The influence of emotions on decision-making processes in management teams = (l'influence des émotions sur les processus de prise de décision dans les équipes de cadres)

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THE INFLUENCE OF EMOTIONS ON DECISION-MAKING PROCESSES IN MANAGEMENT TEAMS

(L'influence des Emotions sur les Processus de Prise de Décision dans les Equipes de Cadres)

THESE

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TABLE OF CONTENTS

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Abstract

This dissertation addresses the emerging area of research on discrete emotions and decision-making in organizational settings. The focus is the role of four classes of emotions, achievement, approach, resignation, and antagonistic and the different influences these may have on team decision-making processes, such as sharing information, generating alternatives, evaluating alternatives, and team cohesion. For each class of emotions, four hypotheses were established, in order to investigate the relationship between the class of emotions and each decision variable. Three levels of analysis were considered: individual, team, and group consensus level. Three types of emotion scores were computed to address memory issues in self-report: mean, maximum, and last scores. A measurement tool for class of emotions, the Emotion Wheel, was construct validated. A questionnaire for decision-making variables was developed.
Respondents, 106 managers attending executive development seminars, took part to this study. They were distributed in 4 to 7 person-teams. Team members operate as a self-managed team that acts like a board of directors of the company they have to manage during a business simulation. The business simulation that was used aimed to help participants see the integration of different functions and competencies necessary to run a multinational organization. It is a complex, large-scale simulation that requires complex decision-making strategies to deal with multiple inputs, unpredictable events, and competing groups. The main results were:
Although achievement emotions are very important for the well being of an individual, and for his/her self-esteem, they can have a negative relationship with decision-making processes at the collective level, particularly at high levels of intensity.
Collective approach emotions appear to be an enhancing factor, in the context of which team members are willing to compete as successfully as possible with both the capability to generate new alternatives and to go through the painstaking analysis and review of alternatives. Yet, high levels of intensity at the aggregated team level relate negatively to decision-making processes.
Collective resignation emotions relate to alternative generation and to team cohesion positively and consistently over time. Contrary to the results found with achievement, approach, and antagonistic emotions, no high levels of intensity of resignation emotions were reported. Thus, these findings corroborate the fact that a moderate level of emotions can contribute to effective decision-making.
Individual antagonistic emotions relate to alternative generation and to alternative evaluation positively when team members have worked a long time enough together. Adversely, when team members are starting to work together, antagonistic emotions relate to alternative evaluation and to team cohesion negatively. An intense level of collective antagonistic emotions is negatively related to all decision-making processes.

Implications for future theory and research are discussed.

INTRODUCTION

The purpose of this research is to determine the extent to which emotions have an influence on decision-making processes in management teams. Four different classes of emotions are considered[1]: achievement emotions, approach emotions, resignation emotions, and antagonistic emotions. Four decision-making processes[2] are considered: sharing information, alternative generation, alternative evaluation, and team cohesion. This research is field-based and exploratory. Managers reported their emotions repeatedly during 8 days while engaged in an intense decision-making situation in an executive workshop. While individual processes are important and also addressed in this research, the thrust will be to discover how emotions combined in a collective dynamic process can impact managers' decision-making processes. As organizations increasingly evolve towards a greater team orientation, it appears relevant to better understand shared processes, whether emotions or other team processes.

Recently, researchers have investigated the extent to which individual affects, moods, or emotions of team members combine into a collective process that influences how teams operate. Researchers who have addressed collective affect[3], propose different viewpoints on how this process occurs. De Rivera (1992) defines emotional climate as the emotional relationships between members of a nation. Paez, Asun, and Gonzalez (1995) posit that an emotional climate is based on shared emotions, beliefs, and social representations, and that it represents a collective phenomenon that is not just an aggregation of individual emotions. Barsade (2001)[4], using Hatfield's (Hatfield, Cacioppo, & Rapson, 1994) definition of emotional contagion (a process of unconscious and automatic mimicry of other's nonverbal behavior), studies emotional contagion in work groups. Bartel and Saavedra (1998, 2000) define collective moods as moods shared by group members. George (1990) defines affective tone as consistent affective reactions within the groups. Totterdell, Kellett, Teuchmann, and Briner (1998) define mood linkages as similar interpersonal mood influences that operate within work teams.

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[1] Defined in section 1.1.
[2] Defined in section 1.3.
[3] Affect is used here as a general term including various affective constructs: emotion, mood, affect disposition, or affective attitude. Later on, definitions of affect, mood, and emotion will be given separately in the introduction and in section 1.1.
[4] I started to use this paper when it was at the stage of a working paper in 1998. Then it became a submitted manuscript in 2001, it has now been published in 2002. In the text, I refer mostly to the 2001 version. Both the 2001 and 2002 references are provided in the reference list.

Within this diversity of frameworks, some of these studies have been able to find an influence of collective affect on teams' processes or outputs. For example, positive emotional contagion is positively related to the level of cooperative behavior in the group and to a greater task performance, and is negatively related to group conflict (Barsade, 2001). Pleasant moods enhance the quality and the efficiency of group performance, whereas unpleasant moods enhance the group's motivation to reach its goals and to provide the targeted quantity of products or services (Bartel & Saavedra, 1998). Positive affective tone is negatively correlated with absenteeism and negative affective tone is negatively correlated with prosocial behavior (George, 1990). However, these studies examine the influence of collective affect on various team processes and outputs, but not its influence on team decision-making processes.

Other studies in the group and group decision-making literature have accounted for the affective side of teamwork. Although collective affect has not been explicitly addressed, a process of affective influence may take place that would lead team members to either like or dislike each other, or to be satisfied or dissatisfied with the team. In these studies, affect is studied in relationship with team processes or outputs. Heath and Jourden (1997) found that group activity enhances positive affect (what they describe as "the enthusiasm effect") but more importantly it buffers team members from translating the negative affect generated by post-performance disillusionment into negative performance evaluations. Other affective dimensions include: a) satisfaction with the leader and confidence in the group decision (Peterson, 1997); b) affective acceptance of other team members, which is considered to be essential to decision quality in top management teams (Amason, 1996); c) "group affect" defined as friendliness, enjoyment, and the extent to which group members like each other (Priem & Price, 1991), which decision-makers expect to be higher when they make their decisions based on consensus, compared to more conflict-inducing decision making conditions; and d) affective or socio-emotional conflict, defined as a dysfunctional type of conflict, based on personal incompatibilities, disagreements, or criticisms, including an anger dimension, which appears to be detrimental to decision quality (Amason, 1996; Devine, 1999; Priem & Price, 1991). These studies examined group decision-making processes influenced by some form of affect, but not by collective emotion.

Studies addressing explicitly or implicitly the issue of collective affect influencing team processes or outputs, such as cooperative behaviors, absenteeism, conflict or acceptance of decisions, for example, have been dealing primarily either with mood, or affect, but not

emotion. The studies focusing on mood defined it as an enduring and diffuse affective state, often without having any particular object or focus (.e.g., Bartel and Saavedra, 2000). The studies focusing on affect defined it a personality trait (e.g. George, 1990), and measured it along Positive Affect/Negative Affect dimensions (see Watson, Clark, & Tellegen, 1988). However, the findings on mood and affect may not generalize to emotion. Emotion is defined in this research as a complex phenomenon, with a series of interrelated changes in five different subsystems of the organism's functioning: cognition, physiological arousal, action tendencies, motor expression, and subjective feeling (Scherer, 1984a). Frijda (1986) defines action tendencies as states of readiness "to execute a given kind of action." (p. 70). Action tendencies are a relevant feature of emotion when it comes to understanding potential or actual behaviors in the context of a decision-making task and at the team level.

