 0.78). All communalities were above .60 except for Surprised (.30). The item “disappointed” was combined with the negative emotions scale ($\alpha = .88$ for the 5-item negative emotions scale). The item “surprised” was kept separate because of the lower communality and because this emotion has received scant attention in group disagreement research.

Task Conflict. The extent to which participants perceived the presence of a task conflict was measured by three items on an 9-point Likert scale going from 0-Not at all to 8-Extremely. One item was adapted from previous experimental research on group disagreement (de Wit et al., 2013): “Within our team, we disagree about the decision to take.”. The second, also adapted from de Wit and colleagues (2013), measured perceived disagreement on the specific task decision (“We have different viewpoints on which district should be prioritized.”). The third item was the same as used in Study 2 to measure reported disagreement (“The people within my team have differences of opinion.”). Scale reliability was $\alpha = .76$.

Relationship Conflict. The extent to which participants perceived the presence of a relationship conflict was measured using three items adapted from previous experimental research by de Wit and colleagues (2013) on group disagreement (sample item: “The exchange of our positions got a bit personal.”). Participants rated their agreement with items on a 9-point Likert scale going from 0-Not at all to 8-Extremely ($\alpha = .46$).

Retention of Teammate Information. The extent to which participants processed the information (i.e., attention allocation and encoding) received from teammates during the group discussion (and which contradicted their initial position) was operationalized using a recognition

memory test. Participants were presented with a list of 12 characteristics (e.g., air pollution, seniors with low mobility, densely populated area) that could have been used to describe any of the four decision options they had been asked to evaluate (the four city districts). Of these 12 items, three described characteristics of the Gapville districts contained in the participant's original information package (participant items). Six items were characteristics described by teammates during the group discussion (teammate items). Three items had never been mentioned during the task (filler items). Participants were given the instruction: "Please think of the information you received about the four Gapville Districts (Maple, Pine, Birch, and Elm). Think of the information that you received personally and from your team." They were asked to indicate with a yes/no answer whether each of the 12 items had been used to describe one or more of the four Gapville districts. We calculated a score indicating participants' *retention of teammate information* based on their number of correct answers to the six teammate items (range: 0-6). Skipped items were counted as incorrect answers.

Assignment to Experimental Conditions and Control Variables

Professional Identity. To allocate participants to their identity-relevant information set (described below), we measured participants' self-reported professional identity (STEM, Health sciences, or Social sciences) with the question: "Which of the following areas of expertise do you identify the most with in terms of professional identity?" (forced choice format).

Professional Identification. Three items measured participants' level of identification with the self-reported professional identity above. They were adapted from previous research on social group identification (sample item: "I identify strongly with this area of expertise"; Brown, Condor, Mathews, Wade, & Williams, 1986; Mael & Ashforth, 1992; Mitchell et al., 2012; van

Knippenberg et al., 2002). Participants rated their agreement with items on a 9-point Likert scale going from 0-Not at all to 8-Extremely ($\alpha = .71$).

Control Variables. The screening questions included a question on participants' age. The end-of-survey sociodemographic questionnaire asked for participants' gender, level of training at the University of Ottawa, and interdisciplinary training background (question: "Do you have one year or more of training in another discipline or in an interdisciplinary program?", yes/no answer).

Perceived Professional Group Composition. Three items verified the extent to which participants perceived their group to be *professionally homogeneous*. One was adapted from Gaither and colleagues (2018): "The other team members were similar to me in terms of professional expertise". Two were added to form a 3-item scale: "The other team members had expertise in the same area than me" and "My team was a professionally homogeneous group". Likewise, three items verified the extent to which participants perceived their group to be *interprofessional*. One was adapted from Gaither and colleagues (2018): "The other team members had different types of training than me". Two were added to form a 3-item scale: "The other team members had different areas of expertise than me" and "My team was an interprofessional group". Participants rated their agreement with items on a 9-point Likert scale going from 0-Not at all to 8-Extremely. The three first items and the three last ones were average to form a *perceived professional similarity* scale (Cronbach alpha = .75) and a *perceived professional diversity* scale (Cronbach alpha = .83), respectively. They correlated at $r = -.34$, $p < .001$.

Scenario Reality Check. Two items checked the extent to which participants experienced the group decision-making scenario as real: "During the task, the other team

members felt real to me” and “During the task, it felt like the other team members and I were interacting in real time”. These were measured on a 6-point Likert-type scale going from 1-Strongly agree to 6-Strongly disagree.

Task Materials

Participants performed a hidden profile decision-making task based on expertise. In the scenario vignettes, the Gapville city council needed to select a city district to pilot a new heat protection program in the coming year. To prioritize the district where residents were most at risk of suffering negative health consequences from heat waves, the city staff had short-listed four potential priority districts (Maple, Pine, Birch, and Elm Districts). Participants were asked to make a recommendation on the district that the city should prioritize.

Unique Information Packages and Hidden Profile

Three different information packages were created for the task (i.e., STEM package, HSc package, and SSc package). At the start of the task, participants received one information package (the one corresponding to their professional identity). Each package contained a portion of *shared* information (same in all packages). This shared portion described the task scenario and provided an infographic on factors that increase health risks during heat waves (high exposure to heat, high sensitivity to heat, and low access to protection from heat).

Each package also contained a portion of *unique* information (different in each package; see Table 4.2 for a summary). The unique information described the four decision options themselves (the four city districts). Importantly, each unique information set described a different, expertise-relevant aspect of the decision situation. STEM participants received unique items on the districts’ physical characteristics, Health sciences participants, on public health characteristics, and Social sciences participants, on psychosocial characteristics.

Table 4.2*Overview of Three Information Packages and Hidden Profile Structure*

	Task information packages			All information (pooled)
	STEM package	Health sciences package	Social sciences package	
Dimension described	Physical characteristics	Public health characteristics	Psychosocial characteristics	
Shared information	Description of scenario Infographic presenting the factors that increase the risk of negative health consequences from extreme summer heat waves (exposure, vulnerability, access to protective measures)			
Unique information	8 physical items (2/district)	8 health items (2/district)	8 psychosocial items (2/district)	24 items (6/district)
Most at-risk district given information set	Maple District	Pine District	Birch District	Elm District

Thus, a participant's initial package contained 8 information items describing the districts (2 items x 4 districts). This information was expertise-relevant and unique to their package. Combining all three packages together (8 items each), the total pool of task information consisted of 24 items. In total, there were 6 items (2 physical, 2 public health, 2 psychosocial) for each of the four districts. The total information pool provided a multidisciplinary view of the overall decision situation.

The structure of the information packages created a hidden profile: When considered separately, each unique information set pointed to a different district as being most at risk (Maple, Pine, or Birch District). However, when combined, the overall multidisciplinary information pool (24 items) pointed to the fourth district (Elm) as being the most at risk and best suited for the city's pilot program. Elm district was thus the optimal, or integrative decision option. The full information sets are presented in Appendix H.

Pretest of Task Materials

Task materials were pretested to ensure clarity and adequate calibration. A preliminary test was performed with a convenience sample ($N = 10$) and enabled adjustments in wording and in the relative univocality of the four district descriptions. A formal test was then conducted with a sample of participants recruited on Prolific ($N = 72$). The pretest contained four experimental conditions: 1) STEM package, 2) HSc package, 3) SSc package, 4) All information package. Participants in conditions 1-3 made two decisions: they received their unique information package (8 items), made an initial decision, received the remaining 16 items, and made a final decision. Participants in condition 4 received all 24 items at once and made only one decision. Allocation to conditions was random, not based on professional background.

In conditions 1-3, 100% of participants chose the intended district (Maple, Pine, or Birch, respectively) in decision 1 based on unique information. After receiving the remaining 16 items, an overall 53% chose Elm (intended optimal option) in decision 2. The proportion of “correct” decision 2 did not vary significantly by unique information condition (44%, 61%, and 53%, respectively; $\chi^2(2) = 1.00$, $p_{\text{exact}} = .62$). Finally, in the all-information condition ($N = 19$; one decision), 90% of participants selected Elm. Therefore, the pretest indicated adequate calibration of the three unique information packages and of the overall hidden profile structure.

Procedure

Participants were invited to participate in a study titled *Feeling the Heat? A Study on Decision Making and Climate Change Risks*. It examined how people perceive climate change information coming from different sources and make decisions. The description presented the study as taking place in an online group decision-making scenario. After the consent form, instructions indicated that the participant’s task was to express their opinion on a decision about the city of “Gapville”. They were asked to indicate their professional identity (STEM, Health sciences, or Social sciences). To make their professional identity more salient, they responded to two short-answer questions asking them to describe 1) two reasons why working in a [STEM/Health Sciences/Social Sciences] discipline is important to them and 2) some of the professional strengths that people working in [STEM/Health Sciences/Social Sciences] professions have according to them. Professional identification was measured at this point. Next, participants were randomly assigned to an experimental condition (homogeneous team vs. interprofessional team).

The *experimental section* started at this point and was comprised of two parts: 1) group composition manipulation, presentation of initial information package (shared and unique

information), initial decision on the most at-risk district, and participant's message to teammates; 2) group discussion with task disagreement and provision of remaining information by teammates, followed by measurement of all dependent variables.

Experimental Manipulation: Homogeneous vs. Interprofessional Group Composition

Upon entering the experimental section of the survey, participants were asked to wait a moment while their team assembled. After a few seconds, a screen titled Professional Team appeared informing participants that they had been assigned to Professional Team No. *X*. Three team members with their professional identity were listed on the screen, each accompanied by a "person icon" image such as commonly used on social media platforms in place of a profile picture. Team member number 1 was always the participant. The participant's professional identity was listed beside the person icon, followed by the number "1" (e.g., STEM 1) and the mention "(You)". In the *homogeneous team condition*, the professional identity of teammates number 2 and 3 was the same as the participant's (e.g., "STEM 2" and "STEM 3") and the three person icons were the same colour (yellow). In the *interprofessional team condition*, teammates number 2 and 3's professional identities were the two not selected by the participant, presented in counterbalanced order (e.g., "Health Sciences 1" and "Social Sciences 1"). The three person icons were of different colour (yellow for the participant; red and blue for teammates in counterbalanced order).

Presentation of Initial Information for Decision 1

After the presentation of team members, instructions told participants they would first receive information on the situation requiring their recommendation, review it individually, and make a first decision. Next, there would be a round of team communications about this decision, after which they would have the opportunity to make a final recommendation. Participants

received the scenario description and infographic as well as information on the four districts (unique information, 8 items, districts presented in counter-balanced order). Participants provided an initial decision based on this information (Decision 1). They were informed that the round of team discussion would start, for which they had been selected to communicate first. They were asked to use the text box to communicate with their team members, inform them of the district they had selected, and provide a clear reason for their decision. Afterwards, team members would be able to share their opinion as well.

Team Discussion (Introduction of Task Disagreement and Teammate Information)

The second part of the experiment started when the participant submitted their message to teammates and was taken to the discussion page. The discussion took the format of a group chat where teammates' responses were pre-programmed scripts. This page indicated "Here is your message to your team. The other team members will reply shortly. (This may take a few minutes.)" The participant's person icon, professional identity, and message appeared below. After a few seconds, Teammate 2's icon and professional identity appeared, followed shortly by moving "typing points" like those commonly used in messaging applications. After a delay, these points disappeared and Teammate 2's message appeared. After a few seconds, the same sequence with different delay lengths was repeated for Teammate 3's message. Finally, a "next" button appeared, enabling participants to move forward once they were done reading their teammates' responses.

Teammate #2's response first expressed disagreement with the participant (e.g., "*Hi all, I don't agree. I don't think Maple District is the most at-risk.*"). Teammate 2 then shared the unique information associated with one of the two remaining information packages (not received by the participant). In the interprofessional group condition, this information corresponded with

the information package associated with the teammates' professional identity. Teammate 2 ended with a statement of their selected district, corresponding to the information package they represented (e.g., *"So I think Pine is the most at-risk."*). Teammate 3's message also started with expressing disagreement with the participant's position. Teammate 3 also expressed disagreement with Teammate 2's position, indicated their own selected district (matching their information package), and shared the unique information contained in that package (e.g., *"Mhmm... I don't agree either. I don't think it's Maple, but I would choose Birch because..."*). Teammates' disagreement expressions were worded to be direct (explicit) but with low oppositional intensity (i.e., Weingart et al., 2015). Across participants, we counterbalanced the presentation order of teammate messages (i.e., information packages) and the presentation order of districts within these messages.

If the participant's initial decision was incorrect (did not correspond to the target district given their information package), teammate messages were adapted in the following way. Instead of starting with stated disagreement, Teammate #2's message directly went on to sharing their package's unique information (e.g., *"Maple District has a large young adult population and it just had a health awareness campaign on air pollution..."*). Teammate #3's message started with expressing disagreement with Teammate #2 only (e.g., *"Mhmm... I don't agree. I would choose Birch because..."*). Thus, participants experienced task disagreement and a coherent automated discussion irrespective of whether they had made a correct initial decision (see Appendix I for full scripts).

Measurement of Dependent Variables

Upon leaving the team discussion screen, participants were asked for their perception on "team processes" and filled the emotion, task conflict, and relationship conflict items. Item

presentation within each category was random. Participants then arrived at the “Final Recommendation” page. They were asked to provide their final opinion on the decision and to explain why they were making this recommendation. The page also contained a summary of the infographic, the information they had initially received (their unique items), and a transcript of the team discussion. After submitting Decision 2, participants filled the satisfaction with team measure followed by the information retention measure. This ended the experimental section of the survey. At this point, participants filled the perceived professional group composition measure, the scenario reality measures, and the sociodemographic questionnaire. Finally, they were debriefed, given the opportunity to leave a comment, and thanked for their participation. Appendix I details task procedures and provides screen shots of task materials.

Results

Sample Composition and Pattern of Missing Data

A total of 827 people entered the online survey, 571 from the campus-wide sample and 256 from the student platform. However, 268 participants (224 from the campus-wide sample, 44 from the student platform sample) did not reach the randomization phase or experimental part of the survey: 69 provided no answers to survey questions, 110 were screened out (no answers to screening questions, less than 18 yrs., living in Canada temporarily, did not identify with any of the three target areas of expertise and/or had already participated), 88 abandoned before getting to the experiment, and one had a doubled student participant number (but did not get far enough the first time to invalidate the second participation).

The large number of abandoned surveys at this stage is explained by the fact that posters and pamphlets included a QR code. Interested people could scan the code with their smart phone to access the study information page and the anonymous survey link. The instructions also asked

participants to complete the survey on a computer. Many abandoned answers are likely due to prospective examination of the survey through the QR code.

Hence, a total of 559 valid participants entered part 1 of the experimental section of the survey and were presented with the group composition manipulation. During part 1, 52 abandoned (did not reach group discussion) and 24 were subsequently excluded from the sample because they did not provide an initial decision (decision 1) or a message to teammates (which rendered the group discussion scenario and task disagreement manipulation invalid). The proportion of participants who entered part 1 of the experimental section and who continued with valid responses to part 2 did not vary by experimental condition (Hom: 85%, Inter: 88%; $\chi^2(1) = 0.65, p_{\text{exact}} = .48$).

A total of 483 participants continued with valid responses to part 2 of the experiment. Of these, 20 dropped the study (no answer to any study variable) and 9 provided incomplete data on core study variables (i.e., dependent variables and mediators). Of the 483 participants, the proportion who provided complete responses to core study variables did not vary by experimental condition (Hom: 94%, Inter: 94%; $\chi^2(1) = .85, p_{\text{exact}} = .43$). The total proportion of participants who entered the experiment and had complete data on all main study variables also did not vary by experimental condition (Hom: 80%, Inter: 82%; $\chi^2(1) = 1.36, p_{\text{exact}} = .29$).

Missing data was checked for randomness to exclude systematic bias ($\chi^2(159) = 106.44, p = 1.00$). Therefore, we proceeded with listwise deletion of participants with incomplete data.

Thus, the final study sample used was comprised of all 454 valid part 2 participants who provided complete data on the core study variables (Hom: $N = 222$, Inter: $N = 232$).

Manipulation Checks

Analyses indicated that indeed, participants in the homogeneous condition perceived their team as significantly more professionally similar ($M = 3.18$, $SD = 1.81$) than did participants in the interprofessional condition ($M = 1.97$, $SD = 1.53$; $t(395.8) = 7.35$, $p < .001$, Cohen's $d = .72$). Of note, due to a glitch, only 417 participants provided responses on the manipulation check items. Participants in the homogeneous group also perceived their team as significantly less professionally diverse ($M = 3.51$, $SD = 1.83$) than did participants in the interprofessional group condition ($M = 5.15$, $SD = 1.59$; $t(415) = 9.75$, $p < .001$, Cohen's $d = -.96$), indicating that the group composition manipulation was successful. Furthermore, 76% of participants indicated agreement with the statement that the other team members had felt real to them. This proportion did not vary significantly by condition (Hom: 76%, Inter: 76%; $\chi^2(1) = 0.004$, $p_{\text{exact}} = 1.00$). Seventy-two percent (72%) of participants indicated agreement with the statement that their interactions with other team members had felt like they were in real time. This proportion did not vary significantly by condition (Hom: 73%, Inter: 71%; $\chi^2(1) = 0.42$, $p_{\text{exact}} = 0.52$). Overall, this confirmed that the online scenario was reasonably realistic for participants.

Main Effect of Group Composition on Group Processes and Outcomes

To test whether group composition affected mediators and outcomes (Question 1), we conducted group comparisons. Table 4.3 presents the means and standard deviations for continuous variables as well as the percentage of integrative final task decision by experimental group. We first performed a multivariate analysis of variance as an omnibus test of the effect of group composition on our continuous variables. We performed follow-up univariate between-group comparisons using Yuen's robust two-sample trimmed t-test (Wilcox, 2017; Yuen, 1974).

Table 4.3*Descriptive Statistics of Study Variables*

	Mean (SD)		Trimmed mean		Hypothesis
	Hom.	Interprof.	Hom.	Interprof.	
Negative emotions	1.57 (1.62)	1.45 (1.59)	1.21	1.05‡	H > I
Surprised	3.80 (2.23)	3.53 (2.23)	4.01	3.69‡	H > I
Task conflict	5.88 (1.50)	5.74 (1.59)	6.24	6.07	NA
Relationship conflict	1.25 (1.31)	1.13 (1.26)	0.98	0.84‡	H > I
Retention of teammate information	4.83 (1.53)	4.77 (1.60)	5.25	5.24	H < I
Satisfaction with team	3.87 (1.95)	4.18 (1.76)	3.92	4.27*	H < I
Task final decision (integrative decision, %)	41%	46%	NA	NA	H < I

* $p < .05$; ‡: $p < .20$

Preliminary verifications led to the identification and winsorization of ten univariate outliers with z scores greater than $|3.29|$.⁴ Preliminary examination of the data revealed the presence of univariate and multivariate non-normality (with no multivariate outliers). The homogeneity of variances-covariances assumption was respected (Box test, $p > .34$). Although all patterns were in the hypothesized direction except for information retention, Hotelling's statistic did not reach significance $T = 0.01$, $F(6, 447) = 0.30$, $p = .46$. However, the observed power was also low (.38).

Due to the low power of the omnibus MANOVA test, the skewed residual distributions, and the directionality of our hypotheses, we examined the between-group differences on each variable using the robust group comparison technique developed by Yuen (1974) and described by Wilcox (2017). This method is akin to a Student's t -test but uses trimmed means and Winsorized variances. We used 20% trimmed means as recommended by Wilcox (2017).

As hypothesized, participants in the interprofessional group reported significantly higher satisfaction with their team ($T_y(261.11) = 1.81$, $p_{\text{one-sided}} = .04$). In this sample, participants in the interprofessional condition also reported lower negative emotions ($T_y(271.85) = 0.91$, $p_{\text{one-sided}} = .18$), lower surprise ($T_y(267.18) = 1.24$, $p_{\text{one-sided}} = .11$), and lower relationship conflict ($T_y(270.84) = 0.96$, $p_{\text{one-sided}} = .17$). They also tended to report lower levels of task conflict ($T_y(271.98) = 1.10$, $p_{\text{two-sided}} = .27$). They demonstrated equivalent levels of retention of teammate information ($T_y(271.84) = 0.08$, $p_{\text{one-sided}} = .47$). Finally, regarding the categorical

⁴ Winsorizing replaces the outlying value with the nearest non-outlying value in the distribution. Given the sensitivity of MANOVA to outliers and our concern for not losing data, we used this method. However, this did not change means by more than a decimal point.

outcome of task final decision, as hypothesized, the proportion of participants making an optimal integrative final decision was higher in the interprofessional group ($proportion_{\text{Inter.}} = 46\%$) compared to the homogeneous group ($proportion_{\text{Hom.}} = 41\%$) even though this difference was not significant ($\chi^2(2) = .83$, $p_{\text{exact(one-sided)}} = .21$). In sum, all group differences except for information processing were in the hypothesized direction, but only satisfaction with team reached the .05 significance level.

Test of Path Model

To answer our second question focusing on the dual pathways leading from emotions to outcomes following disagreement, we conducted path analyses to examine the plausibility of the hypothesized relationships. Correlations between all model variables are presented in Table 4.4.

Initial Model and Re-Specification

Path analyses were performed in R using the lavaan package (Rosseel, 2012). Models were fitted using the WLSMV estimator, a robust weighted least squares (WLS) estimator. The WLS approach was taken because the model contained a dichotomous outcome (Muthén, 1984) and the robust version because distributions were non-normal. In all models, the free parameters included the model path coefficients, the variances and covariance of exogenous variables, the residual variances of endogenous variables, the intercepts of all endogenous continuous variables, and the threshold of the categorical outcome.

Model 1 is depicted in Figure 4.2. The analysis converged normally, and the solution was admissible. The robust model chi-square test was significant, indicating significant differences between predicted and observed covariance matrices. Regarding incremental fit (CFI), the model explained the data 91% better than the null model. The RMSEA 90% confidence interval suggested that the estimate of absolute fit was equally consistent with the close fit ($<.05$) and

Table 4.4*Correlations Between Path Model Variables*

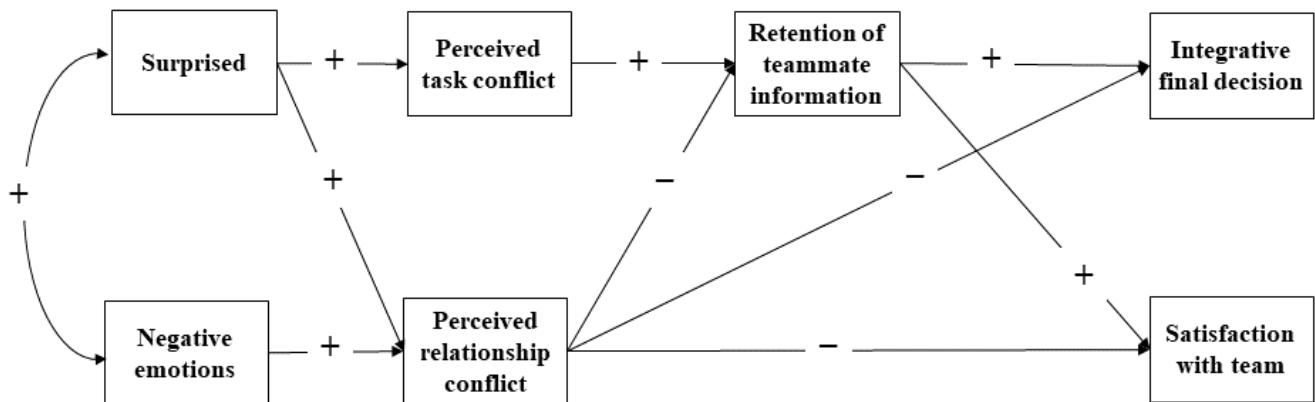
		1.	2.	3.	4.	5.	6.
Emotions	1. Negative emotions						
	2. Surprised	.43**					
Conflict perceptions	3. Task conflict	.17**	.24**				
	4. Relationship conflict	.36**	.17**	.02			
Task processes	5. Information retention	.00	.10*	.13**	-.13**		
Outcomes	6. Integrative decision	-.07	.03	-.05	-.24**	.19**	
	7. Satisfaction with team	-.25**	-.07	.02	-.29**	.23**	.25**

N = 454;

* $p < .05$; ** $p < .01$

Figure 4.2

Model 1: Initial Model of the Role of Emotions in Integrative Decision Making and Satisfaction Through Perceived Conflict and Information Processing



not-so-close fit (.05-.10) hypotheses, but that poor fit could be rejected (Kline, 2015). However, the mean absolute correlation residual was relatively low (SRMR <.10). The global fit evaluation suggested problems with model fit but potential for improvement. The global fit indices and likelihood ratio tests for all models are presented in Table 4.5.

