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WASHINGTON UNIVERSITY IN ST. LOUIS

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“Managing Errors” in the Perception of Workplace Social Networks:

The Case of Workplace Cooperation

by

Patrizia Vecchi

A dissertation presented to
The Graduate School
of Washington University in
partial fulfillment of the
requirements for the degree
of Doctor of Philosophy

August 2020
St. Louis, Missouri

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This work is the result of a journey that dates back years before the start of my Ph.D. when I set the intention of becoming a professor in the field of organizational behavior. Making that happen has required a determination that is for me hard to conceive, looking back now. I am glad I found it and I decided to embark on this incredibly rewarding journey. I owe what I have learned and the person I became to the many people that I have been part of my life as mentors, teachers, friends, and supporters. I am grateful to the Olin Business School for admitting me to their program and giving me the privilege of such a rigorous education. My deepest gratitude goes to my mentor and academic advisor, Professor Ray Sparrowe, for patiently guiding me as I learned and improved on the many skills that make up the scholarly craft. I am also grateful to my committee, which is composed of some of the people that had the greatest impact on me during my PhD program. I wish to thank the Organizational Behavior faculty as a whole for their encouragement and for challenging me so that I could achieve my best work. I also want to thank the doctoral students with whom I shared this journey. I learned from each one of you.

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Patrizia Vecchi

Washington University in St. Louis

August 2020

“You are the bows from which your children as living arrows are sent forth.”

Kahlil Gibran

To my parents, for all their love.

ABSTRACT OF THE DISSERTATION

“Managing Errors” in the Perception of Workplace Social Networks:

The Case of Workplace Cooperation

by

Patrizia Vecchi

Doctor of Philosophy in Business Administration

Washington University in St. Louis, 2020

Professor Raymond T. Sparrowe, Chair

Exchanging help with one’s coworkers is essential to survive the demands and pressures of modern organizational life. But individuals have a limited amount of resources to trade for others and thus necessitate to identify reliable exchange partners with whom the exchange can be beneficial. At the same time, individuals have reputations for cooperation to protect that they need to consider in deciding whether and to what extent they should make themselves and their resources available to colleagues. I argue that these evaluations are informed by the structure of the informal exchanges as the individual perceives it, and I examine the consequences of perceptions that over- versus under-estimate the presence of ties within the structure (or network closure) for the perceiver’s status, reputation as an exchange partner, and job performance. This dissertation is composed of three parts. First, I develop an overarching conceptual model that explains how mental representations of networks inform behavior and impact individual outcomes. Second, I apply my overarching conceptual model to understand and compare the consequences of mental representations that over- versus under-estimate closure in cooperation networks. Third, I empirically examine the relationships between network over/under-estimation

and individual outcomes with a field study of multiple workgroups. Theoretically, this work contributes to the literature on the consequences of network perceptions in organizations and points to a thus far unrecognized source of advantage in network perceptions: the asymmetric costs of alternative errors. Practically, it identifies the costs to organizational members of misperceiving cooperation in their work environment and the side on which they should try to err in making this type of assessment.

Chapter 1: Introduction

Research has long recognized the importance of social networks for individuals in organizations. Social networks influence both the resources to which individuals have access and how others see them in their organization (Podolny, 2001). As such, networks can be assets or liabilities, depending on the position that the individual occupies within the network relative to others (Burt, 1992; Podolny & Baron, 1997) and the nature of the ties that link actors to one another (Labianca & Brass, 2006).

Networks, however, are more than objective social realities that help us to succeed or doom us to failure. At least as important as networks' actual configuration are people's understanding or perceptions of such networks. If these perceptions always reflected reality, they would be a phenomenon of no theoretical interest above and beyond the reality of social networks. However, network perceptions are often dissimilar, sometimes wildly dissimilar, from the networks they are supposed to represent and vary significantly from individual to individual (Krackhardt, 1987). Since people act according to their perceptions, people's perceptions of their networks are a phenomenon of key theoretical interest to understand how networks operate and affect people's lives.

Then, how do individuals stand to benefit or suffer from their imperfect understanding or perception of their intra-organizational networks? One key answer to this question revolves around the role of accuracy. Intuitively, network perceptions should be more advantageous the more accurate they are, that is, the more faithfully they represent the actual structure of the network. Research has confirmed this intuition. Organizational members with a relatively more accurate mental picture of their surrounding networks enjoy practical and political advantages.

Accurate perceptions enable individuals to seize opportunities as they emerge, track the flows of resources, wisely choose partners and allies, politically navigate their organizational environment, and be effective in their managerial tasks (e.g., Krackhardt, 1990; Borgatti & Cross, 2003; Janicik & Larrick, 2005; Marineau, 2016; Burt & Ronchi, 2007).

Understanding the consequences of network perceptions by conceptualizing them in terms of accuracy, however, is limiting because what individuals see accurately in their networks is only one part of what they see. Often, mental representations of networks are *distorted* representations—they exaggerate or understate key elements of the social structure (e.g., Kilduff, Crossland, Tsai, & Krackhardt, 2008; see Brands, 2013, for a review). Acting upon such distorted social realities should have consequences for workplace outcomes to the extent they lead to faulty assumptions and expectations.

Building on this insight and insights from the field of evolutionary psychology, I examine the differential costs of acting upon perceptions of networks that either overestimate or underestimate their systematic structure. Rather than treating these errors only as factors that detract from the overall accuracy with which the network is perceived, I argue that committing one or the other has different implications for workplace outcomes. Ultimately, this work offers a counterintuitive answer to the question of when network perceptions are advantageous. I argue that network perceptions are advantageous not only through what they enable us to see accurately but also through the errors they lead us to make. When perfect or high accuracy is not possible, as in most cases, advantage must be searched in the asymmetry of the costs of alternative errors.

This theoretical contribution is composed of two parts. In the first part, I develop an overarching conceptual model that explains how mental representations of workplace social networks inform behavior and impact individual work outcomes. In the second part, I apply this overarching conceptual model to understand the consequences of misperceiving one type of workplace network in particular: the network of cooperation among colleagues working in the same group. Having laid out in my overarching model how the perception of network structures affects behaviors and outcomes, I apply its logic to the case of workplace cooperation and compare the consequences of mental representations that over- versus under-estimate the number of ties that make the network (i.e., the number of cooperation relations among the members of one's workgroup).

Theoretically, this work contributes to the literature on the consequences of network perceptions in organizations and points to a thus far unrecognized source of advantage in network perceptions: the asymmetric costs of alternative errors. Practically, it identifies the costs to organizational members of misperceiving cooperation in their work environment and the side on which they should try to err in making this type of assessment.

Chapter 2: Theoretical Background

2.1 Social Network Schemas

Perhaps the most thorough understanding of perceptions of social networks and related errors is the one that emerges from the literature on cognitive network *schemas* (see Brands, 2013, for a review). Schemas are enduring cognitive structures that organize experience, often below conscious awareness, and orient expectations and future behavior (Bartlett, 1932). Network schemas, in particular, are elementary network structures that sustain both human recall and human inference about the presence and absence of social relations. On the one hand, schemas allow us to synthesize large numbers of social interactions in meaningful single units and therefore commit them to memory in an organized fashion (Freeman, Freeman, & Michaelson, 1988; Freeman, Romney, & Freeman, 1987; Sentis & Burnstein, 1979). On the other, they create expectations and allow for informed guesses or inferences about how others are related in the absence of direct information (Krackhardt & Kilduff, 1999). Schemas have also the benefit of creating a comforting sense of order and predictability in one's social environment and the impression that people are connected in ways that reflect ones' preferences (Heider, 1958; Kilduff et al., 2008; Flynn, Reagans, & Guillory, 2010).

Although people can potentially hold multiple schemas that reflect their idiosyncratic social experiences (Janicik & Larrick, 2005), a series of studies supports the idea that four schemas can be considered default schemas – basic assumptions and expectations that people use to make sense, encode, and predict social relations (De Soto, 1960; Delia & Crockett, 1973; Janicik & Larrick, 2005). The *balance* schema is the prototypical representation of relations that involve liking or disliking as reciprocal and transitive (De Soto, 1960; Delia & Crockett, 1973;

Heider, 1958). Social networks perceived through the balance schema represent friends of friends as friends, friends of enemies as enemies, enemies of enemies as friends, and so forth. The *categorization* schema – also referred to as grouping schema (De Soto, Henley, & London, 1968) – represents relations within and between groups. Social relations within groups appear as being strong or densely connected, whereas relations between groups appear weak or sparsely connected (Freeman et al., 1988; Freeman, 1992). The *linear order* schema represents influence or dominance relations within hierarchies as non-reciprocal and transitive; that is, only one individual in a dyad can influence the other and, if one individual influences another, he or she also influences those influenced by that individual. Lastly, the *self-enhancement* schema represents the self as being surrounded by a large number of friends as well as being reciprocated by those chosen as friends; i.e., a very optimistic assessment of one's personal network of friends. While chronically accessible, such schemas can be cued by the characteristics of the perceiver as well as the characteristics of the target and thus can be more or less salient in individuals' minds (Janicik & Larrick, 2005; Flynn et al., 2010; Brands & Kilduff, 2014). Furthermore, their influence decreases as the motivation of the individual to accurately read her social environment increases (Casciaro, 1998; Flynn, Reagans, Amanatullah, & Ames, 2006; Simpson & Borch, 2005; Simpson, Markovsky, & Steketee, 2011; Burt & Ronchi, 2007).

Although schemas are invaluable in mentally organizing and inferring social relations, they are also sources of systematic error in mental representations. When a schema represents a social network or organizes its retrieval from memory, the representation resembles the organizing structure of the schema (e.g., Sentis & Burnstein, 1979). Information that is incongruent with the schema is discarded, "corrected," or selectively recalled to fit the schema. The result is a systematic enhancement of the extent to which the defining features of a schema apply to actual

social networks. So, despite that fact that social networks often exhibit schematic properties, these properties are often exaggerated in people's mind. That is, when perceived, sentiment relations appear more balanced than they are, influence relations appear more hierarchical than they are, and groups appear more internally connected and more disjointed from other groups than they are. And our personal social network looms larger and stronger than it is (e.g., Freeman, 1992; Kilduff et al., 2008; Flynn et al., 2010; see also Brands, 2013). Even properties that taken as a whole are hard to find in networks may be accentuated in perception due the concomitant influence of multiple network schemas (Kilduff et al., 2008).

2.2 Origin and Function of Social Network Schemas

Schemas are understood in cognitive and social psychology as a product of experience (Bartlett, 1932; Neisser, 1967; Fiske & Dyer, 1985). Bartlett defined a schema as “an active organization of past reactions, or past experiences, which must always be supposed to be operating in any well-adapted organic response” (Bartlett, 1932: 201). That is, in the course of exposure to many instances of phenomena, the mind abstracts a generic cognitive representation of those occurrences (i.e., a schema). Schemas emerge as sets of individual components and develop with experience into integrated units that are represented and activated in memory in an all-or-none fashion (Hayes-Roth, 1977; Fiske & Dyer, 1985). That is, the activation of a single component of the schema triggers the activation of the whole schema (Hayes-Roth, 1977; Fiske & Dyer, 1985). While normally acquired and reinforced through repeated experience, schemas can also be acquired from single examples provided that the individual has enough background knowledge and experience in the domain to make sense of it as an instance of a more generalized phenomenon (Ahn, Brewer, & Mooney, 1992).

This experience-based account of schemas interprets social schemas as mental models that arise spontaneously in the human mind to help humans cognize about their complex social environment. Network schemas, in particular, are understood as resulting from the overwhelming complexity of cognitively representing social network connections. Even small groups pose considerable challenges to human cognition, as the number of possible dyadic relations increases rapidly as each additional member is added to the group. Faced with a task that exceeds its cognitive capabilities, the human mind then abstracts prototypical network structures - network schemas - from its interaction with the environment and store them in memory to make sense of patterns of relations that otherwise would be too complex to understand and remember. So for example by observing and interacting with others in their environment, people acquire a natural propensity to think of triads as balanced; but as they note exceptions to this rule, they also acquire a schema for missing relations (Janicik & Larrick, 2005). Once formed, network schemas operate like *heuristics*: they supply rules to fill in the blank of one's perceptions by offering "reasonable assumptions" (Kenny, Bond, Mohr, & Horn, 1996: 935) about how others are connected in one's social environment¹. Schemas derive their heuristic value from their strict connection with experience; if they did not capture fundamental characteristics of real network structures, they would lead to frequent poor inferences and would be replaced by new schemas aligned with the new general character of reality (Brands, 2013).

The interpretation of network schemas as social heuristics emphasizes the benefits of schemas for cognitively bounded individuals, namely the possibility of attaining a good general

¹ Schemas are mental representations that hold information – in this case information about individuals are typically connected with one another in relationships of a certain type. Heuristics are rules of thumb that facilitate inference and decision making. Network schemas works as heuristics in the sense that, in the absence of complete information about social relations, the prototypical structure of the schema is used to infer who is likely to be connected with whom, i.e., to fill in the blank.

level of accuracy in network perceptions with a considerable saving of cognitive energies (Freeman, 1992; Kenny et al., 1996). In other words, schemas are understood as cognitive shortcuts that function to reduce the rate of errors in social network perception.

In the following section, I introduce a theory –Error Management Theory– that has at its core the idea that heuristics and biases may develop not to minimize the rate of errors but rather their cost. Is it possible that we develop ways of thinking about social relations whose goal is not to capture a typical pattern but to protect us from costly mistakes? Error Management Theory extends this idea over evolutionary times and attributes it to the design of natural selection. It posits that certain biases and heuristics evolved not to increase the ratio of accuracy to speed but to minimize the ratio of cost to error. The theory offers a potential further approach to understand the origins of errors in social network perception, as it posits that to understand the origin of biases is to look at their consequences. I will borrow its logic to investigate whether errors of over- and under-estimation in the perception of intra-organizational networks have differential costs, mindful of the fact that such asymmetry is both a potential source of advantage in network perceptions and a potential source of bias.

2.3 Error Management Theory

Error Management Theory is a theory advanced in the field of evolutionary psychology to explain the evolution of biases in judgement and decision-making (Haselton & Buss, 2000; Haselton, Nettle, & Murray, 2015). The theory understands biases as capabilities evolved in the human species in response to recurrent problems and the characteristics of the environment in which evolution took place. The theory applies to problems that require a judgement under uncertainty for which there are two types of errors: a false positive or a false negative. A false positive is the belief that something is true or exists when in fact it is false or doesn't exist, and a

false negative is the belief that something is false or doesn't exist when in fact it is true or does exist. When there is asymmetry in the costs of the two errors, such that one significantly reduces the chances of survival or reproductive success relative to the other, the theory predicts selection will favor the bias towards the less costly or the safer of the two errors. That's why, for example, while walking in the woods, we are more likely to mistake a stick for a snake than a snake for a stick: the cost of the former error is significantly lower than the cost of the latter, so we are biased towards making the former (Haselton & Galperin, 2012). As (Galperin & Haselton, 2013: 46) put it, when the costs are asymmetrical, we "err on the 'safe side' by assuming the worst."

EMT has explained a number of cognitive biases in both the non-social and social domains of judgment and decision-making (see Haselton & Galperin, 2012, for a short review). The theory is also used to understand the evolution of heuristics, which are, in and of themselves, a source of systematic bias (Tversky & Kahneman, 1974). By comparing the costs of potential alternative systematic errors given the conditions of the ancestral environment, the theory offers a lens to understand why we possess certain heuristics instead of others. In the logic of the theory, certain heuristics evolved not to minimize the rate of error, as most do, but to minimize the cost of error. As such, their primary goal is not to overcome cognitive limitations by offering rules of thumbs that work well in most circumstances, but to protect from costly mistakes (Haselton et al., 2015).

By introducing costs into the equation, EMT offers a possible complementary way to understand the origins of biases in network perception and possibly the origin of some of our default social network schemas. However, it is important to note that, if cognitive network biases evolved to minimize the cost of errors, they did so during the evolutionary time that led to their selection—they may not work equally well in our time. Said differently, our default schemas

may be useful as rules of thumbs to infer reality, but poor as error management mechanisms. Or they can be useful for both purposes.

In the rest of my dissertation, I build upon this insight to understand the consequences of biased network perceptions in organizations. Mirroring the comparison between false positives and false negatives in EMT, I compare and contrast the consequences of errors of over- and under-estimation in the perception of social network structures. Organizations are contexts in which network perceptions are consequential for the success of an individual, relationships have to be inferred under uncertainty, and alternative errors of perceptions do sometimes have differential costs (e.g., Anderson, Ames, & Gosling, 2008). It is therefore possible that the errors of over- and under-estimation that often characterize network perceptions present differential costs and rewards.

In the next section, I present the overarching model that guides my theorizing. Drawing on network activation theory (Smith, Menon, & Thompson, 2012; Menon & Smith, 2014), I describe mental representations of networks in organizations as instances of motivated cognition. Framing the problem in term of motivated cognition help me identity networks and structural properties that organizational members are likely to mentally represent to secure resources and protect their reputations. Finally, I will examine the consequences of over- versus under-estimating the structure of one of such networks: the network of cooperation among the members of a group or organization.

Chapter 3: Theory and Hypotheses

3.1 Overarching Model

My theorizing about the consequences of biased mental representations of social networks in organizations starts with a preliminary question: What kinds of problems make people activate a mental representation of a social network in organizations, knowing that anytime a person activates such a mental representation there is the opportunity for a schema to creep in and bias perceptions? I frame this problem in terms of motivated cognition, that is, I understand mental representations of networks as representations activated in response to a problem that requires a mental network representation. I assume that organizational members are agentic actors that use their perceptions to guarantee themselves access to resources and manage or protect their reputations (Krackhardt & Kilduff, 1999). How people mentally construct their environment is a fundamental aspect of human agency because those constructions allow for cognitive simulations in which people imagine themselves coping with difficulties and seizing opportunities (Bandura, 1989). Since networks offer opportunities and constraints (e.g., Brass, 1984; Ibarra, 1993) and have consequences for reputations (Krackhardt & Kilduff, 1999; Podolny, 2001), network perceptions are likely to play an important part in such cognitive constructions.

Figure 1 depicts the overall conceptual model that guides my theorizing. Organizations are competitive arenas in which people compete for resources and reputations as well as for exchange partners and allies. Winning these competitions is likely to require the activation of different intra-organizational networks. For example, identifying with whom to cooperate and from whom to seek buy-in are quite different tasks. A reliable cooperator and an influential or well-connected ally is not necessarily the same person: the former may have goodwill but lack power; the latter may have power but not enough time or interest in exchanging task-related help

and similar resources. Similarly, as people go up in organizations and the competition gets fierce, the chances to make enemies increase. Identifying actual or potential enemies, and understanding how they might collude, requires a different mental representation than the one required by identifying potential cooperators.

Insert Figure 1 about here

Because different types of networks signal different reputations (e.g., for power versus for cooperation), intentions (e.g., to support versus to undermine), and capabilities (e.g., to help with one's tasks versus to support one's agenda), I assume that people in organizational settings do not activate one all-purpose network while they attempt to navigate their environment, but they activate different networks depending on the goal, need, or problem that motivates their mental representation. My model therefore starts with a problem that requires a mental network representation, followed by the activation of the mental representation in question (Figure 1, Step 1 and 2).

The activated network is the network as perceived by the individual, that he or she uses to conduct the evaluations that motivated its activation. Since organizational members hold wildly different perceptions of the same networks (e.g., Krackhardt, 1987, 1990), the assessments and evaluations that the individual conducts on the basis of her activated network are subjective, i.e., reflect her idiosyncratic perceptions. The individual's subjective evaluations take into account the perceived opportunities and constraints to anticipate others' behavior, to infer their reputations, and/or to assess their capabilities (Figure 1, Step 3). For example, the individual may use the structure of cooperative ties in her work environment to identify reliable potential cooperators, but the structure of alliance ties to gauge her chances to prevail in a contest.

Depending on the outcomes of these evaluations, the individual decides how to behave (Figure 1, Step 4). Behaviors can go from approaching potential exchange partners for help or allies for support, to launching an initiative or refraining from following a plan. Behavior in any case will be intended or motivated; it represents the course of action chosen by the individual on the basis of her perceptions.

The chosen course of action and the reactions elicited in the surrounding environment will yield consequences, some of which may be unintended (Figure 1, Step 5). The outcome will depend on the extent to which the activated network reflected reality and the direction of the error in the network estimation (i.e., whether of over- or under-estimation). I maintain my focus at the individual level of analysis, so such consequences are individual outcomes in my theory. I expect that the individual will take unexpected and in general negative outcomes as a sign that her network perceptions were incorrect and will therefore attempt to update them to the best of her capabilities, for example by seeking out more information about other people's connections or paying more attention to her environment (Figure 1, Step 6).

In the rest of this work, I applied this logic to understand the consequences of the over- versus underestimation of the structure of one key intra-organizational social network: the network of cooperative ties in one's work environment (e.g., Flynn, 2003; Gargiulo, Ertug, & Galunic, 2009). I organize my theory around two major variations of my overarching conceptual model: one for mental representations that overestimate the number of ties present in the network, and one for mental representations of networks that underestimate it. Because mental representations of networks that over- versus under-estimate their structure entail different perceived opportunities and constraints, they will lead to different subjective evaluations,

different courses of action, and ultimately different outcomes. I detail this logic with regard to the cooperation network and the estimation of the connectedness of the network.

Since individuals in my model are acting upon misperceptions, I expect their perceptions to be costly in terms of outcomes, that is, yield outcomes that are suboptimal relatively to the ones they would yield if their perceptions were crystal-clear. But I expect such costs to be asymmetrical, that is, some errors to be more costly than others. Finally, I recognize that, besides yielding costs, errors of perception can sometimes yield benefits. It is therefore possible for an error to be ‘better’ or less costly than its alternative not only because it yields fewer costs but also because it yields greater benefits (i.e., fewer opportunity costs).

3.2 The Costs of Over Versus Underestimating Cooperation in the Workplace

3.2.1 Perceptions of Cooperation and Cooperative Behavior

Cooperation is one of the great dilemmas in nature (Axelrod & Hamilton, 1981). In organizations this dilemma is reproduced in that organizations are competitive arenas in which a member’s survival and success depend on his or her cooperation with other members who compete for the same opportunities. Interdependent individuals exchange resources and at the same time strive to control them to maintain or extend their basis of power (Thompson, 1967; Pfeffer & Salancik, 1978; Casciaro & Piskorski, 2005). Because people have a limited amount of resources and need to obtain resources from others, a key problem that any organizational member faces is to decide whether and with whom to trade her own resources for others of value. Take, for example, a person that has knowledge that others need. Transferring that knowledge to others comes at a cost for that person because, at a minimum, she has to devote time and effort to communicating what she knows. For that person to continue to share her knowledge without jeopardizing her

tasks, that expenditure of time and efforts need to be paid back, if not in full at least in part, if not now at some point, and if not by the recipient by someone else. Members who generously share their resources with others are seen with respect by their colleagues, but they pay a price in terms of productivity and performance for doing so (Flynn, 2003; Gargiulo et al., 2009). Identifying partners with whom exchanges can be mutually beneficial, then, is important for the viability of cooperative behavior (Blau, 1964). The person in the example needs to ponder over the costs and benefits of expending her knowledge for others, knowing that the time and effort spent in transferring that knowledge to someone can't be used to help someone else or to focus on her own tasks.

To conduct these assessments—to determine the worth of any potential cooperator and in general the returns of cooperative behavior—is to consider the social structure in which one's cooperative exchanges would be embedded. Potential partners embedded in close-knit structures of cooperation relations make for better potential cooperators because those structures alleviate concerns about their capabilities and motivations, keep them accountable, and are conducive to cooperative norms that give further assurance of being reciprocated, if not by the person assisted, by someone else in the group (Granovetter, 1985; Coleman, 1990; Uzzi, 1997; Fowler & Christakis, 2010). Such structures further determine the returns of cooperative behavior by offering reputational benefits to individuals who exchange in good faith and reputational penalties to those who do not (Granovetter, 1985; Uzzi, 1997; Wong & Boh, 2010). Depending on how tight is the structure, one may also want to consider whether to decline or accept others' requests for cooperation, knowing that declining those requests may be costly in tight structures because information spreads fast (Gargiulo et al., 2009).

It follows that, to be able to regulate their own cooperative behavior effectively and identify exchange partners, organizational members need to represent the structure of cooperative ties in their mind. Such structure tells them whether cooperation is prevalent in their work environment or involves only a small group of actors, what implications it carries for one's and others' reputation, and what tacit norms may exist within the group. This information in turn is likely to inform their decisions about whether and with whom they should try to cooperate and whether or not they should accept others' requests for cooperation.

In the literature, cooperation has been conceptualized in psychological or behavioral terms, depending on whether the interest falls on the motive or the behavior of the parties (Chen, Chen, & Meindl, 1998). I adopt the latter, behavioral approach and define cooperation as any discretionary act with which someone contributes task-relevant resources to someone else at a cost to themselves (cf., Wagner, 1995; Lazega & Pattison, 1999; Milton & Westphal, 2005). I assume that the identification of the specific resource or resources contributed (whether it is knowledge, advice, favor-doing, etc.) is unnecessary to the articulation of my theory (cf., Borgatti, Brass, & Halgin, 2014). Thus, I define a cooperative tie as any tie with which two parties voluntarily assist each other in their work, at some cost to themselves.

Given the motivations for mentally representing cooperation networks, I examine the consequences of one characteristic of the network that organizational members are likely to estimate that has implications for their cooperative behavior: "closure" or the extent to which people are connected to one another and form a collaborative workgroup (e.g., Reagans & Zuckerman, 2001; Reagans & McEvily, 2003; Oh, Chung, & Labianca, 2004; Reagans, Zuckerman, & McEvily, 2004; Gargiulo, Ertug, & Galunic, 2009). Closure is often operationalized with density or the ratio of real or perceived ties to the maximum number of

possible ties (Wasserman & Faust, 1994). I assume that organizational members mentally represent such networks as networks of undirected or reciprocated ties. Some ties may appear more salient than others depending on their perceived strength, but mentally representing their direction or degree of imbalance (who is giving more) would make the task of estimating network closure formidably complex, especially when the person is looking beyond her immediate neighbor network. This is not to say that people do not form impressions of how much people are giving or receiving in specific dyadic relationships—only that estimating closure in cooperative networks may involve a higher-order mental representation and the use of heuristics such as reciprocity and balance. Perception of network structures is categorical: past a certain threshold, people are seen as related or unrelated (Freeman, 1992). You can't see each tree while you are looking at the forest.

Figure 2 shows a hypothetical cooperation network and two mental representations: one that underestimates closure and one that overestimates closure. Underestimating means mentally representing the network as composed of only a few ties compared to the ones that exist; depending on how many ties are perceived, underestimating may also mean that, overall, only a few people are perceived as cooperating with others at all. Overestimating, instead, means mentally representing the network as composed of a larger number of ties than the ones that exist and, very likely, a larger number of people involved in such ties.

Insert Figure 2 about here

From the viewpoint of the person who is mentally representing the network, these two mental representations offer different opportunities and constraints and therefore are likely to lead to different subjective evaluations and different behaviors. A mental representation that

underestimates closure implies lower opportunities for cooperation: people appear to collaborate significantly less, presumably either because they do not need each other or because they approach relations competitively. A person is less likely to initiate relations of cooperation when she has such perceptions: because she is likely to infer lower interest in cooperation in others, she is also likely to infer lower prospects of establishing mutually beneficial relations of cooperation with others. She may reason that trying to form such relations has a relatively high chance to result in a net expenditure of resources. She may also reason that she is better not asking for help because she will likely have few chances to return it and she may not want to feel indebted (Blau, 1955, 1964; Greenberg, 1980; Fisher, Nadler, & Whitcher-Alagna, 1982; Thompson & Bolino, 2018). At the same time, a relatively sparse network (low closure) is less constraining in terms of cooperative behavior: since cooperation is not diffuse within the network, the perceived costs of not cooperating in terms of reputation and group sanctions are low. Cooperation does not seem to be expected, and if it is, none seems to be really able to enforce it. Thus, the perceived network offers not only fewer opportunities for cooperation for those seeking partners, but also more freedom not to cooperate for those who depend less on others' resources (Gargiulo et al., 2009).

A mental representation that overestimates closure offers a different set of opportunities and constraints. On one side, to the extent that more colleagues are perceived as surrounded by more ties, more opportunities for cooperation appear to be available. The risk of unduly expending resources for others, or feeling indebted, is attenuated by the larger number of reciprocated exchanges perceived in the network. A person holding this mental picture of the network is more likely to actively seek out opportunities to trade resources because more opportunities are perceived in the first place. At the same time, the greater perceived closure is

more constraining in terms of cooperative behavior. Not cooperating carries the risk of earning a bad reputation within the network due to the large number of ties and strong cooperation norms are inferred with associated potential penalties and a greater potential for enforcement (Granovetter, 1985; Coleman, 1988, 1990). A person holding this mental picture is more likely to feel compelled to cooperate with others, even when her dependence on others for resources is limited and she would prefer not to do so (Gargiulo et al., 2009).

To sum up, I posit that errors of underestimation and errors of overestimation are conducive to different sets of subjective evaluations about the prospects, benefits, and costs of cooperation versus noncooperation, and as a result, have different effects on the likelihood that the individual will cooperate. Namely, I expect that organizational members who underestimate the closure of the network of cooperative relations will be less likely to cooperate than organizational members than overestimate it.

Hypothesis 1. Underestimating the closure of the network of cooperative relations will lead to lower cooperation than overestimating it.

3.2.2 Errors in the Perceptions of Cooperation and Individual Outcomes

Because the person is acting upon false assumptions, the behavioral consequences of acting on exaggerated perceptions of the structure of the network, whether in terms of exaggerated closure or lack thereof, carry over to outcomes. Because errors of underestimation cause the perceiver to understate others' contributions and discourage cooperation, they are likely to make it harder for the perceiver to emerge as a valuable contributor. Employees who exchange generously with their colleagues earn respect for their contributions (Blau, 1994; Flynn, 2003; Willer, 2009), but that entails contributing to others more than others can reciprocate or more than others are already contributing. Errors of underestimation are unlikely to favor such outstanding

contributions, precisely because they are unlikely to lead a person to seek out opportunities for exchange and spend enough effort for others; indeed, they make harder not only to exceed, but even to meet, the expectations of the group. Via their effect on cooperative behavior, thus, errors of underestimation are likely to exact a cost on status.

By contrast, because errors of overestimation encourage to seek out opportunities to cooperate and be responsive to others' requests for cooperation (under the false impression that everyone is doing the same), they increase the likelihood that the individual will become an important source of help for others and will earn respect for being invested in the success of her group or organization. In this case the individual is unwittingly contributing more than necessary and expected, making herself available to others and spending her time and energies for others more than others are doing with her and with one another. While costly in terms of resources, such an error is beneficial in term of status. Overestimation, thus, is not only unlikely to hurt status unlike underestimation, but it may also prove beneficial. One might speculate that, of the two errors, underestimating closure should be the most beneficial in terms of status because, with fewer connections, one should see more opportunities to strategically help others and gain status in their eyes (Flynn et al., 2006). However, this sort of strategic behavior is unlikely to be effective, because it is easier to think of themselves as generous if one has a diminished perception of how much others are assisting each other and how much assistance they expect from others. Indeed, they are the ones with more accurate perceptions that are more effective at these strategies (Flynn et al., 2006).

I therefore expect that organizational members who underestimate cooperation will enjoy less status than organizational members who overestimate cooperation due to their lower propensity to cooperate.

Hypothesis 2a: Underestimating the closure of the network of cooperative relations will be more costly in terms of status than overestimating it.

Hypothesis 2b: The negative effect of underestimating the closure of the network of cooperative relations on status will be mediated by a decrease in cooperation relative to overestimating.

According to Hypothesis 1, errors of underestimation increase the chances of acting as a relatively unhelpful colleague, while errors of overestimation decrease such chances. To the extent that errors of underestimation of network closure discourage people from reaching out to potential exchange partners or do not sufficiently motivate them to respond to others' requests for cooperation (Hypothesis 1), one is likely to earn a reputation for being uncooperative, a lone wolf, or driven by competitive motives. The costs of such behavior are compounded by the fact that, the network being more interconnected than it appears in the subject's mind, an uncooperative reputation is likely to spread fast within the network, damaging the subject well beyond the circle of her immediate contacts and undercutting her chances to receive help in the future. Instances of uncooperative behavior may spread through the network through common third parties, of which the subject was evidently not aware. Errors of underestimation also present the risk of inappropriately brokering between one's colleagues. Attempts at controlling the flow of information and playing one's contacts off each other (Burt, 1992) are likely to cost in terms of reputation as a trustworthy partner because they have a high chance to be unmasked. Errors of overestimation protect from all these costs and should have the additional benefit of being seen as an approachable colleague eager to help and exchange resources.

Hypothesis 3a: Underestimating the closure of the network of cooperative relations will be more costly in terms of positive reputation as an exchange partner than overestimating it.

Hypothesis 3b: The negative effect of underestimating the closure of the network of cooperative relations on reputation as an exchange partner will be mediated by a decrease in cooperation relative to overestimating.

Since network closure increases one's willingness to exchange resources and reduce competition, a number of studies have found a positive association between network closure and the performance of the individuals embedded in the network (e.g., Barker, 1993; Ingram & Roberts, 2000; Lazega, 2001). But closure really only benefits those who depend more on others' resources because it forces others to comply to their requests; those who depend less on others only lose the freedom to allocate their resources to more productive ends (Gargiulo et al., 2009). These findings are based on the assumption that one sees the structure as is, which is by no means obvious. I posit that to understand the consequences of network closure on performance, it is necessary to factor into the analysis not only the degree of resource dependence of the individual *but also* the type of error – of over- versus underestimation – that she makes in estimating it. Remember that organizational members are likely to mentally represent the cooperation network and estimate its closure in response to two needs or problems: the need to secure resources by exchanging one's own wisely, and the need to protect one's reputation to avoid career penalties and not compromise one's chances to exchange with others should the necessity arise. People high in resource dependence have both such needs; people low in resource dependence (i.e., with plenty of resources on their own and thus in less need to exchange) still have the latter.

Because errors of underestimation lead people to eschew cooperation (Hypothesis 1), they are particularly costly for individuals that are relatively dependent on others for resources because, for these individuals, cooperation is critical to obtain the resources they need. Error of underestimation in this case present high opportunity costs: the cost of not exchanging resources when it would be absolutely beneficial to do so. For individuals who are relatively independent of others in terms of resources, instead, errors of underestimation should increase performance

because such errors (perceptually) free them from the constraints of closure and encourage them to redirect their resources from helping others to pursuing their own priorities (Gargiulo et al., 2009).

However, when errors are of overestimation, they are the individuals who are relatively independent of others that pay the most. They feel compelled to put aside other tasks to make room to help their colleagues. Note that while obtaining resources from others is not a pressing problem for such individuals, protecting their reputation is still a necessity. In this case, estimating closure serves the purpose of estimating the reputational penalties of being approached for help and not cooperating. Being perceived as uncooperative may cost career opportunities in organizations that value collegiality. It may also compromise opportunities for cooperation that might emerge in the future. Errors of overestimation prompt relatively independent individuals to cooperate out of these reputational concerns, even if it is suboptimal for their performance (Gargiulo et al., 2009). In other words, they sacrifice their performance for the sake of their reputation. Because errors of overestimation encourage cooperation (Hypothesis 1), resource-dependent individuals, instead, should find them beneficial. They may pursue opportunities for cooperation just to realize that they do not exist (e.g., approach others and be turned down), but overall they will benefit from overestimating because they will be more likely to exploit the opportunities for cooperation that indeed exist, to their great advantage.

In sum, I posit that errors of underestimation of network closure will be particularly costly to people high in resource dependency because underestimation discourage seeking out opportunities to trade resources, which is what these people need the most. However, when resource dependency is low, I posit that it is overestimating the most costly of the two errors, because it exacerbates the reputational concerns associated with closure, encouraging

cooperation when it would be more productive to focus less on others' need and more on one's priorities.

Hypothesis 4a: For individuals who are relatively dependent on others for resources, underestimating the closure of the network of cooperative relations is more costly in terms of job performance than overestimating it.

Hypothesis 4b: For individuals who are relatively independent on others for resources, overestimating the closure of the network of cooperative relations is more costly in terms of job performance than underestimating it.

3.2.3 Magnitude of Errors and Confidence in One's Perceptions

My overarching model and the logic that drives my propositions imply that errors of over- and underestimation should be more predictive of individual behavior and outcomes the more extreme they are, i.e., the more they exaggerate or understate the characteristic that is being perceived (closure in the case of the cooperation network). More extreme mental representations allow for a greater separation between the perceptions and subjective evaluations associated to two types of error and should therefore be conducive to greater differences in behavior and corresponding outcomes. Assuming that most 'real' networks are not themselves extreme (which would make it impossible to observe both errors), I expect the effects predicted by my propositions to be stronger the more extreme are the errors that characterize the corresponding perceptions:

Proposition 5: The asymmetry in the costs of over- and underestimation errors increases with the magnitude of the two errors.