Emotion theorists have suggested the need for research addressing the influence of emotion on decision-making (e.g., Ellsworth, 1991; Ketelaar & Clore, 1998). At the individual level, for example, Lerner and Kelter (2000) have shown that fearful individuals make more pessimistic judgments about future events, whereas angry individuals make more optimistic judgments. At the group level, group decision-making research takes emotion in consideration, for example the effects of anger (e.g., Amason, 1996; Janis, 1989; Priem & Price, 1991), or of fear, shame, guilt, and elation (Janis, 1989). Emotion words are used, yet often without being defined precisely.

In summary, very little empirical work has been done on collective emotion and its influence on team decision-making processes. Thus, the objective of this research is to address this issue and to determine the extent to which different classes of emotions influence decision-making processes in management teams, at the individual and at the team level.

In chapter 1, the literature respectively on (a) emotion at the individual and at the collective level, (b) group decision-making, (c) emotion and decision-making at the individual level, (d) emotion and group decision-making will be reviewed. In chapter 2, the objective of this research and hypotheses will be presented. In chapter 3, the method used to address these hypotheses will be described. In chapter 4 the results will be presented, and in chapter 5 discussed. Finally in chapter 6, the limitations of the present research, and the implications and recommendations for future research will be presented.

CHAPTER 1: REVIEW OF THE LITERATURE

1.1. Emotion

The purpose of this chapter is first, to review definitions of emotion with an emphasis on the most relevant features for the present study, and second, to propose four classes of emotions: achievement, approach, resignation, and antagonistic emotions. Each one of the classes will be defined and reviewed. The concept of classes of emotions was initially proposed by Scherer & Tran (2001) to describe the impact certain emotions could have on organizational learning. Classes of emotions are relevant in applied settings for three reasons. First, with two classes of positive emotions and two classes of negative emotions, this classification departs from a traditional positive/negative dichotomy (see Scherer, 2000). Second, as the main interest in this study is collective emotions, or emotions felt by team members, it is relevant to group certain emotions sharing common features and behavioral outcomes, for example to describe an emotional climate (see chapter 1.2. for a definition). Third, as shown below, there are theoretical as well as empirical reasons, to propose these classes of emotions. Each of the classes of emotions studied here is composed of four emotions. This is not to suggest that these sixteen emotions are the only ones that are covered by the four classes, but they have been selected as examples because they represent modal emotions (see section 1.1.1 for a definition).

1.1.1. Definitions and Relevant Features of Emotion

This section describes a general definition of emotion, with the corresponding theoretical basis, and definitions of other affective constructs (i.e. affect and mood). Two features of emotion, action tendencies and emotion's social role, will be described, as they are relevant features for the present research.

1.1.1.1. Definition

Despite the fact that emotion has long been a neglected topic for researchers (Izard, 1991), knowledge about emotions has recently developed significantly. Emotion researchers have converged towards defining emotion as a complex phenomenon involving different subsystems of the organism's functioning - cognitive, physiological, action tendencies, motor expression, and subjective feeling (Frijda, 1994; Izard, 1991; Roseman, 1984; Scherer, 1984a), also referred to as the componential model of emotion (Scherer, 2000).

Componential theories of emotion (Ellsworth & Scherer, 2003; Frijda, 1987; Lazarus, 1991b; Roseman, 1984; Roseman, Antoniou, & Jose, 1996; Scherer, 1984a; Scherer, 1988, 1999; Smith & Ellsworth, 1985; VanReekum & Scherer, 1997) provide the theoretical basis on which the present research relies. They particularly focus on the cognitive component of emotion, demonstrating theoretically and empirically that cognition and emotion are interdependent. Emotional responses are elicited by individuals' subjective evaluation of an event that is relevant to their needs or goals. The ways in which people *appraise* an event will determine the emotion they will feel. The appraisal process provides great behavioral flexibility to humans, as it is linked to their capability of learning from experiences and adapting, by judging what is harmful or what is beneficial (Ellsworth & Smith, 1988; Lazarus, 1991b). Scherer (1984a; 1994) posits that each of these appraisals leads to a different emotional response, which could lead in theory to an infinite number of emotions. However, Scherer, in convergence with other appraisal theorists, acknowledges the existence of emotion families or prototypes (Scherer, 2000). He proposes the term of "modal" emotions, defined as the outcomes of frequently occurring patterns of appraisal or else, prototypical patterns of appraisal (Scherer 1994; Scherer, 2000; Scherer & Ellsworth, 2001). The notion of modal emotions is central to the present research as the sixteen emotions described and measured are representative of modal emotions.

Emotion, and namely modal emotions, is distinguished from affect and mood, two affective constructs widely used in organizational psychology and social psychology in general Scherer (2000) and in relationship to decision-making in particular. *Emotion* is episodic, which conveys the idea of a dynamic process, with a beginning and an end, and of a relatively brief duration (see Ekman & Davidson, 1994; Frijda, 1994; Kirouac, 1995; Scherer, 1996). Emotion is event/object specific (Lazarus, 1991b), has usually a definite cause and a cognitive content (Forgas, 1991), therefore its implications on behavior are focused and specific (Frijda, 1986; Ketelaar & Clore, 1998). *Affect* is a term that can refer to (a) feelings implying pleasantness or unpleasantness in a broad sense (Frijda, 1994), (b) a personality trait dimension (Diener, Smith, & Fujita, 1995; Watson et al., 1988), or (c) an attitude (Scherer, 2000). Affect is also used as a general term that includes mood and emotion (Kirouac, 1995). *Mood* is a diffuse affective state, low in intensity, relatively long-lasting, often without any particular object or focus, with even an unknown antecedent source (Forgas, 1991; Frijda, 1994; Izard, 1991; also see Ekman, 1994). The argument in favor of mood rather than emotion provided by organizational psychologists is that it is more representative of daily

common place feelings, less intense, and of a less brief nature than emotion, therefore easier to measure (see Barsade, 2001; Kelly and Barsade, 2001).

1.1.1.2. Action Tendencies

Lazarus (1991a) suggests that one must have a stake for an encounter to generate an emotion, and this stake generates an action tendency. Action tendencies are particularly relevant to the present study, as they are precursors to potential overt behavior, which is in turn observable, or at least detectable through indirect indices such as the implication in team activities. However, action tendency and overt behavior should not be confounded. As Scherer (1996) states,

> "It is important to note that most emotion psychologists distinguish action tendencies from overt instrumental behaviour. The actual running or hitting are not generally considered to be components of emotion but rather are seen as behavioural consequences of emotion." (p. 284).

Indeed, any action tendency can be concealed or mediated by coping or regulation mechanisms (Lazarus, 1991b). For example, the central action tendency of anger is attack but it can be transformed into passive aggressive behavior or even be completely inhibited with contradictory behaviors, such as speaking slowly or trying to relax (Averill, 1983). Action tendencies are states of readiness to execute some kind of action supporting an object goal (Frijda, 1986; Frijda, Kuipers, & ter Schure, 1989). Frijda et al. (1989) found that subjects predicted respectively 34.5% and 46.3% of 32 emotions with action readiness cues given to them, respectively for the two studies conducted. On the basis of these results, the authors concluded that emotional experiences consist of both appraisal and action readiness.

1.1.1.3. The Social Role of Emotion

Emotions have an important social role, as stated by Izard (1991): "the expressive behavior associated with emotions constitutes the signal-sending aspect of vitally important social communication systems." (p. 51) Emotion researchers recognize that most emotions are brought into play by the actions of others, hence influencing and being influenced by the course of interpersonal relationships (Ekman, 1994; Frijda & Mesquita, 1994; Lazarus, 1991a). Kemper (1991), in his power-status approach of emotions, suggests that a large number of human emotions are the result of "real, anticipated, imagined, or recollected outcomes of social relations." (p. 333). De Rivera (1984) shares this point of view as he considers emotion to be a characteristic of a person-other(s) relationship. Frijda and Mesquita

(1994) argue that emotions are social events because they occur in the context of socially shared meaning. The social role of emotion has to be understood in the light of ongoing interchanges between the individual and others and the mutual influence that each party's attitudes or actions may have on the other. This aspect of mutual influence is important when considering emotions occurring in a team context.