Following Kline (2015), we performed tests of conditional independence to assess local fit using the dagitty package in R for analysis of causal directed graphs (Textor et al., 2016). This indicated that three conditional independence hypotheses implied by the model (i.e., $\beta_{\text{tas}} = 0$) were significantly inconsistent with the data. The associations between a) satisfaction and final decision, b) satisfaction and negative emotions, and c) retention of teammate information and surprise were significantly different from 0 after controlling for the other model paths ($p < .05$). Examining correlation residuals from the path model estimations, two residuals were above .10 and suggested poor local fit.

In light of these inspections, Models 2-5 incrementally re-specified the model by adding three theory-driven directional paths and removing one path. At each step, we verified incremental fit compared to the previous model (likelihood ratio tests – LRT) and examined the impact on local fit (correlation residuals). In Model 2 (LRT significant), we added a direct effect between negative emotions and satisfaction with team because the indirect effect through relationship conflict did not completely explain the effect of negative emotions.

In Model 3 (LRT significant), we added a path from final decision to satisfaction. In Model 4 (LRT significant), we added the direct effect of surprise on retention of teammate information. Finally, Model 5 (LRT not significant) improved parsimony by removing the near-zero path between surprised and relationship conflict. The maximum correlation residual for this model was $-.08$ (association between integrative decision and task conflict). The final model

Table 4.5*Fit Indices for the Path Models*

	Model 1	Model 2	Model 3	Model 4	Model 5
Model chi-square					
Estimate	32.42	24.19	12.72	7.04	7.21
DF	11	10	9	8	9
<i>p</i> value	.001	.01	.18	.53	.62
CFI	.91	.94	.98	1.00	1.00
RMSEA					
Estimate	.07	.06	.03	.00	.00
90% CI	(.04; .09)	(.03; .09)	(.00; .07)	(.00; .05)	(.00; .05)
<i>p</i> ≤ .05	.15	.33	.79	.95	.97
SRMR	.05	.04	.03	.02	.02
Scaled chi-square difference test					
Δ DF	NA	1	1	1	1
Δ chi-square	NA	8.91**	12.94***	4.99*	.02, <i>ns</i>

Note: Results from robust tests with scaling correction factor;

* *p* < .05; ** *p* < .01; *** *p* < .001

including standardized path coefficients is presented in Figure 4.3. Table 4.6 presents estimates for the intercepts, residual variances, and indirect effects.

Predicted Links in the Final Model

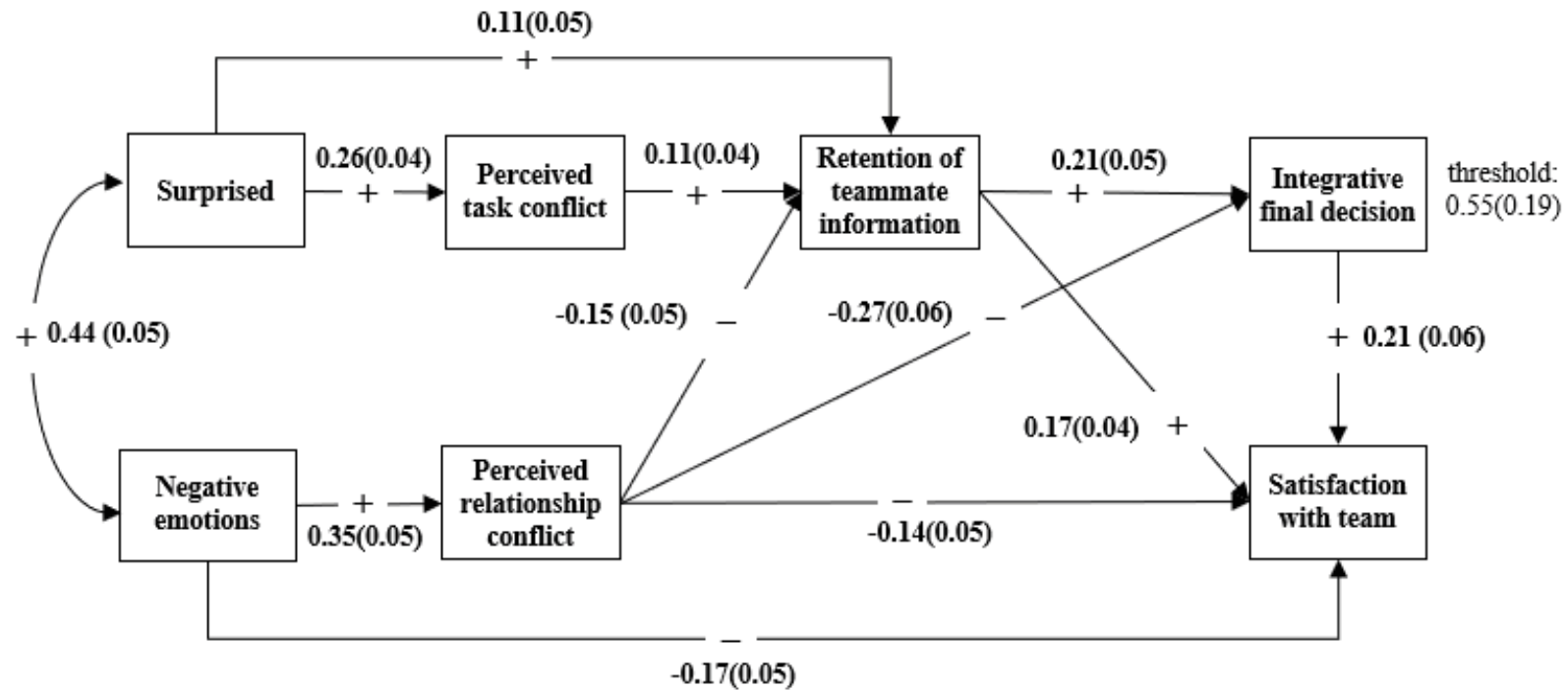
All path coefficients in the final model were significant. Direct links were of small to medium size. The largest predicted effects were between negative emotions and perceived relationship conflict ($\beta = +.35$) as well as between the latter and optimal integrative final decision ($\beta = -.27$). The coefficients for integrative decision correspond to probit regression slopes. The total variance explained was very small for task conflict (.06) and information retention (.04), and between .10 and .18 for the other endogenous variables.

Path analysis results indicated that the hypothesized cognitive and relational pathways between emotions and interaction outcomes following expressed task disagreement were consistent with the data. Regarding the beneficial cognitive pathway, higher reported surprise predicted increased task conflict, but not increased relationship conflict. Higher task conflict predicted increased information processing (retention of preference-inconsistent information). Contrary to expected, higher surprise also directly predicted increased information processing. In turn, increased information processing directly predicted increased integrative decision making and increased satisfaction. The final model also included a significant direct effect whereby integrative decision making directly predicted increased satisfaction with team.

The hypothesized beneficial total indirect effect of surprise on integrative decision through increased task conflict and increased information processing was also consistent with the data. The same was true for the total indirect effect of surprise on satisfaction with team – although this was not only through increased task conflict and increased information processing,

Figure 4.3

Model 5: Final Model of the Role of Emotions in Integrative Decision Making and Satisfaction (Standardized Path Coefficients)



Note: Estimates represent standardized regression coefficients (standard errors in parentheses) and are based on the completely standardized solution. All estimates are statistically significant at the .05 level. The coefficients predicting integrative decision correspond to probit regression slopes.

Table 4.6*Indirect Effects in the Final Model*

Indirect effects	Standardized estimates (SE) ^a	Standardized bias-corrected confidence intervals ^b
Surprised → Integrative decision	.03 (.01)*	(.004; .033)
Surprised → Satisfaction	.02 (.01)*	(.006; .043)
Surprised → Retention of teammate information	.03 (.01)*	(.001; .047)
Negative emotions → Integrative decision	-.11 (.03)***	(-.115; -.040)
Negative emotions → Satisfaction	-.06 (.02)**	(-.125; -.026)
Relationship conflict → Integrative decision	-.03 (.01)**	(-.061; -.008)
Relationship conflict → Satisfaction	-.03 (.01)**	(-.091; -.016)

^a Based on robust standard errors, from the completely standardized solution;^b Based on bootstrapped standard errors;* $p < .05$; ** $p < .01$; *** $p < .001$

but also through increased integrative decision making. Reported surprise following disagreement was significantly associated with the cognitive stream only.

Regarding the detrimental, relational pathway, higher negative emotions predicted increased reported relationship conflict, which in turn predicted reduced information processing, reduced integrative decision making, and reduced satisfaction with team. Higher negative emotions also directly predicted decreased satisfaction with team.

The hypothesized detrimental total indirect effect of reported negative emotions on integrative decision through increased relationship conflict and decreased information processing was consistent with the data. The same was true for the detrimental total indirect effect of reported negative emotions on satisfaction with team – although this was not only through increased relationship conflict and decreased information processing, but also through decreased integrative decision making. Finally, relationship conflict had a significant and detrimental total indirect effect on integrative decision through reduced information processing. It also had a significant and detrimental total indirect effect on satisfaction with team through reduced information processing – as well as reduced integrative decision making.

In sum, results indicated that the final model adequately predicted the data. Analysis of path coefficients and indirect effects provided support for the hypothesized differential influence of surprise and negative emotions on integrative decision making and satisfaction with team. This, through reported task conflict, reported relationship conflict, and processing of preference-inconsistent information shared by teammates.

Supplemental Analyses

One key question was whether the dynamics of these pathways were different in the interprofessional and homogeneous team conditions. An analysis of invariance was performed to

test whether group condition (homogeneous vs. interprofessional) moderated associations in the final path model (Model 5). First, we estimated a fully constrained model where all parameters were the same in each group (Model 5-constrained). Second, we estimated a model where all coefficients were freely estimated in each group (Model 5-free). Global fit indices and the results of the likelihood ratio test are presented in Table 4.7. Figure 4.4 provides the path coefficients by group condition in the model where parameters were free to vary between groups. Appendix J provides correlation tables for each group. Appendix K provides estimates of indirect effects by group condition for the model where parameters were free to vary between groups.

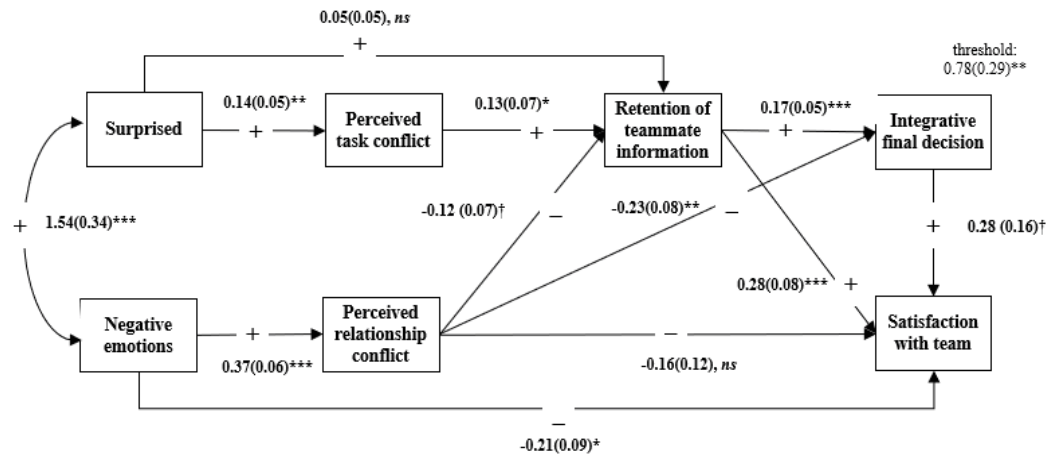
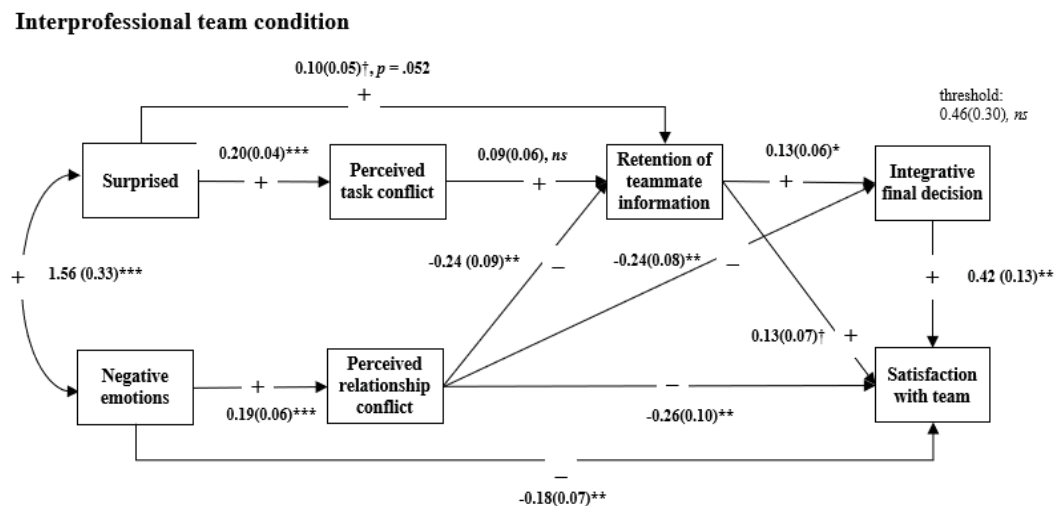
Results indicated that both models showed adequate global fit with the data. The likelihood ratio test comparing the model chi-square statistics from the two models was not significant. This indicated that the model where all parameters were constrained to be equal across groups fitted the data equally well than the model where path coefficients were free to vary between groups.

Although this omnibus test of moderation indicated that an overall model provided sufficient fit for the data in both groups, examination of path coefficients from the free model suggested the presence of some local variations. In particular, negative emotions and reported relationship conflict appeared more strongly related in the homogeneous condition compared to the interprofessional condition. Reported relationship conflict appeared as a stronger predictor of information retention in the interprofessional condition compared to the homogeneous one. The sets of significant predictors for satisfaction with team also differed. In the homogeneous condition, negative emotions and information retention significantly predicted satisfaction. In the interprofessional condition, relationship conflict and integrative decision significantly predicted satisfaction.

Table 4.7*Fit Indices for the Group Invariance Analysis*

	Model 5-constrained	Model 5-free
Model chi-square		
Estimate	34.01	16.13
DF	43	18
<i>p</i> value	.835	.583
CFI	1.00	1.00
RMSEA		
Estimate	0.00	0.00
90% CI	(.00; .03)	(.00; .05)
<i>p</i> ≤ .05	1.00	0.94
SRMR	.05	0.03
Scaled chi-square difference test		
Δ DF	NA	25
Δ chi-square	NA	20.07, <i>ns</i>

Note: Results from robust tests with scaling correction factor.* *p* < .05; ** *p* < .01; *** *p* < .001

Figure 4.4*Model 5: Unstandardized Path Coefficients for Model 5 by Group Condition***a. Homogeneous team condition****b. Interprofessional team condition**

Estimates represent unstandardized regression coefficients (standard errors in parentheses). The coefficients predicting integrative decision correspond to probit regression slopes.

$\dagger p \leq .10$, $* p \leq .05$, $** p \leq .01$, $*** p \leq .001$

Discussion

This study investigated the impact of salient group professional composition on integrative decision making and satisfaction with team following expressed disagreement in a group decision-making context with distributed information. It also investigated the role of emotions (surprise and negative emotions), conflict perception (task and relationship conflict), and processing of information as elements of cognitive and relational pathways to these outcomes. We discuss main study findings and their implications.

Summary of Findings

Role of Salient Identities

First, results of robust group comparisons indicated that as predicted, participants in the interprofessional team condition reported significantly higher satisfaction with team. Except for information processing, group differences on the other variables were all in the expected direction, although they did not reach the .05 significance level and the omnibus test was not significant. The nonsignificant differences on these other variables pose questions as to the mechanisms explaining higher satisfaction in interprofessional teams. Nevertheless, these findings are consistent with research by Rink and Ellemers (2006, 2007) who found that violated expectations of either similarity or dissimilarity about a new team member reduced commitment to future collaboration. Although these authors did not evaluate mediation, they found that expectancy violation also decreased participants' impressions of having a clear image of their teammate and that clarity and commitment were positively correlated. Similarly, Phillips (2003) found that incongruence between social category similarity and individual positioning (i.e., ingroup disagrees or outgroup agrees) was associated with reduced perceptions of group efficacy. Newly formed groups where members do not know each other are characterized by

uncertainty. Taken together, these results suggest that during early interactions in newly formed groups, events that violate expectations may increase this uncertainty. This may lead to more pessimistic views about the attractiveness and performance potential of this group – thereby reducing satisfaction.

Differential Cognitive and Relational Pathways to Outcomes

Results of path analyses on proposed model relationships were consistent with the hypothesis of interweaved cognitive and relational pathways explaining performance and relational outcomes following task disagreement. Regarding the cognitive pathway, the hypothesized positive indirect effects of surprise on outcomes – through increased perceived task conflict and increased processing of preference-inconsistent information – was consistent with the data. Contrary to expected, reported surprise did not predict increased reported relationship conflict. Also contrary to initial hypotheses, reported surprise predicted information processing directly, possibly through increased attention. These results are consistent with recent reviews on the role of surprise following unexpected events, which highlight that surprise redirects attention to source of the unexpected event (Noordewier et al., 2016).

Second, we found that increased retention of teammate information and integrative decision making both had direct positive associations with satisfaction with team. We interpret the association between integrative decision making and satisfaction as reflecting the direct effect of the former on the latter. This is coherent with research by Todorova and colleagues (2014) who found that mild task conflict expressions predicted increased job satisfaction through the sequential intervening role of increased information acquisition and increased positive emotions. Acquiring new information and identifying a better decision option through team interactions are two positive team outcomes that can increase satisfaction with team.

Results also suggested the presence of a detrimental relational pathway, indicating that the hypothesized detrimental indirect effects of negative emotions and relationship conflict perceptions – through reduced processing of preference-inconsistent information – were consistent with the data. This echoes findings by de Wit and colleagues (2015; 2014) suggesting that physiological threat states and relationship conflict (perceived and experimentally manipulated; de Wit et al., 2013) predict reduced use of information coming from others and a reduced tendency to adjust initial views during task conflict. Specifically, de Wit and colleagues (2013) found a significant indirect effect of relationship conflict on increased maintenance of initial position through decreased self-reported epistemic motivation and decreased use of teammate information in final decision justifications. Their reported relationship conflict scale included an item measuring negative emotions. While information processing was not measured *per se*, the authors had interpreted their findings as consistent with the hypothesis that the co-occurrence of task disagreement with relationship conflict increases biased information processing in favour of preference-consistent information. Complementing these findings, we found that relationship conflict also predicted reduced *retention* of teammate information. This is consistent with the hypothesis that the co-occurrence of task disagreement with relationship conflict decreases not only the *use* of preference-inconsistent information, but potentially also how much people *allocate attentional resources* to this new information.

Our results suggest that reported negative emotions have a significant direct link with satisfaction with team. Meta-analysis findings document the detrimental role of relationship conflict for satisfaction (de Wit, Greer, et al., 2012). This, both directly and by a detrimental interaction with task conflict. However, the most commonly used self-reported measures of relationship conflict are confounded with items tapping negative emotionality (Bendersky et al.,

2014). Our results suggest that part of the detrimental interaction between task and relationship conflict in predicting satisfaction could in fact be explained by the presence of negative emotions triggered by relationship and/or task conflict.

Our findings also extend previous propositions that negative emotions and perceptions of relationship conflict can arise from high oppositional intensity in conflict expressions – thereby influencing information processing and conflict trajectories (Weingart et al., 2015). Participants in our study were all exposed to the same disagreement expression, characterized by directness and *low* oppositional intensity. As such, even in low oppositional intensity situations, task conflicts can trigger negative emotions and be associated with relationship conflict perceptions.

In summary: following disagreement, emotions and perceptions of task and relationship conflict may modify information processing and alter decision-making performance as well as satisfaction. When task disagreement occurs, perceiving it is important as this is likely to trigger attention to new, preference-inconsistent information. This can benefit integrative decision making and satisfaction. Conversely, perceived relationship conflict, which may be increased when disagreement engender negative emotions, reduces both attention to new information as well as uptake of new information by way of integrative decision making.

Limitations

This study presents some limitations and points to the need for future research. Recruitment was based on students whose professional identity may not be as established as that of working professionals. Identity was assessed based on identification with disciplinary area versus profession per se. This being said, professional identity in the workforce is often consubstantial with socioeconomic and social status differences which could have brought other confounds. Our sample was also homogeneous in age. Real workplaces are usually age-diverse

and age differences can be an additional source of bias and stereotyping (Lagacé et al., 2019). Therefore, our sample enabled a stricter test of the impact of salient professional identities based on disciplines by using social groups with greater similarity in social profiles and experiences than found in working professionals. Of note, we did not measure participants' attitudes, potential stereotypes, and perceived status differences relative to the three professional groups. Also, we did not consider their level of emotional attachment to their group or the situational threat they could have perceived (e.g., sense of ingroup competition with teammates) as potential moderators in some of the relationships studied (Oore et al., 2013).

Attrition of the campus-wide sample could reflect a potential selection bias in terms of interest for the subject, motivation to remain engaged despite task disagreement, or pro-sociality (responding to in-person invitations to participate). The experiment also consisted of a brief virtual encounter with no actual past history nor predictable future consequences and the online decision-making scenario may not have affected all participants equally. Not all participants agreed that the teammates or real-time interactions felt real to them. This could have reduced effect sizes. In this sense, the study can be considered as a conservative test of our research hypotheses. Despite the minimal social group “dosage”, we observed in our sample a pattern of group differences coherent with the research hypotheses across all variables for which we had a directional hypothesis but for information processing. Our results point to the coherence of expectancy-based models of collaboration dynamics and the potential value of investigating these models further in real group settings.