It could be argued that since more extreme mental representations convey a more clear-cut perception of reality and more clear expectations, they should be characterized by greater confidence, i.e., the perceiver should feel more confident about them. However, this is unlikely to be true because more extreme mental representations may simply be the result of lack of

information and/or greater reliance on cognitive network schemas (Krackhardt & Kilduff, 1999). For example, a cooperation network perceived as very sparse may result from great confidence about the absence of cooperative ties among one's colleagues as much as lack of confidence about the presence of such ties. Vice versa, a cooperation network perceived as very dense may result from the absolute certainty that one's workgroup is very collegial as much as the use of the balance schema and possibly other schemas to fill in their blanks of one's perceptions. Nonetheless, I do expect more confident network perceptions to lead to more confident subjective evaluations and thus more decisive action. So, while I do not expect confidence in one's perceptions to be correlated with the magnitude of either error, I do expect confidence and magnitude to interact in predicting outcomes:

Proposition 6: Confidence in one's perceptions moderates the relationship between the magnitude of over- and underestimation errors and their outcomes, such that the relationship is stronger the greater the confidence of the perceiver.

For a summary of my propositions, see Figure 3.

Insert Figure 3 about here

In Table 1 I summarized the logic that drive my propositions, explicating each of the conceptual steps of my overarching conceptual model with regard to the estimation of the cooperation network (Figure 1).

Insert Table 1 about here

3.3 Overview of Studies

To find preliminary support for my ideas and test my hypotheses I conducted three studies, which are the object of the next three chapters. In Study 1, I used qualitative methods and an inductive approach to gain insights into the phenomenon of discretionary cooperation in the workplace and the role of perceptions in shaping employees' cooperative behavior. Study 1 begins to build support for my ideas by highlighting perceptions, evaluations, and concerns that people take into account in exchanging task-related help with their colleagues. In Study 2, a scale development study, I built on the results of Study 1 to develop and validate two measures — perception of intragroup cooperation and resource independence— that I subsequently used in Study 3 as part of my survey design to test my hypotheses. Finally, in Study 3, I tested the consequences of errors of over and under-estimation of the level of cooperation in one's workgroup using a multi-source, multi-organization field study.

Chapter 4: Qualitative Study

4.1 Rationale

In Study 1, I seek some preliminary support for my ideas and the logic of my overarching theoretical model as it applies to the perception of workplace cooperation. First, I begin to explore whether employees do indeed hold perceptions of the cooperative relations among their colleagues and whether they weight such perceptions in deciding whether, to what extent, and with whom to collaborate at work, in instances when collaboration is not only potentially beneficial but also costly. In the first part of my model, I posit that such perceptions play a role in employee cooperative behavior above and beyond the effect of other factors that previous research has linked to interpersonal helping in the workplace. The organizational citizenship behavior (OCB) literature (Podsakoff, MacKenzie, & Podsakoff, 2018; Organ, Podsakoff, & MacKenzie, 2005), for example, has identified several predictors of interpersonal helping in the workplace, which stand as valid potential alternative explanations for employee cooperative behavior (my key mechanism). This research has shown, for example, that employees are more willing to help their colleagues when they are satisfied with their job, feel supported by their organization, have a personal disposition to help others, and have good relationships with their colleagues and their leader (Moorman, Blakely, & Niehoff, 1998; Organ & Ryan, 1995; Ilies, Nahrgang, & Morgeson, 2007). Other work, consistent with the OCB findings, suggests that cooperation at work may largely be a function of the personal relationships between the parties, with people primarily exchanging task-related help with their friends at work (Bowler & Brass, 2006; Casciaro & Lobo, 2008, 2014). Given these findings, in this study, I seek preliminary evidence for the role of perception in cooperative behavior as a potential explanatory variable alongside the others offered by the literature.

I leveraged this study also to gain insights into the phenomenon of workplace cooperation and collect data useful to the development of a measure of perceived intragroup cooperation (presented in Study 2) that I subsequently used in Study 3 as part of my survey design. The goal of this part of the study is to gather qualitative examples of cooperation in the workplace to ground my work in a thorough understanding of the phenomenon and find support for my working definition of cooperation as a discretionary costly behavior. What do people do for their colleagues that they are not required to do and comes at a cost to themselves? Certain helping acts may prove beneficial to others without being costly to the individual that perform them; others may be perceived as part of the normal give and take that occur within organizations and therefore seen as required or expected rather than discretionary (Organ et al., 2005). Gathering evidence of what people see as discretionary, costly behavior is an important preliminary step from the perspective of my theory. My theoretical model hinges upon the idea that people are motivated to assess their surrounding environment by the need to protect their resources and invest them in exchanges that are mutually beneficial and not excessively costly. To the extent that the environment does not seem to offer such opportunities, I argue that the individual will withdraw her cooperation to focus her resources on more productive relationships (e.g., with partners external to her group or organization) or more productive ends (e.g., her individual tasks or independent work). In Study 1, I seek preliminary evidence that there are indeed work behaviors that individuals perceive as costly from which they feel they can withdraw if necessary.

4.2 Sample

I recruited a sample of 202 full-time employees, residents either of the United States or the United Kingdom, through Prolific Academic, a subject pool for online surveys and experiments

(Palan & Schitter, 2018). Participants were full-time employees who regularly interacted with colleagues at work and belonged to workgroups of at least 10 people. Overall, they worked in 25 different sectors; the sectors most represented in the sample were health care (21%), government (11%), finance and insurance (9%), education (9%), retail (7%), consumer services (5%), manufacturing (5%), professional services (3%), arts and entertainment (3%), business services (3%), and nonprofit (3%). Since I formulated my theory without a specific sector or profession in mind, the broad representation of sectors, job, and roles in the sample was a good starting point to gain insights into the many forms and shapes in which cooperation can take place in the workplace. The median organizational tenure of the sample was approximately 4 years, the median age was 33, and approximately 52% of the respondents were female. Caucasians represented the majority of the sample (81%), followed by African American (7%), Asian (5%), Hispanics (3%), and other ethnicities (4%). Approximately 66% of respondents had at least a college degree. All participants were individuals who spoke English as their first language.

4.3 Methods

Respondents completed a survey composed of four sections. In Section 1, I introduced participants to the concept of cooperation as defined in this work: “This survey concerns how people ask and give help in the workplace and why and when they do this. By help we have in mind cases in which: 1) a person helps a coworker with a task; 2) without being required to do so; 3) at some personal cost to the person who provides the help. Here is a brief explanation of each of these components.” This part, which included practical examples, was necessary to ensure participants understood the topic of the survey and provided pertinent answers to the following questions. (See Appendix A for the full text of the survey.)

Section 2 was distributed to participants in two versions. To one half of the sample (N=101, version A), I asked to describe a recent occasion in which the participant had sought and received help from one of their coworkers; to the second half (N=101, version B), an occasion in which the participant had helped one of their coworkers. In follow-up questions, I asked the participant why they had decided to ask for help to that coworker among all the ones they could have approached for help (version A), or the reasons why they had decided to help that particular coworker (version B). In other questions, I asked participants whether they had ever felt reluctant to ask for help from, or provide help to, their coworkers, the factors that made them feel reluctant, and if not, the factor that enabled them to feel comfortable about asking or providing help. In an attempt to capture the evaluations that drive these decision-making processes, in particular the decision to seek others' cooperation, I included the following question in version A of the survey: "When you have a work-related problem, how do you go about deciding whether and to whom to ask for help?".

In Section 3, I probed participants' interest in assessing the cooperative relations between their colleagues and their motives to do so. At the beginning of the section, I asked participants to briefly describe two recent occasions in which one of their coworkers had helped another coworker. This redirected participants' attention from their relationships with their colleagues to the relationships between their colleagues, and allowed me to check whether participants were still answering the survey with the correct definition of helping and cooperation in mind (i.e., help that is task-related, discretionary, and costly to the helper).

Finally, in Section 4, I collected data about participants' demographics to the purpose of describing the sample. In this section, I also collected data about respondents' autonomy and discretion at work to verify that my respondents enjoyed at least some freedom in deciding

whether and to what extent to cooperate with their colleagues. I would expect individuals who don't have such freedom to be less motivated to assess how their colleagues relate to one another, or to be less influenced by such perceptions, if they can't regulate their behavior accordingly.

One-hundred five participants (97%) reported their autonomy at work through an adapted version of the nine-item work autonomy scale developed by (Morgeson & Humphrey, 2006). The scale measures work autonomy in three domains: work-scheduling (e.g., "I can make my own decisions about how to schedule my work"), decision-making (e.g., "I have significant autonomy in making decisions in my job."), and work methods (e.g., "I can decide on my own how to go about doing my work."). I adapted the items so that instead of stressing the characteristics of the job ("My job allows me/gives me/provides me"), they stressed what the participant felt they were able to do in their job (e.g., I rephased the original item "The job allows me to make my own decisions about how to schedule my work" as "I can make my own decisions about how to schedule my work", and so on for all items). I collected answers on a 5-point agree-disagree scale (1 = *Strongly Agree*; 5 = *Strongly Disagree*; $\alpha = .90$, $M = 4.01$, $SD = 0.71$). Approximately 63% of the people who completed the scale scored 4 or above; 90% scored above 3. This data suggests that most participants enjoyed considerable autonomy in their work and therefore they were suited to answer my questions.

I also asked participants to explicitly report, on a 5-point agree-disagree scale, how much discretion they had in their job to help their colleagues ("I have enough discretion in my job to help my coworkers with their tasks if I want to"; 1 = *Strongly Agree*; 5 = *Strongly Disagree*; $M = 4.39$, $SD = 0.64$), as well as how much discretion their colleagues had to help them ("My coworkers have enough discretion in their job to help me with my tasks if they want to"; 1 =

Strongly Agree; 5 = *Strongly Disagree*; $M = 4.19$, $SD = 0.77$). Of the 195 people who completed the scale, 92% agreed or strongly agreed with the former statement and 87% agreed or strongly agreed with the latter. Overall, the autonomy measure and these two measures indicate that, with very few exceptions, participants were employed in jobs that afforded them autonomy and could freely exchange help with their colleagues.

4.4 Analyses and Results

Helping Acts. In my theoretical development, I defined cooperation as a discretionary act with which someone contributes task-related resources to someone else at a cost to themselves. To develop a better understanding of the phenomenon of cooperation in the workplace, I started by analyzing participants' answers to my question about a recent occasion in which they had either sought or provided help from/to one of their coworkers. I asked participants this question at the start of Section 2 of my survey after providing them with a thorough definition of cooperation in Section 1 (Appendix A). I further stressed the definition by asking them to be specific and report what they had done for their coworker, or what their coworker had done for them, and the sacrifice that they had made, or they thought their colleague had made. I collected 202 usable responses, each describing an episode of cooperation at work, from the totality of my sample. Participants' responses ranged between 16 and 222 words (mean = 56 words per response; $SD = 29.3$ words; median = 53 words).

My coding approach mirrored the one used in qualitative research conducted on archival data (Suddaby & Greenwood, 2005; Carton, 2018) and survey responses (Thompson & Bolino, 2018). Table 3 shows the progression of my coding. First, I coded the raw data by categorizing them in first-order categories that represented the type of helping act described by the participant. This process yielded the eleven types of helping acts defined and exemplified in

Table 2. During this first part of the coding process, I iterated between participants' responses, my initial first-order categories, and the OCB literature until I could find a coherent definition of each helping act that succinctly summarized participants' responses.

Insert Table 2 about here

Insert Table 3 about here

The second step of my coding process was to categorize my first-order categories in higher-level categories that captured their commonalities and represented broader conceptualizations of cooperation in the workplace. This step yielded the five second-order categories that appear in the last column of Table 3, into which my initial eleven helping act can be categorized. These second-order codes essentially represent the main purpose served by different types of helping acts: standing in for a colleague, help a colleague keep up with their workload, provide a colleague with task-related resources, contribute to a colleague's professional development, and watching over a colleague for the colleague's sake. The purpose in creating these higher-level conceptualizations of workplace cooperation was to abstract from the specific examples provided by my sample so as to be able to potentially think of other examples of cooperation that may have not emerged in my data but are nevertheless possible.

Overall, this process provided food for thought for the development of my subsequent studies and my understanding of cooperation in the workplace. In particular, by showing the many forms in which cooperation occurs in the workplace, this preliminary analysis highlights the many opportunities that people have to exchange help with their colleagues but also the many ways in which people incur into costs for others at work.

Reasons for Asking a Colleague for Help. Following their description of a recent occasion in which the respondent had sought help from a colleague (N=101, version A), I asked respondents to elaborate “on the factors that had let you to decide to turn to that colleague for help among the set of all the those you could have asked.” I collected usable responses from 100 participants of length between 5 and 78 words (mean = 24 words per response; SD = 14.4 words; median = 20 words).

I categorized participants’ responses using the same approach I used in my analyses of helping acts. Since a few participants reported more than one reason for which they had decided to approach their coworker for help, my individual coding units were the segments or phases, in participants’ responses, representing a “factor,” or the “factor,” that had let the respondent to approach their coworker for help. Participants’ responses yielded a total of 114 reasons for why they had decided to ask a particular colleague for help. In my coding sheet, I referred to these reasons as “entries” that I then analyzed for commonalities and the possibility to categorize them through higher-order codes.

This first step yielded the seven reasons to approach a particular coworker for help that I have included and defined in Table 4. Contrary to my previous analysis, whose aim was to develop a rather comprehensive inventory of helping acts, in this case I not only categorized participants’ responses, but I also looked at the frequency with which each first-order category appeared in my dataset. The first column of Table 4 shows the percentage of the number of entries, out of all entries derived from participants’ responses, that I categorized in each category. Such percentages must, of course, be interpreted with caution because the sample is small. I conducted this analysis with the goal of getting a rough sense of whether reasons related

to the structure of cooperative relations in one's work environment were present anywhere in the data and, if so, where they stood roughly compared to alternative decisive factors.

Insert Table 4 about here

Of the seven reasons reported by participants, one was distinctively about the chosen coworker's reputation for cooperation in the workplace, that is, their being helpful in the past, either in general or with the respondent (e.g., "I asked this person because I had seen in the past that they were always helpful."; "He was always helpful since he started with us"). I take the fact that this reason was mentioned by participants as a sign that lends preliminary support for my theoretical ideas. For a person to develop a reputation for cooperation in the eyes of a colleague, they must display cooperative behavior either toward that colleague or towards others, which implies that the colleague is registering their behavior and factoring that into their choices. Participants whose responses fell into this category described their coworker by phrases such as "always helpful," "very approachable," or "always happy to help," which spoke of a person's general behavior well beyond the specific instance of cooperation that the participant had recalled a moment before. A coworker's reputation for cooperation for one of the reasons most frequently mentioned by participants (14.2% of all entries), alongside with their trust in the coworker's ability to provide valuable help (38.1%), their personal friendship relationship with the coworker (14.2%), and the fact they and their coworker used to exchange favors and help one another (13.3%). Participants also mentioned cases in which they turned to a coworker for help because the coworker was a subject expert in the domain in which they needed help (8.8%), or simply because he or she happened to be available or within reach (9.7%) (Table 4).

While coding this data, I iterated between participants' responses, first-order categories, and second-order categories. I detailed the progression of my coding in Table 5. The second-order categories emerged naturally from the first-order categories. Based on my first-order codes, I was able to identify three main "effects" or higher-level factors that drive people's decision of whom to turn to for help (Table 5): the person's characteristics (ability, expertise, reputation for cooperation), the relationship between the two (friendship and cooperation), and the work context (opportunity and formal roles).

Insert Table 5 about here

Deriving these second-order categories gave me confidence in the validity of my first-order categories and lent some support to my insight that the choice of whom to turn for help may be more nuanced than going to one's friends versus those who are the most competent at the task at hand (Casciaro & Lobo, 2008; Joshi & Knight, 2015)².

Reluctance Versus Comfort in Asking for Help. To further probe the evaluations people may conduct to decide whom to approach for help, I asked the participants who answered my previous question whether they had ever felt reluctant to ask for help from their coworkers. To the participants who answered affirmatively, I then asked why they had felt so; to the participants who reported they had never felt reluctant, instead, I asked what factors enabled them to feel comfortable asking for help at work. Not surprisingly, the majority of participants (60.4%)

² A follow-up question in which I explicitly ask participants how they went about deciding whether and whom to ask for help did not generate any new meaningful categories, of either first- or second order. Participants' answers essentially replicated the themes that emerged from this question, so their answers are not reported. The only new information that emerged from participants' responses concerned basic conditions coworkers had to meet for being considered for help, such as the coworker must be at least an acquaintance, must be not extremely busy when help is needed, and must have at least some familiarity with the task (condition necessary to be able to help). These conditions define the option set (the set of the people among whom someone can choose), rather than being criteria for choosing among one's options.

reported they had felt reluctant to ask for help for their colleagues in the past (Figure 4, Panel A). The reasons these participants mentioned replicated the findings of previous research on the concerns that people have in asking for help (see Thompson & Bolino, 2018, for a comprehensive analysis). People reported to be concerned about appearing incompetent or insufficiently prepared (e.g., “I always feel a little reluctant because I feel like asking for help is an admission that you can't get everything done yourself”), their fear to disturb their colleagues (“Not wanting to put more onto their workloads and burden them”), their mistrust in their colleagues’ motives (“When I felt the person I would ask cannot be trusted. Backstabbing...”), the fact they did not trust their colleagues’ capabilities to carry out the task (“Around co-workers I am not familiar with if they are covering a shift for example, I am reluctant to ask them for advice because I am not aware of their capabilities, and whether their advice can be trusted”), and their anticipation of a negative response (“The fact that I knew that they would be unkind in their response”).

Insert Figure 4 about here

When I asked the participants who said they had never felt reluctant to ask for help from their coworkers what enabled them to feel comfortable asking for help, the majority of them (62.5%) — again not surprisingly—mentioned their positive personal relationships with their colleagues as the main factor (e.g., “How my work relationship is with them. And their character. If I have known them long enough to trust them.”; “Depending on how long I have known them, or if I have helped them.”). This is consistent with my previous preliminary findings, and previous research, that shows that when a person decides to approach another for help, they often do so because of the relationship (friendship or cooperation) that they have with that person. This

result —people feel comfortable asking for help when they have positive relationship with their colleagues— makes sense in that conceivably more positive relationships with one's colleagues ease each of the concerns, mentioned above, associated with asking for help.

But I found interesting that, for the remaining 37.5% of the participants that never felt reluctant, the main factor easing their concerns about asking for help was not their relationships with their colleagues but their generalized sense of cooperation within the group. For instance, one respondent wrote: “Working as part of a collaborative team, everyone is working towards the same goal. Everyone is friendly and works as part of a team so it is comfortable asking for assistance.” In categorizing responses as indicative of the perception of a cooperation norm or high levels of cooperation, I look for answers that included words such as “everyone” or “one another” and their pronoun “we” or “they” or “my colleagues.” Other sample responses were: “Great working team with friendly helpful staff who all support each other” and “That we all get on as team, that we can rely on each other and that we trust each other to do the right thing by one another. We have a really good team where I work and we help each other out all the time.”

In my theorizing I argued that people regulate their cooperative behavior (by actively seeking opportunities to exchange resources) according to their perception of the level of cooperation with their work group. Seeking help is a way of proactively trying to build cooperation because it initiates an exchange that can potentially develop into a long-term exchange relationship. While the expectation that people regulate their cooperation to their perception of the cooperation norm with their group may not surprise, in my theorizing I added to this statement the important contingency that such perceptions may be off the mark. This preliminary data does not allow me to test whether the participants who described their group as highly collaborative were accurate or were overestimating the positive interactions within their

group. For now, the data show some sign that people are affected by their perception of the relationships within their group and that those relationships may loom larger than their own personal relationships with single individual colleagues. I will come back to this key point later in this chapter.

Reasons for Deciding to Help a Colleague. In version B of my survey, I asked half of my sample to recall and describe a recent occasion in which a colleague had approached them for help and they had decided to help that person (N=101). Immediately after that question, I asked participants to explain the reasons why they had decided to help that person (“Please explain what led you decide to help your coworker”). I collected usable responses from 96 participants, which ranged between 2 and 108 words (mean = 24.6 words per response; SD = 18.9 words; median = 20 words).

I categorized participants’ responses using the same coding procedure I described earlier. Because some participants mentioned more than one reason why they had decided to help their coworker, my coding unit was the phrase or segment of the participant’s response representing a reason. Like before, I treated such segments as ‘entries’ in my coding sheet. I collected a total of 101 entries across all usable responses which I then assigned to first-order codes.

The result of my coding process is on Tables 6 and 7. I identified eight reasons why people decided to accept their colleague’s request for help, which I included and defined in Table 6 along with the frequency with which they appeared among all the entries (bits of coded data) I derived from participants’ responses. Once again, my goal in computing these relative frequencies was to get a rough sense of whether people had chosen to help coworkers for reasons related to the structure of interpersonal relations in their working environment (e.g., pressure to

comply with the perceived cooperation norm, or anticipation of being reciprocated based on the coworker's reputation) rather than their personal relationship with the coworker (e.g., liking) or other factors (e.g., task interdependence).

Insert Table 6 about here

Of the eight reasons offered by respondents, only one was about the perception of the group as a whole: some participants indicated in their responses that they had decided to help the coworker because of a perceived or expected cooperation norm within their group ("Small issues happen, human error is a common thing. I know that if I had made the same mistake my coworkers would help me in the same way."). These participants acted upon the assumption that others would have done the same in their shoes, regardless of who specifically asked them for help; there is not reference in their responses to anything related to the specific person who approach them for help. More frequently, though, participants highlighted their empathy towards the difficulties faced by their coworker (28.7% of the number of total entries), their sense of duty (27.7%), and the fact that they use to collaborate with the coworker or that they wanted to return a favor (13.9%).

I subsequently tried to make sense of these first-order categories by assigning them to second-order categories that highlight what they have in common and what set them apart. This process yielded the three higher-order categories or conceptual "effects" in Table 7. These higher-level codes mirror the ones reported in Table 5; subjects decided to help for reasons that have to do with whom they were (their empathy and sense of duty), their personal relationship with the person who approached them for help (cooperation, friendship), and the characteristics

of their work context (task interdependence, perceived cooperation norm, opportunity, and formal roles).

Insert Table 7 about here

Upon reflecting on these findings, the fact that reasons related to the perception of cooperation within the group, or coworkers' reputations for cooperation, did not come up often among participants' responses (4% of total entries) could be a sign that people were working in environments in which they perceived weak cooperation norms and could therefore not invoke them as the reason why they had decided to help. Concerning the role of empathy, when people mentioned their empathy and their sense of duty as reasons for helping the coworker, it is still possible that their empathic, helpful response to their coworker's request was specific to that coworker (cf., Zaki, Bolger, & Ochsner, 2008), rather than a general tendency to feel for others or a general perceived moral obligation to help those in need. In other words, it is possible that interpersonal mechanisms play an even larger roles in explaining cooperation and helping behavior than the one that transpire from this preliminary data.

Reluctance and Perceived Obligation to Help. I further probed participants' motivations to help by asking whether they had ever felt reluctant to help, if so when and why, and if not, what factors enabled them to feel comfortable providing help to their coworkers. Not surprisingly, the vast majority (65.3%) of the participants who answered this section of the survey reported that they had felt reluctant to provide help to their coworkers in the past (Figure 4, Panel B). The reasons they offered ranged from their being busy and unable to take time out of their schedule (e.g., "The desire to get on with my own work"; "I am already doing too much and don't really have time"), to the poor working relationships with their colleagues and their lack of

reciprocation (e.g., “It would have been unappreciated”, “The fact they had not helped me previously”), and —directly relevant to my line of research— their coworkers’ general reputation for cooperation (e.g., “Their reluctance to help others”; “I know they wouldn't help people if they were asked”). So, while reasons related to coworkers’ reputation for cooperation did not come up in my previous question about reasons for helping, they did come up in this question about reason for not helping.

This finding, combined with the previous one about the role of reputation in asking for help, suggests that people are motivated to assess others’ reputation for cooperation to know whom to ask for help (who are the “givers”) and whom not to help when approached by others (who are the “takers”). As I mentioned before, it is hard to assess someone’s reputation without observing or gathering information about their behavior with others beyond one’s own dyadic relationship with that person. Though it is possible that people have negative relationships with coworkers that a bad reputation and vice versa, both conceptually and in participants’ responses, it is possible to discriminate between the dyadic relationship (e.g., “Their attitude towards me”) and the coworker’s general reputation (e.g., “The coworker's previous attitudes towards helping others”).

Among the 34.7% of participants who reported they had never felt reluctant to provide help to their coworkers, I looked for the percentage of those who reported they felt comfortable helping their colleagues for reasons related to the structure or general level of cooperation within their group. About 17% of participants reported that the most important factor that enabled to feel comfortable providing help to their coworkers was their perception of their group as collaborative (Figure 4, Panel B). Obviously, participants did not report that that was their idiosyncratic perception of their group; instead, they stated it as a fact: (e.g., “The knowledge

that we are all on the same side, and that they would do the same for me”; “Good team spirit and work group”). Other factors that enable participants to feel comfortable providing help included their personal relationship with their colleagues (“...they've helped me before...they're generally thankful or nice to me”; “Being friends with my team”) and their desire to contribute to the team (e.g., “Things will run more smoothly”; “Knowing it makes a difference to the colleague and to the team.”).

In a follow-up question, I asked participants whether they had ever felt, not reluctant, but compelled to help. If they had never felt so, I asked what were the most important factors that enable them to feel free to decline their coworkers’ requests for help when necessary. I asked these questions to probe whether the perception of cooperation in one’s workgroup may cause one to feel compelled to help others for fear of being “punished” or “reprimanded” by the group. The majority of participants (69.3%) reported that they had felt compelled to provide help to their coworkers, but only a low percentage of them said the reason had to do with (their perception of) their group (7.1%) (Figure 4, Panel C). In most cases (91.4%), respondents reported they felt compelled to help with the same reasons that emerged from my previous question on why they had helped a certain coworker, that is: their empathy and compassion for their coworkers (e.g., “Seeing others struggle”), their sense of duty (e.g., “It had to be done and I wanted to have input”), their relationship with their coworkers (e.g., “She is my friend and I know she would do the same for me”), the group’s task interdependence (e.g., “Trying to limit the impact to other team members”), and reasons related to their and their coworkers’ formal role (“manager request, [I] can’t say no”). However, the participants who had felt compelled for reasons related to their group (7.1%) raised the type of concerns I was expecting, that is, the risks of negative reactions on the part of their colleagues (e.g., “Complaints from other co-workers”,

“Peoples’ opinions of me if I said no”, “[...] it shows I am willing to go the extra mile”). Others emphasized that they felt they and their coworkers were all in it together, hinting to a sort of moral obligation to help (e.g., “Team cohesion, win and lose as a team”; “General team spirit and compassion.”).

The participants who reported they had never felt compelled to provide help to their coworkers did not offer any new insights relative to the ones that emerged from previous questions. Respondents with a working and friendly relationship with their colleagues, for example, were generally more able to decline requests thanks to a mutual understanding of one another’s conditions. As one participant explained: “Good communication between the team and a mutual understanding that, because of the demands on the job already, help will not always be forthcoming if the workload is too high as it is!”. Interestingly, it seems that the same spirit of collaboration that made some respondent feel compelled to help enabled other respondents to feel free to decline.

Perceptions of Intragroup Cooperative Relations. In the last part of my survey (Appendix A, Section C), I asked all my participants (N=202) a few questions about their perceptions of the relationships between their colleagues. My goal in doing so was to gather some evidence that people do indeed pay attention to such relations (or at least have a perception of them that could sway them) and some insights about the motivations they have to do so. First, I asked participants to very briefly recollect two recent episodes in which a colleague of theirs had helped another colleague of theirs at work. These answers did not add any examples of cooperation acts beyond those already emerged, but they allowed me to check that participants had understood the questions and were still operating under the definition of interpersonal

helping that I had provided them at the beginning of the survey. All participants provided pertinent answers to this question.

To begin, I asked participants whether they had ever tried to understand who helped whom among their coworkers, and if so, to elaborate on the situation that had led them to do so. Of the 202 participants to whom I asked this question, 197 provided usable responses, and of these, 101 (52.6%) responded affirmatively (Figure 5.1).

Insert Figure 5.1 about here

Because I left participants free to elaborate on the situation that had let them try to understand the structure of cooperation within their group, participants brought up a number of different angles from which to look at such perceptions. Some highlighted their motivations. Among the participants who did so, a common theme in their motivations was the need or desire to identify the people worth collaborating with, or “potential cooperators” as I defined them in my theoretical exposition. Here is a sample of participants’ responses:

“I generally observe people in general in order to scope out them as people. This shapes my relationship with them. Therefore I've tried to understand why my colleagues help one another and I can genuinely say that they are just lovely people trying to support one another's daily lives.” [1]

“Yes, in paying attention to who helps who and with what you can understand individual strengths and weaknesses. This can be of benefit to me when I need assistance. It can also help me identify areas that myself or others in the team can improve if no one is able to help.” [2]

“I have realised that a few of my colleagues will only help a coworker if there is something in it for them. Whilst others will often help, particularly if they know that you would do the same for them.” [3]

“It's mostly even in my workplace. Some people help out less than others so there have been general situations where it's useful to know who is likely to reciprocate any help given.” [4]

“I am generally quite observant of the dynamics within the teams I work in. I know who is most likely to be helpful and who I therefore feel confident approaching if I need help” [5]

A small number of participants in supervisory roles explained they needed to pay attention to the relations of cooperation within their group to fulfill the responsibilities of their job. This highlights a potential boundary conditions of my theory: it is possible that people act upon, or are swayed by, their perception of cooperation among their peers in very different ways than they do with their perception of the relationships among their subordinates. As you can see there is stark difference in the underlying motivation between the previous quotes and the following, and I would expect such difference to have different implications for behavior:

“Absolutely. I manage a group of my work team and so I always attempt to identify who the team players are and who is comfortable helping. I am more likely to ask them to help others and pass on positive feedback to other hiring managers.” [6]

“I always check to see who is the most to least helpful in case someone is busy and I will need to go down the line to get help if needed. This just makes work easier in general.” [7]

“When I took on my current role I was made aware of the friendships within the department, so I could use this knowledge when approaching co-workers. For example co-worker A was friends with co-worker B. A was always behind with her work, but B was always very well organised. I asked B to help A, but asked B to make it look like she was doing this voluntarily, rather than myself imposing this decision on A, who would have refused direct help from me.” [8]

When participants did not highlight their motivations for understanding who helped whom, they highlighted other interesting aspects of their perceptions in their responses. For example, some highlighted the features of the social structure that were most salient to them. Some participants seemed to be aware of single dyadic relationships, others of the presence of

subgroups within their larger group, and still others of the presence of numerous cooperation relations among their colleagues:

“I don't know if there is a specific situation, but it seems like each person relies on a specific person within their group when they need help. It is generally the same person helping each time.” [9]

“I believe I am aware of the individual groups amongst my large team of coworkers, social aspects greatly affect the likelihood of a coworker asking another for help. I am aware what coworkers who would volunteer to help others on most occasions.” [10]

“I noticed cliques where some people help each other as teams while a few work by themselves. I have personal favorites that I help when I can and others I try to ignore since they are not reciprocal for the favors.” [11]

“There appear to be some colleagues who have forged relationships over time, perhaps sharing common interests and or goals. However those strong bonds can sometimes be difficult for newer staff to break through and then other factions begin to form.” [12]

“Everybody seems to help everyone if they are asked too.” [12]

Finally, participants who did not talk about their underlying motivations or how they perceived the structure, talked about the mechanisms that they thoughts were at play to shape cooperation. That is, they talked about their implicit theories of what was driving the presence or absence of cooperation between colleagues for what they could tell. The following quotes are telling of the human tendency to identify and rely on relational schemas as quick and dirty heuristics to both understand how people relate to one another and to know what to expect of others. Some participants formulated their thoughts or heuristics in the form of “if, then” statements, others didn’t but their reasoning followed the same logic. Note how all the following statements are essentially “quick rules” to read and predict interpersonal relationships in the participant’s work environment:

“Coworker who have worked together for some time and are more familiar with each other will be more inclined to help each other. Errors are less likely to occur as they will

'cover' for each other if errors are made or help each other as they have a history of 'favours'." [13]

"Personally and from experience [of] lower graded staff, assistants and practitioners are more willing to help and support each other. Also if you help and support a co-worker you are more likely to receive support when needed." [14]

"Generally, the more experienced coworkers will help the less experienced ones, although there are times when fellow coworkers with specific skills will also help with certain problems because they are the best qualified to go about this." [15]

"People who are friends will most often help each other out. Unfamiliar staff don't tend to help each other as much." [16]

"Normally it's who your friendlier with or you tend to help people that will help you or have helped you." [17]

"Persons that have a clique tend to help individuals on that group." [18]

It is important to note that many of the participants who said they had never tried to understand who helped whom among their coworkers (47.4%) had a mental representation of such relationships. What distinguishes these participants from the others is that they were operating under certain assumptions—they assumed the structure of relations was of a certain kind—therefore they did not feel the need to dig further. Here are what some of these participants reported in their answers:

"It's pretty much everyone helping each other out as there's always something one person doesn't know that another does so I guess it's reciprocal." [19]

"Not really. I just assumed that everyone helps one another until it was pointed out that people feel more comfortable asking me for help than asking other people. This has happened in more than one job. I just enjoy being able to share my knowledge with people." [20]

"No, I haven't but I presume that we all help one another in times of need." [21]

"No as it is a clear chain of command." [22]

"Never really. I figured people help each other to be essentially good people." [21]

"I've never given it a second thought because we all try to help each other whenever we can. It's just how it should be." [22]

Other participants who answered negatively had sweeping perceptions of cooperation and a rather simplistic view of the structure of relations. There are the participants whose mental representation resembled a network with maximum closure as I have previously defined it:

“No, we all just help each other out with whatever problem arises.” [23]

“Everyone helps everyone.” [24]

“No, we work in an environment where we always help each other regardless.” [25]

Despite the fact that these participants did not report interest in understanding the structure of relations among their colleagues does not rule out the fact they may have been affected by their mental representation of it. By operating under certain assumption or upon a very positive understanding of the structure, they were probably still regulating their behavior to the reality as they were understanding it. So, these participants are not completely out of the scope of my theory. They still are, if their assumptions, and the comfort they find in them, is misplaced or over optimistic.

Right after this question I asked my participants: “Suppose someone could tell you in detail who helps whom - and who doesn't help whom – among your coworkers. Would this information be useful to you?” All participants answered this question (N=202) and 66.7% of them answered “Yes, it would be useful to know who helps whom.”, an increase of roughly 14 percentage points relatively to the previous question (Figure 5.2).

Insert Figure 5.2 about here

To these participants I then asked to briefly describe how they would make use of that information. I coded participants' responses through the same approach I used for previous

questions. Since participants sometimes mentioned more than one way in which they would find the information useful, my coding unit was the segment of their response in which they explained one way in which they would use the information. I collected 122 of such segments and categorized them into five categories representing five ways of using the hypothetical accurate knowledge about the structure of cooperation within one's workgroup. I reported the five categories in Table 8 along with their definition and sample responses.

Insert Table 8 about here

The category that came up most often in participants' responses was about identifying reliable exchange partners to whom to turn for help when needed *and* to whom offer help. Participants' responses into this category show a desire not only to find someone to rely on, but also someone with whom to have a mutual exchange relationship. We know from previous research that people rather prefer not to ask help than having to ask for help to someone they anticipate they might not be able to reciprocate, because of the resulting feeling of indebtedness (Fisher et al., 1982; Thompson & Bolino, 2018). As I argued in my theory, such considerations require a mental representation, albeit only incomplete and tentative, of cooperation relations in one's environment to identify individuals who are not only willing to help, but also in need or willing to accept help. As one participant noted: "It would help to know who I should spend more time helping and working alongside with in the future. I would go out of my way to help someone who is a team player." Many participants noted that they would be willing to help only those who helped others, which underscores the inherent, necessary balance in the exchange of resources that most people must pursue in the workplace. For instance, one participant wrote: "I would determine who to ask and be close to. And the people that don't help, would never receive

help.” Another wrote: “I would use the information to decide who is worth trying to help and who is just lazy and wants someone else to do their work.” Others made similar remarks. These participants essentially said that they wanted to expend resources for people with whom they could expect to have a mutual cooperation relation, and that knowing the structure of cooperation relations would have helped them achieve that goal.

