# The Relationship Between Intragroup Conflict, Group Size and Work Effectiveness

by

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To
Aunt Nella


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## Content

# 1. Abstract

The relationship between dimensions of intragroup conflict and work group effectiveness (group delivery and work group job satisfaction), and the moderating effects of group size on this relationship, was investigated. Although the traditional conceptualization of intragroup conflict as a two-dimensional conflict, the ICS (Jehn, 1992; 1994), has shed light on the relationship between intragroup conflict and work group effectiveness, it has not been able to fully explain this relationship. Thus, I theoretically developed a four-dimensional intragroup conflict model with a cognitive task conflict and an emotional person conflict dimension, defined similarly, but not identically, to the emotional/relationship and cognitive/task conflict dimensions currently in use, as well as a cognitive person conflict and an emotional task conflict dimension, which are new. The model was operationalized in a four-dimension intragroup conflict (4IC) scale, and was found to have satisfactory statistical and psychometric properties.

Work group delivery was negatively related to cognitive task conflict, and positively related to emotional task conflict. The latter is a contrasting contribution to the widely held belief in quantitatively research that all intragroup dimensions of conflict are negatively related to group delivery that is not measured by the group's own assessment (De Dreu & Weingart, 2003). In addition, the relationship between emotional task conflict and work group delivery and between emotional person conflict and group delivery were both negatively moderated by group size. Furthermore, work group job satisfaction was negatively related to emotional person conflict and, finally, the relationship between cognitive task conflict and work group job satisfaction was negatively moderated by group size.

Implications of the theoretical presentation of the 4IC model, the development of a subsequent scale to measure this model, and the findings of the relationship between intragroup conflict, group size, work group delivery, and work group job satisfaction was discussed, and possible directions for further research were indicated.

# 2. Introduction

The main focus of this dissertation is to study the relationship between intragroup conflict[1] and work group effectiveness. For the last 50 years, researchers have tried to disentangle the complex nature of this relationship, in particular through developing and studying several dimensions of intragroup conflict, and how these are related to group effectiveness. However, no broad consensus has yet been achieved, and further research is required. This dissertation intends to contribute to this line of research.

In this introduction chapter, the first paragraph (P. 2.1) will give a closer presentation of the focus of the dissertation in terms of main concepts when studying the relationship between intragroup conflict and group effectiveness, including possible interactions with group size. I will argue why the focus on these relationships are important, both in relation to contemporary research, to practicing managers, and work group members in corporate organizations. I will then sum up the focus of the dissertation in a general research model. In Paragraph 2.2 I will present the disposition of the dissertation.

## 2.1 Studying Intragroup Conflict and Group Outcome

### 2.1.1 The Concepts of Group Outcome and Work Group Effectiveness

The concept *group outcome* is used in this dissertation as a general concept of all types of goal related outcomes (Pritchard & Watson, 1992). Within the general concept of group outcome, I use the concept *work group effectiveness* in line with what is commonly defined to be the *work group's performance* and *job satisfaction* (Gladstein, 1984; Hackman & Oldham, 1980[2]). Hackman (1987: 322) explains that the intent of including social and personal criteria such as work group job satisfaction[3] in a "normative model" is: "… to identify the factors that most powerfully enhance or depress the task effectiveness of a group and to do so in a way that increases the possibility that constructive change can occur".

A simple figure will illustrate the structure of the main concepts as they are conceived in this dissertation:

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[1] In this dissertation I will use the expression "intragroup conflict" also when we could use the more general "interpersonal conflict". "Interpersonal conflict" will be used only to the extent that we are referring other scholar's works or when this formulation express something different from "intragroup conflict".

[2] Hackman and Oldham also included competence enhancement.

[3] And competence enhancement, not included here.

*Table 1: Heuristic Classification of Main Concepts*

| | | | |
|---|---|---|---|
| Group outcome | Work group outcome | Work group performance | **Work group delivery**[1] (one of several ultimate performance variables[2]) |
| | | | Other work group performance variables (ultimate or intermediate performance variables[2]) |
| | | **Work group job satisfaction**[1] | |
| | | Other work group variables | |
| | Other group outcomes | | |

1) Main variables in the study.
2) Guzzo & Dickson (1996)

When focusing on the normative aspect of the concept "constructive", the inclusion of work group job satisfaction implies that this type of outcome should be considered in every humanistic organization. A more functional oriented approach to the concept "constructive" would be that increased work group job satisfaction in the long term will increase the work group's performance, and serve as a "long term perspective group performance" concept. In this dissertation, I have adopted the normative model of work group effectiveness from both approaches. From a moral normative point of view, I will barely characterize a work group that is taxed to the extreme by a tyrannical supervisor demanding maximum work group performance as a goal related "effective" work group (Mahoney, 1988; Pritchard & Watson, 1992), since the goals of this particular work group's performance would not be in accordance to "the moral principles and beliefs or accepted standards of a person or social group"[1], or shorter, morally acceptable (Drucker, 1999; Pfeffer & Sutton, 2000). From a long-term normative standpoint, the work group described above may present high short time performance, but at the same time may present or even "promise" a low long-term performance.

### 2.1.2 Studying Intragroup Conflict and Group Effectiveness

We know that organizational performance is critically important for society. We also know that there is a close link between organizational performance and work group performance (Goodman, Ravlin & Schminke, 1987). Indeed, work groups may be considered as the most important building blocks between the individual and the

[1] Collins Dictionnary of the English Language. 1985 (first published 1979). London: Collins

organization (Hackman, 1987), as well as outcomes from groups in an organization signaling the values and behavior necessary for a high performing organization (Katzenbach & Smith, 1993). Among practitioners, as Ken Olsen, President in Digital Equipment Corporation has expressed that teamwork was the key to the company's success as it grew into a larger company (Simon & Button, 1990[1]).

In work group theory, *intragroup conflict* is considered one of several group processes (Gladstein, 1984), and of cardinal importance (De Dreu & Van Vliert, 1997). No other process can be as devastating to group performance or leave group members in such deep frustration as conflict. Still, conflict can also be beneficial in helping group members confront reality and create new solutions to tough problems. In fact, conflict may be perceived as inevitable in successful organizations (Tjosvold, 1997).

Research has brought valuable insight into the nuances of the relationship between conflict and group performance. Especially since the 1950s, three decades of significant contributions were presented (Baron, 1984; Boulding, 1963; Cosier & Rose, 1977; Deutsch, 1949; 1969; Brehmer, 1976; Guetzkow & Gyr, 1954; Janis, 1972; Pondy, 1967; Putnam & Poole, 1987; Rahim, 1983; Riecken, 1952; Schwenk & Cosier, 1980; Thompson, 1967; Tjosvold & Deemer, 1980; Torrance, 1957; Tuckman, 1965).

In the 1990s, research on different dimensions of intragroup conflict and their relationships with group performance accelerated. The relationship between the two conflict dimensions *cognitive/task (C/T)*[2] and *emotional/relationship (E/R)*[3], and group performance in particular, has attracted much attention (e.g. Amason, 1996; Amason, Thompson, Hochwarter, & Harrison, 1995; Eisenhardt, Kahwajy, & Bourgeois, 1997; Jehn 1992; 1994; 1995; 1997a; Pinkley, 1990), and have continuously stimulated to a substantial amount of research since then (De Dreu & Weingart, 2003). From this line of research, the overall impression has been that the relationship between E/R dimensions of conflict and group performance is negative, whereas the relationship between C/T dimensions of conflict and group performance is positive (Amason, 1996; Jehn, 1997b).

In a recent comprehensive metaanalysis, De Dreu and Weingart (2003) has, however, revealed that the majority of empirical studies conducted over the last decade, in fact, indicated that also the C/T dimensions of conflict are not positively, but negatively related to group performance. Thus, after many years of research,

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[1] Simon, R., Button, G. 1990. *What I learned In the Eighties*. Forbes, Jan.8: 100.

[2] The terms are normally used interchangeably

[3] The terms are normally used interchangeably

which indeed has brought profound insight into the relationship between intragroup conflict and group performance, no commonly agreed upon answer to the question of whether the C/T conflict dimension is positively related to group performance, or whether it is negatively related, has been reached.

Furthermore, findings in quantitative research of the negative relationship between emotional/relationship (E/R) conflict dimensions and group performance have also been challenged. Indeed, qualitative studies have described highly emotionally loaded conflicts in work groups that, in fact, have been positively related to group performance (Eisenhardt, Kahwajy, & Bourgeois, 1997; Leavitt & Lipman-Blumen, 1995). However, it should be noted that the conceptualization of the qualitative studies was not identical to the E/R conceptualization commonly used in the quantitative studies. Nevertheless, no consensus is reached whether generally emotional loaded conflicts in groups are negatively related, or whether these conflicts may be positively related to group performance.

To summarize, there is currently no agreement about the relationship between intragroup dimensions of conflict and work group performance, regardless of whether we are looking at cognitive/task dimensions or types of conflict or emotional/relationship dimensions or types of conflict. Additional research seems needed to attain a commonly shared agreement of the relationship between intragroup conflict and group performance.

What possible reasons may explain the scientific uncertainty concerning the relationship between intragroup conflict and group performance? Firstly, a lack of specification of performance variables in intragroup conflict and group performance relationship studies may explain some of the varying research findings, and should be considered carefully. For example, the concept "group performance" in the metaanalysis of De Dreu and Weingart (2003) included mainly decision quality, product quality, production quality, and team effectiveness[1]. Different specifications of the group performance concept may obviously give different relationship to intragroup conflict. Moreover, the difference between the commonly accepted view that C/T conflicts are beneficial related to group performance, whereas the metaanalysis of De Dreu and Weingart (2003) clearly found that this relationship was negative, may to a large extent be explained by the fact that De Dreu and Weingart systematically preferred findings where external assessors or objective performance measures had been used, whereas the general impression of a positive relationship between C/T conflict and group performance has been based to a large extent on self report performance measure..

[1] Should not be confused with the term "group effectiveness" that I will define and use frequently in this dissertation.

Accordingly, there seems to be a need for comprehensive clarification and a "clearing up" process concerning the plethora of intragroup conflict constructs that have been used in this line of research, in particular concerning emotional/relationship constructs and cognitive/task constructs of intragroup conflict (Pearson, Ensley, & Amason, 2002). The different findings of the relationship between intragroup conflict and group performance reported above, may, along with several other factors, be rooted in an inconsistency in conceptualizations and operationalizations of the C/T and E/R conflicts dimensions. Indeed, Jehn and Chatman (2000: 56) concluded: "the most common conceptualization of conflict may be incomplete and actually hinder the usefulness of the research".

When research on the relationship between intragroup conflict and group performance has been at variance, as reported above, researchers have generally reported a negative relationship between intragroup conflict and group job satisfaction (De Dreu & Weingart, 2003. Thus, I do not expect to find otherwise in this dissertation when using established intragroup conflict dimensions concepts. However, since an extended model of intragroup conflict dimensions will be developed in this dissertation, any new intragroup conflict dimension should also be investigated on an explorative basis in relation to work group job satisfaction.

The primary aim of this dissertation is to present a extended and theoretically anchored conceptualization of intragroup conflict dimensions, and thus, to use the intragroup conflict constructs developed from this conceptualization to attain a clearer and broader picture of the complex relationship between intragroup conflict and work group outcomes.

Hence, there is a need to:

- Theoretically discuss the need for specifications and possible extensions of current intragroup conflict models to a more finely grained model of intragroup conflict dimensions.

- Explore the relationship between intragroup conflict and group outcome by using the extended model of intragroup conflict, to see whether an extended model will comprehensively capture this relationship.

### 2.1.3 Group Size as a Moderator

*Group size* has been shown to be an important input factor in relation to group outcomes such as group performance and group job satisfaction (Thomas & Fink, 1963), either categorized as group structure factors (Gladstein, 1984; Goodman, Ravlin, & Argote, 1986) or as compositional factors (Cohen & Bailey, 1997; Levine & Moreland, 1990). Thus, the size of the team parsimoniously represents a team's

structural and compositional context (Amason & Sapienza, 1997). However, the findings on the relationship between group size and group outcomes have been inconclusive (Bantel & Jackson, 1989; Cohen & Bailey, 1997; Goodman, Ravlin, & Argote, 1986; Haleblian & Finikelstein, 1993; Hambrick & D'Aveni, 1992; Levine & Moreland, 1998).

Some contemporary reviewers have suggested that the relationship between group size and group performance might be best understood as an inverted U-shape (Cohen & Bailey, 1997; Goodman, Ravlin, & Argote, 1986). They argue that there seems to be a trade-off when considering small teams versus large teams, in that the benefit of an increase in human resources has to be traded off against the detriment of process loss, for example a decrease in communication and motivation (Ancona & Caldwell, 1998). Based on these observations, it is interesting to investigate whether group size may be a moderator to the relationship between intragroup conflict and group outcome.

Hence, I will:

- Explore a possible moderating effect of group size on the relationship between intragroup conflict dimensions and group outcome.

### 2.1.4 Research Questions and General Research Model

The primary aim of this dissertation is to study the relationship between intragroup conflict and work group effectiveness in organizations. I have argued that there is no currently agreed upon conclusion about this relationship. Building on the pioneer work of Rahim (1983), Pinkley (1990), Jehn (1992; 1995; 1997a), and Jehn, Northcraft, and Neale, (1999), a further elaboration on current models of intragroup conflict dimensions will be presented. The aim is to capture a broader aspect of intragroup conflict than currently exists, and thus, by doing this, disentangling some of the inconsistencies that seem to have hindered previous research arriving at a common agreement as to the nature of the intragroup conflict and work group effectiveness relationship.

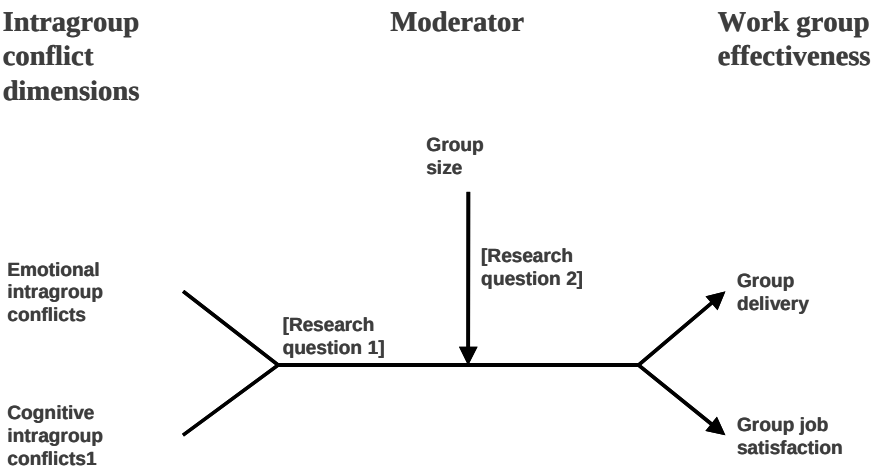
Thus, in general terms one may formulate the following two research questions:

Research question 1: What is the relationship between cognitive and emotional dimensions of intragroup conflict and work group effectiveness?

Research question 2: To what extent does the size of the work group moderate the relationships between dimensions of intragroup conflict and work group effectiveness?

Below is the research model in Figure 1.

*Figure 1: Research Model*[1]




## 2.2 Overview of the Dissertation

In the following theory chapter (Chapter 3), I will first review research on the relationship between intragroup dimensions of conflict and group outcome, in particular work group performance (P. 3.1). In the conceptual part (P. 3.2), the concepts of conflict, cognition, and emotion, and the subconcepts cognitive conflict and emotional conflict will briefly be reviewed. Based on the review and theoretical reasoning, I conclude that the dichotomy of the intragroup conflict concept in a cognitive/task (C/T) dimension of conflict and an emotional / personal / relationship (E/R) dimension of conflict may not capture the whole relationship between intragroup conflict and group outcome. I then develop an extended four-dimensional intragroup conflict mode consisting of an *emotional person (EP)* conflict and a *cognitive task* conflict dimension, in line with the existing concepts of *E/R* and *C/T* dimensions of conflict, respectively (Brehmer, 1976; Guetzkow & Gyr, 1954; Jehn, 1992; 1994; Pinkley, 1990), and two new intragroup conflict concepts, an emotional task conflict dimension, and a cognitive person dimension of conflict (P. 3.3).

The next step is to formulate hypotheses about the relationship between the four intragroup conflict dimensions and work group effectiveness, see Chapter 4. The hypotheses are developed and formulated (P. 4.1 to 4.3), and finally, (P. 4.5), I review

[1] The figure is illustrating causal relationships between the variables. However, in formulating and testing the hypotheses statistically this is not claimed (see discussion in Chapter 5.1.1)

some important aspects of group size, followed by a discussion of how group size can moderate the relationships between intragroup conflict and work group effectiveness.

In order to test the hypotheses in the methodological (Chapter 5) I describe the quasiexperimental correlation design (P. 5.1, see Shadish, Cook, & Campbell, 2002) used in the analysis of data from questionnaires answered by 313 group members in 62 work groups (P. 5.2). The empirical development and confirmation of measurement scales for the four intragroup conflict constructs, group delivery, and work group job satisfaction are presented (P. 5.3) and analyzed (P. 5.4), and the appropriateness of using the individually collected measures on group level is analyzed and discussed. (P. 5.5).

Finally, results are presented in Chapter 5.5, and in Chapter 7 the development of the new intragroup conflict scale and the findings of relationships between the variables in the research model are discussed (P. 7.1) and limitations and possible directions for further research are presented (P. 7.2).

# 3. Theory

In this theory chapter, I will first investigate the current understanding of the relationship between intragroup conflict and group outcome, in particular work group outcome. I start with a short review of previous research in the area, both in relation to group performance and to group job satisfaction. Based on these reviews, I conclude that there is no unanimity among scholars about the intragroup conflict – group performance relationship. I then give a presentation of the most common conceptualizations and measurements of intragroup conflict, arguing that the lack of consensus about the relationship between intragroup conflict and group performance may be concealed in possible shortcomings in these conceptualizations and measurements. I then discuss more thoroughly the question of how a refined model of intragroup conflict might be done, based on a conceptual heuristic framework of the basic concepts behind intragroup conflict, which are the concept of conflict, emotion, cognition, and task and relationship/person oriented conflicts. I also give a short presentation of the Pinkley study (1990), which offers some ideas to be used in the development of a new or refined model. Finally, equipped with theoretical tools for the task, I define a refined model of intragroup conflict; consisting of the four intragroup conflict dimensions cognitive task conflicts, cognitive person conflicts, emotional task conflicts, and emotional person conflicts.

## 3.1 The Relationship Between Intragroup Conflict and Group Outcome

When reviewing other authors works in this dissertation, I use the term group performance as a joint term for a variety of different group performance measures (see table 1), for example; financial performance (Barsade, Ward, Turner, & Sonnenfeld, 2000), members' ratings of the group (Jehn 1995), grades (Polzer, Milton & Swann, 2002), or decision quality (Dooley & Fryxell, 1999), just to mention a few. Common to all these measures, however, is that they measure achievements related to the group's goals and that they are presented as performance types of measurers by the authors (Hackman, 1987).

In this paragraph the relationship between intragroup conflict and group outcome, both group performance and group job satisfaction, will be reviewed, and alternative perspectives to the commonly shared opinions of these relationships will be presented. However, I will first give a short presentation of the different concepts of intragroup conflict that this particular research is built on, in particular the cognitive/task and the emotional/relationship type of conflict dimension. Finally, I present the ICS in more detail (Jehn, 1994), since the operationalization of the E/R

and C/T conflicts in the ICS also reflect issues of relevance to the conceptual discussion presented in the theory chapter.

### 3.1.1 Emotional/Relationship and Cognitive/Task Dimensions of Conflict

The two conflict dimensions that most frequently have been scrutinized in intragroup research are the cognitive/task (C/T) dimension and the emotional/personal/ relationship (E/R) dimension. The C/T and E/R dimensions of conflict have traditionally been described in terms like "rooted in the substance of the task" (C/T) and "deriving from emotional, affective aspects of the group's interpersonal relations" (E/R), respectively (Guetzkow & Gyr, 1954: 369).

Cognitive/task conflicts have been labeled *cognitive* conflicts (Amason, 1996; Eisenhardt et al., 1997; Jehn, 1997a), *intellectual* conflicts (Pinkley, 1990), but most commonly *task* conflicts (Amason, 1996; De Dreu & Weingart, 2003; Guetzkow & Gyr, 1954; Jehn, 1992; Simons & Peterson, 2000). Emotional/relationship conflicts have been labeled *emotional* conflicts (Jehn, 1994; Pelled, Eisenhardt, & Xin, 1999), *relationship* conflicts (Jehn, Northcraft, & Neale, 1999; Polzer, Milton, & Swann, 2002), *affective* conflicts (Amason, 1996; Hambrick & Li, 2003), and *person* conflicts (Janssen, De Vliert, & Veenstra, 1999).

The tradition in this respect of viewing the cognition and task as interchangeable constructs in relation to conflicts can, according to Brehmer (1976), be traced back to Brunswik (1952). Likewise, the tradition of perceiving emotion and relationship as interchangeable constructs accordingly has a long history (Guetzkow & Gyr 1954). Typically, in the C/T dimension and the E/R dimension of conflicts may be described as done by Simons and Peterson:

> Jehn (1995) summarized the distinction well: Task conflict, or cognitive conflict, is a perception of disagreements among group members about the content of their decisions and involves differences in viewpoints, ideas, and opinions. Relationship conflict, or emotional conflict, is a perception of interpersonal incompatibility and typically includes tension, annoyance, and animosity among group members (2000: 102).

Another tradition has been to explain C/T conflict as a neutrally affective valenced concept (Bradley & Lang, 2000), whereas E/R conflicts repeatedly have been described as a strongly negatively affective valenced phenomenon (Guetzkow & Gyr, 1954; Ross, 1989).

It should be noted that Jehn (1997b) actually found evidence for a third dimension of conflict, namely *process* conflicts. Process conflicts focus on how tasks will be accomplished, and has been included in several studies by Jehn and colleagues (Jehn, Chadwick, & Thatcher, 1997; Jehn & Chatman, 2000; Jehn & Mannix, 2001; Jehn, Northcraft, & Neale, 1999). The amount of studies in which process conflicts are

examined has so far been limited. More important, however, is that the focus in this dissertation is on the relationship between intragroup conflict and work group effectiveness at one particular time of assessment. Thus, I will not have the possibility of including the dynamic approach a discussion of the relationship between process conflict dimension and group effectiveness will require.

### 3.1.2 The Relationship Between Intragroup Conflict and Group Performance

From research we learn that conflict among members in a group context, or intragroup conflict, may hurt the coordination and the motivation of the group and make the group members feel uncomfortable. This in turn may cause "process loss" (Steiner, 1972) and in the end be harmful to the group's performance (e.g. Amason, 1996). On the other hand, conflicts may cause needed change in the organization, foster creativity and diverse thinking, and thereby be beneficial to the group's performance (Brehmer, 1976; Deutsch, 1969; Jehn, 1994).

The assumption concerning the emotional/relationship dimensions of conflict has traditionally been that "when emotions run high, reason flies out the window", to which Baron (1997: 185) commented like this: "… and a growing body of empirical evidence suggests that it contains a considerable grain of truth". Several empirical studies have investigated the relationship between E/R conflicts and group performance. With few exceptions, which I will return to later, these studies have concluded that E/R conflicts are detrimental to group performance (e.g. Amason, 1996; Amason & Sapienza, 1997; Amason & Schweiger, 1997; Barsade, Ward, Turner, & Sonnenfeld, 2000; Jehn, 1994; Simons & Peterson, 2000). A comprehensive metaanalysis conducted by De Dreu and Weingart (2003) strongly confirmed these findings.

The general understanding concerning the relationship between cognitive/task dimensions of conflict and group performance is influenced by the pivotal studies by Janis (1972), who found that conflict-oriented group interactions were the norm among teams that made good decisions. After Janis, scholars have mainly taken a cognitive stand to the intragroup conflict issue (Brehmer, 1976; Cosier & Rose 1977; Deutsch, 1969; Johnson & Johnson, 1979; Mason & Mitroff, 1981; Schwenk & Cosier, 1980; Tjosvold, Johnson, & Fabrey, 1980; Tjosvold & Deemer, 1980). Thus, until recently, a majority of scholars have found support for earlier assumptions about the beneficial effect of intragroup C/T conflicts on group performance (Amason & Schweiger, 1997; Amason, Thompson, Hochwarter, & Harrison, 1995; Barsade, Ward, Turner, & Sonnenfeld, 2000; Jehn, 1994; Jehn, 1997b; Pelled, Eisenhardt, & Xin, 1999), even if the findings sometimes have been rather mixed (Amason, 1996; Jehn, 1995, Jehn, 1997a; Jehn, Chadwick, & Thatcher, 1997; Jehn & Chatman, 2000; Jehn & Mannix, 2001).

Nevertheless, the findings of a positive relationship between C/T conflict and group performance and a negative relationship between E/R conflict and group performance have been so pervasive that Amason and Schweiger (1997) suggested that this research problem should now be considered as "empirically settled".

However, in light of contemporary research, there are reasons to argue that this suggestion might be premature.

### 3.1.3 The Relationship Between Intragroup Conflict and Work Group Job Satisfaction

The relationship between intragroup conflict and group job satisfaction has been relatively straight forward, in that research clearly has found a negative relationship between both emotional/relationship conflicts and cognitive/task conflicts and group job satisfaction (De Dreu & Weingart, 2003; see also Amason & Schweiger, 1997; Amason, Thompson, Hochwarter, & Harrison, 1995; De Church & Marks, 2001; Jehn, 1995; 1997a; 1997b; Jehn & Chatman, 2000; Jehn & Mannix, 2001; Jehn, Chadwick, & Thatcher, 1997).

### 3.1.4 Alternative Findings on the Relationship Between Intragroup Conflict and Group Performance

#### 3.1.4.1 Alternative Views of the Relationship Between Emotional Conflicts and Group Performance

The fact that empirical research generally has suggested that the relationship between the particular emotional/relationship conflict type, commonly measured by the ICS (Jehn, 1994), and group performance is negative, does not mean that research supports the idea that the relationship between all types of emotional conflicts and group performance is negative. Early empirical studies, for example Riecken (1952), suggested a potential productive role of the effect of emotions in intragroup conflicts, both as context and as part of the conflicting process:

> Whenever possible, it should be the aim of the leader of a group to create and maintain a 'permissive' group atmosphere – and emotional climate where differences of opinion and even *hostility to another member* can be expressed, discussed, and handled openly rather than being repressed and thus, a persistent source of the group job satisfaction to the member (1952: 252, italics added).