The relationship conflict measure showed low reliability. We were aware of two existing relationship conflict measures that had intentionally excluded references to negative emotions (Jehn et al., 2008; Todorova et al., 2014). However, both measures implied a context where

members had been interacting for some time (e.g., “Sometimes, people fought over personal matters.”, Jehn et al., 2008; “My coworkers and I often have arguments that get personal.”, Todorova et al., 2014). We adapted a previous measure relevant to our study, which had also shown adequate reliability ($\alpha = .74-.88$; de Wit et al., 2013), but removed the item tapping on emotionality (“I felt somewhat irritated by the response of my teammates.”). The resulting lack of reliability is another source of question on the meaning of previous findings based on relationship conflict measures tapping on negative emotionality. Furthermore, while we based our approach on previous research investigating surprise in the context of expectancy violation, using a one-item measure of surprise may have resulted in lack of reliability for this measure and reduced power as a consequence (Goulet & Cousineau, 2019).

Temporal precedence in the associations between emotions, conflict perceptions, and satisfaction cannot be ascertained. While the experimental design guarantees the precedence of group composition, it confounds the sequence of internal processes with the final decision and satisfaction. Notably, the path sequence between emotions and perceived conflict is debatable as perception of task or relationship conflict can themselves generate negative emotions or surprise. Mediation analyses between psychological constructs remain a challenge to test without full experimental designs manipulating both emotions and conflict perceptions.

Finally, we did not include a “no disagreement” control condition. Independent of group composition, disagreement in general can be associated with negative emotions and detrimental reactions (de Wit et al., 2013; de Wit, Scheepers, et al., 2012; Jehn, 1995). This could have reduced our ability to detect the effect of group condition compared to a full experimental design manipulating both group composition and agreement/disagreement.

Future Research Directions

The study points to a number of future research directions. First, studies should test with more targeted moderation studies whether professional group composition moderates some of the relationships present in the dual pathway model leading from emotions to group outcomes. Future research could examine the effect of salient social categories on perception and reactions to task disagreement with more realistic group manipulations (such as with confederates) or in real-group designs. Second, to establish the causal mediating role of conflict perceptions or processing of teammate information in the relationship between emotions and group outcomes, experimental designs could manipulate mediators to rule out alternative explanations (e.g., Spencer et al., 2005). To replicate and extend our current findings, studies should measure epistemic and social goals (e.g., De Dreu et al., 2008) as a potential moderator of the observed associations. Given the low reliability of the relationship conflict scale there remains a need to develop non emotion-confounded relationship conflict scales which could be applied to initial relationship conflict perceptions in newly formed groups. More research is also needed to clarify the similarities and distinctiveness between reported surprise and reported negative emotions as psychological constructs. Finally, replication of our results in a community sample using different professional groups is needed to verify the generalizability of results beyond student populations and the categories of STEM, health sciences, and social sciences disciplines.

Contributions and Practical Implications

This study complements the study of group decision making and intragroup conflict in many ways. First, it tested in a conservative experimental design the impact of salient professional group composition on integrative decision making and satisfaction with team following task disagreement. Results suggests that interprofessional groups can indeed be more

resilient in the face of task disagreement, which may increase their ability to sustain engagement when negative stereotypes from intergroup competition are not triggered. As Rink and Ellemers (2007) have observed, changing people's attitudes towards disagreement and differences can be a long-term process for organizations. However, their results and ours suggest that changing people's *expectations* about the presence of divergent views may be a faster way to prevent task disagreement from eroding team satisfaction, especially in groups that perceive themselves as homogeneous. In the same vein, our results support Srikanth and colleagues (2016)'s contention that organizational diversity interventions aimed at developing superordinate identities could in fact be detrimental to group functioning. The risk may be heightened for groups performing nonroutine tasks where mobilizing distributed information and leveraging divergent thinking is important for performance.

This study contributes to a better understanding of the psychological processes that can influence information processing, integrative decision making, and satisfaction in newly formed groups (Srikanth et al., 2016). Group decision making and conflict are multilevel phenomena. Understanding individual perceptions and reactions to task conflicts are an important building block in the study of group dynamics, especially since these can differ within the same group (Jehn et al., 2010). Studies of team effectiveness also show that, next in line after team design interventions, the team launch (what happens in the first few minutes of a newly formed team) is one of the most impactful team interventions – predicting up to 30% of variance in team outcomes (Wageman & Lowe, 2019). Our study suggests that the experience of negative threat-related emotions during an initial task disagreement event can predict task and relationship conflict perception, information processing, integrative decision making, and satisfaction. Therefore, managing the factors that trigger these reactions (such as setting divergence

expectations during a team launch intervention), could potentially be a leverage point. This could help newly-formed groups mobilize distributed information and build long-term assets such as satisfaction, efficacy, and trust through the “small win” (Vangen & Huxham, 2003) afforded by finding integrative resolutions during initial task disagreement.

In a phenomenon such as team decision making in which multiple layers of socioecological factors such as organizational mandates, priorities, perspectives, and past experience interact, an experimental design controlling for a large number of covariates allows to better address the singular effect of task disagreement. Despite its limitations, it uniquely contributes to the knowledge base.

Conclusion

In conclusion, this study integrated research in group decision making, intragroup conflict, and social category-based expectancy violation to examine the psychological processes that intervene in the associations between social identities, emotion as well as performance and satisfaction following task disagreement. It provides findings on the impact of salient social categories on how people perceive and react to task disagreement. Overall, it contributes to a better understanding of factors that can influence early-stage collaborative groups’ ability to leverage diverse informational resources in the interest of performance and sustained engagement.

Chapter 5: General Discussion

General Discussion

Interorganizational collaboration is at the core of solving many complex problems. The aim of this thesis was to improve our understanding of the role of professional diversity, especially as it pertains to differences in perspectives and identities, in public-sector interorganizational collaboration. More precisely, it sought to examine contextual factors where professional diversity may be beneficial or challenging for interorganizational collaboration. Disaster risk management was chosen as the applied context for this investigation because it is a complex and pressing multidimensional issue faced by public organizations.

Our framework integrated past evidence on the role of social identity, group conflict, organizational diversity, information processing, and other heterogeneity challenges. It used a systems approach to differentiate between the institutional (macro), organisational (meso), interpersonal (micro), and individual (onto) levels of analysis and characterise their interplay. Our three main research questions were: 1) What is the role of professional diversity for interorganizational collaboration within the same jurisdiction and sector? 2) In group problem-solving situations, does salient professional group composition affect how people perceive and react to task disagreement? 3) Following disagreement, are emotions, conflict perceptions, and information processing explaining mechanisms for decision quality and relationship quality? In other words, can we posit the presence of dual cognitive and relational pathways involving emotions, conflict perception, and information processing in predicting these interaction outcomes?

These questions were pursued through two complementary research streams. One stream (Study 1) provided a broad experiential perspective on a multilevel interorganizational system of

collaboration. The other stream (Studies 2 and 3) narrowed the focus on disagreement in group decision-making by testing scenario-based situations.

Using a qualitative approach, Study 1 examined the experience of interorganizational collaboration in an intra-jurisdictional and intra-sectoral context: the Canadian federal public service and the multilateral issue of disaster risk reduction (DRR). In this institutional setting, organizations differ principally in terms of expertise and mandates. The study was based on semi-structured interviews with senior federal public servants working in DRR. It documented perceived barriers and facilitators to federal interorganizational collaboration as well as the contextualized role of professional diversity within this set of factors. It found that, in this setting, differences in mandates and goals emerged as a more salient challenge than individual professional differences. Interorganizational and interpersonal differences did not play a salient role in participants' accounts of collaboration given overriding institutional barriers, which transcended heterogeneity issues in the overall collaboration experience. The study depicted the interplay between various dimensions of heterogeneity, especially how differences in goals can complicate the management of differences in perspectives and identities. It highlighted the importance of factors such as system understanding to buffer heterogeneity's potential detrimental effects and reap its potential benefits.

Through an expert simulation, Study 2 focused on the team level of analysis. It examined whether salient group professional composition (interprofessional or homogeneous teams) was associated with differential expression of, perception of, and reaction to disagreement. It drew on secondary data from a quasi-experimental simulation study based on a highly naturalistic sample of senior risk managers from three professional groups. These were subdivided in either homogeneous or heterogenous triads and performed standardized problem-solving tasks linked to

a disaster scenario. Our study combined observational data (video-recorded) on communication behaviours, participant-reported team ratings, and panel-rated performance measures. Results suggested that perception of and reaction to disagreement differed according to group composition (homogeneous or interprofessional). Interprofessional teams reported higher disagreement than homogeneous teams even though observed disagreement did not differ between conditions. In interprofessional teams, disagreement and group tension had positive or nonsignificant associations with reported measures of effectiveness, performance, and relationship quality, while homogeneous teams showed consistent negative associations between these variables. Results also pointed to different dynamics between observed versus reported disagreement in predicting performance.

Lastly, in a randomized design, experimental Study 3 tested the impact of professional identity similarity or dissimilarity on perception of and reaction to task disagreement in a group decision making task with distributed information. Participants were divided in two experimental conditions (homogeneous versus interprofessional teams). They were exposed to a task disagreement with two teammates whose salient professional identities were either the same or different than participants'. The study also investigated the roles of emotions for performance and satisfaction through conflict perceptions and information processing. Findings indicated that, after experiencing the exact same task disagreement, participants in interprofessional teams were significantly more satisfied with their team than those in homogeneous teams. Path analyses supported the two hypothesized pathways predicting integrative decision making and satisfaction: a) a beneficial cognitive pathway through increased surprise, increased task conflict perception, and increased information processing; and b) a detrimental relational pathway

through increased negative emotions, increased relationship conflict perception, and decreased information processing.

Integration of Findings

Findings from the three studies contribute to our core objectives and the overarching aim of this thesis.

1) The Role of Professional Diversity for Interorganizational Collaboration Outside of Sectoral or Jurisdictional Differences

The first thesis objective was to document the role of professional diversity for interorganizational collaboration when public organizations collaborate within the same jurisdiction and sector. We sought to examine conditions under which professional diversity is a resource or a barrier for collaboration in this type of setting. Qualitative Study 1 examined this question in the mesosystem of Canadian federal organizations involved in disaster risk reduction. Interviews depicted the broader set of facilitators and barriers to collaboration between federal organizations. Nineteen factors were divided in four analytical categories based on a socioecological system framework: a) institutional factors; b) inter-organizational factors; c) intra-organizational factors; and d) person factors.

The thesis provides a nuanced answer that reinforces the importance of considering the multilevel context of collaboration. In macrosystem and mesosystem contexts where there are important structural barriers to collaboration, interpersonal differences are likely less determinant. Representatives embodied their organizations and not only their individual characteristics. Compartmentalized structures and dependence on top-down authority were major challenges to collaboration in the bureaucratic setting studied here. Therefore, structural and top-down supports played a prominent role to initiate and maintain collaboration. Many of these

structural and top-down factors paralleled documented conditions for team effectiveness (e.g., Wageman & Lowe, 2019). Once a collaboration was initiated, psychosocial facilitators documented in previous research were also salient in interviews, such as system understanding, collaborative attitudes, past integration efforts, and pre-existing interorganizational networks (e.g., Markon et al., 2017; Mayer & Kenter, 2016).

Compartmentalized bureaucratic structures seemed to result in two forms of stakeholder heterogeneity: a) different goals and b) compartmentalized organizational identities. In this setting, differences in goals (or mandates) were the most disempowering type of differences. The study documented the interplay between goals, identities, collaborative attitudes, and system understanding. It also highlighted the role of organizational communication in these processes. Organizational communication comes, at one level, from the organization itself, through its mandates, vision statement, rules of engagement, procedures, internal governance, and discourse. At another level, organizational communication also stems from patterns of interpersonal interactions within the organization. Building a common “team” identity, such as through organizational or interpersonal communication, can help build trust and collaborative attitudes among partners, whereas different goals can make building a common identity difficult. Given the interplay between goals and identity, having a common identity can blind members to goal differences; hence, it appeared that to build a common identity to increase collaborative attitudes, it is important to recognize goal diversity. In contrast, leveraging organizational communication and other interventions to build system understanding (awareness of interdependencies) or, in a hierarchical system, using authority to define shared mandates (shared goals) may represent less risky and more direct strategies to increase cooperation. Modeling openness, valuing differences, and fostering respect can also help build trust and collaborative attitudes. In all, goal diversity

seems to be a factor that must be considered in applying teamwork models to interorganizational collaboration.

Therefore, professional diversity was not the most important challenge in this multilevel setting given institutional barriers to collaboration. Professional diversity was mostly considered a resource. Two situations where it became a challenge were 1) the co-occurrence of professional diversity with goal diversity and 2) professional diversity in the absence of system understanding or group facilitation.

Previous interorganizational collaboration research has cited heterogeneity as a greater challenge than what seemed to be the case in our study setting (e.g., Mattessich & Johnson, 2018; Mayer & Kenter, 2016). This could be because they had focused on situations of extreme heterogeneity, where convergence may be particularly complex if not impossible. They may have studied existing collaborations (i.e., where intraorganizational supports were already in place to enable collaboration) or settings involving smaller organizations (where micro dynamics can have more impact). Furthermore, compared to research on cross-functional product development teams (e.g., Cronin & Weingart, 2007), public servants may have been less specialized.

This being said, when professional diversity, and member heterogeneity more generally, are present without the required resources to leverage this asset or manage its challenges, it can hinder the effectiveness and sustainability of a collaboration. Dissecting challenges of heterogeneity in that way can help provide more specific points of action to address them. However, despite the richness of data afforded by this study's qualitative approach and despite the important parallels with previous research on collaboration, many associations would need to be tested in future research.

Study 3 enabled a specific examination of the role of professional diversity in collaboration by experimentally isolating it not only from sectoral and jurisdictional differences but also from sociodemographic diversity and goal diversity. All participants were young, with little work experience and organizational commitment, which otherwise might have confounded results because of differences in seniority, status, and history between professional groups. Experimental Study 3 isolated the effect of salient professional diversity (salient professional categories) in a situation of cognitive diversity based on expertise (different professional perspectives on the same issue). The expression of task disagreement during group communication transformed latent divergences in perspectives (cognitive diversity) into manifest ones (Pondy, 1967). The decision situation was framed as a cooperative one, to achieve the best decision, participants were interacting with members of their sole team, and there was only one task goal. This showed that all else being equal, increasing the salience of professional differences can have a beneficial role to play for the sustainability of collaborations. Possibly, a competitive framing, pitting memberships to diverse faculties against each other, could have yielded different results.

2) The Impact of Differences in Professional Identity on Perception and Reaction Following Task Disagreement

The second thesis objective was to examine the impact of salient professional diversity on how people perceive and react to task disagreement in group problem-solving situations.

Group Composition and Perception of Task Disagreement. Two aspects of disagreement perception were considered: reported task conflict and reported relationship conflict. Regarding task conflict, as expected, expert simulation Study 2 found that interprofessional teams were significantly more likely to *report* frequent team disagreement. This

was the case even though groups exhibited similar frequencies of *observed* disagreement. In both conditions, observed and reported disagreement did not show strong or significant associations. In Study 3, when experimentally exposed to the exact same disagreement and informational benefits, participants in the interprofessional condition reported on average lower levels of task conflict, even though this did not reach significance. These inconsistent results could be due to the fact that Study 2 did not control for the intensity of disagreements, their informational benefits, or the directness and oppositional intensity of disagreement expression.

Regarding relationship conflict, we hypothesized that members of interprofessional teams would be less likely to perceive a task conflict as a relationship conflict. In line with this, expert simulation Study 2 found that homogeneous teams did exhibit a significant and strong positive correlation between reported disagreement and reported personality interference. Although the nonparametric context in Study 2 prevented a formal test of interaction, interprofessional teams exhibited a smaller and nonsignificant correlation. Observed disagreement did not significantly predict reported personality interference.

Experimental Study 3 formally tested this hypothesis. Results indicated that following the same disagreement, participants in interprofessional teams reported lower relationship conflict than those in homogeneous teams – although did not reach statistical significance (possibly in part because the relationship conflict scale suffered from low psychometric reliability). As such, although findings do not provide definitive answers, they are generally consistent with previous findings that disagreement with someone from the same salient social category can increase relationship focus at the expense of task focus (Lloyd et al., 2013).

Results from the two studies converged even though they involved very different samples in terms of age and work experience and despite employing different designs. Expert simulation

Study 2 focused on seasoned professional risk managers with an average age of 50 years old, an average experience in DRR of 17 year, and well-established professional identities. In contrast, experimental Study 3 was based on a sample of undergraduate students with an average age of 20 years and limited experience in their field (64% were in the first or second year of their undergraduate degree). In Study 2, participants were in the lab for around 3 hours, interacted in person within their team, and knew they were going to present their decision to the other teams after team discussions. In Study 3, participants participated virtually in a fictitious scenario, the situation was anonymous (only their professional identity was displayed to their “teammates”), and there was only a short one-off chat interaction. The studies differed both in terms of general group “dosage” and in terms of the potential threats to positive group image (Turner et al., 2011) that ingroup disagreement could have triggered in the homogeneous conditions. These could explain why some of the differences suggested by expert simulation Study 2 were not significant in experimental Study 3.

In sum, to the question of whether differences in salient professional identity influences *perception* of disagreement, the thesis findings, albeit with marginal results, were consistent with the hypothesis that differences could be present under some circumstances. They support the need for more research on the question.

Group Composition and Reaction to Task Disagreement. In terms of reaction to task disagreement, we examined the role of emotions, processing of task information, performance outcomes, and relational quality outcomes.

Emotion. Expert simulation Study 2 used a naturalistic sample and did not control for the level of disagreement. In this sample, interprofessional teams reported more frustration with disagreement than homogeneous teams – consistent with the fact that interprofessional teams

also reported more disagreement. However, only in homogeneous teams was reported disagreement associated with reported frustration. Although consistent with hypotheses, this could have reflected lower statistical power in the interprofessional team condition due to a smaller sample size. Experimental Study 3 controlled the amount and type of disagreement by exposing all participants to the exact same disagreement. As predicted, participants in the interprofessional team condition reported lower negative emotions (frustrated, angry, annoyed, tense, disappointed) and lower surprise – even though these differences did not reach the $p < .05$ significance level.

Despite their equivocality, the pattern of results did show consistency with some previous experimental findings. Phillips (2003) found that disagreement with a same-discipline (vs. different-discipline) teammate predicted greater reported surprise and greater reported irritation. Sun and Yu (2014) also found that violated expectations of social acceptance/rejection predicted greater reported surprise. In three studies, Rink and Ellemers (2006, 2007) found that participants who's (fictional) teammate violated (vs. confirmed) their expectations of similarity/difference reported greater disappointment. This was found when expectations were self-activated, experimentally manipulated using written suggestions of similarity/differences, or experimentally manipulated using salient social categories (gender). However, in the two studies where this was measured, Rink & Ellemers (2007) found that the effect of expectancy violation was limited to disappointment and did not generalize to surprise or hostile negative emotions (angry, irritable, scornful, hostile). Of note, the scenario used in Rink and Ellemers (2007)'s studies did not involve social acceptance/rejection or salient social categories. Although this hypothesis would need to be tested, the pattern of thesis results and previous findings suggest

that, compared to expectancy violations more generally, those related to social acceptance/rejection may be more likely to lead to hostile emotions and surprise.

Processing of Task Information. We expected that task disagreement would be associated with greater processing of information in interprofessional teams compared to homogeneous teams. In expert simulation Study 2, we measured reported elaboration of information (generation of ideas) and reported usefulness of disagreement. Contrary to the idea that professional diversity should lead to a greater pool of available task information, in general and through disagreement, interprofessional teams did not report greater levels of idea generation or greater usefulness of disagreement compared to homogeneous teams. However, disagreement and idea generation did show inverse associations depending on group composition: disagreement (observed and reported) positively correlated with idea generation in interprofessional teams and negatively correlated with idea generation in homogeneous teams.

In experimental Study 3, when exposed to the same disagreement and the same new information, participants in the interprofessional condition did not show greater retention of teammate information than participant in the homogeneous condition. This suggested that group condition did not change how participants allocated attention to new, preference-inconsistent information shared by disagreeing teammates.

Thus, findings from expert simulation Study 2 were consistent with findings by Loyd and colleagues (2013) that greater relationship focus predicts less elaboration of task information when disagreeing with saliently similar teammates compared to saliently different teammates. In contrast, experimental Study 3 did not support this interpretation. With the caveat that Study 3 did not measure participants' perception of information acquisition through disagreement, overall thesis findings are more consistent with results by Todorova and colleagues (2014).

These authors found that people who experienced task conflicts in cross-functional settings reported greater information acquisition compared to those experiencing task conflicts in same-profession teams. They also found that greater information acquisition predicted greater positive emotions in cross-functional task conflicts, but not in same-profession task conflicts.

Thus, attention to new information may not differ depending on salient group composition, but the actual or perceived informational benefits of disagreement may be greater. This interpretation would be coherent with the fact that, in Study 3 and compared to the homogeneous condition, participants in interprofessional teams reported significantly greater satisfaction with team and exhibited a nonsignificant trend towards greater integrative decision making.

Performance Outcomes. Interprofessional teams were expected to show greater decision quality and more particularly greater integrative decision making compared to homogeneous teams. Contrary to expectations, in expert simulation Study 2, interprofessional teams showed a strong and significant negative correlation between observed disagreement and panel-rated decision quality. In homogeneous teams, the correlation was also negative but less conclusive. However, it seemed that in interprofessional teams, information-processing load and efforts to resolve disagreements may have prevented performance in the time-sensitive task. In effect, observed disagreement also predicted greater reported integration of team inputs in this group. In contrast, in homogeneous teams, disagreement (observed, but especially reported) predicted lower integration of inputs.

In contrast with above-cited results on panel-rated decision quality but in line with those on integration of team inputs, experimental Study 3 found that as hypothesized, participants in the interprofessional team condition chose the optimal integrative decision option more often

than in the homogeneous team condition – although this difference did not reach significance. Notably, the trend was observed even though conditions did not differ in terms of actual processing of preference-inconsistent information. The fact that we did not include a “no disagreement” condition and that we did not control for participants’ attitudes towards the other disciplines could have prevented the ability to detect a stronger effect. Furthermore, studies on influence also suggest that similarity with the target predicts greater influence (which could have increased integration in the homogeneous group). Results suggest a more complex picture than a main effect model of group composition on integrative decision making. More controlled investigations would be needed to specify potential moderating factors under which salient diversity may or may not influence integrative decision making.

Relational Quality Outcomes. The most consistent findings across Studies 2 and 3 were those on relational quality outcomes. We predicted that, despite the general phenomenon that interprofessional groups tend to report lower relationship quality and cooperation than homogeneous groups (cf., van Knippenberg & Schippers, 2007), relationship quality would be less detrimentally affected by task disagreement in interprofessional compared to homogeneous teams. As expected, expert simulation Study 2 did find that compared to homogeneous teams, interprofessional teams reported overall lower levels of trust in team and to a lesser extent, lower levels of satisfaction with process. However, coherent with study hypotheses, homogeneous teams showed a consistent pattern of negative associations between disagreement (observed and reported) and relational quality outcomes. In contrast, associations were either positive or small/null in interprofessional teams.

Experimental Study 3 formally tested whether group composition would predict satisfaction with team following disagreement. Consistent with hypotheses, it found that after

being exposed to the exact same disagreement with the same informational benefits, participants in interprofessional teams reported significantly higher satisfaction with team.