Some participants reported they would have used the information about the structure to obtain help, but in a more sophisticated way than just going to the most helpful. If they had known the structure of social relations, they would have played it to their advantage:

“If someone who helps me has a good relationship with another person who helps them I think that I would stand a better chance of them helping me.” [26]

“By knowing who helps who, I may need specific help from someone that isn't very friendly to me. I may need to exploit a friendship to get what I need to finish my job.” [27]

“The info could be manipulated, so that if I did need a favour, I could ask in a roundabout way rather than go to the person direct, if it meant a better chance of help!” [28]

In my theory, I argued that one reason why people should find helpful to know the structure of cooperation is to be aware of how much they should go out of their way for others versus how protective they should be of their time and other resources. This would help them protect their reputations for cooperation while not running out of the resources they need to invest on their tasks. This came up as well among the responses³:

“It would help me make better informed decisions on who I could ask for help. It would also make me consider how much time I spend helping others by seeing how often they help others.” [29]

³ I report the whole response of the participant, though some segments are more relevant than others to the point I am making.

“I would first of all try to be someone known to help others. Then I would make sure that I was able to work with those who help others.” [30]

“I would be able to decide who does not receive a lot of help and I would be willing to help them.” [31]

These participants who left the comments above would have not only sought potential cooperators, but they would also helped others in need. Whether they would have done so out of a genuine concern for others, or strategically to enhance their social standing in their group (Flynn et al., 2006), can’t be really inferred from their answers. But it is notable that some people would have used the information about the structure to make informed decisions about their helping behavior in ways that would have benefitted their reputation.

For the purpose of categorizing responses in meaningful groups, I categorized the responses above with the others I cited previously under the rubric “finding exchange partners” because it seems that the ultimate goal all these participants was to wisely select with whom to exchange their limited resources, whether to have partners to rely on when needed, to protect their reputations by tailoring their contributions to others, or a mix of both motives.

As I show in Table 8, finding exchange partners was not the only ways in which participants would have use that information; of all the 122 usable segments I obtained from their responses, 23.8% of them were about identifying whom to rewards, promote, or give feedback to. These answers came from participants in managerial positions. A third theme that emerge in the data was the usefulness of the information about the social structure for planning purposes (18%), and a fourth was its usefulness to identify subject experts (8.2%).

Table 9 shows my entire coding process and multiple sample responses for each category. My first-order categories fall naturally into two higher-order categories, which also represent two

themes of outmost importance when it comes to cooperation in and across organizations: identifying whom to cooperate with (either because of the potential for exchange or their specialized knowledge) and how to foster cooperation and encourage people to help one another in and across organizational boundaries. The presence of these two categories turned to be quite even in my data (58.2% versus 41.8%), consistently with their importance for individuals and organizations (Cross, Cross, & Parker, 2004; Lazega, 2001; Gardner, 2017).

The Role of Resource Independence in Cooperation. Finally, I asked all my participants to make a choice. I presented them with a scenario in which they had just been asked to join a new workgroup within their organization but given a choice between two groups. Group 1 was a highly collaborative group where everyone helped everyone. Group 2, instead, was a group of self-reliant individuals that prioritized their work over helping others (see Appendix A, Section 3 of the survey for the actual wording). Before asking the participant which group they preferred to join, I gave them this additional piece of information: “You envision you won’t need much help from your coworkers and remaining focused on your tasks is important to you.” At that point, I asked them to make their choice.

The information provided in the vignette is minimal and if one had to bet which group another person would choose, Group 1 would be the safer bet, and the most rational in a sense: should you ever need help, Group 1 is the guarantee that you will get it, while Group 2 does not. As one participant who chose Group 1 noted: “Even though my job nature may not require to work together much, it's still reassuring to know that in instances where you may need support, it will be readily available.”

What I wanted to try to get at with this question was to see whether at least a part of my sample would show some concern about the implications for performance and productivity for a self-reliant individual in a high collaborative group in which cooperation is presumably expected though not formally demanded. Since it's a choice that takes seconds, I reasoned that such a concern had to be salient in a participant's mind for the participant to choose Group 2.

Out of 202 participants, 167 (82.7%) chose Group 1 and 35 (17.3%) chose Group 2.

Insert Figure 6 about here

Right after the participant made their choice, I asked them to elaborate on the factors that had led them to choose either group. I targeted this question to the people who had chosen Group 2. My goal was to probe the evaluations that would lead a person to choose to work in a group of rather uncooperative individuals over a group of very supportive colleagues. In my theory, I argued that the disadvantage of Group 1 is the challenge it poses to performance should cooperation become a source of distraction. Given that I told my participants they would not need much help from their coworkers and that staying focused on their work was important for them, I wanted to see whether any participant would express a concern for their performance if they had chosen Group 1.

The participants who chose Group 2 reported they had made that evaluation. For example, one participant wrote: "I am able to get on with all my tasks and I won't need help from others. Productive work environment." Another participant wrote: "It may mean we can all get on with our own work for the majority of the time." Obviously, these participants' choice was as much driven by the information I gave them as by their personal preferences and individual differences. Someone noted in their comments that it was a "better personality fit" and

“Definitely fits in more in line with my attitude and the way I am at work.” So, it is possible some of these participants would have chosen Group 2 even if I had not added any information about their non-need for help.

Overall, considering how rudimentary my question was, and how naturally appealing Group 1 is, the fact that some participants highlighted the potential costs for cooperation for performance lends some support for my insight that resource independence may play a role in the consequences of errors in the perception of workplace cooperation. I have argued that for a self-reliant individual, mentally picturing one’s workgroup as Group 1 may come at a great cost for their performance. For self-reliant individuals who need to protect their performance, a mental representation of their group that resembles Group 2 may serve them better.

4.5 Conclusion

Across a range of questions, through Study 1, I obtained preliminary evidence about the complexities that surround workplace cooperation and the resulting many concerns and evaluations that guide people’s cooperative behavior. First, the study has shown that the workplace offers a multitude of occasions for cooperation. This speaks to the importance and need for cooperation, but also to the perils associated with it. Like anything costly, cooperation needs to be expended wisely. The people who completed my survey had no problem in recollecting instances of cooperation between themselves and others and between their colleagues. But when asked why they had helped or asked for help to their colleagues (which are both of instances of cooperation since they either initiate or sustain an exchange), they articulated a variety of reasons, which as a whole show that the decision to cooperate is rarely random. The main idea of this work is that one of the factors that affect people’s cooperative behavior is the structure of cooperative relations as the individual perceives it. Some of the

responses I collected from my participants in my questions about their asking or giving help pointed to that direction. Among the factors that people took into account in asking for help was the other person's reputation for cooperation and, among the factors that they took into account in giving help was the general level of cooperation within their group. Both of these assessments require some sort of perception of the relations of cooperation in one's surroundings and I therefore take these preliminary results as encouraging.

When I asked my participants whether they had ever tried to understand the structure of cooperation among their colleagues, the majority of them answered affirmatively and many of those who answered negatively still proved in their comments that they were acting upon certain perceptions of cooperation in their group, even if they felt no need to exert effort to either form a better impression or test their assumptions. When I asked my participants whether they would have found helpful to know who helped whom among their coworkers, an even greater number of them responded affirmatively. Half of the comments in which they articulated how they would use that information was about the need to identify reliable exchange partners – colleagues they could rely on for help but also help in return. Some of them spoke about how they would have maneuvered their knowledge of the structure of relations to secure help, and others pointed out that, if they had known the structure, they would have known how much to do for their colleagues given what their colleagues did for one another. At the core, all these participants spoke about the need to choose carefully whom to exchange resources with, both to expend resources with people who can return them and to protect their reputations. These are precisely the concerns and evaluations with which I opened my theoretical arguments, so these preliminary findings build preliminary support.

Chapter 5: Scale Development Study

5.1 One-Item Omnibus Measure of Interpersonal Helping and Perceived Intragroup Cooperation Scale

In the first part of this study, I develop a measure of interpersonal helping that I can use both at the dyadic level and, adapted, at the group level to measure the relations of cooperation that exist within a workgroup and members' perceptions of such relations. In Study 3, I will use an approach to measure the perception of interpersonal relations that ask respondents to provide their perception of each single dyadic relationship within their workgroup. Besides reporting their own relations of cooperation with others (who they help and who helps them at work), participants will also report who they think helps whom among their colleagues. The method is demanding in that it requires participants to go through the list of all their colleagues and for each of them to indicate to whom they think that person provides task-related help discretionarily and at a cost to themselves.

To ask my participants to do this assessment, I need a concise, one-item measure of interpersonal helping that captures all the key elements of my definition of cooperation, is easy enough to process, and therefore can be asked repeatedly for multiple dyads. Whereas in the OCB literature there are scales that have been widely used to measure interpersonal helping (Williams & Anderson, 1991; Anderson & Williams, 1996; plus various studies that have used adapted versions of these scales), choosing a single item from these scales is theoretically problematic. The goal of multiple-item scales is to sample the theoretical domain of interest through items that capture several aspects of the domain and collectively provide an adequate and parsimonious representation of it. The scale developed by Williams and Anderson (1991), which represents the gold standard to measure interpersonal helping in the workplace, achieves

this through seven items that represent different types of helping, that is, different ways through which a person can assist their coworkers (e.g., “Helps others who have been absent.”; “Helps others who have heavy workloads.”; “Passes along information to co-workers.”). Indeed, each item of the scale samples from one of the first- and second-order types of workplace helping that emerged from Study 1 (Table 3). While the scale as a whole has repeatedly demonstrated to be internally consistent and predictive, it is not suitable for my next study in which I will only be able to ask respondents to report their and others’ dyadic helping behavior through one item.

In this study, I therefore seek to develop one-item measure of interpersonal helping that is broad enough to encompass all the different ways in which a person can assist their coworkers discretionarily and at a cost to themselves. I will start by generating a series of items and then I will progressively reduce and select them through a series of psychometrics techniques.

Besides developing one-item measure of interpersonal helping at the dyadic level, I will also develop a short measure of helping and cooperation at the dyadic level and a corresponding short measure of cooperation at the group level. As it will become clearer in Chapter 6, in my next study I will measure cooperation and employees’ perception of it in two ways: through a social network design and through a round-robin design. The former is the approach I mentioned above that requires one-item measure of dyadic interpersonal helping that the participant answers for each dyad in their group. The latter approach is a similar design in which I ask each participant to “evaluate” each of their coworkers on a few items that assess the coworker’s behavior towards them (some version of “To what extent does this coworker help you?”, and so on for each coworker). By combining these dyadic ratings, I will be able to compute a measure of intragroup cooperation that represents the extent to which, on average, each member helps any member of their group. I will then compare this measure of internal cooperation to a

corresponding measure of *perceived* internal cooperation collected at the group level (“To what extent do you and your coworkers help one another?”)⁴. As you will see as this study and the next unfold, the social network approach and the round robin design are consistent with one other in that they both use items from a selected pool of highly consistent, internally and externally valid items. I will come back to each of these points later in this chapter and then again, more extensively, in Chapter 6.

5.1.1 Item Generation

To develop and validate an omnibus one-item measure of interpersonal helping, I followed the procedures outlined by Hinkin (1998) and discussed in depth by DeVellis (2016). The first step of the process is the generation of an initial set of items that must be subsequently evaluated for content validity. To develop the initial pool of items I used an inductive approach. Instead of generating a pool of potential omnibus items from my formal definition of cooperation (deductive approach), I used data I collected during Study 1 to let the items emerge from respondents’ natural language. The inductive approach has the merit of generating items that are familiar to target respondents and represent how lay people process and think about the domain of interest, in this case workplace cooperation (Hinkin, 1998).

Towards the end of the qualitative survey I used in Study 1, I asked participants how they would have described their workplace to a friend of theirs if the friend had told them that they were considering joining their organization: “Imagine that a friend of yours is considering applying for a job at your organization. He/she is not sure it is the right workplace for him/her and asks you whether/how supportive people are with one another beyond what formally

⁴ These are not the measures I developed and subsequently used in Study 3. I am using these sample questions only to provide an overview of the different approaches I pursued. The exact measures I used in Study 3 emerged from this study and thus I will present them in Chapter 6.

required by their job. How would you describe your work environment in response to his/her question?”. Participants answered this question towards the end of the survey, when the concept of cooperation was clear and salient in their mind as a result of having engaged with it several times during the survey. I intentionally did not use the term ‘cooperation’ in the question to avoid constraining participants’ respondents. Hinkin (1998) notes that a challenge of the inductive approach is that, since items are not deductively generated from the formal definition of the construct, it may be difficult to develop items that are conceptually consistent. I think that this concern is mitigated in this case for two reasons. First, the participants from whom I elicited responses answered my question with a shared understanding of the topic of the survey and the meaning of cooperation. While free to choose their language, they all started from a shared understanding of what the question was about. Second, my analyses of their responses were guided by a clear definition of cooperation as a costly, discretionary, and task-related helping behavior. Having a clear definition of the construct in mind allowed me to enter the coding process with clarity about how to interpret participants’ responses (i.e., identify which responses tapped the construct and which ones did not).

The totality of my sample from Study 1 answered the question above (N=202). I collected 202 usable responses of length between 3 and 135 words (mean = 30.1 words per response; SD = 18.2 words; median = 29 words). I coded the data in two phases. First, I read each participant’s answer to get a sense of the general theme of their response (Hinkin, 1998). Since I asked participants how they would have described their workplace to a friend who was considering joining, there were multiple angles from which they could tackle the question. Even if I asked participants to elaborate on “whether/how supportive people are with one another beyond what formally required by their job,” and I expected most answers to be pertinent to

cooperation, I was aware that the open format of my question could very well elicit comments on other aspects of their workplace as well. As a first step, I therefore read and coded responses for their general theme or aspect of the workplace or workgroup on which the participant had focused their answer.

Six themes emerged from participants' responses (Table 10). As I expected given the way I phrased my question, cooperation was the most prevalent of all the aspects of their work environment that participants discussed in their responses (57.7% of all responses were about cooperation). Participants also talked other aspects of the work environment, such as how much their workgroup felt united and operated like a team (social and task cohesion), how much people got along and created a pleasant, relaxed environment (harmony), the intensity and pace of the work environment, and the level of psychological safety. Since my goal was to develop items that captured the extent to which people exchange task-related help with one another informally and at a cost to themselves, it was important to separate responses centered around cooperation from responses about related but conceptually different group characteristics. In this regard, establishing the difference between cooperation and cohesion seemed particular important, given the instrumental nature of cooperation and the more expressive nature of cohesion (feelings of interpersonal attraction, task commitment, and group pride that motivate the members to stay in the group) (Festinger, 1950).

Insert Table 10 about here

I then analyzed participants' responses in each category for the language participants used to talk about each theme. Table 11 details my coding process at this stage of analysis. In each response, I coded the segment(s) or phrase(s) the participant used to describe the main

theme of their response. Each segment represented a potential item (e.g., “people want to help others insofar as possible”; “colleagues genuinely try to help each other”; “people are always willing to help each other out”). In Table 11, I reported all the segments I obtained from participants’ responses minus the segments that were almost identical, very similar, or clearly redundant to the ones already in the table. I ordered segments by similarity and used them a basis for generating items (third column of Table 11). Some of the items I derived from participants’ responses represent verbatim their language (e.g., “We all look after each other”); others succinctly express the meaning of a few similar items (e.g., “People do whatever they can to help others”). My inductive approach facilitated the generation of items that are simple, concise, and easy to understand, as recommended by the guidelines for writing items (DeVellis, 2016).

Insert Table 11 about here

I did not derive items for work pressure and psychological safety due the presence of established scales, but I did develop items for cohesion. Though cohesion has been vastly studied in the literature, and many scales and variations of them exist, most studies have measured and analyzed cohesion as a whole, with short scales encompassing all components of the construct in a few items (e.g., Raver & Gelfand, 2005; Tekleab, Quigley, & Tesluk, 2009; Willer, 2009; Menon & Phillips, 2010). In my subsequent analyses, I will check the convergent validity between my measure of workgroup cooperation and one such established, encompassing measure of cohesion. However, given my focus on cooperation and its conceptual affinity with task cohesion, I will also check how my inductively derived measure of cooperation fare against my inductively derived measure of task cohesion. I will do this to assess whether it is possible to empirically separate the two constructs. In a review of the literature on cooperation and cohesion,

I found that items that are explicitly about intragroup cooperation sometimes appear in scales used to measure group cohesion, and vice versa, which raises some questions about the extent to which the two constructs empirically overlap⁵.

I leverage the data also to develop items related to a relatively novel construct that emerged in participants' responses: 'harmony' or the perception of the workplace as a peaceful, harmonious environment. Harmony was the second most frequently theme brought up by participants in their responses (15.5% of all participants' responses were about this theme), followed by task cohesion (13.8%). Overall, this coding and item development exercise was helpful because it forced me to iterate between constructs and ways to express them, which in turn helped me reflect on their meaning and increased the conceptual consistency of my items.

From data I collected in response to my question about how participants would describe their work environment and the extent to which their colleagues supported one another beyond their formal duties, I inductively generated 18 items to measure cooperation, and —though not central to this work—7 items to measure task cohesion, 5 items to measure social cohesion, and 7 items to measure harmony (Table 11, third column). At this point I came back to the literature and compared my items to the items in existing scales that measure the same or related constructs in order to verify consistency in meaning and style, and to identify items to add to my set of items.

Table 12 shows the final sets of items to measure intragroup cooperation that I derived inductively and their adaptation to measure interpersonal helping at the dyadic level. Before administering both sets of items to evaluate their performance and reduce them to a small set to

⁵ For example, Wendt, Euwema, & van Emmerik (2009) included two items that are explicitly about cooperation in their cohesion scale: "People cooperate with each other" and "People are willing to share resources".

form a scale, I asked one OB professor who was familiar with the OCB literature to assess their face validity. All items passed the test and were therefore included in the next analyses.

Insert Table 12 about here

5.1.2 Questionnaire Administration: Sample and Methods

I administered a questionnaire consisting of the 18 dyadic interpersonal items, the 18 group-level items, and other scales to assess convergent and discriminant validity, to 300 participants via Prolific Academic. Participants spoke English as a first language, had an approval rate of 90 or above, and were employed full-time. Through Prolific Academic I was able to further pre-screen potential participants according to other relevant criteria for my study and send the survey only to individuals interacting regularly with colleagues in either small (2-10 members) or large groups (more than 10 members). Two hundred and 63 respondents passed the attention checks I dispersed throughout the survey and were retained in the sample, for a response rate of 87%. Their median age was 34, their median organizational tenure was 5 years, their median job experience in their current role was 6.4 years, and approximately 47% of them were female.

At the beginning of the survey, I explained participants that I had designed the survey to develop questions for a future study and I asked them to evaluate and respond to each item separately despite their possible similarity. I explained that this would help me identify which items worked best to describe certain behaviors and which ones were more consistent with one another. For the full text of the survey, instructions, and details on all the scales included, see Appendix B.

5.1.3 Item Reduction

To reduce items, I used the psychometric techniques recommended by DeVellis (2016). I conducted these analyses with three goals in mind. First, I needed to reduce my pool of 18 omnibus interpersonal helping items down to only a few to use in my round-robin design. Second, among those few items, I need to identify the best omnibus item to use in my social network design to elicit employees' perceptions of each dyadic relationship in their workgroup. Finally, I needed to identify a short measure of intragroup cooperation that was conceptually consistent with the two dyadic measures of interpersonal helping (round-robin and network approach) and, at the same time, valid to measure cooperation at the level of the group. I therefore started by reducing my pool of interpersonal helping items and then I assessed the performance of their corresponding group-level items to form a conceptually consistent measure.

Table 13 details the analyses I conducted to evaluate the performance of my initial pool of interpersonal helping items, the evaluating criteria of each analysis, and their rationale for the progressive exclusion of items. DeVellis (2016) recommends adopting a sequential approach that first evaluates items to identify problematic items that should not be included in a measure ("bad" items) and then reassesses the remaining items to identify which items to retain to reduce the length of the scale ("the best" items). The first set of analyses assesses items for their consistency with other items and their psychometric qualities (inter-item correlations, item squared multiple correlation, item distributions, item-scale correlation) to spot individual-item problems; the second set of analyses further screens items based on their contribution to the resulting scale to identify items to omit for the sake of brevity (alpha reliability analysis and factor analysis). DeVellis (2016) notes that the first set of analyses should be used to make a tentative selection of the items. I therefore used the analyses I detailed in the first part of Table

13 to identify the most promising and the most problematic items, and the analyses detailed in the second part to further screen items⁶.

Insert Table 13 about here

Figure 7 shows the eigen values of a principal component analysis and the eigen values of a factor analysis (scree plot). The scree plot suggested the presence of one statistically significant principal component and one or two statistically significant factors (Figure 7). The exploratory factor analysis I subsequently conducted on the scale formed by the 18 omnibus interpersonal helping items indicated that one factor was sufficient to describe the data. Table 14 reports the results of the rotated solution (oblimin), which was substantially identical to the unrotated solution. Item 1 (“Goes out of their way to help me at work no matter how big or small the issue is.”) and item 8 (“Does whatever he/she can to help me.”) emerged as the best performing omnibus items among all the items in the scale, not only for factoring loadings but also across the entire range of criteria detailed in Table 13. Among other indicators of their performance, these items the most strongly correlated with the omnibus 18-item scale ($r = .88$), the most representative of the underlying factor (both factor loadings were .88), and the most strongly correlated with the dyadic version of Williams and Anderson’s Interpersonal Helping scale ($r = .88$). In study 3, I will use these two items to measure cooperation at the dyadic level in my round-robin design (“This person goes out of their way to help me at work no matter how big or small the issue is”; “This person does whatever he/she can to help me”, repeated for each coworker), and I will use item 1 as my omnibus one-measure of cooperation to assess both cooperation and cooperation perceptions in my social network design (e.g., “Mary goes out of

⁶ The results of each of the analyses in Table 13 is available upon request.

her way to help Jack,” “Steve goes out of her way to help Ann,” “Peter goes out of his way to help Mike”).

Insert Figure 7 about here

Insert Table 14 about here

To measure cooperation at the level of the group through a short scale, I conducted a full assessment of the 20-omnibus-item measure I developed inductively. The scale is composed of 18 items that match the dyadic items plus 2 items previously used in the literature. First, I assessed how items 1 and 8 performed and whether I can select them along with a few others to form a short scale. Then, I assess the convergent, discriminant, and predictive (criterion-related) variability of the short scale obtained.

Table 15 shows the results of the exploratory factor analysis I conducted on the scale after running the analyses detailed in Table 13. All items loaded on one factor and the rotated solution (oblimin) was identical to the unrotated solution. As hoped, items 1 and 8 were among the set of items with the highest factor loadings (.81 and .84 respectively).

Insert Table 15 about here

Table 16 shows the correlations between the items with the highest factor loadings and the group-level version of Williams and Anderson’s Helping scale ($\alpha = .89$). I conducted this analysis to identify the items most consistent with an established measure of cooperation and ultimately decide which items to include in a short measure of intragroup cooperation.

Correlations between each item and Williams and Anderson’s Helping scale ranged from .68 to

.76, confirming the conceptual consistency of the omnibus items and the homogeneity of their composite.

Insert Table 16 about here

Upon further tests of the reliability and validity of alternative short versions of an intragroup cooperation scale that essentially established their equivalence⁷, I selected three items (item 7, 5, and 14) that were both the most strongly correlated with the Williams and Anderson's Helping scale (.73, .73, and .76) and the ones with the greatest factor loadings (.85, .83, and .82 respectively). Table 17 shows the correlation between these items and items 1 and 8, which I kept in the scale for consistency with my dyadic measure of cooperation. All items were strongly correlated with one another, with correlations ranging from .66 to .74 and a Cronbach's alpha reliability score of .92. The scale includes the following items: "People go out of their way to help others at work no matter how big or small the issue is", "People do whatever they can to help others", "People can count on one another when they need help at work", "People are willing to take the trouble to help others at work," and "People are genuinely glad to help others when they need help."

Insert Table 17 about here

5.1.4 Convergent, Discriminant, and Predictive Validity

To obtain evidence of the validity of my 5-item scale of intragroup cooperation ($\alpha = .92$), I included established measures in my questionnaire to assess whether my measure was positively related to similar constructs and negatively related to opposite constructs to which it should be

⁷ Available upon request.

inversely related. I also assess its discriminant validity by including established measures of constructs that are theoretically independent of intragroup cooperation and should therefore no correlations with my measure. Finally, I assessed the predictive validity of my scale by checking whether intragroup cooperation, measured on my scale, would negatively predict turnover intentions. Table 18 provides an overview of the established measures against which I checked the validity of my 5-item measure of intragroup cooperation, the expected relation, and the correlations I obtained from my data.

Insert Table 18 about here

To test for convergent validity, I measured cohesion and intragroup conflict. It reasonable to expect that cohesive workgroups —groups in which members feel part of a team, work towards common goals, like one another, and are proud to belong to their group— are more willing to help one another. By contrast, groups characterized by greater conflict should be characterized by less cooperation, either because of compromised personal relationships or because of constating views on how to do things (Jehn, 1997).

I measured cohesion with Willer's (2009) 5-item bipolar scale, which asks participants to rate the extent to which their group is characterized by either end of a continuous item (e.g., close/distant; coming together/coming apart) ($\alpha = .93$). To measure conflict, instead, I used Jehn's (1995) 8-item scale of intragroup conflict ($\alpha = .94$), which includes items such as “There is friction among people in my group” and “There is conflict about the work we do in my

group.” As expected, my measure of intragroup cooperation was positively related to cohesion ($r = .73$) and negatively related to intragroup conflict ($r = -.57$)⁸.

To test for discriminant validity, I measured task interdependence and collectivism. In principle, cooperation, for how I defined it, should be independent of task interdependence. Workgroups whose members must exchange input and outputs to complete their job may not necessarily go beyond what required of them to help their colleagues, and groups of highly independent coworkers should nevertheless have many opportunities to help one another if they want to. I included collectivism, instead, because I was interested in establishing whether my measure of perceived intragroup cooperation is independent of the respondent’s cultural prescriptive norm that says that people should help one another and work together for the sake of their group.

I measured task interdependence using Pearce and Gregersen's (1991) 8-item task interdependence scale ($\alpha = .82$), which I adapted to capture task interdependence in the respondent’s workgroup (rather than the task interdependence of the respondent). Sample items include “Our work requires us to work closely with others,” “People must frequently coordinate their efforts with others”, and “We work fairly independent of each other in our work” (reversed item). The correlation between the scale and my 5-item scale of perceived intragroup cooperation was positive, though mild ($r = .19$). A positive correlation makes sense in light of the fact that members of highly task interdependent groups may need to cooperate more to effectively

⁸ In further analyses, which do not appear in Table 18, I checked the correlation between my measure of intragroup cooperation and the three scales I inductively and preliminarily generated from my data from Study 1 as possible measures of task and social cohesion and group harmony (see Table 11 for the items; $\alpha = .93$, $.93$, and $.96$ respectively). My measure of intragroup correlation was positively related to all of them ($r = .81$, $.71$, $.76$ respectively) and the greatest of all correlations, as expected, was with task cohesion.

complete their task. Notwithstanding, the mild correlation between group task interdependence and intragroup cooperation confirms that the two are separate constructs⁹.

I measured collectivism with Singelis, Triandis, Bhawuk, and Gelfand's (1995) 16-item collectivism scale ($\alpha = .80$), which includes two dimensions of collectivism: horizontal collectivism or the extent to which the self sees themselves as part of the ingroup (e.g., "I feel good when I cooperate with others," "To me, pleasure is spending time with others."), and vertical collectivism or the extent to which the self is different from the self of others and inequality is accepted (e.g., "I usually sacrifice my self-interest for the benefit of my group," "Before taking a major trip, I consult with most members of my family and many friends"). The correlation between the scale and my 5-item scale of perceived intragroup cooperation was positive and rather strong ($r = .38$), which may reflect the fact that individuals with greater collectivistic tendencies see/report greater cooperation in their workgroup. If this is true, it would point to culture as a potential antecedent of how people perceive cooperation, that is, a potentially biased lens through people interpret the dynamics with their group.

Finally, I sought to establish the predictive validity of my scale by checking whether lower levels of intragroup cooperation would predict stronger intentions to leave the organization. I measured turnover intentions with a 7-item scale composed of Kelloway, Gottlieb, and Barham's (1999) 4-item scale (e.g., "I am thinking about leaving my employer") and three additional items ("I intend to ask to be transferred to another unit," "I would not recommend a friend to seek employment where I work," and "I would not recommend my

⁹ As much as I designed my intragroup cooperation scale to capture respondents' perceptions of the cooperation within their workgroup, the task interdependence scale may very well have captured respondents' perceptions of the interdependence of the group. Interpreting them from this perception angle does not change the conclusion regarding their being separate constructs.

workplace to anybody”). As expected, my 5-item scale of perceived intragroup cooperation predicted turnover intentions: respondents who perceived their workgroup as less cooperative reported greater intention to leave their workplace ($r = -.45$).

Overall, this pattern of correlations provides evidence for the convergent, discriminant, and predictive validity of my scale. My measure of perceived intragroup cooperation was positively related to perception of intragroup cohesion, negatively related to perceptions of intragroup conflict, mildly positively related to group task interdependence and respondents’ collectivism, and predicted turnover intentions.

5.1.5 Conclusion

Through this study, I developed three closely related measures of interpersonal helping and intragroup cooperation that I will use in my field study (Chapter 6). First, I developed one-item measure of dyadic cooperation (“Goes out of their way to help others at work no matter how big or small the issue is”) that I will subsequently use to measure the relations of cooperation in workgroups and members’ perceptions of them in my social network design (e.g., “Mary goes out of her way to help Jack,” “Steve goes out of her way to help Ann,” “I go out of my way to help John”). I obtained this measure by selecting the best performing items of all the items I developed inductively. Second, I identified two dyadic items to measure dyadic cooperation through a round robin design, that is, items with which I will ask respondents the extent to which each of their colleagues help them at work. The items are the two best performing items in my analysis of omnibus interpersonal items (“Goes out of his/her way to help me at work no matter how big or small the issue is,” and “This person does whatever he/she can to help me”). Finally, I developed a short measure of perceived intragroup cooperation that I will use in my field study to compare the group’s actual level of cooperation (as measured by the round robin design) to

members' perceptions of it. The scale comprises five items, which reflect the dyadic items and include the two best performing items ("People go out of their way to help others at work no matter how big or small the issue is," and "People do whatever they can to help others"). To compare perceptions to actual behavior I will further reduce my perception of intragroup cooperation scale to these two items in my analyses, to make it entirely match my dyadic measure. I will still collect the entire scale and report the correlations between the two items and the rest of the scale.

5.2 Resource Independence Scale

My theory posits that individuals who possess all or most of the resources they need to carry out their job responsibilities may pay a higher performance price from overestimating cooperation in their workgroup than individuals in greater need of exchanging help with their colleagues. I called this construct —being self-reliant at work versus needing others' help— "resource independence." I found no suitable established scale to measure the construct, except for scales or single items used to measure to extent to which a firm or organizational unit is dependent on others for resources (e.g., Kostova & Roth, 2002; Tortoriello & Krackhardt, 2010). Since these measures were useful but required substantial adaptation, I decided to develop and validate my measure of resource independence at the interpersonal level. My approach to my scale development was similar to the one I followed to develop my measures of interpersonal helping and intragroup cooperation, except for the item generation approach, which was deductive rather than inductive.

5.2.1 Item Generation

I generated items deductively starting from my formal definition of resource independence. I defined resource independence as the extent to which a person does not need to rely on their

colleagues' resources to perform their job. Vice versa, resource dependence is the extent to which a person needs their colleagues' help to perform their job.

With this definition in mind, I generated items in four rounds, each time selecting and refining items from the previous round. Table 19 shows my item generation process through the three rounds. My initial pool of items comprised 30 items. In generating items, I did my best to stay close to my definition of the construct by including items that expressed the need for others' help (e.g., "I often find myself having to ask my colleagues if they can lend me a hand") rather than the help received from others (example of discarded item: "My colleagues are an indispensable source of help/knowledge/expertise at work for me") or a person's perception of their colleagues' competence and ability to help (example of discarded items: "My colleagues have knowledge, information, expertise, or other resources from which I could benefit," "Receiving help from my colleagues makes a difference in the quality of my work").

Insert Table 19 about here

I submitted my first round of items an OB professor as a test for content validity. This step led to the elimination of 13 items and the retention of 17 items (round 2). Upon further consultations with a larger group of OB colleagues, and review of the literature on organizational resource dependence, I reduced the 16 items that survived round 2 to 6 items (round 3). Since the guidelines for item generation recommend to generate at least twice as many items will be needed in the final scale (DeVellis, 2016; Hinkin, 1998), I generated 12 additional items and added them to the ones from the previous round (round 4). In this phase of generation of new items, I built on what I had learned from Study 1 and the OCB literature to generate items that reflected the need for certain resources (e.g., "I rarely need to turn to my colleagues' for advice

on work matters,” “I rarely need to ask my colleagues to substitute for me,” “I rarely need to ask my colleagues to teach me something”). During this phase, I also rewrote some of the item for clarity and conciseness (for example I rephrased “I have all the expertise, knowledge, and abilities that my job requires to be done at its best” as “I have all I need to perform my job at its best”).

I reached the end of my item generation process with 18 items (Table 20).

Insert Table 20 about here

5.2.2 Questionnaire Administration: Sample and Methods

I administered my items to a sample of 300 full-time workers recruited via Prolific Academic along with other scales included in the questionnaire to conduct validity tests. I selected potential participants that worked in either small (2-10 members) or large groups (more than 10 members), interacted regularly with other employees at work (coworkers, subordinates, assistants, superiors, etc.), and spoke English as their first language. Two hundred and 84 respondents passed all attention checks and were retained in the sample. Their median age was 32, their median organizational tenure was 4.4 years, and median experience in their current job was 5.6 years, and 57% of the participants were female.

At the beginning of the questionnaire, I explained that the survey was designed to develop questions for a future study and asked participants to evaluate each item separately despite obvious similarities. (The full text of the questionnaire is in Appendix C.)

5.2.3 Item Reduction

To reduce items, I evaluated their performance through the full set of analyses I described in Table 13¹⁰. Through the first set of analyses I started identifying strongly and poorly correlated items and candidates for exclusion. Through the second set of analyses I was able to validate my previous analyses and rank items per their contribution to the overall consistency of the scale. The scree plot suggested the presence of one principal component and up to three possible factors (Figure 8). The results of an initial exploratory factor analysis (EFA) with an oblique rotation (oblimin) and three factors suggested the presence of two strongly correlated factors ($r = .70$) and the presence of a small groups of items uncorrelated with either factor. The orthogonal solution confirmed the presence of two factors and provided clarity on which items belonged to which factor. The EFA that provided the best solution was an oblique rotation with two factors. Of the 18 initial items, only eleven loaded on either factor with a loading greater than or equal to .50 (Table 21). While I did not expect to find two factors, a close inspection of the eleven items shows that there are indeed two dimensions in my scale: the first factor seems to measure pure reliance on one's colleagues' help (e.g., "I rarely need to somebody for help at work"), while the second factor whether that reliance is essential for top performance (e.g. "I have all I need to perform my job at its best"). The strong correlation between the two factors attenuates concerns about whether the two dimensions are two facets of the same underlying construct or represent different constructs. With regards to my theory, both dimensions seem to be relevant and closely related to one another. As long as cooperation comes at the risk of stripping away resources that could be productively invested in one's tasks, errors of overestimation of the degree of cooperation in one's workgroup should be more costly to self-reliant individuals than individuals

¹⁰ All analyses and results, including checks of assumptions and multivariate outliers analysis, are available upon request.

who need to trade resources to supplement those they lack, whether that self-reliance means being able to complete one's tasks or being able to do so excellently. I therefore decided to maintain both dimensions in the scale.

Insert Figure 8 about here

Insert Table 21 about here

As a further step to discriminate among items and reduce the length of my scale, I looked at the correlations between each of my items and two task interdependence scales: Pearce and Gregersen's (1991) 8-item task interdependence scale, and Kiggundu's (1983) 12-item received task interdependence scale, which measures the impact one's colleagues work has on one's work and hence the need to receive task-related inputs from others ("I depend on other people's work for information I need to do my work"). Through my scale I am hoping to capture a type of independence that stem from the individual's abilities, expertise or other informal sources of resources (e.g., personal connections), rather than a type of independence that stem from the structure of the workflow or the individual's formal position. I therefore looked at the items that were most weakly correlated with the two scales and found six items that were the least correlated with task interdependence across both scales (Table 22).

Insert Table 22 about here

As a final step in my item reduction process, I created two alternative versions of a short resource independence scale: one version comprised of the six items with the highest factor loadings ($\alpha = .85$) and one version comprised of the six items with the lowest correlations with the

two task interdependence scale ($\alpha = .81$) (Table 23). The two scales had three items in common (items 2, 14, and 17). Further analyses confirmed the almost equivalence of the two short scales and the presence of two aforementioned dimensions in both of them.