In summary, emotion is a dynamic process (Scherer, 1994), triggered by a specific object or event, during an interaction with the environment or with others, limited in its duration, and having specific action tendencies, and behavioral consequences, which may vary depending on the intensity of the emotion felt. These behavioral consequences in turn impact the relationships one has with others, as others will react according to the signals they perceive (Frijda & Mesquita, 1994). Certain emotions share similar patterns of appraisal, including action tendencies, and behavioral consequences, thus it is posited that these emotions can be grouped in classes. The four classes of emotions proposed in this study will now be reviewed.

1.1.2. Achievement Emotions

Achievement emotions include emotions such as pride, elation, joy, and satisfaction[5]. There are theoretical and empirical justifications for grouping these emotions under the same banner. Shaver, Schwartz, Kirson, & O'Connor (1987) and Scherer (1984a) conducted categorization studies where subjects had to sort emotion words. Pride, elation, joy, and satisfaction were identified to be part of the same class, indicating that the association of these emotions makes empirical sense. Pride, elation, joy, and satisfaction share common characteristics. These are positive emotions, with an appraisal of rather high control over events and their consequences (Scherer, 1984a), enhancing self-esteem and well-being: pride is associated with the enhancement of ego-identity (Lazarus, 1991a) and self-esteem (Zammuner, 1996); elation gives one the feeling of living fully (Izard, 1991); joy makes one feel confident, comfortable and boosts self-esteem (Frijda, 1987; Izard, 1991); and satisfaction is conducive to a feeling of fulfillment and well-being (Izard, 1991; Lazarus, 1991a).

[5] As mentioned p. 4, these four emotions do not represent an exhaustive list of achievement emotions, but rather represent prototypical achievement emotions. This comment is valid for all four classes of emotions presented in this chapter.

The behaviors and/or action tendencies associated with pride, elation, and joy are being exuberant, expansive, excited (Frijda et al., 1989; Izard, 1991; Lazarus, 1991a). Satisfaction is associated with serenity, relaxation, and openness (Frijda et al., 1987; Izard, 1991).

Achievement emotions occur at both the individual and the collective level: when feeling pride one endorses the credit for the achievement but pride can also be felt collectively and the whole group's identity becomes heightened (Lazarus, 1991a); joy and satisfaction give a sense of accomplishment when a job is well done, or when a new task or an intellectual challenge have arisen, given oneself or the group a sense of worth and competence (Izard, 1991). Elation and joy are important emotions that strengthen bonds between people: one is more open, receptive, participative (Frijda, 1986), caring for others, which leads to solidarity with others (Kemper, 1991) and one is more amenable to celebrate with others (De Rivera, 1984). Achievement emotions mark the celebration of success (Scherer & Tran, 2001).

Achievement emotions may also have negative implications. They could imply overestimation of personal merit and encourage stagnation or complacency (Scherer & Tran, 2001). When displaying pride, one can trigger envy or hostility in others (Lazarus, 1991a; Zammuner, 1996), which could lead to counterproductive conflicts. Elation can lead to boastful course of actions, which could be damaging for the individual of for the group (Janis, 1982). Although joy encourages creativity and intuition, it can also slow down performance and decrease productive thinking (Izard, 1991). Satisfaction may prevent the individual or the group to make the effort to explore new alternatives (Scherer & Tran, 2001).

Table 1 provides a summary of the different aspects of achievement emotions.

Table 1

Summary of Definitional Elements for Achievement Emotions

Class	Emotions	Appraisal and definition	Behaviors	Positive aspects*	Negative aspects*
ACHIEVEMENT EMOTIONS	Pride	• Positive, high control • Sense of power	• Exuberance, expansiveness • Bragging, assertiveness	• Enhances ego/group identity (I/G)	• Complacency (I/G) • Arrogance (I/G)
	Elation	• Positive, high control • Stimulated	• Exuberance, impulsivity, excessiveness	• Gives the impression of living fully (I) • Display of attention to others and participation (I/G)	• Risk to engage in boastful course of actions (I/G)
	Joy	• Positive, high control • Sense of accomplishment	• Excitement • Free activation, creativity • Wanting to be with others	• Being generous, patient, tolerant, supporting (I/G) • Enhances creativity and confidence (I/G) • Wanting to celebrate with others (G)	• Slowing down of productive thinking, lack of analysis (I/G) • Low concentration (I)
	Satisfaction	• Positive, high control • Sense of accomplishment	• Openness, smiling	• Marks the celebration of success (I/G) • Enhances sense of fulfillment and well-being (I)	• Stagnation, complacency (I/G)

* I indicates the implications for the individual
G indicates the implications for a group

1.1.3. Approach Emotions

Approach emotions include emotions such as relief, hope, interest, and surprise. In the similarity judgment study done by Scherer (1984a), hope, interest, and surprise appear in the same class, except relief, and share common characteristics: they are positive, with an appraisal of a rather low control over events and their consequences (Scherer, 1984a) and have a future orientation. Relief, hope, interest, and surprise encourage exploration, development, and moving forward: relief occurs after a negative emotion, but something has changed for the better, distress diminishes (Lazarus, 1991a) and one is encouraged to move on to other activities; hope contains some uncertainty (Lazarus, 1991a; Roseman et al., 1996; Smith & Ellsworth, 1985) but is a future-oriented emotion (Frijda et al., 1989; De Rivera, 1984) and plays an adaptive role to pursue one's goals (Ketelaar & Clore, 1998; Lewin, 1948); interest is the emotion triggered when one feels engagement, fascination, and curiosity (Izard, 1991), it is typically associated with creative activities, with the development of skills and intelligence, the acquisition of new competencies, and persistence in effort (Izard, 1991); and surprise, also accompanied by uncertainty, keeps one alert and stimulated to cope with new and sudden events (Izard, 1991).

The behaviors and/or action tendencies associated with hope and interest, are being vigilant, mobilized, committed (Lazarus, 1991a), attending, effortful, energetic, motivated, and involved (Izard, 1991; Ellsworth & Smith, 1988; Frijda, 1987; Smith and Ellsworth, 1985). When feeling relief one is rather relaxed, showing signs of decompression (Lazarus, 1991a) thus enabling the organism to regain energy for new events. When surprise is felt, there is little physical effort (Smith and Ellsworth, 1985) but it leads to a clearing of the mind, while gaining information (Roseman, 1984) and orienting oneself to the unexpected event causing surprise (Ellsworth & Smith, 1988).

In an organizational context, team members feeling relief for example after a task is finally accomplished or a reward has been granted would feel re-energized before moving to the next task. Hope and interest sustain the vigilance and the mobilization groups need to move forward. Paez et al. (1995) describe hope, in the context of Pinochet's dictatorship in Chile, as a powerful social tool to make a group keep faith and committed to actions. Interest reinforces links between people, and as Izard (1991) explains, it is "a vehicle for the formation and maintenance of social units." (p. 109-110).

Approach emotions can also have negative implications. Relief, if prolonged, can lead to withdrawal; hope can lead to unrealistic goals and inappropriate actions; interest, if too narrowly focused, can lead to unrealistic plans, scattered attention, blindness or dispersion of energy and attention (Scherer & Tran, 2001); surprise can lead to freezing (Roseman, 1984).

Table 2 provides a summary of the different aspects of approach emotions.