Furthermore, Deutsch (1969), found that arousal to a certain (appropriate) level was one (out of three) key psychological element to creative thinking in productive conflicts. Indeed, some recent studies have reported findings that indicate that the relationship between emotional conflict and group performance found in the majority studies may be more complex than commonly assumed. For example, Jehn (1995) did not find a negative relationship between E/R conflict and group performance,

contrary to her 1994 study, and neither did Pelled, Eisenhardt, and Xin (1999). Moreover, in a qualitative study, Eisenhardt, Kahwajy, and Bourgeois (1997) reported that the relationship between emotional conflict incidents and group performance was positive, at least up to a moderate level of conflict. They reported:

> "We found that highest conflict top management teams led the highest performing firms. In contrast, firms with lower conflict executive teams did less well…. Moreover, conflict is highly emotional in that it requires both the confidence and motivation to engage in a process that many executives dislike and avoid. And, high conflict teams can be fast and cohesive." (1997: 59)

From these descriptions one get an impression of a dimension of emotional conflict where group members are engaged and without fear of negative reactions from colleagues. It is, however, an emotional conflict dimension instigated by the importance of the *task*, and not the person.

Finally, from group development theory, Tuckman's (1965; Tuckman & Jensen, 1977) popular model ("forming, storming, norming, performing, and adjourning") describes the emotional "storming" conflict period as advantageous for the group's development, and associated with the "obedient phase" of a child (Tuckman, 1965). Similarly, Gersick (1988), in her "punctuated equilibrium" model, found a midpoint phase where emotional conflicts contributed to a transition of the group process as well, inevitable and essential in that the transition phase represents the last opportunity for a changing agenda within the group.

Even if group development theories might be criticized for lack of theoretical fundaments (Gersick, 1988; McGrath, 1991), the empirical findings underscore the complex role that emotions play in conflicting situations. The development perspective triggers the question of whether emotional conflicts are the "bitter pill" groups must swallow in order to get to a more mature state of group work (Katzenbach & Smith, 1993; McGrath, 1991; Tuckman, 1965).

Thus, these few, but important findings indicate that the relationship between E/R conflicts, as measured in the ICS (Jehn, 1994), and group performance, are not necessarily the same thing as the relationship between "emotional conflicts" as such, and group performance. There may be aspects of the broader emotional conflict concepts that are not captured in the E/R construct, and that these "not-covered by current constructs" parts of a broader emotional conflict concept are more positively related to group performance than the E/R construct is.

3.1.4.1 Alternative Views of the Relationship Between Cognitive Conflicts and Group Performance

After years of agreement about a positive relationship between the cognitive/task dimension of conflicts and group performance, the meta-analysis by De Dreu and Weingart (2003) came to conclusions that seriously challenged these views. They found that 20 out of 26 studies actually reported a negative relationship between C/T conflicts and group performance. Of the six studies that reported a positive relationship, only two found strong positive relationships. Hence, the authors concluded that task conflicts (the C/T conflict dimension) do *not* improve team performance. Moreover, they found that only strong moderating variables (openness, psychological safety, and within-team trust) could change the negative path from task conflicts to group performance, to a positive path. It should be added that De Dreu and Weingart (2003) used strict criteria for effect size, in that they selected only objective team performance[1] measures or ratings by managers where such data were available. Thus, they sometimes ended up with negative conclusions about the relationship between C/T conflicts and team performance where the original authors reported mixed results (e.g. Amason, 1996; Jehn & Chatman, 2000[2]).

3.1.4.1 A Dynamic Perspective on the Intragroup Conflict – Group Performance Research

The group development approach, commented above (Gersick, 1988; Tuckman, 1965), directs attention towards a dynamic perspective of conflict in general, a perspective that probably is under-investigated in intragroup conflict research. Jehn and Mannix (2001) studied a sample of students from business schools at three phases through one semester, and found that "high performance teams" had a pattern of "low -> low -> high" relationship (E/R) conflict amounts, and a "low -> high -> low" pattern for task conflicts. Thus, by studying teams only at the starting point we find support for the conclusion from recent research that both E/R conflicts and C/T conflicts in general are detrimental to group performance (De Dreu & Weingart, 2003). However, by studying teams only in the middle phase we will confirm the traditional view that E/R conflicts are detrimental whereas C/T conflicts are beneficial to group performance (Amason & Schweiger, 1997). And, finally, by studying teams only in the end phase we will conclude that E/R conflicts are beneficial to group performance, whereas C/T conflicts can be detrimental! In particular, I consider this last finding of the positive relationship between E/R

[1] The authors used the term "team performance", and we will use the same tern synonymous to "work group performance".
[2] At the moderate level of C/T Conflicts.

conflicts and group performance in the final phase of group work to be of relevance, and in opposition to what is commonly agreed upon (se earlier discussion)..

3.1.4.1 The Complexity of Intragroup Conflict Research

Even if this dissertation explicates a particular interest in different intragroup conflict dimensions, one should bear in mind that a substantial amount of studies of the relationship between intragroup conflict and group performance have been done without using the distinction between emotional/relationship and cognitive/task dimensions of conflicts. Important contributions have been made from intragroup conflict related areas such as *groupthink* (Janis, 1972; Turner, 1998), *minority dissent* (De Dreu & De Vries, 1997; Moscovici & Faucheux, 1972; Nemeth & Staw, 1989), structured (cognitive loaded) dissent like *dialectical inquiry* and *devil's advocacy* (Cosier, 1978; Mason, 1969; Schweiger, Sandberg, & Ragan, 1986; Schwenk, 1990), *nominal group technique* (Van de Ven, 1974), *contradiction/creativity theory* (De Dreu & Van Vliert, 1998), and general *group diversity* research (Guzzo & Dikcson, 1996; Jackson & Ruderman, 1995, Milliken & Martins, 1996; O'Reilly, Williams & Barsade, 1998; Williams & O'Reilly, 1998). In these studies, among many others, productive and creative forces inherent in intragroup conflict (disagreement, dissent, opposition, critique, confrontation etc) have been indicated and elaborated, and with a varied mixture of emotion and cognition inherent in the conflict processes.

However, several of these studies also emphasize in various ways the "double-edged sword" nature of the effect of contradictable encounters in a group on the group's performance (Milliken & Martins 1996). In this respect, these studies contribute to our understanding of the variety of complex contextual and processual factors that may have an impact on the intragroup conflict - group effectiveness relationship.

We may also consider whether discrimination, or lack of discrimination, between conflict context and conflict content may have confused some intragroup conflict - group performance findings. In particular, we may benefit from considering the impact of *mood valence* and *climate* as contextual variables. Indeed, several cognitive oriented intragroup conflict reports have called attention to the influence of affective components as a positive context or "element" (Tjosvold & Field, 1983). For example, conflict climate has been found to be a precondition for (productive) cognitive conflict to occur (Tjosvold & Deemer, 1980; Tjosvold, 1984a; 1995). Typically, a constructive conflict climate is described in this manner: "They discuss their feelings and values they consider important and develop personal relationships" (Tjosvold & Wong, 2000: 355). However, the study of the relationship between several intragroup conflict dimensions and group performance is not a question of a contextual mood valence factor. One may be engaged in a tough cognitive/task oriented conflict regardless of whether the mood valence is positive or negative. This

may also happen with an emotional conflict, even if one expects that the conflict dimension and the contextual mood valence will become intermingled after a period of time.

### 3.1.5 Current Measurements of Intragroup Conflict - The Intragroup Conflict Scale (ICS)

The distinction between a cognitive/task and an emotional/relationship dimension of conflicts has been closely echoed in operationalized measurement scales of intragroup conflict. Among these measurements, the Intragroup Conflict Scale – the ICS[1] (Jehn, 1992; 1994; 1995; Pearson, Ensley, & Amason, 2002), is by far the most commonly employed (however, see also Barsade & Gibson, 1998 and Cox, 1998 for the E/R dimension of conflicts). The IC scale builds on the traditional approach from Guetzkow & Gyr (1954) where "task conflicts" and "emotional conflicts" are seen as theoretically complementary in relation to each other. Jehn (1992: 10-11) originally defines relationship (emotional) conflicts as "an awareness by the parties involved that there are interpersonal incompatibilities", and task conflict as "awareness by the parties involved that there are disagreements about the actual task being performed".

In constructing the IC scale, Jehn (1992; 1994; Rahim, 1983) revealed two factors; "emotional conflict" and "task conflict". The relationship/emotional items in the IC scale contain mainly negative connotations, whereas the items in the cognitive/task conflict are neutrally connotated. The first factor in the IC scale, "emotional conflicts", has four items:

> "How much anger is present in your work group?"; "To what extent are personality clashes present in your work group?"; "How much friction is present in your work group?", and "How much emotional conflict is there in your work group?" (Jehn, 1994: 229).

The second factor, "task conflicts", also has four items:

> "To what extent are there differences of opinion regarding the task in your work group?" "How often do people in your work group disagree about the work being done?"; "How frequently are there disagreements about the task you are working on in your work group?", and "How often do people in your work group disagree about ideas regarding the task?"(Jehn, 1994: 229).

Jehn (1992: 10) explained, "People tend to dislike others who do not agree with them and who do not share similar beliefs and values". Thus, the IC scale measures emotional (including relational) conflicts as "bad conflicts" (e.g. clashes and anger) and task (including cognitive) conflicts as neutrally mood valenced conflicts (e.g. disagreements and difference of opinion).

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[1] Of readability reasons I will use the term "IC-scale" and not the "ISC", as is the term in use. This makes it also easier to write about the "IC model" I will discuss later in the dissertation.

#### 3.1.4.1 Comments to the IC Scale

In a qualitative study, Jehn (1997a) clarified that people's cognitive schemas associate conflict as two types, "people problems" and "work or task disagreements". However, a general weakness with building of this factual situation is that the theorist does not always get an answer to what in this case intragroup conflict *is*, but what people *think it is.* To readers who do not perceive these two alternatives as identical, the difference may be problematic in cases where laypersons' perceptions of a concept are systematically different from the scientific view. We are in danger of experiencing a confrontation between laymen's stereotypes and prejudice against the scientific concept, and consequently, seriously harm a model's external validity through within built covariance between the concepts, for example intragroup conflict and work group performance (e.g. self-fulfilling prophesy).

Thus, we are describing a situation where the mood valence of the emotional conflict dimension presented in the dominating scale for measuring intragroup conflicts seems to a large extent to be rooted in a face value approach, that is, based on personal judgment rather than objective evidence built on proper definition. Pedhazur and Schmelkin commented:

> "As in the case with any concept, ambiguity, confusion, and disagreement are bound to surround the meaning of measurement when it is left undefined or when it is referred to without regard to a specific definition." (1991: 16)

Even if these somewhat critical comments may sound controversial, they should not be perceived as such. Jehn explained the general theoretical conceptual situation concerning intragroup dimensions of conflict in the following way:

> There are many labels of task-related conflict (e.g. task, cognitive, realistic) and relationship conflict (emotional, socio-emotional, personal, interpersonal, people). There have also been many critiques of the various terms. For instance, many task conflicts have an emotional affective aspect to them as well, which makes distinguishing between task and emotional conflict confusing. …There is also a problem with the term interpersonal conflict in that both dimensions of conflict occur between people. The various terms have been a continued source of difficulty in this literature (1997b: .97).

An additional problem connected to these difficulties is that researchers also have used the IC scale inconsistently, "adding and deleting items in a seemingly arbitrary fashion" (Pearson, Ensley, & Amason, 2002: 111).

Consequently, one would also expect that the distinction between the concepts is unclear. As Jehn (1997a: 553) pointed out: "Task conflicts can be laden with negative emotionality (e.g., 'That is a really, really stupid idea!')". These discriminant validity problems are also reflected empirically in a relatively high correlation between the C/T and E/R constructs. In the metaanalysis of De Dreu and Weingart (2003), the

average correlation in 24 studies between the C/T and the E/R conflict dimension was $r = +.54$, with 25% of the studies having a correlation above $r = +.70$.

The IC scale can also be assessed from a *construct validity*[1] point of view (Shadish, Cook, & Campbell, 2002). Construct validity is the validity of the inference about the higher order construct that represents sampling particulars. Do the constructs C/T and E/R, in fact, measure the two higher order constructs "*intragroup cognitive conflict"* and "*intragroup emotional conflict",* or not? The fundamental question is this: to what extent does the IC scale and similar scales, actually measure the higher order and theoretically grounded concepts intragroup or interpersonal "emotional conflict" and "cognitive conflict"? Underlying this question is, of course, the assumption that emotional conflicts and cognitive conflicts are, in fact, theoretically separate concepts, a question I will return to in Paragraph 3.2.

Moreover, even if the two IC scale constructs measure vital dimensions with the intragroup conflict concepts, can it be possible that there also exist other vital dimensions of the intragroup conflict concept that are not covered in the two IC scale constructs? For example, would it be possible to consider other dimensions of emotionally loaded conflicts that are not covered in the E/R construct? Accordingly, could there be other dimensions of cognitive conflicts than those that are covered by the C/T construct in the IC scale?

Clearly, there seems to be room for further development and improvements of the existing intragroup conflict conceptualization and scale. In particular, a further clarification of the theoretical demarcations between emotion/affective and relationship/person aspects of conflicts and between the cognitive/intellectual and task aspects of conflicts is needed.

## 3.2 In Search of a Renewed Conceptual Framework

In this paragraph I will first shortly review the basic concepts underlying intragroup conflict and its dimensions, namely the concepts of conflict and cognition in relation to emotion. Research has been centered on the common understanding that cognitive conflicts are synonymous (used interchangeably) with task conflicts, and that emotional conflicts are used synonymously with relationship/person oriented conflict.

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[1] The term validity is used differently by different authors and in different contexts. The most widely used tripartite classification related to validation of measures is *content, criterion, and* construct validity (Pedhazur and Schmelkin, 1991). When using these terms they will be related to the terms namely statistical conclusion validity, internal validity, external validity, and construct validity, respectively.

Thus, I have added the Pinkley study (1990) to this conceptual chapter, since this study was the first that actually challenged these assumptions of interchangeability between cognition and task, and between emotion and relationship. As such, the study of Pinkley (1990) is of great conceptual interest.

### 3.2.1 Reviewing Research on Intragroup Conflict

There is no consensus on the precise definition of conflict (Thomas 1992b) and, according to Pruitt (1998); there are almost as many definitions of conflict as there are authors writing about this concept. Before developing this dissertation's definition of intragroup conflict, I will present some important findings from the research on conflict in general and intragroup conflict constructs and scales in particular.

Traditionally, the majority of studies of interpersonal and intragroup conflicts focus on conflict caused by emotional factors between persons (Brehmer, 1976). Thomas (1976; se also Torrance, 1957: 891) described conflict as "… the process, which begins when one party perceives that another has frustrated, or is about to frustrate some concern of his". In the same vain, *social conflict* is explained as "divergence of interest and annoyance" (Pruitt, 1998).

However, negatively affective valenced "caused emotions" (Zajonc, 1998) like annoyance and frustration are not included as a necessary component of the conflict concept. For example, from the political arena, the classical definition provided by Kenneth Boulding (1963: 5) is emotionally neutrally valenced: "Conflict may be defined as a situation of competition in which the parties are aware of the incompatibility of potential future positions and in which each party wishes to occupy a position that is incompatible with the wishes of the other". From general sources, conflict is commonly explained as "opposition between two simultaneous, but incompatible wishes or impulses" (Collins English Dictionary), emphasizing that the incident should appear simultaneously. Putnam and Poole (1987: 552) define conflict in relation to negotiations as: "The interaction of interdependent people who perceive opposition of goals, aims, and values, and who see the other party as potentially interfering with the realization of these goals". Lastly and shorter, Rhoades and Arnold (1999: 361) define social conflict as occurring: "…when the interests or goals of two or more individuals are perceived to be incompatible". Putnam and Poole (1987) found three general characteristics that seemed to have survived for a long time within this line of research[1], namely: *interaction*, *interdependence*, and *incompatible goals* (see also Thomas, 1992a).

[1] Mainly within organizational, group/team, micro-organizational, and social psychological research. Among line of research that are not covered in this dissertation is psychotherapy and family research,

Thus, the tendency to connect negative affect and conflict seems to have to some extent faded away in latter-day understanding of the conflict concept. Indeed, some recent conflict theories propose that conflict and affect are actually separate constructs that can independently influence team activities (Sessa, 1996).

Even if none of these characteristics of conflict prescribe emotional negativity, the characteristic incompatible goals include emotions, since selection among goals requires emotions, as explained by Frijda:

> With cognitive judgments, there is no reason, other than affective one, to prefer any goal whatever over some other. Cognitive reasoning may argue that a particular event could lead to loss of money or health or life, but so what? (1993: 199).

Thus, the pure cognitive components of conflicts are not about (incompatible) goals. They are about incompatible *reasoning*, including the correctness and relevance of the information used in the reasoning.

Conflict in organizations seems to be frequently approached in two ways, either as conflict behavior, such as arguments and fight, or as a source of conflict behavior, such as negatively affected (Thomas, 1992b), annoyance, and divergence of interest (Pruitt, 1998). By combining both approaches, Pondy (1967) has suggested a broader working definition that views conflict as a process rather than one particular incident. In this view, a conflict episode can be viewed as a process through phases like awareness, thoughts and emotions, intentions, behavior, and performance, including a feedback loop from behavior backs to thoughts and emotions (Thomas, 1992b: 658).

Thus, we should realize that conflict normally will not only be experienced as one instant conflict episode, but as a series of episodes chained to each other in a process, and where all incidents or sub-parts of the conflict process, from awareness to performance, are perceived as relevant experiences in describing the conflict. This conflict process will in part be dominantly cognitive and partly dominantly emotional, and the emotional conflicts may be affective valenced in different directions, even if one will expect most emotional person oriented conflicts to be negatively affective valenced (Baron, 1984).

To discuss the properties of emotional and cognitive conflicts further, I will first review some conceptualizations of cognition and emotion in general in the following.

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both of them of great interest as far as emotion/Conflict/group aspects in general is concerned, but too much focused to deviance and therapy to be of main interest in this dissertation.

### 3.2.2 Cognitive and Emotional Mental Processes

A general definition of cognition could typically be: "The mental act or process by which knowledge is acquired, including perception, intuition, and reasoning." (Collins English Dictionary). Of this, knowledge would be the facts, feelings, or experiences known by a person and stored in short and long-term memory, whereas reasoning would be described as the act or process of drawing conclusions from facts, evidence, etc. Rumelhart and Abrahamson (1973) defined (working definition) reasoning as the set of thought processes of information retrieval that operates on the structure, as opposed to the content of organized memory. The ability to reason has commonly been viewed as the essence of our humanity, immortaly formulated by Descartes' (1647) "I think, therefore I am", and who defined intelligence as the ability to judge true from false (cited from Salovey & Mayer, 1990: 186). After the scientific cognitive revolution in the 1950s, research on reasoning has increased substantionally. The question of whether computers actually "think", or are capable of "reasoning" became an area of interest during the 1950s (Hunt, 1994). Indeed, the similarity between information processing done by a computer and by a human being makes it very easy to view these two systems as doing the same thing, as illustrated in the so called Turing test[1].

Through the 1970s, the words *affect*, *attitude*, *emotion*, *feeling*, and *sentiment* were not mentioned in any major book of cognitive psychology (Zajonc, 1980: 152). This is not to say that there was no research on emotions at that time (Plutchik & Kellermann, 1980), but apparently rarely in a cognitive context. Indeed, the concept of emotion has been extremely difficult to grasp using few sentences, or to define (Ashforth & Humphrey, 1995). As Zajonc (1998: 591) puts it: "A complete and coherent definition of emotions is equivalent to this entire chapter including the content of its references[2]. Other scholars go even further and characterize emotion research as a "conceptual and definitorial chaos" (Buck, 1990), in some scholars' view to an extent that the study of emotion eventually were "left out" (LeDoux, 2000: 129; see LeDoux, 1996). However, in the 1980s, emotion was gradually acknowledged by many scholars to be of equal interest with cognition in social psychology, through seminal articles by Zajonc (1980; 1984, see also review 1998). This renewal of interest lead Buck (1988) to proclaim that "Psychology has

[1] The Turing test, suggests that if people are not able by telegraphic communication to discriminate between a machine and a person, when these are doing a problem-solving task, computer reasoning and person reasoning are to be regarded as practically the same. Even if this probably would be the case in a chess game between a computer and a person (except for very skilled chess players as judges), no computer has yet passed the Turing test on a more general problem solving basis (see Hunt, M. 1994. *The Story of Psychology*. New York: Random House, page 538-541.

[2] 43 pages and 322 references.

rediscovered emotion", a "comeback" strongly supported by breakthrough perspectives presented from neuroscience research (Damasio, 1994; LeDoux, 1996).

3.1.4.1 The Connection Between Emotion and Relationship and Between Cognition and Task

The traditional separation between task and relationship conflicts has had a substantial influence on intragroup conflict research. According to Simons and Peterson (2000: 102), the distinction between task and relationship conflict in groups has survived over 40 years of scrutiny, since: "Guetzkow and Gyr (1954) first identified the distinction between task and relationship conflict in groups." However, Guetzkow and Gyr did not identify the distinction between task and relationship conflicts, they merely prescribed it:

> Let us make a conceptual distinction between at least two dimensions of conflict – conflict rooted in the substance of the task that the group is undertaking, and conflict deriving from the emotional, affective aspects of the group's interpersonal relations (1954: 369).

Even if relationship conflict can in many cases be more threatening to ones' self and self-concept than task conflicts between people, it is hard to find any theoretical arguments that link cognitive conflicts and task conflicts, and emotion conflicts and relationship/person conflicts, together as interchangeable concepts respectively. Indeed, it may be that cognitive conflicts can be about tasks, but why should cognitive conflicts not be about persons? Moreover, emotional conflicts can be about persons, but why should emotional conflicts not be about tasks?

The seemingly weak theoretical foundation behind the habit of coupling cognition and task conflicts together, and emotional and relationship conflicts together as interchangeable concepts, strongly supports the assumption that improvements of current conceptualizations of intragroup conflicts is needed. It also increases the expectation that such improvement may be beneficial for a more comprehensive understanding of the relationship between intragroup conflict and group effectiveness.

### 3.2.3 The Pinkley Study

Pinkley (1990) studied how people perceived interpersonal conflicts and found three specific orthogonal and bipolar dimensions of conflict framing. The first bipolar conflict dimension was a dimension ranging from entirely relationship conflicts and to entirely task conflict. The second conflict dimension had emotional dimensions of conflict at one pole and intellectual conflicts at the other (for details, see Pinkley & Northcraft, 1994).

In this unique study, empirical support was, for the first time, provided for a distinction between emotional and relationship/person conflicts, and also between intellectual/cognitive and task conflicts. According to these observations, emotional conflicts may be relationship oriented, as well as task oriented, and cognitive conflicts may be task oriented, however, also relationship oriented.

Since the study of Pinkley was known before the development of the IC scale by Jehn (1992; 1994), and has been often cited in theoretical articles, it may be surprising that the theoretical pathway Pinkley's empirical study indicated was never followed by other scholars doing empirical studies. One might speculate that the choice of a bipolar scale of the emotional/intellectual conflict dimension and a bipolar scale of the relationship/task conflict dimension could have been perceived as too contrary to entrenched views. Another reason might be that Pinkley (1990) did not present any theoretical explanation for his findings. Some weaknesses in the psychometric properties of the study, also mentioned by the author[1], may in addition have spurred a lack of confidence in the results (however, see Pinkley & Northcraft 1994).

Nevertheless, the approach in Pinkley's (1990) study is an excellent point of departure in searching for an extended conceptualization of the intragroup conflict concept, in order to be able to improve the understanding of the complexity in the intragroup conflict – group effectiveness relationship.

## 3.3 Developing an Extended Model of Intragroup Conflict

In the first paragraph of this chapter I argued that research on the relationship between intragroup conflict and group performance has not been able to reach generally agreed upon suggestions about the relationship. Moreover, I suggested that this may be because of a weak theoretical conceptual groundwork to underpin the analyzes of the relationship, which in turn may have harmed current operationalizations and measurements used in quantitative research on the relationship, in particular the IC scale (Jehn, 1994).

Based on the short presentation in the previous paragraph of the conceptual framework used when studying the relationship between intragroup conflicts and group effectiveness, I will now present a heuristic theoretical framework for a revised and extended four-dimensional intragroup conflict model, consisting of a cognitive task (CT), a cognitive person (CP), an emotional task (ET), and an emotional person (EP) dimension of intragroup conflict.

[1] Some items had unacceptable loadings on more than one Dimension.

### 3.3.1 Basic Premises

When developing a revised and extended model of intragroup conflict, I will first approach this challenge by choosing between two alternatives. Firstly, we may realize that the concept of intragroup conflict is so strongly anchored in laymen's associations, that the alternative described by Blalock when he commented the term "causality", might seem tempting (cited from Pedhazur & Schmelkin, 1991: 697): "Blalock (1964) stated that he will not attempt a formal definition of causality and that 'it indeed may turn out wise to treat the notion of causality as primitive or undefined' (p.9)". Thus, we may ask: is the general impression that "all conflicts are bad" so ingrained in the population that a theoretical consistent conceptualization of intragroup conflict never will be reflected and confirmed by people's behavior? Even if my answer in casu will be "no", the mere formulation of the question is made to emphasize the problem connected to scientific use of concepts that already are heavily biased in laymen's perceptions, especially when doing empirical work based on self-reports.

Followed by Blalock's caution against a possible trivialization of these types of complex concepts by defining them in mind, my chosen alternative has been to specify formal definitions of intragroup conflict and its dimensions, theoretically anchored in basic properties of the overall intragroup conflict concept. More specifically, I will use a combination of a heuristic definitorial approach and a quasiexperimental social – development approach (Sternberg, 1985; see also Aronson, Wilson, & Brewer, 1998; Kihlstrom & Cantor, 2000), in order to capture both theoretically anchored and statistically valid and reliable constructs.

First of all, I will present a heuristic approach to the theoretical connection between the concepts of cognition and emotion, an approach that will serve as one of several theoretical elements in the emotional and cognitive conflict concepts.