Insert Table 23 about here

5.2.4 Convergent, Discriminant, and Predictive Validity

In my questionnaire, I included several scales to begin to develop the nomological network of my construct by testing the convergent, discriminant, and predictive validity of my scale. I checked the validity of both my alternative 6-item scales as a further check of their overall equivalence. Table 24 provides an overview of the constructs I measured, the relation I expected between those measures and my measures of resource independence, and the correlations I obtained from my data.

Insert Table 24 about here

I tested the convergent validity of my scales by measuring constructs with which resource independence should be both positively and negative correlated. A positive convergent validity should emerge with task mastery, self-efficacy, and job experience, which should be all signs that the individual is capable of doing her job and presumably quite independent in carrying it out. I measured task mastery with Morrison's (2002) 7-item scale (e.g., "I have learned how to successfully perform my job in a successful manner"), self-efficacy with Chen, Lee-Chai, and Bargh's (2001) 8-item scale (e.g., "I am confident that I can perform effectively on many different tasks"), and job expertise by asking respondent to report for how long they had been doing their current job at their current employer and potentially others for which they had

worked before. As expected, task mastery and self-efficacy correlated positively with both versions of my resource independence scale, but not job experience, with which resource independence turned out to be uncorrelated ($r = .02$ with version 1 and $r = .05$ with version 2). I expected participants with longer experience in their current job to be less in need of their colleagues' help, which should have appeared in the data through a positive correlation between their job experience and both of my scales. Participants' job experience ranged between less than year to 39 years, but the interquartile range was only 7.2 years of experience ($Q3 - Q1 = 10 - 2.8 = 7.2$). It possible that job experience did not vary enough in my data or that the time spent doing a job is a simply a very inaccurate measure of someone's ability in performing their job and their independence at work.

I tested the convergent validity of my scales also by including measures of constructs that should be negatively correlated with resource independence, such as role overload, role ambiguity, role conflict, and job stress. Role overload, role ambiguity, and role conflict are job stressors that should result in a greater need to rely on one's colleagues. Job stress is a psychological indicator of pressing job demands which is also likely to result in a greater need for others' help. I therefore expect a negative correlation between these constructs and resource independence.

I measured role overload with Bolino & Turnley's (2005) 3-item scale (e.g., "It often seems like I have too much work for one person to do") and role ambiguity and role conflict with the 6-item and 8-item subscales in Rizzo, House, and Lirtzman (1970) (a sample item for role ambiguity is "I know exactly what is expected of me", reversed scored; a sample item for role conflict is "I receive incompatible requests from two or more people"). I measured job stress with Motowidlo, Packard, and Manning's (1986) 4-item scale (e.g., "Many stressful things

happen to me at work”). As expected, participants that were subject to stronger jobs stressors reported to rely more on their colleagues, as indicated by a negative correlation between each one of these measures and both my scales.

I retested discriminant validity by correlating my two scales with the measures of task interdependence I mentioned in the previous paragraph. Version 2 of my scale, which comprises the items that were individually less correlated with task interdependence, was a little less correlated with the construct than version 1 based on factor loadings, but the correlation was still quite strong ($r = -.47$ and $r = -.40$ for version 1; $r = -.40$ and $r = -.35$ for version 2). This does not establish independence between the two constructs, but it does not show that the two constructs are the same either. Individuals in more interdependent jobs are probably bound to rely more on their colleagues, even for tasks that are not formally required but nevertheless require other people’s cooperation. So, while I did not establish discriminant validity, the negative correlation between the two constructs make sense and is a sign that my measure taps into the need to informally rely on others or, vice versa, the absence of such need or independence.

To get further insights on the correlation between the two constructs, I also run a confirmatory factor analysis on a scale composed of all the 11 task interdependence items with loading greater than or equal to .50 (Tables 21 and 22) and all the 21 task interdependence items resulting for combining Pearce and Gregersen's (1991) 8-item task interdependence scale and Kiggundu's (1983) 12-item received task interdependence scale. The results of the confirmatory factor analysis confirmed the presence of two factors and showed that both sets of items had high positive loadings on their respective factor. The estimated covariance between the two factors was negative (-.28), which was consistent with a negative correlation between the 11-item

resource independence scale and the 21-item task interdependence scale ($r = -.47$). This confirms that the two constructs are distinct but related.

Finally, I tested whether resource independence would predict job performance, job satisfaction, and help-seeking. Self-reliant individuals should perform better than dependent individuals and, as a result of greater autonomy and greater accomplishments, should derive greater satisfaction from their job. Resource dependence should also obviously negatively predict help-seeking behavior. Participants reported their job performance with Meyer, Allen, and Smith's (1993) 2-item measure: they reported the latest overall performance evaluation they receive, and their own assessment of their performance, on a scale from 1 (poor) to 7 (excellent). I measured job satisfaction with Judge, Bono, and Locke's (2000) 5-item scale (e.g., "I find real enjoyment in my job") and help-seeking with an adapted version of Anderson & Williams' (1996) help-seeking behavior scale (e.g., "I often ask my colleagues to assist me with certain tasks or projects").

As expected, resource independence positively predicted job performance ($r = .32$ and $r = .34$) and negatively predicted help-seeking behavior ($r = -.62$ and $r = -.59$), but unexpectedly, it did not predict job satisfaction ($r = -.01$ and $r = -.03$).

Figure 9 shows the nomological network of resource independence as it emerged from this study. Since full scale development and validation efforts should ideally be conducted with multiple independent samples (Hinkin, 1998), one for each step of the process, the nomological network that emerged from this study should be seen as preliminary and requires further investigation.

Insert Figure 9 about here

5.2.5 Conclusion

In the second half of this chapter I described how I developed and validated a short measure of resource independence, which I defined as the extent to which a person needs their colleagues' help to perform their job. As Study 1 has shown, there are countless ways in a person can rely on their colleagues for help at work. With this measure, I tried to capture the extent to which a person needs to trade resources with their colleagues to get their work done, above and beyond the cooperation that is expected and dictated by their and their colleagues' formal roles. The construct proved to include two dimensions: a general need to rely on one's colleagues and the need to rely on one's colleagues to excel at work.

Through this study, I was also able to understand how the construct relates to other constructs. Of note is that resource independence is negatively correlated, not uncorrelated, with task interdependence. While I developed my items to capture the extent to which a person doesn't depend on the goodwill and informal cooperation of their colleagues, it proved difficult to identify items that were uncorrelated or weakly correlated with task interdependence scales. More likely, highly interdependent jobs create more occasion for informal cooperation, that is, more instances in which one can benefit from another's person cooperation beyond that person's formal duties. For example, an employee who has to complete some paperwork before passing it to a coworker for further processing might need extra time to complete her job. If the work as a whole must be completed within a certain timeframe, asking more time to her coworker means her coworker will have to finish process the files on a tighter schedule than then one she would normally have. In this case, taking more time will require the coworker's cooperation. If the employee were doing a less interdependent job (e.g., processing the file from start to end), she

would have to sacrifice her own time and rework her own schedule to meet her deadline rather than those of a coworker. In this case, less interdependence creates less needs for cooperation.

Chapter 6: Field Study

6.1 Sample and Procedure

To test my hypotheses, I conducted a multi-source, multi-organization field study of multiple workgroups. I sought to sample workgroups in the field that meet the following characteristics: a) cooperation among the members is possible but not prescribed; b) members are individually responsible for certain outcomes and are evaluated on their performance by someone above them; c) workgroups are relatively small. The first condition was necessary to make sure that participants could regulate their cooperative behavior based on their perception of how cooperative their group was. The second condition was necessary to guarantee that participants' performance could be assessed separately from that of their group or organizational unit. The third condition was necessary to keep the survey as compact as possible, given that each participant had to report on their relationship with each member of their group as well their perception of each dyadic relationship in the group.

To find workgroups willing to participate in the study, I reached out to my network and the network of colleagues with contacts in organizations potentially interested in taking part in the study. I obtained access to survey nine workgroups of office workers in three organizations: a retail business, an organizational unit within a university, and a manufacturer in the aerospace industry. The workgroups had a median size of 8 individuals and an average size of 12.11 individuals. Each workgroup met each of my conditions. Of the 109 total individuals working in these groups, 77 participated in my study and each reported on the relationships between each pair of individuals in their group. Participation rates in the various groups ranged between 56% to 100% (see Table 25 for details). Because one organization let me survey multiple groups from

one department (workgroups 4 to 9) plus a group exclusively formed by the leaders of that department (workgroup 3), five individuals in my sample completed two surveys: they reported their perceptions of the relationships in their team (made up of they themselves and their subordinates) as well as their perceptions of the relationships with and between their fellow leaders. These individuals, who participated in two separate groups from the same organization in my sample, entered my dataset twice, once per group. This resulted in an individual-level dataset comprising of 82 cases in 9 workgroups.

Insert Table 25 about here

Of the 77 individuals who agreed to complete the survey, 70% have at least a college degree and had worked in their organization for an average of 15.14 years ($SD = 12.70$; Median = 11.33) and in their current position for 9.26 years ($SD = 8.24$; Median = 9). Minorities (nonwhite) represented approximately 21% of the sample and approximately 76% of all participants were female.

I asked participants to complete an online survey comprised of questions about themselves, their relationships with their colleagues, and their perceptions of the relationships each of their colleagues had with one another. Since each participant was asked to evaluate each of their colleagues, the length of the survey varied depending on the size of their workgroup. Supervisors were asked to fill out an additional portion of the survey with questions about their subordinates' performance. I reported the full text of the survey in Appendix D.

Before administering the questionnaire, I provided participants assurance that their responses would remain confidential and I asked the head of their department to issue a letter

confirming that they had no interest in acquiring individual responses. All three organizations granted permission to their employees to complete the questionnaire during regular business hours. At the end of the data collection in each site, I sent each participant a personal and confidential report with information about their scores on key study measures and the distribution of scores in their workgroup. Along with the report, each participant received a \$10 gift card as a token of appreciation for their participation.

6.2 Measures

6.2.1 Dependent and Independent Variables

In this section, I describe the measures I computed to test my hypotheses. I used two main approaches in my study design, which yielded alternative measures for some of my key variables. Table 26 provides an overview of two approaches and a summary of the key alternative measures derived from two approaches.

Insert Table 26 about here

Intragroup Cooperation Network and Perceptions. I used Krackhardt's (1987) Cognitive Social Structures (CSS) approach to measure participants' perception of the helping relationships in their group and their own relationships with their workmates. Each participant reported whom they helped among their workmates and whom they thought each of their workmate helped within their group. First, participants checked the names of those whom they "went out of their way to help at work" among all the people in their workgroup. Then, they answered the same question for each of their workmates, each time checking the names of those whom they think the workmate in question went out his or her way to help at work. For example, after answering the question "Whom do you go out of your way to help at work?", participant A answered the

question “Whom do you think B goes out of their way to help at work?”, and so on for each workmate in their group. In their responses, participants could check their own name if they thought someone went out of their way to help them.

This systematic procedure allowed me to draw each participant’s mental map of the network of helping relations in the participant’s workgroup, as well as to derive the actual relationships in the group by iteratively comparing what two people reported about their relationship. To establish helping relationships between any pair in the group, I compared people’s responses about one another’s relationship. When A reported that she went out her way to help B, and B confirmed that A went out of her way to help him, I considered the helping relationship from A to B as real (A went out of their way to help B). The item I used to capture dyadic helping is an abbreviated version of the item that emerged as the most performing among all the items that I tested in Study 2 (“Goes out of his/her way to help me at work no matter how big or small the issue is”).

Actual Intragroup Cooperation (CSS approach). I measured intragroup cooperation as the density of the network I obtained from the CSS data. The density of a network is defined as the number of relationships that exist in the network divided by the total number of possible relationships in the network (Wasserman & Faust, 1994). For example, in a group of five persons, there are 20 possible helping relationships: 20 possible different pairs in which the first person might help the second person. If there are only 5 of such relationships in the group, the density of the group’s network is $5/20$ or .25.

Because I had missing participants in each group, I had to adapt the calculus of the density measure to account for missing data. Because I had missing participants in each group, I

had dyadic relationships in each group about which I had either incomplete information (only one of the two participated in the study) or missing information (none of the two participated in the study). I used two strategies to handle dyads about which I had incomplete information. When either individual in a dyad participated, I used the information provided by that person about the relationship with the other to infer the relationship between the two. For example, if A participated and B did not, I coded that A helped B if A reported they helped B, and I coded that A did not help B if A reported they did not help B. Similarly, I coded that B helped A if A reported being helped by B, and I coded that B did not help A if A did not report being helped by B. The risk with this strategy is to code as existing relationships that the other party might have not confirmed if they had participated in the survey, but it has the advantage of using all the information available in the dataset. I also used a more conservative strategy that treated as missing all relationships on which only one person had provided information: if A participated and B did not, I considered the relationship from A to B, and the one from B to A, as missing regardless of A's responses.

Following strategy 1, I computed density as the number of relationships within the group (reported by both participants, and by one for incomplete dyads) divided by the total number of *known* relationships within the group, where a known relationship is a relationship that I had either solved as existing (because reported by both participants, or by either when only one participated) or as non-existing (because neither participants reported, or because the only participant in the dyad did not report it). The computation of density following strategy 2 is identical, except that the numerator only includes relationships reported by both participants and the denominator excludes relationships reported by only one participant in incomplete dyads.

Because the two strategies yielded very strongly correlated measures and almost identical results, from now on I will report and discuss the results I obtained with strategy 1¹¹.

Actual Intragroup Cooperation (Round-robin approach). The CSS approach is the gold standard in the literature on social network perceptions, but because it is time consuming and cognitively taxing, it is typically used to measure the existence or the absence of interpersonal relationships, rather than their strength (e.g., Brands & Mehra, 2018; Krackhardt, 1990). Adapting the method to collect the strength of social network perceptions (through a scale, for example) is not impossible but would make the task hardly feasible, even in small groups. (Imagine someone asked you “To what extent do you think A goes out of her way to help B?,” “To what extent do you think A goes out of her way to help C?,” and so on for any possible dyad, first iterating over all possible Bs, and then restarting the process anew for all possible As.)

To overcome this limitation of the CSS approach and increase the validity of my relational measures, I asked participants to report on their relationships also on a scale (1 = *Strongly Disagree*, 5 = *Strongly Agree*), by using two of the items that I validated in Study 2: “This person goes out of his or her way to help me at work no matter how big or small the issue is,” and “This person does whatever he/she can to help me.” With this data, I first computed the strength of each single dyadic relationship with the group (by averaging the two items) and then I

¹¹ Unfortunately, no strategy can deal with completely missing dyads, i.e., dyads where neither individual participated in the study. There is simply no way for me to know what the two parties of those relationships would have reported about their relationship, if they had participated. Rather than assuming that those relationships existed or not existed, I excluded them from the computation of density, which is what statistical packages for social network analysis typically do when they compute density in the presence of missing dyads. As a result, the denominator of my density measures is the number of *known* relationships rather than the number of *possible* relationships; using the number of possible relationships would imply I know whether each of those possible relationship actually existed or not, which is not my case.

measured intragroup cooperation as the average strength of the dyadic helping relationships with the group.

Perceived Intragroup Cooperation (CSS approach). Using the data that I collected through the CSS approach, I computed each participant's perception of intragroup cooperation as the density of their perceived network, i.e., the density of their mental map of the network of helping relations in their group. I computed density as the number of the helping relationships in the group reported (perceived) by the individual divided by the total possible number of relationships within the group that the individual could have reported.

Perceived Intragroup Cooperation (scale approach). I also asked each participant to rate the level of cooperation within their group using the group-level version of the items I used to measure dyadic cooperation through the round-robin approach. Participants answered the following two items on a 5-point agree-disagree scale: "People go out of their way to help others at work no matter how big or small the issue is," and "People do whatever they can to help others" (1 = *Strongly Disagree*, 5 = *Strongly Agree*). The two items were strongly correlated ($r = .85$). These items appeared in the survey alongside three additional items ($\alpha = .92$): "People can count on one another when they need help at work," "People are willing to take the trouble to help others at work," and "People are genuinely glad to help others when they need help." I validated all items and the larger 5-item scale in Study 2. My two-item measure of perceived intragroup cooperation was strongly and positively correlated with the scale score derived from these three additional items ($r = .92$), as well as with the score of the overall 5-item scale ($\alpha = .96$) ($r = .97$).

Estimation Error (CSS approach). I used my measures of actual and perceived intragroup cooperation to compute participants' errors of over and underestimation in their perception of the level of cooperation within their group. Using the measures I derived from the CSS data, I computed errors as the difference between the density of the perceived intragroup cooperation network of each participant and the density of the actual intragroup cooperation network. Positive score indicated errors of overestimation and negative scores indicated errors of underestimation.

Estimation Error (Round-robin/scale approach). I computed errors of over- and underestimation of the level of cooperation in the group also as the difference between the participant's perception of the strength of cooperation with the group (2-item measure described above) and the average strength of dyadic helping relations within the group (2-item measure of actual intragroup cooperation based on the round-robin approach).

Cooperative Behavior (CSS approach). Using actual intragroup cooperation network of each group I derived from the CSS data, I computed each participant's cooperative behavior as the number of colleagues each participant went out of his or her way to help at work. To account for groups of different size, I normalized this measure by dividing by the total number of known relationships between the participants and his or her colleagues¹². In network jargon, this measure the participant's "outdegree" in the intragroup cooperation network, or the number of relationships in which he or she provides helps to others.

¹² I could not normalize the measure by dividing it by the total number of colleagues in the group to account for missing data, which caused some of those relationships to be unknown.

Cooperative Behavior (Round-robin approach). Because I asked each participant to evaluate the helping behavior of each one of their workmates on two items (“This person goes out of his or her way to help me at work no matter how big or small the issue is,” and “This person does whatever he/she can to help me”), I was able to compute participants’ cooperative behavior also as the average of the dyadic ratings each of them received from their workmates.

Resource Independence. I measured resource independence with a 4-item measure composed of items I validated in Study 2. The scale is a short version of the second scale I reported in Table 23. It comprised the following items: “As long as everyone does their job, I generally don’t need help from my colleagues to complete my tasks,” “I rarely need to ask my colleagues to teach me something,” “I have all I need to perform my job at its best,” “I never find myself in situations that I cannot solve with my colleagues’ help.” Since the Cronbach’s alpha for the whole scale turned out to be low in my field study sample ($\alpha = .67$), I eliminated the item that was least correlated with the others (“I have all I need to perform my job at its best”) and the rest of the scale to increase the reliability of my measure. The resulting 3-item scale had a slightly higher Cronbach’s alpha in my field study sample ($\alpha = .71$).

Error Magnitude. I measured the magnitude of participants’ error in the perception of their workgroup’s cooperation as the absolute value of the error score. Since I computed errors through two approaches, I computed the absolute value of each of my two alternative measures. Error magnitude is therefore the absolute value of the difference between the perceived and actual network density of the participant’s workgroup (CSS approach) and, alternatively, the absolute value of the difference between participants’ perception of the strength of cooperation in their workgroup and the actual strength of the dyadic relationships within the group.

Social Status. Participants rated each of the workmates on three items adapted from Flynn's (2003) 3-item social status scale: "I respect this person's point of view," "This person makes valuable contributions at work," "This person exerts influence over my decisions at work" (1 = *Strongly Disagree*, 5 = *Strongly Agree*; $\alpha = .82$). I adapted the items in the sense that instead of asking participants to report on the general status of the focal workmate's as in the original version of the scale (e.g., "How much influence does this person exert over decisions at work?"), I asked participants to report on the status the focal workmate enjoyed in their eyes (e.g., "This person exerts influence over my decisions at work"). I computed participants' status as the average of the dyadic ratings each of them received from their workmates.

Reputation for Cooperation. Using participants' mental map of the network of interpersonal helping in their workgroup, I measured participants' reputation for cooperation as their number of people that, on average, their workmates thought the participant went out of their way to help at work. In network jargon, this measure is called participants' average "outdegree" or the average number of ties in which the participant is seen as helping others at work. Because my participants belonged to workgroups of different sizes, I divided their average scores by the total number of people in their group, thereby obtaining a measure that is comparable across workgroups.

In-role Job Performance. I asked each participant's direct supervisor (the workgroup's leader) to assess the participant's job performance through three items from Liden, Wayne, and Stilwell (1993): "Rate the overall level of performance of that you observe for this person" (1 = *Extremely poor*, 7 = *Outstanding*), "Overall, to what extent do you feel this person has been effectively fulfilling his or her role responsibilities?" (1 = *Very ineffective*, 7 = *Very effective*), "Overall, to what extent do you feel this person is performing his or her job the way you would

like it to be performed?” (1 = *Not at all*, 7 = *Entirely*). The Cronbach’s alpha of the scale was .94.

6.2.2 Control Variables

Study 1 showed that helping behavior is affected by three broad categories of factors: the characteristics of the person who helps, the relationship between that person and the person receiving help, and the work context. For sake of keeping the survey short, I could not include all possible variables that fall within the three categories that may determine who helps whom, but I did include one key control variable per category to capture these important influences.

Task Interdependence. A key element of the work context that affect cooperation is the task interdependence, which is the extent to which jobs and positions are interlinked in a workgroup or organization as a result of the formally designed exchange of inputs and outputs between them. In highly interdependent jobs, for certain employees to complete their tasks, other employees need to complete theirs. Because interdependence creates opportunities for interaction between coworkers, it may very well shape helping relations and related outcomes. I measured each participant’s task interdependence with their workmates with four items from Pearce & Gregersen's (1991) task interdependence scale. Pearce & Gregersen's (1991) scale included two factors; I chose the two items with the highest factor loadings per factor: “I work closely with others in doing my work,” “I frequently must coordinate my efforts with others,” “I work fairly independent of others in my work” (reversed scored), and “I can plan my own work with little need to coordinate with others” (reversed scored) (1 = *Strongly Disagree*, 5 = *Strongly Agree*; $\alpha = .82$).

Prosocial Orientation. To control for participants’ personal characteristics that may have affected their helping behavior, I measured participants’ prosocial orientation by six items

adapted from Rioux & Penner's (2001) prosocial values scale. Sample items include: "I feel it is important to help those in need" and "I want to help my colleagues in any way I can" (1 = *Strongly Disagree*, 5 = *Strongly Agree*; $\alpha = .83$).

Affinity with Work Colleagues. People feel more comfortable turning for help to their colleague friends than to others at work (Casciaro & Lobo, 2008). At the same time, people feel compelled to help their friends at work because of tacit expectation that friends help one another. I asked participants to report on their personal relationship with each of their colleagues through two items from Joshi & Knight (2015): "I like this person," and "This person is a friend of mine" (1 = *Strongly Disagree*, 5 = *Strongly Agree*; $r = .63$). Since people with a greater number of positive relationships at work are more likely to be approached for help and more likely to provide it, I computed participants' affinity with their workmates as the average of the dyadic ratings each of them received on the two items.

Organizational Rank. All workgroups included in this study included the workgroup's designated leader. I coded rank as 1 for members in supervisory roles and 0 for all the others.

Organizational Tenure. Participants directly reported the years and months for which they had been working for their organizations.

For a summary of all study measures, see Table 27.

Insert Table 27 about here

6.3 Results

6.3.1 Variability in the Perception of Workgroup Cooperation

As explained earlier, I asked participants to report their perception of the level of cooperation in their workgroup by mapping the network and by answering a group-level scale. In my methods, such measures of perceptions are individual-level measures: they represent how the individual perceives cooperation among their workmates. Alongside these perceptual measures, I then created measures of actual workgroup cooperation based on what people reported about their own relationships with others.

As a first step, I assessed the adequacy of my perceptual measures by checking whether there was sufficient disagreement in participants' perceptions of intragroup cooperation for these variables to be meaningful at the individual level¹³. I started with the perceptual measure of intragroup cooperation that I derived from the CSS approach: participants' perception of the density of the intragroup network. Figure 10 shows the distribution of participants' perceived network density for each workgroup. Considering that network density varies between 0 and 1, there was considerable variability in the density of participants' mental representations of the network (see Table 28 for descriptive statistics). The range of the variable (the difference between the maximum and the minimum value registered in each group) varied between .55 and 1, and was greater than .72 in six of the nine workgroups, which indicates that, in most groups, density was perceived as very low all the way up to as very high. Despite considerable variation in perceptions within groups, a one-way analysis of variance (ANOVA) on the full data with 82

¹³ Researchers often measure group attributes by asking members to answer a few questions about their group and then averaging their responses. This should be done only when members' assessment of the group attribute, while not identical, converge such that each response is a reflective measure of the underlying group-level construct, whose measurement error is cancelled out by aggregation with other individual responses.

cases in 9 workgroups, team membership as the independent variable, and participants' perceived density as the dependent variable, indicate that participants' perceptions did cluster around different means ($F_{(9,82)} = 4.06, p = .00$), which makes sense considering that these were independent workgroups.

Insert Figure 10 about here

Insert Table 28 about here

I found evidence of variability in perceptions also in my second measure of perceived intragroup cooperation: participants' rating of internal cooperation collected through my 5-item intragroup cooperation scale. Figure 11 shows the distribution of participants' scale scores for each workgroup. Despite participants' ratings were collected on a relatively short 5-point scale, they varied within groups with certain groups registering a 3- or 4-point difference between their minimum and maximum rating (Table 29). The results of a one-way analysis of variance (ANOVA) on the full data with 82 cases in 9 workgroups with team membership as the independent variable and participants' rating of intragroup cooperation as the dependent variable show that such ratings were not significantly different across groups ($F_{(9,82)} = 1.83, p = .08$), which is what would be expected of meaningful group-level variables, which should converge within groups and diverge across groups (c.f., Edmondson, 1999).

Insert Figure 11 about here

Insert Table 29 about here

To further test whether my perceptual measures (and related construct) were conceptually meaningful at the individual rather than group level of analysis, I computed intraclass correlation coefficients (ICCs) to check whether there was substantial agreement or disagreement between group members on the level of cooperation within their group (Shrout & Fleiss, 1979). Table 30 shows the ICCs of each workgroup obtained by treating the items of my intragroup cooperation scale as subjects and group members as raters. I estimated ICCs through a two-way model where participants/raters were treated like fixed effects (no generalization beyond the single workgroup) and items/subjects were treated as random effects (ICC3)¹⁴. A high ICC (close to 1) indicates high similarity between ratings from the same group. A low ICC (close to zero) indicates that the ratings from the same group are not similar, i.e., the members disagree on the level of cooperation within their group. The ICC3 were zero or very close to zero in all groups (Table 30), indicating substantial disagreement among group members in their rating of intragroup cooperation and lending support for an individual-level conceptualization of the variable.

Insert Table 30 about here

As a whole this set of analyses showed considerable variance in group members' perception of the level of cooperation in their group, both when such perceptions were measured through scale-based ratings and when they were derived from participants' mental representation of the group's network. This is an important piece of preliminary evidence for the analyses that follow.

¹⁴ The results of alternative models to estimate ICCs yielded almost identical results.

6.3.2 Correlations

Table 31 reports the descriptive statistics and correlations for study variables. Because most of the main study variables are normalized to account for workgroups of different size, their row and standard deviation reported in Table 31 may be difficult to interpret. To facilitate the interpretation of the descriptive statistics, Figure 12 shows the distribution of the main study variables through density plots.

Insert Table 31 about here

Insert Figure 12 about here

A first glance to the correlations reveals some interesting correlation patterns. First of all, the two measures of errors in the perception of workgroup cooperation which I derived with my two alternative approaches were only moderately correlated ($r = .37, p = .00$), suggesting overall agreement in the direction of the error according to the two methods, but also some discordances between the two methods in the direction or intensity of participants' error scores. Similarly, my two alternative measures of cooperative behavior, based on the CSS approach and the round-robin approach, were moderately correlated ($r = .39, p = .03$), again suggesting overall but not complete agreement between the two approaches.

Second, concerning correlations indicative of potential casual relationships between variables, it is interesting to note that the sign of the error of estimation in the perception of workgroup correlation was positively and significantly correlated with cooperative behavior only for the measures derived from the CSS approach ($r = .46, p = .00$); according to the measures derived from the round-robin approach making an error of over- versus under-estimation seemed

to make no difference in the level of cooperativeness of the individual within his or her workgroup ($r = .01$, $p = .94$). However measured, though, cooperative behavior resulted to be positive and significantly correlated with all outcome variables, namely status (CSS: $r = .31$, $p = .01$; round-robin: $r = .85$, $p = .00$), reputation for cooperation (CSS: $r = .43$, $p = .00$; round-robin: $r = .72$, $p = .00$), and job performance (CSS: $r = .23$, $p = .01$; round-robin: $r = .55$, $p = .00$). Only weakly correlations, instead, were found between these outcomes and two measures of estimation errors (Table 30).

Finally, the patterns of correlations suggested that my control variables did indeed play a role in explaining my dependent variables. While task interdependence was not significantly correlated with either measure of cooperation behavior, individuals who scored high on prosocial orientation and individuals with greater social affinity with their workmates cooperated more according to both methodological approaches, with correlations ranging between .37 and .78. It is also interesting to note a positive and significant correlation between prosocial orientation and the error of estimation with both approaches (CSS: $r = .20$, $p = .07$; round-robin: $r = .31$, $p = .00$). Individuals with a greater disposition towards helping others tended to estimate a larger degree of cooperation within their workgroup, possibly making errors of overestimation to a greater extent than individuals with weaker prosocial tendencies. This might be a sign that high prosocial individuals tend to project their helpful dispositions onto others, seeing more cooperation among their colleagues than it actually exists. Alternatively, it may also simply indicate that error type and prosocial orientation are independent antecedents of cooperative behavior (i.e., individuals who overestimate and prosocial individuals tend to cooperate more) and thus their correlation is a result of their positive relation with that dependent variable.

The fact that task interdependence was uncorrelated with both measures of cooperative behavior (CSS: $r = .10$, $p = .35$; round-robin: $r = .04$, $p = .72$) lends support to the validity of my measures of cooperative behavior as a discretionary behavior that goes above and beyond the requirements of one's job. Task interdependence was uncorrelated also with my measure of resource independence ($r = .02$, $p = .89$), again lending support to the validity of my measure as reflective of the extent to which a person needs or does not need to rely on their colleagues' discretionary help to complete their job or carry out their job duties at their best.

6.3.3 Hypothesis Testing: Test of Differences¹⁵

To test my hypotheses, I categorized participants into two groups depending on the sign of their estimation error (over- versus under-estimation) and I analyzed differences in outcomes (status, reputation, and performance) between the two groups through a series of one-way Analysis of Variance (ANOVA) and related ANCOVA. I chose this approach as my main analytical approach over a standard regression approach because, while linear effects may exist, my hypotheses predict a difference between groups, not a linear effect. For example, predicting that underestimating cooperation is more costly in terms of status than overestimating it (Hypothesis 2a) means that participants who underestimated cooperation in their workgroup should have on average lower status than participants who overestimated it. Linear effects may exist but perhaps only within certain ranges of the continuous estimation error variable; for example, it may be that greater errors of underestimation lead to greater losses in status, but greater errors of overestimation do not lead to greater *gains*. In the logic of error management, the benefit of overestimation is to protect from the loss of status associated with underestimation, not to

¹⁵ In this section and the next (section 6.3.4), I use the term “effect” to describe results indicative or suggestive of an association between variables. However, since my data are cross-sectional, I cannot claim causality. My use of the term “effect” in this context has the sole purpose of reminding the reader of my hypotheses and which variables are dependent and independent in my theoretical model.

increase one's status. It is also possible that past a certain threshold in underestimation, greater errors of underestimation do not make any difference in terms of status. The same reasoning applies to the other outcomes. So, linear effects may or may not exist, and their existence is not essential to support my hypotheses. In Section 6.3.4, I will run a series of analyses to test for possible linear effects to complement and extend my preliminary ANOVA/ANCOVA results.

I categorized participants into two groups according to the sign of their error score: positive error scores identified participants who overestimated cooperation in their group while negative error scores identified participants who underestimated it. Because I created two estimation error measures (CSS approach and scale/round-robin approach), I created this categorical independent variable for each of my measures, thereby obtaining two categorizations, one per methodological approach. I also run two sets of analyses, one per methodological approach. Remember that besides deriving alternative measures of estimation errors and corresponding over- and under categorizations, I also derived corresponding measures of participants' cooperative behavior: the number of colleagues that the participant helped at work ("Cooperative Behavior (CSS approach)") and the average peer rating received by their colleagues on two dyadic-level items ("Cooperative Behavior (Round-robin approach)"). Below I report the results I obtained with both approaches.

Both of my categorizations yielded the same exact number of cases in each group: according to both my methodological approaches, of the 82 cases in my dataset, 49 overestimated cooperation and 33 underestimated it. However, as foretold by a moderate (rather than strong) correlation between my two error measures ($r = .37$), the 49 cases of overestimation and the 33 cases of underestimation were not exactly the same across the two approaches.

Precisely, a cross-tabulation of the number of cases per group according to the two measures

showed that 14 cases were swapped: 14 participants were categorized in the overestimation group according to one approach but in underestimation group according to the other (Table 32).

Insert Table 32 about here

CSS Approach

Hypothesis 1 predicts that participants who underestimate cooperation in their workgroup should show lower level of cooperation than participants who overestimate it. To test this hypothesis, I conducted an Analysis of Variance (ANOVA) to test for a difference in cooperative behavior between participants who overestimated cooperation and participants who underestimated cooperation in their workgroup¹⁶. This baseline ANOVA¹⁷ confirmed a significant effect of participants' error type (over- or under-estimation) on participants' cooperative behavior in their workgroup, $F(1, 80) = 13.62$; $p < .001$. As suggested by Hypothesis 1, participants who underestimated the number of cooperative relations in their group were significantly less involved in such relationships helping others than participants who overestimated such relationships ($M_{\text{Under}} = 0.35$, $SD = 0.28$; $M_{\text{Over}} = 0.58$, $SD = 0.29$). Because the standard deviation of participants' cooperative behavior did not differ between groups ($SD_{\text{Under}} = 0.29$, $SD_{\text{Over}} = 0.28$), I computed Cohen's d as a measure of effect size (Cohen, 1988). Cohen's d was 0.84, which indicates a large effect size (Cohen's d confidence interval: 0.35, 1.32). These results lend preliminary support for Hypothesis 1.

¹⁶ Despite having participants nested within workgroups, I did not conduct a nested ANOVA because it requires the subgroups (workgroups) to be nested into the main groups (over-estimation group and under-estimation group), while in my case the subgroups appeared in both groups (i.e., some participants from a workgroup overestimated cooperation and other participants from the same workgroup underestimated it).

¹⁷ Before running any analysis, I tested the underlying assumptions. Assumptions were generally confirmed, and no strong violation was found for any of the analyses presented in this chapter. More details are available upon request.

I also run an Analysis of Covariance (ANCOVA) to control for the effect of prosocial orientation and affinity, given their positive correlation with cooperative behavior ($r = .37$ for both measures). The rationale for including these variables in the analysis as covariates is that participants' cooperative behavior may have been affected by their natural tendency to help others and as well as their personal relationships with their workmates (see Study 1). The data confirmed all the assumptions of ANCOVA. Crucially, both covariates were linearly related to the outcome variable (cooperative behavior) and they did not interact with the grouping variable (error type). I included both variables in the analysis despite the fact that I did not find significant differences in affinity score between groups ($M_{\text{Under}} = 3.93$, $SD = 0.51$; $M_{\text{Over}} = 3.89$, $SD = 0.42$); I found differences between the two groups only in prosocial orientation ($p < .01$; $M_{\text{Under}} = 4.46$, $SD = 0.41$; $M_{\text{Over}} = 4.72$, $SD = 0.42$), which once again hints at the possibility of a casual relationship between prosocial tendencies and the tendency to overestimate cooperation.

After adjustment for prosocial orientation scores and affinity scores, I still found a statistically significant difference in cooperative behavior between the two groups, $F(2, 78) = 12.05$; $p < .001$ (adjusted means: $M_{\text{Under}} = 0.36$, $M_{\text{Over}} = 0.57$) (Figure 13). Both covariates were positively and linearly related to cooperative behavior (prosocial orientation: $F = 16.09$, $p < .001$; affinity: $F = 8.45$, $p < .01$). Essentially, adding the covariates to the analysis did not alter the results and confirmed the difference in cooperative behavior between the two groups. These results confirmed Hypothesis 1.

Insert Figure 13 about here

Hypotheses 2a-4b predicts that error of over and under-estimation should lead to differential outcomes and Hypothesis 5 predicts that the difference in outcomes should increase

with the magnitude of the two errors. Since, in my model, cooperative behavior is the mediating variable linking errors of perceptions to outcomes, for error magnitude to moderate the cost asymmetry in status, reputation for cooperation, and performance, more extreme errors of perception (perceptions that deviate more strongly from reality) should be associated with greater differences in cooperative behavior (Figure 3). In other words, participants whose errors of over- and under-estimation are in the upper and lower range of the variable (close to +1 and -1, respectively) should display greater differences in cooperative behavior than participants whose errors of over- and under-estimation are close to zero.