Table 2

Summary of Definitional Elements for Approach Emotions

Class	Emotions	Appraisal and definition	Behaviors	Positive aspects*	Negative aspects*
APPROACH EMOTIONS	Relief	• Positive, low control	• Relaxation, decompression	• Enables the removal of distress (I) • Re-energize before moving to the next project (I/G)	• Withdrawal (I/G) • Lack of energy (I/G)
	Hope	• Positive, low control • Uncertainty • Future-oriented	• Vigilant, mobilized, committed • Ready to expand effort if necessary	• Sustains group activity (G) • Motivates to move forward (I/G) • Enhances vigilance (I/G)	• Pursuing unrealistic goals (I/G)
	Interest	• Positive, low control • Engaged	• Approaching, exploring • Energetic, excited • Learning	• Enhances creativity, curiosity (I/G) • Acquiring new skills, competencies (I/G) • Persisting in tasks, even tedious ones (I/G)	• Dispersion of energy and attention (I/G) • Being too narrowly focusing on items to the detriment of others (I/G)
	Surprise	• Positive, low control • Uncertainty • Transient emotion	• Orienting oneself • Attending	• Helps to deal effectively with new and sudden event (I)	• If leading to fear, risk of panic (I/G)

* I indicates the implications for the individual
G indicates the implications for a group

1.1.4. Resignation Emotions

Resignation emotions include sadness, fear, shame, and guilt. In the Scherer (1984a) similarity judgment study, the four emotions appear in the same class, confirming empirically the shared common characteristics: they are negative emotions, with an appraisal of low control over events and their consequences (Scherer, 1984a). Resignation emotions lead to reduced activities and efforts, little innovation, and internal focus. Sadness is felt when something is lost in one's life, a dear one, a job, a reputation or social status (Kemper, 1991; Lazarus, 1991a; Smith and Ellsworth, 1985; Scherer, 1984a), and is typically associated with resignation and sense of failure; fear triggers a sense of threat (Oatley & Duncan, 1994), of uncontrollability (Frijda, 1987) and a desire to preserve integrity (Paez et al., 1995); shame is felt when a negative evaluation of the global self is involved (Lewis, 1993; Tangney, 1999): one feels humiliated, worthless in the eyes of the self and others (Niedenthal, Tangney, & Gavanski, 1994), causing a temporary inability to think logically and efficiently (Izard, 1991); and guilt, which also involves negative self-evaluation but related to specific actions and behaviors (Baumeister, Stillwell, & Heartherton, 1994; Lewis, 1993), makes one feel remorse and regret with recurrent thoughts about wrongdoing (Tangney, Miller, Flicker, & Barlow, 1996; Tangney, 1999).

The behaviors and/or action tendencies associated with fear are avoidance and escape (Frijda, 1987; Ketelar and Clore, 1998; Lazarus, 1991a). Fear narrows thoughts, which can limit the number of alternative options for action (Izard, 1991), but can also serve as a signal function for obtaining relevant information from the environment (Paez et al., 1995). Behaviors associated with sadness are withdrawal, apathy, and appeal for support (Frijda et al., 1989; Lazarus, 1991a), which help the organism to save energy, in order to adjust to new conditions (Kemper, 1991). When feeling shame, one wants to hide (Frijda, 1987; Tangney et al., 1996); one is either unable to speak and is confused (Lewis, 1993) or on the contrary, one has a rapid, repetitive, even obsessive speech (Scheff, 1990). The main behavior characteristic of guilt is reparative action (Lewis, 1993; Tangney, 1999). Resignation emotions strengthen the bonds between the members of a group: sadness leads to protective behavior and reinforces social cohesion (Paez et al., 1995); fear restrains aggressive behavior (Ketelaar and Clore, 1998) and reunite the members of a group as well (Paez et al., 1995); shame encourages prosocial behavior (Lazarus, 1991a) and acts as a force of social cohesion too, enhancing conformity and individual responsibility (Izard, 1991); guilt increases compliance

(Carlsmith & Gross, 1969), reinforces social bonds, with a sense for interpersonal obligation (Baumeister et al., 1994) and empathy (Niedenthal et al., 1994).

Resignation emotions have other positive implications. They provide a recuperation time, where one can readapt to new conditions, and prevent one from embarking on ventures that are too risky (Scherer & Tran, 2001). Sadness slows the pace down, and one is led to replace unattainable goals by attainable ones (Levine, 1996). Fear makes one think more carefully about risks, thus it is an adaptive emotion (Izard, 1991). Fear also has a useful signaling function, which enables the organism to get information from the environment (Paez et al., 1995). Shame leads to self-improvement in order to avoid the sense of incompetence brought by the shame experience (Izard, 1991), it helps restore one's ideal and identity (De Rivera, 1984). Finally, guilt prevents one from acting destructively against others (Kemper, 1991).

Table 3 provides a summary of the different aspects of resignation emotions.

Table 3

Summary of Definitional Elements for Resignation Emotions

Class	Emotions	Appraisal and definition	Behaviors	Positive aspects*	Negative aspects*
RESIGNATION EMOTIONS	Sadness	• Negative, low control • Loss	• Withdrawal • Resignation, powerlessness	• Possibility to adjust to new events, review objectives realistically (I/G) • Reinforces social bonds and support (G)	• Sense of failure, like nothing can be done (I/G)
	Fear	• Negative, low control • Threat, uncertainty	• Avoidance, escape • Protect oneself	• Reunification of group or country (G) • Restrain aggressive behavior (I/G) • Think carefully about risks (I/G)	• Triggers tunnel vision (I/G) • Freezing /I/G)
	Shame	• Negative, low control • Humiliated, feeling incompetent	• Hide or wanting to hide • Shrinking of the body	• Enhances conformity and individual/social responsibility (I/G) • Improvement of self (I)	• Speech disruption (I) • Obsessive speech (I) • Painful (I)
	Guilt	• Negative, low control • Done something morally reprehensible	• Thinking • Confessions, apologies, reparative actions	• Encourages reconciliation and empathy (G) • Enhances compliance with group norms	• Feeling isolated (I) • Rumination (I)

* I indicates the implications for the individual
G indicates the implications for a group

1.1.5. Antagonistic Emotions

Antagonistic emotions include envy, disgust, contempt, and anger. Both theoretical and empirical sources help demonstrate that these emotions as part of the same class. Disgust, contempt, and anger have been described by Izard (1991) as the hostility triad; that is, there is an observable pattern that these three emotions often occur together, even if each one retains its own characteristics. In Shaver et al. (1987) and in Scherer (1984a), subjects have classified envy, disgust, contempt, and anger in the same classes. Antagonistic emotions share common characteristics: they are negative, with an appraisal of high control over events and their consequences (Scherer, 1984a). Antagonistic emotions enhance aggressiveness, which could nurture a blind desire for retaliation and potential fighting (Scherer & Tran, 2001). Envy is felt when one wants what someone else has (Lazarus, 1991a) and one feels inferior (Parrott & Smith, 1993). If associated with anger, envy includes potential attack (Lazarus, 1991a) and if felt for a long period of time, it can poison all relationships (Lazarus, 1991a), with family, friends, or colleagues at work. Disgust[6] is felt when one is facing something considered repulsive (Smith and Ellsworth, 1985). If combined with anger, disgust with oneself or with members of the group can provide motivation for attack or destruction (Izard, 1991). Contempt is referred to as the "cool" emotion of the hostility triad: one feels superior and triumphant, but rather than attacking, one may use other indirect strategies such as outcasting or humiliation (De Rivera, 1984; Izard, 1991). Anger is the emotion triggered when one feels something wrong has been done, by oneself or by others, that could be considered as an offense (Lazarus, 1991a), with a feeling of injustice or unfairness (Izard, 1991; Lazarus, 1991a; Scherer, 1984a; Smith & Ellsworth, 1985). There is a belief that one has control over the situation (Lazarus, 1991a), and can do something to restore one's threatened goals (Levine, 1996).