### 3.3.2 A Heuristic Approach to Cognition and Emotion

There seem to be no commonly acknowledged general theories, definitions or broad agreement about the connection between emotion and cognition, beyond an increasingly mutual recognition of the importance of both cognition and emotion as independent processes, or as formulated by Forgas (1991 a: 5): "Within social psychology there is now growing evidence suggesting that in many everyday social contexts, affect and cognition may be regarded as at least partially independent response systems."

From a cognitive point of view, I emphasize a decision-making context where the most important part of human cognition, reasoning, is selected and stripped down to the simplest, but yet basic task of making the choice between "similarity" or not

(Rumelhart & Abrahamson, 1973), or "truth" or not (Zajonc 1998). However, I will follow the recommendation from Hunt (2003) to avoid the philosophical complexities of the meaning of "true" (Fernandez-Armesto, 1997), and have decided to use the term *correct* and *incorrect*, instead of "true" and "false".

From an emotional point of view, an evolutionary perspective will view emotion as adaptive reaction to stimuli (Darwin 1872/1965), basically meaning that individuals and species have evolved by facilitating survival through the fundamental reflexive behaviour patterns *approach* and *withdrawal* (Bradley & Lang, 2000: 270). These behaviour patterns could, for example, take place within four existential problems of life, *territorially*, *hierarchy*, *temporality*, and *identity* (Plutchik, 1980) to perceive threats and opportunities in order to survive, adapt, and reproduce (TenHouten, 1996). This approach is widely accepted as a valid heuristic explanation of emotions, as put by Salovey & Mayer (1990: 186): "Emotions typically arise in response to an event, either internal or external, that has a positively or negatively valenced meaning for the individual."

A question of particular relevance is whether emotions should be described as discrete or categorical (Ekman & Friesen, 1971; Etcoff & Magee, 1992), or if they are values of a continuous variable (Russell, 1980). Further, if the latter is the case, whether this continuous dimension is bipolar (Russell & Carroll, 1999a; 1999b) or unipolar (Watson & Tellegen, 1999). In the continuous-variable tradition, there seems to be a common agreement about two independent orthogonal dimensions in particular (regardless of uni- or bipolarity), the *pleasant/unpleasant* (pleased/displeased) dimension and the *activation* (arousal, activity/passivity) dimension (Bush, 1973; Russell & Carroll, 1999a). Current studies have also found these two dimensions to be uncorrelated (Bradley & Lang, 2000).

Thus, the best commonly agreed upon heuristic approach for a strict definition of emotion seems to be to distinguish it from cognition (Zajonc, 1998), and consider emotion to be responding to categories as positive/negative, attraction/aversion, or/and approach/avoidance, whereas cognition in this context can be classified into the categories of correct/incorrect processes. Based on these heuristic conceptualizations of cognition and emotion, I move on to the intragroup conflict construct.

### 3.3.3 Revising the Current Intragroup Conflict Concept

I view intragroup and interpersonal conflicts to be reactions to incompatible wishes or impulses, in line with traditional definitions of conflict (e.g. Collins English Dictionary). Further, from the definition of Boulding (1963), I view these stimuli to be examples of generally incompatible stimuli from the environment, as perceived by the receiver. Further, I see cognition and emotion to be two independent processors

of these stimuli in the brain[1] (Forgas, 1991; Frijda, 1993; Isen, 1997; LeDoux, 2000; Zajonc, 1998; Zola-Morgan, Squire, Alvarez-Royo & Clower, 1991). Commensurable with a heuristic distinction between emotion and cognition, emotional conflict will be referred to as an incompatible approval/avoidance stimuli situation, and cognitive conflict as an incompatible correct/incorrect stimuli situation.

Pinkley's (1990) study of multidimensional interpersonal conflict revealed three specific orthogonal and bipolar dimensions of conflict framing, relationship vs. task conflicts, emotional vs. intellectual conflicts, and cooperation vs. win conflicts (see also Pinkley & Northcraft, 1994). I follow this approach to the extent that cognition or emotional conflicts are independent of task or relationship conflicts, and thus, separate the traditional link between cognition and task conflicts and between emotion and relationship conflicts, respectively.

I have not, however, found convincing arguments to support the view that constructs of emotional and cognitive conflicts are bipolar, which means that emotional conflicts and cognitive conflicts empirically are the opposite of each other. Accordingly, I do not perceive constructs of task and relationship conflicts to be bipolar on a continuous scale, since they are two different constructs.

As previously argued, emotional and cognitive conflicts can be viewed as independent constructs. In line with the accepted approach in the intragroup conflicts research (e.g. Jehn, 1994; Amason, 1996), I view task and relationship conflicts as independent conflict dimensions. Specifically, I use the label person conflicts rather than relationship conflicts, since I emphasize conflicts about group member's enduring behavioral pattern more than conflicting relationships as such (e.g. Janssen, De Vliert & Veenstra, 1999).

### 3.3.4 Defining the Four-dimensions of Intragroup Conflict

Based on the theoretical arguments above, I define intragroup conflict as follows:

> Definition 1: An intragroup conflict is defined as an interaction based on the awareness of simultaneous and incompatible correct/incorrect or approval/avoidance issues among interdependent group members, with relation to tasks or persons in the group.

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[1] The ultimate biological and theoretical evidence to claims of independency or primacy (or both) of cognition vs. emotion are not found. In lack of evidence on both sides, the researcher has to choose on other grounds. For example, Richard S Lazarus chose to rely on established cognitive theory: "However, that independence can be argued logically does not make it the best theory. For the way emotion is commonly experienced, I think that approaches emphasing the neuropsychological and psychological separation of emotion and cognition are less fruitful than the cognitive theory I and many others espouse." (1984: 1281)

Based on this general definition, I propose a four-dimensional model of intragroup conflict, with cognitive task, cognitive person, emotional task, and emotional person conflicts, defined as follows:

Emotional Task Conflict Dimension

Definition 2: An intragroup emotional task conflict is defined as an interaction based on the awareness of a simultaneous and incompatible approval/avoidance issues among interdependent group members, with relation to tasks.

Emotional Person Conflict Dimension

Definition 3: An intragroup emotional person conflict is defined as an interaction based on the awareness of simultaneous and incompatible approval/avoidance issues among interdependent group members, with relation to persons in the group.

Cognitive Task Conflict Dimension

Definition 4: An intragroup cognitive task conflict is defined as an interaction based on the awareness of simultaneous and incompatible correct/incorrect issues among interdependent group members, with relation to tasks.

Cognitive Person Conflict Dimension

Definition 5: An intragroup cognitive person conflict is defined as an interaction based on the awareness of simultaneous and incompatible correct/incorrect issues among interdependent group members, with relation to persons in the group.

The four-dimensions of intragroup conflict are systemized in the table below.

*Table 2: A Four-Dimensional Model of Intragroup Conflict*

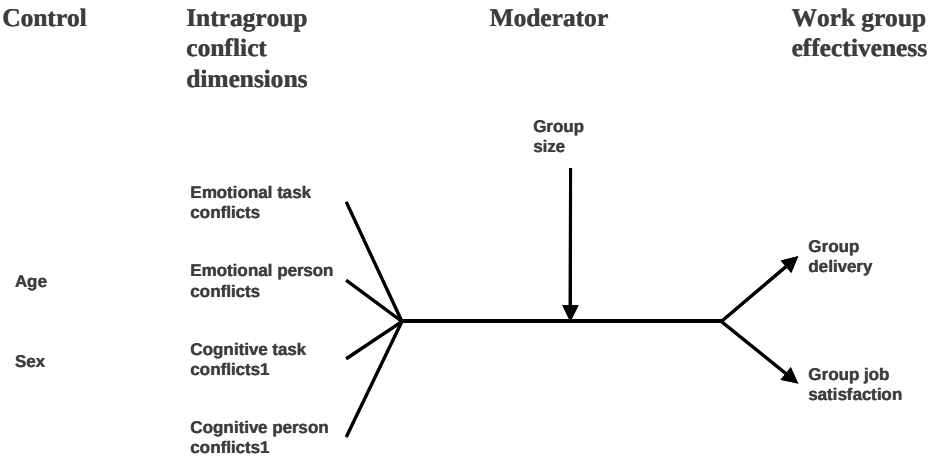
| Intragroup Conflicts | | Conflict Content | |
|---|---|---|---|
| | | Task | Person |
| Conflict Type | Emotional | *Emotional Task (ET) Conflict* | *Emotional Person (EP) Conflict* |
| | Cognitive | *Cognitive Task (CT) Conflict* | *Cognitive Person (CP) Conflict* |

Whereas the definition of cognitive task conflicts is close to the traditional cognitive/task conflict dimension, and emotional person conflict is close to the traditional emotional/relationship conflict dimension, the model introduces two new intragroup conflict dimensions, emotional task conflicts and cognitive person conflicts. For the sake of convenience, I will sometimes use the abbreviation "4IC model" or "4ICM" when writing about the four-dimensional intragroup conflict

model, and, accordingly, "4IC scale" or "4ICS" when writing about the four-dimension intragroup scale, similar to the ICS, the intragroup conflict scale ((Jehn, 1994).

Thus, referring to the general research model in Figure 1, I am at this point able to present an illustration of a final research model for this dissertation, see Figure 2.

*Figure 2: Conceptual Model*[1]




From the preliminary research model in Figure 1, I have extended the model in Figure 2 with the four intragroup conflict dimensions, and added the two control variable average age and sex rate in the groups. Thus, the above is a representative illustration of a complete conceptual research model in this dissertation.

In the following I will describe emotional task conflict and the cognitive person conflict dimension a little further.

3.1.4.1 The Emotional Task Conflict Dimension

Emotional task conflicts are conflicts that are emotional while still task oriented, and indications support that if the focus stays on the task, arousal is found beneficial to performance (Cummins & King, 1973). Emotional task outbursts are never personal in the sense that the other person is the target, even if the emotional disputes are

[1] The figure is illustrating causal relationships between the variables. However, in formulating and testing the hypotheses statistically this is not claimed (see discussion in Chapter 5.1.1)

centered on two combatants in the group. Instead, emotional task outbursts are focused on the task. This is a conflict familiar to practical life and is explicitly put forward in a qualitative study by (Eisenhardt, Kahwajy, & Bourgeois, 1997)[1].

They studied several senior executives in 12 top management teams, and found that the top management teams with the highest conflict levels also led the highest performing firms and at the same time, the conflict was "highly emotional". A few citations from the interviews by Eisenhardt, Kahwajy, and Bourgeois (1997: 45-47) illustrate these points:

> The group is very vocal, they all bring their own ideas; we scream a lot, then laugh, and then resolve the issues; we yell a lot…we get it out on the table and argue about it.

Indeed, the emotional part of the conflict seems to be a precondition to reach a higher level. After having criticized previous researchers taking a static view of conflict, Eisenhardt, Kahwajy, and Bourgeois continue:

> In this view [of previous researchers static view of conflicts], there is no emotional attachment to a position, no fear of offending colleagues, and no reluctance to engage in what is for many an unpleasant and time-consuming activity. It is "conflict without soul." (1997: 60, brackets added)

Sometimes the emotional part of the work group can be taken to the extreme, yet the group may be accordingly extremely effective. Leavitt and Lipman-Blumen (1995; Leavitt, 1996; Lipman-Blumen & Leavitt, 1999) describe what they call "Hot Groups", a particular type of work groups, with apparently extremely high levels of achievement potential. Two major and heavily emotional loaded characteristics of Hot Groups are a "total preoccupation with task" and "a sense of ennoblement" (Lipman-Blumen & Leavitt, 1999: 27-29). Two other characteristics of Hot Groups are of particular relevance here. First, and convergent to highly emotional task conflicts: "Hot groups are likely to be internally confrontational, challenging, and critical, all with the aim of improving their work" (p. 35). Second, and discriminant to personal oriented emotional person conflicts: "hot groups [do not] usually pay very much attention to their own or other people's feelings. They focus on their task, not on their relationship with another" (p. 36). We also notice that the authors stress that Hot Groups is not a new type of work group, rather, Hot Groups are "a state of mind" and "task-obsessed and full of passion" (p. 3). Clearly, this is a combination of *passion* and *task-obsession* in groups that are also likely to be *internally confrontational* and *critical.* Even if the authors describe these processes as a "state of mind", and apparently over a period of time, one may expect that these ingredients may accordingly be beneficial also when they occur from time to time in an "ordinary" work group.

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[1] It is interesting that the authors in this dissertation claims to have supplemented their data with insights from their consulting experiences (in addition to other research).

Descriptions of emotional elements are frequently described also within a cognitive framework to the intragroup conflict discussion. The basic presumption here has been a confidence in rational thought in finding a productive path in the group process, primarily through cooperation and critical thinking (Johnson & Johnson, 1989; Tjosvold & Deemer, 1980). However, in constructive conflicts the whole group contributes to effective joint work (Tjosvold, 1985), and there is a desire to work with other people (Tjosvold & Yu, 2002). At the same time, the groups display key communicative strategies for productive conflict by talking about differences and empathizing with group members (Ayoko, Hartel, & Callan, 2002). For this reason in particular, a high level of respect among members is absolutely crucial (Earley & Mosakowski, 2000; Tjosvold & Yu, 2002). Moreover, Mitroff (1982: 222) argued that the conflict induced by a structured and imposed dialectical interaction produces a: "learning process, whereby through active, heated, and intense debate . . . the parties come to discover and to invent entirely new alternatives". A person may be assigned to take a critical evaluation role by attacking the group's current preference (devil's advocate), or assigning sub-groups' opposing views (dialectical inquiry) (Tjosvold & Wong, 2000; see e.g. Schweiger, Sandberg, & Ragan, 1986).

#### 3.1.4.1 The Cognitive Person Conflict Dimension

Cognitive person conflicts are conflicts between group members concerning personal matters. I make a distinction between correcting current behavior on the one side, which typically will be perceived as a task conflict ("no, you got it wrong!"), and correcting patterns of behavior on the other side, which more likely will be perceived as a personal conflict ("no, you always get this wrong!"). While this distinction is easily understood from a theoretical point of view, it is not always easy to distinguish between "criticizing you" (personal criticism) and "criticizing what you do" (task-oriented criticism) in real life. Moreover, the distinction between cognitive person and emotional person conflicts may be even more difficult to sort out. Correcting or criticizing behavior patterns and attitudes on a strictly cognitive basis may often be perceived as disliking by the receiver, and as a threat to a person's self-esteem maintenance (Tesser, 2000). The peaceful coexistence inherent in: "You are wrong and I like you", is not always easy to master. However, I will argue that difficulties in perceiving the right dimension of conflict in a practical situation should not be used as an argument against the existence of these dimensions of conflict from a theoretical point of view. On the contrary, it should be an incentive to further scrutinize the content and the applicability of the phenomenon in theory and practice.

# 4. Hypotheses

Based on the review, it seems evident that more research is needed to investigate the relationship between intragroup conflict and work group effectiveness. Equipped with an extended conceptualization of intragroup conflict, the four-dimensional intragroup conflict model (4ICM), and based on review of previous research, I will return to the research model illustrated in Figure 2. First, I will formulate eight hypotheses about the relationship between the emotional person (EP), emotional task (ET), cognitive task (CT), and cognitive person (CP) conflict dimensions, and work group performance and work group job satisfaction, respectively (H 1-H 8). Research on the possible moderating effect of group size on the relationship between the four intragroup conflict variables and the two group effectiveness variables has also been from scarce to non-existent, so, second, I formulated four general explorative hypotheses about the in all eight possible moderating relationships in the model (H 9 - H 12). All hypotheses are formulated at the group level (see P. 5.5).

## 4.1 The Relationship Between Emotional Task Conflict and Work Group Effectiveness

### 4.1.1 The Relationship Between Emotional Task Conflict and Work Group Delivery

Since there is no quantitative empirical research on the relationship between ET conflicts and work group performance, I have to rely on indices from non-empirical research. Two main sources available are quantitative studies. The report from Eisenhardt, Kahwajy and Bourgeois (1997) has been cited several times in this dissertation, and by reading the statements from the respondents from the successful groups described in the study, it seems evident that they de facto are describing a high degree of emotion and task oriented conflicts, or the ET conflicts (see citations on page 34). Similar descriptions are found in the work of Lipman-Blumen and Leavitt (1999), in their description of the interaction in their so-called "Hot groups". The hot groups are "task-obsessed and full of passion" (p.3), *and* confrontational. Hot Groups are also described generally as very successful groups. Accordingly, I hypothesize the following:

H 1: The relationship between a work group's performance and the frequency of emotional task conflicts in the group is positive.

### 4.1.2 The Relationship Between Emotional Task Conflict and Work Group Job Satisfaction

We recall that the definition of the emotional task (ET) dimension of conflict: "An intragroup emotional task conflict is defined as an interaction based on the awareness of a simultaneous and incompatible approval/avoidance issues among interdependent group members, with relation to tasks.". Incompability applies to the task, not the other group members as persons. As was the case for the relationship between ET conflicts and group delivery, we do not have quantitative studies about the relationship between ET conflicts and group job satisfaction. From research on the relationship between emotional loaded conflicts (E/R conflicts) and work group job satisfaction we would expect the relationship between ET conflicts and work group job satisfaction to be negative.

However, from some of the descriptions from the qualitative studies I have cited, one may as well expect the relationship to be positive. For example: "We scream a lot, then laugh, and then resolve the issues" (Eisenhardt, Kahwajy, & Bourgeois, 1997: 45). Other citations, however, may indicate a tense relationship between the involved. For example: "We air opinions and they're often heated … We argue about most things" (p. 45). From hot groups we learn that they usually do not "pay very much attention to their own or other people's feelings. They focus on their task, not on their relationship with another" (Lipman-Blumen & Leavitt, 1999: 36). By taking the liberty of combining these citations freely, we may easily sense the occurrence of a heated conflict, where work group members do not necessarily care very much about reactions to whatever outbursts might have occurred, even if these may be characterized as task oriented.

Thus, indices from qualitative research support the definition of ET conflicts in that this conflict dimension is not systematically biased in terms of emotional (affective) valence. We may not assume that since EP conflicts tends to be negatively mood valenced (se below), and negatively related to work group job satisfaction partly of this reason, ET conflicts will be positively mood valenced, and accordingly positively related to work group job satisfaction.

Moreover, ET conflicts are always about incompability, where the solution to the incompability is not apparent for the people involved. Somebody may lose and somebody may win. Not all conflicts about tasks are "win – win" - conflicts. Even if the incompability is about a task, someone may be dissatisfied to an extent that it could influence one's work group job satisfaction in the group as well, especially if loosing the case seems to happen frequently.

To summarize, it seems difficult to hypothesize any particular relationship between ET conflicts and work group job satisfaction, based on the scientific

evidence that is available at present. Neither does intuitive reasoning define/give/indicate a clear direction of how the relationship between ET conflicts and work group job satisfaction should be. Thus, I suggest an "explorative hypothesis", that emotional task conflict is *not* related to work group job satisfaction, positively or negatively

H 2 There is no significant relationship between the work group's job satisfaction and the frequency of emotional task conflicts in the group.

## 4.2 The Relationship Between Cognitive Task Conflict and Work Group Effectiveness

### 4.2.1 The Relationship Between Cognitive Task Conflict and Work Group Delivery

The metaanalysis of De Dreu and Weingart (2003) cast serious doubt on the traditional view that C/T dimensions of conflict have a positive impact on work group delivery. Hence, since the conceptual overlap between the traditional C/T dimension of conflicts and the CT conflict dimension in my model seems substantial, the empirical basis for proposing the following hypothesis is the findings in the metaanalysis of (De Dreu & Weingart, 2003):

H 3: The relationship between a work group's delivery and the frequency of cognitive task conflicts in the group is negative.

### 4.2.2 The Relationship Between Cognitive Task Conflict and Work Group Job Satisfaction

De Dreu and Weingart (2003) found that the average correlation between task conflicts (the C/T dimensions) and group job satisfaction was negative. Hence:

H 4: The relationship between a work group's job satisfaction and the frequency of cognitive task conflicts in the work group is negative.

### 4.2.3 The Relationship Between Emotional Person Conflict and Work Group Delivery

The traditional view of the effect of relationship conflicts has been that they are associated with decreased goodwill and mutual understanding, which hinders the completion of organizational tasks (Deutsch, 1969; Gladstein, 1984; Evan, 1965; Wall & Nolan, 1986). This is a conclusion that has been confirmed in recent research, and summed up in the metaanalysis of De Dreu and Weingart (2003).

Moreover, there are theoretical reasons to suggest that the E/R conflict construct in Jehn's Interpersonal Conflict scale, the IC scale (Jehn, 1995), and the EP conflict dimension defined in this dissertation cover approximately the same theoretical content. Thus, I expect previous research to be replicated, and I propose:

H 5 The relationship between a work group's performance and the frequency of emotional person conflicts in the group is negative.

### 4.2.4 The Relationship Between Emotional Person Conflict and Work Group Job Satisfaction

Jehn (1995) found that the more relationship (E/R) conflicts work group members perceive, the lower their work group job satisfaction, their liking of other group members, and their intent to remain in the group. In the qualitative part of the study, Jehn (1995) concluded that members felt psychologically distressed when there were frequent arguments about interpersonal issues amongst members. That member's assessment of relationship conflict decreased member satisfaction has also found support in subsequent studies (e.g. Jehn, Chadwick, & Thatcher 1997). Also Jehn (1997a) found that relationship conflict to be detrimental related to work group job satisfaction. Moreover, De Dreu and Weingart (2003) included 14 studies that investigated the relationship between relationship (E/R) conflicts and work group job satisfaction. The general conclusion is clear: All studies reported negative relationship. Thus, empirical evidence point in a negative direction when it comes to the relationship between the EP conflict dimension and work group job satisfaction, Moreover, task conflicts have a weaker association with work group member satisfaction than relationship conflicts (the E/R dimension): "While both dimensions of conflict appear to harm satisfaction, relationship conflict is certainly worse than task conflict" (De Dreu & Weingart, 2002: 4). Thus, and in line with previous research I propose:

H 6: The relationship between a work group's job satisfaction and the frequency of emotional person conflicts in the group is negative.

## 4.3 The Relationship Between Cognitive Person Conflict and Work Group Effectiveness

### 4.3.1 The Relationship Between Cognitive Person Conflict and Work Group Delivery

As was the case for the ET conflict dimension, CP conflict is a new construct, and there is no explicit empirical research to build on in suggesting hypotheses to possible relationships with work group performance. Former research gives reason to expect that CP conflict may easily develop in EP conflicts, since we know that affective

conflict seems to emerge in teams when cognitive disagreement is perceived as personal criticism (Amason, 1996; Pruitt & Kim, 2004). However, the fact that CP conflict quickly may be transformed to an EP conflict is not a good enough reason for hypothesizing that CP and EP conflicts are similar related to work group performance. Moreover, CP conflicts arise from correlation that could lead to improvement, which is important for work group performance. Thus, as long as CP conflicts remain CP conflicts and are not transformed to EP conflicts, I would expect CP conflicts to be associated with efforts to improve performance among team members, and accordingly:

H 7: The relationship between a work group's work group performance and the frequency of cognitive person conflicts in the group is positive.

### 4.3.2 The Relationship Between Cognitive Person Conflict and Work Group Job Satisfaction

As discussed above, criticism directed against another person may easily be perceived as threatening, as is the case with EP conflicts. However, even if CP conflicts can improve performance of particular members, one may not expect the subject of the cognitive criticism to be happy about it, at least not in the first run. On the other hand, the correction or criticism of the team member will basically be based on cognitive reasoning, and no harsh feelings are intended.

Thus, on an explorative basis, I expect the unpleasantness of being corrected may be weighed up against the reasonable and non-emotional way the correction is conveyed to the receiver, so that the relationship to work group job satisfaction will end up being indecisive. Hence:

H 8: There is no significant relationship between the work group's job satisfaction and the frequency of cognitive person conflicts in the group.

## 4.4 Group Size as Moderator of the Relationship Between Dimensions of Intragroup Conflicts and Group Effectiveness

### 4.4.1 The Appropriateness of Group Size as a Moderator

Past research has almost entirely been occupied with the direct relationship between group size and group performance, and reports about possible moderating properties of group size on other relationships to group performance are rare (see however Badin, 1974). Formulated and applied to this dissertation's variables, group size is a moderator if the relationship between intragroup conflict and work group effectiveness (group delivery or group job satisfaction) is a function of the level of the

team's size (James & Brett, 1984). In addition, a moderator should preferably have a minimum of covariation both to dependent and independent variables (Baron & Kenny, 1986; James & Brett, 1984).

Thus, a short overview of former research on the direct relationship between group size and group performance, group job satisfaction, and intragroup conflict, respectively, is needed to ensure that none of these direct relationships is found to be present to a degree that introducing the question of group size as a moderator variable will be inappropriate.

In general, the direct relationship between group size and group performance has revealed both positive relationships[1] (Campion, Medsker, & Higgs, 1993; Eisenhardt & Schoonhoven, 1990; Gallupe, Dennis, Cooper, Valacich, Bastianutti, & Nunamaker, 1992; Haleblian & Finikelstein, 1993; Hambrick & D'Aveni, 1992; Magjuka & Baldwin, 1991), but also negative relationships are found (Curral, Forrester, Dawson, & West, 2001; Dooley & Fryxell, 1999; Dooley, Fryxell & Michie, 2002; Hambrick, Cho & Chen, 1996; Markham, Dansereau, & Alutto, 1982). Moreover, a substantial amount of no significant relationships has been reported (Bantel & Jackson, 1989; Dooley, Fryxell & Michie, 2002; Hackman & Vidmar, 1970; Lucas & Lovaglia, 1998; Markham, Dansereau, & Alutto, 1982; O'Reilly, Williams, & Barsade, 1998; Pelled, Eisenhardt, & Xin, 1999; Smith, Smith, Olian, Sims, 1996). Finally, researchers have also introduced additional complexity to the question of the relationship, such as that equal size teams outperform odd teams (Cosse, Ashworth, & Weisenberger, 1999); a parabolic relationship (Manners, 1975); that no appreciable performance occurs from increases in group size from group size five and further (Yetton & Bottger, 1982); and an inverted U-shaped relationship (Nieva, Fleishman, & Rieck 1978), a view that has gained some support by recent reviewers (Cohen & Bailey, 1997; Goodman, Ravlin, & Argote, 1986). Still, the picture is clearly mixed, and to an extent that reviewers have suggested that searching for an optimal group size (large, small, medium) as a question itself may be flawed (Levine & Moreland, 1998)[2].