To test this hypothesis, I conducted an ANCOVA using the type of error (over versus under) as the grouping categorical variable and error magnitude as a covariate. My hypothesis is supported if the covariate interacts with the categorical variable, indicating greater differences in cooperative behavior between the two groups for errors of greater magnitude (absolute value of the error score)¹⁸.

I did find an interaction between type of error (over vs under) and error magnitude. Error magnitude was linearly related to cooperative behavior in both groups (over and under) but the slopes of the relationship were significantly different between the two groups (Figure 12). The ANCOVA with error type as the categorical variable, error magnitude as the covariate, and the interaction term between the two variables, showed that while errors of over- and under-

¹⁸ Normally, researchers do not want a covariate to interact with the grouping variable; in fact, one of the assumptions of ANCOVA is that the two variables do not interact. The assumption exists because, in ANOVA designs, researchers are usually interested in showing a single overall effect of the independent variable on the outcome *at every level of the covariate*. In this case, however, I am answering a different research question. My question is whether greater errors of over- and under-estimation lead to greater differences in behavior, that is, *whether the effect of the independent variable (type of error) on the outcome is stronger at higher levels of the covariate (magnitude of error)*. While not typically used in this way, the analysis is therefore appropriate to test the hypothesis in question.

estimation predicted different levels of cooperative behavior (significant main effect: $F = 14.91$, $p < .001$), the difference in the cooperative behavior between the two groups crucially depended on the magnitude of the two types of error (significant interaction effect: $F = 8.44$, $p < .01$). For participants who made errors of over- and under-estimation close to zero (i.e., over- or under-estimated cooperation in their group only a little bit), there was no significant difference in cooperative behavior. The difference emerged and widened as participants made greater and greater errors of estimation and it was at its maximum between participants with overly optimistic and overly pessimistic perceptions of cooperation in their workgroup (Figure 14).

Insert Figure 14 about here

It is interesting to note that, among participants who underestimated cooperation, the relationship between error magnitude and cooperative behavior was stronger than among participants who overestimated cooperation (compare slopes in Figure 14). In other words, the losses in cooperative behavior associated with greater errors of underestimation were greater than the gains in cooperative behavior associated with greater errors of overestimation. This suggests that, in line with the logic of error management theory, the goal of overestimation is more to protect from costly losses in cooperative behavior than to produce gains. These initial results lend support for Hypothesis 5.

Once again, controlling for participants' prosocial orientation and affinity did not alter the results. Both covariates were positively and linearly related to cooperative behavior (prosocial orientation: $F = 18.20$, $p < .001$; affinity: $F = 9.60$, $p < .01$), there was a significant difference in cooperative behavior between the participants who over- and under-estimated

cooperation (significant main effect: $F(1, 76) = 13.70$; $p < .001$), but the difference critically depended on the magnitude of their error (significant interaction term: $F = 10.23$, $p < .01$).

Hypotheses 2a and 3a predict that errors of over- and under-estimation should be differentially costly in terms of status and reputation for cooperation and that underestimation should be the costliest of the two errors, resulting in lower status and reputation for cooperation relative to overestimation. Hypotheses 2b and 3b predict that the different costs should be due to differences in cooperative behavior induced by the two errors. At a very basic level, if support for Hypotheses 2a and 3a is found in a baseline ANOVA, support for Hypotheses 2b and 3b is found if adding cooperative behavior in the ANOVA as a covariate (ANCOVA) eliminates the difference between the two groups.

A baseline ANOVA with no covariate showed no significant difference between the two groups in status ($M_{\text{Under}} = 3.98$, $SD = 0.51$; $M_{\text{Over}} = 4.01$, $SD = 0.5$; ns). When I added cooperative behavior in the analysis as a covariate, I still found no difference in status between the two groups. In line with ANCOVA assumptions, cooperative behavior was positively and linearly related to status in both groups (more cooperative participants enjoy greater status in their group) and did not interact with the grouping variable. To check whether differences in status between the two groups existed only for errors of a certain magnitude (Hypothesis 5), I run an ANCOVA with status as the outcome variable, the type of error as the grouping variable, and error magnitude as a covariate potentially interacting with the grouping variable. I found no

significant difference in status among the two groups at any level of the covariate. These analyses did not support Hypotheses 2a, 2b, and 5¹⁹.

Similarly, I found no difference in reputation for cooperation between participants who overestimated cooperation in their workgroup and participants who underestimated it ($M_{\text{Under}} = 0.51$, $SD = 0.18$; $M_{\text{Over}} = 0.54$, $SD = 0.22$). A difference between the two groups emerged when I added cooperative behavior in the analysis as a covariate, but in the opposite direction than the one I had hypothesized ($M_{\text{Under}} = 0.48$; $M_{\text{Over}} = 0.59$; $p < .01$). In line with ANCOVA assumptions, cooperative behavior was positively and linearly related to reputation for cooperation in both groups and did not interact with the grouping variable (i.e., the type of error). To check whether differences in reputation for cooperation between the two groups existed only for errors of a certain magnitude (Hypothesis 5), I run an ANCOVA with reputation for cooperation as the outcome variable, the type of error as the grouping variable, and error magnitude as a covariate potentially interacting with the grouping variable. The results hinted at growing differences in reputation between errors of greater magnitude, but the difference was not significant. Hypotheses 3a, 3b, and 5 were not supported.

It is possible that this lack of support is due to the fact that this analytical approach does not allow me to control for the fact that participants belonged to different organizations with potentially different organizational cultures. The same cooperative behavior may be received differently and yield different reactions in different organizations. In some organizations, it may yield a more positive response and be rewarded with status and reputation to a greater extent than in others, depending on how much it is valued. In Section 6.3.4 of this chapter, I will use a

¹⁹ There was no significant difference between the two groups in rank and organization tenure, so I did not include these variables as covariates in any of these analyses.

different analytical approach that allows me to control for participants' organizations to address this shortcoming.

Hypotheses 4a and 4b predict that, when it comes to job performance, the costlier error between over- and under-estimating cooperation in one's workgroup depends on the extent to which the individual depends on their colleagues' help to carry out their work and perform well. To test these hypotheses, I conducted a two-way ANOVA with two categorical variables: the type of error (over- versus under-estimation) in the perception of cooperation and the level of resource independence of the individual (high versus low). Since the distribution of resource independence in my sample resembled a bell curve with similar mean and median located at the center of the distribution (Mean = 2.92, SD = 0.95, Median = 3.00), I used the median of the variable as a cutoff to identify participants with (relatively) low and high resource independence. Thirty-four participants (41%) fell into the high resource independence group and 48 (59%) in the low resource independence group. Table 33 shows the number of participants in each cell of the two-way ANOVA across the two approaches. Unfortunately, I missed performance evaluations for 10 participants in my sample, so 10 cases were deleted from the actual test of Hypotheses 4a and 4b ($N = 72$).

Insert Table 33 about here

The results of a baseline one-way ANOVA showed no significant difference in job performance ratings between participants who underestimated and participants who overestimated cooperation in their workgroup ($M_{\text{Under}} = 5.52$, $SD = 0.93$, $M_{\text{Over}} = 5.57$, $SD = 0.81$, $F(1, 70) = 0.05$; $p = .82$). A separate one-way ANOVA showed a marginal effect of resource independence on job performance ($F(1, 70) = 2.86$; $p = .09$); unexpectedly, though,

high independence participants performed worse on average ($M_{\text{High}} = 5.35$, $SD = 0.86$) than low independence participants ($M_{\text{Low}} = 5.69$, $SD = 0.83$).

The results of a two-way ANOVA showed no significant interaction between error type (over versus under) and resource independence (high versus low). The results showed signs of a possible interaction, but in the direction opposite to the one I had hypothesized (Figure 15). Contrary to my expectations, low resource independence participants obtained on average slightly higher performance ratings when they underestimated cooperation ($M_{\text{Low-Under}} = 5.76$, $SD = 1.00$) than when they overestimated it ($M_{\text{Low-Over}} = 5.66$, $SD = 0.76$), and high resource independence participants obtained on average slightly higher performance ratings when they overestimated cooperation ($M_{\text{High-Over}} = 5.40$, $SD = 0.90$) than when they underestimated it ($M_{\text{High-Under}} = 5.30$, $SD = 0.84$). These differences did not turn out to be statistically significant ($F(1, 68) = 0.21$; $p = .65$), but if they were, they would suggest that, for relatively dependent individuals, underestimating is actually less costly than overestimating, and vice versa for relatively independent individuals. I therefore did not find support for Hypotheses 4a and 4b.

Insert Figure 15 about here

A two-way ANOVA with error magnitude as a covariate and the two categorical variables (error type and resource independence) as main predictors did not return a positive interaction between the covariate and either categorical variable, but it did return a significant 3-way interaction between the two categorical variables and error magnitude. In other words, the cost asymmetry in performance ratings widened for errors of greater magnitude, though not in the hypothesized direction. For participants whose error magnitude was below the median of the distribution, there was no significant difference in performance between over- and under-

estimation at either resource independence level. However, among participants whose perceptions were affected by greater errors (i.e., errors above the median of the distribution), errors of over- and under-estimation turned out to be differentially costly, albeit in a different way than the one I expected (interaction term between error type and resource independence: $F(1,30) = 1.35, p < .01$) (Figure 16). Among relatively independent individuals, those who were underestimating performance received significantly lower performance evaluations ($M_{\text{High-Under}} = 4.96, SD = 0.74$; $M_{\text{High-Over}} = 5.76, SD = 0.69$), while among relatively dependent individuals, performance ratings were significantly lower for individuals who were overestimating cooperation ($M_{\text{Low-Under}} = 6.50, SD = 0.58$; $M_{\text{Low-Over}} = 5.72, SD = 0.68$). These findings confirm that it is only when errors of perceptions are of a certain magnitude that differences in behavior and outcomes emerge. The direction of the interaction found in this data is opposite to the one I predicted in Hypothesis 4, but Hypothesis 5 is supported.

Insert Figure 16 about here

I did not collect data on members' level of confidence in their perceptions, so Hypothesis 6 remained untested.

Scale-based/Round-robin Approach

I replicated all the analyses I described above with the measures I derived from my alternative data measurement approach. The two approaches yielded different but correlated measures of errors of perceptions, cooperative behavior, and error magnitude (Table 31 and Figure 10). One relevant difference between the two approaches was the swapping of 14 participants in the categorization of participants in the over- and under-estimation groups.

Perhaps of even bigger relevance is the difference between the two approaches in the correlation between participants' errors of perception (signed variable taking positive and negative values) and the magnitude of their error (absolute value of error scores). The CSS yielded error scores and error magnitudes that were mildly positively correlated ($r = .23$), meaning that the magnitude of the error increased with overestimation. The same correlation using the variables generated by the scale-based/round-robin approach is similar in size but negative ($r = -.30$); this means that, according to this approach, error size increased with underestimation. This difference suggests that the two approaches differ not only in the categorization of certain subjects, but also in the very way they measured perceptions and related errors.

I did not find support for any of my hypotheses using the measures of errors of perception, cooperative behavior, and error magnitude that I derived from the scale-based/round-robin approach. I found no difference in cooperative behavior among participants who over- and under-estimated cooperation in their workgroup according to this alternative categorization (no support for Hypothesis 1) and no differences emerged for errors of greater magnitude (no support for Hypothesis 5). Prosocial orientation and affinity with one's workmates still predicted participants' cooperative behavior (both effects were significant at the $p < .001$ level). Similarly, I found no difference in outcomes between the two types of errors. Status, reputation for cooperation, and performance did not differ significantly between the two groups, and adding cooperative behavior to the analysis of variance as a covariate did not alter these null effects. Cooperative behavior did have a positive effect on status and reputation, but I found no group effect, even for errors of greater magnitude (no support for Hypotheses 2a-3b). No difference in performance evaluations emerged between participants who over- and under-estimated cooperation and only a very marginal difference emerged between high and low resource

independence which favored high-resource independence participants. A two-way ANOVA with job performance as the outcome variable, the type of error (over vs under) and resource independence (high vs low) as the two categorical variables showed no interaction and no main effects. When I checked whether differences in performance emerged between the four (2 x 2) groups for errors of greater magnitude, I did not find any (no support for Hypothesis 4a-b)²⁰.

The discrepancy in the results yielded by the two approaches may be a sign of the inadequacy of my scale-based measure of perceived intragroup cooperation. Despite variation in participants' responses, asking participants to indicate the overall level of cooperation in their workgroup on a scale from 1 to 5 may have resulted in too a rough measure of their perceptions. In other words, lack of measurement precision may be the reason why the effect captured by the CSS approach disappeared with the alternative method. The strength of the CSS approach lies in the fact that it asks participants to report the relations of cooperation of which participants are actually aware, rather than general, summary estimates of cooperation in their group like the ones collected on a group-level 5-point scale. This is not to say that using Likert-scale-based measures of a group level construct is always inadequate. For studies interested in measuring the overall level of cooperation with a group, asking participants to rate cooperation and then averaging their individual responses (if convergent) into a group-level measure may be appropriate, because the averaging process cancels some of the noise out of the final measure (e.g., Chatman & Flynn, 2001). However, when the focus is on participants' perceptions and their differences, these results seem to suggest that a scale-based approach may be inadequate to

²⁰ Greater details about these null findings are available upon request.

assess those differences with enough precision to capture their effect on behavior. In this case, the CSS approach proved more suited to the task.

6.3.4 Hypothesis Testing: Linear Approach

I retested my hypotheses using a linear modeling approach to account for the nested structure of the data. The same behavior might yield different outcomes in different organizations or be differently acknowledged, rewarded, or encouraged. I resorted to two models to try to control for these effects.

First, I estimated an unconditional random coefficient model with individual-level effects and level 2 random effects. The model allows level 1 slopes to vary randomly between organizations but without predicting them with a 2-level predictor (which I don't have because I do not have measures at the organizational level). So, without estimating specific organizational effects, the model allows the relationship between individual outcomes and individual predictors to vary across the three organizations in my sample, to assess how much of the variance in individual outcomes resides at the individual level (level 1) versus the organizational level (level 2).

I run the unconditional model for two of my outcome variables: status and reputation for cooperation. I could not estimate the model for job performance due to insufficient data per organization. At level 1, the variance of individual status scores, assumed to be homogenous across the three organizations, was 0.24. At level 2, the three organizations' mean status scores were distributed around the grand mean with variance equal to 0.02. The intraclass correlation coefficient (ICC), assessing the proportion of variance in status scores that was between-organization variance, was 0.08, meaning that 8% of the variance in individual status scores was driven by organizational differences. Another way of interpreting the ICC is as the average

correlation between the status scores of two randomly selected individuals from two randomly selected organizations. An ICC of 8% signals weak but nevertheless existing organizational influences.

The variance of individual reputation scores (level 1) and average organizational reputation scores (level 2) was roughly the same and equal to 0.02. The intraclass correlation coefficient (ICC) was 0.46, meaning that almost half of the variance in individual reputation scores can be attributed to organizational differences. This means there are strong differences in reputation-for-cooperation scores between participants from different organizations, which in turn may reflect differences in how those organizations expected or rewarded discretionary cooperation.

Mindful of these influences at the organizational level, I rested my hypotheses using a fixed-effect single-level linear model with two dummy variables (to control for organizational effects coming from three organizations). With only three organizations in my sample, I could not estimate a hierarchical linear model at two levels, so I control for organizational influences by coding the organizations through dummy variables and adding them to the model/s as fixed effects. To test for mediation (error > cooperative behavior > individual outcome), I run a series of linear regressions for each of my three outcome variables to test the significance of the different relationships involved (Baron & Kenny, 1986), and then I used Preacher & Hayes's (2004) bootstrapping technique to test the significance of the mediation effect. In light of the results of my previous analyses, I limited these analyses to the measures I obtained from the CSS approach. In coding participants' organizations, I made organization 1 the reference category (Table 25), so the coefficients for organization 2 and organization 3 represent the expected

increment or decrement in the outcome had one to leave organization 1 and join organization 2 or 3.

First, I regressed participants' cooperative behavior on participants' error scores to test whether greater error scores were associated with greater cooperative behavior (error > cooperation). Because the error variable took positive values for errors of overestimation and negative values for errors of underestimation, a one-unit increase in the variable (predictor) means the error is less of an error of underestimation and more of an error of overestimation. Controlling for participants' organizations, I found a positive and significant effect of participants' error of perception on their cooperative behavior ($b = .54$, $p < .001$; omega squared₂₁ = .30) (Table 34, Model 1). The effect remained strong and significant ($b = .51$, $p < .001$, omega squared = .27) when I added in the regression participants' prosocial orientation and affinity with their colleagues as control variables (Table 34, Model 2). These results indicate that greater errors of underestimation (larger negative scores) are associated to lower levels of cooperation, while greater errors of overestimation (larger positive scores) are associated to greater level of cooperation. In other words, as participants moved away from underestimation and move towards overestimation, their cooperation increased. These results support Hypothesis 1.

Insert Table 34 about here

²¹ I reported omega squared as a measure of effect size because it is a less biased alternative to eta-squared, especially for small samples. Field (2013) suggested the following rules of thumb to interpret omega squared. Values of the statistics between 0 and 0.01 indicate very small effects, between 0.01 and 0.06 small effects, between 0.06 and 0.14 moderate effects, and values greater than 0.14 large effects.

To dig further into the effect of errors of perception on cooperative behavior, and to test the logic underpinning Hypothesis 5, I tested for a possible interaction between the two components of participants' error scores: their sign and their magnitude. Table 35 shows the results of a regression analysis with error type (over versus under) and error magnitude as main predictors and their product as their interaction term. Before adding the interaction term to the regression, error type has a strong and positive relationship with cooperative behavior ($b = .25$, $p < .001$, omega squared = 0.17; Model 2), confirming, as a general pattern of results, that overestimation leads to greater cooperation than underestimation. Error magnitude, in this regression, has a negative effect ($b = -.32$, $p < .05$, omega squared = .04; Model 2). However, when interaction between the two variables is entered in the regression, it is interesting to note that the effect of type of error becomes null ($b = .00$; Model 3) due to a strong interaction with the magnitude of the error ($b = 1.14$, $p < .000$; omega squared = .17; Model 3). Figure 17a shows the estimated values of cooperative behavior associated with errors of over- and under-estimation at different levels of error magnitude (one standard deviation above and below the mean). When error magnitude is low (mean – 1SD), there is not significant difference in cooperative behavior between participants who under- and over-estimated cooperation (simple slope 1SD below the mean: $b = .06$, $SE = 0.07$, $t\text{-value} = 0.86$, $p = 0.39$). However, at higher levels of error magnitude, the difference in cooperative behavior associated with the two errors is greater and significant, and it is maximum at high levels of error magnitude (simple slope at the mean: $b = .26$, $SE = 0.05$, $t\text{-value} = 5.16$, $p = 0.00$; simple slope 1SD above the mean: $b = .46$, $SE = 0.07$, $t\text{-value} = 6.48$, $p = 0.00$).

Insert Table 35 about here

Insert Figure 17a about here

Figure 17b show the same interaction effect but this time plotting error magnitude on the x-axis to show how the estimated difference in cooperative behavior associated with the errors widens progressively as error magnitude increases. As error magnitude increases, the difference in the estimated values in cooperative behavior between the two types of errors increases. For errors of estimation equal or close to zero, there was no or little difference between participants' cooperation scores, but as errors became more substantial, so did the difference in their cooperative behavior (Figure 15b). The loss in cooperative behavior associated with a one-unit increase in error of underestimation was greater than the gain in cooperative behavior associated with a one-unit increase in error of overestimation, confirming that rather than boosting cooperation, overestimation protects from the penalizing effect of underestimation. Model 3 in Table 35 shows that the results are robust after controlling for prosocial orientation and affinity. These results confirm the ANOVA/ANCOVA results but add more precision because they factor in the organizational effects. These results also provide indirect support for the Hypothesis 5.

Insert Figure 17b about here

I looked at the region of significance of error magnitude: the range of value of the moderator within which the slope of error type (the difference in cooperative behavior between errors of overestimation and errors of underestimation) is significant. The analysis of the Johnson-Newman interval (Johnson & Fay, 1950), with Esarey & Sumner (2018) correction for repeated tests, showed that the slope of error type was significant for any value of error

magnitude between 0.11 and 0.77 (the maximum value of error magnitude observed) (Figure 17c).

Insert Figure 17c about here

Because I found that errors of perception linearly affect cooperative behavior and errors of overestimation are associated with greater cooperation than errors of underestimation (error > cooperation), I then tested whether cooperative behavior had any linear effect on outcomes. Table 36 show the results of a few linear regressions predicting status. I found a positive effect of cooperative behavior on status (cooperation > status; $b = .59$, $p < .05$, omega squared = .06; Model 2), though the effect was attenuated when I controlled for rank ($b = .39$, $p < .10$, omega squared = .02, Model 4). I did not find a direct effect of error of estimation on status (Models 1 and 3). Using Preacher & Hayes' bootstrapping technique (2004), however, I found a significant mediated effect of participants' errors of perception on participants' status via their cooperative behavior (causal paths included in the mediation analysis: Model 1 of Table 34 and Models 1 and 2 of Table 36; ACME = 0.32, CI (95%) = .08, 0.67, $p < .001$). The mediation was once again confirmed when I controlled for prosocial orientation and affinity in predicting cooperative behavior and for rank in predicting status (causal paths included in the mediation analysis: Model 2 of Table 34 and Models 3 and 4 of Table 36; ACME = 0.20, CI (95%) = .02, 0.45, $p < .05$). Overall, the mediation analysis lends some support to Hypotheses 2a and 2b, though the direct effect of error of perception on status (Hypothesis 2a and step 1 in Baron & Kenny's methodology) was not supported.

Insert Table 36 about here

To test for Hypothesis 5, I tested for a positive interaction between error type and error magnitude in predicting status. The interaction was positive but not significant ($b = .26$, $se = 0.59$, Table 37, Model 3). Figure 18a shows the estimated values of status associated with errors of over- and under-estimation at different levels of error magnitude (one standard deviation above and below the mean). Since the interaction is not significant, none of the three slopes in Figure 18a are significant. However, the trend in the data suggests that it is only when errors of estimation are of great magnitude that overestimation is the least costly of the two errors (simple slope 1SD below the mean: $b = -.07$, $SE = 0.14$, $t\text{-value} = -0.52$, $p = 0.61$; simple slope at the mean: $b = -.03$, $SE = 0.10$, $t\text{-value} = -0.26$, $p = 0.80$; simple slope 1SD above the mean: $b = .02$, $SE = 0.15$, $t\text{-value} = 0.13$, $p = 0.90$). In other words, the effect I hypothesized emerged in the data trend only for error of certain magnitude – errors must be significant to affect behavior in the manner I explained in my theoretical arguments.

Insert Table 37 about here

Insert Figure 18a about here

Figure 18b shows the same interaction between error type and error magnitude but shows the difference in status associated with the two errors along the whole range of error magnitude (rather than at three points: below the mean, at the mean, and above the mean). The difference between the two slopes widens in favor of overestimation only past a certain threshold in magnitude, before which it is smaller. If the data were restricted only to errors of magnitude approximately greater than 0.35, Hypothesis 5 might find support (with a large enough sample).

In other words, it is possible there are thresholds in these linear relationships that make errors consequential only past a certain magnitude.

Insert Figure 18b about here

I did not find a direct effect of errors of perception on participants' reputation for cooperation (Model 1, Table 38), but I did find a positive effect of cooperative behavior on participants' reputation for cooperation (cooperation > reputation; $b = .28$, $p < .001$, omega squared = .14; Model 2, Table 38). Overall, the mediation effect tested significant using Preacher & Hayes' bootstrapping technique (2004) (causal paths included in the mediation analysis: Model 1 of Table 34 and Models 1 and 2 of Table 38; ACME = 0.15, CI (95%) = .07, 0.26, $p < .001$). Again, while the direct effect of errors on reputation did not emerge, the mediation analysis jointly supports Hypothesis 3a and 3b.

Insert Table 38 about here

I found no significant interaction between error type and error magnitude in predicting reputation for cooperation (Table 39, Model 3), though there is clearly some trend in the data (Figures 19a and 19b). The asymmetry in costs of over- and under-estimation did increase with the magnitude of the two errors, although in the direction opposite to the one that I had hypothesized (Figure 19a). Since the interaction is not significant, none of the three slopes in Figure 19a are significant, but the trend in data suggests that as at greater levels of error magnitude, the difference in status between the two errors is more and more in favor of underestimation (rather than overestimation as per Hypothesis 3a) (simple slope 1SD below the mean: $b = -.02$, $SE = 0.05$, $t\text{-value} = -0.47$, $p = 0.64$; simple slope at the mean: $b = -.05$, $SE =$

0.04, t -value = -1.33, p = 0.19; simple slope 1SD above the mean: b = -.07, SE = 0.05, t -value = -1.37, p = 0.17).

Insert Table 39 about here

Insert Figure 19a about here

Figure 17b shows how the differences in reputation scores associated with the two errors increases as error magnitude increases. For small errors in the perception of cooperation, the predicted difference in participants' reputation is negligible; however, as the magnitude of the error increases, it grows quickly (Figure 19b). Contrary to my predictions, however, when error magnitude is included in the equation, it is underestimating cooperation that seem to yield greater status. Overall, Hypothesis 5 was not supported with regards to the effects on reputation for cooperation.

Insert Figure 19b about here

I did not find any statistically significant results concerning job performance, but I did find interesting patterns in the data. The effect of error of perception on job performance was positive but not significant (error > performance; b = .42, se = .34; Model 1, Table 40). While I hypothesized that over and underestimation would have a different effect on the performance of high versus low resource independent individuals, I found not significant interaction between error scores and resource independence (Table 41, Model 3). In fact, the relationship between the error type and job performance was the same at any level (-1SD, mean, +1SD) of resource independence (simple slope 1SD below the mean: b = .04, SE = 0.31, t -value = 0.14, p = 0.89;

simple slope at the mean: $b = .03$, $SE = 0.21$, $t\text{-value} = 0.13$, $p = 0.89$; simple slope 1SD above the mean: $b = .01$, $SE = 0.28$, $t\text{-value} = 0.05$, $p = 0.96$) (Figure 20). Based on these results, there would seem there is not support whatsoever for Hypotheses 4a and 4b.

Insert Tables 40 and 41 about here

Insert Figure 20 about here

However, when I factored in the analysis the magnitude of the errors, the pattern of results changed in the direction that I hypothesized. Table 42 shows the results of a three-way interaction between error type (over and under), error magnitude, and resource independence. While the main effects and the interaction term do not reach significance in this sample, the trend in the data shows that, as participants made greater errors of perception, the effect of such errors on their job performance did depend on their level of resource independence, and did so in the direction I hypothesized (Figure 21a and 21b). For relatively dependent individuals who misrepresented cooperation in their workgroup, overestimation was the most beneficial of the two errors, but relatively dependent individuals with a similar inaccurate mental representation of cooperation in their workgroup, it was overestimation the costliest of the two errors (Figure 21a and 21b).

Insert Table 42 about here

Insert Figures 21a and 21b about here

Because the regression coefficients are not significant, I cannot claim support for Hypotheses 4a and 4b, but I found the pattern of results encouraging in light of the small sample and other limitations (missing responses). I summarized hypotheses and results in Table 43.

Insert Table 43 about here

6.4 Conclusion

This study provided some general support for the ideas presented in this dissertation, though not all of my hypotheses were formally supported. First, the study has quantitatively demonstrated a key insight of this dissertation and a key result from Study 1: people hold different perceptions of cooperation in their workplace and those perceptions affect how they behave with one another. Data from 77 office workers in 9 workgroups showed that people had quite different mental picture of who helped whom in their workgroup, despite most of the groups being small in size. While it is not possible to conclusively speak of causality with results derived from cross-sectional data like the ones presented in this chapter, the data did show a clear association between individual perception of workgroup cooperation and cooperative behavior. Because of the emphasis of this dissertation is on the errors that people make in perceiving workplace relations, I compared the effect of errors of over- and under-estimation of intragroup cooperation on the extent to which participants helped others in their group. Results showed that participants who made the greatest errors of underestimation in perceiving cooperation in their workgroup were also the ones who withdrew themselves the most from helping others and cooperated the least. On the hand, those with overly optimistic perceptions of cooperation in their workgroup were the ones who cooperated the most.

The study also provided evidence that, by affecting cooperative behavior, perceptions of cooperation have consequences for individual outcomes. In analyses that took into account the fact that participants belonged to different organizations with potentially different cultures and implicit reward systems, I found a positive association between cooperative behavior and status. Also, among participants with rather inaccurate perceptions (error scores of magnitude of 0.4 over a range from the 0.0 to 0.8), only errors of overestimation were associated with greater status: participants who misrepresented cooperation in their workgroup by substantially underestimating, not only cooperated less, but they also enjoyed less status. The results are not conclusive in that they lacked statistical significance, but the trend in the data is clear and encouraging in the context of an overall small sample.

Cooperative behavior also turned out to be positively associated with participants' reputation for cooperation, with more cooperative participants enjoying a greater positive reputation. Overall, after controlling for participants' organizational affiliation, data supported a mediated positive effect of perceptions (with greater scores indicating more optimistic perceptions) on reputation via their effect on cooperative behavior. However, when I unpacked participants' error scores into their sign (error type) and their strength (error magnitude), the trend in the data showed that among participants with the most inaccurate mental representations of intragroup cooperation, those who had underestimated cooperation had a greater reputation for cooperation than those who had overestimated it. This finding, though only speculative, is puzzling because it is hard to imagine what chain of events thinking of one's group as uncollaborative might put in motion that eventually results in a greater reputation for cooperation. If we are to believe that overestimating cooperation leads to individuals to cooperate more and develop better reputations, it is like if participants who heavily

underestimated cooperation were prompt to do something that earned them a good reputation in their workgroup despite cooperating less overall. Perhaps these were individuals who got involved less in helping others but in more visible tasks when they did.

The study also showed some support for my prediction that overestimating cooperation is good for the performance of workers who tend to rely on their colleagues' help and relatively bad, compared to underestimating cooperation, for the performance of self-reliant workers. These effects emerged only for errors of over- and under-estimation of a certain magnitude (errors over 0.4 in a range from the 0.0 to 0.8), which makes sense considering that small or negligible errors are less likely to affect behavior and be consequential than more substantial errors. This is one consistent and crucial piece of evidence from this study: in most cases, effects started to emerge when errors of perception in the estimation of workgroup cooperation reached and surpassed a certain threshold.

Chapter 7: Discussion and Conclusions

Social networks are central to organizational life, but their configuration is not at all obvious to the individuals who make the network. While prior research has emphasized the benefits of perceiving networks accurately, this work emphasizes the benefits that derive from making certain errors of perception rather than others. Building on the insight of Error Management Theory that alternative errors of perception may have differential costs, I first developed a conceptual model of how individuals act upon their network perceptions and then I examined the consequences of perceptions that over- or under-estimate the structure of a key workplace network: the network of discretionary cooperation. My way of understanding of how people act upon their network perceptions integrates two seemingly opposing conceptualizations of networks: the view of networks as concrete patterns of relations that an individual can see with varying degree of accuracy (Krackhardt, 1990) and the view of networks as mental constructions that influence behavior independently of reality (e.g., Krackhardt & Porter, 1985). I argue that to understand the consequences of network perceptions both conceptualizations are necessary. When activated, a network mental representation affords opportunities and constraints; organizational behavior is motivated by such (subjectively experienced) opportunities and constraints. Such opportunities and constraints are inherently related to the motivations that lead to the activation of the mental representation – for example, when people think about the network of helping relations in their work environment, they may do so to identify potential helpers, identify people worth exchanging resources with, and/or decide how to respond to others' requests for help. It follows that, when thinking about the structure of helping relations, people are likely to try to gauge the characteristics of the network that are most diagnostic of the

information they are looking for. I argued that closure is one of such characteristics, i.e., how much closure people see in the network will affect their cooperative behavior.

While a mental representation affects behavior though, the consequences of that behavior are determined by the reality of the context in which that behavior takes place. A person may pursue opportunities, or endeavor to circumvent constraints, which do not exist; for example, she may miss opportunities to exchange resources because she underestimates others' willingness and ability to provide help, or spend more time helping others than advisable because she overestimates the reputational costs of shielding her time and resources from others' requests. These costs are clearly unexpected because the person operated under false assumptions. While we should expect errors to be costly to a certain extent, the point of this work that we should not expect them to be equally costly.

I built support for my theoretical ideas through two preliminary studies and one field study of workgroups in three organizations. Qualitative evidence collected from employees in a variety of industries and roles showed that cooperation —the decision of whom to help and from whom to seek help— was in the forefront of the mind of workers with limited resources and in search of an efficient way to exchange them. These workers reported that knowing the structure of cooperative relations (who helps whom) would have been useful to know whom to approach for help and how to respond to others' requests for help. Some participants showed confidence in their perceptions, as if they were sure to know and did not need to dig further; other participants reported that they had tried to figure out the structure of relations among their colleagues and recognized both the usefulness and difficulty of doing so. What is relevant to this work is that, regardless of where they stood in that spectrum, all of them were using some mental

representation of the network of cooperative relations in their work environment to regulate their behavior.

In a field study of office workers in nine workgroups, I tried to empirically and quantitatively establish the link between perception of cooperation in one's workgroup and individual behavior and outcomes. While not entirely conclusive, in part because of the limitations of the sample, the study built evidence in support of my theoretical arguments. First, even members of relatively small workgroups had different perceptions of the cooperative relations in their group. This means that they were inevitably either overestimating or underestimating cooperation in their workgroup, and they turned out to do so with varying degrees of intensity. Second, participants' perceptions were associated with their cooperative behavior and indirectly with their individual outcomes. Errors of over- and under-estimation were differentially costly, but generally only past a certain threshold marking a rather inaccurate mental representation of the network. Some of the findings emerged from the trend of in the data rather than from pure statistical significance.

Overall, this work contributes to the scholarly conversation on the role of network perceptions in organizations in several ways. While I concentrated my effort in understanding the consequences of errors of over- and under-estimation of the structure of one workplace network, the broader insight that drives this work—that errors may be differentially costly such that one errors is more desirable than another—points to a thus far overlooked source of systematic errors in network perceptions and perceptions in organizations broadly speaking. Error Management Theory posits that we humans have biases that evolved over evolutionary times to protect our species from making costly mistakes. This has two implications. The first is that we may have ingrained ways of thinking about social network relations that are a residue of the adaptive

problems faced by our ancestors during evolutionary time. This possibility is both fascinating and practically relevant because biases that served us over evolutionary times may or may not serve us equally well in the world of contemporary organizations. Understanding whether we possess default over- and underestimation biases of the type discussed in this work would yield insights about (a) the kind of errors we should expect to see in organizations and (b) how hard it may be to reverse them if not longer useful.

An equally compelling possibility is that after incurring in large costs, people learn to err on the safest side. A natural extension of this work would be to test whether the least costly error is indeed the most frequent in organizations, i.e., test for a general over and underestimation bias. If this were the case, it would suggest that people can reduce the penalties associated to costly errors not only by increasing their level of accuracy (Anderson, Srivastava, Beer, Spataro, & Chatman, 2006; Anderson et al., 2008), but also by developing a tendency to err on the opposite side that can be more or less conscious and deliberate. It should be noted, however, that the presence of trade-offs in the consequences of alternative errors of perception, like the ones I highlighted in this work regarding the cooperation network, makes the identification of the ‘best’ error not at all obvious. For example, I argued and find general support for the idea that overestimating closure in cooperative networks is better than underestimating it to achieve status, but it may be worse to achieve or maintain high levels of job performance.

The most interesting findings from my field study emerged when I unpacked perceptual errors into their two components: their sign, which says whether the error is of over- or underestimation, and their magnitude, which says how far the perception is from the reality. The cost asymmetries of the two errors started to emerge only for error greater than a certain magnitude, which in this case, given how the error variable was measured and operationalized, was slightly

below the midpoint of its possible range and at the midpoint of its observed range (0.4 for an error variable ranging from 0 to 1 with scores registered from 0 to roughly 0.8). This finding points to the fact that not all errors of perceptions are consequential if negligible, and what “negligible” means may vary depending on the error. How strong does an error need to be to be of essence? It would be not only interesting to pinpoint this empirically, by identifying the threshold or tipping point after which relational inaccuracies are likely to be consequential; perhaps most importantly this should be taken into account in theoretical efforts, to focus and direct them to errors of perceptions in organizations that have a good chance to be significant if not substantial. Interpersonal relations in organizations are good candidates in this sense, given the many times demonstrated difficulty of making sense of them (e.g., Eisenkraft, Elfenbein, & Kopelman, 2017; Campagna, Dirks, Knight, Crossley, & Robinson, 2019; Flynn et al., 2006).