The behaviors and/or action tendencies associated with anger are antagonistic: one is ready to strike out or attack (Frijda et al., 1989; Kemper, 1991; Lazarus, 1991b; Levine, 1996). However, anger is often inhibited for social reasons, as physical aggression incurs social disapproval or even punishment (Lazarus, 1991a). Thus, it may be replaced by verbal or symbolic aggression (e.g., the denial or removal of some benefit held by the anger instigator), by being very calm to compensate (Averill, 1983); or by passive aggressive behaviors (e.g., counter-implementing an order given by the boss or playing sick (Lazarus, 1991a)).

[6] In the context of this study, moral disgust will be considered as the likelihood of the participants to be exposed to something physically noxious being close to zero.

Antagonistic emotions can also have positive implications. They can help group members to gain confidence and the right amount of energy to achieve their goals together, and to eventually counter-attack (the enemy, competition) with the objective of winning. Envy can lead to emulation of a positive accomplishment in order to get admiration from peers (Lazarus, 1991a); disgust can serve as a signal for the individual or the group to change their attitude or behavior, or to risk rejection if they do not, as for example maintaining a lower level of pollution (Izard, 1991); contempt also contributes to maintaining social norms by putting pressure on deviant individuals (Izard, 1991); and finally a little anger increases self-confidence in certain situations (Izard, 1991), which is necessary to react to aggression or attack from others. The group may gain cohesiveness as anger can reinforce group values (De Rivera, 1984).

Table 4 provides a summary of the different aspects of antagonistic emotions.

Table 4

Summary of Definitional Elements for Antagonistic Emotions

Class	Emotions	Appraisal and definition	Behaviors	Positive aspects*	Negative aspects*
ANTAGONISTIC EMOTIONS	Envy	• Negative, high control • Sense of inferiority	• Mobilization • Yearning • With anger, potential attack	• Effort towards emulation to improve self or team (I/G)	• If prolonged, could poison relationships, with friends or colleagues (G)
	Disgust	• Negative, high control • Repulsion • Hostility triad	• Rejection • With anger, potential attack	• Signals "poisonous" others (G)	• Risk of being rejected by the group (G)
	Contempt	• Negative, high control • Hostility triad	• Indirect aggression • Despise	• Maintains group conformity (G)	• Prejudicing other groups (G)
	Anger	• Negative, high control • Hostility triad • Sense of unfairness	• Attack • Verbal or symbolic aggression • Passive aggressive	• Improves self-confidence (I/G) • Helps reinforcing team values (G)	• In case of attack, one can get punished, socially disapproved or undergo retaliation (I/G)

* I indicates the implications for the individual
G indicates the implications for a group

1.1.6. Summary

Emotion is a dynamic process, involving several sub-systems of the organism: cognition, motor expression, physiology, action tendencies, and subjective feeling (or conscious awareness). What differentiates an emotion from a mood or an affect is the fact that emotion is object or event related and is of brief duration. The most salient aspects of emotion for the present study are the actual or potential behavioral consequences, as they influence present and future interactions between individuals.

A non-exhaustive number of modal emotions currently treated in the literature can be grouped in four classes of four emotions each. Achievement emotions (for example pride, elation, joy, satisfaction) occur in situations when people have a sense of accomplishment, personally or professionally, and a desire to celebrate successes with others. Approach emotions (for example relief, hope, interest, surprise) occur in situations when people are attentive, alert, exploring, wanting to learn, and looking forward to the future.

Resignation emotions (for example sadness, fear, shame, guilt) occur in situations when people suffer some kind of a loss, personally (death of a parent, loss of a friend or lover) or professionally (loss of a job, restructuring of one's company, loss of colleagues, or financial drawback). Antagonistic emotions (for example envy, disgust, contempt, anger) occur in situation when people think theirs or themselves have been harmed, morally or physically, and that the cause of this harm is unfair.

In essence, emotions are tightly intertwined with every aspect of life. This does not only occur at the psychological level, but it also seems to occur at the collective level, where emotions either are shared or transmitted from one individual to another within a group. This aspect of emotion is reviewed in the next section.

1.2. Emotion at the Collective Level

Le Bon (1896), in his work on crowds, studied the idea of emotions occurring at a collective level. According to Le Bon, the crowd submerges the rationality of its members, and each individual's consciousness is replaced by a 'collective mind' in which sentiments and ideas of all the persons composing the crowd take the same direction. Le Bon described this phenomenon as contagion. In the same vein, McDougall (1920/1973) attributed emotional contagion to the racial similarity of the members of a group, which would determine the speed at which people would be affected by others' emotions. He considered emotions as being inherently contagious: an emotion is triggered in one individual by the expression of the same emotion in another. Both Le Bon and McDougall suggested that the results of emotional contagion tended to be irrational (i.e., leading to behaviors which could be perceived as out of control). These two authors have remained a reference to contemporary researchers who address collective emotion, despite the fact that both the emergence of cognitivism in the 1960s (Scherer, 1984b) and the efforts to provide operational definitions of constructs (Luft, 1970) led to a more rational view of human behavior (Scherer, 1984b). On the one hand, the term 'group mind' was not generally accepted, and was considered too vague and too mystical (Luft, 1970), or even mere metaphysics (Lewin, 1948). On the other hand, social psychologists studying group dynamics continue to recognize, explicitly or implicitly, the fact that something "affective" occurs during interactions and/or tasks performed in groups (Anzieu & Martin, 1994). The following two paragraphs review these social or group aspects of emotion.

Redl (1942, as cited by Anzieu & Martin, 1994) identified three types of emotional phenomena relevant to groups: (a) constituent group emotions, the basis for the group formation; (b) secondary group emotions that develop from these forming processes; and (c) emotional contagion, the propagation of someone's behavior in the group to another person or to the whole group. Lewin (1947; 1951/1975) demonstrated in his studies on food habits how change could be successfully implemented by provoking an emotional catharsis among members of a constituency to break down prejudice and change habits. In his paper on group morale (Lewin, 1948), he reported studies showing how the atmosphere deteriorated in a family after the father had lost his job: the father lost hope, and his low morale spread to the children and the whole family consequently had a low morale. Bales (1950) identified positive and negative socio-emotional types of interactions in his analysis of interaction processes in small groups. Luft (1970) described his concept of *habeas emotum* as the emotional freedom

of having emotions and of expressing one's own emotions, unless it limits the expression of someone else's emotions. This concept could be linked to emotion regulation, and to mutual emotional influence processes. Pagès (1975), in his work on affective life of groups, defined group affect as an often-unconscious feeling that is dominant at some point in time, that rules the life of the group, and that is shared by all members of the group. He also described how group members tend to converge as they work together: group members cooperate more and more while accomplishing the task, having increasingly similar views, and the group affect, previously at the unconscious level, becomes conscious. St-Arnaud (1978) identified group climate as the social-emotional dimension of small groups, and affective energy, as the subjective need of group members to love and to be loved. In addition, early research on group cohesion (Cartwright & Zander, 1968; Festinger, 1950) laid its foundation on the affective bonds between group members. This point will be addressed in section 1.3.4.