Also in relation to group job satisfaction or closely related concepts, there seems to be no straightforward positively or negatively relationship with group size. A tendency toward a negative relationship is observed (Hare, 1994b; Morgan & Bowers, 1995; Levine & Moreland, 1998), but also a U-shaped relationship is found (Nordholm, 1975), or no relationship at all (Jehn, 1995). In general, the relationship

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[1] In the following reports where group size are included as a control variable are also presented

[2] A finding of a linear relationship would indicate the maximum/minimum size of a group within the normal range of group size in small group research, which commonly would be from two to 30 group members (Hare, 1994a[2]).

between group size and group job satisfaction seems to be moderated by several variables (Gallupe, Dennis, Cooper, Valacich, Bastianutti, and Nunamaker (1992; Mullen, Symons, Hu, & Salas, 1989).

Finally, the direct relationship between group size and intragroup conflict may be considered in relation to the appropriateness of group size as a moderator to the intragroup conflict – group delivery – relationships. However, with this relationship, the findings are also mixed. Amason (1996; Amason & Sapienza, 1997) found a clearly positive relationship between group size and both cognitive and affective conflict. However, Lovelace, Shapiro and Weingart (2001) found no relationship between group size and task disagreement; neither did O'Reilly, Williams, and Barsade (1998); and Polzer, Milton, and Swann (2002) exclude group size as control variable in an analysis of task conflict (among other variables) because of lack of any significant effects.

Based on this short overview, I find it reasonable to conclude that the direct relationship between group size and group delivery is inconclusive.

However, the above refers to an emerging interest among reviewers towards a possible inverted U-shape relationship between group size and group performance (Cohen & Bailey, 1997; Goodman, Ravlin, & Argote, 1986). This may direct attention to what one may characterize as a factual trade-off situation which has to be carried out in creating a new work group, or changing the size of an existing one (Ancona & Caldwell, 1998:27-28). Increased access to human competency, increased idea production, and increased work power (Hare, 1994b) have to be traded against decreased self-consciousness, motivation, increased stress, and less inter-member interaction. Thus, group size can make a difference, and there seems to be a typical moderating function of group size to which earlier research has not paid much attention.

### 4.4.2 Group Size as a Moderator on the Relationships Between Intragroup Conflict Dimensions and Group Performance

Published empirical investigations of the particular moderator effects of team size on the relationship between intragroup conflict and group effectiveness are not known to this author. Indeed, the only empirical investigation of the moderator effect of group size on the relationship between a group process variable and group effectiveness I have found is an interesting report from Badin (1974). This study investigated group size as moderator on the relationship between consideration and initiating structure[1] as variables on individual employee satisfaction (in the company) and group external

[1] Obtained from the Supervisory Behavior Questionnaire, with reference to Fleishman, (1957).

evaluated group performance[1], respectively. Badin (1974) found there was a positive moderator effect of group size on the negative relationship between initiating structure and group performance, in that groups with 12 members or more did significantly better than did smaller groups. However, he found no moderator effect of group size on the relationship between consideration and group performance. Thus, the study found that increasing group size might reduce a negative relationship between initial structure and group performance from being significantly negative to be non-significantly negative.

Even if Badin's study (1974) is interesting in relation to this dissertation's approach on group size as a potential moderator, there is little contribution in this study, or other studies for that matter, on the understanding of how group size might moderate the relationship between intragroup conflict dimensions and group performance. I have, therefore, decided to present the hypotheses in this paragraph as entirely explorative, based on theoretical and intuitive reasoning.

We know that in comparison, large groups, as a rule, will generally benefit from increased competence. At the same time, we know that large groups are more impersonal and formal in their communication, and conform less to group norms (Diener, Fraser, Beaman, & Kelem, 1976), which may reduce the impact of emotional loaded capacities in the group. Thus, one might expect that in particular cognitive intelligence and cognitive loaded elements of competence, such as knowledge, and partly also skills, will be more dominant in larger groups than in smaller groups. Consequently, when cognitive dimensions of conflict appear in large groups, one might expect that these groups will draw on their cognitive capacities to a greater extent than smaller groups. Thus, I propose the following explorative hypothesis:

H 9: Group size positively moderates the relationship between (a) cognitive task conflict and (b) cognitive person conflicts and work group performance, in that the relationship between these conflict types will be more positively related (or less negatively related) to work group performance in large groups than in small groups.

On the other hand, we know that smaller groups tend to outperform larger groups in terms of better interaction and motivation, and group processes where one might expect that emotional loaded competence will benefit, such as emotional intelligence and emotional aspects of the attitude competence concept. Smaller groups may then positively moderate the effect of emotional loaded conflicts on group performance. Thus, the larger the group, the more negative, or less positive, emotional loaded conflicts will be related to group performance. Thus:

[1] Evaluated by the ""branch officer to whom the supervisor of each work group reported" (p.382)

H 10: Group size negatively moderates the relationship between (a) emotional task conflict and (b) emotional person conflicts and work group performance, in that the relationship between these conflict types will be less positively related, or more negatively related, to work group performance in large groups than in small groups.

### 4.4.3 Group Size as Moderator on the Relationships Between Intragroup Conflict Dimensions and Work Group Job Satisfaction

The study of Badin (1974) also investigated the moderating role of group size on the relationships between initiating structure and consideration and employee satisfaction, which was measured at individual level for the whole company. No relationships were found at a 5% level of significance or better, but there were a significant negative moderating effect of group size on the relationship between initiating structure and employee satisfaction. This indicates that small groups probably inject a more positive (or less negative) relationship between the variable and employee satisfaction, than large groups do. The effect was not found for the consideration – employee satisfaction relationship, even if the sign of the correlation was the same.

It is possible that the tendency of a negative moderation of group size and satisfaction found in the Badin (1974) study is an indication of a negative moderation effect of group processes on work group job satisfaction in general. Thus, a positive process – work group job satisfaction (as performance) relationship may be easier to create in small groups compared to large groups. Following this clue, one might expect that the relationship between intragroup conflicts and work group job satisfaction will also be negatively moderated by group size, in the sense that the effect of intragroup conflict on work group job satisfaction will be worsened as the group increases in size.

Indeed, it is quite possible that increased group size will harm cognitive dimensions of conflicts in the group (the CT and CP dimension), since conflicts in large groups may involve more group members, conflict lines and alliances, to the extent that group members feel confused, frustrated and dissatisfied with the group. On the other hand, it is also quite possible that increased group size will *not* harm the emotional dimension of conflicts (the ET and EP dimension). The negative experience of being witness to, or even more, being involved in other group members' emotional conflicts, may be stronger in small groups, which in general tend to be more cohesive, while large groups tend to be more loosely joined.

Thus, the effect of an emotional conflict on work group job satisfaction may be positively moderated by group size, whereas we may expect a negative moderation effect of the relationship between cognitive dimensions of conflict and work group job satisfaction. Hence these exploratory hypotheses:

H 11: Group size negatively moderates the relationship between (a) cognitive task conflict and (b) cognitive person conflicts and work group job satisfaction, in that the relationship between these conflict types will be more negatively related, or less positively related, to group performance in large groups than in small groups.

H 12; Group size positively moderates the relationship between (a) emotional task conflict and (b) emotional person conflicts and work group job satisfaction, in that the relationship between these conflict types will be more positively related, or less negatively related, to work group job satisfaction in large groups than in small groups.

# 5. Method

## 5.1 Research Design

### 5.1.1 General Research Design

To investigate the relationship between intragroup conflict and group performance I have decided to conduct a nonexperimental theory-based evaluative correlation design. The approach of this design is according to Shadish, Cook, and Campbell, and is primarily:

> (1) To explicate the theory of treatment by detaining the expected relationships among inputs, mediating processes, and short and long term performance; (2) to measure all the constructs specified in the theory; and (3) to analyze the data to assess the extent to which the postulated relationships actually occurred (2002: 501).

Even if experiments are commonly perceived to be better in specifying cause and effect (Aronson, Wilson, and Brewer, 1998: 102-104), Shadish, Cook, & Campbell (2002: 501) reported that: "Some authors (e.g. Chen & Rossi, 1987, 1992; Connell et al., 1995) have advocated theory-based evaluation as an attractive alternative to experiments when it comes to testing causal hypotheses".

Also group researchers have from time to time urged researchers to collect data in different ways than by experiments (Levine and Moreland, 1998). Among the adventures of nonexperimental theory-based evaluative correlation design, Shadish, Cook, and Campbell l (2002) listed that: first, it requires only a treatment group, not a comparison group, second, a match between theory and data suggests the validity of the causal theory without having to go through a laborious process, and third, the fact that it is often impractical to measure distant end points to a presumed causal chain.

However, the main problem with nonexperimental theory-based evaluative correlation design is, indeed, the question of whether causal interpretation can be drawn from a design without a comparison group at all. Holland (1986: 959) reported: "Donald Rubin and I once made up the motto NO CAUSATION WITHOUT MANIPULATION to emphasize the importance of this restriction". Another saying of utmost credibility is that "correlation does not prove causation" (Aronson, Wilson, and Brewer, 1998: 102). Both citations point in the same direction, which seems to be bad news in a research situation where comparison groups are inconvenient to establish and the treatments are of a nature that manipulation would be met with scepticism and even resistance. Both reactions are typical for what we would expect in the case of research on real life intragroup conflict experiences.

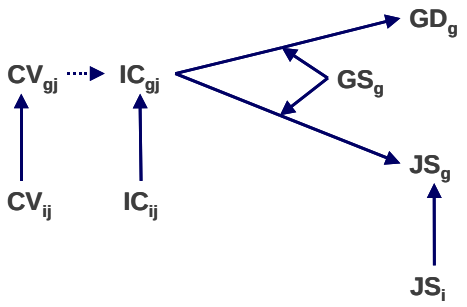
Whether and when there is a causal relationship between the constructs in this and similar studies, has traditionally been a complex philosophical question, based on the assumption that no causal relationship can be proved to exist (Hume, 2000). A general discussion of this question is beyond the scope of this dissertation. However, we notice that under all circumstances: "The language of causality is not neutral, it is impregnated with theories, *our* theories" (Hanson, 1969: 292-293). Thus, no causality without theory, and when comparing experiments and nonexperimental theory-based evaluative correlation design, Shadish, Cook, and Campbell (2002: 502) explained that experiments do not require a well-specified theory in constructing causal knowledge, and that "experimental causal knowledge is less ambitious than theory-based knowledge, but the more limited ambition is attainable". The lesson learned is that: if the theory is well specified, a nonexperimental theory-based evaluative correlation design might not be less ambitious in terms of causal explanations than experimental design.

However, it should be emphasized that even if I comment expressions as for example "the relationship between emotional task conflict and group performance is positive" in a causal way, indicating that increased emotional task conflicts leads to increased group delivery, and not the other way, I do not use 1-tailed statistics when testing the hypotheses, and by this admitting that the statistical arguments for asserting causal relationships in my research design is still somewhat weak.

### 5.1.2 Model Specification of Level

The levels in the research model may be illustrated as in Figure 3, adapted from Kozlowski and Klein, (2000).

*Figure 3: Model Specification of Construct Levels*




$GD_g$ = Delivery, group level; $JS_g$ / JSi = Work group job satisfaction, group/individual level; $IC_{gj}$ / $IC_{ij}$= Intragroup conflict, group/individual level for j = 4 dimensions; $GS_g$ = Group size, group level, and two control variable ($CV_{ij}$ / $CV_{gj}$).

The model can be characterized as a *shared* and *mixed single level unit model* (Kozlowski & Klein, 2000), where the unit is the group. The shared unit model is between the intragroup conflict dimensions (IC) and work group job satisfaction (WGJS), where both are aggregated from individual to group level of unit, and the mixed models are between the intragroup conflict dimensions (IC) and group delivery (GD), and between the group size moderator (GS) and both group delivery (GD) and work group job satisfaction (WGJS).

After having presented the sample in the next paragraph, having theoretically developed the items to measure each construct in Paragraph 5.3 and explored and analyzed the statistical properties of the final selected items and scales in Paragraph 5.4, I will investigate the individual measured data for their appropriateness in being aggregated to group level in Paragraph 5.5.

## 5.2 Sample and Procedure

A field sample of 62 work groups and 313 individual responses from seven companies were examined to test the relationships described in the hypothesis. The groups were ongoing work groups at middle management level in private companies. The average age of the respondent 42 years, with 42% men and 58% women. In the table below further information is provided about the samples.

*Table 3: Basic Sample Data*

| Sample | | Groups | Resp. | Resp pr group | Group size | % Resp | Men rate | Age avrg[1] | Age st.dv. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Factory (dep. of advisers) | 17 | 95 | 6.2 | 6.9 | 92 % | .56 | 42 | 4.5 |
| 2 | Small factory (all employees) | 5 | 24 | 5.8 | 6.2 | 89 % | .71 | 43 | 6.1 |
| 3 | Employees in voluntary org. A | 5 | 23 | 5.8 | 5.8 | 100 % | .17 | 38 | 9.4 |
| 4 | Small factory (all employees) | 4 | 15 | 3.9 | 5.4 | 69 % | .41 | 43 | 8.0 |
| 5 | Employees in voluntary org. B | 11 | 51 | 5.6 | 6.7 | 78 % | .34 | 42 | 4.3 |
| 6 | Housing Cooperative Company A | 10 | 46 | 5.3 | 9.5 | 58 % | .43 | 39 | 6.2 |
| 7 | Housing Cooperative Company B | 10 | 55 | 5.9 | 7.4 | 80 % | .47 | 45 | 3.4 |
| | All | 62 | 309[2] | 5.8 | 7.1 | | .46 | 42 | 5.8 |

1) Approximation based on registration of 10 years intervals. 2) Plus four respondents who did not report group (N=313).

The data was collected by questionnaires, completed partly as a net-based survey (company 1 and 6), partly by manual questionnaires on a seminar (company 2, 3, 5, and 7), and partly by manual questionnaires distributed at the place of work (company 4). The field group members in the samples had worked together in groups from three months to 30 years. All participants were asked to evaluate the conflict structure of the group, job satisfaction in the group over the last quarter of a year, and to report group size. All questionnaires except group size were reported on a 5-point Likert scale ranging from 1 (*to a very little extent*) to 5 (*to a very great extent*). For control reasons respondents reported sex and age, however, the latter in 10 years intervals. In a sub sample (N= 183) I asked for mood valence and intensity within the group

## 5.3 Measurements

### 5.3.1 Developing the Intragroup Conflict Dimension Constrcust

To operationalize the four-dimension intragroup conflict model, emotion conflicts, cognitive conflicts, task conflicts, and person conflicts, four types of questions, each addressing one conflict dimension, had to be developed.

All items in the scale were developed on the basis of my definition of intragroup conflict in general, and the particular conflict dimension definitions in particular (Definition 1 - Definition 5, page 32).

Partly in accordance with the definitions, and partly to make each conflict dimension more explicit to the respondents, I formulated a set of 10 elements that should preferably be included in each conflict dimension scale, however, not in each item. A comment to each element and an assessment of the degree to which the inclusion of the element is achieved in the 17 items is presented in Appendix H1. The elements were:

1. Emotional person and cognitive task conflicts should include terms and formulations currently in use by other scholars to measure emotional/relationship and cognitive/task conflicts.

2. All dimensions of conflict should include items where the term "conflict" is used.

3. All dimensions of conflict should include items in which the terms "disagreement", "discussion", or "different opinion" are used.

4. Both task dimensions of conflict should have items in which the term "task" is used, and denial of "task" in the person dimensions of conflict.

5. Both person dimensions of conflict should have items where the term "person" is used, and denial of "person" in the task dimensions of conflict.

6. Both emotional dimensions of conflict should have items where the term "emotion" or "feeling" are used, and denial of "emotion" or "feeling" in the cognitive dimensions of conflict.

7. Both cognitive dimensions of conflict should have the items in which the term "cognitive", "reason" and "rational" are used, and denial of "cognitive" or "reason" or "rational" in the emotional dimensions of conflict.

8. Positive and negative mood valence and high and low intensity of the emotional dimensions of conflict should be represented in the emotional task dimension. Negative mood valence should be represented in the emotional person dimension of conflict.

9. Mood valence and intensity of the conflict should be formulated in neutral terms in the two cognitive dimensions of conflict.

10. All items should be interpretable as processual conflicts.

The list of items is presented I the table below.

*Table 4: Intragroup Conflict Items*

| |
|---|
| *Cognitive task conflicts* |
| During the conflict, the group was concerned with solving problems by using a sensible and rational procedure |
| Our disagreement was task oriented and we had long discussions, however, we always put reason before emotions |
| While disagreeing on the subject matter, feelings were kept under control and one made an effort to argue in a logical and analytical manner |
| The conflict which the group experienced was task relevant and justified in a sensible way |
| *Emotional person conflicts* |
| It seemed as though narrow-mindedness or envy was driving the conflict |
| When differences occurred, some tried to promote themselves forward at the expense of others |
| The conflict was marked by personal clashes in the group |
| There was an emotional conflict that the group experienced as unessential in relation to the task. |
| There were tendencies to anger and aggression between some persons in the group |
| *Emotional task conflicts* |
| The conflict was engaged and emotional, but led to new ways of viewing the case |
| We expressed different opinions that were quite heated, however, it brought everything on the table |
| The conflict was characterized by strong feelings and motivation to find the best solution |
| The discussions were lively and energetic, however, we had a shared need of finding the best alternative |
| *Cognitive person conflicts* |
| Some members of the group had to be reminded of the rules and norms we had in the group, and after a while they understood why they had been corrected |
| Bad habits on the part of some group members were pointed out, however, the conflict did not become emotional because we clearly explained why |
| Personal critique was open and relevant arguments were put forward during the discussion |
| Criticism of some members of the group occurred, but in such a way that nobody became defensive |

In the process of developing the items, three questions, in particular, indicated the need for extra consideration; the question of mood valence and conflict, the question of long sentences, and the question of conflict processes over time. Some additional comments to these issues are presented in the following.

3.1.4.1 Conflict Content and Form

To tap the distinctions between *type* and *content* correctly, four general types of questions need to be developed: "How much emotional conflict is present in your work group that is personal?" (Emotional person conflict); "How much emotional conflict is present in your work group about the task?" (Emotional task conflict); "How much task conflict is present in your work group that is cognitive oriented?" (Cognitive task conflicts), and finally; "How much cognitive conflict is present in your work group that is personal?" (Cognitive person conflicts.)

3.1.4.1 Mood Valence and Conflict

One of the most challenging item constructions has been to correctly reflect the affective valence of the two emotional conflict dimensions (ET and EP). As reported, I have operationalized the two emotional dimensions of conflict equally in terms of affective valence, since I have not taken the tendency of a skewed balance of valence in emotional person conflicts into account in the EP definition: An intragroup emotional person conflict is defined as an interaction based on the awareness of simultaneous and incompatible approval/avoidance issues among interdependent group members, with relation to persons in the group.. Certainly, there is some overlap of affective valence between the items in the two dimensions, e.g. between the emotional person conflict item: " It was an emotional conflict which the group experienced as not essential to the task" and emotional task item; "We expressed different opinions that were quite heated, however, it brought everything on the table". Frequently we may experience a heated "showdown" described in the ET conflict description as more negatively affective valenced than the EP conflict description, which sometimes may also be experienced as "just boring". Still, the main impression reflected in the items is that emotional person conflicts also in this work tends to be negative affective valenced, whereas emotional task conflicts tends to be mostly, but not entirely, positive affective valenced.

We may question whether the emotional task and the emotional person conflicts dimension ever will be affective valence balanced, due to the fact that person conflicts will always be a potential threat to the self esteem maintenance of the persons involved.

3.1.4.1 Long Sentences

In order to describe some particular conflict processes, especially within the cognitive person conflict domain, I formulated relatively long sentences describing conflict processes that could have been developed over a period of time. This is relevant because sentences, which are too long, may obscure the content of the item and may cause response bias (Hinkin, 1995). When piloting the questionnaire, respondents were sensitive to conflicts that had a personal component, and almost systematically grouped these dimensions of conflict as emotional person conflicts, no matter whether I explicitly characterized these conflicts in the items as "not emotional" or as "reason conflicts" etc.

Thus, in order to depict the correct content of especially the cognitive person conflict dimension, I had to delineate the conflict situation in some length in the items. The most extreme example is item 22: "Some members of the group had to be reminded of what rules and norms we had in the group, and, after a while, they themselves understood why they had been corrected." This item had 33 words. However, of the 26 items, only three items had more than 20 words, which have been recommended as an advisable "rule-of –thumb" (Payne, 1951: 136, cited from Converse & Presser, 1986). Thus, I consider this solution as acceptable, even if these three items would have benefit from being shorter.

3.1.4.1 Long Duration of the Conflicts

Due to similar reasons, some items describe conflict processes, which could likely have taken place over a long period of time. This may blur the conflict assessment for the respondent and make it difficult to discriminate the conflict episode from all sorts of other conflicting events within the same period of time. Besides, the same event may cause different dimensions of conflict over a time span, and the respondent may have difficulty in selecting one conflict dimension as more representative than the other. However, since a recommended maximum of six months has been suggested (see discussion in Converse & Presser, 1986: 20-23), I asked the respondent to describe the events of interest over the last three months, and all questions are about the frequency of various conflict incidents described by the items.

### 5.3.2 Developing the Work Group Effectiveness Construcs

In this paragraph I will define the concepts of work group performance and work group job satisfaction. Then I will explain the concept of work group effectiveness, and why I use this as a joint concept of group performance and work group job satisfaction. Finally, I will operationalize group performance and work group job satisfaction into constructs which I can measure and analyze in order to find whether

there is evidence in support of the hypotheses I have suggested about these construct relationships with intragroup conflicts and group size.

However, I will first define what I mean by the concept of work group in this dissertation. I use the following definition suggested by Hackman:

> Definition 6: Work groups in organizations are defined as (1) Real groups (that is, intact social systems complete with boundaries and differentiated roles among members); (2) groups that have one or more *tasks* to perform, resulting in discernible and potentially measurable group products and services; groups that operate within an *organizational context* (1987: 322, the phrase "and services" added by this author).

#### 3.1.4.1 Supervisor Evaluated Work Group Delivery

There has been a strong tradition in intragroup research that group performance should not only be assessed by a group's delivery measures, but also by measures of the group processes. These measures will prove whether the process has enriched group members and fostered their ability of doing well in the future (Beyerlein & Johnson, 1994, Guzzo & Dikcson, 1996, Tannenbaum, Beard & Salsa, 1992). Indeed, almost all group process models imply that group process is related to the group's delivery (Goodman, Ravling, & Argote, 1986).

Recent research has suggested that the connection between process performance and the actual delivery is less than certain for a group, and nowhere is this more apparent that in organizational decision making (Guzzo, 1986). Group performance should be defined in terms of the extent to which the work group delivers according to its goals (Scott, 1992; however, see also Weick, 1979). Accordingly, I have decided to study the work group's *ultimate* performance and not it's *intermediate* performance. In doing so, I agree with scholars who claim that group performance should be defined in terms of accomplishment of what the group is "chartered" to deliver (Guzzo, 1986). Thus, in this dissertation I define work group delivery in line with Hackman (1987):

> Definition 7:Work group delivery is the output of the work group according to the group's external formulated standard, as evaluated by an external sponsor or manager.

The definition of the work group's delivery follows the suggestion that in an organization there should be a person outside the work group who evaluates the group performance (De Dreu & Weingart, 2003). The external evaluator will be the responsible (manager) for the mandate of the work group. This is of particular importance when measuring intellectual work groups, where objective measures (sales figures, production quantities) are rare.

### 3.1.4.1 Group Job Satisfaction as Group Assessed Work Group Job Satisfaction

Work group job satisfaction (for discussion of the translation of the concept in Norwegian, see Petersen, 1984[1]) is explained as one of several operationalizations of attitudes at work (Staw and Barsade, 1993). However, even if attitude typically is described as a mix of cognitive, affective, and behavioral aspects, work group job satisfaction is often explained in affective terms, such as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976: 1300), and even more affectively oriented: "group job satisfaction is feelings or affective responses to facets of the situation" (Smith, Kendall, & Hulin, 1969: 6). Still, even if real time affect is related to overall group job satisfaction, and that affect while working might be a "missing piece" in studies of overall job attitude, affect is not identical to satisfaction (Fisher, 2000: 185).

Taking this in consideration, there seems to be a need to clarify the conceptual demarcation between emotions and group job satisfaction. First, a perspective that influences group job satisfaction is that it is a result of an appraisal process anchored in ones job values and congruent with ones basic physical and psychological needs (Locke, 1976). This is a conscious appraisal process, and thus, a cognitive prosess more than an emotional prosess in origin, even if affective reactions to the appraisal process will eventually be evoked.

In a comprehensive metaanalysis Judge, Bono, Thoresen, and Patton (2001) concluded that there clearly is a significant, but moderate, positive relationship between performance and job satisfaction (corrected mean correlation, $r = .30$, $p < 0.01$), contrary to what is traditionally assumed (Iaffaldano & Muchinsky, 1985). Whether these figures will hold, regarding the relationship between performance and group job satisfaction, is not known to this author. Moreover, the question of whether the relationship between performance and group job satisfaction is a (1) simple correlation due to third factors; (2) a performance to group job satisfaction type; (3) a group job satisfaction to performance type; or, finally, (4) a reciprocal performance

[1] Since the survey in this dissertation is conducted in Norwegian, where the concept "trivsel" is used, we will mention that the content relation between "satisfaction" and "trivsel" is problematic. In fact, it is claimed that the concept "trivsel" does not exist outside the Nordic language area. Thus, other concepts could easily compete with "trivsel " as identical with "satisfaction", for example "fornøyd" (satisfied, pleased) and "tilfreds" (satisfied, contented). Even if "general satisfaction" seems to be the commonly accepted translation of "trivsel", it has been claimed that "mental well-being", conceptually speaking, is a more precise translation of "trivsel". As far as "fornøydhet" and "tilfredshet" is concerned, we find these concepts to be more associated with a *state* than do "trivsel", and we prefer to keep this more dynamic association in my concept (for a discussion, see Petersen 1984).

and group job satisfaction type, is still not fully answered (Judge, Bono, Thoresen, & Patton, 2001).