Overall, thesis results are strongly consistent with those of previous experimental studies suggesting that incongruence between salient group composition and deep-level positions predicts lower reported group efficacy (Phillips, 2003) and lower reported commitment to collaboration (Rink & Ellemers, 2006). More broadly, they are consistent with experimental findings on the negative effects of expectancy violation for relational outcomes (Mendes et al., 2007; Sun & Yu, 2014).

In sum, how do differences in professional identity affect perception of and reaction to task disagreement? Thesis findings suggest that the clearest advantage of interprofessional teams in facing task disagreement is increased resilience of relationship quality. Moving beyond a main effect model could provide greater nuances in the prediction of conflict perceptions, emotions, information processing, and performance following disagreement.

3) The Role of Emotion, Perceived Group Functioning, and Information Processing for Decision Quality and Relationship Quality

Finally, the third thesis objective was to investigate the role of emotions, conflict perceptions, and information processing for decision quality and relationship quality following disagreement. Experimental Study 3 addressed this objective by testing a dual pathway model to explain the links between emotions and outcomes.

Cognitive and Relational Pathways Following Disagreement. Our study found that the hypothesized dual pathway between emotions and outcomes was consistent with the data. Results suggested the existence of a beneficial, task-focused pathway: surprise following disagreement predicted a higher probability of making an optimal integrative decision and

increased satisfaction with team through increased reported task conflict and increased information processing. Path analysis results also suggested the existence of a detrimental, relationship-focused pathway linking increased negative emotions to a reduced probability of making an integrative decision and to reduced satisfaction with team through increased reported relationship conflict and decreased processing of preference-inconsistent information. These results were consistent with previous meta-analytical findings on the interaction between task conflict and relationship conflict in predicting performance and satisfaction (de Wit, Greer, et al., 2012). They were consistent with experimental findings on the detrimental effects of relationship conflict for information processing and integrative decision making following disagreement (de Wit et al., 2013). Furthermore, our findings extended those of previous studies on the negative role of relationship conflict for information processing and integrative decision making by documenting similar relationships for satisfaction with team. Findings also support the importance of differentiating between the effects of negative emotions and relationship conflict on group processes and outcomes.

Supplementary path models, estimated separately for each group condition, confirmed a plausible common thrust in the prediction of integrative decision making and satisfaction with team, based on emotion, task and relationship conflict perceptions, and information processing. Although more targeted moderation studies would be required to examine this question, they also pointed to a potential modulation in coefficient weights based on salient group composition (interprofessional, homogeneous). In the homogeneous team condition, negative emotions had a comparatively stronger association with relationship conflict. In the homogeneous condition, the main predictors of satisfaction were negative emotions and retention of information. In the

interprofessional condition, the main predictors of satisfaction were relationship conflict and integrative decision making.

Surprise as a Distinct Emotion Following Disagreement. Surprise is not a commonly studied emotion in intragroup conflict studies. Even though the correlation between surprise and negative emotions was fairly high ($r = .43$), experimental Study 3 suggested a distinctive role for surprise in predicting decision quality and relationship quality following disagreement. Unlike negative emotions, surprise showed a positive direct link to task conflict and information retention. This is actually consistent with previous research on expectancy violation showing better recall for targets (social or not) that violate (vs. confirm) expectations (Bartholow et al., 2001b; Meyer et al., 1991). These findings suggest the potential benefits of singling out surprise in research on group disagreement.

Unlike negative emotions, surprise did not contribute to the detrimental relational pathway in our study. This contrasts with findings from other studies on expectancy violation which had involved a relational component between participants and targets. These found that experimental conditions predicting greater reported surprise also predicted reduced satisfaction (Sun & Yu, 2014) and reduced perceived group efficacy (Phillips, 2003). However, the direct association between surprise and these outcomes was not reported. A potential explanation for the apparent discrepancy is that our analyses controlled for negative emotions following disagreement in examining the role of surprise. Taken together, these findings indicate a potential double-edge sword for surprise in relational contexts and a need to investigate this emotion for group dynamics in future studies.

In summary, although more controlled causal mediation studies are required, our findings supported and documented intertwined cognitive and relational pathways predicting decision and relational outcomes following task disagreement in diverse or similar professional contexts.

Integration of Findings Across Levels and Across Methods

In which conditions and by which mechanisms can micro-level professional diversity between representative influence the performance and sustainability of meso-level interorganizational collaboration?

Regarding macro-level and meso-level conditions, professional diversity is less likely to be a determining factor when collaboration faces important structural challenges, such as in large bureaucratic organizations. Furthermore, professional diversity is less likely a challenge when it does not co-occur with intersectoral and interjurisdictional differences. Conversely, professional diversity may be more likely to become salient when interorganizational structures are in place to facilitate interactions.

At the micro-level, thesis findings from qualitative Study 1 suggest that professional diversity is more likely to pose an issue when stakeholders bring different goals, lack understanding of interdependencies, do not see the need for collaboration, are not willing to shared power, are unaware of differences, or at the individual level, lack partnering skills (communication, conflict management) to manage these differences. Interacting dimensions of diversity (differences in goals and professional perspectives) can increase the complexity of a collaboration. Higher system-level heterogeneity transfers down to lower micro-level encounters: individuals interact carrying or conveying meso-system diversity – which might not always be recognized.

Qualitative Study 1 depicted the challenges of gaining a collective identity in the context of goal diversity. It suggested that communicating a common identity for instrumental reasons without recognizing goal diversity may not work or may even backfire. Expert simulation Study 2 and experimental Study 3 suggested that salient professional differences may actually protect relationship quality when task disagreement arises during group interactions. Together, findings from this thesis and previous studies (Beck & Plowman, 2014; Ungureanu et al., 2020) suggest that collective identity should be more carefully thought of as a product of collaboration rather than a precondition. As noted by Rink and Ellemers (2007), expectations of differences may be easier to change than attitudes towards differences. Keeping different identities salient may help members remain committed during the process of sorting out differences and gaining a system understanding of the problem space and the stakeholder space. Together, these findings point to the value of targeting system understanding (awareness of interdependencies) rather than common identity as a strategy to support commitment to collaboration. They highlight the role of organizational and interpersonal communication as a channel of intervention.

At the individual ontological level, findings suggest that the experience of negative emotions during disagreement can result in increased relationship conflict perception, reduced attention to new information, reduced uptake of new information, and reduced satisfaction. Settings where professional diversity increase negative emotions (such as when negative stereotypes or intergroup biases are activated), could lead to negative consequences of professional diversity for collaboration. In the early stages of a heterogeneous collaboration, strategies to limit negative emotions and relationship conflict perception associated with disagreement may thus favour the information processing, integrative re-positioning, and satisfaction required for progress and sustained commitment. Avoiding personalization of

disagreement may be more fruitful than trying to build a shared identity. This idea is in continuity with previous contributions on the role of “small wins” to iteratively build trust in interorganizational collaboration (Vangen & Huxham, 2003).

As such, our thesis findings illustrate how the role of professional diversity for interorganizational collaboration is embedded in a larger network of interacting factors. Depending on context, professional diversity may be more or less salient in collaboration. Adopting a heuristic of diversity presumptions and attentiveness could potentially facilitate openness and learning about partners’ different perspectives.

Across Methods. The use of a multi-methods research strategy enabled us to paint a more complex and nuanced picture of the role of professional diversity in collaboration. The qualitative study suggested factors at different levels of analysis that could moderate the effect of professional diversity and salient group composition on collaboration. It benefitted from participants’ prolonged experience of our topic. It provided a rich depiction of the multilevel context and intertwined factors involved in interorganizational collaboration. In-depth examinations were possible, which also meant that the sample had to be smaller. Expert simulation Study 2 provided observational data on communication during interorganizational decision-making tasks with seasoned professionals. This enabled investigation of different concurrent factors in group decision making without relying on self-reported accounts on the collaboration setting. The methodology and the type of sample prevented confirmatory approaches but provided observed and self-reported sources of data on the phenomenon of interest. Finally, experimental Study 3 provided a controlled setting to test specific hypotheses regarding the impact of professional group composition on collaboration and regarding intervening mechanisms. The experimental setting targeted a simplified version of the dynamics

of real-life collaboration. Interpreting results from this simplified setting was aided by the more nuanced perspectives documented in Studies 1 and 2.

Limitations

The contributions of this thesis must be interpreted in light of its limitations. Qualitative Study 1 originally aimed to “isolate” the role of differences in expertise for interorganizational collaboration from other sources of heterogeneity such as sectors and jurisdictions. However, we did not anticipate that participants’ experience of interorganizational collaboration would in fact include many inter-jurisdictional or inter-sectoral situations. Given the importance of inter-jurisdictional collaboration *within* mandate areas for Canadian governance, our focus on intra-federal collaboration *across* mandate areas had less ecological validity. As noted by Rocan (2018b), disagreement, conflict, and tension can be a difficult subject to research as participants may feel less comfortable discussing it. This could have created a certain social desirability effect during interviews. Along with our recruitment approach based on snowballing and DRR events, it could have biased our sample towards public servants with more favourable experiences of collaboration.

Expert simulation Study 2 took advantage of available observational and semi-experimental data on interorganizational problem solving, which provided a sample of high ecological validity. The drawback was a small sample size. The significance level adopted, and the number of tests performed increased the probability of type I error. Although gender composition was balanced across conditions, cross-categorization effects which we could not control for, could have influence behaviours and outcomes in some teams. Importantly, the goal of Study 2 was not confirmatory. This subject matter expert study was designed to provide a test case examination of hypotheses on the effect of salient professional diversity on how people

express, perceive, and react to disagreement. It supported pursuing this investigation further in Study 3 and in future studies using larger naturalistic samples.

In contrast, experimental Study 3 attempted to maximize sample size and controls by adopting a randomized design, an individual-level approach, and a standardized online decision-making scenario. This brought its own drawbacks in terms of a reduced possible duration of team interactions and a lower immersive nature of the design. As a result, the “groupness” of the experimental situation was weaker compared to studies based on in-person interactions. This could have reduced effect sizes. Expectations of agreement were not measured to avoid influencing participants’ subsequent responses. The characteristics of the simulation could have increased expectations of agreement for participants in both conditions, thereby reducing the potential effect of salient group composition based on expectancy violation. The design did not include a “no disagreement” control condition. Finally, potential moderating factors that were not measured in this study could have influenced decision and satisfaction outcomes. This, either directly or by influencing emotions, conflict perceptions, and information processing following disagreement. Controlling for additional variables, such as participants’ attitudes towards the other professional roles or the affective strength of their ingroup identification (Oore et al., 2013), could have better isolated the effect of the experimental manipulation. Participants with negative biases towards the other disciplines could have exhibited more negative reactions to the task disagreement in the interprofessional team condition, thus confounding our results. The design also isolated professional identity as the only available source of social categorization. Nevertheless, in reality, the STEM, Health sciences, and Social sciences student groups also differ in sociodemographic composition. This could have created unmeasured cross-categorization effects and augmented noise especially in the interprofessional team condition.

Research Contributions

In spite of these limitations, this thesis provides meaningful research contributions. It investigated the role of professional diversity for interorganizational collaboration through an interdisciplinary conceptual framework. The research objectives were addressed through a multi-method empirical strategy embedded in existing research projects and partnerships and taking advantage of available naturalistic data. Samples included Canadian federal public servants, seasoned risk managers, and university students. The empirical strategy integrated qualitative, nonparametric, and experimental research approaches. It included the development of an experimental decision-making simulation to test in a fully balanced design the impact of salient professional group composition on perception of and reaction to disagreement. Based on this research approach, the thesis provides a number of contributions to research on interorganizational and team-level collaboration.

The Role of Professional Diversity in Interorganizational Collaboration

First, this thesis demonstrates the benefits of interprofessional diversity and brings some nuances to the idea that professional diversity constitutes a widespread challenge for interorganizational collaboration. Investigating interorganizational collaboration in an intra-jurisdictional and intra-sectoral context, it found that differences in professional expertise were not really a significant issue in this setting. The extent to which higher level diversity, such as institutional or organizational, permeated the collaboration endeavour was more likely a challenge and at times unrecognized. The findings contribute to a better understanding of the ecosystem of (inter)organizational conditions that influence the salience or impact of professional differences in interorganizational collaboration.

Task Disagreement, Conflict, and Collaboration. The thesis furthers our understanding of the role of task disagreement for conflict and collaboration. Conflict between heterogeneous organizations is cited as a challenge for collaboration. In public administration or disaster management research, interorganizational conflict and the interactions leading to it are rarely studied directly. This thesis looked at the role of differences, and particularly of disagreement, in interorganizational collaboration and in newly formed decision-making teams. It included both observational and self-reported measures of disagreement. It studied naturally occurring as well as experimentally manipulated disagreement. It tested the simultaneous role of emotions, conflict perception, and information processing for decision and satisfaction following disagreement. Finally, it documented a potential role of surprise for information processing following task disagreement. The results increase our understanding of intervening mechanisms that could simultaneously explain performance and satisfaction in group decision-making tasks.

The Role of Social Identity in Interorganizational Collaboration. As there is a debate in research on interorganizational collaboration regarding the benefits of developing a collective identity (cf., Ungureanu et al., 2020), this thesis tested, in a controlled experimental design, current hypotheses on the interplay between different perspectives and salient social categories. It showed that, all else being equal, salient group homogeneity can lead to decreased team satisfaction following task disagreement. These findings are of significance because social categorization interventions, such as promoting the development of a superordinate identity, are often considered a beneficial strategy to increase cooperation and trust in heterogeneous groups. However, such an approach could have the unintended detrimental effect of reducing the resilience of group cohesion in the face of disagreement.

Social Psychological Factors in Interorganizational Collaboration

In all, this thesis contributes to a better understanding of the psychosocial dimension of interorganizational collaboration.

Cognitive and Affective Pathways in Group Decision Making. The thesis contributes to documenting the role of negative emotions for integrative decision making and satisfaction with team, through the mediating role of increased relationship conflict and decreased processing of new information. While negative emotions, such as the ones brought up by disagreement, seem to be associated to worse information processing, reporting surprise seemed to be able to improve attention and retention. Bringing empirical evidence to the dual pathway model contributes to progress in this research area.

The Combined Roles of Structure and Emergence for Collaboration in Interorganizational Contexts. Teamwork scholars have documented key structural/design factors supporting team effectiveness (Hackman, 1987; Wageman et al., 2005; Wageman & Lowe, 2019). This include having a “real team” (bounded, interdependent, stable), comprised of the right people, a compelling purpose, an enabling structure (adequate task design, core group norms, team size), a supportive organizational context (reward system, training system, information system), and access to expert coaching. Qualitative Study 1 found that many structural facilitators of interorganizational collaboration that pertain to the “top-down” route overlap with these structural features from team research. It appeared that the more an interorganizational group resembles a traditional team, the easier it will be for members to be effective.

However, this thesis also points to limitations in this type of strategy for increasing coherence across public-sector organizations because these facilitating conditions are not always

available to organizational representatives. As previous scholars have noted, collaboration takes time and resources (Bakvis & Juillet, 2004; Huxham & Vangen, 2005). Creating formal and stable interorganizational teams requires investing resources in creating new structures. In a large bureaucratic system, the needs for interorganizational articulation and mutual adjustment are likely far greater than the number of formal interorganizational teams that can be created – and that may actually be needed. As such, our findings highlight the value of considering dynamics of emergence in public organizations – the “bottom-up route” to collaboration. This route echoes the concept of innovation systems in public service organizations (OECD, 2018). It relates to the concepts of organizational learning (e.g., Argote, 2013) and supports the notion of organizations and interorganizational collaborations as complex adaptive systems (Beck & Plowman, 2014; Okros et al., 2011). Framing interorganizational collaboration in large public service organizations as a complex adaptive system can help identify strategies that managers can use to promote self-organization.

Multilevel System Assumptions in Models of Interpersonal Collaboration. More largely, this thesis contributes to interdisciplinary integration in collaboration research. It documents the applicability of social psychological teamwork models to the context of interorganizational collaboration, especially in large governmental bureaucracies. On the one hand, it brings support for the transferability of negotiation/conflict management models highlighting the benefits of integrative/problem-solving conflict management approaches (Tjosvold et al., 2014). It supports team diversity models highlighting the role of intrapersonal functional diversity (Bunderson & Sutcliffe, 2002) for the effectiveness of professionally diverse teams. At the same time, it highlights some socioecological differences between inter-organizational and team settings, which may require adjusting assumptions when moving from

teamwork to interorganizational collaboration. First, professional diversity may not be a salient issue when a) institutional structures create deeper divisions; b) members come from the same sector; c) knowledge barriers are thinner (e.g., than what is observed in cross-functional product development teams in the high-tech industry or even in interprofessional health teams). Second, goal diversity is a normal state of affairs; therefore, researchers must think through whether the models they apply assume goal commonality and how hypothesized relationships could change if this assumption was dropped.

Thus, thesis findings speak to the importance of considering how context shapes interpersonal collaboration in a socioecological system. Even with a definition of collaboration that is isomorphic across levels of analysis and even if we study “fundamental” social psychological dynamics in collaboration, the multilevel context of the real-life collaborations under study must be part of our equations. Contextual features can modify dynamics that are otherwise well-documented in other settings, such as would be the case in competitive, private-sector, or highly specialized technical organization (e.g. NASA, open-heart surgery room, etc). In this thesis, the public sector provided a broad-based, bureaucratic, rather generic, problem space.

Contribution to Collaboration for Disaster Risk Reduction

Finally, this thesis also contributes in different ways to a better understanding of collaboration in DRR. Previous research has identified a lack of knowledge on the cognitive and affective underpinnings of disaster response collaborations (Steigenberger, 2016) and on the actual interaction processes that can lead to conflict between representatives (Kalkman et al., 2018). The thesis provides observational data on disagreement and conflict during interorganizational problem solving among senior risk management professionals. It documents

the potential negative effects of salient homogeneity. It supports the importance of advance planning between heterogeneous stakeholders to resolve differences before disaster strikes. It also documents potential downsides of strategies that aim to improve collaboration solely by building shared identity. Rather, it proposes that building a better understanding of problem complexity and of interdependencies between organizations may be a less risky strategy. Finally, most research on DRR collaborations focuses on disaster response networks (Kapucu & Demiroz, 2017). The thesis contributes to the field by documenting collaboration at planning stages of DRR and in large bureaucratic organizations.

Practical Implications

This thesis points to a number of implications for practice, which also highlight the undergirding function of organizational communication and learning in interorganizational collaboration. Findings suggest that the often-favored approach to increase cohesion and collaboration by fostering a collective identity can have some drawbacks. Other levers of interventions should be pursued. For example, qualitative Study 1 highlights the role of system understanding as a key organizational asset for collaboration. It stresses the value of increasing this system understanding, rather than collective identity, to foster collaborative attitudes and help stakeholders collaborate across differences. This could be targeted through organizational communication strategies to better educate stakeholders on interdependencies and on how their activities and goals fit in the broader problem domain. This echoes the importance of explaining the broader picture to support stewardship among public servants (Simpkins et al., 2021). Qualitative Study 1 also documented how turnover can lead to organizational asset losses in terms of system understanding. This may be particularly detrimental when collaborating in heterogeneous stakeholder networks. Therefore, organizations wishing to sustain and increase

their collaborative capacity over time could favour organizational learning strategies and institutional memory practices to cultivate, share, and maintain this knowledge.

Experimental Study 3 suggests that, rather than focusing on identity, interventions could also target negative emotions, relationship conflict perception, or information processing to support performance and relational quality. It supports the relevance of conflict communication strategies that could reduce the likelihood of evoking negative threat-related emotions and perceptions of relationship conflict. For example, managers could facilitate training on conflict communication strategies and conflict management strategies that limit the perceived oppositional intensity of disagreement and promote problem-solving conflict management styles (DeChurch et al., 2013; Tjosvold et al., 2014; Weingart et al., 2015). Given the detrimental toll that conflicts have on employee health and well-being, increasing conflict management skills among employees could have parallel benefits within organizations (Oore & Dolan, 2017).

Srikanth and colleagues (2016) proposed that solutions that focus on integration, enable better coordination, and reduce the chances of misattribution may be preferred to identity interventions. This thesis brings further support to this notion. It highlights the potential advantages of strengthening trans-disciplinary understanding and pro-diversity norms for performance in groups with cognitive diversity (Homan, 2019; Mitchell et al., 2017). Efforts to educate participants on attribution biases and modify expectations of agreement can also serve as promising practices in interorganizational settings. The culture of decision by consensus might at times induce groupthink; the expression of diversity in perspectives and of disagreements is to be encouraged in view of reaching an integrative decision.

Future Research Directions

To build on the thesis contributions, future research should further test the moderation effects of professional group composition on the relationships present in the dual pathway model leading from emotions to outcomes. In view of the discrepancy between observed disagreement and reported disagreement documented in expert simulation Study 2, there is also a need to pursue research with these two constructs and examine factors that influence perception of disagreement.

Future research should also examine the impact of salient group composition on perception of and reaction to disagreement in naturalistic settings involving professional groups with strongly developed identities, such as scientists versus politicians. By the same token, it should test whether interventions creating expectations of disagreement would eliminate potential differences in satisfaction between interprofessional and homogeneous groups following disagreement. Beyond expectations of agreement per se, there is a need to examine the potential benefits of diversity presumptions or heuristics as a way to prime learning and attentiveness mindsets to support collaboration across a range of situations. This could also limit the chances of attributing coordination glitches to lack of cooperation on the part of others (Srikanth et al., 2016).

Researchers conducting intragroup conflict studies based on self-reported scales should also consider measuring group identification and including this variable as a moderator in their studies. Examples where this could be informative include: studies on factors that predict reported task conflict or team conflict asymmetry (i.e., Jehn et al., 2010) or studies looking at reported task conflict as an independent variable to predict other outcomes.

Future studies on the impact of salient group composition on perception of and reaction to disagreement should go beyond a main effect model and include potential moderators of this effect. For example, it should consider participants' attitudes towards the other professional groups, such as prejudice or appreciation (Blais-Rochette, 2020), stereotyped views about competence and warmth (Fiske, 2018), perceived status differences as well as perceived sociodemographic diversity in terms of gender, ethnic background, and, especially in real-work settings, age (Lagacé et al., 2019). Research should also examine other factors that may influence people's consideration of new, preference-inconsistent information in group situations. It should better study the role of prior emotions such as surprise and negative emotions in how people perceive and react to disagreement. Given that performance and relational quality are two fundamental aspects of successful collaboration, research should continue to investigate collaboration with a multivariate approach considering both decision and satisfaction outcomes.

Research is needed to ascertain whether effects ascribed to relationship conflict in existing scholarship are in fact explained by negative emotionality rather than perceptions of interpersonal incompatibilities. Further studies on the role of relationship conflict in early group interactions should seek to better differentiate its effects from those of negative emotions. This would require clarifying the definition and the construct of relationship conflict outside of animosity. It would call for the development of a relationship conflict measure not confounded by negative emotionality and suitable for early interactions.

Overall, this thesis points to the possibility and benefits of much broader applications of social psychological theories to the functioning of public organizations. Public administration is increasingly paying attention to the "micro-dynamics" and "behavioural" dimensions of public organizations. Yet, most applications of psychology models remain concentrated at the

individual level and in the area of leadership and management (Grimmelikhuijsen et al., 2017).