Schachter (1959) extended Festinger's (1954) social comparison theory and applied it to emotion in his work on affiliation. When confronted with a novel threat, an individual seeks affiliation with similarly threatened others, not so much to be reassured, but rather as a mean to socially evaluate him/herself, and to obtain cognitive clarity about bodily arousal consequent to the threat. Comparing oneself with others indeed helps to determine the label for and appropriateness of one's emotional state. Furthermore, Schachter posited that affiliation would lead to the homogenization of emotional state, due to the fact that individuals tend to try to bring others closer to their own emotional state (such as in Festinger's model of social comparison, where people either change their opinion, try to change others' opinions, or reject comparison with individuals that are very different from oneself). Gump & Kulik (1997) hypothesize that affiliation could be linked to emotional convergence or contagion. This idea is actually embedded in Schachter's (1959) conclusions, as he says: "(…) it could expected that the emotions would be particularly vulnerable to social influence. It may be this presumed vulnerability that will eventually help us understand phenomena of emotional contagion such as panic and riots." (p. 128). Schachter's work continues to be influential in contemporary research, as it will be described in section 1.2.2. below.

Recently, the notion of collective emotion has regained popularity among researchers who have investigated the extent to which individual affects, moods, or emotions are shared among members of a group, either small such as a work group, or large such as the population of a country. Wierba and Mackie-Lewis (1994) have defined group emotion as being the

'neural glue' of group entities. They have suggested that (a) there is a connection between group members' emotions and the group's emotion, and (b) the emotion of the group is different from the individuals' emotions. They argued that the way group emotional connections are made is through the pursuit of a common activity, i.e. through interrelated behaviors encompassed in a common task. Similarly, Barsade and Gibson (1998), in their review of the state of research on collective emotion, argued that groups are emotional entities and that there is a reciprocal and interactive relationship between group member's emotions and group emotion. They also considered group emotion to be the glue that bonds group members together, and that the understanding of group emotion is a way to better understand how groups develop and mature over time, implying a more dynamic approach.

Several recent empirical studies coming from different perspectives have tested the existence of collective affect and will be reviewed next.

1.2.1. Emotional Climate

De Rivera (1992) developed the concept of emotional climate, and defined it as the emotional relationships between members of a society. De Rivera was interested in the emotional climate that arises in a nation. A nation's emotional climate represents an aspect of its objective-behavioral environment; it affects and dominates people's behaviors. A national climate is not simply an aggregation of all emotional relations. Similarly to the role emotions play for an individual, i.e. to maintain the individual's identity and values (De Rivera, 1984), the emotions of a nation may contribute to maintain the political unity, or cultural identity, of the members of the nation. De Rivera (1992) describes climates of fear, security, instability, confidence, dissatisfaction, hostility, solidarity, and hope.

Paez et al. (1995) extended De Rivera's (1992) work and studied the emotional climate prevailing during the dictatorship of Pinochet in Chile. They defined an emotional climate as a state of collective mood, based on the predominance of certain emotions, of certain social representations, and of certain action tendencies that permeate the network of social interactions. They argued that emotional climates are collective phenomena, representing something more than just the sum of individual emotions. In their study, Paez et al. intend to use quantitative and qualitative methods to demonstrate that emotional climates are emergent processes, which have social functions. First, they selected four 'basic' emotions, fear, anger, sadness, and joy, based on Kemper's (1991) social-interactional theory of emotion, and asked two social psychologists to give scores for these four emotions to the

prototypical right, center, or left-wing individual in Chile during the period 1973-1990. Second, the objective indicators of collective behavior are composed of the number of civilians killed by Army members, manifestations of collective violence such as riots for example, and the number of Army members killed for political reasons. Third, they also performed interviews. Paez et al. concluded that it is essential to gather collective indicators, interviews, polls, and expert judgments in order to be able to identify predominant emotional climates. In this specific study, they were able to find convergence between expert judgments of emotional climate and collective behavior indexes: anger in right wing individuals was related to repression against the left wing; fear in left wing individuals was related to civilian deaths; high anger, and low sadness and fear in left wing individuals was related to strong collective violence. In other words, sadness and fear were related to repression, whereas anger was related to political violence. Although fear was recognized as the dominant emotion in Chile during Pinochet's dictatorship, Paez et al. concluded that the emotional climate was composed of an aggregate of the four basic emotions (i.e. as mentioned above, anger, fear, sadness, and joy). They also found that the behaviors related to such a climate continued to be displayed beyond the objective conditions that created it. In addition, contrary to Kemper's prediction stating that when fearful, individuals seek support and contact, Paez et al. found that these behaviors did not appear under a climate of fear and anxiety, but were rather associated with anger and happiness.

In summary, both De Rivera's and Paez et al.'s perspectives provided interesting examples of multi-level research, with measures ranging from the individual level to the macro-level with broader sociological implications. De Rivera proposed a theoretical model, and drew attention to the methodological need to develop objective measures of emotional climate. Paez et al. (1995; 1997) did develop measures of emotional climate. The elements of their research relevant to the present study are the demonstration that emotional climates were formed by "an aggregate of the four 'basic' emotions" (p. 172), i.e. fear, anger, sadness, joy, accompanied by "specific ways of social interaction", and "specific predisposition towards action" (p. 172).

1.2.2. Emotional Contagion

Hatfield, Cacioppo and Rapson (1992; 1994) defined emotional contagion as the tendency to 'catch' another person's emotions[7]. Hatfield et al. (1992) posited: "an important consequence of emotional contagion is an attentional, emotional, and behavioral synchrony that has the same adaptive utility (and drawbacks) for social entities (dyads, groups) as has emotion for the individual." (p. 153) Hatfield et al. distinguished 'primitive' emotional contagion as being the unconscious and automatic tendency to mimic and synchronize other's nonverbal behaviors (facial, vocal, postural), thus emotionally converging with others. Hatfield et al. reported research conducted in other domains (developmental, clinical, socio-psychological, and psychophysiological) to demonstrate evidence of the existence of emotional contagion. As Barsade (2001) noted, Hatfield and her colleagues' work examined less dramatic, yet more relevant effects of contagion with to day-to-day implications, compared to emotional contagion described by Le Bon (1896) or McDougall (1921). Selected organizational psychologists based their studies of emotional contagion on Hatfield et al.'s definition (e.g. Bartel and Saavedra, 1998, 2001; Barsade, 2001, see below).

Gump & Kulik (1997) combined both Schachter's (1959) emotional evaluation model (based on social comparison theory applied to emotion, see above, p. 21) and Hatfield et al.'s (1992; 1994) emotional contagion theory, to investigate the occurrence of these processes at the dyad level. First, their goal was to test Schachter's affiliation hypothesis that anxious individuals will seek affiliation with similarly anxious others, who are subjected to the same anxiety-producing situation. Second, Gump and Kulik wanted to compare and contrast the social comparison model of contagion, which states that contagion occurs if two individuals find themselves together in the same emotional state, through a social influence process, and the primitive emotional contagion model, which occurs via unconscious facial and postural mimicry (thus without knowing in which emotional state the other person is a priori). In order to do so, they videotaped interactions of dyads while threat was induced experimentally. Affiliative behaviors were measured in terms of looking at the other, and of the time spent frowning versus smiling at the other. Gump and Kulik were able to confirm Schachter's affiliation hypothesis, as threatened subjects seek affiliation with similarly threatened others. They were not able to find emotional contagion via mimicry. One can hypothesize that the

[7] Emotion is defined here as indicated in section 1.1.1., i.e. a complex phenomenon including cognitive appraisal, physiological processes, action tendencies, subjective feelings, and expressive behaviors.

cognitive component of emotion was more dominant than the unconscious nonverbal mimicry component in the emotional contagion process that occurred.