In my model, I have chosen the first approach, and assume that both group job satisfaction and group delivery (group's effectiveness) are influenced by a third factor, dimensions of intragroup conflicts, an approach which is well anchored in intragroup conflict research (De Dreu & Weingart, 2003). Thus, I define (see Hackman, 1987):

> Definition 8: Work group job satisfaction is group members' assessment of group satisfaction versus frustration over a period of time.

#### 3.1.4.1 The Work Group Effectiveness Scale

Even if the definition from Hackman (1987) and Gladstein (1984) of work group effectiveness in terms of work group performance and work group job satisfaction is frequently referred to, operationalizations of these definitions are sparse (Goodman, Ravlin, & Argote, 1986). Thus, in order to measure work group effectiveness, I have developed a separate scale for each of the two constructs; work group delivery, and work group job satisfaction.

In accordance with my definition of *work group delivery* as the output of the work group according to the evaluation of an external supervisor, I measure work group delivery by the group supervisor's evaluation on a two item 5-point Likert scale questionnaire, about whether the group has met or exceeded organizational standards.

In general, a minimum of three items is preferable when measuring perceptions of an event (Hinkin, 1995). However, in the case of a manager's evaluation of the work group delivery, one can argue that the most proper measure should be a global 1-item measure, or at least a very small number of items. In general, single-item measures can be divided into two categories: (a) those measuring self-reported facts, and (b) those measuring psychological constructs. Whereas (a) is considered commonly accepted, the latter (b) is considered not advisable, indeed, in some journals considered as a "fatal error" (Hinkin & Schriesheim, 1989, Wanous, Reichers, & Hudy, 1997). However, the assumption that overall psychological constructs always are better measured by a multiple-item measure compared to a single-item measure is not put forward without dispute. For example, in a review of single- and multiple-item measures of "job satisfaction", Wanous, Reichers, and Hudy (1997: 250-251) concluded: "The use of single-item measures should not be considered fatal flaws in the review process. Rather, their appropriateness for a particular piece of research should be evaluated." (See also Nagy, 2002; Wanous & Hudy, 2001). Thus, the appropriateness of a one-item measurement of the construct in this case rests on the fact that group delivery is "evaluated" or even stronger, "determined", by the work

group supervisor, not "assessed". The evaluation of the supervisor is not a "good guess" made by an external observer; it is the value of the delivery, due to the fact that the work group manager is the formal manager or sponsor of the work group, and thus, the formal evaluator. In a "real life" field study, to be able to decide salary or bonus issues, a manager always has to be prepared to make one single global evaluation of subordinate individuals or work groups.

In this dissertation however, I have decided to somewhat compromise, and chosen a 2-item evaluation from the work group manager, an approach that I have also found accepted and used in other reports in this line of research (De Dreu & Weingart, 2003, Jehn, Northcraft, & Neale, 1999).

The reason for the seemingly inconsistent solution of using two items to measure work group delivery after the above arguments is to have the ability to examine the level of homogeneity (Klein, Dansereau, & Hall, 1994), a "safety net" to be able to capture situations where the correlation between supervisor evaluation of the two items is so low that the construct or the assessor of work group delivery has to be reconsidered. If, however, the rating correlation between the two items is close to 1.00, with high risk of collonarity, I may fall back on the 1-item issue without any harm to my theoretical point of departure.

*Work group job satisfaction* was defined as perception by group members of the current satisfaction versus frustration in the group, as a result of the group's experience with working together over a period of time (1/4 of a year). I measured this performance variable through a four item questionnaire on a 5-point Likert scale, and aggregated the individual answers in the group to an average group measure (see table 5).

The questions are phrased identically in the introduction of each question, in that every question starts with: "We have been more satisfied than frustrated by the experience of…" and then followed by "the particular work assignments", "the social climate", the "distribution of the tasks", and "the coordination" of the work in the group. Even if this introduction to each question is in line with the definition of the concept (Hackman, 1987), it might be argued that the coupling of the two sub-concepts "satisfied" and "frustrated" together in one sentence seems to be somewhat unusual. The alternative of asking people about the group's job satisfaction only may mask the experience of both satisfaction and frustration by the job experience in the group. I suppose that respondents in any case have to weigh the amount of satisfying and frustrating episodes in the group to each other (even if one of them is set to zero) when reflecting on their "group job satisfaction", in the same manner they have to weigh climate factors and job content factors against each other.

However, it may be argued that the best solution would be to ask two different questions, such as a "how frustrated are you" - type and a "how satisfied are you," - type, and make a joint work group job satisfaction index out of these factors (averaged or weighted by factor loadings). This is quite possible, but then we are removing the joint perception between satisfying and frustrating episodes from the respondent's perception of what happens in the group. Thus, the question of the "net satisfied value" in the group may be left to a mathematical question of aggregation, which in my view is probably a less valid solution than I have suggested.

*Table 5: Work Group Effectiveness Items*

| THE WORK GROUP EFFECTIVENESS SCALE |
|---|
| *Work group delivery* |
| How satisfied are you as the work group's manager, with the products/services the work group has delivered (in total) during the last three months? |
| So far the work group has delivered the products/services that I have expected them to deliver |
| *Work group job satisfaction in the group* |
| We have been more satisfied than frustrated by the particular work assignments in the group |
| We have been more satisfied than frustrated by the social climate in the group |
| We have been more satisfied than frustrated by the distribution of the tasks in the group |
| We have been more satisfied than frustrated by the coordination of the work in the group |

### 5.3.3 The Measurement of Group Size

In this dissertation I will use ln [group size] as a measure, and not the actual group size numbers. This choice is based on an intuitive assumption of a declining incremental effect size between group size and group outcome in general, and that using the logarithm of group size more appropriately will capture this relationship (Yetton & Bottger, 1982). The use of natural logarithm (ln or $\log_e$) instead of the Briggs' logarithm ($\log_{10}$) is done for mathematically convenient reasons, which is not uncommon (e.g. Jehn, Northcraft, & Neale, 1999 for diversity).

## 5.4 Analysis

After having defined and operationalized the seven constructs to be used in this dissertation, the construct reliability of the six self report constructs (not group size) will be measured, and the four intragroup conflict variables and the two work group effectiveness variables will be explored through factor analysis (EFA) and checked for common method variance. Finally, the four-dimensional intragroup conflict model and the work group effectiveness model will them be tested for good fit between models and data in a confirmative analysis (CFA). With relation to the new intragroup conflicts dimensions, the discriminant and convergent validity of each construct or variable will be examined through comparison with other internal and external constructs or variables.

### 5.4.1 Exploring the Intragroup Conflict and Work Group Effectiveness Scales

3.1.4.1 Common Method Variance

Analyzing the variance in self-reporting measured data sets raises the question of whether the relationship can be attributable to the same common method variance. For five of the seven variables, data is assessed through the same questionnaire and should be examined for common variance.

Even if the sixth construct, work group delivery, was collected from another questionnaire, as well as by a person outside the group, there are reasons to argue that this construct should also be considered in relation to the danger of a common method variance. First, the evaluation of the group's delivery is based on the supervisor's subjective impression[1], as is also the case with the evaluation of team members. The supervisor's evaluation was also mostly collected at the same time (using the same Likert scale as in the team's questionnaire), and also for some supervisors present where team workers filled out their questionnaire. For these reasons, to rule out the possibility of supervisor evaluation being confounded with contextual variables like good or bad affective valence at the same time and place as when the team's self-report data was collected, it is desirable that items measuring the work group delivery construct are also included in the evaluation of common method variance. The result of the analysis is found in the table below.

[1] Even if some supervisors had objective measures as partly basis for their evaluation.

*Table 6: Explorative Factor Analysis of Main Self- Report Constructs in the Research Model*

| | Component[1] | | | | | |
|---|---|---|---|---|---|---|
| Work group constructs | EP | CT | JS | CP | CT | D |
| *Emotional person conflicts (EP)* | | | | | | |
| The conflict was marked by personal clashes in the group | .83 | | | | | |
| When differences occurred, some tried to put themselves forward at the expense of others | .81 | | | | | |
| It seemed like narrow-mindedness or envy was driving the conflict | .77 | | | | | |
| There were tendencies of anger and aggression between some persons in the group | .74 | | | | | |
| *Emotional task conflicts (ET)* | | | | | | |
| The conflict was characterized by strong feelings and motivation to find the best solution | | .74 | | | | |
| The discussions were lively and energetic, however, we had a shared need to find the best alternative | | .72 | | | | |
| The conflict was engaged and emotional, but led to new ways of viewing the case | | .66 | | | | |
| We expressed different opinions that were quite heated, however, it brought everything on the table | | .59 | | | | |
| *Cognitive person conflicts (CP)* | | | | | | |
| The group drew attention to some of the bad habits of certain group members, however, the conflict did not become emotional because we clearly explained why. | | | | .82 | | |
| Some members of the group had to be reminded of the rules and norms we had in the group, and after a while they understood on their own why they had been corrected | | | | .68 | | |
| Criticism of some members of the group occurred, but in such a way that no one became defensive | | | | .63 | | |
| Personal critique was open, with relevant arguments put forward during the discussion | | .36 | | .56 | | |
| *Cognitive task conflicts (CT)* | | | | | | |
| During the conflict, the group was concerned about solving problems by using a sensible and rational procedure | | | | | .80 | |
| Our disagreement was task oriented and we had long discussions, however, we always put reason before emotions | | .31 | | | .70 | |
| While disagreeing on the subject matter, feelings were kept under control and one made an effort to argue in a logical and analytical manner | | | | | .82 | |
| *Work group job satisfaction (JS)* | | | | | | |
| We have been more satisfied than frustrated by the experience of the distribution of the tasks in the group | | | .87 | | | |
| We have been more satisfied than frustrated by the experience of the coordination of the work in the group. | | | .87 | | | |
| We have been more satisfied than frustrated by the experience of the social climate in the group. | | | .70 | | | |
| *Work group delivery (D)* | | | | | | |
| How satisfied are you as the team's supervisor with the services the team has delivered (in total) during the last three months? | | | | | | .86 |
| So far the team has delivered the products/services that I expected them to deliver. | | | | | | .88 |
| Cronbach's Alpha | .86 | .70 | .82 | .70 | .76 | .70 |

*1): Factor loadings less than .30 is not shown in the table.*

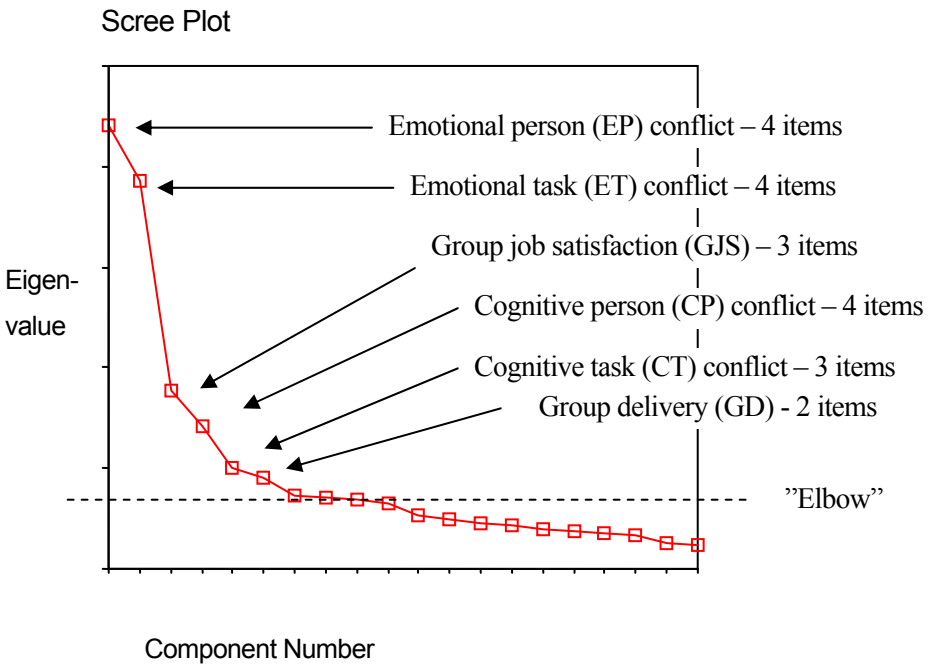
Dotted line mark independent variables (above) and depended variables

The Kaiser–Meyer–Olkin (KMO) measure of adequacy of the investigated sample was .82, while Bartells' test of sphericity was 1761 (df = 190, $p < .001$), which confirmed the appropriateness of the data for the factor analysis.

The exploratory factor analysis (principal component with varimax rotation) of the 23 items revealed that three items had undesired cross-loadings on other dimensions of conflict, and had to be removed in order to attain an appropriate factor structure. From cognitive task I removed item: "The conflict which the group experienced was task relevant and justified in a way that made sense", because of insignificant factor loading, and since the reliability (Cronbach's Alpha, se below) was increased by removing this item. From emotional person I removed the item: "It was an emotional conflict which the group experienced as not essential to the task", since this increased the factors reliability. And from work group job satisfaction I removed the item: "We have been more satisfied than frustrated by the experience of the particular work assignments in the group", since this removal improved the general discrimination of the factor structure.

The final solution was a 4 (EP) + 3 (CT) + 4 (ET) + 4 (CP) = 15 item factor structure for the four-dimensional intragroup conflict scale, and a 2 (GD) + 3 (WGJS) = 5 item factor structure for the work group effectiveness scale. For the sake of convenience, I label the four-dimensional intragroup conflict scale as the "4IC scale". All the intragroup conflict factors and the work group job satisfaction factor had eigenvalue over 1.00, whereas work group delivery had eigenvalue = .92, and the eigenvalue dropped to .72 for the seventh and not defined factor. In the so-called scree test (Cattell, 1966), see Figure 4, the drop in eigenvalue can be spotted, and a small but recognizable drop from group delivery as the sixth factor and to an "elbow" of several factors representing a horizontal picture indicating a factor structure with a distinct different significance to the rest of the factors from factor seven to factor 20. The main disadvantage of the scree test is subjectivity (Nunnally & Bernstein, 1994), and for the position of the CT conflict dimension and group delivery (GD) we should consider the small numbers of items indicating them.

*Figure 4: The Scree Test*




The results from the analysis show that none of the variables seem to be confounded with common method variance. In particular, we see that none of the variables work group job satisfaction and work group delivery had any cross-loadings to the intragroup conflict variables above .30.

In the following, I will present further statistical properties of the intragroup conflict scale and the work group effectiveness scale separately, however, referring to the factor structure presented in

3.1.4.1 Exploring the Intragroup Conflict Scale

The *reliability* of the four intragroup conflict dimensions developed above (se Table 6) was assessed, using Cronbach's Alpha. The standardized values were .87 for the EP dimension (4 items), .76 for the CT dimension (3 items), .70 for the ET dimension (4 items), and .70 for the CP dimension (4 items) of conflict.

In the explorative factor structure, the factor loadings of the items measuring the four intragroup conflict constructs ranged between .56 and .83. One of the 15 items had loading below .60, considered by some researchers to be "small" (Nunnally & Bernstein, 1994: 533), and by other researchers to be "strong" as long as the loading exceeds .50 (Osborne & Costello, 2004). The highest cross loading was .36, which is higher than the recommended maximum of .35 (Kiffin-Petersen, & Cordery, 2003), and the difference between main factorloading and cross loading (.56 - .36 = .20) which is recommended as a minimum difference (Dyne, Graham, & Dienesch, 1994).

It is also recommended that the correlation matrix for each construct be inspected, since items (variables) that define a factor may have negligible correlations with another (Nunnally & Bernstein, 1994). The intercorrelations between the items in the EP construct ranged between .57 and .71, in the CT construct between .48 and .54, in the ET construct between .31 and .43, and in the CP construct between .30 and .45. All item-to-item correlations within the four factors correlated above the suggested $r \geq .30$ thresholds of "discriminating items" (Nunnally & Bernstein, 1994: 305).

Thus, the explorative factor analysis has revealed significant evidential support to my model of a four-dimensional, orthogonal and independent factor structure of intragroup conflict, with acceptable reliability for each factor and a distinct factor structure with acceptable loadings and cross-loadings.

Next step is to investigate whether the intragroup conflict model, consisting of four, error free latent variables, is confirmed, is to see whether the factor structure of the model is non-significant similar to a null-model consisting of only one factor, and has acceptable fit indicators in relation to the proposed model. To do this, I will use confirmative factor analysis, CFA (Jöreskog & Sörbom, 1993). CFA as an analytical tool is still relatively new, and the use of CFA indicators vary between research reports. Thus, general information concerning the method and the arguments behind the selection of fit indices used in this dissertation is presented in Appendix 8.2.

#### 3.1.4.1 Confirming the Intragroup Conflict Scale

I used the 15-item composition extracted from the exploratory analysis in a LISREL 8 program to conduct a confirmative analysis of the intragroup conflict model, using maximum likelihood estimates on the data (Jöreskog & Sörbom, 1993). The chi-square statistic of the 15-item composition extracted from the exploratory analysis (Table 6) was 136 with 84 degrees of freedom, which means that the difference between proposed and observed matrices was significant at the level of $p > 0.01$, in contrast to what is desirable.

The absolute fit measure GFI was 0.93, and RMSEA was 0.050, which is exactly on the .050 threshold of "a close fit" (Jöreskog & Sörbom, 1993: 124). The RMSEA is of particular importance, since the sample size is close to 200. The 90% upper confidence interval value to the RMSEA was .065, which is below a "reasonable error of approximation in the population" of .08 (Jöreskog & Sörbom, 1993: 124).

The incremental fit indicium NFI was .90 and the parsimonious fit measure AGFI was .90, both measures indicating acceptable fit. Another parsimonious fit measure, the normed Chi-square, was 1.6, which is below the suggested upper threshold of 2.0 for appropriate fit indices in this dissertation (Hinkin, 1995, see Appendix 8.2).

Thus, even if the proposed and the observed matrix is significantly different ($p < .01$); given that the 90% upper level for RMSEA is .065, the CFI, NFI, and AGFI is above 0.90, and that the normed chi-square on *df* ration is below 2.0, I deem the 15-item data matrix to fit the proposed four-dimensional intragroup conflict model at an acceptable level (see discussion in Van Prooijen & Van der Kloot, 2001: 787-788)[1]

The measurement equations from the confirmatory analysis of the four-dimensional intragroup conflict model with 4 + 3 + 4 + 4 items are presented in the table below. The standardized CFA factor loadings (standardized validity coefficients) were all significant ($p < .01$) and ranged from .62 to 1.05, and reliability ranged from .36 to .88.

[1] The authors did not report AGFI, but their NNF (Non-Normed fit index, or Tucker –Lewis index, TLI) was .87, whereas NNFI in my data was .93.

*Table 7: The Four-Dimension Intragroup Conflict Scale - Measurement Equations, Measurement Errors, and Reliability*

| **LISREL Estimates (Maximum Likelihood)** | | **Measurement Equations and reliability ($R^2$)** |
|---|---|---|
| *Emotional person conflicts (EP)* | | |
| It seemed that narrow-mindedness or envy were driving the conflict | = 0.80 | * EP, errorvar.= 0.60, $r^2$ = 0.52 |
| When differences occurred, some tried to put themselves forward at the expense of others | = 0.81 | * EP, errorvar.= 0.60, $r^2$ = 0.52 |
| The conflict was marked by personal clashes in the group | = 1.04 | * EP, errorvar.= 0.35, $r^2$ = 0.75 |
| There were tendencies of anger and aggression between some persons in the group | = 0.98 | * EP, errorvar.= 0.52, $r^2$ = 0.63 |
| *Cognitive task conflicts (CT)* | | |
| During the conflict the group was concerned about solving problems by using a sensible and rational procedure | = 0.77 | * CT, errorvar.= 0.67, $r^2$ = 0.47 |
| Our disagreement was task oriented and we had long discussions, however, we always put reason before emotions | = 0.75 | * CT, errorvar.= 0.58, $r^2$ = 0.49 |
| While disagreeing on the subject matter, feelings were kept under control and one made an effort to argue in a logical and analytical manner | = 0.75 | * CT, errorvar.= 0.39, $r^2$ = 0.59 |
| *Emotional task conflicts (ET)* | | |
| The conflict was engaged and emotional, but led to new ways of viewing the case | = 0.58 | * ET, errorvar.= 0.65, $r^2$ = 0.34 |
| We expressed different opinions that were quite heated, however, it brought everything on the table | = 0.65 | * ET, errorvar.= 0.87, $r^2$ = 0.32 |
| The conflict was characterized by strong feelings and a motivation to find the best solution | = 0.61 | * ET, errorvar.= 0.74, $r^2$ = 0.33 |
| The discussions were lively and energized, however, we had a need to find the best alternative | = 0.82 | * ET, errorvar.= 0.61, $r^2$ = 0.53 |
| *Cognitive person conflicts (CP)* | | |
| Some members of the group had to be reminded of which rules and norms we had in the group, and after a while they understood on their own why they had been corrected | = 0.66 | * CP, errorvar.= 0.66, $r^2$ = 0.40 |
| The group drew attention to some of the bad habits of certain group members; however, the conflict did not become emotional because we clearly explained why. | = 0.61 | * CP, errorvar.= 0.77, $r^2$ = 0.34 |
| Personal critique was open, with relevant arguments put forward during the discussion | = 0.71 | * CP, errorvar. = 0.91, $r^2$ = 0.36 |
| Criticism of some members of the group occurred, but in such a way that nobody became defensive | = 0.63 | * CP, errorvar. = 0.53, $r^2$ = 0.43 |

### 3.1.4.1 Refining the Intragroup Conflict Model and Scale

If the 15-item scale of the intragroup conflict model had been put to the strictly confirmatory test, of Jöreskog and Sörbom (1993: 115), called the "SC situation", the

model would have failed the test, since the difference between the data matrix and the proposed model was significant ($p$ = 0.00001). This is a situation many explorative developed models, theory driven or not, face when the data set is tested in a CFA analysis (Van Prooijen & Van der Kloot, 2001). We should bear in mind that CFA analysis adds substantial restrictions on the EFA factor structure before testing. For example, CFA analysis normally does not allow the items measuring one construct to correlate, unless manual modification is carried out. This strictly theoretical approach goes beyond the restrictions in EFA analysis.

To consider the 4IC model in relation to a strict confirmatory test, I used the 15-item 4IC scale extracted from the exploratory analysis as a tentative initial model, by Jöreskog and Sörbom (1993: 115-121) described as a model generating procedure, or the "MG situation". I then followed the procedure advocated by the authors step by step by removing items (parameters) that reduce the chi-square value, following the modification indices suggested in the LISREL 8 software. Nonsignificance at the level of $p > .05$ for the respecified 4IC model was reached by removing two items, from the original 4 + 3 + 4 + 4 = 15 items model, to a 4 + 3 + 3 + 3 = 13 items model. For the sake of convenience, I label these two models as the 4IC15 model (the original model, elsewhere in the document called the 4IC model) and the 4IC13 model, respectively.

The chi-square statistics of the 4IC13 scale were 78 with 59 degrees of freedom. The absolute fit measure GFI was 0.95, and RMSEA was 0.035, with a 90% upper confidence interval value at .055. The incremental fit indicium NFI was .93 and the parsimonious fit measure AGFI was .93. All in all, the fit indices indicated close fit between observed and proposed model.

Fortunately, the fit appropriateness of the EFA developed 4IC15 scale and the refined CFA developed 4IC13 scale may also be compared to several versions of the commonly used IC scale (Jehn, 1994). Pearson, Ensley, and Amason (2002) ran 16 CFA – analyzes of IC scales with a different amount of items, from the smallest 3 + 3 = 6 items scales to the largest 4 + 5 = 9 items scale version. Thus, we may compare these IC scales, consisting of the emotional/relationship dimension and the cognitive/task dimension of conflict, with the two 4IC scales I have presented above, both consisting of an emotional person dimension, a cognitive task dimension, an emotional task dimension, and a cognitive person dimensions of conflict.

The results are presented in the table below. Four 4 + 4 = 8 items IC scales are presented (IC scale-1 to -4), and may be considered in comparison to my EFA developed 4IC15 scale (presented in bold). Likewise, six 3 + 3 = 6 items IC scales are presented (IC scale-1 to –6), and may be compared with the refined 4IC13 scale developed in this dissertation.

*Table 8: Comparison of CFA Results Between the IC Scale and the 4IC Scale**

| Scale & Sample no | Items | N | Df | $\chi^2$ | $X^2/df$ | GFI | RMSEA | RMSR | NFI | AGFI |
|---|---|---|---|---|---|---|---|---|---|---|
| IC scale-1 | 4+4 | 156 | 19 | 59.5 | 4.58 | .91 | | .05 | .90 | .83 |
| IC scale-2 | 4+4 | 322 | 19 | 41.9 | 2.20 | .97 | | .03 | .97 | .94 |
| IC scale-3 | 4+4 | 316 | 19 | 56.2 | 2.96 | .89 | | .04 | .90 | .82 |
| IC scale-4 | 4+4 | 256 | 19 | 52.7 | 2.77 | .87 | | .06 | .86 | .79 |
| IC scale-5 | 3+3 | 156 | 8 | 19.5 | 2.43 | .96 | | .04 | .95 | .89 |
| IC scale-6 | 3+3 | 322 | 8 | 16.6 | 2.07 | .98 | | .01 | .98 | .95 |
| IC scale-7 | 3+3 | 316 | 8 | 17.6 | 2.21 | .94 | | .03 | .92 | .90 |
| IC scale-8 | 3+3 | 256 | 8 | 13.4 | 1.68 | .93 | | .04 | .92 | .89 |
| IC scale-9 | 3+3 | 102 | 8 | 17.2 | 2.15 | .96 | | .02 | .95 | .91 |
| IC scale-10 | 3+3 | 148 | 8 | 7.7 | .96 | .98 | | .02 | .98 | .98 |
| 4IC15 scale | 4+3+4+4 | 248 | 84 | 135.5 | 1.61 | .93 | .05 | | .90 | .90 |
| 4IC13 scale | 4+3+3+3 | 248 | 59 | 76.5 | 1.30 | .98 | .04 | | .93 | .93 |

*: Data about the IC scale is obtained from Pearson, Ensley, and Amason (2002: 115, table 2)

Of the six models fit indices presented in the study of Pearson, Ensley, and Amason (2002), five are directly comparable[1]. The general impression is that the all over fit indices in the two four-dimensions scales, developed and presented in this dissertation, are highly comparable to the similar fit indices in the 10 sample- and item-versions of the IC scale.

[1] 6 analyzes with 7 and 9 item versions are omitted from this presentation, but do not change the conclusions in any way.