Hence, future work in organizational psychology should seek to apply models of collaboration and organizational learning to this context within a broader system approach.

Conclusion

As many complex public issues such as disaster risk management require collaboration among heterogeneous organizations, organizational representatives need to contend with professional differences and disagreement to promote network performance and sustainability. This thesis brings a multilevel and multimethod investigation on the social psychology of interorganizational collaboration. It aims to improve understanding of the interplay between differences in perspectives and identities in collaboration. We hope that findings from this thesis can contribute to interventions to help organizations collaborate in the face of complex problems.

References

- Agranoff, R. (2006). Inside collaborative networks: Ten lessons for public managers. *Public Administration Review*, 66, 56–65. <https://doi.org/10.1111/j.1540-6210.2006.00666.x>
- Aldrich, H. (1977). Visionaires and villains: The politics of designing interorganizational relations. In E. H. Burack & A. R. Negandhi (Eds.), *Organization design: Theoretical perspectives and empirical findings* (pp. 23–40). Kent State University Press.
- Allen, V. L., & Wilder, D. A. (1979). Group categorization and attribution of belief similarity. *Small Group Behavior*, 10(1), 73–80. <https://doi.org/10.1177/0090552679101006>
- Amsler, L. B., & O’Leary, R. (2017). Collaborative public management and systems thinking. *International Journal of Public Sector Management*, 30(6/7), 626–639. <https://doi.org/10.1108/IJPSM-07-2017-0187>
- Ansell, C., & Gash, A. (2007). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory*, 18(4), 543–571. <https://doi.org/10.1093/jopart/mum032>
- Argote, L. (2013). *Organizational learning: Creating, retaining, and transferring knowledge* (2nd ed.). Springer US. 10.1007/978-1-4614-5251-5
- Bakvis, H., & Juillet, L. (2004). *The horizontal challenge: Line departments, central agencies and leadership*. (No. SC103-1/2004E). Canada School of Public Service.
- Bartholow, B. D., Fabiani, M., Gratton, G., & Bettencourt, B. A. (2001). A psychophysiological examination of cognitive processing of and affective responses to social expectancy violations. *Psychological Science*, 12(3), 197–204. <https://doi.org/10.1111/1467-9280.00336>

- Beck, T. E., & Plowman, D. A. (2014). Temporary, emergent interorganizational collaboration in unexpected circumstances: A study of the Columbia Space Shuttle response effort. *Organization Science*, 25(4), 1234–1252. <https://doi.org/10.1287/orsc.2013.0888>
- Bedwell, W. L., Wildman, J. L., DiazGranados, D., Salazar, M., Kramer, W. S., & Salas, E. (2012). Collaboration at work: An integrative multilevel conceptualization. *Human Resource Management Review*, 22(2), 128–145. <https://doi.org/10.1016/j.hrmr.2011.11.007>
- Beech, N., & Huxham, C. (2003). Cycles of identity formation in interorganizational collaborations. *International Studies of Management & Organization*, 33(3), 28–52. <https://doi.org/10.1080/00208825.2003.11043686>
- Bendersky, C., Bear, J., Behfar, K., Weingart, L. R., Todorova, G., & Jehn, K. A. (2014). Identifying gaps between the conceptualization of conflict and its measurement. In O. B. Ayoko, N. M. Ashkanasy, & K. A. Jehn (Eds.), *Handbook of conflict management research* (pp. 79–89). Edward Elgar Publishing Ltd.
- Berlin, J. M., & Carlström, E. D. (2011). Why is collaboration minimised at the accident scene?: A critical study of a hidden phenomenon. *Disaster Prevention and Management*, 20(2), 159–171. <https://doi.org/10.1108/09653561111126094>
- Blais-Rochette, C. (2020). *Personality and cultural attitudes* [Doctoral dissertation]. Université d'Ottawa / University of Ottawa.
- Bliese, P. D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 349–381). Jossey-Bass.

- Borins, S. (2000). Loose cannons and rule breakers, or enterprising leaders? Some evidence about innovative public managers. *Public Administration Review*, 60(6), 498–507.
<https://doi.org/10.1111/0033-3352.00113>
- Bourgault, J. (2002a). Conclusion. In J. Bourgault (Ed.), *Horizontalité et gestion publique* (pp. 249–278). Les Presses de l'Université Laval.
- Bourgault, J. (2002b). Gestion horizontale: Facteurs significatifs. In J. Bourgault (Ed.), *Horizontalité et gestion publique* (pp. 249–278). Les Presses de l'Université Laval.
- Bourgault, J. (Ed.). (2002c). *Horizontalité et gestion publique*. Les Presses de l'Université Laval.
- Bourgault, J. (2002d). Introduction. In J. Bourgault (Ed.), *Horizontalité et gestion publique* (pp. 249–278). Les Presses de l'Université Laval.
- Bourgault, J. (2014). *An introduction to the horizontal coordination of public policies: Usefulness, facilitating factors, obstacles, and current challenges*. National Collaborating Centre for Healthy Public Policy & Institut national de santé publique du Québec.
https://www.ncchpp.ca/docs/2014_GouvInt_ApprocheHorizontale_En.pdf
- Bradley, B. H., Anderson, H. J., Baur, J. E., & Klotz, A. C. (2015). When conflict helps: Integrating evidence for beneficial conflict in groups and teams under three perspectives. *Group Dynamics: Theory, Research, and Practice*, 19(4), 243–272.
<https://doi.org/10.1037/gdn0000033>
- Brennan, R. L., & Prediger, D. J. (1981). Coefficient kappa: Some uses, misuses, and alternatives. *Educational and Psychological Measurement*, 41(3), 687–699.
<https://doi.org/10.1177/001316448104100307>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.

- Bryson, J. M., Crosby, B. C., & Stone, M. M. (2006). The design and implementation of cross-sector collaborations: Propositions from the literature. *Public Administration Review*, 66(s1), 44–55. <https://doi.org/10.1111/j.1540-6210.2006.00665.x>
- Bryson, J. M., Crosby, B. C., & Stone, M. M. (2015). Designing and implementing cross-sector collaborations: Needed and challenging. *Public Administration Review*, 75(5), 647–663. <https://doi.org/10.1111/puar.12432>
- Bunderson, J. S., & Sutcliffe, K. M. (2002). Comparing alternative conceptualizations of functional diversity in management teams: Process and performance effects. *The Academy of Management Journal*, 45(5), 875–893. <https://doi.org/10.2307/3069319>
- Byrt, T., Bishop, J., & Carlin, J. B. (1993). Bias, prevalence and kappa. *Journal of Clinical Epidemiology*, 46(5), 423–429. [https://doi.org/10.1016/0895-4356\(93\)90018-V](https://doi.org/10.1016/0895-4356(93)90018-V)
- Carlile, P. R. (2002). A pragmatic view of knowledge and boundaries: Boundary objects in new product development. *Organization Science*, 13(4), 442–455. <https://doi.org/10.1287/orsc.13.4.442.2953>
- Carlile, P. R. (2004). Transferring, translating, and transforming: An integrative framework for managing knowledge across boundaries. *Organization Science*, 15(5), 555–568. <https://doi.org/10.1287/orsc.1040.0094>
- Carter, A. B., & Phillips, K. W. (2017). The double-edged sword of diversity: Toward a dual pathway model. *Social and Personality Psychology Compass*, 11(5), e12313. <https://doi.org/10.1111/spc3.12313>
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology*, 83(2), 234–246. <https://doi.org/10.1037/0021-9010.83.2.234>

Chiocchio, F., Grenier, S., O'Neill, T. A., Savaria, K., & Willms, J. D. (2012). The effects of collaboration on performance: A multilevel validation in project teams. *International Journal of Project Organisation and Management*, 4(1), 1–37.

<https://doi.org/10.1504/IJPOM.2012.045362>

Clerk of the Privy Council. (2013). *Blueprint 2020. Getting started—Getting your views. Building tomorrow's public service together*. Government of Canada.

<https://www.canada.ca/content/dam/pco-bcp/documents/pdfs/bp2020-eng.pdf>

Comfort, L. K. (1989). *Learning from risk: Organizational interaction following the Armenian earthquakes*. FMHI Publications.

https://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1032&context=fmhi_pub

Comfort, L. K. (1990). Turning conflict into cooperation: Organizational designs for community response in disasters. *International Journal of Mental Health*, 19(1), 89–108. JSTOR.

Cronin, M. A., & Weingart, L. R. (2007). Representational gaps, information processing, and conflict in functionally diverse teams. *Academy of Management Review*, 32(3), 761–773.

<https://doi.org/10.2307/20159333>

Cropper, S., & Palmer, I. (2008). Change, dynamics, and temporality in interorganizational relationships. In S. Cropper, C. Huxham, M. Ebers, & P. Smith Ring (Eds.), *The Oxford handbook of inter-organizational relations* (Oxford Handbooks Online).

Curnin, S., & Owen, C. (2014). Spanning organizational boundaries in emergency management. *International Journal of Public Administration*, 37(5), 259–270.

<https://doi.org/10.1080/01900692.2013.830625>

- Curnin, S., Owen, C., & Trist, C. (2014). Managing the constraints of boundary spanning in emergency management. *Cognition, Technology & Work*, 16(4), 549–563.
<https://doi.org/10.1007/s10111-014-0285-z>
- Curşeu, P. L., & Schruijer, S. G. (2017). Stakeholder diversity and the comprehensiveness of sustainability decisions: The role of collaboration and conflict. *Current Opinion in Environmental Sustainability*, 28, 114–120. <https://doi.org/10.1016/j.cosust.2017.09.007>
- Dahlin, K. B., Weingart, L. R., & Hinds, P. J. (2005). Team diversity and information use. *Academy of Management Journal*, 48(6), 1107–1123.
<https://doi.org/10.5465/AMJ.2005.19573112>
- De Dreu, C. K. W. (2003). Time pressure and closing of the mind in negotiation. *Organizational Behavior and Human Decision Processes*, 91(2), 280–295.
[https://doi.org/10.1016/S0749-5978\(03\)00022-0](https://doi.org/10.1016/S0749-5978(03)00022-0)
- De Dreu, C. K. W., & Gelfand, M. J. (2007). Conflict in the workplace: Sources, functions, and dynamics across multiple levels of analysis. In C. K. W. De Dreu & M. J. Gelfand (Eds.), *The psychology of conflict and conflict management in organizations* (pp. 3–54). Taylor & Francis Group/Lawrence Erlbaum Associates. <https://doi.org/10.4324/9780203810125>
- De Dreu, C. K. W., Nijstad, B. A., & van Knippenberg, D. (2008). Motivated information processing in group judgment and decision making. *Personality and Social Psychology Review*, 12(1), 22–49. <https://doi.org/10.1177/1088868307304092>
- De Dreu, C. K. W., & van Knippenberg, D. (2005). The possessive self as a barrier to conflict resolution: Effects of mere ownership, process accountability, and self-concept clarity on competitive cognitions and behavior. *Journal of Personality and Social Psychology*, 89(3), 345–357. <http://dx.doi.org/10.1037/0022-3514.89.3.345>

- De Dreu, C. K. W., & Weingart, L. R. (2003). Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis. *Journal of Applied Psychology, 88*(4), 741–749.
- de Wit, F. R. C. (2015). Conflict in project teams. In F. Chiocchio, E. K. Kelloway, & B. Hobbs (Eds.), *The psychology and management of project teams: An interdisciplinary perspective* (pp. 213–237). Oxford University Press.
<https://doi.org/10.1093/acprof:oso/9780199861378.003.0009>
- de Wit, F. R. C., Greer, L. L., & Jehn, K. A. (2012). The paradox of intragroup conflict: A meta-analysis. *Journal of Applied Psychology, 97*(2), 360–390.
<https://doi.org/10.1037/a0024844>
- de Wit, F. R. C., Jehn, K. A., & Scheepers, D. (2013). Task conflict, information processing, and decision-making: The damaging effect of relationship conflict. *Organizational Behavior and Human Decision Processes, 122*(2), 177–189.
<https://doi.org/10.1016/j.obhdp.2013.07.002>
- de Wit, F. R. C., Jehn, K. A., & Scheepers, D. (2014). Coping with intragroup conflict. In O. B. Ayoko, N. M. Ashkanasy, & K. A. Jehn (Eds.), *Handbook of Conflict Management Research* (pp. 221–235). Edward Elgar Publishing. <https://www-elgaronline-com.proxy.bib.uottawa.ca/view/9781781006931.00022.xml>
- de Wit, F. R. C., Scheepers, D., & Jehn, K. A. (2012). Cardiovascular reactivity and resistance to opposing viewpoints during intragroup conflict. *Psychophysiology, 49*(11), 1523–1531.
- DeChurch, L. A., & Marks, M. A. (2001). Maximizing the benefits of task conflict: The role of conflict management. *The International Journal of Conflict Management, 12*(1), 4–22.

- DeChurch, L. A., Mesmer-Magnus, J. R., & Doty, D. (2013). Moving beyond relationship and task conflict: Toward a process-state perspective. *Journal of Applied Psychology*, 98(4), 559–578. <https://doi.org/10.1037/a0032896>
- Dolbier, C. L., Webster, J. A., McCalister, K. T., Mallon, M. W., & Steinhardt, M. A. (2005). Reliability and validity of a single-item measure of job satisfaction. *American Journal of Health Promotion*, 19(3), 194–198. <https://doi.org/10.4278/0890-1171-19.3.194>
- Dooley, R. S., & Fryxell, G. E. (1999). Attaining decision quality and commitment from dissent: The moderating effects of loyalty and competence in strategic decision-making teams. *The Academy of Management Journal*, 42(4), 389–402. <https://doi.org/10.2307/257010>
- Edmondson, A. C., & Harvey, J.-F. (2018). Cross-boundary teaming for innovation: Integrating research on teams and knowledge in organizations. *Human Resource Management Review*, 28(4), 347–360. <https://doi.org/10.1016/j.hrmr.2017.03.002>
- Edwards, F. L. (2013). All Hazards, whole community: Creating resiliency. In N. Kapucu, C. V. Hawkins, & F. I. Rivera (Eds.), *Disaster resiliency: Interdisciplinary perspectives* (p. 27).
- Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. *Journal of Public Administration Research and Theory*, 22(1), 1–29. <https://doi.org/10.1093/jopart/mur011>
- Field, A. P. (2013). *Discovering statistics using SPSS: And sex and drugs and rock “n” roll* (4th ed.). SAGE Publications.
- Fiske, S. T. (2018). Stereotype content: Warmth and competence endure. *Current Directions in Psychological Science*, 27(2), 67–73. <https://doi.org/10.1177/0963721417738825>

Gaither, S. E., Apfelbaum, E. P., Birnbaum, H. J., Babbitt, L. G., & Sommers, S. R. (2018).

Mere membership in racially diverse groups reduces conformity. *Social Psychological and Personality Science*, 9(4), 402–410. <https://doi.org/10.1177/1948550617708013>

Goulet, M.-A., & Cousineau, D. (2019). The power of replicated measures to increase statistical power: *Advances in Methods and Practices in Psychological Science*, 2(3), 199–213.

<https://doi.org/10.1177/2515245919849434>

Government of Canada. (2016). *Pan-Canadian framework on clean growth and climate change:*

Canada's plan to address climate change and grow the economy (No. En4-294/2016E-PDF). Environment and Climate Change Canada.

<http://publications.gc.ca/site/eng/9.828774/publication.html>

Gray, B. (1985). Conditions facilitating interorganizational collaboration. *Human Relations*,

38(10), 911–936. <https://doi.org/10.1177/001872678503801001>

Gray, B. (2004). Strong opposition: Frame-based resistance to collaboration. *Journal of*

Community & Applied Social Psychology, 14(3), 166–176.

<https://doi.org/10.1002/casp.773>

Greitemeyer, T., & Schulz-Hardt, S. (2003). Preference-consistent evaluation of information in

the hidden profile paradigm: Beyond group-level explanations for the dominance of shared information in group decisions. *Journal of Personality and Social Psychology*, 84(2), 322–339. <https://doi.org/10.1037/0022-3514.84.2.322>

Grimmelikhuijsen, S., Jilke, S., Olsen, A. L., & Tummers, L. (2017). Behavioral public

administration: Combining insights from public administration and psychology. *Public Administration Review*, 77(1), 45–56. <https://doi.org/10.1111/puar.12609>

- Guetzkow, H. (1950). Unitizing and categorizing problems in coding qualitative data. *Journal of Clinical Psychology*, 6(1), 47–58. [https://doi.org/10.1002/1097-4679\(195001\)6:1<47::AID-JCLP2270060111>3.0.CO;2-I](https://doi.org/10.1002/1097-4679(195001)6:1<47::AID-JCLP2270060111>3.0.CO;2-I)
- Gwet, K. L. (2014). *Handbook of inter-rater reliability: The definitive guide to measuring the extent of agreement among raters* (4th ed.). Advanced Analytics, LLC.
- Hackman, J. R. (1987). The design of work teams. In *Handbook of organizational behavior* (pp. 315–342). Prentice-Hall.
- Harrison, D. A., & Klein, K. J. (2007). What’s the difference? Diversity constructs as separation, variety, or disparity in organizations. *Academy of Management Review*, 32(4), 1199–1228.
- Harrison, D. A., Price, K. H., & Bell, M. P. (1998). Beyond relational demography: Time and the effects of surface- and deep-level diversity on work group cohesion. *Academy of Management Journal*, 41(1), 96–107. <https://doi.org/10.2307/256901>
- Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as information processors. *Psychological Bulletin*, 121(1), 43–64.
- Hobman, E. V., & Bordia, P. (2006). The role of team identification in the dissimilarity-conflict relationship. *Group Processes & Intergroup Relations*, 9(4), 483–507. <https://doi.org/10.1177/1368430206067559>
- Homan, A. C. (2019). Dealing with diversity in workgroups: Preventing problems and promoting potential. *Social and Personality Psychology Compass*, 13(5), e12465. <https://doi.org/10.1111/spc3.12465>

- Hopkins, M., Couture, C., & Moore, E. (2001). *Moving from the heroic to the everyday: Lessons learned from leading horizontal projects*. Canadian Centre for Management Development.
- Hornsey, M. J., & Hogg, M. A. (2000). Assimilation and diversity: An integrative model of subgroup relations. *Personality and Social Psychology Review*, 4(2), 143–156.
https://doi.org/10.1207/S15327957PSPR0402_03
- Horwitz, S. K. (2015). Functional diversity in project teams. In F. Chiocchio, E. K. Kelloway, & B. Hobbs (Eds.), *The psychology and management of project teams: An interdisciplinary perspective* (pp. 329–362). Oxford University Press.
<http://www.oxfordscholarship.com/view/10.1093/acprof:oso/9780199861378.001.0001/acprof-9780199861378-chapter-13>
- Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research. *Journal of Applied Psychology*, 94(5), 1128–1145. <https://doi.org/10.1037/a0015978>
- Huo, Y. J., Molina, L. E., Sawahata, R., & Deang, J. M. (2005). Leadership and the management of conflicts in diverse groups: Why acknowledging versus neglecting subgroup identity matters. *European Journal of Social Psychology*, 35(2), 237–254.
<https://doi.org/10.1002/ejsp.243>
- Huxham, C., & Vangen, S. (2005). *Managing to collaborate: The theory and practice of collaborative advantage*. Routledge.
- Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in organizations: From input-process-output models to IMOI models. *Annual Review of Psychology*, 56(1), 517–543. <https://doi.org/10.1146/annurev.psych.56.091103.070250>

- Jehn, K. A. (1995). A multimethod examination of the benefits and detriments of intragroup conflict. *Administrative Science Quarterly*, 40(2), 256–282.
- Jehn, K. A. (1997). A qualitative analysis of conflict types and dimensions in organizational groups. *Administrative Science Quarterly*, 42(3), 530–557.
- Jehn, K. A., Greer, L., Levine, S., & Szulanski, G. (2008). The effects of conflict types, dimensions, and emergent states on group outcomes. *Group Decision and Negotiation*, 17(6), 465–495. <https://doi.org/10.1007/s10726-008-9107-0>
- Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly*, 44(4), 741–763.
- Jehn, K. A., Rispens, S., & Thatcher, S. M. B. (2010). The effects of conflict asymmetry on work group and individual outcomes. *Academy of Management Journal*, 53(3), 596–616. <https://doi.org/10.5465/AMJ.2010.51468978>
- Kahane, A. (2017). *Collaborating with the enemy: How to work with people you don't agree with or like or trust*. Berrett-Koehler Publishers.
- Kalkman, J. P., Kerstholt, J. H., & Roelofs, M. (2018). Crisis response team decision-making as a bureau-political process. *Journal of Contingencies and Crisis Management*, 26(4), 480–490. <https://doi.org/10.1111/1468-5973.12243>
- Kapucu, N., & Demiroz, F. (2017). Interorganizational networks in disaster management. In *Social network analysis of disaster response, recovery, and adaptation* (pp. 25–39). Elsevier Inc. <https://doi.org/10.1016/B978-0-12-805196-2.00003-0>

- Kapucu, N., & Garayev, V. (2011). Collaborative decision-making in emergency and disaster management. *International Journal of Public Administration*, 34(6), 366–375.
<https://doi.org/10.1080/01900692.2011.561477>
- Kapucu, N., Garayev, V., & Wang, X. (2013). Sustaining networks in emergency management. *Public Performance & Management Review*, 37(1), 104–133.
<https://doi.org/10.2753/PMR1530-9576370105>
- Kenis, P., & Provan, K. G. (2009). Towards an exogenous theory of public network performance. *Public Administration*, 87(3), 440–456. <https://doi.org/10.1111/j.1467-9299.2009.01775.x>
- Keyton, J., Ford, D. J., & Smith, F. I. (2008). A mesolevel communicative model of collaboration. *Communication Theory*, 18(3), 376–406. <https://doi.org/10.1111/j.1468-2885.2008.00327.x>
- Koslowsky, M., & Sagie, A. (1993). On the efficacy of credibility intervals as indicators of moderator effects in metanalytic research. *Journal of Organizational Behavior*, 14(7), 695–699.
- Lagacé, M., Van de Beeck, L., & Firzly, N. (2019). Building on Intergenerational Climate to Counter Ageism in the Workplace? A Cross-Organizational Study. *Journal of Intergenerational Relationships*, 17(2), 201–219.
<https://doi.org/10.1080/15350770.2018.1535346>
- Laschinger, H. K. S., Leiter, M., Day, A., & Gilin, D. (2009). Workplace empowerment, incivility, and burnout: Impact on staff nurse recruitment and retention outcomes. *Journal of Nursing Management*, 17(3), 302–311. <https://doi.org/10.1111/j.1365-2834.2009.00999.x>

