Chapter 5

General Discussion

According to ancient Greek philosophy primeval humans were round and composed of two beings stuck back-to-back. They had four hands, four feet, and two faces on a round neck. Their strength and “thoughts of heart” were so immense that they challenged the powers of the gods. Zeus was envious of these enormous powers and split them in two because then they would only have half their strength. As a result, in our time humans are continually on the lookout for another half to become whole and strong again (Plato, trans. 1998).

Inspired by the idea that people may be in search of complementary other halves to become stronger, this dissertation proposed that it is important to investigate how perceptions of expertise dissimilarity and expertise complementarity within pairs of team members are related to their behavior and the performance of their teams. In the subsequent section, the main findings are presented, followed by a reflection on the weaknesses and strengths of the present research, combined with some suggestions for future research. We conclude with a discussion of the theoretical and practical implications of the findings.

Summary of the Main Findings

The most important results of this dissertation can be summarized in three main findings. First, this dissertation shows that the dyad is an important source of team members’ perceptions related to differences in teams. Second, the present research indicates that team members can perceive the same expertise differences to be more or less dissimilar and more or less complementary at the same time. Finally, our findings indicate that these perceptions have different dyad-level antecedents and dyad-level consequences but together predict team performance. Below, we describe these main findings in more detail.

The Dyad: An Important Source for Perceptions of Differences

In Chapter 1 we observed that previous research mostly conceptualized and measured
intrateam differences at either the individual or the team level of analysis using objective proxies of differences. We argued that these conceptualizations overlook basically important variance at the dyadic level of analysis and fail to acknowledge that team members can differ dramatically in their recognition of differences. Therefore, we deemed it necessary to focus on perceptions of differences within pairs of team members. Chapters 2 and 3 substantiated this conviction by showing that the dyad is indeed a rich and important source of difference perceptions. In Chapter 2 the so-called ‘insider approach’ of asking team members themselves what kinds of differences they perceived between them and specific other members resulted in an extensive inventory of various types of dyadic differences. Interestingly, and contrary to assumptions in most previous research (e.g., Jackson et al., 1995; Jehn et al., 1999; Pelled, 1996), the findings show that members of diverse teams did not primarily focus on observable differences such as demographic differences in age, gender, and functional background. Rather, team members appeared to concentrate on less readily visible differences such as aspects of and characteristics related to another’s task-related expertise and personality.

Additionally and cumulatively, the results from Chapter 3 demonstrate that the dyad is indeed an important basis for perceptions of differences in teams. Social relations analyses revealed that, over and above variance at individual and team levels, the most important source of variance of perceived expertise differences was located at the dyadic level. Thus, team member perceptions of expertise differences were not the result of individual-level factors (a team member is seeing everybody in the team as different or is being seen by everybody as different), nor of team-level factors (team members A and B are members of a team that is very diverse). Rather, the breaking news is that perceptions of expertise differences are principally based on unique and specific impressions of other team members.

**Appreciating Expertise Differences: Perceptions of Expertise Complementarity**

In Chapter 1 we also observed that organizational researchers primarily view the effects of intrateam differences through the lens of theories of similarity attraction (e.g., Byrne, 1971), social identity and self-categorization (e.g., Tajfel & Turner, 1986). On the basis of these theories, it is assumed that intrateam differences have negative effects because team members generally value dissimilarity negatively. In Chapter 2 we put these assumptions to the test by asking team members how negatively and positively they valued their differences with others. Contrary to assumptions inherent in theories of similarity attraction, social identity and self-categorization, our findings indicated that team members do not necessarily value their differences with others negatively. Particularly, excerpts from interviews with team members
revealed that the same differences in expertise are sometimes valued both negatively and positively depending on whether they are considered to be *complementary* to someone’s expertise (i.e. benefit individuals’ task completion).

In Chapters 3 and 4 we built on the finding that team members may both negatively and positively value the same differences in expertise. In these chapters we suggest on the basis of theories of self-expansion and self-evaluation maintenance (cf., Aron et al., 2004; Pilkington et al., 1991) that team members may perceive another’s expertise to be more or less *dissimilar* but also more or less *complementary* at the same time. Substantiating this theoretical distinction, confirmatory factor analyses showed that team members were indeed able to distinguish between expertise dissimilarity and expertise complementarity.