Another extension of this work is to study the antecedents of the errors of over- and underestimation that I predict have organizational consequences. Potential antecedents include individual differences and contextual factors. Alongside individual differences in the activation of network schemas that may translate into errors of over- and under-estimation of the network structure (Flynn et al., 2010; see also Kilduff et al., 2008), there might be individual differences independent of schemas that affect higher-order mental representation. For example, individuals with competitive motives may tend to see less cooperation in their workplace social networks than individuals with prosocial motives, for example because they project their socially unacceptable thoughts, motivations, and desires to others in their surroundings (Freud, 1894). In my field study, I found evidence that individuals with stronger prosocial orientation perceived more cooperation in their workgroup than their less prosocial colleagues and more cooperation than actually existed in the group. It is like if these individuals, who enjoyed helping others,

assumed that others were like them. Contextual factors may play a role as well in shaping perceptions and related errors. For example, individuals who have worked in the past in very competitive environments may continue to see more competition and less cooperation around them even when they move to more collegial environments.

More broadly, this work calls attention to the subjectivity of norms in organization and the very concept of organizational culture. How certain employees see their organization may be very different from how other employees see it. In my field study, I showed that cooperation “norms” in groups can be very subjective—in fact, so subjective that some thought everybody helped everybody in their group and others hardly saw any helping going on. Here I made the case that such variability creates variability in behaviors and outcomes, but the fact that it existed is of theoretical import per se.

In the end, I hope this work will stimulate scholars interested in understanding how individuals can benefit from their network perceptions to look beyond the benefits of forming accurate perceptions. While certainty advantageous, accuracy remains elusive when it comes to understanding social relations. On the other hand, errors are ubiquitous. Recognizing potential asymmetries in their costs is the key to turn them to our advantage.

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Tables

Table 1. The Asymmetric Cost of Over- and Underestimating Closure in Cooperation Networks

Problems that Motivate the Activation of the Network Mental Representation	Type of Error	Subjective Evaluations	Motivated Behavior/ Interpersonal Mechanisms	Individual Outcome	Costs
<p>Secure resources from others; identify present opportunities for cooperation</p> <ul style="list-style-type: none"> Estimate others' interests in cooperation Estimate chances to be reciprocated Estimate chances to return favors thereby discharging obligations Estimate changes to be turned down <p>Protect one's reputation as a trustworthy exchange partner; estimate costs of turning down others' requests for cooperation</p> <ul style="list-style-type: none"> Estimate likelihood that one will suffer career penalties for being seen as uncooperative Estimate likelihood that a bad reputation will spread across the organization thereby precluding potential future opportunities for cooperation 	<p>Closure Underestimation</p> <ul style="list-style-type: none"> Fewer perceived cooperation ties Fewer people perceived as cooperating with others 	<ul style="list-style-type: none"> Perceived lower interest in cooperation in others Perceived lower changes to be reciprocated Perceived lower chances to return favors (greater feelings of indebtedness) Perceived weaker cooperation norms/expectations Perceived lower probability to be sanctioned for not cooperating Perceived lower risk to earn a bad reputation across the organization 	<p>Lower likelihood that the perceiver will cooperate</p> <ul style="list-style-type: none"> Less likely to actively seek out opportunities for cooperation (invite others; ask for help) More likely to turn down others' requests for cooperation <p>Greater likelihood that perceiver will cooperate/contribute less than other members and less than expected</p>	<p>Less likely to earn others' respect for one's contributions (status)</p> <p>More likely to earn a reputation for being uncooperative</p> <p>More likely to perform better if resource dependence is low; More likely to perform worse if resource dependence is high</p>	<p>Higher for status</p> <p>Higher for reputation</p> <p>Higher for job performance if resource dependence is high</p>
	<p>Closure Overestimation</p> <ul style="list-style-type: none"> More perceived cooperation ties More people perceived as cooperating with others 	<ul style="list-style-type: none"> Perceived higher interest in cooperation in others Perceived higher changes to be reciprocated Perceived higher chances to return favors (lower feelings of indebtedness) Perceived stronger cooperation norms/expectations Perceived higher probability to be sanctioned for not cooperating Perceived higher risk to earn a bad reputation across the organization 	<p>Higher cooperation</p> <ul style="list-style-type: none"> More likely to actively seek out opportunities for cooperation (invite others; ask for help) More likely to accept others' requests for cooperation even if suboptimal for in-role performance <p>Greater likelihood that perceiver will cooperate/contribute more than other members and more than expected or necessary</p>	<p>More likely to earn others' respect for one's contributions (status)</p> <p>Less likely to earn a reputation for being uncooperative; more likely to earn a positive reputation as an exchange partner</p> <p>More likely to perform better if resource dependency is high; More likely to perform worse if resource dependency is low</p>	<p>Lower for status</p> <p>Lower for reputation</p> <p>Higher for job performance if resource dependency is low</p>

Table 2. Study 1: Types of Helping Acts

Type of Helping Act	Definition	Sample Response
Swap Shifts	Agree to switch shifts or tasks or to change schedule to accommodate a coworker's need	"Shifts were changed in order for me to attend a party, the other person didn't have plans so agreed to change"
Coworker Substitution	Cover for an absent coworker by completing a task on their behalf or temporarily taking on their job duties	"Coworker completed some sampling and analysis of a chemical study that was ongoing whilst I was on holiday. Required ~1 hr of work from my colleague"
Task Completion	Help a coworker complete a task/project on time or take on some of their workload	"I had a coworker help me with a job I was completing which was under time pressure so we split the workload, it was emergency light testing and we work in a hospital so quite critical to ensure completed"
Task Support	Provide auxiliary help while coworker works on main task	"I asked a co-worker to help me collect a patient from theatre. The patient had been unwell and I wanted some backup and support. My co-worker came with me, sacrificing their own work time. It meant that they then had less time available to complete their own tasks because they had helped me."
Sharing/Lending Material	Sharing or lending material with/to a coworker	"My coworker didn't have a form that she needed, so I gave her my last copy and then went to print off more for myself later that day."
Information Sharing	Give helpful information to a coworker	"As a student nurse on a busy ward I sought help from a nurse as I did not know where the bandages were kept on the ward as I was new to the ward. The nurse helped me by showing me where the bandages were kept"
Knowledge Transfer	Show a coworker how to complete a task or solve a work-related problem; teach a skill	"I asked a co-worker for some help to understand a new process. They helped me by calling me to talk this process through."
Advice	Provide a coworker advice on how to deal with a task-related issue	"I have sought help when I have been unsure with what to do with one of my cases. [...] I asked my co-worker to look at the assessment that I had done and look at my professional opinion and to give me advice on whether it was sufficient"
Feedback	Check and provide feedback on a coworker's work	"I recently needed a co-worker to sit in with me while I rehearsed a presentation for an important client meeting. This co-worker works in a different department, so it's not her job to do it. She ended up staying late at work to listen to me do the presentation, and the sacrifice was her personal time since she's salaried."
Courtesy	Gestures that help a coworker prevent a problem or get into trouble	"One of my Co workers was having a hard time grasping a new task. So I spoke to the manager and asked was it ok if we reviewed training at a meeting so my co worker wouldn't be embarrassed at not knowing something."
Social Support	Listen to a coworker's worries and express sympathy	"This one time I was having relationship problems I asked one of them and I told her about it and she's understood it really helped"

Table 3. Study 1: Types of Helping Acts Coding Process

Sample Responses	First Order Category	Second Order Category
<p>“I recently had an injury which makes it difficult to carry out some of my duties. My colleague offered to swap some shifts with me to allow me to fully recover and not risk further injuring myself.”</p> <p>“I asked a coworker to swap locations at work so that I didn't have far to travel as I didn't have use of my car. They did swap for me which would mean them going further than they would normally. This was much appreciated.”</p> <p>“My coworker asked me to swap shifts and that meant to work weekend. I had plans for the weekend too, however, I changed the shifts for my coworker and rearranged my plans accordingly.”</p> <p>“Swapping shifts to accommodate my colleagues' annual leave, resulting in me having to work a different pattern and with less of the regular team that I tend to work alongside. This also meant that I had to deputise for them. Carrying much more senior a role, whilst also doing my own role. The workload was essentially doubled. I felt exhausted.”</p>	Swap Swifts	
<p>“I was going to be out of office for several days, and was concerned about a project I was working on getting held up in the event that other key players had questions. So I asked my coworker if he would answer questions while I was away and, if need be, attend any important meetings related to the project. My coworker did indeed help with these tasks and prevented the project from stalling during my absence. I believe my coworker had to sacrifice some of the time he would have used to work on his own projects and other tasks, and may have had to work longer than usual if there were any issues he had to spend a lot of time on.”</p> <p>“I have very recently gone on maternity leave from my job as a telephone operator in customer services. As part of my job I have been assisting a customer for several months with an ongoing billing issue. My co worker has took over doing this on my behalf and corrects the customers bill every month and calls them back to let them know what changes have been made and to reassure that we are still looking after them”</p> <p>“My manager took several months off work owing to illness. In his absence, I was asked to manage my colleagues in a team of 20+ people. I was asked to manage the team by his manager - I said that I was happy to help in whatever way I could (and I meant this). However, this meant that I juggled my role and his for a few months. On his return, I helped him settle back into the workplace by updating him on what the team had achieved in his absence and setting up meetings / activities for him to action as a priority. I also supported his general day-to-day workload for a few months into his return. This did take a lot of effort because, as I said, I was juggling two jobs but it wasn't a problem and although this helped him it also was great for my self-development.”</p> <p>“Our engineering team often has to complete presentations for clients outlining the scope of work for a project. We discuss requirements and deliverables. I had a co worker who had another important meeting come up even though he was scheduled to present to a customer. My coworker asked me to present the material for him. Since I had no idea what the project was, he briefed me on it and provided me with everything I needed for the presentation (location, names, PowerPoint, and handouts, etc). I then flew to St. Louis from TX to present to this customer.”</p>	Coworker Substitution	Standing in for a colleague

“I recently had a co-worker take on a finance project I had. This co-worker was in accounting, so she had nothing to do with finance but knew how to do it. I had several projects and knew I could not finish it by the deadline. She gave up her free time and break times in order to do the project for me because she still had to do her regular job.”	Task Completion	
“They helped me with sheer volume of work. As a newspaper sub editor I had a high volume of pages to do on this day, more than what would be classed as normal. I asked coworkers to help, they took 25% of my work, making my workload manageable, but increasing their own workload”		
“A co-worker had a back log of calls to make and had a deadline to adhere to so asked if I could complete a couple of the calls for her. As I had already completed my own case load I decided to splits her calls 50/50 to enable her to achieve her own deadline”		
“I sometimes work on the customer service desk, another co worker was inundated with returns and asked me to help clear the backlog while she dealt with customers. I was working in another part of the store that day but was happy to help her. To which she was very grateful”		
“In my social work role, I asked the co-worker to make a joint visit to see my client as I needed my co-worker to protect me from potential allegations and witness my interaction with the client who was displaying challenging behaviors.”	Task Support	Help a colleague keep up with their workload
“I recently asked one of my coworkers to support me in attending a meeting with a client. This is not part of my coworker’s duty and she had to stay beyond her usual hours to complete this. I asked her as the client is notoriously difficult to please. She stayed for one hour offering support and wrote up the notes of the meeting for me.”		
“A relatively new member of staff was opening up, which means starting at 7.30 instead of 8.00. And then turning everything on, printing off case lists for the theatres and sending porters for patients. She was a little nervous as first time doing it on her own. So I offered to come in at 7.30 and help/support her, unpaid.”		
“A coworker responsible for delivering a particular risk related piece of work had done all the right things but got wrong footed at a meeting by those risk people not taking responsibility for what they had done. This reflected badly on my co-worker and at the same time knowing that he was going through some family trauma. I took control and provided support to make sure that it was rectified and my co-worker didn't take responsibility for others' failings. I also called him to make sure he was ok.”		
“My coworker didn't have a form that she needed, so I gave her my last copy and then went to print off more for myself later that day.”	Sharing/Lending Material	Provide a colleague with task-related resources
“As a student nurse on a busy ward I sought help from a nurse as I did not know where the bandages were kept on the ward as I was new to the ward. The nurse helped me by showing me where the bandages were kept”	Information Sharing	
“I needed help from a coworker with a customer concern. I got the information I needed from the coworker and was able to remedy the situation. There was no sacrifice.”		
“Recently in work I asked another member of staff how to put some information on the computer so that the data can be recorded. The coworker helped by going through it step by step which did take some time therefore taking her away from her tasks”	Knowledge Transfer	Contribute to a colleague’s professional development

“There is a forecast of energy for the pacific northwest I put out every month. I need to know what units were in and out of service for this forecast. I knew a coworker in another section had a program that could pull this data. He was willing to sit with me and show me how to use it.”		
“I took a few hours to teach a coworker how to use a specific spreadsheet needed to do her job, despite the fact she should have known it already.”		
“Recently our systems were updated and a co worker wasn't really understanding how to use it. I went through all the new commands on the system so they have a better understanding of it. This took me away from my work for around 45 minutes. Meaning I was behind on meeting my diary target.”		
“I have sought help when I have been unsure with what to do with one of my cases. I have a social worker that I can ask or my line manager. I asked my coworker to look at the assessment that I had done and look at my professional opinion and to give me advice on whether it was sufficient”	Advice	
“I asked a colleague for advice on a technical aspect to provide reassurance that the approach I was taking was correct. I asked this person to review a technical document and information contained therein and to make sure that our response would be correct and accurate. As a result of this my colleague took about two hours out of their time to provide the right solution plus meetings to resolve issues.”		
“A coworker recently asked me to help her figure out how to structure an activity for her math class. I talked through the problem she was having and gave her some ideas and suggestions. She said my ideas really helped her implement the activity in class and it went well. My sacrifice was time that I could have spent grading and prepping my own classes along with mental energy.”		
“I helped an older member of staff with some information and advice on using LinkedIn for work purposes”		
“I was recently helped by my manager. I was working on putting together a presentation for a client. However I am a nervous presenter, my manager stepped in and offered to give her advice to me if I presented to her first. I accepted this practice run and was happy to receive positive, helpful critique of the content and delivery which ultimately improved the work. She took specific notes, and provided comprehensive feedback on elements of the presentation which could have done with some fine tuning. She also gave up time in her diary to do this for me.”	Feedback	
“My coworker often rereads my emails before I send them to make sure I've made myself clear.”		
“A co-worker asked me to help her brainstorm about an idea she was having, and asked me to look over her work to see if I had any thoughts/feedback. It required time and mental effort that I'd otherwise have put into my own work, but gave me satisfaction to help out another member of the team.”		
“I often help my colleague make sure her case investigations are thorough and I let her know if she has missed anything as this will improve her overall investigation and letter with the customer”		
“A coworker responsible for delivering a particular risk related piece of work had done all the right things but got wrong footed at a meeting by those risk people not taking responsibility for what they had done. This reflected badly on my co-worker and at the same time knowing that he was going through some family trauma. I took control and provided support to make sure that it was	Courtesy	Watch over a colleague for the colleague’s sake

rectified and my co-worker didn't take responsibility for others' failings. I also called him to make sure he was ok.”		
“I "noticed" something was off about a report I was given. If I had used the information given to me, it would have wrecked the project down the road, and the coworker who gave it to me would be in trouble. But I had to figure out what it is I thought was off before I sent it back to the coworker. After a bit of research I had found that the coworker had used an incorrect code for a ledger line. I corrected it, sent it back to them, and gave them a heads up to comb over it again.”		
“Recently a co worker has had some marital issues [...] I have [...] spoken to their superior to ensure they are aware of the need to give some leeway to the individual [...].”		
“This one time I was having relationship problems I asked one of them and I told her about it and she's understood it really helped”	Social Support	
“[...] knowing that he was going through some family trauma [...] I also called him to make sure he was ok.		
“Recently a co worker has had some marital issues, as such they were generally feeling down, unmotivated and struggling with their workload. I have lent a sympathetic ear to this person during my lunch breaks rather than getting lunch [...] It took [...] no real effort to listen.		
“I stayed late to file some patient papers for a co worker who is struggling through a divorce. He thanked me the next day and I told him I'll do whatever I can to help him through it.”		

Table 4. Study 1: Reasons for Asking a Colleague for Help

Reason for Choosing the Helper	Definition	Sample Response
Coworker Ability-based Trust (38.1%)	The subject trusts the coworker's ability to complete the task successfully or to provide useful advice	"I know that this particular coworker is reliable and trustworthy. I know that I can trust in her not to let this customer down"
Coworker Reputation for Cooperation (14.2%)	The coworker is known for, or perceived as, being willing to help	"I asked this person because I had seen in the past that they were always helpful."
Liking/Friendship (14.2%)	The subject likes, feels close to, or considers the coworker as a friend	"The coworker was a friend and if the roles were reversed I would have done the same to help him."
Reciprocity (13.3%)	The subject and the coworker use to exchange favors, or the subject helped the coworker in the past and the coworker owes them a favor	"We always help each other out and work closely together."
Opportunity (9.7%)	The coworker happens to be available, to have what needed, to be within reach, or they offer to help	"Stewart was the only person I could ask as he was the next manager on shift"
Coworker Expertise (8.8%)	The coworker is the most knowledgeable on the subject matter	"This coworker was the most knowledgeable on the new system. They knew all the ins and outs of it. Some of the others knew it to but no one as well as this specific coworker."
Formal Roles (1.8%)	The coworker is the role that required them to help	"They were my line manager."

Table 5. Study 1: Reasons for Asking a Colleague for Help Coding Process

Sample Responses	First Order Category	Second Order Category
<p>"I asked that coworker specifically due to their familiarity with the type of disease; while I could've asked someone else, this coworker had a general idea of what she would be seeing and I could trust that she would do it well."</p> <p>"[...] I had no hesitation as I know her to be a very knowledgeable and conscientious member of staff. I did not go to any other colleagues as I was more than confident in her abilities."</p> <p>"Kerry is very capable and I know she would be able to have the job done the quickest"</p> <p>"This lady worker is someone I trust at work she is very good with computers and is reliable."</p>	Coworker Ability-based Trust (38.1%)	Helper Characteristics (61.9%)
<p>"The coworker in question is very experienced in dealing with server related problems, possibly the best in the office therefore it made logical sense to turn to them."</p> <p>"They have the most knowledge on the new process as they helped to set it up."</p> <p>"This person was the best technical person I had who was well respected by others."</p> <p>"I had a very big load. I could not get my head around on how to organize my delivery. Mick the controller helped me because his knowledge of London is second to none. I needed his expertise to help me get my load organized quickly."</p>	Coworker Expertise (9.7%)	
<p>"She was always helpful in the workplace so I trusted her"</p> <p>"He was always helpful since he started with us"</p> <p>"They have helped me on this task in the past"</p> <p>"She is very approachable and enjoys the satisfaction of helping other people."</p>	Coworker Reputation for Cooperation (14.2%)	
<p>"I turned to her because she is probably my best "work friend," and she has helped me in the past with other tasks."</p> <p>"I feel I have a strong bond with this particular coworker."</p> <p>"Good friend, I'd helped in a similar way on previous occasions."</p> <p>"She was closest to me. A sort of friend"</p>	Liking/Friendship (14%)	
<p>"This particular employee often asks me to perform similar tasks, so I know I can ask and receive help whenever needed."</p> <p>"I have helped them in the past"</p> <p>"I've done similar favours for him in the past."</p> <p>"We help each other with work tasks and are always willing to help each other out."</p>	Reciprocity (13.3%)	Relationship Between the Parties (27.4%)
<p>"The coworker was next to me so I asked them"</p> <p>"They appeared to be the least busy out of the coworkers I had access to"</p> <p>"There wasn't a specific reason why I chose this particular coworker because the coworker was next to me working so I just thought I should ask them."</p> <p>"They were the only person with the training and skill set who would have been able to do the job"</p>	Opportunity (8.8%)	Context (10.6%)
<p>"They were my line manager."</p> <p>"I asked the boss for help. I had confidence he would take my request seriously, as being the boss he has overall responsibility."</p>	Formal Roles (1.8%)	

Table 6. Study 1: Reasons for Deciding to Help a Colleague

Reasons for Deciding to Help	Definition	Sample Response
Empathy (28.7%)	The subject empathizes with the difficulties faced by the coworker	"I remember what it's like to be new, and wanted to help and support her. Someone did the same for me years ago when I was new."
Sense of Duty (27.7%)	The coworker feels that helping the coworker is the right thing to do	"As the head of department I felt responsible. I also felt that I could get the job done more quickly."
Reciprocity (13.9%)	The subject and the coworker use to exchange favors or the subject wants to return a favor	"My coworker has helped me with a lot of projects in the past and I wanted to be able to repay the favor."
Task Interdependence (12.9%)	The subject wants to help the team/organization achieve its goals	"Basically a one and all attitude - if someone in the department messes up, it creates problems for everybody, so it's best to nip it as early as possible."
Liking/Friendship (5.9%)	The subject likes or considers the coworker as a friend	"I have known her since my college and we are good friend"
Opportunity (4 %)	It is easy/convenient for the coworker to help	"It made sense as I was going to the place anyway."
Perceived Group Cooperation (4%)	The coworker expects that her coworkers (in general) would do the same	"We work in a team and help each other out. I was relatively quiet work-wide that day so could help out. This is often reciprocated by other staff to help to even out the amount of time we all spend doing things so no one has to stay too late in the office."
Formal Roles (3%)	The employee is in a subordinate position and feels they can't reject the request of a superior	"I felt I had no choice as they were above me in rank and seniority."

Table 7. Study 1: Reasons for Deciding to Help a Colleague Coding Process

Sample Responses	First Order Category	Second Order Category
<p>“I greatly empathised with my coworker as I have been in a possible redundancy position earlier in my career. I understand the constant worry and fear of potentially losing your job. This concern can greatly impact your mental health, happiness and confidence levels. I was very eager and willing to help my coworker in preparing their presentation as I knew that without my help, they would have struggled to have prepared it within the standards that the organisation required.”</p> <p>“I could see that she was nearly buried in them. The mixture of the technical glitch - which meant none were printed out for several days then all came out at once - and her being on leave meant she had far more than usual within a time scale. I really felt for her and would hate to be in the position she found herself in.”</p> <p>“I know it's not nice when u can't understand something and I felt if I explained it all they would feel more confident.”</p> <p>“I felt sorry for them as they were stressed and anxious.”</p>	Empathy (28.7%)	Subject Characteristics (56.4%)
<p>“As the main IT person was away there was no one else on site which a good understanding of IT / electronics who could fulfill his duties. Therefore I felt as though I had to offer my support during this time.”</p> <p>“The fact that the groups of students will be left unsupervised and my co-worker disrupting the lesson thus not having a flow to her delivery session.”</p> <p>“I saw my colleague becoming more stressed and frustrated. I felt like it was my duty to help her”</p> <p>“I am more knowledgeable in that area and dealt with more complaints in that particular issue”</p>	Sense of Duty (27.7%)	
<p>“She was by far the friendliest person in the office and was a good person - I'll always help a good person.”</p> <p>“My co-worker is a good friend [...] I want to make her life easier, and help her make the best thing she can.”</p> <p>“I like his enthusiasm and hard work”</p> <p>“She is [...] a personal friend.”</p>	Liking/Friendship (5.9%)	
<p>“My coworker has helped me many times in the past. I would call him for simple questions that I had. He has also helped me with numerous projects in the past by acting as a knowledge resource. I know he would do the same for me if I asked him too.”</p> <p>“I owed her a favour”</p> <p>“I know she would have done the same thing for me”</p> <p>“I thought about if it was me in that position would they help me out”</p>	Reciprocity (13.9%)	
<p>“The project has a critical deadline and high visibility to senior management. Failure to deliver would look badly on my teammate and the team I support”</p>	Task Interdependence (12.9%)	Context (23.8%)

<p>“She was clearly out of sorts over this problem and in all reality, it was in my best interest to not have her running around the office all frazzled - who can focus when you're listening to that - so really, it was selfishness and desire to want to keep the office calm - and she just seemed liked she needed someone to step in and help her - so I did.”</p>		
<p>“Their misuse made my job harder.”</p>		
<p>“He needed the help and it was important information to know for SEC reporting and therefore critical to the company that we get it right and get it done on time.”</p>		
<p>“We're all a team and would expect the same”</p>		
<p>“Small issues happen, human error is a common thing. I know that if I had made the same mistake my coworkers would help me in the same way.”</p>		
<p>“I knew that if I were in that position someone would help out, and I hope to lead by example.”</p>		
<p>“We work in a team and help each other out. I was relatively quiet work-wide that day so could help out. This is often reciprocated by other staff to help to even out the amount of time we all spend doing things so no one has to stay too late in the office. I also like the other members of my team!”</p>	Perceived Group Cooperation (4%)	
<p>“The coworker asked me for assistance. I was able to help and wanted a break from what I was currently doing.”</p>		
<p>“She was on same shift pattern as I was. However, we had elected to come in on overtime for this cancer related procedure. We had both worked 42 hours before the operation began.”</p>		
<p>“It made sense as I was going to the place anyway.”</p>		
<p>“Time and efficiency”</p>	Opportunity (4%)	
<p>“I felt I had no choice as they were above me in rank and seniority.”</p>		
<p>“He asked and I was also told to by my supervisors. They felt it was better to teach him than to let him go and have to go through the hiring process all over again.”</p>		
<p>“My coworker is also my superior and I'm pretty new in my position. I didn't think it would look good to say no”</p>	Formal Roles (3%)	

Table 8. Study 1: How Participants Would Use Accurate Knowledge of Who Helps Whom

Reasons for Deciding to Help	Definition	Sample Response
Finding exchange partners (50%)	Identify whom to ask for help and whom to try to collaborate with	“It would help to know who I should spend more time helping and working alongside with in the future. I would go out of my way to help someone who is a team player.”
Rewards/Promotions/Feedback (23.8%)	Identify whom to reward, advance, or give developmental feedback to	“I would aim to reward those who help others. Team work makes all the difference in the workplace and I would like to reward those who help.” “We would certainly consider that information when making promotion and compensation decisions”
Planning (18%)	Plan workload assignments, distribution of tasks, coaching needs; assist people in finding mentors and identify role models; assign people to projects or teams	“As a manager myself, it would help me manage workloads and try to balance workloads across staff better, and to allocate time off for extra work more accurately.” “It would let me know who the more willing members are, who may be able to coach the less able members. It would also highlight the people who need coaching, or are not team players, possibly allowing them to identify roles more suited to them.” “I could use that information to help arrange teams more efficiently.”
Identifying subject experts (8.2%)	Identify whom to ask for help on specific subject domains or tasks	“I along with my colleagues would know who to go to straight away to help with specific problems and tasks without having to ask around, which wastes time and makes jobs longer than they need to be.”

Table 9. Study 1: How Participants Would Use Accurate Knowledge of Who Helps Whom Coding Process

Sample Responses	First Order Category	Second Order Category
<p>“Because you would then know who to ask for help and not bother asking the ones who only help specific people.”</p> <p>“So I knew who to rely on, and remember for future reference should they require returned favours or help themselves.”</p> <p>“I would know who I could depend on.”</p> <p>“I would determine who to ask and be close to. And the people that don't help, would never receive help.”</p> <p>“Know which colleagues to help out if needed, those that are willing to help others.”</p> <p>“I would use the information to decide who is worth trying to help and who is just lazy and wants someone else to do their work.”</p> <p>“If it's clearly known who doesn't help, it would be right not to help that person.”</p>	Finding exchange partners (50%)	Identifying Whom to Cooperate With (58.2%)
<p>“I would look to co-workers that have specific skills for the task that I am trying to do”</p> <p>“I would be able to select appropriate coworkers to help me based on what I know”</p> <p>“I know who to has what knowledge and it would easier to know who to go for help.”</p> <p>“It would make it easier to see the people I could ask for help in specialist areas.”</p> <p>“Gives an idea of who to send people to for support on specific complex subjects”</p>	Identifying subject experts (8.2%)	
<p>“It would show me who is a team player and who is willing to make a sacrifice for the team. These people are ones I would like to make sure stay with the company. I could also encourage the less helpful members to provide more assistance.”</p> <p>“Knowing who helps out when they are not asked to shows who is a potential future leader for the team.”</p> <p>“I would be able to reward those who help.”</p> <p>“As I can keep an eye if anyone is not asking for help or if there is any clicky groups forming at work instead of being a team and all working together.”</p> <p>“I would use the example to encourage those, who are less likely to help others, to build similar relationships with each other and I would focus more of my time on these people in a supervisory capacity.”</p> <p>“It would allow me to then identify if there were any development areas to look at amongst the employees who did not help.”</p> <p>“It would be constrictive to know this so that we could address the problem of some individuals being less helpful. Their manager could discuss this with them in their appraisal to identify the reasons why they are reluctant to help and how they can improve in this area to be a better asset to the company.”</p>	Rewards/Promotions/ Feedback (23.8%)	Fostering Cooperation (41.8%)
<p>“This would help with the planning and distribution of tasks and duties, assigning to individuals strengths.”</p>	Planning (18%)	

“I would be able to identify those who do not feel they have anyone to help them.”		
“I would use it to reallocate assignments potentially so that the work is more evenly distributed.”		
“It would let me know who the more willing members are, who may be able to coach the less able members. It would also highlight the people who need coaching, or are not team players, possibly allowing them to identify roles more suited to them.”		
“I believe I already know this to a certain extent, this allows you to more understand what workload other members for the team are carrying and also how busy some people actually are.”		
“I guess the best part about this type of information is that you can usually figure out how best to group work tasks together by knowing who naturally works well together and who already have some sense of mutual teamwork flow together.”		
“I think that would be a great indicator of who to match up with projects.”		

Table 10. Themes Emerged from Participants' Descriptions of Their Workgroup (Study 2)

Group Property	Definition	Sample Response
Cooperation	The extent to which people help each other out at work.	<p>"In the place that I work, each team has a specific set of skills for doing their jobs, and everyone in that team is willing to help others both in their team and outside of that team. Everyone that I work with are generally very helpful and patient, and are willing to help out where they can."</p> <p>"My workplace environment is probably like any other - there are some people who are really helpful and go out of the way to help others, while others are lazy, moody or incompetent. It's all about developing good working relationships with the right people and taking a collaborative approach."</p> <p>"I would not recommend this workplace to anyone. It is mostly driven by an 'if your face fits' type culture, whilst telling everyone it's all about fairness and inclusion. It isn't. If you're one of the chosen few, you'll be fine - you'll get all the support you could ever need. If you don't fit into that group, you're pretty much on your own."</p>
Task Cohesion	The extent to which people work together as if they were part of a team (if task interdependence is low) or are committed to the team's goals (if task interdependence is high).	<p>"Staff always work together as a team to ensure all tasks are completed efficiently and safely. Although we all have our individual tasks to do, we complete them as a team and ensure that no one is left to struggle on their own."</p> <p>"All in all, there is an understanding that we each work as hard as we can to pull our own weight but that ultimately we are a team on a mission, so it pays to help one another."</p> <p>"It is an environment where patient safety is of upmost concern and so everybody works together, helping each other out to achieve good patient care. However, it may not always seem this way due to busy and stressful circumstances."</p>
Social Cohesion	The extent to which there are strong ties among people. Feeling of interpersonal attractiveness between group members.	<p>"I would say that people are very friendly and help each other. It's close knit, people at my work get together every Friday for a dinner at the pub. Its helps to create a union."</p> <p>"Our environment is quite unique as we are all co-workers but we are always all friends. We all met in a professional environment however it has now changed to a friendly relationship rather than just professional. We are professional at work, and friends outside of work."</p>
Harmony	Perception of the workplace as a peaceful environment. The extent to which people get along, respect one another, and work well together.	<p>"The work environment is a great place to be and work. Everyone gets along and the managers are nice."</p> <p>"I would tell him it is a brilliant place to work, all my team work well together. We have a laugh and joke and are all quite close. There is no awkwardness and little bitchiness. Everybody seems to get along well and we try and help and support new colleagues."</p>

Work Pressure	The extent to which the work environment is fast-paced and expectations are high.	<p>“I would say overall it is a very supportive work place. It is a high intensity, high pressure job, as a result of this, most staff are aware of the pressures exerted upon one another, and are therefore supportive as required.”</p> <p>“I would say my teams need to be hardworking team players with a can-do attitude who need to put the extra effort in to meet deadlines that I set for them.”</p>
Psychological Safety	The extent to which people are not judgmental and asking for help or making a mistake is okay.	<p>“I would say that the people are relaxed and non-judgmental and like to have a good laugh as well as being productive. It's a pretty safe environment.”</p> <p>“People recognise that we work on specialised machinery, and you can't learn to work on it anywhere else, so, as long as you are willing to work hard, listen and learn, people will happily help.”</p> <p>“We have a very good working environment, and we have bred an open, no blame culture where everyone is happy at work and is aware that making mistakes is only human”</p>

Table 11. Analysis of the Language Used by Participants to Describe Their Work Group for Item Generation (Study 2)

Perceived Group Property	Language Used by Respondents²²	Item generation
Cooperation	<p>“we all want to see each other succeed”</p> <p>“we muck in and help each other out”</p> <p>“we all look after each other”</p> <p>“we care about each other”</p> <p>“we care about each other’s performance”</p> <p>“we are there for each other”</p> <p>“we all go out of our ways to help each other no matter how big or small the issue is”</p> <p>“we always help out those who strive to help others and make best efforts”</p> <p>“colleagues genuinely try to help each other”</p> <p>“people want to help others insofar as possible”</p> <p>“people are willing to help out where they can”</p> <p>“they will all support you as best they can, if asked”</p> <p>“it’s never an inconvenience to provide help to someone in my team”</p> <p>“people want others to be successful”</p> <p>“people champion each other’s success”</p> <p>“people want to help”</p> <p>“people will find time to help you”</p> <p>“people are always willing to help each other out”</p> <p>“people pitch in to help each other out, when needed.”</p> <p>“[people] will go beyond the call of duty all the time for one another”</p> <p>“as long as you are willing to work hard, listen and learn, people will happily help”</p> <p>“So long as you demonstrate competence in your position, most of my employees would be happy to help”</p> <p>“my coworkers would always lend a hand or offer advice freely”</p> <p>“If they have a question, we would answer that question without hesitation.”</p> <p>“It is second nature in our organization to support each other in the work place”</p> <p>“everyone has time for everyone”</p> <p>“everyone helps each other out”</p> <p>“everyone is there to help others and for in as best as they can”</p> <p>“everyone helps out wherever they can to get the job done”</p>	<p>We all look after each other.</p> <p>People go out of their way to help others at work no matter how big or small the issue is.</p> <p>People do whatever they can to help others.</p> <p>People are genuinely glad to help others when they need help.</p> <p>People want others to be successful.</p> <p>People willingly help others who have work-related problems.</p> <p>People go beyond the call of duty for one another.</p> <p>People do not hesitate to help others.</p> <p>People are always ready to lend a helping hand to those around them.</p> <p>People can count on one another when they need help at work.</p> <p>People rely on one another for help at work.</p>

²² I removed phrases that were almost identical, very similar, or clearly redundant.