- LeBreton, J. M., & Senter, J. L. (2008). Answers to 20 questions about interrater reliability and interrater agreement. *Organizational Research Methods, 11*(4), 815–852.
<https://doi.org/10.1177/1094428106296642>
- Lemyre, L., Boutette, P., Pinsent, C., Corneil, W., Johnson, C., Munoz, M., Lemieux, V., Lalande-Markon, M.-P., Gibson, S., Riding, J., Lemus, C., Blust-Volpato, S., & Dennie-Filion, E. (2009). *Research using in vivo simulation of meta-organizational shared decision making (SDM). Task 1: Synthesis of case studies to form a SDM framework* (DRDC CORA TR [W7714-083659/001/SV]). Defence Research and Development Canada.
- Lemyre, L., & Smith, P. M. (1985). Intergroup discrimination and self-esteem in the minimal group paradigm. *Journal of Personality and Social Psychology, 49*(3), 660–670.
- Lovelace, K., Shapiro, D. L., & Weingart, L. R. (2001). Maximizing cross-functional new product teams' innovativeness and constraint adherence: A conflict communications perspective. *Academy of Management Journal, 44*(4), 779–793.
<https://doi.org/10.2307/3069415>
- Loyd, D. L., Wang, C. S., Phillips, K. W., & Lount, R. B. (2013). Social category diversity promotes premeeting elaboration: The role of relationship focus. *Organization Science, 24*(3), 757–772. <https://doi.org/10.1287/orsc.1120.0761>
- Lu, L., Yuan, Y. C., & McLeod, P. L. (2012). Twenty-five years of hidden profiles in group decision making: A meta-Aanalysis. *Personality and Social Psychology Review, 16*(1), 54–75. <https://doi.org/10.1177/1088868311417243>

- Mandell, M. P., & Keast, R. (2008). Evaluating the effectiveness of interorganizational relations through networks. *Public Management Review*, 10(6), 715–731.
<https://doi.org/10.1080/14719030802423079>
- Mannix, E., & Neale, M. A. (2005). What differences make a difference?: The promise and reality of diverse teams in organizations. *Psychological Science in the Public Interest*, 6(2), 31–55. <https://doi.org/10.1111/j.1529-1006.2005.00022.x>
- Markon, M.-P., Chiochio, F., & Fleury, M.-J. (2017). Modelling the effect of perceived interdependence among mental healthcare professionals on their work role performance. *Journal of Interprofessional Care*, 31(4), 520–528.
<https://doi.org/10.1080/13561820.2017.1305951>
- Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *The Academy of Management Review*, 26(3), 356–376.
<https://doi.org/10.2307/259182>
- Mattessich, P. W., & Johnson, K. M. (2018). *Collaboration: What makes it work: A review of research literature on factors influencing successful collaboration* (3rd ed.). Fieldstone Alliance.
- Mayer, M., & Kenter, R. (2016). The prevailing elements of public sector collaboration. In K. Miller-Stevens & J. C. Morris (Eds.), *Advancing collaboration theory: Models, typologies, and evidence* (pp. 43–64). Routledge.
- Mendes, W. B., Blascovich, J., Hunter, S. B., Lickel, B., & Jost, J. T. (2007). Threatened by the unexpected: Physiological responses during social interactions with expectancy-violating partners. *Journal of Personality and Social Psychology*, 92(4), 698–716.
<https://doi.org/10.1037/0022-3514.92.4.698>

- Meyer, L. F. (2009). Cognition and norms: Toward a developmental theory linking trust, reciprocity, and willingness to cooperate. *Fourth Workshop in Political Theory and Policy Analysis*. <http://dlc.dlib.indiana.edu/dlc/handle/10535/2054>
- Meyer, W.-U., Niepel, M., Rudolph, U., & Schützwohl, A. (1991). An experimental analysis of surprise. *Cognition and Emotion*, 5(4), 295–311.
<https://doi.org/10.1080/02699939108411042>
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (Third edition.). SAGE Publications.
- Milliken, F. J., & Martins, L. L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review*, 21(2), 402–433.
- Mitchell, R., Boyle, B., O'Brien, R., Malik, A., Tian, K., Parker, V., Giles, M., Joyce, P., & Chiang, V. (2017). Balancing cognitive diversity and mutual understanding in multidisciplinary teams. *Health Care Management Review*, 42(1), 42–52.
<https://doi.org/10.1097/HMR.0000000000000088>
- Mitchell, R., Parker, V., & Giles, M. (2012). Open-mindedness in diverse team performance: Investigating a three-way interaction. *The International Journal of Human Resource Management*, 23(17), 3652–3672. <https://doi.org/10.1080/09585192.2012.654807>
- Muthén, B. (1984). A general structural equation model with dichotomous, ordered categorical, and continuous latent variable indicators. *Psychometrika*, 49(1), 115–132.
- Noordewier, M. K., Topolinski, S., & van Dijk, E. (2016). The temporal dynamics of surprise. *Social and Personality Psychology Compass*, 10(3), 136–149.
<https://doi.org/10.1111/spc3.12242>

- Nowell, B. (2010). Out of sync and unaware? Exploring the effects of problem frame alignment and discordance in community collaboratives. *Journal of Public Administration Research and Theory*, 20(1), 91–116. <https://doi.org/10.1093/jopart/mup006>
- Nowell, B., & Steelman, T. A. (2013). The role of responder networks in promoting community resilience: Toward a measurement framework of network capacity. In N. Kapucu, C. V. Hawkins, & F. I. Rivera (Eds.), *Disaster resiliency: Interdisciplinary perspectives* (pp. 232–257). Routledge.
- Nowell, B., Steelman, T. A., Velez, A.-L. K., & Godette, S. K. (2017). Perspective matters: The challenges of performance measurement in wildfire response networks. In E. C. Jones & A. J. Faas (Eds.), *Social network analysis of disaster response, recovery, and adaptation* (pp. 59–73). Butterworth-Heinemann. <https://doi.org/10.1016/B978-0-12-805196-2.00005-4>
- Ödlund, A. (2010). Pulling the same way? A multi-perspectivist study of crisis cooperation in government. *Journal of Contingencies and Crisis Management*, 18(2), 96–107. <https://doi.org/10.1111/j.1468-5973.2010.00605.x>
- OECD. (2018). *The innovation system of the public service of Canada* (Organisation for Economic Co-operation and Development). OECD. <https://doi.org/10.1787/9789264307735-en>
- Office of the Auditor General. (2005). *Chapter 4. Managing horizontal initiatives*. Minister of Public Works and Government Services Canada. <https://www.deslibris.ca/ID/203032>
- Okros, A., Verdun, J., & Chouinard, P. (2011). *The Meta-Organization: A Research and Conceptual Landscape* (DRDC CSS TR 2011-13; p. 74). Defence R&D Canada – Centre for Security Science.

- O'Neill, T. A., Allen, N. J., & Hastings, S. E. (2013). Examining the “pros” and “cons” of team conflict: A team-level meta-analysis of task, relationship, and process conflict. *Human Performance*, 26(3), 236–260.
- Oore, D. G., & Dolan, N. (2017). Workplace conflict resolution interventions. In C. L. Cooper & M. P. Leiter (Eds.), *The Routledge Companion to Wellbeing at Work* (1st ed., pp. 356–372). Routledge. <https://doi.org/10.4324/9781315665979-25>
- Oore, D. G., Gagnon, A., & Bourgeois, D. (2013). When White feels right: The effects of in-group affect and race of partner on negotiation performance. *Negotiation and Conflict Management Research*, 6(2), 94–113. <https://doi.org/10.1111/ncmr.12005>
- Oore, D. G., Leblanc, D., Day, A., Leiter, M. P., Laschinger, H. K. S., Price, S. L., & Latimer, M. (2010). When respect deteriorates: Incivility as a moderator of the stressor–strain relationship among hospital workers. *Journal of Nursing Management*, 18(8), 878–888. <https://doi.org/10.1111/j.1365-2834.2010.01139.x>
- Paquet, G. (2004). *Pathologies de gouvernance: Essais de technologie sociale*. Liber.
- Paquet, G. (2009). *Scheming virtuously: The road to collaborative governance*. Invenire Books.
- Paquet, G., & Wilson, C. (2011). Collaborative co-governance as inquiring systems. *Optimum Online*, 41(2), 1–12.
- Paquet, G., & Wilson, C. (2015). Collaboration in the absence of affectio societatis. *Optimum Online*, 45(1).
- Paquet, G., & Wilson, C. (2016). *Intelligent governance: A prototype for social coordination*. Invenire.

- Peeters, M. A. G., Rutte, C. G., van Tuijl, H. F. J. M., & Reymen, I. M. M. J. (2006). The Big Five personality traits and individual satisfaction with the team. *Small Group Research*, 37(2), 187–211. <https://doi.org/10.1177/1046496405285458>
- Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly*, 44(1), 1–28. <https://doi.org/10.2307/2667029>
- Phillips, K. W. (2003). The effects of categorically based expectations on minority influence: The importance of congruence. *Personality and Social Psychology Bulletin*, 29(1), 3–13. <https://doi.org/10.1177/0146167202238367>
- Phillips, K. W., & Apfelbaum, E. P. (2012). Delusions of homogeneity? Reinterpreting the effects of group diversity. In M. A. Neale & E. A. Mannix (Eds.), *Research on managing groups and teams* (Vol. 15, pp. 185–207). Emerald Group Publishing Limited. [https://doi.org/10.1108/S1534-0856\(2012\)0000015011](https://doi.org/10.1108/S1534-0856(2012)0000015011)
- Phillips, K. W., & Loyd, D. L. (2006). When surface and deep-level diversity collide: The effects on dissenting group members. *Organizational Behavior and Human Decision Processes*, 99(2), 143–160. <https://doi.org/10.1016/j.obhdp.2005.12.001>
- Piercy, N., Phillips, W., & Lewis, M. (2013). Change management in the public sector: The use of cross-functional teams. *Production Planning & Control*, 24(10–11), 976–987. <https://doi.org/10.1080/09537287.2012.666913>
- Pondy, L. R. (1967). Organizational conflict: Concepts and models. *Administrative Science Quarterly*, 12(2), 296–320. JSTOR. <https://doi.org/10.2307/2391553>
- Privy Council Office. (2019). *Public Service Renewal: Beyond2020*. Government of Canada. <https://www.canada.ca/en/privy-council/services/blueprint-2020/beyond-2020.html>

- Pruitt, D. G. (1983). Strategic choice in negotiation. *American Behavioral Scientist*, 27(2), 167–194. <https://doi.org/10.1177/000276428302700204>
- Public Safety Canada. (2008). *Canada's national disaster mitigation strategy*. Government of Canada. <https://www.publicsafety.gc.ca/cnt/rsrscs/pblctns/mtgtn-strtg/mtgtn-strtg-eng.pdf>
- Public Safety Canada. (2019). *Emergency management strategy for Canada: Toward a resilient 2030* (Government of Canada).
- Rink, F., & Ellemers, N. (2006). What can you expect? The influence of gender diversity in dyads on work goal expectancies and subsequent work commitment. *Group Processes & Intergroup Relations*, 9(4), 577–588. <https://doi.org/10.1177/1368430206067560>
- Rink, F., & Ellemers, N. (2007). The role of expectancies in accepting task-related diversity: Do disappointment and lack of commitment stem from actual differences or violated expectations? *Personality and Social Psychology Bulletin*, 33(6), 842–854. <https://doi.org/10.1177/0146167207301016>
- Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4(2), 155–169. <https://doi.org/10.1007/BF01405730>
- Rocan, C. (Ed.). (2018a). *Building bridges: Case studies in collaborative governance in Canada*. Invenire.
- Rocan, C. (2018b). Conclusion. In C. Rocan (Ed.), *Building bridges: Case studies in collaborative governance in Canada* (pp. 177–193). Invenire.
- Rocan, C. (2018c). Introduction. In C. Rocan (Ed.), *Building bridges: Case studies in collaborative governance in Canada* (pp. 1–21). Invenire.

- Rosenthal, U., 't Hart, P., & Kouzmin, A. (1991). The bureau-politics of crisis management. *Public Administration*, 69(2), 211–233. <https://doi.org/10.1111/j.1467-9299.1991.tb00791.x>
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(1), 1–36. <https://doi.org/10.18637/jss.v048.i02>
- Schraagen, J. M., & van de Ven, J. (2011). Human factors aspects of ICT for crisis management. *Cognition, Technology & Work*, 13(3), 175–187. <https://doi.org/10.1007/s10111-011-0175-6>
- Schruijer, S. G. L. (2008). *The Social Psychology of Inter-organizational Relations*.
- Schulz-Hardt, S., & Mojzisch, A. (2012). How to achieve synergy in group decision making: Lessons to be learned from the hidden profile paradigm. *European Review of Social Psychology*, 23(1), 305–343. <https://doi.org/10.1080/10463283.2012.744440>
- Simons, T. L., Pelled, L. H., & Smith, K. A. (1999). Making use of difference: Diversity, debate, and decision comprehensiveness in top management teams. *Academy of Management Journal*, 42(6), 662–673. <https://doi.org/10.2307/256987>
- Simons, T. L., & Peterson, R. S. (2000). Task conflict and relationship conflict in top management teams: The pivotal role of intragroup trust. *Journal of Applied Psychology*, 85(1), 102.
- Simpkins, L., Beaudry, M., & Lemyre, L. (2021). Can we better define stewardship for public sector executives? A research agenda. *Canadian Public Administration*, 64(1), 143–159. <https://doi.org/10.1111/capa.12403>
- Spector, P. E., & Bruk-Lee, V. (2008). Conflict, health, and well-being. In C. K. W. De Dreu & M. J. Gelfand (Eds.), *The psychology of conflict and conflict management in*

- organizations* (pp. 267–288). Lawrence Erlbaum Associates.
<https://doi.org/10.4324/9780203810125>
- Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology*, 89(6), 845–851.
<https://doi.org/10.1037/0022-3514.89.6.845>
- Srikanth, K., Harvey, S., & Peterson, R. S. (2016). A dynamic perspective on diverse teams: Moving from the dual-process model to a dynamic coordination-based model of diverse team performance. *Academy of Management Annals*, 10(1), 453–493.
- Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology*, 48(6), 1467.
- Steigenberger, N. (2016). Organizing for the Big One: A review of case studies and a research agenda for multi-agency disaster response. *Journal of Contingencies and Crisis Management*, 24(2), 60–72. <https://doi.org/10.1111/1468-5973.12106>
- Sun, S., & Yu, R. (2014). The feedback related negativity encodes both social rejection and explicit social expectancy violation. *Frontiers in Human Neuroscience*, 8.
<https://doi.org/10.3389/fnhum.2014.00556>
- Tajfel, H. (1974). Social identity and intergroup behaviour. *Social Science Information*, 13(2), 65–93. <https://doi.org/10.1177/053901847401300204>
- Thompson, L. L. (1991). Information exchange in negotiation. *Journal of Experimental Social Psychology*, 27(2), 161–179. [https://doi.org/10.1016/0022-1031\(91\)90020-7](https://doi.org/10.1016/0022-1031(91)90020-7)

- Tjosvold, D. (1986). Constructive Controversy: A Key Strategy for Groups. *Personnel*, 63, 39–44.
- Tjosvold, D., Wong, A. S. H., & Feng Chen, N. Y. (2014). Constructively managing conflicts in organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, 1(1), 545–568. <https://doi.org/10.1146/annurev-orgpsych-031413-091306>
- Todorova, G., Bear, J. B., & Weingart, L. R. (2014). Can conflict be energizing? A study of task conflict, positive emotions, and job satisfaction. *Journal of Applied Psychology*, 99(3), 451.
- Treasury Board of Canada Secretariat. (2005). *Review of the responsibilities and accountabilities of ministers and senior officials*. Government of Canada.
- Trist, E. (1977). A concept of organizational ecology. *Australian Journal of Management*, 2(2), 161–175. <https://doi.org/10.1177/031289627700200205>
- Turner, J. C. (1975). Social comparison and social identity: Some prospects for intergroup behaviour. *European Journal of Social Psychology*, 5(1), 1–34.
<https://doi.org/10.1002/ejsp.2420050102>
- Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Basil Blackwell.
- Turner, J. C., & Reynolds, K. J. (2012). Self-Categorization Theory. In P. Van Lange, A. Kruglanski, & E. Higgins (Eds.), *Handbook of Theories of Social Psychology: Volume 2*. SAGE Publications Ltd. <https://doi.org/10.4135/9781446249215>
- Turner, M. E., Pratkanis, A. R., & Struckman, C. K. (2011). Groupthink as social identity maintenance. In A. R. Pratkanis (Ed.), *The science of social influence: Advances and future progress* (1st ed.). Psychology Press. <https://doi.org/10.4324/9780203818565>

- Uitdewilligen, S., & Waller, M. J. (2018). Information sharing and decision-making in multidisciplinary crisis management teams. *Journal of Organizational Behavior*, 39(6), 731–748. <https://doi.org/10.1002/job.2301>
- Ungureanu, P., Bertolotti, F., Mattarelli, E., & Bellesia, F. (2020). Collaboration and identity formation in strategic interorganizational partnerships: An exploration of swift identity processes. *Strategic Organization*, 18(1), 171–211. <https://doi.org/10.1177/1476127019840148>
- United Nations. (2015). *Sendai framework for disaster risk reduction 2015-2030*. United Nations Office for Disaster Risk Reduction (UNISDR).
- United Nations Office for Disaster Risk Reduction. (2020a). *Disaster*. Terminology. <https://www.undrr.org/terminology/disaster>
- United Nations Office for Disaster Risk Reduction. (2020b). *Terminology*. <https://www.undrr.org/terminology>
- Van Der Vegt, G. S., Emans, B. J. M., & Van De Vliert, E. (2001). Patterns of interdependence in work teams: A two-level investigation of the relations with job and team satisfaction. *Personnel Psychology*, 54(1), 51–69. <https://doi.org/10.1111/j.1744-6570.2001.tb00085.x>
- van Knippenberg, D., De Dreu, C. K. W., & Homan, A. C. (2004). Work group diversity and group performance: An integrative model and research agenda. *Journal of Applied Psychology*, 89(6), 1008–1022. <https://doi.org/10.1037/0021-9010.89.6.1008>
- van Knippenberg, D., & Schippers, M. C. (2007). Work group diversity. *Annual Review of Psychology*, 58(1), 515–541. <https://doi.org/10.1146/annurev.psych.58.110405.085546>

- van Knippenberg, D., van Knippenberg, B., Monden, L., & de Lima, F. (2002). Organizational identification after a merger: A social identity perspective. *British Journal of Social Psychology*, 41(2), 233. <https://doi.org/10.1348/014466602760060228>
- van Knippenberg, D. van, & Ginkel, W. P. van. (2010). The categorization-elaboration model of work group diversity: Wielding the double-edged sword. In R. J. Crisp (Ed.), *The psychology of social and cultural diversity* (pp. 255–280). Blackwell Publishing Limited. <https://doi.org/10.1002/9781444325447.ch11>
- van Meerkerk, I., & Edelenbos, J. (2018). *Boundary spanners in public management and governance: An interdisciplinary assessment*. Edward Elgar Publishing. <https://doi.org/10.4337/9781786434173>
- Vangen, S., & Huxham, C. (2003). Nurturing collaborative relations: Building trust in interorganizational collaboration. *The Journal of Applied Behavioral Science*, 39(1), 5–31. <https://doi.org/10.1177/0021886303039001001>
- Wageman, R., Gardner, H., & Mortensen, M. (2012). The changing ecology of teams: New directions for teams research. *Journal of Organizational Behavior*, 33(3), 301–315. <https://doi.org/10.1002/job.1775>
- Wageman, R., Hackman, J. R., & Lehman, E. (2005). Team diagnostic survey: Development of an instrument. *The Journal of Applied Behavioral Science*, 41(4), 373–398. <https://doi.org/10.1177/0021886305281984>
- Wageman, R., & Lowe, K. (2019). Designing, launching, and coaching teams. In D. Clutterbuck, J. Gannon, S. Hayes, L. Iordanou, K. Lowe, & D. Mackie (Eds.), *The Practitioner's Handbook of Team Coaching* (1st ed., pp. 121–137). Routledge. <https://doi.org/10.4324/9781351130554-9>

- Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology*, 82(2), 247–252.
<https://doi.org/10.1037/0021-9010.82.2.247>.
- Weber, E. P., & Khademian, A. M. (2008). Wicked problems, knowledge challenges, and collaborative capacity builders in network settings. *Public Administration Review*, 68(2), 334–349. <https://doi.org/10.1111/j.1540-6210.2007.00866.x>
- Weichselgartner, J., & Pigeon, P. (2015). The role of knowledge in disaster risk reduction. *International Journal of Disaster Risk Science*, 6(2), 107–116.
<https://doi.org/10.1007/s13753-015-0052-7>
- Weingart, L. R., Bear, J., & Todorova, G. (2009). *Excited to disagree? A study of conflict and emotions* (SSRN Scholarly Paper ID 1488626). Social Science Research Network.
<https://doi.org/10.2139/ssrn.1488626>
- Weingart, L. R., Behfar, K. J., Bendersky, C., Todorova, G., & Jehn, K. A. (2015). The directness and oppositional intensity of conflict expression. *Academy of Management Review*, 40(2), 235–262. <https://doi.org/10.5465/amr.2013.0124>
- Weiss, H. M., & Cropanzano, R. (1996). Affective events theory: A theoretical discussion of the structure, causes and consequences of affective experiences at work. In B. M. Staw & L. L. Cummings (Eds.), *Research in organizational behavior: An annual series of analytical essays and critical reviews* (Vol. 18, pp. 1–74). Elsevier Science/JAI Press.
- Wilcox, R. R. (2017). *Introduction to robust estimation and hypothesis testing* (4th edition). Elsevier.
- Williams, K. Y., & O'Reilly, C. A. (1998). Demography and diversity in organizations: A review of 40 years of research. *Research in Organizational Behavior*, 20, 79–140.

- Williams, P. (2012). *Collaboration in public policy and practice: Perspectives on boundary spanners*. Policy Press.
- Wilson, C. (2011). On collaboration. *Optimum Online*, 41(1), 15–31.
- Wittenbaum, G. M., & Stasser, G. (1996). Management of information in small groups. In J. Nye & A. Brower, *What's social about social cognition? Research on socially shared cognition in small groups* (pp. 3–28). SAGE Publications, Inc.
<https://doi.org/10.4135/9781483327648.n1>
- Wood, D. J., & Gray, B. (1991). Toward a comprehensive theory of collaboration. *The Journal of Applied Behavioral Science*, 27(2), 139–162.
<https://doi.org/10.1177/0021886391272001>
- Xiao, Y., Zhang, H., & Basadur, T. M. (2016). Does information sharing always improve team decision making? An examination of the hidden profile condition in new product development. *Journal of Business Research*, 69(2), 587–595.
<https://doi.org/10.1016/j.jbusres.2015.05.014>
- Yuen, K. K. (1974). The two-sample trimmed t for unequal population variances. *Biometrika*, 61(1), 165–170. <https://doi.org/10.2307/2334299>

Appendix A

Interview Guide (Study 1, Qualitative Study)

Part 1: Current position

1. Current position
2. Time in organization
3. Experience in federal government
4. Experience in DRR-related work
5. Training and education

Part 2: Objectives of disaster risk reduction

1. What does the term “disaster risk reduction” mean to you?
2. According to you, what is the federal government’s role in disaster risk reduction? (esp. at planning stage)
3. Where do you see your organization fitting within this broader mandate? (esp. at planning stage)

Part 3: Interorganizational collaboration needs

1. If the federal government is to play its full role in disaster risk reduction, what are the collaborations that are needed between federal organizations?
2. If we look more precisely at three federal portfolios [name of departments] and more specifically at risks associated with natural hazards (such as floods or extreme heat for example).
 - a. From your perspective, what is the current state of collaboration between these organizations? (What forms of collaborations are happening?)
 - b. What forms of collaboration are needed between these organizations to ensure the success of DRR efforts in Canada?
 - c. Are there any gaps, untapped opportunities, or potential synergies that you see?