**Perceived Expertise Dissimilarity and Complementarity: Antecedents and Consequences**

The third main finding of this dissertation concerns the antecedents and consequences of perceptions of expertise dissimilarity and complementarity. Specifically, we found that these perceptions were differently related to the same dyad-level antecedents and consequences.

**Dyad-level antecedents.** The findings in Chapter 4 indicate that proxies of differences in domains of expertise and levels of expertise predict perceptions of expertise dissimilarity and complementarity. The results of this study suggested that differences in educational background and educational level are both *independently* related to perceptions of expertise dissimilarity suggesting that team members use both types as proxies for gauging expertise differences with others. Additionally, we found that differences in educational background and educational level together with organizational tenure *interdependently* predicted perceptions of expertise complementarity. More precisely, we uncovered that team members perceive most complementarity in expertise when another team member is *different* in educational background and *similar* in educational level. The analyses further revealed that this interaction depended on the level of organizational tenure, insightfully suggesting that the more work experience team members have the more they are able to perceive complementarity with other team members.

**Dyad-level consequences.** In Chapter 3 the results of cross-lagged analyses revealed that expertise dissimilarity and expertise complementarity were differently related to a team process variable that is of crucial relevance for team performance, namely dyadic helping. On the one hand, we found that perceived expertise dissimilarity at Time 1 was not significantly related to dyadic helping at Time 2. On the other hand, the more team members perceived to be complementary in
expertise at Time 1 the more they helped each other at Time 2. Not only do these results elegantly confirm the presumption that the concepts are inherently different; they also indicate that a team member helps another team member because of the experience of complementarity in expertise with that specific person.

**Team-level consequences.** Finally, the results in Chapter 4 showed that teams perform better to the extent that team members perceive that other team members have complementary dissimilar expertise. As such, this finding additionally underscores the importance of understanding dyadic relations in teams. Moreover, it supports suggestions in earlier research (e.g., Hanna & Walsh, 2002; Harrison, Hitt, Hoskisson, & Ireland, 2001; Levine & Moreland, 2004) that both dissimilarity and complementarity are important for understanding why some teams perform more effectively than others.

**Strengths and Weaknesses**

As with any research, the present research has its strengths and weaknesses. To begin with, a strength of this dissertation is that it started with a study that used an inductive approach. The specific observations acquired by this open-ended and exploratory approach served as a valuable basis for broader generalizations and theory building in the subsequent chapters. For example, by adopting this inductive approach we were able to discover that team members can value the same expertise differences with others both negatively and positively which served as a basis for the further project reported in Chapters 3 and 4. Due to concerns regarding the cognitive burden for respondents, a weakness of this approach was that we were only able to explore team members’ evaluation of differences. We were not able to go into detail about reasons for why team members value their expertise differences negatively or positively. Nevertheless, the results offer a fruitful starting point for further cumulative explorations into what kinds of differences team members perceive and how they value these differences. It would be valuable if additional qualitative studies systematically collect data on reasons for why team members value differences negatively, positively, or neutrally.

A second strength of this dissertation is that we examined the relations between the antecedents and consequences of perceived expertise dissimilarity and expertise complementarity in different samples of real life teams. By conducting the empirical studies in different work contexts, we strengthened the external validity of the findings and are confident to have contributed to the generalizability of the results. However, a drawback was that the non-experimental setup of our studies did not allow us to manipulate and control the antecedents to perceptions of expertise
dissimilarity and expertise complementarity. As a consequence, we were unable to rigorously test the causal paths from the antecedents’ manifestations to the consequences of perceptions of expertise dissimilarity and complementarity. In addition, we couldn’t ascertain whether the relations between the antecedents and consequences of perceptions of expertise dissimilarity and complementarity were driven by unmeasured extraneous variables. It seems valuable to additionally investigate the determinants of and the relation between expertise dissimilarity and expertise complementarity in the laboratory in order to pinpoint more exactly what causes these perceptions and their interrelation. For example, it would be interesting to examine to what extent perceptions of expertise complementarity are a result of team members’ task and outcome interdependence, team members’ personality, or both simultaneously or sequentially.