#### 3.1.4.1 Convergent and Discriminant Validity

The 4IC scale measuring emotional person (EP), cognitive task (CT), emotional task (ET), and cognitive person (CP) dimensions of conflict, should also be compared to the IC scale (Jehn, 1994), measuring the emotional/relationship (E/R) and the cognitive/task (C/T) dimensions of conflict, in terms of how these constructs are correlated to each other.

From the theoretical development of the 4IC scale and the discussion of the IC scale, I expect high correlation between the EP and the E/R constructs, and between the CT and C/T construct, indicating good convergent validity between EP and E/R, and CT and C/T, respectively.

Conversely, I expect low correlation between EP and C/T, and between CT and E/R, indicating good discriminant validity between the constructs. However, previous research has frequently found a relatively high correlation between C/T and E/R in the IC scale, commonly around $r$ = .55 (De Dreu & Weingart, 2003). Thus, my expectations to these crossover relationships are mixed, since I do not expect a positive, and indeed not a high positive correlation between the CT construct and the EP construct in the 4IC scale.

To compare the IC scale and the 4IC scale, I collected data from company 4, 5, and six in my sample, consisting of 114 respondents. I used the 3 + 3 item version of the IC scale, which turned out to be the best "refined" solution in the aforementioned confirmative factor analysis conducted by Pearson, Ensley, and Amason (2002). The results are reported in the table below.

*Table 9: Discriminant and Convergent Validity: The 4IC-S and the JIC scale (Jehn, 1994).*

| **Conflict dimensions - Correlations (a)** | EP | CT | ET | CP | E/R | C/T |
|---|---|---|---|---|---|---|
| Emotional person (EP) conflicts (4 items) | 1 | | | | | |
| Cognitive task (CT) conflicts (3 items) | -.35** | 1 | | | | |
| Emotional task (ET) conflicts (4 items) | .05 | .44** | 1 | | | |
| Cognitive person (CP) conflicts (4 items) | .41** | .09 | .51** | 1 | | |
| Emotional/relationship (E/R) conflicts (3 items) | .66** | -.34** | .16 | .40** | 1 | |
| Cognitive/task (C/T) conflict (3 items) | .50** | -.08 | .27** | .45** | .72** | 1 |

** Correlation is significant at the 0.01 level (2-tailed).

a Listwise N=105. Individual Level.

We observe that the convergent validity of the EP construct seems appropriate, since the correlation between the EP construct and the E/R construct is high ($r = .66$, $p < .01$). Somewhat surprisingly, however, there was practically no correlation between the CT construct and the C/T construct ($r = -.08$, n.s.), which seriously challenges the assumption of perceiving these two constructs as measures of same dimension of conflict. However, the correlation between E/R and C/T is high ($r = .77$, $p < .01$), which is within (the upper 10%) of the correlations found in 24 studies reviewed by De Dreu and Weingart (2003: 743). In comparison, the correlation between EP and CT is as expected negative ($r = -.35$, $p < .01$), which supports the theoretical description of the different properties of these two constructs.

The moderately high correlation between C/T and ET ($r = .27$, $p < .01$), and the high correlation between C/T and E/R, commented above, raises the question mentioned in the theoretical discussion, about whether the C/T conflict dimension in the IC scale may be rather emotionally related.

I also investigated to what extent one of the dimensions of emotions; activation (also labeled as arousal or activity/passivity) (Bush, 1973; Russell & Carroll, 1999a) was present in the two emotional conflict constructs, EP and ET. I combined the content of the concepts "active" and "arousal" in the slightly stronger concept "intensity". In addition, I investigated whether the two emotional conflict dimensions,

EP and ET, were confounded with too high correlation with positive affective valence in the case of ET, and too high negative correlation with affective valence in the case of EP. Thus, 180 group members responded to the two questions illustrated in the table below.

*Table 10: Mood Valence[1] and Intensity of the Intragroup Conflict Dimension Items*

| *Mood valence and intensity* |
|---|
| How would you consider the general mood of the team during the period? |
| How would you consider, in general, the intensity of the disagreements/conflicts the group experienced? |

The results are presented in the table below. First, we conclude that even though the constructs were correlated positively or negatively, which was expected, none of the correlations exceeded .49, which indicate that neither of the constructs in the analysis seems to be confounded by mood valence or intensity.

[1] In the Norwegian questionnaire I use the term "stemning" withiin the group, rated from "very negative" to "very positive". This should not be confused with the English term "mood", which is commonly understood as a description of an individual state of mind ("sinnstilstand", see Kunnskapsforlagets blå ordbok). Alternatively, I could use the Norwegian definition "belønningens sunbjektive verdi for individet" (Kaufmann & Kaufmann, 2003: 49[1]), or: the subjective value of the reward for the individual (my translation), analogically for the group. This, definition, however, is created within a motivation theory context, which is not the focus of this dissertation. All in all, I admit that the translation of "valence within the group" with "stemning i gruppen" may have room for improvements.

*Table 11: The Intragroup Conflict Constructs and Mood Valence and Intensity of the Conflict.*

| **Correlations (a)** | EP | CT | ET | CP | Mood valence | Intensity |
|---|---|---|---|---|---|---|
| Emotional person (EP) conflicts (4 items) | 1.00 | | | | | |
| Cognitive task (CT) conflicts (3 items) | -.33** | 1.00 | | | | |
| Emotional task (ET) conflicts (4 items) | .19** | .30** | 1.00 | | | |
| Cognitive person (CP) conflicts (4 items) | .44** | .11 | .51** | 1.00 | | |
| Mood valence (1 item) | -.43** | .34** | .02 | -.16* | 1.00 | |
| Intensity (1 item) | .53** | -.21** | .28** | .38** | -.30** | 1.00 |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

a Listwise N=183. Individual Level.

When first looking at the discriminant validity of the emotional task conflict construct, we find that ET does not correlate with positive mood valence. This indicates that emotional task conflict is *not* "a conflict where the group members happen to be in a good mood". Moreover, we register that ET conflict is significantly correlated with intensity ($p < 0.01$), which clearly indicates the convergent validity between ET conflict and one of the emotional dimensions, arousal/activation (represented here with the closely related concept intensity). Thus, we find that an ET conflict is not "a conflict that is not a conflict at all", that is, "a passive discussion about some unimportant issues". All in all, we find that emotional task conflicts are likely to appear or be created in the work group no matter whether the mood in the group is good or bad, and that ET conflicts are significantly indicated to be intense as well.

Moreover, emotional person conflict shows discriminant validity in relation to positive mood valence and convergent validity in relation to intensity. Cognitive task conflict shows discriminant validity to intensity, but a convergent validity to mood valence. Thus, it might be that "rational, analytical and solution oriented disagreements" (a common informal description of the C/T conflict dimension) are not likely to occur when the mood of the group is bad.

The validity of cognitive person conflict, however, seems to be more ambiguous in relation to the definition of the concept. The moderate, albeit significantly, negative relationship with mood valence, marks CP conflicts as different from CT conflicts, as one might expect, considering the different character of person-oriented conflicts tends to have compared to task oriented conflicts. However, the strong positive correlation between CP conflicts and intensity does not indicate a convergent validity to a "not emotional" conflict construct. The tension connected to cognitive oriented person conflicts is apparently not easy to "erase", and I must admit that the discriminant validity of CP conflicts in relation to emotional conflicts is not clear.

#### 3.1.4.1 Exploring the Work Group Effectiveness Scale

The particular work group effectiveness scale consists of the two-performance variable work group delivery and work group job satisfaction. In the common exploratory factor analysis of the self-reported variables (see Table 6), one of the work group job satisfaction items had to be removed. The work group job satisfaction construct consists of the 3 remaining items.

The eigenvalue for the factor consisting of the three work group job satisfaction items was above 1.00, and thus, the job satisfactory construct is considered to be significant. However, the eigenvalue for the work group delivery factor was 0.92, which is marginally below the recommended threshold of 1.00. However, the eigenvalue depends to a certain extent on the number of items in the factor. We also know that there is a tendency to extract too few factors when using eigenvalue at 1.00 as cut off in analyzes with fewer than 20 variables or items (Hair, Anderson, Tatham, & Black, 1998: 103-104, see also Nunnally & Bernstein, 1994: 535-536). Thus, since work group delivery is measured by only two items, and the number of items in the analyzes is 20, which is the lowest possible number of variables before the threshold of eigenvalue of 1.00 tends to be too conservative, I deem the work group delivery factor also to be marginally significant.

The factor loadings of the items measuring group effectiveness in terms of work group job satisfaction and work group delivery ranged between .70 and .88. Thus, none of the five items had loadings below .60, and there were no cross-loadings between the two factors, or in relation to the four intragroup conflict factors.

I also analyzed the four intragroup conflict dimensions for reliability, using Cronbach's Alpha. The standardized values were .82 for the work group job satisfaction factor and .70 for the work group delivery factor (2 items). The correlations between the work group job satisfaction items were between .53 and .70, whereas the correlation between the two work group delivery items was .54.

Thus, the explorative factor analysis has revealed significant evidence for a two-dimensional, orthogonal and independent factor structure of work group effectiveness, with acceptable reliability for each factor and a distinct factor structure with acceptable loadings and cross-loadings in total.

3.1.4.1 Confirming the Work Group Effectiveness Scale

The chi-square statistic of the 5-item composition extracted from the exploratory analysis (Table 6) was 4.8 with 5 degrees of freedom, which means that the difference between proposed and the observed matrices was non-significant above the level of $p > 0.05$. The absolute fit measure GFI was 0.99, and RMSEA was 0.0, with a 90% upwards confidence interval value on .085, which means that the RMSEA is approaching the recommended threshold of acceptable fit of 0.08 for RMSEA with 90% certainty. The incremental fit indicium NFI was .99, and the parsimonious fit measure AGFI was .98, both measures indicating close fit. The parsimonious fit measure normed Chi-square was 1.0, which is within the recommended threshold of 1.0, avoiding the risk of the model having "over fitted" the data (Hair, Anderson, Tatham, & Black, 1998: 658-659).

*Table 12: Team Effectiveness Scale – Measurement Equations, Measurement Errors, and Reliability*

| LISREL Estimates (Maximum Likelihood) | Measurement Equations and reliability ($R^2$) | |
|---|---|---|
| *Work group job satisfaction (WGJS)* | | |
| We have been more satisfied than frustrated by the experience of the social climate in the group. | = 0.62 | * WGJS, errorvar. = 0.48, $r^2 = 0.44$ |
| We have been more satisfied than frustrated by the experience of the distribution of tasks in the group | = 0.77 | * WGJS, errorvar.= 0.37, $r^2 = 0.62$ |
| We have been more satisfied than frustrated by the experience of the coordination of work in the group. | = 0.90 | * WGJS, errorvar. = 0.24, $r^2 = 0.77$ |
| *Work group delivery (WGD)* | | |
| How satisfied are you as the team's supervisor with the services the team has delivered (in total) during the last three months? | = 0.42 | * WGD, errorvar. = 0.38, $r^2 = 0.32$ |
| So far the team has delivered the products/services, which I expected them to deliver. | = 0.66 | * WGD, errorvar. = 0.05* $r^2 = 0.90$ |

* Error variance was negative, and was set to 0.05 by default (Jöreskog & Sörbom, 1993).

Thus, all indicators pointed in the direction of a close fit between the work group effectiveness model and the collected data matrix.

## 5.5 Using Individual Data at Group Level

### 5.5.1 A Group Level Perspective

Rousseau (1985) suggests three areas where a level should be specified for the variables. First, the *level of measurement*, which is the level to which generalizations are made. Second, the *focal unit,* which is the unit to which the data are directly attached. Third, the *level of analysis*, which is the level to which data are assigned for hypothesis testing and statistical analyzes. According to Rousseau (1985), the problems involved in finding the consequences of differences in focal unit, level of measurement and level of analysis, represent the basis of the methodological difficulties of multilevel research. However, Klein, Dansereau, and Hall (1994: 196) emphasize that these areas are also equally important for single level studies: "Precise articulation of the level of one's constructs is an important priority for all organizational scholars whether they propose single- or mixed-level theories".

In this dissertation, the level of analysis and the focal unit of the relationships between the latent variables are entirely at group level. However, since the level of measurement for five of the seven constructs in the dissertation is at individual level (see Table 13), arguments could be put forward in support of other perspectives, especially the multilevel perspective on the relationship with group job satisfaction, which is measured on individual level (Klein & Kozlowski, 2000). In particular, collecting and aggregating individual data to group level opens for an "emergent bottom-up perspective", where the effort would be to comprehend "the means by which elements in dynamic interaction create collective phenomena." (Kozlowski & Klein, 2000: 16).

However, the theoretical perspective in this dissertation is not the emergence from an individual level to a collective level, for example the constituence of a collective group job satisfaction from members individually reported group job satisfaction. This latter perspective implies a composition process based on assumption of isomorphism (identical concepts), that individual group job satisfaction is essentially the same as it "emerges upward" to group level group job satisfaction. In this dissertation however, a wholistic perspective is conducted, implying that group members are so sufficiently similar with respect to the construct in question that they may be characterized as a whole: "He or she need not refer to group members at all, but only to the group as a whole; a single value

or characteristic is sufficient to describe the group. Objective group size is perhaps an extreme example; it is clearly invariant across the members of a group" (Klein, Dansereau, & Hall, 1994: 198).

### 5.5.2 Aggregation from Individual to Group Level

An overview of level of measurement, levels of analysis, and focal unit is listed in the table below.

*Table 13: Specification of Levels of Measurement, Analysis, and Focal Unit (Adapted from Rousseau, 1985)*

| Levels<br>Individual level = "i" Group level = "g" | | | A<br>Level of measurement<br>The unit to which the data are directly attached | B<br>Focal unit<br>The level to which generalizations are made | C<br>Level of analysis<br>The level to which data are assigned for hypothesis testing and statistical analyses |
|---|---|---|---|---|---|
| Var no. | Variables | Collection of data | level | level | level |
| 1 | Work group delivery | Team supervisor evaluation | g | g | g |
| 2 | Job satisfaction | Team membe'rs assessment | i | g | g |
| 3 | Emotional task conflict | Team member's assessment | i | g | g |
| 4 | Emotional person conflict | Team member's assessment | i | g | g |
| 5 | Cognitive task conflict | Team member's assessment | i | g | g |
| 6 | Cognitive person conflict | Team member's assessment | i | g | g |

All variables will be analyzed at group level, which makes it necessary to discuss questions concerning aggregation of individual data. Indeed, averaging individual assessment of the four group dimensions of conflict, the work group's perception of work group job satisfaction and in the supervisors evaluating of the work group's effectiveness raises several methodological questions.

A substantial amount of research supports the acceptability of an individual level of measurement as basis for reasoning on group level as the focal unit, given certain requirements (e.g. Barsade & Gibson, 1998; Goodman, Ravlin, & Schminke, 1987; Ilgen, Major, Hollenbeck, & Sego, 1995; Pritchard & Watson, 1992; Tesluk, Mathieu, & Zaccaro, 1997). Several requirements have been suggested, of which we will mention four, in the following referred to as R1, R2,

R4, (Goodman, Ravlin, & Schminke, 1987, Tesluk, Mathieu, & Zaccaro, 1997) and R3 (Bliese, 2000).

First, a theoretical conceptualization of the work group level construct must be accomplished (R1). I perceive this as the ultimate requirement (Klein, Dansereau, & Hall, 1994). Second, individuals should explicitly assess group level performance (R2). Third (R3), work group assessors need to empirically demonstrate adequate within-group reliability in relative consistency among responses. (Bliese, 2000). Commonly, this requirement is formulated as an adequate within-group agreement among respondents. However, all individual level items in this dissertation, except group size, address factual events, either concerning respondent's recall of intragroup conflicts or respondent's perception of current group job satisfaction in the group as a whole. The question is whether the answers from respondents in the same group are reliable and proportionally consistent, not whether they are similar. To test the reliability I will use a one-way random-effects ANOVA to calculate the Intraclass Correlation Coefficient measures ICC1 and ICC2 (James, 1982). The ICC1 can be interpreted as the degree of reliability associated with a single assessment of the group mean, or as an index of interrater reliability. ICC1 varies from -1 to 1. When ICC1 is large, a single rating from an individual is likely to provide a relatively reliable rating of the group mean. When ICC1 is small, multiple ratings are recommended to increase reliable estimates of the group mean (Bliese, 2000). ICC2 represents the reliability of the overall sample mean, and is linked mathematically to ICC1 by the group size in the sample.The ICC2 is of particular interest in assessing reliability in proportionally consistency (James, 1982), as in this case, and is equivalent of the overall sample-mean reliability estimate (Bliese, 2000). Significance of the ICC1 is indicated and ICC2 measured by the F-ratio from the ANOVA analysis.Fourth, and finally (R4), the measurement properties and validity of work group level variables should be addressed at their proper level of analysis (Goodman, Ravlin, and Schminke, 1987; Tesluk, Mathieu and Zaccaro, 1997).

In the following, I will discuss these four requirements for aggregation individually collected data on group level for each of the variables used in this dissertation.

### 5.5.3 Intragroup Conflict Variable at Group Level

Concerning the first requirement, that the theoretical conceptualization should be done at the proper level (R1), the focal unit in studying intragroup conflict is the group (Rousseau, 1985). Accordingly, the definition of intragroup conflict is made at the group level, and a general heuristic definition of intragroup conflict (before specification in the four-dimensions of conflict) is the awareness of

simultaneous, but incompatible, correct/incorrect or approval/avoidance issues among group members, with relation to tasks or persons in the group. We notice that a conflict has to be "among group members", which means all from two group members up to all group members. Accordingly, at least two members have to be aware that they are involved in the issue (however, it is of no consequence whether they prefer to describe the issue as "a conflict" or e.g. as "not a conflict, only a disagreement"). Thus, the conceptualization of intragroup conflict is made at group level.

The second requirement was that individual respondents should be asked to explicitly assess group level performance (R2). This requirement is covered in the banner of the questionnaire that is used to collect the data: "Some research questions concerning disagreement, delivery, work group job satisfaction, and learning *in your group* (department/unit) and about feelings" (italics added). A closer inspection of the items used to measure the four-dimensions of conflict gives no reason to fear that the respondents will be directed away from the group level to the individual level, since five of the 12 questions mention the word "group" explicitly, as well as three additional items used the plural formulations "we" or "some" (of us).

The third requirement was work group assessors need to empirically demonstrate consistent adequate within-group reliability among responses (Bliese, 2000) (R3). I first will present respondents on each individually assessed item in the study. A one-way random effect ANOVA found a significant main effect of group membership at the level of $p < .05$ for 11 out of the 15 variables (Table 14). Four items did not, however, show significant reliability at group level. It is noticeable that three of these four items were emotionql task conflict questions. The item "The conflict was characterized by strong feelings and a motivation to find the best solution" was not even close to a group level response. In fact, by having a negative ICC1, the within group variance for this item was even smaller than the between-group variance. One possible explanation might be that the perception of relationship between the formulations "strong feelings" and "motivation" was so unstable among respondents that a consistent pattern of group response to this desciption was unattainable.

The reliability of the group means (ICC2) for each item except the ET item discussed above varied between .10 and .74. We should keep in mind that ICC2 is conservative in that it supposes a subsample from an infinite pool of potential raters or informants, when in thesc data, almost all possible informants are represented (Simons & Peterson, 2000).

*Table 14: Intragroup Conflict Items - Testing Differences of Within-Group and Between-Group Agreement. ANOVA, ICC1, and ICC2*

| | | df | Mean Square | F | Sig. | ICC1 | ICC2 |
|---|---|---|---|---|---|---|---|
| *Emotional person (EP) conflict* | | | | | | | |
| It seemed like narrow-mindedness or envy was driving the conflict | BG | 61 | 1,35 | 3,00 | 0,00 | 0,24 | 0,67 |
| | WG | 227 | 0,90 | | | | |
| When differences occurred, some tried to put themselves forward at the expense of others | BG | 61 | 2,15 | 2,13 | 0,00 | 0,15 | 0,53 |
| | WG | 226 | 1,01 | | | | |
| The conflict was marked by personal clashes in the group | BG | 61 | 3,25 | 3,34 | 0,00 | 0,27 | 0,70 |
| | WG | 226 | 0,97 | | | | |
| There was tendencies of anger and aggression between some persons in the group | BG | 61 | 3,54 | 3,89 | 0,00 | 0,32 | 0,74 |
| | WG | 228 | 0,91 | | | | |
| *Cognitive task (CT) conflict* | | | | | | | |
| During the conflict the group was concerned about solving problems by using a sensible and rational procedure | BG | 61 | 2,19 | 2,12 | 0,00 | 0,15 | 0,53 |
| | WG | 230 | 1,03 | | | | |
| Our disagreement was task oriented and we had long discussions, however we always put reason before emotions | BG | 61 | 1,28 | 1,11 | 0,29 | 0,02 | 0,10 |
| | WG | 226 | 1,16 | | | | |
| While disagreeing on the subject matter, feelings were kept under control and one made an effort to argue in a logical and analytical manner | BG | 61 | 1,25 | 1,43 | 0,03 | 0,06 | 0,30 |
| | WG | 225 | 0,88 | | | | |
| *Emotional task (ET) conflict* | | | | | | | |
| The conflict was engaged and emotional, but led to new ways of viewing the case | BG | 61 | 1,35 | 1,50 | 0,02 | 0,07 | 0,34 |
| | WG | 228 | 0,90 | | | | |
| We expressed different opinions that were quite heated, however it brought everything on the table | BG | 61 | 1,46 | 1,14 | 0,24 | 0,02 | 0,13 |
| | WG | 214 | 1,28 | | | | |
| The conflict was characterized by strong feelings and a motivation to find the best solution | BG | 61 | 1,07 | 0,94 | 0,61 | -0,01 | -0,07 |
| | WG | 218 | 1,14 | | | | |
| The discussions were lively and energized, however we had a shared need of finding the best alternative | BG | 61 | 1,52 | 1,24 | 0,13 | 0,04 | 0,20 |
| | WG | 218 | 1,22 | | | | |
| *Cognitive person (CP) conflicts* | | | | | | | |
| Some members of the group had to be reminded of which rules and norms we had in the group, and after a while they understood on their own why they had been corrected | BG | 61 | 1,81 | 2,04 | 0,00 | 0,14 | 0,51 |
| | WG | 227 | 0,89 | | | | |
| The group pointed out some bad habits of some of the group members, however the conflict did not become emotional because we clearly explained why. | BG | 61 | 1,70 | 1,62 | 0,01 | 0,09 | 0,38 |
| | WG | 222 | 1,05 | | | | |
| Personal critique was opendly and with relevant arguments put forward during the discussion | BG | 61 | 1,83 | 1,44 | 0,03 | 0,07 | 0,31 |
| | WG | 225 | 1,26 | | | | |
| Criticism of some members of the group occurred, but in such a way that nobody became defensive | BG | 61 | 1,28 | 1,40 | 0,04 | 0,06 | 0,28 |
| | WG | 216 | 0,92 | | | | |

BG: Between Group; WG: Within group. Average group size used in calculating ICC1 is k = 6.26.

After having examined respondents reliability in assessing the 15 conflict situations items, I will now turn to the reliability of respondents assessment of each intragroup conflict dimension, operationalized in the 4IC conflict scale, emotional person conflicts (4 items), cognitive task conflicts (3 items), emotional task conflicts (4 items), and cognitive person conflicts (4 items). Since all four items in the EP and CP conflict scale were significantly reliable at individual level, we also expect these scales to be reliable when assessed at group level. However, the other two dimensions of conflict had items that were not significant at individual level, and we should examine whether the two task dimension scales CT and ET are reliably assessed at group level (see table below).

In a one-way random effect ANOVA, I found a significant main effect of group membership at the level of $p < .01$ for all four intragroup conflict dimensions, indicating sufficiently reliability of all ICC2 values.. As expected, the ICC1s for individuals' assessment of group EP and CP conflicts, were significantly indicated by the F-value ($p < .001$). Not so obvoiusly, the ICC1s for the CT and ET conflict dimensions were also significantly indicated ($p < .01$). Thus, even if three of the four questions measuring emoitional task conflicts were not aggreable at a single item level, the four ET questions averaged together seem to indicate a reliable measurement of each group member's assessment of the appearance of group ET conflicts. The reliabilities of the group mean of the four conflict dimensions, the ICC2, should have values above .50 to be considered as tolerable (Klein, Bliese, Kozlowski, Dansereau, Gavin, Griffin, Hofmann, James, Yammarino, & Bligh, 2000). Thus, the ICC2 for aggregating group means of EP and CP conflicts is tolerable (.78 and .57, respectively), whereas the ICC2 for CT and ET conflicts did approach this level, with .41 and .39, repectively. Whether the appropriateness of aggregation from individual assessment to group level should rest on more that one indicator, in this case the ICC2, or several indicators pointing in the same direction is required, such as both the ICC1 and the ICC2, is a question that yet is not concluded (se discussion and simulation in Klein et al. 2000).

*Table 15 Intragroup Conflict Scales - Testing Differences of Within-Group and Between-Group Agreement. ANOVA, ICC1, and ICC2*

| | No items | | df | Mean Square | F | Sig. | ICC1 | ICC2 |
|---|---|---|---|---|---|---|---|---|
| *Emotional person (EP) conflict scale* | 4 | BG | 61 | 2,53 | 4,50 | 0,00 | 0,36 | 0,78 |
| | | WG | 233 | 0,56 | | | | |
| *Cognitive task (CT) conflict scale* | 3 | BG | 61 | 1,17 | 1,70 | 0,00 | 0,10 | 0,41 |
| | | WG | 234 | 0,69 | | | | |
| *Emotional task (ET) conflict scale* | 4 | BG | 61 | 0,95 | 1,65 | 0,00 | 0,09 | 0,39 |
| | | WG | 235 | 0,58 | | | | |
| *Cognitive person (CP) conflict scale* | 4 | BG | 61 | 1,18 | 2,32 | 0,00 | 0,17 | 0,57 |
| | | WG | 236 | 0,51 | | | | |

BG: between Group. WH: Within-Group.

The fourth requirement was that the measurement properties and validity of group level variables should be addressed at their proper level of analysis (R4)**.** All intragroup measures will be addressed and validated at work group level, which is the proper level in this dissertation.

Thus, there should be sufficiently arguments behind the appropriateness of aggregating the individually collected data on intragroup dimensions of conflict at group level.