Bartel and Saavedra (1998; 2000) examined collective moods, drawing on both Schachter's (1959) emotional evaluation model (that they name "emotional comparison", based on the fact that social comparison processes are applied to emotion), and Hatfield et al.'s (1994) definition of emotional contagion to explain mood convergence. Bartel and Saavedra defined collective moods as moods shared by members of a group. First, their objective was to demonstrate mood convergence (with self-report measures), and that moods in work group are detectable by external observers. A team of observers was trained to code non-verbal behaviors (facial, vocal, and postural). To do so, they developed an Observer's Guide to Work Group Mood based on Larsen and Diener's (1992) circumplex model of emotion. Second, their objective was to determine whether stability of group membership, groups' mood regulation norms (actually measured as the individual susceptibility to mood convergence), task and social interdependence among members promote mood convergence. Bartel and Saavedra did find mood convergence in work groups, and observers were able to detect different types of moods. Moods characterized by higher arousal were more accurately assessed. In addition, Bartel and Saavedra found that stability of work group membership, task and social interdependence were significant predictors of mood convergence. Group mood regulation norms influenced mood convergence only for high-energy moods (both pleasant and unpleasant).

Barsade (2001) studied emotional contagion in groups and its influence on work group dynamics, i.e. cooperativeness, degree of group conflict, and individual satisfaction with performance. She proposed that *mood*[8] contagion is influenced by two factors: the valence (positive or negative orientation) of the emotion, and the energy with which the emotion is expressed. Emotional contagion was measured with: (a) self-report measures of mood, based on adjectives from the Larsen and Diener's (1992) circumplex model of emotion; and (b) the observation of facial expressions, body language, and verbal tone via videotapes recording group interactions (using the same observation criteria as Bartel and Saavedra (2000), see above). In her experimental study, Barsade found that: (a) emotional contagion did occur in groups; (b) unpleasant moods did not lead to greater contagion than positive moods; (c) the level of energy with which moods are expressed was an indicator of contagion processes, but

[8] Barsade actually chose to focus on mood and not emotion (see definitions p. 5) but she uses both terms interchangeably. I will thus comply with her labels in describing her study.

a weak one; (d) positive emotional contagion lead to greater cooperativeness; (e) positive emotional contagion lead to lesser group conflict; and (f) positive emotional contagion lead to greater individual assessment of task performance. In her non-experimental study, Barsade found strong convergence of group members' moods, also positively related to cooperativeness and perception of performance, and negatively related to group conflict.

In summary, the three studies presented in this section addressed some aspect of affective contagion: Bartel and Saavedra, and Barsade focused on mood contagion; Gump and Kulik focused on emotional contagion, but did not specify how they defined 'emotion'. Bartel and Saavedra found mood convergence in natural work groups based on the theoretical assumption that group members can 'catch' (Hatfield et al., 1994) nonverbal behaviors in other members, that in turn influence the type of mood they feel. Barsade found emotional contagion in groups, based on the theoretical assumption that contagion stems from different valences and different energy levels of affect; namely, positive emotional contagion was the most prevalent type of contagion and had the most significant effect on outcomes such as performance or helping behaviors. Gump and Kulik explored emotional contagion in dyads in an experimental context. They based their paradigm both on social comparison, applied to emotion, and on primitive emotional contagion via mimicry. Their study points out to the process of social influence, studied in the context of dyads, which principles could apply to teams. These three studies are relevant to the present research as they demonstrate the phenomenon of collective 'affect' occurring in groups or dyads.

1.2.3. Affective Tone

George (1990) defined affective tone as consistent affective reactions within the groups. George grounded her definition of affective tone in three theoretical frameworks: (a) Schneider's Attraction-Selection-Attrition (ASA) model (as cited in George, 1990), which implies that similar people tend to find themselves together in certain organizational settings; (b) group socialization, which implies that newcomers in organizations learn group values, norms, and standards (e.g., George, 1990); and (c) personality traits such as positive affect (PA) and negative affect (NA) (Watson et al., 1985; 1988), which implies an influence on the positive and on the negative affective tones of groups. George suggested that ASA might allow similarity of personality within work groups. She posited that the number of people having either one of the personality characteristics would be positively linked to the corresponding affective tone, i.e. if there were a majority of individuals with PA in the group,

the affective tone of the group would be positive. Conversely, if there were a majority of individuals with NA, the affective tone would be negative. Group socialization influences both affect and outcome variables, i.e. prosocial behavior (measured in the study as helpful behaviors towards customers) and absenteeism. George was able to find affective tone in these groups and her hypothesis of matching personality traits (PA and NA) with affective tone was confirmed. Negative affective tone was found to be negatively related to prosocial behavior and partially related to absenteeism. Positive affective tone was negatively related to absenteeism.

George's study represents a reference in the domain, as it is one of the first studies to empirically measure collective affect and using multi-level analyses (at the individual and at the group level of analysis), elements that are relevant to the present research.

1.2.4. Mood Linkage

Totterdell et al. (1998) defined mood linkage as interpersonal mood influences that operate within work teams over time, as team members work together and share life events. Their moods will become linked together and temporally synchronized. For mood linkage to occur, two processes are necessary: not only shared life events, to which team members will respond similarly, but also interpersonal mood influences, which are the result of verbal and nonverbal, conscious and non conscious interactions between team members[9]. Totterdell et al. were interested to find out whether the strength of association between individual mood and the moods of teammates depends on the individual's commitment to the team and his/her perception of the team climate. They also posited that an individual whose mood is not synchronized will experience more trouble with his/her teammates, and that the level of synchronization is inversely related to the amount of daily hassles[10] an individual may experience with his/her team. Finally, they wanted to investigate the role of conscious processes in mood linkage. They used both daily measurements (i.e., diary methodology) and the Experience Sampling Methodology (ESM) (Stone, Shiffman, & DeVries, 1999), which was designed to measure moods and emotions at some precise moments in time. In the first study, Totterdell et al. found a synchronization between individual moods and the collective moods of their teammates, in other words, the individuals' moods were more related to the

[9] Totterdell et al. refer to non conscious processes as primitive emotional contagion (see Hatfield et al., 1994); even though they do not specify a term for conscious processes, these can be related to emotional comparison (see Gump & Kulik, 1997).

[10] Totterdell et al. operationalized shared life events as sharing negative events, i.e. daily hassles, and not sharing positive life events.

moods of their teammates than to the moods of individuals belonging to other teams. The positive correlation between individuals' moods and teammates moods occurred regardless of the number of shared daily hassles, and were even greater in case of older individuals who were more committed to the team, perceived a better team climate, and experienced fewer hassles with teammates. In the second study, Totterdell et al. were able to conclude that it is possible for people to consciously process information about other people's moods and make a reasonable judgment about them. Conscious processes may explain interpersonal mood influence within teams in this case.

Totterdell et al. looked at the effect of mood over a certain period of time. The repeated measurement methodology represents the most relevant aspect of this study to the present research. The second important point is the fact that further empirical evidence is provided that team members' affective states or processes are interconnected, namely in a context where team members work together intensively. These findings are consistent with Bartel and Saavedra's findings regarding the high level of task interdependence implying a greater degree of mood convergence.

1.2.5. Summary

Progress has been made in better understanding the collective affective processes, not only in their extreme forms, but in daily life and work settings as well. Table 5 shown below summarizes definitions from 1896 to present. Even though current researchers have named collective emotion with different labels (e.g. affective tone, mood linkage, mood convergence), there is still a distinct red thread throughout all the definitions: the idea of contagion, which involves transmission of affect from one individual to another by various channels (facial, vocal, postural, behavioral, conscious, non conscious) and sharing of affect[11]. Concomitantly, the contagion or the sharing lies on the interrelationships between group members and the fact that they do something together (i.e., they have a common goal for a common task). The collective affect then takes on a quality of its own, distinct from individual affects. Some researchers conjecture that the sum is different from the parts. (Smelser, 1963), in his theory of collective behavior, argued that several determinants of collective behavior are necessary but for the latter to actually materialize, the determinants must combine in a definite pattern. This particular constellation of determinants would rule out any other alternative.