A final strength of the present research is that we adopted a round-robin design in Chapters 3 and 4. As a consequence, we were able to gain a more fine-grained understanding of team members’ perceptions regarding expertise differences. We were able to ascertain that perceptions regarding expertise differences are attributable to characteristics unique to the relation between two team members rather than characteristics of the perceiver, target, or teams in which team members operate. Yet, because this design requires self-report measures gathered by means of questionnaires, an unfavorable consequence may be that the relation between the variables of interest was affected by limitations of questionnaire studies such as common method variance in the form of socially desirable responding. However, given that we used a cross-lagged design in Chapter 3 and related perceptions of expertise differences to archival data and supervisor data in Chapter 4, we trust that this cannot provide an alternative explanation for our results. Moreover, the relatively low correlations between perceived expertise dissimilarity and perceived expertise complementarity in both studies suggest that this supposition falls short as a plausible explanation of the results.

Theoretical Implications

The three main findings of the present research have several theoretical implications for research and theory building on the relation between intrateam differences and the performance of teams. They cluster around the level of analysis, and the perceptual and evaluative nature of the core variables.

Importance of Dyadic Level of Analysis
Organizational researchers have recently highlighted that focusing on the dyad may
enhance understanding of how intrateam differences come about and influence team performance (cf., Jehn & Greer, 2007). Given that the fundamental unit of analysis regarding intrateam differences is the dyad (Tsui & Gutek, 1999) and that processes within pairs of individuals are the ‘building blocks’ of many processes observed in larger aggregations (Weick, 1969), scholars have proposed that returning to the core theoretical basis of team interaction may provide more insight into processes related to intrateam differences. The findings of this dissertation underline and underpin these assertions by showing that perceptions of (expertise) differences originate at the dyadic level and are related to dyad-level behavior and overarching team-level performance. As such, this finding implies that the common team-level and individual-level conceptualizations of intrateam differences as employed in past research (for an overview see Riordan, 2000; Williams & O’Reilly, 1998) cover only part of the variance of the behavior in teams. Moreover, because of the relation with the performance of teams, the findings of the dissertation also imply that dyad-level perceptions are important and heretofore hidden roots for processes at the team level. All in all, the findings of this dissertation underscore Kozlowski and Klein’s (2000) admonition to start theorizing at the lowest possible level of conceptualization. Specifically and in line with recent research (cf., Knight, Klein, & Bates, 2007; Van der Vegt, Bunderson, & Oostehof, 2006), this dissertation implies that understanding processes by starting from the lowest social unit, the dyad, offers insightful information for understanding processes at the level of the team notably including the performance of teams.

**Importance of Perceptions of Intrateam Differences**

The overview of the extant literature in Chapter 1 revealed that most of the prior research into team diversity has tried to understand the influence of intrateam differences by means of investigating the effects of objective differences. Despite the merits of using objective data, this approach has been criticized because such measures fail to incorporate whether and to what extent individuals are aware of these differences among them. Proponents of many of the theories on the effects of intrateam differences emphasized the importance of team members’ perceptions of intrateam differences. In addition, they recommended to investigate what kinds of differences are salient in teams and to what extent team members actually perceive differences with others (Riordan, 2000). This dissertation offers interesting information on these recommendations by uncovering that team members seem to be focusing more on deep-level, less visible differences than on surface-level, more visible differences. Additionally, our results suggest that team members use objective information as a basis for construing interpersonal differences in expertise and that
the perceptions of differences rather than the objective differences influence team performance.

Taken together, these findings imply that investigating team members’ perceptions is important for understanding what kinds of dyadic differences are relevant in teams. They are in line with the results of other studies that have moved beyond an exclusive emphasis on demographic differences to include “deeper” forms of intrateam differences as predictors of team outcomes. For instance, these studies found that underlying, less visible differences in particular are important antecedent conditions of the effects of interpersonal differences in general (e.g., Harrison et al., 1998; Harrison et al., 2002; Hobman et al., 2003; Van der Vegt & Van de Vliert, 2005). Furthermore, our findings seem to be compatible with the so-called expectation model of diversity (McGrath et al., 1995). The relation between objective expertise differences and perceptions of these differences suggests that team members use objective demographic differences to make inferences about underlying attributes (cf., Northcraft, Polzer, Neale, & Kramer, 1995).