### 5.5.4 Group Effectiveness Variable at Group Level

The evaluation of work group delivery is measured at the group level; however, we need to examine group job satisfaction. In general, studying group job satisfaction in work groups and organizations is a controversial matter, particularly as a performance variable. One approach, often referred to as a cognitive model, is to view group job satisfaction as related to individual expectations or needs. Thus, more or less durable characteristics with the individual (often measured by proxies like age and tenure) will be related to this individual's group job satisfaction. In this approach, people with low expectations and needs are more satisfied with their job than people with high expectations and needs. Another approach has been to assume that work group job satisfaction varies with objective, contextual physical, or social properties connected to the job situation (Hackman & Oldham, 1975). An illustration of the seeming antagonism between these two approaches is formulated by Cappelli, and Sherer (1991: 57), who beleive that the traditional dominance of the cognitive approach has been "the most important explanation for the ignorance of contemporary research in related fields". In this dissertation I have chosen the contextual

approach, in the sense that different dimensions of intragroup conflicts will vary with different work group job satisfaction states in the group.

Thus, concerning the first requirement of a proper level of aggregated analysis of work group job satisfaction that the theoretical conceptualization should be done at the proper level, the focal unit in studying work group job satisfaction is the group. Accordingly, I defined work group job satisfaction as: "Work group job satisfaction is group members' assessment of group satisfaction versus frustration over a period of time".

The second requirement (R2) was that individuals should explicitly assess group level performance. In Table 6 we find the items selected to measure work group job satisfaction These were: "We have been more satisfied than frustrated by the experience of the social climate in the group" ; "We have been more satisfied than frustrated by the experience of the distribution of the tasks in the group"; "We have been more satisfied than frustrated by the experience of the coordination of the work in the group". As we can see, all three items explicitly address the group level, including the respondent "we".

However, to meet the proper level of analysis requirement (R4), we should first investigate the third requirement (R3), that work group assessor needs to empirically demonstrate adequate within-group agreement.

*Table 16: Group Job Satisfaction Items - Testing Differences of Within-Group and Between-Group Agreement. ANOVA, ICC1, and ICC2*

| | | Df | Mean Square | F | Sig. | ICC1 | ICC2 |
|---|---|---|---|---|---|---|---|
| We have been more satisfied than frustrated by the experience of the social climate in the group. | BG | 61 | 1.56 | 2.28 | 0.00 | 0.17 | 0.56 |
| | WG | 234 | 0,68 | | | | |
| We have been more satisfied than frustrated by the experience of the distribution of the tasks in the group | BG | 61 | 1,06 | 1,15 | 0,23 | 0,02 | 0,13 |
| | WG | 230 | 0,93 | | | | |
| We have been more satisfied than frustrated by the experience of the coordination of the work in the | BG | 61 | 1,75 | 2,03 | 0,00 | 0,14 | 0,51 |
| | WG | 233 | 0,86 | | | | |

BG: between Group. WH: Within-Group.

A one-way random effect ANOVA of the three items measuring work group job satisfaction found a significant main effect of group membership at the level of $p < .001$ for two of them. The third items did not show significant reliability at the group level. It is interesting that the item "We have been more satisfied than frustrated by the experience of the distribution of the tasks in the group" was not significant. Assumingly, perception of the groups satisfaction or frustration

concerning the distribution of tasks seems to be more individualistic than the perception of the group's social climate and coordination. Intuitively this seems plausibe, since the distributuion of tasks in a group can turn out to be uneven, thus, biased perception of the satisfaction or frustration in the group. The reliability of the group means (ICC2) for JS1 and JS3 was .56 and .52, respectively, whereas the ICC2 for JS2 was as low as .13.

Next, I investigated the reliability of respondents perception of the work group job satisfaction at group level (see table below). One-way random effects ANOVA found a significant main effect of group membership at the level of $p <$ .01 for the work group job satisfaction scale. The ICC1 for the scale was .13, indicating the reliability of a work group job satisfaction perception done by one individual in the group. The ICC2, or the reliability of the group mean was .48, which is approaching acceptable level at .50, as recommended by (Klein, et al., 2000), and significant ($p < .01$).

*Table 17 Group Job Satisfaction Scale - Testing Differences of Within-Group and Between-Group Agreement. ANOVA, ICC1, and ICC2*

| | Items | | Df | Mean Square | F | Sig. | ICC1 | ICC2 |
|---|---|---|---|---|---|---|---|---|
| *The Work group job satisfaction scale (3 items)* | 3 | BG | 61 | 1,14 | 1,93 | 0,00 | 0,13 | 0,48 |
| | | WG | 236 | 0,59 | | | | |

BG: between Group. WH: Within-Group.

The fourth requirement was that the measurement properties and validity of group level variables should be addressed at their proper level of analysis. Given the appropriateness of aggregating individually measured data to group level as is indicated above, the level of analysis will be conducted at the group level.

### 5.5.5 Conclusion

In this chapter I have found support for the appropriateness of aggregating individually measured data across items when testing the hypothesis at their proper level, which is the group.

# 6. Results

## 6.1 The Relationship Between Intragroup Conflict, Group Size, and Work Group Effectiveness

### 6.1.1 Means, Standard Deviations, and Intercorrelations

The means, standard deviations and correlations for all group level variables are provided in table 18. Although there were several significant correlations among the variables, the magnitude of those associations, except for one, is not larger than $r < .55$, indicating multicollinearity did not present a significant problem, and that all the variables could be included in the regressions.

We notice, however, that the correlation between emotional person conflict and cognitive person conflict is large ($r = .69$), which brings up the question of how "cognitive *cognitive person* conflicts" - although formulated cognitively as they are - are assessed when group members report these conflicts. This question is not new, since the correlation between emotional/relationship conflicts and cognitive/task conflicts has repeatedly turned out to be substantial in several investigations. For example, in the metaanalysis of De Dreu and Weingart (2003), the mean correlation between C/T and E/R types of conflict was $r = .54$, with a mean of $r = .75$ for the upper quartile of the reports.

In table 18 we see that the correlation between work group delivery and group job satisfaction was non-significant ($r = .20$). We also register that ln group size is not correlated with any of the variables[1]. This confirms the empirical discussion, that of the appropriateness of using group size as a moderator should not be related to any of the variables in the research model (Baron & Kenny, 1986; James & Brett, 1984).

[1] This is also the case for group size, and the correlation between ln group size and group size was .96.

*Table 18: Means, Standard Deviations, and Intercorrelations (a). Group Level*

| | | Mean | S.d. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1, | Emotional person conflict | 2.02 | .75 | | | | | | |
| 2. | Cognitive task conflict | 3.26 | .50 | -.50** | | | | | |
| 3. | Emotional task conflict | 2.76 | .47 | .25* | .08 | | | | |
| 4. | Cognitive person conflict | 2.26 | .53 | .69** | -.13 | .54** | | | |
| 5. | Group size (ln) | 1.73 | .42 | .14 | -.01 | .12 | .13 | | |
| 6. | Work group delivery | 3.70 | .61 | .02 | -.20 | .20 | -.04 | -.09 | |
| 7. | Group job satisfaction | 3.45 | .51 | -.44** | .36** | .05 | -.24 | -.01 | .20 |

N = 61

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

### 6.1.2 Normality of the Data

All hypotheses were tested with ordinary least squares (OLS) regression or a repeated-measures version of OLS regression. All independent and assumed moderator variables were centered prior to the analysis. Therefore, assumptions of normality, homoscedasticity, linearity, and a lack of noncollinearity apply to our data. None of the intragroup conflict variables had skewness and kurtosis that reject the assumption of normality of the distribution at the .01 probability level.The emotional person conflict dimension however, was barely significantly skewed at the .05 probability level ($z_{skew}$ = 1.98). Normal probability plots and residual plots did not indicate any serious violations of the assumptions of normality, homoscedasticity, or linearity.

### 6.1.3 Multicollinarity

Pairwise and multiple variable collinarity were inspected by collinarity diagnostics in SPSS prior to analyzes. The lowest tolerance value was, for the assumed moderator variable on the relationship between cognitive person conflicts and group delivery (.19) and group job satisfaction (.19), both above the common cut-off threshold value of .10 (Hair, Anderson, Tatham, & Black, 1998), and also closely approaching the "worthy of concern value" of .20 (Menard, 1995).

### 6.1.4 Statistical Power and Testing

Before collecting the data, I had to consider what sample size would be sufficient to meet requirements of Type I error $\alpha$ (probability of rejecting the null hypoythesis when actually true), Type II error $\beta$ (probablity of failing to reject the null hypothesis when it is actually false), and power (probability of correctly rejecting the null hypothesis when it should be rejected). I decided to follow common acceptance of $\alpha$ levels at .05 at the minimum, with power levels of 80% (Cohen, 1977).

Next, I assess the appropriate level of effect size for the relationships in the research model and the hypotheses. Since the sample size of n = 62 was initially fixed in my study, I had to calculate the correlation needed to reach the level of significance and power I had formulated. Using a formula explained by Cohen and Cohen (1983: 116 - 120), I calculated that the necessary $R^2$ in the multiple regression analysis should be $R^2 = .25$ ($n = 62$) for the work group delivery and for group job satisfaction models. In the full model, with 11 independed variables ($df = 11$), the actual $R^2$ found was .28 for group delivery and .38 for job satisfaction. Thus, given the $R^2$ found for the two models, the sample size seems appropriate meet requirements to both Type I error, Type II error, and power level at 80%.

## 6.2 The Relationship Between Intragroup Conflict, Group Size, and Work Group Delivery – Results

In the following, the results of the hierarchical regression analysis are presented, following the principles from Cohen and Cohen (1983). The analysis is ran through four steps. In the first step, control variables are introduced. Following the principle of research relevance (Cohen & Cohen, 1983: 120 - 125), the four main inntragroup conflict dimension variables are introduced in Step 2. In Step 3, the direct effect of the assumed moderator, group size (ln)), is introduced in order to identify eventual direct influence of group size on work group delivery. Finally, in Step 4, group size as a suggested moderator on the relationship between the four intragroup conflict constructs and work group delivery is included. Since these four steps represent three different models of relationship between intragroup conflict and work group delivery (WGD), I will label them model WGD1, model WGD2, and model WGD3, represented in Step 2, 3, and 4, respectively (in Step 1 the control variables are introduced).

### 6.2.1 Control Variables

Sex rate of men and age were included in the regression analysis as control variables. To increase confidence of confidentiallity, Age were collected in 10

years intervals, each information were centered (45 for 40-59, 55 for 50-59 e.g.), and the individual data in each group were averaged.

### 6.2.2 Outliers

The individual data matrix was also checked for outliers. No outliers deviated more than 3 standard deviations from mean outcome values. Three observations deviated more than 2 standard deviations. These three obeservations were deleted from their groups in a preliminary analysis. The general results were that the significance of the models increased, as did the strongest variable in each step. However, no *new* significant relationships were found by eliminating the outliers, neither for the models, nor for the particular variables.

### 6.2.3 Main Results

The results are presented in table 19. The relationship between four intragroup conflict dimensions and work group delivery in the research model, Model WGD1, with the four conflict dimensions, emotional person, emotional task, cognitive task, and cognitive person intragroup conflict, and controlled for average age and sex rate in the group, was not significant ($F(6,55) = 1.72$, $p = .13$), but the change by the adding the four intragroup conflict dimensions to the control variables was marginally supported ($F(4,55) = 2.33$, $p = .07$). In addition, the relationship between emotional task conflict and work group performance was significant ($\beta = .41$, $p = .01$), supporting hypothesis H 1. Moreover, cognitive task conflict was marginally significant negatively related to work group delivery ($\beta = -.30$, $p = .07$), which supports hypothesis H 3. However, emotional person conflicts and cognitive person conflicts were not related to group delivery, and thus, hypothesis H 5 and H 7 respectively, were not supported.

In Model WGD2, the model was extended with the direct relationship between group size (ln) and work group delivery. Group size was not significantly related to work group delivery, as expected, also in terms of the appropriateness of group size as a moderator on the intragroup conflict and work group delivery relationship (Baron & Kenny, 1986; James & Brett, 1984). Still, it may be noticed that when group size is included in the model, and controlled for sex rate and average age in the grups, the relationship between emotional task conflict and group delivery seems to be strengthened ($\beta = .42$, $p = .01$), whereas the negative relationship between cognitive task conflicts and group delivery seems to stays at approximately the same level ($\beta = -.29$, $p = .08$).

In the full model WGD3, I included the four interaction variables. The model was marginally significant ($F(11,50) = 1.79$, $p = .08$). However, the introduction of the

interaction variables did not changed the model significantly ($\Delta F(4,50) = 1.90$, $p = .12$). In particular, the interaction effects found indicate that group size moderates the relationship between emotional task conflict and work group delivery ($\beta = -.25$, $p = .10$), and also that group size moderates the relationship between emotional person conflict and work group delivery ($\beta = -.32$ , $p = .09$).Thus, hypothesis H 10a and b, which suggested that both emotional conflict dimensions would be positively moderated by group size in terms of their relationship with work group delivery, was marginally supported. In the full model (WGD3) we also notice that the significance relationship between cognitive task conflict and work group delivery, found in model WGD1, became stronger ($\beta = -.34$, $p < .05$), whereas the relationship betweem emotional task conflict and work group delivery became weaker, and not significant ($\beta = .30$, $p = .11$).

*Table 19: The Relationship Between Intragroup Conflict, Group Size, and Work Group Delivery – Results*

| Model | | WGD1 | WGD2 | WGD3 |
|---|---|---|---|---|
| Step | Step 1 | Step 2 | Step 3 | Step 4 |
| Sex | -0.10 | 0.01 | -0.01 | 0.00 |
| Age | 0.06 | 0.15 | 0.15 | 0.13 |
| Emotional person (EP) | | -0.10 | -0.07 | -0.13 |
| Cognitive task (CT) | | -0.30+ | -0.29+ | -0.34* |
| Emotional task (ET) | | 0.41* | 0.42** | 0.30 |
| Cognitive person (CP) | | -0.23 | -0.23 | -0.19 |
| Group Size | | | -0.13 | -0.12 |
| EP*Group size | | | | -0.32+ |
| CT*Group size | | | | -0.08 |
| ET*Group size | | | | -0.25+ |
| CP*Group size | | | | 0.13 |
| F | 0.47 | 1.72 | 1.62 | 1.79+ |
| F Change | 0.47 | 2.33+ | 1.00 | 1.90 |
| R Square | | 0.16 | 0.17 | 0.28 |
| Adjusted R Square | | 0.07 | 0.07 | 0.12 |
| R Square Change | | 0.14 | 0.02 | 0.11 |

a Listwise N=62

Significance is marked reported with "**" for $p < .01$ and "*" for $p < .05$ in a 2-tailed test and marginal significance for $p < .10$.is marked with "+".

WGD is abbreviation for Work Group Delivery.

Group size is logarithmic measured (ln).

Note that all interaction effects of group size are incrementally diminishing with increased group size, since I use the natural logarithm of the group size and not the actual number.

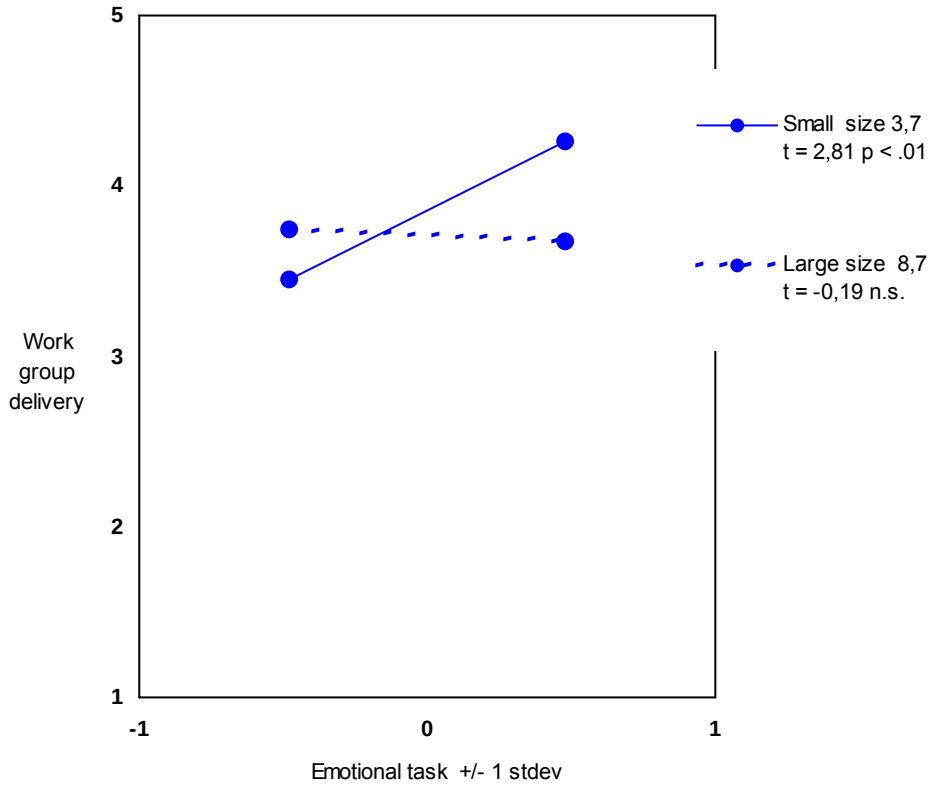
I found no interaction effects of group size connected to the relatinship between the two cognitive conflict dimensions (CT and CP), and thus, hypothesize (H 9), that the two cognitive conflict dimensions would be positively moderated by group size in terms of their relationship with group performance, was not supported.

### 6.2.4 Group Size as a Moderator on the Partial Relationship Between Emotional Task Conflict and Work Group Delivery

In the stepwise hierarchical regression (see table 19), I found that the interaction effect found indicate that there is a negative moderator effect on the relationship between emotional task conflicts and work group delivery. Based on this information, I developed an illustration of the interaction effect as recommended by Aiken and West (1991), and presented in Figure 5. The figure is based on model WGD3 in the analysis.

The figure indicates that the work group delivery in small groups (average 3.7 members) is positive related to the relationship between emotional task conflict and group delivery ($t = 2.81$, $p < .01$), and that the relationship between large groups (average 8.7 members) and work group delivery is not significantly related to the relationship between emotional task conflict and group delivery.

*Figure 5: Group Size as Moderator of the Relationship Between Emotional Task Conflict and Work Group Delivery*[1]

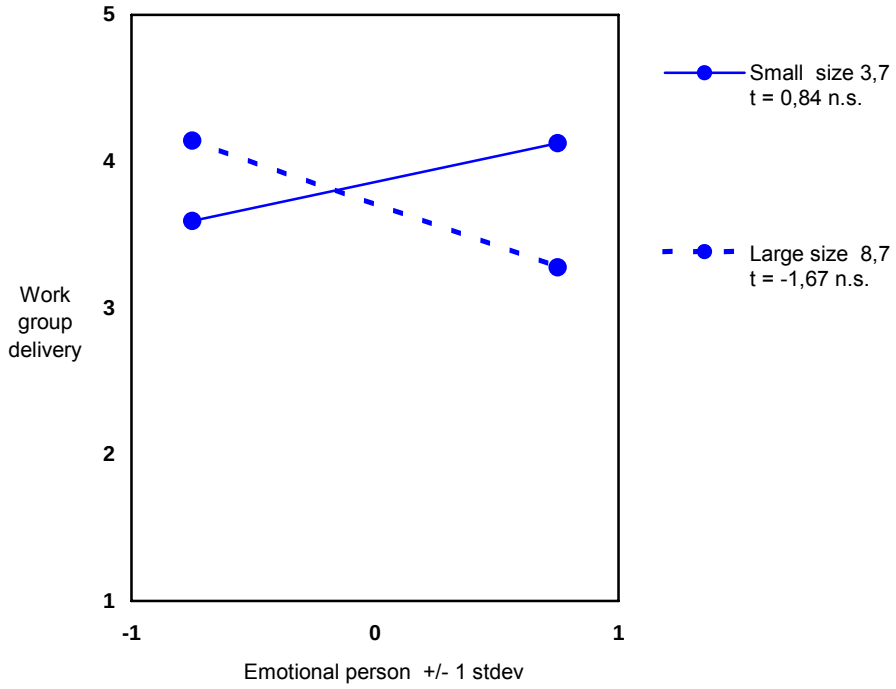



[1] Illustrating the effect of partial variable from a multivariate context represents a problem concerning value of the intercept. In this figure and the two to follow, the figure should be understood as the level of group delivery (y-axis) when the emotional task conflict (x-axis) varies from 1 to 5 in frequency, at the same time as the other conflict dimensions are held constant at their average conflict level. Thus, the two left hand side bullets in the figure illustrate the level of group delivery when the frequency of the emotional task conflict dimension is lowest possible (1), at the same time as the frequency of the other three conflict dimensions are at their respective average levels. This is also the case for the two bullets at the right hand side of the figure, but here the frequency of emotional task conflict is at a maximum level (5).

### 6.2.5 Group Size as Moderator of the Partial Relationship Between Emotional Person Conflict and Work Group Delivery

In the stepwise hierarchical regression (see table 19), I also found an interaction effect that indicates that group size moderate negatively the relationship between emotional person conflict and work group delivery ($\beta$ = -.32, $p$ = .09). Figure 6 is based on the regression analysis made in Model WGD3, and indicates that the question of whether the relationship between emotional person conflict and group delivery in small groups is positive, whereas the relationship between emotional person conflict and group delivery in large groups is negative, might be worth while to examine closer.

*Figure 6: Group Size as Moderator of the Relationship Between Emotional Person Conflict and Work Group Delivery*



## 6.3 The Relationship Between Intragroup Conflict, Group Size, and Work Group Job Satisfaction

### 6.3.1 Preliminary Analyses

3.1.4.1 Control Variables

As was the case for work group delivery, I ran a preliminary analysis for work group job satisfaction where sex rate of men and sex diversity were included as control variables in the first model of the analysis (Step 0). None of these control variables were significant. Moreover, they did not change the conclusions of significance neither for the model nor for the particular intragroup conflict relationships with the dependent variables.

3.1.4.1 Outliers

The data matrix for work group job satisfaction was also checked for outliers. No outliers deviated more that 3 standard deviations from expected value calculated from the regression equation. Three observations deviated more than the 2 standard deviations. These three observations were deleted in a preliminary analysis. The general results were that the significance of the models in each step increased, as did the strongest variable in each step. However, no new significant relationships were found by eliminating the outliers, neither for the models nor for the particular variables.

### 6.3.2 Main Results

The results of the analysis of the relationship between intragroup conflict and work group job satisfaction, with group size as an assumed moderator, are presented in table 20. As in the case of the work group delivery analysis in the previous paragraph, the sex ratio of men and average age in the group were included as control variables. In Model WGJS1, the four intragroup conflict predictors were calculated, and the model of the relationship between the four intragroup conflict dimensions and work group job satisfaction was supported ($F(6,55) = 3.82$, $p < .01$), as well as the adding of the four conflict dimensions to the control variables ($\Delta F(4,55) = 4.92$, $p < .01$). However, only one of the four conflict dimensions, emotional person conflict, was related to work group job satisfaction and thus, the hypothesis H 6, that suggests a negative relationship between EP conflicts and work group job satisfaction, was marginally supported ($\beta = -.32$, $p = .10$). The hypothesis H 2, which suggested that the relationship between emotional task conflict and work group job satisfaction would be indecisive, and since the relationship was not significant ($\beta = .19$, $p = .18$, n.s.), the hypothesis was supported.. Both hypothesis H 8, that the relationship

between cognitive person conflict and work group job satisfaction is negative, and hypothesis H 4, that the relationship between cognitive task conflict and job satisfaction is negative, were not supported.

In Model WGJS2, the direct relationship between group size and work group job satisfaction was included, and no relationship was found, congruent with what is appropriate for assumed moderator variables (Baron & Kenny, 1986; James & Brett, 1984). However, the model added by group sinze was still significant ($F(7,54) = 3.25$, $p = .01$), and the marginal negative relationship between emotional person conflict and job satisfaction was approximately the same as in WGJS1 ($\beta = -.33$, $p = .09$).

In Model WGJS3, the introduction of the four interaction variables did not change the model significantly (($\Delta F(4,50) = 1.77$, $p = .15$, n.s.), whereas the complete model (WGJS3) was significant ($F(11,50) = 2.83$, $p = .01$). As in model WGJS1 and model WGJS2, the negative variable relationship between emotional person and work group job satisfaction in model WGJS3 remained significant, and not marginally related as in model WGJS1 and WGS2 ($\beta = -.43$, $p < .05$).

One negative interaction effect was found, indicating that group size moderate negatively the relationship between cognitive task conflict and work group job satisfaction ($\beta = -.29$, $p < .05$). Thus, hypothesis H 11:a, which suggested that the relationship between the cognitive task (CT) dimensions of intragroup conflict and work group job satisfaction would be negatively moderated by group size, was supported. However, the interaction effect betweem the other cognitive dimension, cognitive person (CP) conflicts, and work group job satisfaction, was not significant, and hypothesis H 11b was therefore not supported. Neither was hypothesis H 12; supported, that group size should positively moderate the relationship between emotional person and job satisfaction and emotional task conflict and job satisfaction.

*Table 20: The Relationship Between Intragroup Conflict, Group size, and Work Group Job Satisfaction*

| | WGJS1 Step 1 | WGJS1 Step 2 | WGJS2 Step 3 | WGJS3 Step 4 |
|---|---|---|---|---|
| sex | 0,17 | 0,16 | 0,17 | 0,15 |
| age | -0,10 | -0,11 | -0,11 | -0,12 |
| Emotional person (EP) | | -0,32+ | -0,33+ | -0,43* |
| Cognitive task (CT) | | 0,17 | 0,17 | 0,11 |
| Emotional task (ET) | | 0,19 | 0,19 | 0,10 |
| Cognitive person (CP) | | -0,13 | -0,13 | 0,01 |
| ln Group Size | | | 0,05 | 0,04 |
| EP*Group size | | | | -0,06 |
| CT*Group size | | | | -0,29* |
| ET*Group size | | | | -0,10 |
| CP*Group size | | | | 0,14 |
| F | 1,27 | 3,82*** | 3,25** | 2,83** |
| F Change | 1,27 | 4,92*** | 0,16 | 1,77 |
| R Square | | 0,29 | 0,30 | 0,38 |
| Adjusted R Square | | 0,22 | 0,21 | 0,25 |
| R Square Change | | 0,25 | 0,00 | 0,09 |

a Listwise N=62

Significance is marked reported with "**" for $p < .01$ and "*" for $p < .05$ in a 2-tailed test and marginal significance for $p < .10$.is marked with "+".