	<p>“everyone is understanding if you have a snag somewhere and need to reach out for help”</p> <p>“everyone has each other's backs”</p> <p>“most people are willing to coach others”</p> <p>“most of my coworkers are supportive of each other”</p> <p>“most people are helpful, though not everyone”</p> <p>“most people will help where they can”</p> <p>“most of the coworkers are very helpful and supportive”</p> <p>“generally most people will help you when needed”</p> <p>“80% of colleagues will go the extra mile”</p> <p>“many people are more than willing to offer support”</p> <p>“My workplace environment is probably like any other - there are some people who are really helpful and go out of the way to help others, while others are lazy, moody or incompetent.”</p> <p>“some individual departments are very supportive but there are some which show limited support”</p> <p>“you will always get the help you need from coworkers”</p> <p>“someone is always willing to help you”</p> <p>“we will all help you if you need any help”</p> <p>“Even though most people have super busy days, they will take the time out of their day to help with either questions or tasks you may need help with”</p> <p>“people are not supportive unless management are watching” (R)</p> <p>“the environment breeds independence above all” (R)</p> <p>“most coworkers just want to make it through the day and then go home” (R)</p> <p>“often people don't help others” (R)</p> <p>“everyone looks after number one - themselves.” (R)</p> <p>“[you must] watch your back” (R)</p> <p>“You need to have firm resolve and thick skin.” (R)</p> <p>“people are supportive because our supervisors require us to be” (R)</p>	<p>Everyone has each other's backs.</p> <p>People go the extra mile to see others succeed at work.</p> <p>People never refuse to do favors.</p> <p>People make a special effort to help others.</p> <p>People are willing to take the trouble to help others at work.</p> <p>People are willing to make sacrifices to help their colleagues.</p> <p>There is a high level of cooperation between people.</p> <p>People support one another in words and deeds.</p>
Task Cohesion	<p>“we work as a team”</p> <p>“we try to work as a team”</p> <p>“we stick together through tough times”</p> <p>“everyone is pulling in the same direction”</p> <p>“the team ‘pulls’ together”</p> <p>“we pull together at times that it's needed”</p> <p>“we are a great team to work for”</p> <p>“if you pull your weight and muck in, there are many that will do the same”</p> <p>“we all try to learn and grow together”</p>	<p>My work group feels like a team.</p> <p>We stick together in every situation.</p> <p>Everyone is pulling in the same direction.</p> <p>If you pull your weight and help out, there are many that will do the same.</p>

	<p>“everyone has shared goals”</p> <p>“people are focused on common goals”</p> <p>“Everyone shares the common goal of the success of the company”</p> <p>“ultimately you're all after the same goal and the success depends on each other”</p> <p>“there is a sense of community and working together to complete a goal”</p> <p>“ultimately we are a team on a mission”</p> <p>“we are all in it together”</p>	<p>Ultimately, we all share the same goals.</p> <p>There is a sense of working together to complete a goal.</p> <p>We are all in it together.</p>
Social Cohesion	<p>“we call each other ‘family’”</p> <p>“We treat each other like family”</p> <p>“there is a sense of community”</p> <p>“We are just like one big family who look out for each other.”</p> <p>“we are all co-workers but we are always all friends”</p> <p>“people here are often out of work friends”</p> <p>“we socialize regularly outside of work”</p> <p>“we are all a very close group of coworkers”</p>	<p>My work group feels like one big family.</p> <p>My work group feels like a community.</p> <p>We all stand in solidarity with one another.</p> <p>We are all friends with each other out of work.</p> <p>We are all a very close group of coworkers.</p>
Harmony	<p>“it's easy to fit in on our team”</p> <p>“it's easy to get along”</p> <p>“we are all very kind”</p> <p>“a tight team that [...] treats each other with respect”</p> <p>“It is a fun environment where you get on with your coworkers”</p> <p>“It is a relaxed environment that values positive people and good work”</p> <p>“My work environment is pleasant and peaceful.”</p> <p>“My work environment is friendly and supportive.”</p> <p>“It's friendly, good environment, and high morale.”</p>	<p>It's easy to fit in my work group.</p> <p>It's easy to get along in my work group.</p> <p>People are all very kind.</p> <p>People treat each other with respect.</p> <p>People are friendly.</p> <p>People work well together.</p> <p>My work group is a great place to work.</p>
Work Pressure	<p>“It is a high intensity, high pressure job”</p> <p>“most staff are aware of the pressures exerted upon one another”</p> <p>“[you] need to be hardworking team player”</p> <p>“[you must have] a can-do attitude”</p> <p>“it is a very fast-paced environment”</p> <p>“as much as you'd like to plan ahead where your work is concerned, be prepared to drop work frequently, if something urgent and pressing comes in. This happens often.”</p>	
Psychological Safety	<p>“people are [...] non judgmental”</p> <p>“It's a pretty safe environment.”</p> <p>“there is not embarrassment about asking for help”</p> <p>“we have [...] an open, no blame culture”</p> <p>“everyone is [...] aware that making mistakes is only human”</p>	

Table 12. Items Developed Inductively to Measure Interpersonal Helping and Perceived Intragroup Cooperation (Study 2)

Interpersonal Helping
<ol style="list-style-type: none"> 1. Goes out of way to help me at work no matter how big or small the issue is. 2. Goes beyond the call of duty for me. 3. Willingly helps me when I have work-related problems. 4. Is always ready to lend me a helping hand. 5. Is willing to take the trouble to help me at work. 6. Is willing to make sacrifices to help me at work. 7. Is genuinely glad to help me when I need help. 8. Does whatever he/she can to help me. 9. Makes a special effort to help me. 10. Goes the extra mile to see me succeed at work. 11. Does not hesitate to help me. 12. Never refuses to do me a favor. 13. I rely on this person for help at work. 14. I can count on this person when I need help at work. 15. Wants me to be successful. 16. Supports me in words and deeds. 17. Has my back. 18. Looks after me.
Perceived Intragroup Cooperation
<ol style="list-style-type: none"> 1. People go out of their way to help others at work no matter how big or small the issue is. 2. People go beyond the call of duty for one another. 3. People willingly help others who have work-related problems. 4. People are always ready to lend a helping hand to those around them. 5. People are willing to take the trouble to help others at work. 6. People are willing to make sacrifices to help their colleagues. 7. People are genuinely glad to help others when they need help. 8. People do whatever they can to help others. 9. People make a special effort to help others. 10. People go the extra mile to see others succeed at work. 11. People do not hesitate to help others. 12. People never refuse to do favors. 13. People rely on one another for help at work. 14. People can count on one another when they need help at work. 15. People want others to be successful. 16. People support one another in words and deeds. 17. Everyone has each other's back. 18. We all look after each other. 19. There is a high level of sharing between people. (<i>Chatman & Flynn, 2001; Wendt et al. 2009</i>) 20. There is a high level of cooperation between people. (<i>Chatman & Flynn, 2001; Wendt et al. 2009</i>)

Table 13. Summary of Item Performance Evaluation Analyses (Study 2)

Analysis to identify and eliminate <i>bad</i> items	Prime candidates for exclusion	Rationale for exclusion
<i>Item Correlation Matrix</i>	<p>Items that correlate poorly with other items.</p> <p>Items whose correlations with other items are markedly different (positive, negative, null).</p>	<p>The higher the correlations among the items, the more reliable their composite will be; in other words, the greater the proportion of common/shared variance to the total variance.</p> <p>If an item that positively correlated with some items and negatively correlated with others in a homogeneous set, evidently the source of those items cannot be the latent variable. If items are caused by the same latent variable, they must covary.</p>
<i>Item Squared Multiple Correlation*</i>	Items whose squared multiple correlation is low (or the lowest, if seeking to reduce the scale's length)	Items whose squared multiple correlation is low share little variance with the other items and therefore are unlikely to be caused by the same latent variable.
<i>Item Means</i>	Items whose mean is near one of the extremes of the range.	<p>Items whose mean is near to one of the extremes of the range might fail to detect certain values of the construct.</p> <p>Such items will also have low variances and therefore will correlate poorly with other items.</p>
<i>Item Variances</i>	<p>Items whose variance is fairly low.</p> <p>Items whose variance is markedly different from that of the other items.</p>	<p>Items that does not vary cannot covary.</p> <p>Markedly different item variances may be undesirable because they probably signify either substantially different sources of error from item to item or a failure to meet the requirements for equal item-to-true-score covariances required by the essentially tau-equivalent model.</p>
<i>Item-scale Correlation</i> (correlation between each item and the set of remaining items)	Items with a low item-scale correlation (or with the lowest item-scale correlation, if seeking to reduce the scale's length).	Items with a low item-scale correlation are not representative of the construct presumably measured by the rest of the scale.

Analysis to identify <i>the best</i> items to retain in the scale to reduce its length	Prime candidates for exclusion	Rationale for exclusion
<i>Alpha Reliability Coefficient:</i> <ul style="list-style-type: none"> - <i>For full set of items</i> - <i>For all possible k-1 item sets (every possible version with a single item removed)</i> - <i>For split sample</i> 	<p>Items whose elimination increases alpha.</p> <p>Items whose elimination causes a small loss in alpha.</p>	<p>These are items with lower-than-average correlations, which may be seen as not representing the “core” construct tapped by the rest of the scale.</p> <p>“Least good” items eliminated to the sole purpose of reducing the scale length.</p>
<i>Factor Analysis</i> <ul style="list-style-type: none"> – <i>Determine number of factors (eigenvalues, scree plot, parallel analysis)</i> – <i>Factor Rotation and Identification</i> 	<p>Items that does not load on any factor or that load on many factors.</p>	<p>A low factor loading is indicative of the fact that the item shares little variance with the other items and therefore is unlikely to be caused by any underlying factor. If the previous analyses are done correctly, though, all items should have good factor loadings and the “least good” items are eliminated to the sole purpose of reducing the scale length.</p>

* Obtained by regressing the item on all the remaining items. This is an estimate of the item’s *communality*, the extent to which it shares variance with the other items.

Table 14. Rotated Factor Loadings for Items Developed to Measure Interpersonal Helping (Study 2)

Interpersonal Helping Items	Factor Loadings
1. Goes out of way to help me at work no matter how big or small the issue is.	.88
2. Goes beyond the call of duty for me.	.86
3. Willingly helps me when I have work-related problems.	.79
4. Is always ready to lend me a helping hand.	.85
5. Is willing to take the trouble to help me at work.	.83
6. Is willing to make sacrifices to help me at work.	.83
7. Is genuinely glad to help me when I need help.	.78
8. Does whatever he/she can to help me.	.88
9. Makes a special effort to help me.	.85
10. Goes the extra mile to see me succeed at work.	.84
11. Does not hesitate to help me.	.80
12. Never refuses to do me a favor.	.79
13. I rely on this person for help at work.	.69
14. I can count on this person when I need help at work.	.86
15. Wants me to be successful.	.76
16. Supports me in words and deeds.	.79
17. Has my back.	.81
18. Looks after me.	.79

Note: The items in boldface are the best performing items across all the range of analyses detailed in Table 13.

Table 15. Rotated Factor Loadings for Items Developed to Measure the Perception of Intragroup Cooperation (Study 2)

Perceived Intragroup Cooperation Items	Factor Loadings
1. People go out of their way to help others at work no matter how big or small the issue is.	.81
2. People go beyond the call of duty for one another.	.80
3. People willingly help others who have work-related problems.	.79
4. People are always ready to lend a helping hand to those around them.	.82
5. People are willing to take the trouble to help others at work.	.83
6. People are willing to make sacrifices to help their colleagues.	.81
7. People are genuinely glad to help others when they need help.	.85
8. People do whatever they can to help others.	.84
9. People make a special effort to help others.	.86
10. People go the extra mile to see others succeed at work.	.85
11. People do not hesitate to help others.	.82
12. People never refuse to do favors.	.66
13. People rely on one another for help at work.	.66
14. People can count on one another when they need help at work.	.82
15. People want others to be successful.	.77
16. People support one another in words and deeds.	.82
17. Everyone has each other's back.	.78
18. We all look after each other.	.81
19. There is a high level of sharing between people.	.71
20. There is a high level of cooperation between people.	.74

Table 16. Correlations Between Intragroup Cooperation Items and Established Helping Scale (Study 2)

Perceived Intragroup Cooperation Items	Factor Loadings*	Correlation w/ Helping Scale (William & Anderson 1991)
#9. People make a special effort to help others.	.86	.70
#7. People are genuinely glad to help others when they need help.	.85	.73
#10. People go the extra mile to see others succeed at work.	.85	.71
#8. People do whatever they can to help others.	.84	.71
#5. People are willing to take the trouble to help others at work.	.83	.73
#4. People are always ready to lend a helping hand to those around them.	.82	.70
#11. People do not hesitate to help others.	.82	.73
#14. People can count on one another when they need help at work.	.82	.76
#16. People support one another in words and deeds.	.82	.74
#1. People go out of their way to help others at work no matter how big or small the issue is.	.81	.68
#6. People are willing to make sacrifices to help their colleagues.	.81	.70
#18. We all look after each other.	.81	.72

Table 17. Five-item Perceived Intragroup Cooperation Scale and Items Correlations (Study 2)

Items Correlations	2	3	4	5
[#1] 1. People go out of their way to help others at work no matter how big or small the issue is.	.72	.67	.72	.72
[#8] 2. People do whatever they can to help others.		.72	.72	.74
[#14] 3. People can count on one another when they need help at work.			.68	.66
[#5] 4. People are willing to take the trouble to help others at work.				.70
[#7] 5. People are genuinely glad to help others when they need help.				

Note: Numbers in parentheses [#] stand for the original item numbers.

Table 18. Perceived Intragroup Cooperation 5-item Scale: Convergent, Discriminant, and Predictive Validity Analysis (Study 2)

Type of Validity	Expected Relation	Measure	Correlation with 5-item scale ($\alpha = .92$)
Convergent Validity	Positive	Cohesion ($\alpha = .93$)	.73
	Negative	Intragroup Conflict ($\alpha = .94$)	-.57
Discriminant Validity	None	Task Interdependence ($\alpha = .80$)	.19
		Collectivism ($\alpha = .80$)	.38
Predictive Validity	Negative	Turnover Intentions ($\alpha = .90$)	-.45

Table 19. Deductive Item Generation Process to Develop a Measure of Resource Independence (Study 2)

Round 1 – Initial generation of items
<ol style="list-style-type: none"> 19. I cannot succeed in my tasks without help. 20. I need help to do my best work. 21. I need to turn to my colleagues often for help. 22. I often need help at work. 23. I cannot imagine doing this job and not being able to count on somebody's help. 24. I don't need my colleagues' help to complete my tasks or excel at my work. (R) 25. I rarely need to turn to somebody for help at work. (R) 26. I depend on other people's help to complete my tasks or excel at my work. 27. I don't have (yet) all the expertise, knowledge, and resources within me or at my disposal to complete my work without asking any help from my colleagues. 28. I can't count only on my own resources and perform at my best at the same time. 29. With some help, I can do better at work. 30. My work improves when I am assisted. 31. In my job, being able to count on one's colleagues' help is crucial. 32. I often encounter problems at work that I cannot solve entirely by myself. 33. I must rely on my colleagues for knowledge, information, and other resources. 34. I (still) need help to excel at my job. 35. There are (still) tasks that I cannot complete or do at my best without my colleagues' help. 36. My work could improve significantly if I had more resources. 37. There are tasks that I could do better if I had more resources or expertise. 38. I can't always do everything that is required of me without asking my colleagues to help me. 39. I have still a lot to learn at work. 40. As long as everyone does their job, I don't need extra help from my colleagues to complete my tasks. (R) 41. I often have to ask my colleagues if they can help me. 42. I wouldn't have to seek help from my colleagues if I had more expertise or other resources. 43. I often find myself having to ask my colleagues if they can lend me a hand. 44. Even if I could ask help to the most experienced and knowledgeable people in my job, I would not need it. (R) 45. I think I have margins of improvement in the way I do my job that I could tap with some help from my colleagues. 46. Regardless of whether or not my colleagues can help me, I would benefit from some help. 47. Regardless of whether or not I feel comfortable reaching out to my colleagues for help, I would benefit from being able to rely on someone's expertise or ability. 48. I (still) don't have all the expertise, knowledge, or abilities that my job requires to be done at its best.
Round 2 – First screening based on content validity analysis
<ol style="list-style-type: none"> 1. I have mastered all the skills required by my job. 2. I am an expert at my job. 3. I know how to do my job. 4. I am very good at my job. 5. I rarely need to turn to somebody for help at work. 6. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks. 7. I have all the expertise, knowledge, or abilities that my job requires to be done at its best. 8. I have still a lot to learn at work. (R) 9. There are tasks that I could do better if I had more resources or expertise. (R) 10. I can generally do what is required of me without asking my colleagues to help me.

11. I often encounter problems at work that I am not sure how to best address. (R) 12. I have enough knowledge and expertise to do this job at its best. 13. I can count exclusively on my own resources and perform at my best at the same time. 14. I haven't reached my full potential yet in terms of how I perform my job. (R) 15. I don't need my colleagues' help to complete my tasks. 16. I don't need my colleagues' help to excel at my work. 17. I (would) greatly benefit from being helped at work.
Round 3 – Second screening based on content validity analysis and literature review
1. I rarely need to turn to somebody for help at work. 2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks. 3. I have all I need to perform my job at its best. 4. I can generally do what is required of me without asking my colleagues to help me. 5. I can count exclusively on my own resources and perform at my best at the same time. 6. I don't need my colleagues' help to excel at my work.
Round 4 – Generation of additional items based on Study 1 and OCB literature on relevant types of help to add to the ones selected previously
1. I rarely need to turn to somebody for help at work. 2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks. 3. I can generally do what is required of me without asking my colleagues to help me. 4. I can rely exclusively on my own resources and perform at my best at the same time. 5. I don't need my colleagues' help to excel at my work. 6. I rarely need my colleagues' help. 7. I rarely need my colleagues' practical help. 8. I rarely need my colleagues' moral support. 9. I rarely need to ask my colleagues to substitute for me. 10. I rarely need to turn to my colleagues for advice on work matters. 11. I rarely need to turn to my colleagues for feedback on my work. 12. I rarely need to ask my colleagues to teach me something. 13. I rarely need to ask somebody a favor at work. 14. I never find myself in situations that I cannot solve without my colleagues' help. 15. I never find myself in situations from which only my colleagues can rescue me. 16. I don't need my colleagues' help to fulfill the demands of my job. 17. I have all I need to perform my job at its best. 18. I rarely wish I had somebody else's resources (skills, expertise, etc.) when I am at work.

Table 20. Final Pool of Items Developed Deductively to Measure Resource Independence (Study 2)

Resource Independence
<hr/>
1. I rarely need to turn to somebody for help at work.
2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks.
3. I can generally do what is required of me without asking my colleagues to help me.
4. I can rely exclusively on my own resources and perform at my best at the same time.
5. I don't need my colleagues' help to excel at my work.
6. I rarely need my colleagues' help.
7. I rarely need my colleagues' practical help.
8. I rarely need my colleagues' moral support.
9. I rarely need to ask my colleagues to substitute for me.
10. I rarely need to turn to my colleagues for advice on work matters.
11. I rarely need to turn to my colleagues for feedback on my work.
12. I rarely need to ask my colleagues to teach me something.
13. I rarely need to ask somebody a favor at work.
14. I never find myself in situations that I cannot solve without my colleagues' help.
15. I never find myself in situations from which only my colleagues can rescue me.
16. I don't need my colleagues' help to fulfill the demands of my job.
17. I have all I need to perform my job at its best.
18. I rarely wish I had somebody else's resources (skills, expertise, etc.) when I am at work.

Table 21. Rotated Factor Loadings for Items Developed to Measure Resource Interdependence (Study 2)

Interpersonal Helping Items	Factor 1 Loadings*	Factor 2 Loadings*
#1. I rarely need to turn to somebody for help at work.	.87	-.05
#6. I rarely need my colleagues' help.	.82	.03
#2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks.	.69	.17
#7. I rarely need my colleagues' practical help.	.57	.10
#10. I rarely need to turn to my colleagues for advice on work matters.	.55	.01
#12. I rarely need to ask my colleagues to teach me something.	.54	.00
#17. I have all I need to perform my job at its best.	-.11	.77
#16. I don't need my colleagues' help to fulfill the demands of my job.	.10	.62
#14. I never find myself in situations that I cannot solve without my colleagues' help.	.01	.62
#5. I don't need my colleagues' help to excel at my work.	.18	.62
#4. I can rely exclusively on my own resources and perform at my best at the same time.	.39	.50

Note: *Loadings greater than or equal to .50

Table 22. Correlations Between Resource Interdependence Items and Established Task Interdependence Scales (Study 2)

Resource Interdependence Items*	Correlations with Established Scales**	
	Task Interdependence (Pearce & Gregersen 1991)	Received Task Interdependence (Kiggundu 1983)
#1. I rarely need to turn to somebody for help at work.	-.42	-.34
#6. I rarely need my colleagues' help.	-.41	-.32
#2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks.	-.32	-.23
#7. I rarely need my colleagues' practical help.	-.31	-.26
#10. I rarely need to turn to my colleagues for advice on work matters.	-.43	-.29
#12. I rarely need to ask my colleagues to teach me something.	-.30	-.25
#17. I have all I need to perform my job at its best.	-.26	-.27
#16. I don't need my colleagues' help to fulfill the demands of my job.	-.37	-.34
#14. I never find myself in situations that I cannot solve without my colleagues' help.	-.32	-.28
#5. I don't need my colleagues' help to excel at my work.	-.39	-.31
#4. I can rely exclusively on my own resources and perform at my best at the same time.	-.22	-.20

Note: *Loadings greater than or equal to .50; **Boldface and underlines denote the items with the weakest correlation with the task interdependence scales.

Table 23. Short Resource Independence Scale, Two Versions (Study 2)

Resource Independence – Items with the highest loadings per factor ($\alpha = .85$)	
#1. I rarely need to turn to somebody for help at work.	
#6. I rarely need my colleagues' help.	
#2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks.	
#17. I have all I need to perform my job at its best.	
#16. I don't need my colleagues' help to fulfill the demands of my job.	
#14. I never find myself in situations that I cannot solve without my colleagues' help.	
Resource Independence – Items with the lowest correlations with task interdependence scales ($\alpha = .81$)	
#2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks.	
#7. I rarely need my colleagues' practical help.	
#12. I rarely need to ask my colleagues to teach me something.	
#17. I have all I need to perform my job at its best.	
#14. I never find myself in situations that I cannot solve without my colleagues' help.	
#4. I can rely exclusively on my own resources and perform at my best at the same time.	

Table 24. Resource Independence: Convergent, Discriminant, and Predictive Validity Analysis (Study 2)

Type of Validity	Expected Relation	Measure	6-item Version 1 ($\alpha = .85$)	6-item Version 2 ($\alpha = .81$)
Convergent Validity	Positive	Task Mastery ($\alpha = .86$)	.54	.55
		Job Experience (months)	.02	.05
	Negative	Self-efficacy ($\alpha = .90$)	.37	.38
		Role Overload ($\alpha = .87$)	-.17	-.11
		Role Ambiguity ($\alpha = .85$)	-.36	-.36
		Role Conflict ($\alpha = .83$)	-.10	-.05
		Job Stress ($\alpha = .95$)	-.14	-.09
Discriminant Validity	None	Task Interdependence ($\alpha = .84$)	-.47	-.40
		Received Task Interdependence ($\alpha = .91$)	-.40	-.35
Predictive Validity	Positive	Job Performance (2-item)	.32	.34
		Job Satisfaction ($\alpha = .89$)	-.01	-.03
	Negative	Help-Seeking ($\alpha = .88$)	-.62	-.59

Table 25. Field Study Sample (Study 3)

Organization	Workgroup	Size (N)	Respondents (n)	Response Rate
Organization 1	Workgroup 1	15	15	100%
Organization 2	Workgroup 2	32	18	56%
Organization 3	Workgroup 3	8	7	88%
	Workgroup 4	7	7	100%
	Workgroup 5	6	4	67%
	Workgroup 6	19	12	63%
	Workgroup 7	4	4	100%
	Workgroup 8	7	6	86%
	Workgroup 9	11	9	82%

Table 26. Field Study: Overview of the Two Study Designs (Study 3)

	Cognitive Social Structure (CSS) Design	Round-robin Design
Definition	Participants are asked to report who they help at work and who they think helps whom at work. Relationships are collected through one-item binary measure, i.e., each participant reports whether or not they think the relationship exists between any pair of individuals in their group.	Participants evaluate one another on the extent to which they help one another at work. Evaluations are collected potentially on multiple items (I used two), i.e., each participant evaluates each of their colleagues on a series of items about the colleague's helping behavior towards them.
Overview of Key Measures	The design allows to draw each participant's mental map of the network and derive the actual network of relationships in the group by comparing each pair's responses about their own relationship. Both networks (actual and perceived) are then processed to compute the number of relationships in the network vis a vis each participant's perception of it.	The design allows to measure the average strength of dyadic helping relationships within the group as a measure of the group's internal cooperation. To get at each participant's perception of the intragroup cooperation, the design must be supplemented with a group-level scale composed of the same items used at the dyadic level but adapted to reflect cooperation within the group.
Key Measures		
Actual Intragroup Cooperation	Density of the network of helping relationships	Average strength of dyadic helping relationships within the group (dyadic items)
Participant's Perceived Intragroup Cooperation	Density of the network of helping relationships perceived by each participant	Participant's perception of intragroup cooperation (group-level items)
Participant's Cooperative Behavior	Number of colleagues the participant helps at work (derived by actual network)	Average peer rating (average of the dyadic ratings received by the participant)
Reputation for Cooperation	Number of people that the other members think the participant helps	--

Table 27. Field Study: Summary of Study Measures (Study 3)

CONSTRUCT	OPERATIONALIZATION AND SOURCE
Main Predictors	
Actual Intragroup Cooperation	1. Network density: number of dyadic helping relationships within the group divided by the total number of known relationships* (each relationship reported/confirmed by both parties) 2. Average strength of dyadic helping relationships within the group based on a two-item dyadic measure of interpersonal helping adapted from OCB literature (round-robin design)
Perceived Intragroup Cooperation	3. Perceived network density: perceived number of dyadic helping relationships within the group divided by the total number of relationships 4. Two-item measure adapted from two-item measure used in round-robin design tapping perception of cooperation at the level of the group
Estimation Error (Over vs Under)	5. Difference between the respondent's perceived number of helping relationships within the group and the actual number of such relationships (difference between perceived and actual density) (#3 – #1) 6. Difference between the respondent's perception of the strength of cooperation with the group and the average strength of dyadic helping relationships within the group (#4 – #2)
Cooperative Behavior (participant's involvement in the network in the role of "giver")	7. Number of colleagues that the respondent helps at work (each tie reported/confirmed by both parties) divided by the total number of known helping relationship between the respondent and his or her colleagues * 8. Average of the dyadic ratings received by the participant on the dyadic cooperation scale (round-robin) **
Resource Independence	9. Four-item measure developed for this study
Error Magnitude	Absolute value of error in estimating cooperation within the group: 10. Absolute value of #5 11. Absolute value of #6
Outcome Variables	
Social Status	Average of the dyadic ratings received by the participant on three items adapted from Flynn (2003)
Reputation for Cooperation	Number of people that, on average**, the other members think the participant helps (measure derived from CSS data) divided by the number of people in the participant workgroup***
In-role Job Performance (supervisory ratings)	Three items from Liden, Wayne, & Stilwell (1993)
Control Variables	
Task Interdependence	Pearce & Gregersen (1991)
Prosocial Orientation	Six items adapted from Rioux & Penner (2001)
Affinity with Work Colleagues	Average of the dyadic ratings received by the participant on two items from Joshi & Knight (2015)
Organizational Rank	From personnel records; coded as 1 for supervisor, 0 otherwise
Organizational Tenure	From survey; coded in years

Notes: *Divided by the total number of *known* helping relationships between the respondents and others, rather than the total number of *possible* helping relationships to account for missing data. **Computing the average, rather than the sum, of the evaluations received by the respondents allows to account for workgroups of different sizes as well as for possible differences in the number of evaluations received by respondents in the same workgroup. ***Divided by the total number of people in the group to account for groups of different sizes.

Table 28. CSS Design: Perceived Network Density, Descriptive Statistics (Study 3)

Perceived Network Density	Mean	SD	Median	Min	Max	Range	Actual Network Density
Workgroup 1	0.50	0.29	0.39	0.14	1.00	0.86	0.31
Workgroup 2	0.37	0.23	0.36	0.09	0.88	0.79	0.35
Workgroup 3	0.76	0.23	0.71	0.45	1.00	0.55	0.71
Workgroup 4	0.69	0.35	0.69	0.00	1.00	1.00	0.64
Workgroup 5	0.74	0.49	0.98	0.00	1.00	1.00	0.77
Workgroup 6	0.39	0.24	0.41	0.02	0.75	0.73	0.42
Workgroup 7	0.90	0.21	1.00	0.58	1.00	0.42	0.83
Workgroup 8	0.83	0.23	0.93	0.48	1.00	0.52	0.69
Workgroup 9	0.69	0.35	0.86	0.01	1.00	0.99	0.53

Table 29. Scale-based Rating Approach: Ratings of Intragroup Cooperation, Descriptive Statistics (Study 3)

Ratings of Intragroup Cooperation	Mean	SD	Median	Min	Max	Range
Workgroup 1	4.31	0.47	4.2	3.80	5.00	1.20
Workgroup 2	3.87	0.79	4.00	2.00	5.00	3.00
Workgroup 3	4.40	0.81	5.00	3.00	5.00	2.00
Workgroup 4	4.29	0.72	4.00	3.20	5.00	1.80
Workgroup 5	4.25	0.50	4.00	4.00	5.00	1.00
Workgroup 6	3.88	1.15	4.00	1.00	5.00	4.00
Workgroup 7	4.25	0.87	4.50	3.00	5.00	2.00
Workgroup 8	4.60	0.49	4.80	4.00	5.00	1.00
Workgroup 9	4.82	0.35	5.00	4.20	5.00	0.80

Table 30. Intraclass Correlation Coefficients Ratings of Intragroup Cooperation (5-item scale) (Study 3)

Ratings of Intragroup Cooperation	ICC	F	p	Lower Bound	Upper Bound
Workgroup 1	0.080	2.30	.07	-0.01	0.55
Workgroup 2	0.064	2.23	.08	-0.01	0.49
Workgroup 3	0.000	1.00	.43	-0.11	0.52
Workgroup 4	0.019	1.13	.37	-0.11	0.55
Workgroup 5	0.000	1.00	.44	-0.23	0.66
Workgroup 6	0.000	1.00	.42	-0.06	0.38
Workgroup 7	0.000	1.00	.44	-0.23	0.66
Workgroup 8	0.000	1.00	.43	-0.16	0.56
Workgroup 9	0.000	1.00	.42	-0.08	0.45

Table 31. Descriptive Statistics and Correlations (Study 3)

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Error of Perception (CSS)	0.07	0.28															
2. Error of Perception (RR-scale)	0.08	0.76	.37														
3. Error Magnitude (CSS)	0.23	0.18	.23	.05													
4. Error Magnitude (RR-scale)	0.58	0.49	.02	-.30	.01												
5. Cooperative Behavior (CSS)	0.49	0.30	.46	.06	-.05	.15											
6. Cooperative Behavior (RR)	4.20	0.47	.05	.01	.09	-.06	.39										
7. Resource Independence	2.92	0.95	-.29	-.09	.13	.01	-.22	.01									
8. Status	3.99	0.50	-.01	-.06	.03	.04	.31	.85	-.10								
9. Reputation for Cooperation	0.52	0.20	-.10	.01	.09	-.14	.43	.72	.25	.62							
10. Job Performance	5.55	0.85	.10	.05	-.04	-.01	.23	.55	-.28	.60	.23						
11. Task Interdependence	3.38	0.63	-.10	.03	.11	.18	.10	.04	.02	.10	.05	-.03					
12. Prosocial Orientation	4.62	0.43	.20	.31	.06	.03	.37	.26	-.15	.20	.25	.32	.24				
13. Affinity	3.90	0.45	.01	-.02	.08	-.13	.37	.78	-.12	.71	.64	.49	.05	.61			
14. Rank	0.23	0.42	-.04	-.17	-.13	.09	.17	.29	-.23	.47	.26	.19	.00	.13	.24		
15. Job Tenure	9.30	7.99	-.02	-.08	.08	.05	.31	.25	.40	.16	.44	.06	.02	.20	.24	.01	
16. Organizational Tenure	15.65	12.85	.03	-.09	.03	.08	.46	.39	.18	.20	.47	.27	.07	.26	.35	.08	.13

Table 32. Categorization of Participants in Two Groups According to Error Type (Study 3)

		Scale/Round-Robin Approach		
		Over	Under	Sum
CSS Approach	Over	35	14	49
	Under	14	19	33
	Sum	49	33	82

Table 33. Categorization of Participants According to Error Type and Resource Independence (Study 3)

CSS Approach

		Error Type		
		Over	Under	Sum
Resource Independence	High	17	17	34
	Low	32	16	48
	Sum	49	33	82

Scale Approach

		Error Type		
		Over	Under	Sum
Resource Independence	High	15	19	49
	Low	34	14	33
	Sum	49	33	82

Note: Contingency table before the deletion of ten participants in the test of Hypotheses 4a and 4b due to missing performance evaluations.

Table 34. The Effect of Errors of Perception of Intragroup Cooperation on Cooperative Behavior (Study 3)

	Model 1	Model 2
Intercept	0.21*** (0.06)	-0.53+ (0.31)
Organization 2	0.10 (0.08)	0.06 (0.08)
Organization 3	0.36*** (0.07)	0.28*** (0.07)
Prosocial Orientation		0.06 (0.06)
Affinity		0.14* (0.6)
Error of Perception	0.54*** (0.09)	0.51*** (0.09)
Multiple R-squared	0.47	0.52
Adjusted R-squared	0.45	0.49
F statistic	23.19***	15.50***

Note: N = 82; + p < .10, *p < .05, **p < .01, ***p < .001

Table 35. The Moderating Effect of Error Magnitude on the Relationship Between Type of Error and Cooperative Behavior (Study 3)

	Model 1	Model 2	Model 3
Intercept	-0.82* (0.36)	-0.58+ (0.32)	-0.44 (0.29)
Organization 2	-0.04 (0.09)	0.00 (0.08)	0.05 (0.07)
Organization 3	0.19* (0.08)	0.25** (0.07)	0.30*** (0.07)
Prosocial Orientation	0.14* (0.07)	0.04 (0.07)	0.05 (0.06)
Affinity	0.14* (0.7)	0.17** (0.06)	0.15* (0.06)
Error Type		0.25*** (0.06)	0.00 (0.8)
Error Magnitude		-0.32* (0.15)	-0.99*** (0.21)
Error Type x Error Magnitude			1.14*** (0.27)
Multiple R-squared	0.32	0.47	0.58
Adjusted R-squared	0.28	0.44	0.54
F statistic	8.98**	11.30**	14.40**

Note: N = 82; + p < .10, *p < .05, **p < .01, ***p < .001

Table 36. Linear Regression Predicting Participants' Status in their Workgroup (Study 3)

	Model 1	Model 2	Model 3	Model 4
Intercept	3.76*** (0.13)	3.64*** (0.14)	3.73*** (0.12)	3.65*** (0.13)
Organization 2	0.16 (0.18)	0.10 (0.17)	0.02 (0.16)	0.00 (0.16)
Organization 3	0.32 (0.15)	0.11 (0.17)	0.23 (0.13)	0.09 (0.15)
Rank			0.54*** (0.12)	0.50*** (0.12)
Error of Perception	0.04 (0.20)	-0.28 (0.24)	0.04 (0.18)	-0.18 (0.22)
Cooperative Behavior		0.59* (0.24)		0.39+ (0.23)
Multiple R-squared	0.06	0.13	0.26	0.29
Adjusted R-squared	0.03	0.08	0.23	0.25
F statistic	1.73	2.83*	6.94***	6.28***

Note: N = 82; + p < .10, *p < .05, **p < .01, ***p < .001

Table 37. Linear Regression Testing the Moderating Effect of Error Magnitude on the Relationship Between Type of Error and Status (Study 3)

	Model 1	Model 2	Model 3
Intercept	3.73*** (0.11)	3.71*** (0.15)	3.73*** (0.16)
Organization 2	0.01 (0.16)	0.01 (0.16)	0.02 (0.16)
Organization 3	0.22+ (0.13)	0.21 (0.13)	0.22 (0.13)
Rank	0.54*** (0.12)	0.55*** (0.12)	0.55*** (0.12)
Error Type		-0.04 (0.10)	-0.09 (0.16)
Error Magnitude		0.19 (0.28)	0.04 (0.45)
Error Type x Error Magnitude			0.26 (0.59)
Multiple R-squared	0.27	0.27	0.27
Adjusted R-squared	0.24	0.22	0.21
F statistic	9.35***	5.60***	4.65***

Note: N = 82; + p < .10, *p < .05, **p < .01, ***p < .001

Table 38. Linear Regression Predicting Participants' Reputation for Cooperation in their Workgroup (Study 3)

	Model 1	Model 2
Intercept	0.49*** (0.04)	0.43*** (0.04)
Organization 2	-0.17** (0.06)	-0.20*** (0.05)
Organization 3	0.12* (0.05)	0.02 (0.05)
Error of Perception	-0.09 (0.06)	-0.24** (0.07)
Cooperative Behavior		0.28*** (0.24)
Multiple R-squared	0.39	0.48
Adjusted R-squared	0.37	0.46
F statistic	16.56***	18.08***

Note: N = 82; + p < .10, *p < .05, **p < .01, ***p < .001

Table 39. Linear Regression Testing the Moderating Effect of Error Magnitude on the Relationship Between Type of Error and Reputation for Cooperation (Study 3)

	Model 1	Model 2	Model 3
Intercept	0.48*** (0.04)	0.51*** (0.05)	0.50*** (0.06)
Organization 2	-0.16** (0.06)	-0.17** (0.06)	-0.17** (0.06)
Organization 3	0.13** (0.05)	0.13** (0.05)	0.12* (0.05)
Error Type		0.14*** (0.04)	-0.02 (0.06)
Error Magnitude		-0.05 (0.04)	0.10 (0.16)
Error Type x Error Magnitude		0.01 (0.10)	-0.14 (0.59)
Multiple R-squared	0.37	0.39	0.39
Adjusted R-squared	0.36	0.35	0.35
F statistic	23.52***	12.12***	9.73***

Note: N = 82; + p < .10, *p < .05, **p < .01, ***p < .001

Table 40. Linear Regression Predicting Participants' Job Performance (Study 3)

	Model 1	Model 2
Intercept	5.05*** (0.22)	4.91*** (0.24)
Organization 2	0.92* (0.35)	0.88* (0.35)
Organization 3	0.53* (0.25)	0.31 (0.29)
Error of Perception	0.42 (0.34)	0.09 (0.42)
Cooperative Behavior		0.62 (0.44)
Multiple R-squared	0.11	0.14
Adjusted R-squared	0.07	0.08
F statistic	2.81*	2.63*

Note: N = 72; + p < .10, *p < .05, **p < .01, ***p < .001

Table 41. Linear Regression Testing the Moderating Effect of Resource Independence on the Relationship Between Type of Error and Job Performance (Study 3)

	Model 1	Model 2	Model 3
Intercept	5.12*** (0.21)	5.69*** (0.48)	5.66*** (0.64)
Organization 2	0.88* (0.35)	0.67+ (0.38)	0.66+ (0.38)
Organization 3	0.48+ (0.24)	0.41+ (0.25)	0.41 (0.25)
Error Type		0.03 (0.21)	0.07 (0.69)
Resource Independence		-0.18 (0.11)	0.17 (0.18)
Error Type x Resource Independence			-0.02 (0.22)
Multiple R-squared	0.09	0.13	0.13
Adjusted R-squared	0.06	0.08	0.06
F statistic	3.43*	2.44+	1.93+

Note: N = 72; + p < .10, *p < .05, **p < .01, ***p < .001

Table 42. Linear Regression Testing the Moderating Effect of Resource Independence and Error Magnitude on the Relationship Between Type of Error and Job Performance (Study 3)

	Model 1	Model 2	Model 1
Intercept	5.12*** (0.21)	5.71*** (0.49)	4.50*** (1.07)
Organization 2	0.88* (0.35)	0.67+ (0.38)	0.75+ (0.39)
Organization 3	0.48+ (0.24)	0.42+ (0.25)	0.49+ (0.26)
Error Type		0.04 (0.21)	-1.12 (1.27)
Error Magnitude		-0.14 (0.56)	-4.20 (4.57)
Resource Independence		-0.17 (0.11)	-0.21 (0.31)
Error Type x Error Magnitude			4.21 (5.38)
Error Type x Resource Independence			0.40 (0.39)
Error Magnitude x Resource Independence			1.31 (1.11)
Type of Error x Error Magnitude x Resource Independence			-1.42 (1.47)
Multiple R-squared	0.09	0.13	0.16
Adjusted R-squared	0.06	0.06	0.04
F statistic	3.43*	1.94+	1.34

Note: N = 72; + p < .10, *p < .05, **p < .01, ***p < .00

Table 43. Summary of Results (Study 3)

Hypotheses	Results*
<p><u>Effect on Cooperative Behavior (Mediator)</u></p> <p>H1: Underestimating the density of the network of cooperative relations will lead to lower cooperation than overestimating it.</p>	Supported
<p><u>Cost Asymmetry in Status</u></p> <p>H2a: Underestimating the density of the network of cooperative relations will be more costly in terms of status than overestimating it.</p> <p>H2b: The negative effect of underestimating the density of the network of cooperative relations on status will be mediated by a decrease in cooperation relative to overestimating.</p>	Overall mediation supported
<p><u>Cost Asymmetry in Reputation as Exchange Partner</u></p> <p>H3a: Underestimating the density of the network of cooperative relations will be more costly in terms of positive reputation as an exchange partner than overestimating it.</p> <p>H3b: The negative effect of underestimating the density of the network of cooperative relations on reputation as an exchange partner will be mediated by a decrease in cooperation relative to overestimating.</p>	Overall mediation supported
<p><u>Cost Asymmetry in Job Performance</u></p> <p>H4a: For individuals who are relatively dependent on others for resources, underestimating the density of the network of cooperative relations is more costly in terms of job performance than overestimating it.</p> <p>H4b: For individuals who are relatively independent on others for resources, overestimating the density of the network of cooperative relations is more costly in terms of job performance than underestimating it.</p>	<p>Trend in the data shows support</p> <p>Trend in the data shows support</p>
<p><u>Moderating Factors</u></p> <p>H5: The asymmetry in the costs of over- and underestimation errors increases with the magnitude of the two errors.</p> <p>H6: Confidence is one's perceptions moderates the relationship between the magnitude of over- and underestimation errors and their outcomes, such that the relationship is stronger the greater the confidence of the perceiver.</p>	<p>Trend in the data shows support with regard to H2a-2b, and H4a-4B</p> <p>Not tested</p>

Note: *Results obtained from the linear analytical approach, which was the only one that allowed me to account for the nested nature of the data.