**Evaluation of Expertise Differences: Perceptions of Expertise Dissimilarity and Expertise Complementarity**

**Evaluation of differences.** As already mentioned, in previous studies researchers have typically used theories of similarity-attraction, social identity and self-categorization (e.g., Byrne, 1971; Tajfel & Turner, 1986) to understand the effect of intrateam differences. Based on these theories, scholars presuppose that team members negatively value intrateam differences and are therefore reluctant to cooperate with dissimilar others (cf., similar assertions by Bunderson & Sutcliffe, 2003). This dissertation presents a more balanced and more realistic perspective by suggesting that team members can both negatively and positively value the same expertise differences depending on whether these differences are beneficial for attaining goals. By itself, these reported results have two implications for the literature on diversity/dissimilarity in teams. First, our findings substantiate assertions in recent literature that individuals may not only have negative but also positive attitudes towards diversity/dissimilarity (e.g., Van Knippenberg, Van Ginkel, Homan, & Kooij-de Bode, 2005; Van der Zee, Paulus, Vos, & Parthasarathy, 2007). Second, these outcomes are important given that recent research has indicated that evaluations of differences play a crucial role in the relation between similarity and attraction (Montoya & Horton, 2004). Consequently, our findings regarding the differential evaluation of the same differences may be a first step towards understanding why some individuals like to cooperate with certain dissimilar others whereas others do not.
Perceived expertise dissimilarity and expertise complementarity. Based on the results regarding the evaluation of expertise differences, we argued and found that team members may report perceptions of both expertise dissimilarity and expertise complementarity. Our results indicated that perceptions of expertise dissimilarity are based on observations of to what extent another team member has a different background or level of expertise for complementarity to be experienced. In contrast, more interpretive perceptions of expertise complementarity are more complex in that they necessitate sufficient work experience and equality in the level of expertise. That is, when team members have much know-how and are similar in their levels of expertise, they experience the most complementarity. Interestingly, these findings are reminiscent of research in the adjacent field of cooperative learning. Studies from this field show that individuals who need to cooperate in small group settings see value in each other’s respective domain of expertise when they perceive each other as equal (e.g., Aronson & Patnoe, 1997; Cohen, 1994).

Taken together, our findings signify that pure perceptions of expertise dissimilarity and more interpretative expertise complementarity are related yet representing essentially different constructs. They are related in that they both concern perceptions of expertise differences. They are different in that perceived expertise dissimilarity is a superficial and descriptive observation of the extent to which another team member has a different expertise, whereas perceived expertise complementarity is a deeper and more integrative insight into how one’s expertise can be combined with another’s expertise to effectively complete team tasks. Essentially, this is similar to perceiving that the elements of a jigsaw puzzle are dissimilar but together can form an entity of complementary elements.

By making an evaluation-referenced distinction between perceptions of expertise dissimilarity and expertise complementarity, this dissertation makes a significant contribution to the literature on expertise differences in teams. Previously, researchers examining the effects of expertise differences in teams have equated expertise dissimilarity with expertise complementarity (e.g., Hinds, Carley, & Krackhardt, 2000; Jackson, 1996; Krishnan, Miller, & Judge, 1997). For example, in their study on the relation between team characteristics and team effectiveness, Campion and colleagues operationalize expertise differences with items concerning both expertise dissimilarity and expertise complementarity (e.g., “The members of my team vary widely in their areas of expertise”; “The members of my team have skills and abilities that complement each other”; Campion, Medsker, & Higgs, 1993: 849). Clearly, the first item refers to expertise dissimilarity whereas the second refers to expertise complementarity. The conclusions arrived at in this dissertation imply that this equation of expertise dissimilarity and complementarity is an unjustified
simplification. In an insightful way, the findings suggest that the effects of expertise differences on team effectiveness are dependent on the extent to which team members perceive that their dissimilarity in expertise is in fact complementary.