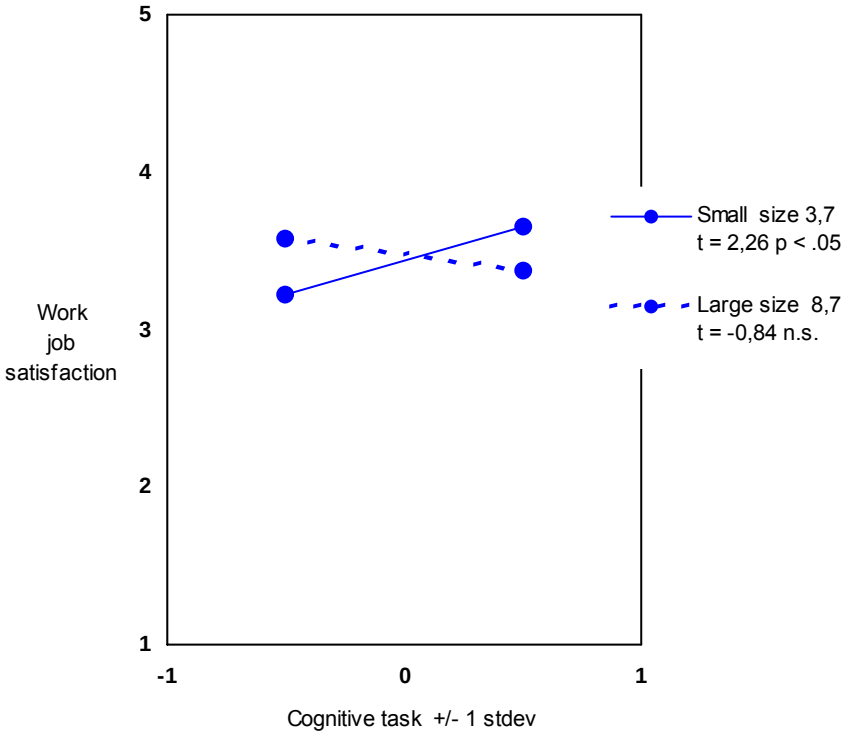
WGJS is abbreviation for Work Group Job satisfaction.

Group size is logarithmic measured (ln).

### 6.3.3 Group Size as a Moderator of the Partial Relationship Between Cognitive Task Conflicts and Work Group Job Satisfaction

In the stepwise hierarchical regression (see table 20), I found that group size moderated the relationship between cognitive task conflicts and work group job satisfaction negatively. In figure 7 this moderator effect is illustrated by a sample with group size with one standard deviation distance from centred mean, and elsewhere using the method advocated by Aiken and West (1991). The figure illustrates the significant negative interaction effect from group size ($\beta$ = -.29, $p$ < .05), in that increased group size is negatively related to the relationship between cognitive conflict and job satisfaction. Moreover, studying the slope of large groups (average size = 8.7 members) and small groups (average 3.7 members) separately, we notice that in small groups there is a significant positive relationship between cognitive task conflicts and job satisfaction ($t$ = 2.25, $p$ < .05), whereas the slope of the relationship between cognitive conflict and job satisfaction is negative, but not significantly different from zero ($t$ = -.84, n.s.).

*Figure 7: Group Size as Moderator of the Relationship Between Cognitive Task Conflict and Work group job satisfaction*



## 6.4 Summary of Findings

I have investigated the relationships between the variables in the research model through two main models, one concerning work group delivery and one concerning work group job satisfaction. I first investigated the relationship between the four-dimensional intragroup conflicts model, developed in this dissertation, and work group delivery. This model was supported. In particular, I found support for the hypotheses that work group delivery is related positively to emotional task conflict, and negatively to cognitive task conflicts, the latter also in line with contemporary research on this relationship (De Dreu & Weingart, 2003). Moreover, I found that group size negatively moderated the relationship between emotional task conflict and work group delivery, in that large groups delivered significantly worse than small groups when the frequency of ET conflicts increased. I also found that the relationship between emotional person relationship and work group delivery was negatively moderated by group size.

In the second model, I investigated the relationship between the un-moderated four-dimensional intragroup conflict (4IC) model and work group job satisfaction, and I found that the 4IC model was significantly related to work group job satisfaction. In particular, emotional person conflict was negatively related to work group job satisfaction, whereas emotional task conflict was not significantly related to work group job satisfaction as hypothesized. I found no support for my hypothesis of a negative relationship between cognitive task conflict and work group job satisfaction (De Dreu & Weingart, 2003). Moreover, validity analysis in this dissertation indicated that the cognitive/task conflict dimension and the cognitive task conflict dimension might be more dissimilar than I assumed when the CT conflict dimension was defined (r = .02 n.s.). However, C/T conflicts correlated clearly positive with both E/R conflicts and EP conflicts (*r* = .63** and *r* = .59**, respectively), whereas CT conflict correlated negatively with E/R conflict and not significantly with EP conflicts (r = -.33** and r = .15 n.s., respectively). Thus, C/T conflicts may include an emotional component which makes the relationship between C/T conflicts and work group job satisfaction similar to the relationship between E/R conflicts and work group job satisfaction. The assessment of task conflicts (the C/T dimension) as synonymous with "cognitive" or "intellectual" conflicts, and *not* emotional or affective conflict, should be considered revised.

I also found support for the complete model of the relationship between intragroup conflict, work group job satisfaction and moderator variables. In particular, increased group size was found to worsen the relationship between cognitive task conflicts and group job satisfaction.

# 7. Discussion

## 7.1 The Relationship Between Intragroup Conflict and Group Effectiveness

In this dissertation, I have developed a model of four intragroup conflict dimensions, which I have labeled the 4IC model, consisting of a cognitive task (CT), a cognitive person (CP), an emotional task (ET), and an emotional person (EP) dimension of an intragroup conflict. The CT and EP conflicts were intentionally developed to cover central domains of constructs currently in use, the cognitive/task oriented and the emotion/relationship/person (E/R) oriented dimensions of conflict (Jehn, 1992; Rahim, 1983). The ET and the CP conflict dimensions are new concepts, developed in this dissertation. I have also developed and tested an inventory to be used in measuring these four conflict dimensions, and the psychometric properties seem to be satisfactory and comparable with traditional two-dimensional intragroup conflict models currently in use, especially the ISC (Jehn, 1992; 1994; Pearson, Ensley, & Amason, 2002).

The main reason for developing the four-dimensional intragroup conflict model has been the impression of increased acceptance by scholars of the idea that all types of intragroup conflicts are negatively related to both group performance and to group job satisfaction. This impression became drastically accentuated by the presentation of the pivotal metaanalysis of De Dreu and Weingart (2003). This study was first presented at the Academy of Management Conference in Denver in 2002 (De Dreu & Weingart, 2002), where evidence was brought to suggest that *both* emotional/relationship and cognitive/task conflict dimensions were negatively related to performance[1] and group job satisfaction in groups.

Thus, since there have been no other dimensions of conflict to choose amongst other than the aforementioned, as far as the relationship between emotion/cognition and task/relationship has been concerned[2], we may just imagine the plethora of discouraging implications the message from De Dreu and Weingart's metaanalysis may have, or even already may have had, on research and practical leadership and membership in work groups. Most imperative among these implications can be illustrated in the following: "Avoid all

[1] Measured by objective data or by a sponsor, manager or supervisor from outside the work group.
[2] With exception of process conflicts, which has been commented earlier in this paper.

dimensions of conflicts in groups!" I simply could not accept this to be "end of story"[1].

Tests of complicated models are often inconclusive (Goodman, Ravling, and Argote, 1986). However, in this dissertation I have presented evidence of the relationship between an intragroup conflict model, measured by the four-dimension intragroup conflict scale (4IC scale), and both work group delivery and work group job satisfaction. However, this is important only to the extent that this relationship portrays something new to already existing knowledge of the relationship between intragroup conflict and group effectiveness.

Thus, I consider the evidence of a positive relationship between emotional task conflict and work group delivery, as this dissertation's main contribution to the intragroup conflict and group effectiveness relationship line of research. If this finding holds true through later scrutiny, hopefully to come, we may have added an "encouraging message" to already existing knowledge of the relationship between intragroup conflict and work group effectiveness, and that would be this: "Do NOT avoid all dimensions of conflicts in groups!"

Below I have summed up some of the important findings concerning the relationship between intragroup conflict and work group performance (reviewed in the theory chapter in this dissertation), and have tried to integrate some of the main findings from this dissertation into a joint perspective. In the list, I lean heavily on the findings in metastudy by De Dreu and Weingart (2003), and elsewhere I refer to the theory chapter in this dissertation:

1. The emotional task dimension of intragroup conflict (the ET dimension) is

    a. Positively related to group performance

        i. Comment: Suggested in this dissertation for the first time, and "group performance" specified as "group external supervisor evaluated work group delivery".

    b. Not related to group job satisfaction

[1] When I took the liberty of bringing this up in an informal email correspondence with professor Karen E. Jehn, I got the following answer: "(And I) also agree that I think that 'all conflict is bad' is NOT the end of the story!!!" Needless to say that this encouraging answer was really a treat to this author! (Cited with permission from professor Jehn.)

i. Comment: Indirectly supported in this dissertation. Thus, both the task oriented ET conflicts and CT conflicts, as they are defined in this dissertation, may not be related to work group job satisfaction (see 3.b.i).

2. The emotional person/relationship dimensions of intragroup conflicts (both the E/R and the EP dimension, which are similar) are:

   a. Negatively related to group performance[1].

      i. Comment: Neither confirmed, nor rejected in this dissertation, and thus, indirectly supported, but commonly found evident in other research.

   b. Negatively related to group job satisfaction.

      i. Comment: Commonly found elsewhere and supported in this dissertation for work group job satisfaction.

3. Cognitive/task oriented dimensions of intragroup conflicts (the C/T or the CT dimension) are:

   a. Negatively related to group performance

      i. Comment: No unanimity among researcher (see theory chapter), but supported in this dissertation.

   b. Negatively related to group job satisfaction

      i. Comment: Commonly found elsewhere, neither confirmed, nor rejected in this dissertation for work group job satisfaction. However, the C/T conflict type may be more emotionally loaded than the CT conflict type. Thus, the relationship between the less emotional CT conflict types may not be related to group job satisfaction at all.

4. Other conflict dimensions of intragroup conflict are considered, and accordingly, their relationship to group performance is still under explorative investigation:

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[1] Performance, delivery, or both.

a. This dissertation suggests the existence of a cognitive person dimension of conflict (the CP dimension).

    i. Significant relationships between CP conflicts and group effectiveness variables were not found in this dissertation. However, CP conflicts were negatively related to the two group effectiveness variables in this dissertation.

b. Some interesting research is done on the process conflict dimension.

5. Group size has been found to be a significant moderator on the relationship between intragroup conflicts and work group effectiveness, in that group size:

    a. Negatively moderates the relationship between emotional task conflict and work group delivery.

    b. Negatively moderates the relationship between emotional person conflict and work group delivery.

        i. Comment: Found in this dissertation. Emotional conflicts do not seem to be beneficial for large groups in terms of the group's delivery.

    c. Negatively moderates the relationship between cognitive task conflict and group job satisfaction.

        i. Comment: Found in this dissertation for work group job satisfaction. Cognitive conflicts in large groups do not seem to be related to high work group job satisfaction, whereas small groups seems to be more appropriate for cognitive conflicts in terms of work group job satisfaction.

The aim of presenting this list of suggested, indeed, general findings, all commented upon in earlier chapters of this dissertation, is to put this dissertation's contribution to empirically oriented intragroup research into a broader perspective. The general impression we can extract from the list, is that conflicts in groups are *still* "bad", at least if the conflict does not contribute to "clear the air" in a group

development perspective (Gersick, 1988; Tuckman, 1965). However, this dissertation may indicate some positive paths to follow. I have found evidence for an emotion and task oriented conflict dimension (ET), which is positively related to work group delivery, in particular if the work group is not too large. The condition required to keep this emotional conflict dimension beneficial seems to be a combination of a strict focus on the task in relatively small groups, where emotions may flourish among the group members, however, possible within "reasonable" limits not delineated in this dissertation, to avoid "emotional hijacking" (Baron, 1984; Goleman, 1995).

Moreover, this dissertation indirectly suggests that the assumption that cognitively task oriented conflict dimensions are detrimental to work group job satisfaction may be questioned, in as much as no such relationship was found. We recall that there seems to be a fairly substantial emotional proportion in the currently used cognitive/task conflicts dimension. 25% of the studies included in the metaanalysis of De Dreu and Weingart (2003) correlated higher that $r$ = .70 with the emotional/relationship conflict dimension, and the correlation between the currently used cognitive/task oriented C/T conflict and EP defined in this dissertation was $r$ = .59, and $r$ = .63 between C/T and E/R. In contrast, the CT conflict defined in this dissertation does not seem to be emotionally loaded. The relationship between the CT and EP conflict was $r$ = -.29, and between CT and E/R the correlation was $r$ = -.33 (all correlations mentioned significant at the $p < .01$ level). Thus, even if I expected the CT conflict and the C/T conflict to be similar, they turned out to be not related to each other at all ($r$ = .02 n.s.). Presumably, it may not be unreasonable to suggest that the CT conflict dimension defined in this dissertation is a more discriminant valid cognitive conflict dimension than the C/T conflict dimension currently in use, since the latter seems to be too emotionally loaded to be labelled a "pure" cognitive conflict, as much as this is practically possible to measure. Thus, a possibility would be to continue the tradition of labelling this type of conflict a "task conflict", as many do, but not associate the conflict type with particular "cognitive" or "intellectual" properties.

For practitioners, the size of the work group is one of the main aspects to consider when creating a new work group. Even if the main focus on group size from scholars seems to have been in the 1970s, a renewed interest to the question seems also to have emerged (e.g. Amason & Sapienza, 1997; Bantel & Jackson, 1989; Haleblian & Finikelstein, 1993; Pearce & Herbik, 2004). In this dissertation I have found evidence for a negative moderating effect of group size on the relationship between intragroup conflicts and group effectiveness. In particular, I found evidence for a negatively moderating effect from group size on the relationship between ET and EP conflicts and work group delivery, and between CT conflicts and work group job satisfaction. A warning is accordingly warranted in this respect: Even if movement towards large

groups does not necessarily "cause" conflicts in groups, these findings indicate that certain types of conflicts can be more troublesome to approach in large groups as compared to small groups. Thus, smaller groups may not be recommended because they avoid conflicts more often than large groups. At the same time, they may be recommended because they can prove to be more capable of transforming the conflict, which may appear into higher performance levels and higher group job satisfaction than larger groups may achieve, particularly in the case of emotional task conflict and cognitive task conflicts, respectively.

## 7.2 Limitations and Further Research

A limitation must be admitted concerning the risk of *common-method variance* or mono method bias, as all variables emerged from the same survey instrument (intragroup conflict and work group job satisfaction), or from the same survey approach (intragroup conflict and work group delivery). Even if a common factor analysis of all self-reported variables was conducted, we are not allowed to completely rule out the possibility that common method variance artificially may inflate bivariate correlations. However, complex data relationships is not easily explained by common method, since respondents cannot easily guess researcher hypotheses or respond in a socially desirable manner that would lead to spurious findings (Brockner, Siegel, Daly, Tyler, & Martin, 1997). Further studies should consider collecting work group job satisfaction data from another survey instrument than what is employed to measure intragroup conflict.

Even if the statistical and psychometric properties of emotional task conflict were satisfactory in the current study, further development of the construct is needed, especially for clarifying and improving the understanding of the difference between "positive emotional conflicts" and "cognitive task conflicts in a positive emotional context".

We may, however, expect to find most improvements in the further development of the cognitive person conflict dimension. From a theoretical point of view, this conflict dimension should not be more difficult to comprehend than the other three conflict dimensions in our model. Moreover, this conflict dimension may also be most interesting from a more practical point of view. However, even if negative feedback based on cognitive reasoning is perhaps necessary in group ambition to reach peak performance, the difficulty arises when it comes to the question of how cognitive negative feedback should be conveyed without eliciting negative emotional reactions from the receiver. Future studies may be confronted with the fact that the respondents will perceive most cognitive person conflict questions as emotional person conflicts questions, even if they are not, in theoretical terms. Thus,

how to solve this problem when investigating the relationship between cognitive person conflict and group performance is an important avenue for future research. The cognitive person conflict dimension is also the statistically "weakest" dimension in our study. Thus, in this respect too, the cognitive person dimension needs further improvement.

Even if the decision in this dissertation to study the relationship between intragroup conflict and work group effectiveness entirely on group level in my view should be considered as the most appropriate, certainly several limitations follow as a consequence of this decision. First of all, when reducing the N from 313 individuals to 62 groups, a substantial amount of variance in the sample will not be investigated, especially if the study includes a relatively large number of variables.

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# 8. Appendix

## 8.1 Theory Driven Preferable Properties of Intragroup Conflict Items

1. All dimensions of conflict should include items where the term "conflict" is used.

    a) Comment: Making the concept "conflict" explicit for all dimensions of conflict. Laymen's' perception of "conflict" is that e.g. cognitive task conflicts are not "conflicts", but just "disagreements", whereas emotional person conflicts are "real conflicts". By using the term "conflict" in all dimensions of conflict, this erroneous implicit perception is counteracted.

    b) Achievement

        i. In cognitive task the term "conflict" is used in item CT1 and CT4.

        ii. In emotional person the term "conflict" is used in item EP1, EP2, and EP3.

        iii. In emotional task the term "conflict" is used in item ET1, and ET3.

        iv. In cognitive person the term "conflict" is used in item CP2.

2. All dimensions of conflict should include items were the terms "disagreement", "discussion", or "different opinion" is used.

    c) Comment: Making it explicit that conflict types "real conflict", such as emotional person conflict, also may for example be a disagreement.

    d) Achievement

        i. In cognitive task the term "disagreement" was used in item, CT2 and CT3, and the term "discussion" in term CT2.

        ii. In emotional task the term "discussion" was used in item EP3 and ET4, and the term "different opinion" in item ET2.

3. Both task dimensions of conflict should have item where the term "task" is used, and denial of "task" in the person dimensions of conflict.

    e) Comment: Making it explicit that task conflict is about tasks, and that person conflict is not about tasks, which is not self-evident (cf. "process conflict", Jehn, Chadwick, and Thatcher, 1997).

    f) Achievement

i. The "task" term is used in item CT2 and CT4, and in cognitive task, however, no items in emotional task.

ii. Denial of "task" is used in item EP3 in emotional person conflicts, however, no items in cognitive person.

iii. Both person dimensions of conflict should have items (an item?) where the term "person" is used, and denial of "person" in the task dimensions of conflict.

g) Comment: Making it explicit that person conflict is about persons, and that task conflict is not about persons (cf. c) an above).

h) Achievement

i. The "person" term is used in item EP2 and EP5 in emotional person conflict.

ii. No denial of "person" terms is used in cognitive task and emotional task.

4. Both emotional dimensions of conflict should have items where the term "emotion" or "feeling" is used, and denial of "emotion"/"feeling" in the cognitive dimensions of conflict.

i) Comment: To make it explicit that this is an emotional conflict, and that cognitive conflicts are not emotional, in terms of dominance. Laypersons tend to use the term "feeling" instead of "emotion", which makes the term "emotion" difficult to use.

j) Achievement

i. The term "emotional" is used in item EP3 in emotional person conflict, and in item ET1 and ET3 in emotional task type, and the term "feeling" is used in item ET3 in emotional task.

ii. The denial of the term "emotional" is used in item CT2 in cognitive task and in item CP2 in cognitive person, and the denial of the term "feeling" is used in item CT3 in cognitive task and in item CP2 in cognitive person.

5. Both cognitive dimensions of conflict should have the items where the term "cognitive", "reason" and "rational" is used, and denial of "cognitive"/"reason" / "rational" in the emotional dimensions of conflict.

k) Comment: Intentions were to make it explicit that this is a cognitive conflict, and that emotional conflicts are not cognitive, in terms of dominance. However, the term "cognitive" is even lesser used by laypersons than the term "emotion" (cf. e)a above), and I decided not

to use the term explicitly, since many respondents would simply not understand the content of the term.

l) Achievement

i. The term "cognitive" was not used in any of the items, but reason was used in item CT2 and "rational" was used in item CT1 in cognitive task. In cognitive person none of these terms were used, and

ii. No denial of the terms was used in emotional task and emotional person.

6. Positive and negative mood valence and high and low intensity of the emotional dimensions of conflict should be represented in the emotional dimensions of conflict, and mood valence and intensity should be formulated in neutral terms in the two cognitive dimensions of conflict.

m) Comment: Based on psychological and neurological understanding of emotion as a two-dimensional term, consisting of intensity and affective valence (Bush, 1973; Bradley & Lang, 2000). In terms of intensity, there is no systematic difference between the two emotional dimensions of conflict. However, see further comments below on the question of affective valence., in this dissertation specified as mood valence.

n) Achievement

i. In emotional person conflict, item EP3 describes a conflict the group members experience as "not essential". The other work group is negatively valenced. Item EP2 and EP5 express high intensity conflict.

ii. In emotional task item ET1, ET3, ET2, and ET3 are neutrally mood valenced, whereas items ET1 and ET3 are positively mood valenced. No items are negatively mood valenced. All items, with a possible exception of item ET3, expressed high intensity in the conflicts.

iii. All cognitive task items are either mood valence/intensity neutral (e.g. item EP3) or irrelevant.

iv. All cognitive person items were either formulated mood valence/intensity neutral or irrelevant.

7. All items should be interpretable as processual conflicts.

o) Comment: The awareness of a conflict can be instant or sustainable.

p) Achievement

i. All items conform to the preferred requirement.

ii. Emotional person and cognitive task conflicts should include terms and formulations currently in use to measure emotional/relationship and cognitive/task conflicts

q) Comment: The theoretical similarity between cognitive task and cognitive/task conflicts and between emotional person and emotional/relationship conflicts is substantial. This similarity should be reflected in the items, however, not to make them identical, since the theoretical basis of cognitive/task and emotional/relationship conflicts is unclear.

r) Achievement: Cognitive task vs. cognitive/task dimensions of conflicts

i. The item: How frequently are there disagreements about the task you are working on in your work group? (Jehn, 1994) have some similarity with item CT2: Our disagreement was task oriented and we had long discussions, however, we always put reason before emotions.

ii. The item: We will work together in reaching a decision (Priem & Price, 1991) has some similarity with item CT7: The task-oriented conflict that occurred probably gave better basis to a correct decision afterwards.

s) Achievement: Emotional conflict vs. emotion/relationship dimensions of conflict

i. The item: In our group, we have lots of bickering over that should do what job (Rahim, 1983) has some similarity with item EP1: During the discussion, time was wasted bickering about things that had nothing to do with the case in question.

ii. The item: To what extent are personality clashes present in your work group? (Jehn, 1994; see Rahim, 1983) has significant similarity to item EP2: The conflict was marked by personal clashes in the group.

iii. The item: How much anger is present in your work group? (Jehn, 1994) has some similarity with item EP5: There were signs of anger and aggression between some persons in the group

iv. The item: One party frequently undermines another (Friedman, Tidd, Currall, & Tsai, 2000) has some content similarity to item EP1. There was some downgrading of others in relation to the conflict, and item 10. When

differences occurred, some tried to put themselves forward at the expense of others.

## 8.2 Using Confirmative Factor Analysis

A general introduction to the confirmative factor analysis (CFA) method will be presented in the following, before starting to investigate the scales.

The only statistical measure of goodness of fit in CFA is the chi-square value. Chi-square statistics are obtained by a comparison of the proposed and the observed matrixes. An appropriate solution to the difference between these two matrixes is *not* significant. However, using chi-square as a test statistics is regarded as less useful than regarding chi-square as a measure of overall fit (Jöreskog & Sörbom, 1993). Besides, the Chi-square test is most appropriate for samples between 100 and 200 (Hair, Anderson, Tatham, & Black, 1998: 605), and the sample sum in this analysis (listwise deletion) is 248. In general therefore, one will prefer to use chi-square as a "badness-of-fit measure, where a small chi-square relative to the degrees of freedom (df) is considered as god fit. There is no common consensus about an acceptable fit level of a chi-square given the degrees of freedom. A ratio between chi-square and *df* of two or three is suggested to be acceptable (Hinkin, 1995), and I will perceive a ratio between chi-square and *df* of 2.0 to be a maximum threshold for an appropriate fit indices in this dissertation.

CFA has a large amount of other non-statistical goodness of fit measures. The overall *absolute goodness of fit* indicator (GFI) gives the relative amount of variance and co-variance explained by the model. The GFI measures how much better the model fits as compared to no model at all, with a maximum value of 1.00 for perfect fit (Jöreskog & Sörbom, 1993: 122). Another frequently used absolute fit measure is the root mean square error of approximation (RMSEA), or the average of the residuals between observed and estimated input matrices. The RMSEA is primarily a measure designed to correct for the tendency of chi-square rejection of larger samples ($N > 200$), which makes the RMSEA value especial interesting for this dissertation. The RMSEA should be below .08 to be deemed as a reasonable good fit, and below .05 to be regarded as a close fit

Of *incremental fit* measures, the normed fit index (NFI) is calculated as one minus the ratio of the chi-square of the proposed model and a null model. The null model is normally a baseline single-factor model, where all indicators are related to one single construct, and with no measurement error.

This model will produce a Chi-square that all other proposed models will be expected to exceed, that is, having a lower Chi-square. Thus, a perfect fit between a proposed model and the data matrix will give a Chi-square of zero and a NFI equal to 1.00.

Lastly, several *parsimonious fit* measures are available. Parsimonious measures include the number of coefficients that have been used to achieve good fit, to prevent "over fitting" with the data. The adjusted goodness-of-fit (AGFI) is the GFI index adjusted by the ratio of degrees of freedom for the proposed model to the degrees of freedom of a null model, and the AGFI value when perfect fit is 1.00.

In this dissertation I will perceive values that exceed .90 as acceptable fit, (or good and very good), whereas values between .80 and .90 will be denoted as "marginally acceptable" fit.

# 9. Figures and Tables

## 9.1 Figures



## 9.2 Tables

## 10. References


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