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Appendices

Appendix A. Study 1: Online Survey

SECTION 1 - INTRODUCTION

This survey concerns how people ask and give help in the workplace and why and when they do this. By help we have in mind cases in which:

- 1) a person helps a coworker with a task
- 2) without being required to do so
- 3) at some personal cost to the person who provides the help.

Here is a brief explanation of each of these components.

1. **A person helps a coworker to complete a task or solve a work problem.** Showing a coworker how to use better a machine or a computer program that she needs in her job is an example of work-related help. Watering the plants she keeps on her desk while she is on vacation is not because that is not task- or work-related.

Other general examples of task-related help include: helping a coworker catch up with a backlog of work; sharing or lending materials to a coworker; giving advice to a coworker on a work-related problem; completing small tasks for a coworker who is absent so that they do not pile up on his desk; agreeing to switch shifts to accommodate a coworker's emergency, and so on.

2. **To help her coworker, the person agrees to do something that is not part of her job.** We are interested in cases where helping another person is voluntary, that is, something that is not a formal requirement of the helper's job. He or she is not directly rewarded for helping a coworker and she cannot be punished for not doing it.

3. **The person is sacrificing something to help the coworker.** The sacrifice can be time, mental and physical energies, or other resources that the person could use for other purposes. Example: A person reads and offers suggestions for improvement to a report prepared by a coworker. The coworker asked for this favor because she has a big meeting coming up. Reading her coworker's report is not part of this person's job description. In addition to taking her time, it requires her to reschedule other tasks. Thus, this person is giving up something –making a sacrifice– to help her coworker.

Throughout this survey, by "coworker" we mean any person who works in your organization. A coworker can be a superior, a peer, or a subordinate.

In the next section of this survey, we will ask you to briefly describe examples of helping. Please remember that we are interested in help that is not part of the helper's job description, that requires a sacrifice, however small, and that helps the other person advance her tasks or solve a work-related problem.

SECTION 2 – VERSION A

In this section, we ask a series of questions about *others helping you* at work.

Q1. Please describe a recent occasion in which you sought and received help from one of your coworkers. Be as specific as you can in describing what you asked your coworker to do for you, the help he or she provided, and the sacrifice you believe he or she made. For example, if your coworker completed one of your tasks to take some weight off your shoulders, please briefly describe the task and the effort it took to complete it.

Q2. Please explain what led you to decide to turn to that colleague for help from among the set of all those you could have asked.

Q3. When you have a work-related problem, how do you go about deciding whether and to whom to ask for help?

Q4. Have you ever felt reluctant to ask for help from your coworkers? ☐ Yes ☐ No

Q4.1. [If yes] Please briefly describe the situation when you felt reluctant to ask for help from your coworkers.

Q4.2. [if yes] What factors in particular led to your reluctance to ask for help from your coworkers?

Q4.3. [If no] What are the most important factors that enable you to feel comfortable asking for help from your coworkers?

SECTION 2 – VERSION B

In this section, we ask a series of questions about *you helping others* at work.

Q5. Please describe a recent occasion in which you helped one of your coworkers. Be as specific as you can in describing what your coworker asked you to do for him/her, the help you provided, and the sacrifice you made. For example, if you completed a task to take some weight off a coworker's shoulders, please briefly describe the task and the effort it took to complete it.

Q6. Please explain what led you to decide to help your coworker.

Q7. Have you ever felt reluctant to provide help to your coworkers? ☐ Yes ☐ No

Q7.1. [If yes] Please briefly describe the situation when you felt reluctant to provide help to your coworkers.

Q7.2. [If yes] What factors in particular led to your reluctance to provide help to your coworkers?

Q7.3. [If no] What are the most important factors that enable you to feel comfortable providing help to your coworkers?

Q8. Have you ever felt compelled to provide help to your coworkers? ☐ Yes ☐ No

Q8.1. [If yes] Please briefly describe the situation when you felt compelled to provide help to a coworker.

Q8.2 [If yes] What factors in particular caused you to feel compelled to provide help to your coworker?

Q8.3. [If no] What are the most important factors that enable you to feel free to decline your coworkers' requests for help if necessary?

SECTION 3

In this section, we ask a series of questions about the help that ***your coworkers exchange with one another.***

Q9. Please describe two occasions in which one coworker of yours helped another coworker other than yourself. Please be as specific as you can. Each description should identify the help one person provided to another and the sacrifice you believe he or she made. For example, if one person completed a task to take some weight off another person's shoulders please briefly describe the task and the effort it took to complete it.

Q10. Have you ever tried to understand who helps whom among your coworkers? If so, please describe the situation that led you to do this.

Q11. Suppose someone could tell you in detail who helps whom - and who doesn't help whom – among your coworkers. Would this information be useful to you?

- ☐ Yes, it would be useful to know who helps whom
- ☐ No, it would not be useful to know who helps whom

Q11.1. Describe briefly how you would make use of knowing who helps whom among your coworkers.

Q12. Imagine that a friend of yours is considering applying for a job at your organization. He/she is not sure it is the right workplace for him/her and asks you whether/how supportive people are with one another beyond what formally required by their job. How would you describe your work environment in response to his/her question?

Q13. Imagine this. Your company asks you to join a new workgroup but offers you two options from which you can choose. In group 1 most people help one another. If X asks help to Y, chances are that Y will help X. In group 2 most people do what they have to do but rarely do something beyond what is required. Everyone focuses on their work and only a few people go the extra mile to help someone else (specific) in the group. You envision you won't need much help from your coworkers and remaining focused on your tasks is important to you. Which group would you join?

- ☐ Group 1
- ☐ Group 2

Q13.1. What factors led you to prefer [selected choice] over [non-selected choice]?

SECTION 4

In this last section, we ask you a few questions about your job and your professional profile.

Q14. What industry most closely describes the industry in which you work?

Q15. Please indicate your current position in your organization.

Q16. How long have you been working for your current employer in that position?

Q17. Please briefly describe your job duties and responsibilities. What do you do at work?

Q17.1. Approximately how many people is your workgroup composed of?

Q18. Please rate the extent to which you agree with each of the following statements (1=strongly disagree, 5=strongly agree):

(Autonomy Scale adapted from Morgeson & Humphrey, 2006)

(Work Scheduling Autonomy)

1. I can make my own decisions about how to schedule my work.
2. I can decide in what order I do things in my job.
3. I can plan how I do my work.

(Decision-Making Autonomy)

4. I have the chance to use my personal initiative or judgment in carrying out the work.
5. I can make a lot of decisions on my own in my job.
6. I have significant autonomy in making decisions in my job.

(Work Methods Autonomy)

7. I can make decisions about what methods I use to complete my work.
8. I have considerable opportunity for independence and freedom in how I do my job.
9. I can decide on my own how to go about doing my work.

Q19. Please rate the extent to which you agree with each of the following statements (1=strongly disagree, 5=strongly agree):

1. I have enough discretion in my job to help my coworkers with their tasks if I want to.
2. My coworkers have enough discretion in their job to help me with my tasks if they want to.

Q20. Please rate the extent to which you agree with each of the following statements (1=strongly disagree, 5=strongly agree):

(Prosocial Motivation Scale adapted from Rioux & Penner, 2001)

1. I feel it is important to help those in need.
2. I believe in being courteous to others.
3. I am concerned about other people's feelings.
4. I want to help my co-workers in any way I can.
5. It is easy for me to be helpful.
6. I like interacting with my coworkers.

Q21. Finally, please answer these last few questions for statistical purposes.

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to answer

Q22. What is your age?

Q23. What is your ethnicity?

- ☐ Asian
- ☐ Black or African American
- ☐ Hispanic or Latino
- ☐ Native American or American Indian or Alaska Native
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Caucasian, non-Hispanic or non-Latino
- ☐ Other
- ☐ Prefer not to answer

Q24. What is the highest degree or level of school you have completed? If currently enrolled, indicate the highest degree received.

- ☐ Less than a high school diploma
- ☐ High school degree or equivalent (e.g., GED)
- ☐ Some college, no degree
- ☐ Trade/technical/vocational training
- ☐ Associate degree (e.g., AA, AS)
- ☐ Bachelor's degree (e.g., BA, BS)
- ☐ Master's degree (e.g., MA, MS, MEd)
- ☐ Professional degree (e.g., MD, DDS, DVM)
- ☐ Doctorate degree (e.g., PhD, EdD)

Appendix B. Scale Development Study: Interpersonal Helping Questionnaire

GENERAL INSTRUCTIONS

This survey is designed to develop questions for a future study. We ask you to respond to a series of items to understand which ones best describe certain work behaviors or work situations. All you have to do is to indicate how much you agree or disagree with each item.

You might find that certain items are similar, however, please treat them as independent. To help us identify which items work best to describe people's behavior and which items are more consistent with one another, **it is really important that you evaluate and respond to each item separately.**

ITEMS²³

Q1. Please think of one of your colleagues. This can be any person with whom you regularly interact at work.

Please write their first name or initials here: _____

Q2. Please indicate how much you agree or disagree with the following statements about your colleague, [colleague's name].

1. Goes out of way to help me at work no matter how big or small the issue is.
2. Goes beyond the call of duty for me.
3. Willingly helps me when I have work-related problems.
4. Is always ready to lend me a helping hand.
5. Is willing to take the trouble to help me at work.
6. Is willing to make sacrifices to help me at work.
7. Is genuinely glad to help me when I need help.
8. Does whatever he/she can to help me.
9. Makes a special effort to help me.
10. Goes the extra mile to see me succeed at work.
11. Does not hesitate to help me.
12. Never refuses to do me a favor.
13. I rely on this person for help at work.
14. I can count on this person when I need help at work.
15. Wants me to be successful.
16. Supports me in words and deeds.
17. Has my back.
18. Looks after me.
19. Helps me when I have been absent.
20. [If you are reading this item, please check disagree.]
(*Interpersonal Helping, Williams & Anderson 1991*)²⁴
21. Helps me when I have heavy workloads.

²³ All scales were rated on 5-point Strongly Disagree-Strongly Agree Likert scale unless otherwise noted.

²⁴ The text in parenthesis and italics is included here to acknowledge the content and sources of the scales. It did not appear in the questionnaire that was administered to participants.

22. Assists me with my work.
23. Takes time to listen to my problems and worries.
24. Takes a personal interest in me.
25. Passes along information to me.
- (Adaptation of Williams & Anderson's Interpersonal Helping scale based on Study1)*
26. Stands in for me when I need to swap shifts or I am absent from work.
27. Helps me to keep up with my workload by taking on some of my work or providing auxiliary help.
28. Provides me with resources such as material or information that I may lack at the moment.
29. Contributes to my professional development by sharing with me their knowledge and giving me advice and feedback.
30. Helps me avoid situations at work that may cause me to be in trouble.
31. Is a source of support when I feel down or am worried.

Q3. Please indicate how much you agree or disagree with the following statements about **your work group**.

By work group, we mean the group of colleagues with whom you normally interact at work.

1. People go out of their way to help others at work no matter how big or small the issue is.
2. People go beyond the call of duty for one another.
3. People willingly help others who have work-related problems.
4. People are always ready to lend a helping hand to those around them.
5. People are willing to take the trouble to help others at work.
6. People are willing to make sacrifices to help their colleagues.
7. People are genuinely glad to help others when they need help.
8. People do whatever they can to help others.
9. People make a special effort to help others.
10. People go the extra mile to see others succeed at work.
11. People do not hesitate to help others.
12. People never refuse to do favors.
13. People rely on one another for help at work.
14. People can count on one another when they need help at work.
15. People want others to be successful.
16. People support one another in words and deeds.
17. Everyone has each other's back.
18. We all look after each other.
19. There is a high level of sharing between people.
20. There is a high level of cooperation between people.

(Interpersonal Helping, Williams & Anderson 1991)

21. People help their colleagues when they have been absent.
22. People help their colleagues when they have heavy workloads.
23. People assist their colleagues with their work.
24. People take time to listen to their colleagues' problems and worries.
25. People take a personal interest in their colleagues.
26. People pass along information to their colleagues.

(Adaptation of Williams & Anderson's Interpersonal Helping scale based on Study 1)

27. People stand in for others when someone needs to swap shifts or is absent from work.

28. People help others to keep up with their work by taking on some of their work or providing auxiliary help.
29. People provide others with resources such as material or information that they may lack at the moment.
30. People contribute to their colleagues' professional development by sharing with them their knowledge and giving them advice and feedback.
31. People help others avoid situations at work that may cause them to be in trouble.
32. People are a source of support when someone feels down or worried.

Q4. Please indicate how you would describe **your work group** using the two adjectives at either end of the scale below. The closer your choice to one of the two adjectives, the more that adjective describes your group.

By work group, we mean the group of colleagues with whom you normally interact at work.

(Cohesion, Willer 2009)

1. Close/Distant
2. Coming together/Coming apart
3. Solid/Fragile
4. Cohesive/Divisive
5. Converging/Diverging

Q5. The following statements may or may not describe **your work group**. Please indicate how much you agree or disagree with each of them.

By work group, we mean the group of colleagues with whom you normally interact at work.

(Cohesion, developed inductively; in parenthesis studies that used the same item.)

(Items 1-9: Task commitment

Items 10-15: Interpersonal attraction

Items 16-19: Group pride)

1. My work group feels like a team. *(Willer 2009)*
2. We stick together in every situation. *(Willer 2009; Raver & Gelfand, 2005; Seashore, 1954)*
3. Everyone is pulling in the same direction.
4. If you pull your weight and help out, there are many that will do the same.
5. Ultimately, we all share the same goals.
6. There is a sense of working together to complete a goal.
7. [If you are reading this item, please check agree.]
8. We are all in it together. *(Carron et al. 1985)*
9. Our group is united in trying to reach its goal for performance. *(Carron et al. 1985)*
10. We all take responsibility for any loss or poor performance by our group.
11. My work group feels like one big family. *(Willer et al 2012)*
12. My work group feels like a community.
13. We all stand in solidarity with one another.
14. We are all friends with each other out of work.
15. We are all a very close group of coworkers. *(Wendt et al. 2009)*
16. People always speak well of our work group. *(Wendt et al. 2009)*
17. People are proud to belong to the group.
18. Our success as a group is very important to the success of our organization at large.

19. We represent an important group within the broader organization.

(Harmony; items developed inductively if not noted otherwise)

20. It's easy to fit in my work group.

21. It is easy to get along in my work group. *(adapted from Dailey, 1978)*

22. People are all very kind.

23. People treat each other with respect. *(Wendt et al. 2009)*

24. People are friendly. *(Wendt et al. 2009)*

25. People work well together. *(Wendt et al. 2009)*

26. There is a friendly atmosphere among people. *(Wendt et al. 2009)*

27. People in my work group trust each other. *(Wendt et al. 2009)*

28. My work group is a great place to work.

(Intragroup Conflict; Jehn 1995; 1=none, 5=a lot)

(Items 29-32: Relationship Conflict)

(Items 33-36: Task Conflict)

29. There is friction among people in my work group.

30. Personality conflicts are evident in my work group.

31. There is tension among people in my work group.

32. There is emotional conflict among people in my work group.

33. People in my work group often disagree about the work to be done.

34. Often, there are conflicts about ideas in my work group.

35. There is conflict about the work we do in my work group.

36. There are differences of opinions in my work group.

(Task Interdependence; adapted from Pearce & Gregersen, 1991)

37. Our work requires us to work closely with others.

38. People must frequently coordinate their efforts with others.

39. People's performance is dependent on receiving accurate information from others.

40. The way each of us performs their job has a significant impact on others.

41. Our work requires us to consult with each other fairly frequently.

42. We work fairly independently of each other in our work. *(R)*

43. Each of us can plan their own work with little need to coordinate with others. *(R)*

44. We rarely have to obtain information or materials from one another to complete our own work. *(R)*

Q6. Please indicate how much you agree or disagree with these statements.

(Turnover Intentions; Kelloway, Bottlieb, & Barham, 1999; Chen, 2005)

1. I am thinking about leaving my employer.

2. I am planning to look for a new job.

3. I intend to ask people about new job opportunities.

4. I do not plan to keep working for my employer much longer.

5. I intend to ask to be transferred to another unit. *(added)*

6. I would not recommend a friend to seek employment where I work. *(added)*

7. I would not recommend my workplace to anybody. *(added)*

Q7. Almost done! This is the last set.

These are **general statements** that may or may not apply to you. Please indicate how much you agree or disagree with each of them.

(Social Desirability; Reynolds, 1982)

1. It is sometimes hard for me to go on with my work if I am not encouraged. (R)
2. I sometimes feel resentful when I don't get my way. (R)
3. On a few occasions, I have given up doing something because I thought too little of my ability. (R)
4. There have been times when I felt like rebelling against people in authority even though I knew they were right. (R)
5. No matter who I am talking to, I am always a good listener.
6. There have been occasions when I took advantage of someone. (R)
7. I am always willing to admit when I make a mistake.
8. I sometimes try to get even rather than forgive and forget. (R)
9. I am always courteous, even to people who are disagreeable.
10. I have never been irked when people expressed ideas very different from my own.
11. There have been times when I was quite jealous of the good fortune of others. (R)
12. I am sometimes irritated by people who ask favors of me. (R)
13. I have never deliberately said something that hurt someone's feelings.

(Collectivism; Singelis et al 1995)

(Items 14-21 Horizontal Collectivism

Items 22-30 Vertical Collectivism)

14. The well-being of my coworkers is important to me.
15. If a coworker gets a prize, I would feel proud.
16. If a relative were in financial difficulty, I would help within my means.
17. It is important to maintain harmony within my group.
18. I like sharing little things with my neighbors.
19. I feel good when I cooperate with others.
20. My happiness depends very much on the happiness of those around me.
21. To me, pleasure is spending time with others.
22. I would sacrifice an activity that I enjoy very much if my family did not approve of it.
23. I would do what would please my family, even if I detested that activity.
24. Before taking a major trip, I consult with most members of my family and many friends.
25. I usually sacrifice my self-interest for the benefit of my group.
26. [Please check strongly agree for this item to let us know that you are still with us.]
27. Children should be taught to place duty before pleasure.
28. I hate to disagree with others in my group.
29. We should keep our aging parents with us at home.
30. Children should feel honored if their parents receive a distinguished award

BACKGROUND QUESTIONS

Finally, please answer the these last few questions for statistical purposes.

For how long have you been doing your current job? If before working for your current employer, you did the same job for another employer, please report **your overall job experience**.

Years: _____ Months: _____

How long have you been working for your current employer in that position?

Years: _____ Months: _____

Approximately how many people is your workgroup composed of? _____

What is your age? _____

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to answer

You have completed the survey! Thank you for helping us progress with our research.

Appendix C. Scale Development Study: Resource Independence Questionnaire

GENERAL INSTRUCTIONS

This survey is designed to develop questions for a future study. We ask you to respond to a series of items to understand which ones best describe certain work behaviors or work situations. All you have to do is to indicate how much you agree or disagree with each item.

You might find that certain items are similar, however, please treat them as independent. To help us identify which items work best to describe people's behavior and which items are more consistent with one another, **it is really important that you evaluate and respond to each item separately.**

ITEMS²⁵

Q1. The following statements assess your need for help at work.

Please indicate how much you agree or disagree with each of them.

1. I rarely need to turn to somebody for help at work.
2. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks.
3. I can generally do what is required of me without asking my colleagues to help me.
4. I can rely exclusively on my own resources and perform at my best at the same time.
5. I don't need my colleagues' help to excel at my work.
6. I rarely need my colleagues' help.
7. I rarely need my colleagues' practical help.
8. I rarely need my colleagues' moral support.
9. I rarely need to ask my colleagues to substitute for me.
10. I rarely need to turn to my colleagues for advice on work matters.
11. I rarely need to turn to my colleagues for feedback on my work.
12. I rarely need to ask my colleagues to teach me something.
13. I rarely need to ask somebody a favor at work.
14. I never find myself in situations that I cannot solve without my colleagues' help.
15. I never find myself in situations from which only my colleagues can rescue me.
16. [If you are reading this item, please check disagree.]
17. I don't need my colleagues' help to fulfill the demands of my job.
18. I have all I need to perform my job at its best.
19. I rarely wish I had somebody else's resources (skills, expertise, etc.) when I am at work.

Q2. The following statements are about the **requirements of your job**.

Please indicate how much you agree or disagree with each statement. Your answers should depend entirely on the characteristics of your job and how it fits into your organizational context.

²⁵ All scales were rated on 5-point Strongly Disagree-Strongly Agree Likert scale unless otherwise noted.

(Task Interdependence, Pearce & Gregersen 1991)²⁶

(Factor 1, items 1-5: reciprocal interdependence

Factor 2, items 6-8: independence)

1. I work closely with others in doing my work.
2. I frequently must coordinate my efforts with others.
3. My own performance is dependent on receiving accurate information from others.
4. The way I perform my job has a significant impact on others.
5. My work requires me to consult with others fairly frequently.
6. I work fairly independently of others in my work. (R)
7. I can plan my own work with little need to coordinate with others. (R)
8. My work rarely requires me to obtain information from others. (R)

(Received Task Interdependence, Kiggundu 1983)

9. My job requires support services provided by other people.
10. I depend on other people's work to obtain the tools, materials, or equipment necessary to do my job.
11. I receive much of the information I need to do my job from other people.
12. A large percentage of my job activities are affected by the work of other people.
13. The work of a large number of people affects the activities of your job.
14. It would take long my performance to be affected by the performance changes of other people's work. (R)
15. A large percentage of my job performance is dependent on support services provided by other people.
16. I spend a great deal of time on contacts with other people which help me get my work done.
17. My job cannot be done unless other sections do their work.
18. I depend on other people's work for information I need to do my job.
19. I depend on other people's work for materials, tools, or supplies that I need to do my job.
20. My job depends on the work of many different people for its completion.
21. Most of my job activities are affected by the work activities of other people.

Q3. The following statements are about various aspects of your job.

Please indicate how much you agree or disagree with each of them. Please remember to evaluate one statement at a time.

(Task Mastery; Morrison, 2002)

1. I am confident about the adequacy of my job skills and abilities.
2. I feel competent conducting my job assignments.
3. It seems to take me longer than planned to complete my job assignments. (R)
4. I rarely make mistakes when conducting my job assignments.
5. I have learned how to successfully perform my job in an efficient manner.
6. I have mastered the required tasks of my job.
7. I have not fully developed the appropriate skills and abilities to successfully perform my job. (R)

(Role Ambiguity & Role Conflict; Rizzo, House & Lirtzman 1970)

(Items 8-13 Role Ambiguity Scale

Items 14-21 Role Conflict Scale)

²⁶ The text in parenthesis and italics is included here to acknowledge the content and sources of the scales. It did not appear in the questionnaire that was administered to participants.

8. I feel certain about how much authority I have on the job.
9. I have clear, planned goals and objectives for my job.
10. I know that I have divided my time properly.
11. I know what my responsibilities are.
12. I know exactly what is expected of me.
13. I have received a clear explanation of what has to be done.
14. I have to do things that should be done differently.
15. I have received an assignment without the manpower to complete it.
16. I have to buck a rule or policy in order to carry out an assignment.
17. I work with two or more groups who operate quite differently.
18. I receive incompatible requests from two or more people.
19. I do things that are apt to be accepted by one person and not accepted by others.
20. I receive an assignment without adequate resources and materials to execute it.
21. I work on unnecessary things.

(Role Overload; Bolino & Turnley 2005)

22. [If you are reading this item, please check agree.]
23. The amount of work I am expected to do is too great.
24. I never seem to have enough time to get everything done at work.
25. It often seems like I have too much work for one person to do.

(Job Stress; Motowidlo, 1986)

26. I feel a great deal of stress because of my job.
27. Many stressful things happen to me at work.
28. My job is extremely stressful.
29. I almost always feel stressed at work.

(Job Satisfaction; Judge, Bono, & Locke, 2000)

30. I feel fairly satisfied with my present job.
31. Most days I am enthusiastic about my work.
32. Each day at work seems like it will never end. (R)
33. I find real enjoyment in my work.
34. I consider my job to be rather unpleasant. (R)

(Job Performance, self-reported; Meyer, Allen, & Smith, 1993)

Q4.1 What is the overall performance evaluations you received from your supervisor or human resource personnel on your most recent performance appraisal? (1=poor, 7=excellent)

Q4.2 What is your own assessment of your overall performance? (1=poor, 7=excellent)

Q5. The following statements are about your behavior at work.

Please indicate how much you agree or disagree with each of them.

(Help-seeking Behavior, self-reported; adapted from Anderson & Williams, 1996)

1. I often ask my colleagues to assist me with certain tasks or projects.
2. Oftentimes I will approach my colleagues for advice on handling particular situations or problems.
3. I have on several occasions requested that my colleagues take over a task or project that I would normally do.
4. I frequently ask for my colleagues' assistance with my tasks.

5. Oftentimes I seek my colleagues' help or suggestions for dealing with work-related matters.
6. I often request my colleagues' help when I get behind in my duties.
7. I frequently ask my colleagues' for needed information to complete a task.
8. Often, I approach my colleagues for feedback on my work.
9. I often ask my colleagues to teach me how to do something related to my work.

Q6. Almost done! These are general statements that may or may not apply to you. Please indicate how much you agree or disagree with each of them.

(Self-efficacy; Chen, Gully, & Eden 2001)

1. I will be able to achieve most of the goals that I have set for myself.
2. When facing difficult tasks, I am certain that I will accomplish them.
3. In general, I think that I can obtain outcomes that are important to me.
4. I believe I can succeed at most any endeavor to which I set my mind.
5. I will be able to successfully overcome many challenges.
6. I am confident that I can perform effectively on many different tasks.
7. Compared to other people, I can do most tasks very well.
8. Even when things are tough, I can perform quite well.

(Social Desirability; Reynolds, 1982)

9. It is sometimes hard for me to go on with my work if I am not encouraged. (R)
10. I sometimes feel resentful when I don't get my way. (R)
11. On a few occasions, I have given up doing something because I thought too little of my ability. (R)
12. There have been times when I felt like rebelling against people in authority even though I knew they were right. (R)
13. No matter who I am talking to, I am always a good listener.
14. There have been occasions when I took advantage of someone. (R)
15. I am always willing to admit when I make a mistake.
16. I sometimes try to get even rather than forgive and forget. (R)
17. I am always courteous, even to people who are disagreeable.
18. [Please check strongly agree for this item to let us know that you are still with us.]
19. I have never been irked when people expressed ideas very different from my own.
20. There have been times when I was quite jealous of the good fortune of others. (R)
21. I am sometimes irritated by people who ask favors of me. (R)
22. I have never deliberately said something that hurt someone's feelings.

BACKGROUND QUESTIONS

Finally, please answer the these last few questions for statistical purposes.

For how long have you been doing your current job? If before working for your current employer, you did the same job for another employer, please report **your overall job experience**.

Years: _____ Months: _____

How long have you been working for your current employer in that position?

Years: _____ Months: _____

Approximately how many people is your workgroup composed of? _____

What is your age? _____

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to answer

You have completed the survey! Thank you for helping us progress with our research.

Appendix D. Field Study Survey

SECTION 1: SELF

Q1. The following questions ask about your perceptions of your work. How much do you agree or disagree with the following statements?²⁷

*(Resource Independence)*²⁸

1. As long as everyone does their job, I generally don't need help from my colleagues to complete my tasks.
2. I rarely need to ask my colleagues to teach me something.
3. I have all I need to perform my job at its best.
4. I never find myself in situations that I cannot solve without my colleagues' help.

Q2. Below are the names of your colleagues in [name of team/organization]. **Please click the names of those that you go out of your way to help at work.** Ignore your name among the answer choices.

I go out of my way to help...

[Roster]

Q3. The next questions are about your perceptions of helping in your workgroup. How much do you agree or disagree with the following statements about **people in your workgroup**?

(Perceived Intragroup Cooperation)

1. People go out of their way to help others at work no matter how big or small the issue is.
2. People do whatever they can to help others at work.
3. People can count on one another when they need help at work.
4. People are willing to take the trouble to help others at work.
5. People are genuinely glad to help others when they need help.

Q4. The next questions are about whether your job requires you to work with others. How much do you agree or disagree with the following statements about **the requirements of your job**?

(Task Interdependence, Pearce & Gregersen 1991)

1. I work closely with others in doing my work.
2. I frequently must coordinate my efforts with others.
3. I work fairly independently of others in my work. (R)
4. I can plan my own work with little need to coordinate with others. (R)

Q5. The following questions are about your attitudes towards other people. How much do you agree or disagree with the following statements?

²⁷ All scales were rated on 5-point Strongly Disagree-Strongly Agree Likert scale unless otherwise noted.

²⁸ The text in parenthesis and italics is included here to acknowledge the content and sources of the scales. It did not appear in the questionnaire that was administered to participants.

(Prosocial Orientation, adapted from Rioux & Penner 2001)

1. I feel it is important to help those in need.
2. I believe in being courteous to others.
3. I am concerned about other people's feelings.
4. I want to help my colleagues in any way I can.
5. It is easy for me to be helpful.
6. I like interacting with my colleagues.

Q6. These questions are about how you see yourself. Please rate how much each pair of traits describes you.

(Big Five Personality, Gosling, Rentfrow, & Swann 2003)

"I see myself as:"

1. Extraverted, enthusiastic.
2. Critical, quarrelsome.
3. Dependable, self-disciplined.
4. Anxious, easily upset.
5. Open to new experiences, complex.
6. Reserved, quiet.
7. Sympathetic, warm.
8. Disorganized, careless.
9. Calm, emotionally stable.
10. Conventional, uncreative.

Q7. The following questions are about how you see yourself in social situations. How much do you agree or disagree with the following statements?

(Self-monitoring, Lennox & Wolfe 1984)

1. Once I know what the situation calls for, it's easy for me to regulate my actions accordingly.
2. I have found that I can adjust my behavior to meet the requirements of any situation I find myself in.
3. I have trouble changing my behavior to suit different people and different situations. (*R*)
4. In social situations, I have the ability to alter my behavior if I feel something else is called for.
5. I can usually tell when I've said something inappropriate by reading it in the listener's eyes.
6. My powers of intuition are quite good when it comes to understanding others' emotions and motives.
7. If someone is lying to me, I usually know it at once from that person's manner of expression.
8. In conversations, I am sensitive to even the slightest change in facial expression of the person I am conversing with.

SECTION 2: COLLEAGUES' EVALUATION²⁹

Q8. The following questions are about your perceptions of [name]. Please indicate how much you agree or disagree with the following statements about [name].

²⁹ This section was repeated for every member of the respondent's workgroup.

1. This person goes out of his/her way to help me at work no matter how big or small the issue is.
2. This person does whatever he/she can to help me.
3. I respect this person's point of view.
4. This person makes valuable contributions at work.
5. This person exerts influence over my decisions at work.
6. I like this person.
7. This person is a friend of mine.

Q9. This question asks who [name] goes out of his or her way to help at work. Please click on the names that you believe [name] goes out of their way to help.

[Name] goes out of his or her way to help... (Place a check)

[Roster]

SECTION 3: PERFORMANCE EVALUATIONS (ONLY FOR SUPERVISORS)

The three questions below ask about your perceptions of [name]'s overall job performance.

We won't share these evaluations with anybody including the person you are evaluating.

1. Rate the overall level of performance that you observe for [name].
2. Overall, to what extent do you feel [name] has been effectively fulfilling his or her role responsibilities?
3. Overall, to what extent do you feel [name] is performing his or her job the way you would like it to be performed?

SECTION 4: BACKGROUND QUESTIONS

Please answer these last few questions for statistical purposes.

How long have you been working in your current position?

Years: _____ Months: _____

How long have you been working for at this organization?

Years: _____ Months: _____

Approximately how many people is your workgroup composed of? _____

What is your age? _____

What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other
- ☐ Prefer not to answer

What is your ethnicity?

- ☐ Asian
- ☐ Black/African American
- ☐ Hispanic/Latino
- ☐ White
- ☐ Other
- ☐ Prefer not to respond

What is the highest level of education that you completed?

- ☐ Less than a high school diploma
- ☐ High school degree or equivalent (e. g., GED)
- ☐ Some college, but no degree
- ☐ Associate degree in college (2 years)
- ☐ Bachelor's degree in college (4 years)
- ☐ Master's degree
- ☐ Doctoral degree
- ☐ Professional degree (JM, MD)