Part 4: Facilitators and barriers to collaboration

1. If you think of an experience of collaboration that went well between you and somebody from another department, what facilitated collaboration and communication in that context?
2. More generally, what are the main facilitators to collaboration in the federal government according to you?
3. Looking at the other side of the medal, can you think of an experience that did not go so well? What were the main challenges?
4. According to you, what would be currently the most significant challenges for interorganizational communication and collaboration between federal organizations?

Part 5: Follow-up questions

5. According to your perspective, what would you say are the main challenges for federal disaster risk reduction efforts currently?
6. What is needed to develop integrative solutions for complex policy problems such as disaster risk reduction?
7. Do you see any training needs that could be addressed to foster better collaboration?

Appendix B

Consent Form (Study 1, Qualitative Study)

Consent form

Dear Sir or Madam,

You are invited by Dr. Louise Lemyre from the University of Ottawa to participate in an interview on Risk Management and Governance.

The goal is to conduct a series of interviews to better understand key actors' and decision-makers' perception of disasters and extreme weather events, the strategies employed to prevent and to solve the problems faced during complex crises, and their experience working with representatives from other organizations to prevent and solve public emergencies. This part of the project is funded by the Social Sciences and Humanities Research Council of Canada.

Your opinion is important to us. Participation in the study will consist of an individual interview to answer questions directed by a trained interviewer. A voice recorder will be used to audiotape the session. The interview will last approximately 1 hour. Questions of the following type will be asked in relation to your perception of extreme weather events, disasters, public emergencies, and interorganizational collaboration in this context: *"From your perspective, what factors can facilitate communication and collaboration between professionals from different governmental organizations?"* Your answers can be general and you do not have to reveal any information that you do not want to. There are no right or wrong answers. We only want to know your experience.

Benefits: This study will help to better understand the important factors influencing disaster risk reduction and interorganizational collaboration in Canadian communities. It will also serve to develop and evaluate best-practice guidelines to assist in managing psychosocial considerations relative to risk management.

Your participation is confidential. Do not use your full real name (nor others') during the interview. Confidentiality and anonymity will be maintained by the research team. Participation in the study might not be completely anonymous: if participants choose to have the interview conducted at their workplace, their employer might know that he or she is participating. Beyond this, the research team will protect the anonymity of participants by ensuring that participants' names are not provided to any group outside of the research team directly involved with this study. The analysis of the results will look at common themes and ideas. While interview results of the study will be published and discussed within the research team and at research conferences, **no identifiable individual response** will be shared. All of the data will be treated and maintained by the researchers in accordance with research confidentiality standards.

Conservation of Data: All of the discussion will be transcribed and entered in a computer file for analysis of content. Your identity will not appear on any of the written transcriptions. The audio recordings and

interview transcripts will be stored for a maximum of 10 years after completion of the research in a secure server in a locked office to which only the researchers have access at the University of Ottawa GAP-Santé research laboratory. They will be destroyed at the end of the project.

Participation is completely voluntary. You are free to withdraw at any time, refuse to participate, or refuse to answer certain questions. If you choose to withdraw, your data will be deleted and will not be used. There is no direct individual benefit from answering the questions. There is no expected harm or risk except the possible negative feelings sometime associated with self-reflecting on extreme weather events and public emergencies. However, in the unlikely event of distress or discomfort you may wish to contact the Confidential Help Line within your locality or the federal public service's Employee Assistance Program (EAP).

If you have any questions or require more information about the study itself, you may contact Dr. Louise Lemyre at louise.lemyre@uottawa.ca or 613-562-5800 x 1196.

If you have any questions with regards to the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, tel.: (613) 562-5387 or ethics@uottawa.ca.

There are two copies of this form, one for you, one for the research team. You can also provide verbal confirmation of your consent at the beginning of the audio recorded interview.

I agree to participate in this study about Risk Management and Governance: Understanding Problem Solving and Decision Making conducted by Dr. Louise Lemyre.

PARTICIPANT: _____ DATE: _____

Witness: _____ Date: _____

Appendix C

Detailed Coding Grid (Study 1, Qualitative Study)

Level or category	Definition and subcategories
A. Institutional factors	Factors that pertain to the broader national, political, institutional, and problem context. Organizational members cannot really influence these factors.
A1. Geography	Characteristics of Canada as a country, including geography, population, or society that influence collaboration.
A2. DRR problem space	Factors that pertain to the context of disaster risk reduction and climate change adaptation, especially in Canada. Includes: a) How disasters and stages of the disaster cycle (mitigation, preparedness, response, recovery) influence collaboration; b) The complexity, uncertainty, and rarity of some disasters; c) The political and historical issues associated with climate change in Canada; d) The perceived risk and importance of DRR issues.
A3. Jurisdiction	Characteristics of the federal, provincial/territorial, and municipal governance system in Canada and inter-jurisdictional relations. Includes: a) The FPTM governance system, the constitutional balances of power, and the history or political context of inter-jurisdictional relationships; b) The authority structures between the federal government and other jurisdictions, including through funding/money (e.g., presence or absence of federal power over organizations from other jurisdictions); c) The federal vs. provincial/territorial mandates in DRR and how this influences collaboration and integrated policies in DRR.
A4. Bureaucratic structure	General characteristics of the Canadian federal bureaucracy. Includes: a) Public sector context (vs. private sector or not-for-profit sector) b) General characteristics of the federal bureaucracy, hierarchical structures, or the federal public service; c) National Capital Region vs. other regions; d) The role of elected officials; e) The authority structures between departments (including through funding/money); f) Mandates (ministerial, organizational, program); g) Federal funding (budgets, funding approval processes, rules around funding); h) Incentive structures; i) Overarching frameworks: government-wide or international; j) Federal strategies that could be implemented to facilitate horizontal collaboration and overall coherence k) Institutional/structural barriers or facilitators to accessing the required expertise (e.g., difficulty outsourcing expertise outside federal government, federal directory of competencies).

B. Inter-organizational factors	Factors that are observed primarily at the inter-organizational level. These can be psychosocial factors at the interpersonal level, managerial factors, or structural factors.
B1. Formalized supports (or lack of)	Formal elements and structures that are put in place by organizations and decision-makers to support interorganizational collaboration. Includes: a) Network coordination, or how a coordinating organization and its representatives facilitate (or should facilitate) collaboration between a set of stakeholders; b) Interorganizational governance by top executives (e.g., governance structures and processes, such as initiating, negotiating, and organizing collaboration); c) Formal structures and opportunities that enable interactions between organizations and their representatives, such as discrete events, established interorganizational groups, interorganizational teams, projects, co-located personnel, and dedicated interface personnel (such as WPMs or regional representatives); d) Information/data sharing systems and formal mechanisms between organizations; challenges (antecedents) of establishing information/data sharing mechanisms (e.g., rules, privacy, system incompatibility) that do not fit in other categories.
B2. Rich communications (or lack of)	Interactions and behaviours that enable or consist of communication or information sharing. Interactions that enable mutual exchange, combination, and adjustment of knowledge and perspectives. Includes: a) Face-to-face interactions; b) Two-way conversations or exchanges (including joint planning activities, important topics to discuss, conversations, discussions, dialogue); c) Frequent (or infrequent) opportunities for interaction between stakeholder organizations (could be same or different organizational representatives); d) Interpersonal communication through other modalities (virtual, telephone, email);
B3. Interorganizational networks (or lack of)	The characteristics of the network of relationships between organizations or their representatives. Characteristics of relationships include density, quality, reputation (perceptions), and leverage capacity (influence). Relationships can be interpersonal/informal or structural/interorganizational. Includes: a) Density: existence and number of relationships (e.g., connections, linkages, communication channels, partnerships) between organizations or their members; b) Affect-based trust: trust or mistrust that exists between people or organizations (i.e., benevolence/cooperativeness) c) Belief that contributions will be useful: when an organization is seen as a competent, credible, valued partner, or when a partner's past or future contributions are believed to be beneficial to target; d) Leverage: leadership and influence through relationships (vs. influence through authority/power or transactions/money); e) Tensions: presence of relational tensions such as frictions, clashes, animosity, or dominance tensions between stakeholders.
B4. Integration as asset, process, and outcome (or lack of)	The existence, importance or process of arriving at integrated (common, coherent, combined) perspectives or actions – especially in a situation where there were initial differences. Includes: a) Having or developing common understanding or shared clarity on the parameters of a collaboration (i.e., goals, roles, language); b) Having or developing agreements, solutions that fulfill different stakeholder needs; c) Combining expertise and resources to create something new, joint knowledge creation; d) Having or arriving at coherent/coordinated actions (including integrated policies).

B5. Quality and Continuity of Membership Assets	The composition of the group (or dyad), either at the interpersonal level (organizational representatives) or the interorganizational level (organizations themselves). Includes: a) Characteristics of group composition that are stated as important/unimportant when choosing/delegating stakeholders (e.g., group size; member expertise, experience, legitimacy, power/required hierarchical level); b) Turnover (or continuity) of personnel and organizational representatives at any hierarchical level; c) Strategies to make a collaboration resilient to (inevitable) turnover.
B6. Stakeholder differences and similarities	Any mention of similarities or differences (i.e., homogeneity/heterogeneity) between organizations or between the individuals that represent them. Includes differences/similarities in: a) Mandates, priorities, needs, stakes, goals, time horizons; b) Knowledge, expertise, language; c) Perspectives, understanding, opinions, perceptions; d) Organizational/team identities; e) Organizational rules/procedures or expectations about processes/procedures/behaviours; f) Organizational size, resources; g) Sectors, jurisdictions; h) Values, cultures.
C. Intra-organizational factors	Factors that are observed at the intra-organizational levels. These can be psychosocial factors at the interpersonal level, managerial factors, or structural factors.
C1. Top-down directives and supports	Factors that relate to the intra-organizational prioritizing, approvals, and supports given to collaboration. Intra-organizational top-down authority structures often play a determining role in these processes. Includes: a) Support from the top, or the hierarchical role of leaders in influencing collaboration through authority structures (including “championing”); b) Organizational priorities and time horizon; c) Resources for collaboration: Investing resources needed for collaboration (material resources, time, human resources, technology); d) Human resource strategies to acquire and promote the skillsets needed for collaboration; e) The dependency of lower levels on the approval of higher levels to be able to collaborate.
C2. Intraorganizational collaboration	Relationships, collaboration processes (such as helping, information-sharing, or coordination), and coherence within an organization. This is either horizontally between colleagues/units, vertically between the different hierarchical levels, or across time. When discussing cross-sectoral or FPTM relations, this category can include mentions of the role of horizontal collaboration between federal departments. Includes: a) Horizontal collaboration, coordination, and relationships between colleagues or units of an organization; b) Intraorganizational coherence (between units/people, across time); c) Relationships or collaboration between hierarchical levels, such as the presence/absence of supportive and trusting relations or vertical information flows; d) Frictions, tensions, or breakage points between levels; e) Discussions of the role of lower levels in collaboration (e.g., professionals, working level, people on the ground); f) Discussions of how hierarchical level influences or is associated with different attitudes or behaviours.

C3. Organizational learning and service orientation	Processes and strategies whereby organizations and their members acquire/maintain/lose collaboration-relevant knowledge, improve organizational collaboration capacity, or value/improve the quality of organizational outputs for partners. Includes: a) Learning regarding other organizations, the environment, how collaborate, and good practices in general. Learning processes can be individual or organizational, unilateral or mutual between organizations/their representatives; b) Organizational memory (maintaining or generalizing learning across organizational members); c) Organizational client-centeredness (putting in place strategies to improve products based on client needs, actively sharing information that is important for partners) d) Focus on ongoing improvement e) Strategies to develop subject matter expertise needed for collaboration f) Strategies to develop the collaborative expertise needed for collaboration.
C4. Work well-being (or lack of)	Physical and mental well-being of employees in their work and their satisfaction with their job.
D. Person factors	Psychosocial factors that can be observed at the individual level, even though they can also be shared by a group or an organization.
D1. Collaborative attitudes (or lack of)	[Attitudes] Stances and attitudes (e.g., beliefs, motivations, mindsets, mentality, cultures) towards the value and autonomy of stakeholders and towards collaboration with them. This includes both positive and negative stances. It includes stances of any strength or affective intensity, such as strongly believing in respecting the diversity of contributions (strong positive stance) or simply not being interested (low-intensity negative stance). Includes: a) Willingness and openness, or stance towards collaboration itself and related processes (either positive or negative stance). For example: being willing/unwilling, interested/uninterested, or open/closed to share power, cooperate, share information, communicate, consult, learn about others or an issue. b) Respect/recognition of partners (e.g., respecting people, autonomy, jurisdiction, perspectives, expertise, and contributions) vs. not respecting autonomy, jurisdictions, people, ideas, competence (e.g., taking a saviour attitude).
D2. System understanding (or lack of)	[Knowledge, perspective] People's understanding (definition, awareness, knowledge) of other partners, stakeholder networks, issues, and interdependencies. This understanding could be attributed to people at any level (executives, managers, professionals). Includes: a) Systemic view of problems and of self-interest. How people/groups/organizations understand a problem, its complexity, or interdependencies; Whether a perspective/approach is systemic or focused on the public good vs. restricted, siloed, or "stove-pipe". How people define or understand their own self-interest or dependencies on others; b) Awareness and understanding partners and networks. Awareness/understanding (or lack of it) regarding relevant stakeholders: their existence, relationships, expertise, resources, language, needs, perspective (one-way or mutual);

D3. 'Good partnering' skills (or lack of)	[Behaviours, skills] Interpersonal behaviours, skills, competencies that support different aspects of collaboration and work in a network context. Includes behaviours/skills related to: a) Partnership- and trust-building (mentions of partnership/trust-building skills or behaviours or definitions of what these skills consist of); b) Communication, such as adapting messages to stakeholders, communicating uncertainty, explaining reasons behind positions, listening and openness; c) Integration, such as favouring the progressive integration of perspectives and interests between stakeholders through negotiation, conflict management, reframing, finding compromise; d) Leading networks or operating within them, such as leadership skills, the ability to work on an equal plane with others and function outside of hierarchical relationships, the ability to convince and influence, and skills at facilitating meetings; e) Mentions that people lack the competencies required for collaboration or working in networks (e.g., "not hired to do that", skills needed are different than what is required/rewarded in traditional bureaucrats). f) Information sharing behaviour on the part of individuals (e.g., sharing important, relevant information in a timely manner); g) Strategic thinking skills.
D4. Entrepreneurial engagement (or lack of)	[Motivation, engagement] Motivational/affective states, attitudes, and behaviours that reflect commitment (motivation, investment) towards quality and future impact. The focus of commitment can be the substantive work (improving issues, ensuring the quality of outputs) and/or partners (the relationships built with them, the services provided to them). Includes: a) Showing drive, motivation (e.g., initiative, effort, passion, action-oriented attitude), b) Showing openness to changes vs. risk or change aversion; c) Being innovative (e.g., finding creative ways to make things happen or to make things more efficient) vs. following procedures as they are / adhering rigidly to status quo; d) Anticipation: thinking strategically, anticipating future scenarios; e) Having "a vision" of what is possible f) Proactive engagement towards partners (e.g., proactivity reaching out/engaging with, taking the time, investing energy in understanding needs, building or maintaining relationships); g) Focusing on or anticipating partners' needs (e.g., client focus; thinking in terms of consequences); h) Demonstrating interest or inclusion towards partners
D5. Personality	Personality characteristics that influence collaboration. Includes: a) Personality traits (e.g., extraversion, 'people type'); b) Moral traits (e.g., honesty, benevolence); c) General descriptions that relationships or collaborations depends on personalities or on how well they match or not.

Appendix D

Consent Form (Study 2, Expert Simulation)

Information Sheet and Consent form

You have been invited to participate in a study entitled **Risk Management and Governance: Understanding Problem Solving and Decision Making: “*Problem-solving and Organizational Decision-making (PODS) Project*” (the “Project”)**. This document provides information on the study including the overall purpose of the study, what is involved in participating, possible risks and benefits, how confidentiality and anonymity will be protected by the researchers, how data will be conserved, and the voluntary nature of the study. As you read through this information sheet, please note any questions that you have or anything that you would like to have clarified by the researcher before you sign your acceptance to participate in the study.

Title of the study: Risk Management and Governance: Understanding Problem Solving and Decision Making: *Problem-solving and Organizational Decision-making (PODS) Project*

Principal Investigator: Louise Lemyre
Professor, School of Psychology
Faculty of Social Sciences
University of Ottawa
Tel: 613-562-5800 (ext 1196)
llemyre@uottawa.ca

Funders: This study is funded by the Social Sciences and Humanities Research Council, with additional funding from Defense Research Development Canada.

Purpose of the Study: I understand that the purpose of the study is to better understand how people in decision making roles perceive risks, assess problems and manage threats during emergencies. This study involves having people from different organizations participate in a session that is similar to a table-top exercise that focuses on a specific emergency scenario.

Participation: My participation in the study will consist of one session of approximately four hours, located at the downtown campus of the University of Ottawa. During the session I will be asked to participate in an exercise that resembles a table-top exercise often used for emergency planning. I and the other participants assigned to my group for the session will be presented with a scenario and asked to complete problem-solving tasks related to the scenario. I will be asked to interact with other session participants as I work through the tasks. As well, I will be asked to complete questionnaires that ask about my perceptions and opinions of the tasks, performance and interactions. The session will be video and audio recorded for data collection purposes, and later transcribed in an electronic file.

Risks: I understand that this research is devoid of physical and psychological risks other than the possible mild negative feelings that could be associated with working with a scenario that focuses on an emergency situation. The research team has selected the materials and developed the scenario in a manner that attempts to minimize this risk by not including graphic descriptions or negative images.

Benefits: My participation in this study will help improve understanding and provide useful information for the emergency planning and response community on how to potentially improve decision-making and management of emergency events.

Confidentiality and Anonymity: I have received assurance from the researcher that the information I will share will remain strictly confidential. I understand that the contents will be used only for research purposes and that my confidentiality will be protected: only grouped data will be reported. My participation in the study will not be completely anonymous, as the fellow session participants will know that I am participating. Beyond this, the research team will protect my anonymity by ensuring that my name is not provided to any group outside of the research team directly involved with this study.

Conservation of Data: The questionnaires, audio and video tapes and the transcriptions will be kept in a secure manner in a laboratory at the University of Ottawa to which only the researchers have access for a period of ten years.

Voluntary Participation: I am under no obligation to participate and if I choose to participate, I may withdraw from the study at any time. I may also refuse to answer any questions, without suffering any negative consequences. If I choose to withdraw, all data gathered until the time of withdrawal will be destroyed and will not be used.

Acceptance: Participation is completely voluntary. You are free to withdraw at any time, refuse to participate, or refuse to answer certain questions. There is no direct individual benefit from answering the questions. There is no expected harm or risk except the possible negative feelings sometime associated with self-reflecting on public emergencies. However, in the unlikely event of distress or discomfort you may wish to contact the Confidential Help Line within your locality. You may also contact Dr Louise Lemyre at the University of Ottawa at 613-562-5800, extension 1196, or the University of Ottawa Research Ethics Board Officer at 613-562-5387, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 159, Ottawa, ON (ethics@uottawa.ca).

I agree to participate in this study **Risk Management and Governance: Understanding Problem Solving and Decision Making: “*Problem-solving and Organizational Decision-making (PODS) Project*”** conducted by Dr Louise Lemyre.

PARTICIPANT: _____ DATE: _____

Appendix E

Rating Scale for Panel-Rated Decision Quality (Study 2, Expert Simulation)

Judges' response were recorded on an Likert-type scale going from 0 (strongly disagree) to 4 (strongly agree).

1. The decision/recommended action addresses the most significant priorities/issues.
2. The decision/recommended action presents a novel approach to addressing the issue.
3. The decision/recommended action is implementable given the context.
4. The decision/recommended action would be effective in mitigating real and/or perceived risk.
5. The decision/recommended action anticipates indirect consequences.

Appendix F

Consent Form (Study 3, Experiment)

ISPR Sample



Consent form: Feeling the Heat? A Study on Decision Making and Climate Change Risks

Invitation to Participate: You are invited to participate in a study on risk perception and decision making relative to climate change. The study is being conducted by Dr. Louise Lemyre, full professor at the School of Psychology, University of Ottawa with Myriam Beaudry, PhD candidate in psychology, University of Ottawa. It is part of a research project titled Risk Perception & Risk Communication: Trends and Key Factors.

Participation: Your participation will consist of completing an online task of about 25 minutes. You will be asked to participate in an online group decision-making scenario. This includes reading vignettes on a case study, expressing your opinion, and communicating online within the context of the scenario. There is no right or wrong answer. We only want your opinion.

Purpose of the Study: The aim of the study is to understand how people perceive information related to risk and community resilience and make decisions about this information.

Benefits: This study will help improve our understanding of risk evaluation and decision making processes. This information will be useful for developing risk protection strategies. There will be no direct benefits to you personally, except for the 0.5 point that you will be able to earn based on the ISPR policy.

Risks: Answering the questionnaire does not involve any risk to you other than the possible slight eye fatigue caused by watching a computer screen.

Confidentiality and Anonymity: Your answers will remain strictly anonymous and confidential. They will be used solely for the purposes of this research. The survey uses the software Qualtrics and your anonymous data will be saved in a database on a server in Canada. The only people who will have access to the individual research data are the researchers involved in this study. Doctoral students will use some results in their theses. Results will be published based on group responses. Anonymity is guaranteed. You are not being asked to provide your name and your IP address will not be saved.

Conservation of data: The data will be kept for 10 years in an anonymous encrypted secure way on a protected server at the University of Ottawa. Because the data are collected anonymously, your data cannot be withdrawn once the study is completed.

Voluntary Participation: You are under no obligation to participate and you may refuse to answer questions that you do not want to answer at any time. Completion of the online questionnaire by you implies consent.

If you have any questions or require more information about the study itself, you may contact Dr. Louise Lemyre at louise.lemyre@uottawa.ca or 613-562-5800 x 1196.

If you have any questions with regards to the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, tel.: (613) 562-5387 or ethics@uottawa.ca.

Thank you in advance for your participation!

You can print a copy of this page for your records.

**If you agree with these conditions and you agree to participate,
please press on the arrow below.**

Campus-Wide Sample



Consent form:

Feeling the Heat? A Study on Decision Making and Climate Change Risks

Invitation to Participate: You are invited to participate in a study on risk perception and decision making relative to climate change. The study is being conducted by Dr. Louise Lemyre, full professor at the School of Psychology, University of Ottawa with Myriam Beaudry, PhD candidate in psychology, University of Ottawa. It is part of a research project titled Risk Perception & Risk Communication: Trends and Key Factors.

Participation: Your participation will consist of completing an online task of about 25 minutes. You will be asked to participate in an online group decision-making scenario. This includes reading vignettes on a case study, expressing your opinion, and communicating online within the context of the scenario (in writing only). There is no right or wrong answer. We only want your opinion.

Purpose of the Study: The aim of the study is to understand how people perceive information related to risk and community resilience and make decisions about this information.

Benefits: This study will help improve our understanding of risk evaluation and decision making processes. This information will be useful for developing risk protection strategies. There will be no direct benefits to you personally.

Risks: Answering the questionnaire does not involve any risk to you other than the possible slight eye fatigue caused by watching a computer screen.