**Practical Implications**

In addition to the above theoretical implications, the findings reported in this dissertation also have some implications for how practitioners may effectively manage the performance of teams in which team members with different expertise need to solve complex problems. To begin with, the results have an implication for the composition of teams. Scholars have frequently argued that teams need to be composed of members who have different yet complementary expertise (e.g., Hanna & Walsh, 2002; Harrison, Hitt, Hoskisson, & Ireland, 2001; Levine & Moreland, 2004). Until now it was unclear which situations foster perceptions of expertise complementarity. The present findings unmistakably suggest that, to the extent that managers have control over the composition of their teams, it is advisable to compose teams of members who have different yet complementary expertise and similar levels of expertise. However, it is important to staff teams with members who have sufficient work experience because work experience enables team members to see and value to what extent their expertise is complementary to another’s expertise. The study in Chapter 4 suggests that managers can compose teams by using data obtained from the Human Resources department regarding employees’ educational curriculum and organizational tenure. Specifically, teams can be composed of members who have a different educational background, a similar educational level, and substantial organizational tenure. By intervening in this way, it is made likely that team members experience more complementary intrateam work relations, which fosters the effectiveness of teams.

Second, the results suggest that the effectiveness of expertise-diverse teams may be improved by enhancing team members’ perceptions of each others’ expertise. To that end, interventions aimed at the recognition of expertise could be functional. One method to increase the visibility of expertise is to introduce an intranet-based expert-finder system in an organization. An expert-finder system is an online repository by which people within organizations are able to identify ‘who knows what and to what extent’ (e.g., Becerra-Fernandez, 2000; Huijsen, Driessen & Slijp, 2007). Such a system may be helpful because information on employees’ types and levels of expertise can facilitate team members in seeing what kind of expertise is available in a team.

Another way to enhance the perceptibility of expertise surfaced during debriefings
of our participants. During these debriefings, we learned that team members appreciated to reflect on the expertise of each team member and the effectiveness of working with them. It seemed that reflecting on the effectiveness of intrateam work relationships made team members aware of what expertise is needed to perform effectively in teams. Therefore, this approach may be an effective instrument for supporting the development and deployment of team members. That is, by letting team members actively discuss and give honest feedback on each other’s strengths and weaknesses, they may become more cognizant of their own expertise, others’ expertise, and what expertise team tasks require. As a consequence, it may become clear ‘who knows what’ within the team and what expertise is shared by a team. This knowledge about the sharing or overlap of expertise enhances the accuracy of team members’ expectations of each other’s needs. This in turn enables efficient coordination as team members anticipate each other’s requirements, which then leads to superior team performance (e.g., Marks, Zaccaro, & Mathieu, 2000; Mathieu, Heffner, Goodwin, Cannon-Bowers, & Salas, 2005).

A final approach to enhance the visibility of expertise is to organize work in such a way that individuals need to interact in a cooperative, interdependent manner and operate as equals such as has been done in classroom settings (cf., Aronson & Patnoe, 1997). This can be done by providing team members with group goals and group feedback, and by designing the team task in such a way that team members need each other’s help to successfully complete this task. Research has shown that in such circumstances, team members are better able to identify the expertise of team members and to see how the different pieces of expertise can be of value for successful task completion. As a positive side effect, it is likely that these circumstances also enhance team members’ propensity to help each other with task-related problems (cf., Aronson, Bridgeman, & Geffner, 1978; Van der Vegt, Van de Vliert, & Oosterhof, 2003).
Concluding Remarks

This dissertation began with a quote of Thomas Edison. He stated that without the help of his assistants, he would have been delayed by details for attending to which he had “no earthly fitness”. On the one hand, this quote indicates the importance of effective intrateam relations. On the other hand, this quote also seems to suggest that Edison’s projects were successful not only because he was aware of his own expertise and that of his assistants, but also because he knew how their expertise could complement his contributions to facilitate the successful completion of research projects. The present research underscores the crucial role of intrateam relations and perceptions of expertise complementarity for understanding why team members help each other and why some teams perform more effectively than do others.