Confidentiality and Anonymity: Your answers will remain strictly anonymous and confidential. They will be used solely for the purposes of this research. The survey uses the software Qualtrics and your anonymous data will be saved in a database on a server in Canada. The only people who will have access to the individual research data are the researchers involved in this study. Doctoral students will use some results in their theses. Results will be published based on group responses. Anonymity is guaranteed. You are not being asked to provide your name and your IP address will not be saved.

Conservation of data: The data will be kept for 10 years in an anonymous encrypted secure way on a protected server at the University of Ottawa. Because the data are collected anonymously, your data cannot be withdrawn once the study is completed.

Voluntary Participation: You are under no obligation to participate and you may refuse to answer questions that you do not want to answer at any time. Completion of the online questionnaire by you implies consent.

If you have any questions or require more information about the study itself, you may contact Dr. Louise Lemyre at louise.lemyre@uottawa.ca or 613-562-5800 x 1196.

If you have any questions with regards to the ethical conduct of this study, you may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5, tel.: (613) 562-5387 or ethics@uottawa.ca.

Thank you in advance for your participation!

You can print a copy of this page for your records.

**If you agree with these conditions and you agree to participate,
please press on the arrow below.**

Appendix G

Final Measures (Study 3, Experiment)

Professional Identification

To what extent do you agree with the following statements? [0-Not at all, 8-Extremely]

1. I identify strongly with this area of expertise.
2. When someone criticizes this area of expertise, it feels like a personal insult.
3. I feel strong ties with this area of expertise.

Adapted from: van Knippenberg et al., 2002

Emotions

Please indicate how you are feeling right now. [0-Not at all, 8-Extremely]

Right now, I feel:

1. Angry.
2. Annoyed.
3. Disappointed
4. Frustrated.
5. Surprised
6. Tense.

Adapted from: Phillips, 2003; Rink & Ellemers, 2007; Todorova et al., 2014.

Task Conflict

How much you agree with the following statements? [0-Not at all, 8-Extremely]

1. Within our team, we disagree about the decision to take.
2. We have different viewpoints on which district should be prioritized.
3. The people within my team have differences of opinion.

Adapted from: Lemyre et al., 2010; de Wit et al., 2013

Relationship Conflict

Please indicate how much you agree with the following statements. [0-Not at all, 8-Extremely]

1. The exchange of our positions got a bit personal.
2. We get along well.
3. There are interpersonal incompatibilities in this team.

Adapted from: de Wit et al., 2013

Satisfaction with team

Please indicate how much you agree with the following statements: [0-Not at all, 8-Extremely]

1. Working with this team was productive.
2. I am satisfied with the composition of this group.
3. I would like to work with this group in the future.
4. Working with this team has been an enjoyable experience.
5. I am very satisfied with working in this team.

Adapted from: DeChurch & Marks, 2001; Peeters et al., 2006; Van Der Vegt et al., 2001.

Perceived professional similarity

1. The other team members were similar to me in terms of professional expertise.
2. The other team members had expertise in the same area than me.
3. My team was a professionally homogeneous group.

Item 1 is adapted from Gaither et al., 2018

Perceived professional difference:

4. The other team members had different types of training than me.
5. The other team members had different areas of expertise than me.
6. My team was an interprofessional group.

Item 1 is adapted from Gaither et al., 2018

Scenario Reality Check

How much do you agree with the following statements?

- During the task, the other team members felt real to me.
 - a. Strongly agree
 - b. Agree
 - c. Somewhat agree
 - d. Somewhat disagree
 - e. Disagree
 - f. Strongly disagree
- During the task, it felt like the other team members and I were interacting in real time.
 - a. Strongly agree
 - b. Agree
 - c. Somewhat agree
 - d. Somewhat disagree
 - e. Disagree
 - f. Strongly disagree

Appendix H

Full Information Set for Hidden Profile Task Structure (Study 3, Experiment)

Table H.1

Unique Information Sets

Gapville Districts					
Information sets	Maple District	Pine District	Birch District	Elm District	Option favoured
STEM package (physical information)	- (R) Is a heat island - (R) Has poor air quality due to a nearby highway	- (P) Has some protection from its tree shade coverage. - (P) Electricity transmission grid recently replaced	- (P) Has some protection from its tree shade coverage. - (C) Has a good bike lane network	- (R) Is a heat island - (C) Has a good bike lane network	Maple District
Health sciences package (public health Information)	- (P) Large young adult population - (C) Recent health awareness campaign on air pollution.	- (R) Has many seniors with health problems - (R) Has no air-conditioned public space	- (P) Large young adult population - (P) Has many air-conditioned public spaces	- (R) Has many seniors with low mobility - (C) Recent health awareness campaign on air pollution.	Pine District
Social sciences package (psychosocial information)	- (P) Middle class neighbourhood - (P) It has a strong sense of community.	- (P) Middle class neighbourhood. - (C) Many services are within walking distance.	- (R) Most residents are low-income without AC at home - (R) Many social housing units.	- (R) Most residents are low-income without AC at home. - (C) Many services are within walking distance.	Birch District

Legend:

(R) Risk factors (increasing level of district priority)

(P) Protective factors (decreasing level of district priority or cancelling importance of a risk factor)

(C) Conditional protective factors (only relevant depending on other characteristics)

Appendix I

Task Procedures (Study 3, Experiment)

Your task today

Your role

Your role is to express your opinion on a decision about the city of “Gapville”, a typical Canadian town of 200,000 people located in Southern Ontario. The City of Gapville is testing a new Heat Protection Program to protect the population against the impacts of extreme summer heat waves. It needs to select which city district to prioritize this coming year for implementing the new program.

Task procedure

This task takes place in a group decision-making scenario. We would like to ask some questions about your academic and professional background to assign you to a professional team for the task.

When you are ready, you can click on the arrow below.



Professional training and expertise

[Professional identity question & Identity salience manipulation]

- Which of the following areas of expertise do you identify the most with in terms of professional identity?
 - a. Sciences, technology, engineering, and mathematics (STEM)
 - b. Health sciences
 - c. Social sciences
- Please describe two reasons why working in a [STEM/Health Sciences/Social Sciences] discipline is important to you.
[text box]
- According to you, what are some of the professional strengths that people working in [STEM/Health Sciences/Social Sciences] professions have?
[text box]

To what extent do you agree with the following statements? [0-Not at all, 8-Extremely]

- I identify strongly with this area of expertise.
- When someone criticizes this area of expertise, it feels like a personal insult.
- I feel strong ties with this area of expertise.



Thank you for your answers.

Please wait a moment while your team assembles. . .

SAME professional identities	DIFFERENT professional identities
Professional Team You have been assigned to: Professional Team No. 6 Team member 1:  Social Sciences 1 (You) Team member 2:  Social Sciences 2 Team member 3:  Social Sciences 3 The next pages present the problem for which Gapville needs to take a decision. First, you will revise the situation individually to make a first recommendation. Then, there will be a round of team communications about this decision. Finally, you will have the opportunity to make a final recommendation. 	Professional Team You have been assigned to: Professional Team No. 5 Team member 1:  Social Sciences 1 (You) Team member 2:  Health Sciences 1 Team member 3:  STEM 1 The next pages present the problem for which Gapville needs to take a decision. First, you will revise the situation individually to make a first recommendation. Then, there will be a round of team communications about this decision. Finally, you will have the opportunity to make a final recommendation. 

Protecting the Gapville population from extreme heat: Selecting a city district to test a new Heat Protection Program

The situation: Gapville residents are suffering from extreme summer heat waves

Due to climate change, the frequency and intensity of extreme summer heat waves are increasing in Gapville. Last summer, Gapville suffered the most severe heatwave ever recorded. Temperatures reached record highs for more than two weeks. The number of heat-related 911 calls, heat-related hospitalizations, and heat-related deaths reached record levels in the city. Air pollution levels also increased because the heat was trapping pollutants. Some areas of town even experienced power shortages because the old electricity transmission infrastructure could not sustain the increased demand from air conditioning systems.

Creation of a new Heat Protection Program

The Gapville City Council has decided to put in place a new Heat Protection Program to protect the population from illness and mortality from future heat waves. The program will include: 1) infrastructure investments to reduce heat in the city and 2) targeted efforts to help at-risk residents. The city council has decided to test the program in one district this year. However, it is not clear which district is most at-risk and should be prioritized by the new Heat Protection Program.

The task: Selecting a city district where to test the new program

Within your team, you need to identify the city district where Gapville should implement the new program this year. The city staff has already identified a short-list of four potential districts: Maple District, Pine District, Birch District, and Elm District [randomized presentation order]. You need to select the most at-risk district within this list. The Gapville City Council will use your team's recommendations to decide where to prioritize resources for testing the program this coming year.

**In the next page, you will find information on heat-related health risks
and on the four Gapville districts to help you in your decision.**



Information on heat-related health risks

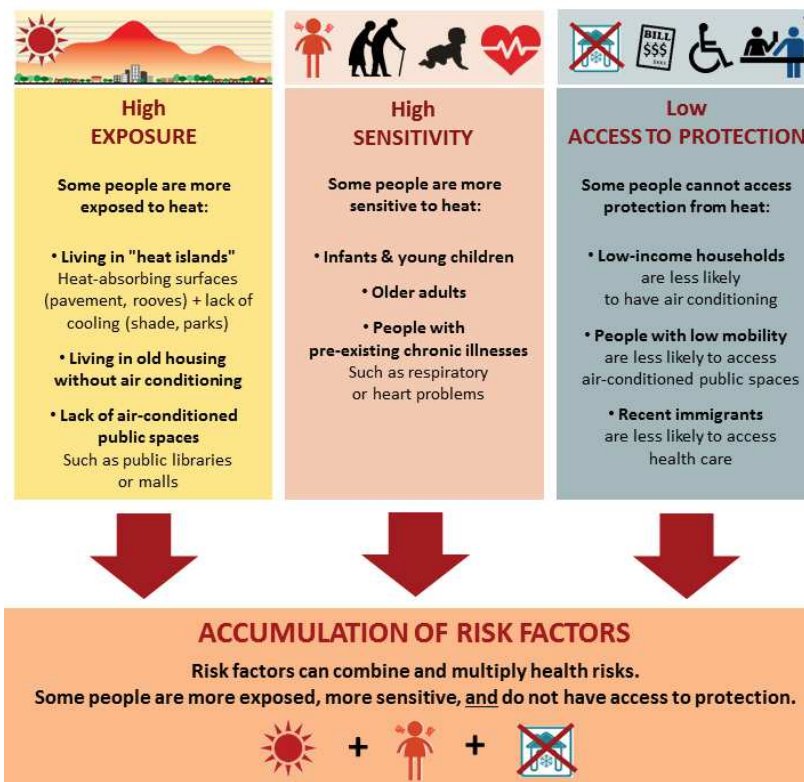
General overview of heat-related health risks

Heat waves and health risks

Heat waves can result in significant health problems.
The most severe is heat stroke, when the body overheats.
This can cause permanent organ damage or death.
Other health impacts include dehydration, heat exhaustion, and fainting.

Important factors that increase heat-related health risks

Factors that increase the risk of health problems during a heat wave include:



Information on the four Gapville district

Summary: Important factors that increase heat-related health risks

 High EXPOSURE	 High SENSITIVITY	 Low ACCESS TO PROTECTION
• Living in "heat islands" • Living in old housing without AC • Lack of air-conditioned public spaces	• Infants & young children • Older adults • People with pre-existing illnesses	• Low-income households • People with low mobility • Recent immigrants
ACCUMULATION of risk factors Some people are more exposed, more sensitive, <u>and</u> do not have access to protection.   		

What you know about the four short-listed districts

Based on your professional expertise
and personal observations, you know that:

Pine District	• Is a middle-class neighbourhood. • Many services are within walking distance.
Maple District	• Is a middle-class neighbourhood. • Has a strong sense of community.
Elm District	• Most residents are low-income without air conditioning at home. • Many services are within walking distance.
Birch District	• Most residents are low-income without air conditioning at home. • Has many social housing units.

Initial recommendation

Given this information, please indicate which district the new Heat Protection Program should prioritize according to you (the most at risk).

- Maple District
- Pine District
- Birch District
- Elm District

Team discussion

Your team will now have a round of discussions about this recommendation.

You have been selected to communicate first.

Please use the box below to communicate to your team members.

After receiving your message, the other team members will be able to share their opinion as well.

Message to your team members

In your message, inform your team members of the district you selected. Provide a clear reason for your decision.

[text box]



Step 1

Here is your message to your team.

(automated)

The other team members will reply shortly.
(This may take a few minutes.)



Social Sciences 1 (You)

[Participant's message to teammates appears here.]

Step 2

Here is your message to your team.

The other team members will reply shortly.
(This may take a few minutes.)



Social Sciences 1 (You)

[Participant's message to teammates appears here.]



Health Sciences 1



Step 3

Here is your message to your team.

The other team members will reply shortly.
(This may take a few minutes.)



Social Sciences 1

[Participant's message to teammates appears here.]



Health Sciences 1

Hi all, I don't agree. I don't think Birch District is the most at-risk. It has a large young adult population and it has many air-conditioned public spaces.

Maple also has a large young adult population and it just had a health awareness campaign on air pollution.

Elm has many seniors with low mobility, but it was part of the campaign on air pollution.

Pine has many seniors with health problems and no air-conditioned public space.

So I think Pine is the most at-risk.



STEM 1



Step 4

Here is your message to your team.

The other team members will reply shortly.
(This may take a few minutes.)



Social Sciences 1 (You)

[Participant's message to teammates appears here.]



Health Sciences 1

Hi all, I don't agree. I don't think Birch District is the most at-risk. It has a large young adult population and it has many air-conditioned public spaces.
Maple also has a large young adult population and it just had a health awareness campaign on air pollution.
Elm has many seniors with low mobility, but it was part of the campaign on air pollution.
Pine has many seniors with health problems and no air-conditioned public space.
So I think Pine is the most at-risk.



STEM 1

Mhmm... I don't agree either. I don't think it's Birch, but I would choose Maple because it's a heat island and it has poor air quality due to a nearby highway.
Birch has some protection from its tree shade coverage plus it has a good bike lane network.
Pine also has some protection from its tree shade coverage and its electricity transmission grid was recently replaced.
Elm is a heat island, but it has a good bike lane network.

When you have finished reading team communications,
simply click on the arrow below.



Team processes

Current emotions

Please indicate how you are feeling right now. [0-Not at all, 8-Extremely]

Right now, I feel:

1. Active.
2. Angry.
3. Annoyed.
4. Attentive.
5. Calm
6. Disappointed
7. Energetic.
8. Frustrated.
9. Interested.
10. Peaceful
11. Surprised
12. Tense.



How much you agree with the following statements? [0-Not at all, 8-Extremely]

- Within our team, we disagree about the decision to take.
- We have different viewpoints on which district should be prioritized.
- The people within my team have differences of opinion.
- My teammates and I agree on what the best decision would be.
- My solution and the ones proposed by my teammates are the same.



Please indicate how much you agree with the following statements. [0-Not at all, 8-Extremely]

- The exchange of our positions got a bit personal.
- My teammates' comments were not really helpful.
- We get along well.
- There are interpersonal incompatibilities in this team.



Final recommendation

Thank you for your feedback.

Now, please provide your final opinion on this decision.

If you wish to consult the information received previously or the team discussion,

simply scroll down.

According to you, which district should your team recommend for implementing the new heat protection program this year?

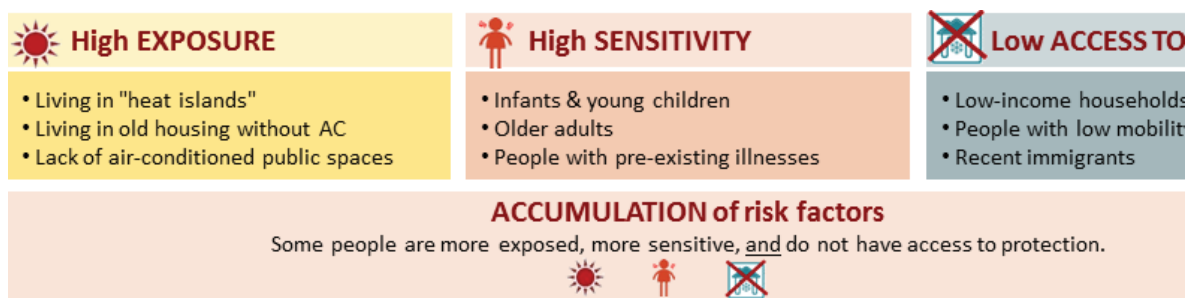
- a) Maple District
- b) Pine District
- c) Birch District
- d) Elm District

Please explain why you are making this recommendation.

[text box]

Summary: Important factors that increase heat-related health risks

Summary: Important factors that increase heat-related health risks



[Continues from next page on the same screen]

Information based on your professional expertise and personal observations

Pine District	• Is a middle-class neighbourhood. • Many services are within walking distance.
Maple District	• Is a middle-class neighbourhood. • Has a strong sense of community.
Elm District	• Most residents are low-income without air conditioning at home. • Many services are within walking distance.
Birch District	• Most residents are low-income without air conditioning at home. • Has many social housing units.

Team Discussion



Social Sciences 1 (You)

[Participant's message to teammates appears here.]



Health Sciences 1

Hi all, I don't agree. I don't think Birch District is the most at-risk. It has a large young adult population and it has many air-conditioned public spaces.
 Maple also has a large young adult population and it just had a health awareness campaign on air pollution.
 Elm has many seniors with low mobility, but it was part of the campaign on air pollution.
 Pine has many seniors with health problems and no air-conditioned public space.
 So I think Pine is the most at-risk.



STEM 1

Mhmm... I don't agree either. I don't think it's Birch, but I would choose Maple because it's a heat island and it has poor air quality due to a nearby highway.
 Birch has some protection from its tree shade coverage plus it has a good bike lane network.
 Pine also has some protection from its tree shade coverage and its electricity transmission grid was recently replaced.
 Elm is a heat island, but it has a good bike lane network.



How challenging was it to make this decision? [0-Not at all, 8-Extremely]

How confident are you in your decision? [0-Not at all, 8-Extremely]



Thank you for submitting your final opinion.

We have a few additional questions on your perceptions of the task.

Perceptions of your team

Please indicate how much you agree with the following statements: [0-Not at all, 8-Extremely]

- Working with this team was productive.
- I am satisfied with the composition of this group.
- Working with this team was unpleasant.
- I would like to work with this group in the future.
- If I had to participate in a similar task again, I would rather be on another team.
- Working with this team has been an enjoyable experience.
- I am very satisfied with working in this team.

According to you, how successful would this team be at making a joint recommendation to the Gapville City Council?

[0-Not at all, 8-Extremely]



Description of the four districts

[Information retention]

Please think of the information you received about the four Gapville Districts (Maple, Pine, Birch, and Elm). Think of the information that you received personally and from your team.

Please indicate whether the characteristics listed below were used to describe one or more of the four Gapville districts. [Yes/No]

Think of the information you received personally and from your team members.

[STEM info package]

- Air pollution
- Heat island
- Protection from tree shade coverage

[Health info package]

- Seniors with low mobility
- No air-conditioned public space
- Large young adult population

[Social info package]

- Low income residents without air conditioning
- Social housing units
- Middle class neighborhood

[Not mentioned, one for each area of expertise]

- Densely populated area
- Residents with intellectual disability
- Single-parent households



Group perceptions

How much do you agree with the following statements? [0-Not at all, 8-Extremely]

- Professional expertise was the most prominent characteristics of team members.
- If I had to describe members of this team to someone, I would think about whether they are from STEM, Health Sciences, or Social Sciences.
- I did not think at all about professional identity or expertise during the task. (reverse-coded)
- The other team members were similar to me in terms of professional expertise. (adapted from Gaither et al., 2018)
- The other team members had expertise in the same area than me. (new item)
- My team was a professionally homogeneous group. (new item)
- The other team members had different types of training than me. (adapted from Gaither et al., 2018)
- The other team members had different areas of expertise than me. (new item)
- My team was an interprofessional group. (new item)



General feel of the task

How much do you agree with the following statements?

- During the task, the other team members felt real to me.
 - a. Strongly agree
 - b. Agree
 - c. Somewhat agree
 - d. Somewhat disagree
 - e. Disagree
 - f. Strongly disagree
- During the task, it felt like the other team members and I were interacting in real time.
 - a. Strongly agree
 - b. Agree
 - c. Somewhat agree
 - d. Somewhat disagree
 - e. Disagree
 - f. Strongly disagree

Feel free to leave us your impressions.

[text box]



SOCIODEMOGRAPHIC QUESTIONNAIRE, DEBRIEFING, AND END OF SURVEY

Appendix J

Correlation Tables by Group (Study 3, Experiment)

Table J.1

Correlations Between All Variables by Group Condition

Homogeneous team condition		1.	2.	3.	4.	5.	6.
Emotions	1. Negative emotions						
	2. Surprised	.43**					
Conflict perceptions	3. Task conflict	.16*	.20**				
	4. Relationship conflict	.47**	.22**	.05			
Information processing	5. Information retention	.03	.04	.14*	-.10		
Outcomes	6. Integrative decision	-.11	-.02	-.10	-.21**	.21**	
	7. Satisfaction with team	-.29**	-.03	.07	-.25**	.25**	.21**
Interprofessional team condition		1.	2.	3.	4.	5.	6.
Emotions	1. Negative emotions						
	2. Surprised	.43**					
Conflict perceptions	3. Task conflict	.18**	.27**				
	4. Relationship conflict	.24**	.12	-.02			
Information processing	5. Information retention	-.03	.15*	.12	-.16*		
Outcomes	6. Integrative decision	-.03	.08	.00	-.26**	.17**	
	7. Satisfaction with team	-.20**	-.10	-.02	-.32**	.21**	.28**

N_{Hom.} = 222; N_{Inter.} = 232; * $p < .05$; ** $p < .01$

Appendix K

Detailed Results of the Path Invariance Analysis (Study 3, Experiment)

Table K.1

Model 5: Results by Group Condition

Indirect effects	Homogeneous		Interprofessional	
	Estimates B (SE) ^a	Bias-corrected confidence intervals ^b	Estimates B (SE) ^a	Bias-corrected confidence intervals ^b
Surprised → Integrative decision	.01 (.01), <i>ns</i>	(-.005; .044)	.02 (.01), <i>ns</i>	(.000; .044)
Surprised → Satisfaction	.02 (.01), <i>ns</i>	(-.006; .071)	.02 (.01), <i>ns</i>	(.002; .047)
Surprised → Retention of teammate information	.02 (.01), <i>ns</i>	(-.003; .062)	.02 (.01), <i>ns</i>	(-.013; .057)
Negative emotions → Integrative decision	-.09 (.03)**	(-.172; -.036)	-.05 (.02)*	(-.107; -.018)
Negative emotions → Satisfaction	-.08 (.05), <i>ns</i>	(-.195; .017)	-.06 (.03)*	(-.125; -.015)
Relationship conflict → Integrative decision	-.02 (.01), <i>ns</i>	(-.126; .018)	-.03 (.02), <i>p</i> = .06	(-.101; -.010)
Relationship conflict → Satisfaction	-.04 (.03), <i>ns</i>	(-.076; .009)	-.04 (.02)*	(-.079; -.002)

Notes: Estimates are unstandardized to enable comparison between groups;

^a Based on robust standard errors;^b Based on bootstrapped standard errors;* *p* < .05; ** *p* < .01; *** *p* < .001