[11] Including mood and emotion.

In this study, ‘collective emotion’ is defined as shared emotions embedded in interrelated behaviors associated with the accomplishment of a task over time.

Table 5

Review of Definitions of Collective Emotion

Authors	**Construct**	**Emergence process**	**Effects or functions**
Le Bon (1896)	Emotional contagion	Each individual's consciousness is replaced by a **'collective mind'**	• Sentiments and ideas of all the persons composing the crowd take the same direction • Leads to unpredictable shifts in collective behavior
McDougall (1920)	Emotional contagion	An emotion is triggered in one individual by the expression of the same emotion in another	Constitutional or racial similarity determines the rapidity at which a suggestion takes hold
Redl (1942)	Emotional contagion	The propagation of someone's behavior in the group to another person or to the whole group. Contagion can be positive or negative	Contagion can often be beneficial to the functioning of the group
Schachter (1959)	Affiliation	An individual will seek **affiliation** with "similarly feeling" others, not so much to be reassured, but rather as a mean to socially evaluate him/herself	Obtain cognitive clarity about bodily arousal consequent to the emotion felt
Pagès (1975)	Group affect	An often-unconscious feeling is dominant at some point in time, rules the life of the group, and is **shared** by all members of the group	
George (1990)	Affective tone	A **consistent** or homogeneous affective reaction within a group	People with similar affective reactions should behave in a similar way

Hatfield, Cacioppo, & Rapson (1992)	Emotional contagion Primitive emotional contagion	• The tendency to 'catch' another person's emotions (his or her emotional appraisals, subjective feelings, expressions, patterned physiological processes, action tendencies, and instrumental behaviors) • The tendency to automatically mimic and **synchronize** movements, expressions, postures, and vocalizations with those of another person and, consequently, to converge emotionally	
De Rivera (1992)	Emotional climate	The **emotional relationships** between people supporting a cultural identity or political unity, e.g. climates of fear, security, solidarity, instability, confidence, dissatisfaction, hostility, hope	The emotional climate affects everyone in a given environment and becomes a characteristic of a society
Wierba and Mackie-Lewis (1994)	Group emotion	• Is the neural glue of group entities • There is a **connection** between group members' emotions and the group's emotion, yet they are different	Group emotion is made possible through **interrelated behaviors** associated with the pursuit of a common task
Paez, Asun, & Gonzalez (1995)	Emotional climate	A state of **collective mood**, characterized by: • The predominance of certain **emotions** (for instance, happiness and anger, versus sadness and fear) • The predominance of **social representations** or a group of beliefs held about the world (positive, trust, versus negative, mistrust) and of the future (optimistic, hope, versus pessimistic, despair) **shared** by a specific subculture • And by the predominance of certain **action tendencies** that will permeate the network of social interactions	• Emotional climates are accompagnied by specific ways of social interaction and by specific predisposition to action • Behaviors related to a given emotional climate continue to be displayed beyond the objective conditions that created it

Gump & Kulik (1997)	Emotional comparison and contagion	• Emotional comparison: individuals in a certain emotional state seek **affiliation** with others in a similar emotional state (Schachter, 1959); • Primitive emotional **contagion**: unconscious facial and postural mimicry (Hatfield et al., 1992)	
Totterdell, Kellett, Teuchmann, & Briner (1998)	Mood linkage	• People interact **over a period of time** • Linkage refers to a general process known as mutual entrainment, in which one rhythmic process causes or is caused to oscillate with the same frequency as another (= **synchronization**) • **Shared** affect is based on shared life events and both conscious and non conscious mood induction processes	• People reciprocally **influence** each other's moods • The mood linkages between individual moods and team moods are even stronger when team members are older, committed to the team, perceived a better team climate, and experienced less hassles with team members
Bartel & Saavedra (1998; 2000)	Convergence of moods in groups	• Work group moods are constructed socially, involving the complex interplay of **contagion** and **comparison** processes that are triggered by behavioral expressions of mood • Group moods are diffuse and relatively enduring affective state that are **shared** by group members	• Moods characterized by higher arousal are easier to assess by external observers • Stability of work group membership, task and social interdependence influence mood convergence • Group mood regulation norms influenced mood convergence only for high-energy moods (both pleasant and unpleasant)
Barsade (2001, 2002)	Emotional contagion	• "… a process in which a person or group influences the emotions, or behavior of another person or group through the conscious or unconscious induction of emotion states and behavioral attitudes" (Schoenewolf, 1990, as cited in Barsade, 2002) • Emotions are **shared**	Positive emotional contagion leads to: • Greater cooperativeness • Lesser group conflict • Greater individual assessment of task performance

None of the studies reviewed above directly address (a) emotion, or (b) emotion within and among a team involved in a decision-making situation. Group decision and its main processes will now be reviewed, before emotion and decision-making can be in turn reviewed.

1.3. Group Decision-Making

Group decision-making had a tradition of research in social psychology (Messick, Moore, & Bazerman, 1997; Samuelson, 1992; see Brandstaetter, Davis, & Stocker-Kreichgauer, 1982 for a review). Reviews have underlined the fact that small group research in social psychology has waned over the years, but has been revitalized within the domain of organization psychology (Davis, 1996; Ilgen, 1999; Levine & Moreland, 1990; Simpson & Wood, 1992), as Steiner (1986) had partially predicted. The trend is indeed to use teams in organizations more heavily (Bettenhausen, 1991; Guzzo, Salas, & Associates, 1995; Ilgen, 1999; Paulus, 2000). The current assumption is that groups make better decisions than individuals (Guzzo & Dickson, 1996; Shaw, 1981). For historical reasons, there is also probably a desire to avoid the dominance of autocratic individuals who decide for everyone else (Davis & Hinsz, 1982). Thus, teams making important strategic decisions are seen as crucial to the sustainability of organizations (Dooley & Fryxell, 1999).

The particular focus in this study is strategic decision-making observed in a naturalistic decision-making framework. In other words, naturalistic decision-making is the environment in which decisions are made, and strategic decision-making refers to the specific type of decisions[12]. A strategic decision is defined as an important decision, that deals with complex and ambiguous issues, and requires the commitment of a large amount of resources from the organization (Amason, 1996; Mintzberg, Raisinghani, & Théorêt, 1976). The complexity and ambiguity surrounding a strategic decision is usually too overwhelming for only one person do deal with it, thus strategic issues are often handled by top management teams (Schweiger, Sandberg, & Rechner, 1989). Priem and Price (1991) point out that in strategic decision-making, the "correctness" of a possible solution is difficult to verify. In her study on strategic decision-making in high velocity environments, Eisenhardt (1989) found that executive teams use real-time information, which gives them "an intimate knowledge of their business" (p. 555). They simultaneously generate and evaluate multiple alternatives because of time pressure, which enables them to process strengths and weaknesses quicker and make sure they don't leave "a stone unturned" (p. 572). They focus their attention on their most experienced members' opinion. They are used to work with each other in turbulent

[12] Three types of decision are commonly distinguished: operational decisions, which deal with daily, routine issues; tactical decisions, which deal with medium-term, non-routine issues but not affecting the organization's goals; and strategic decisions, which deal with long-term, affecting the organization's goals (Furnham, 1997).

conditions, but to deal with high-stakes decisions, they have to cope with anxiety, actively deal with conflict resolution, and build confidence.

Naturalistic decision-making (NDM) departs from prescriptive decision-making theory (how decisions should be made) and from behavioral decision-making theory (assessing if actual decisions conform to prescribed ones). NDM is an extension of behavioral decision making theory, as it describes how people (usually managers) concretely make decisions, and implement them. It is concerned with practical knowledge and experience about real-world decision-making (Beach, 1997). Zsambok (1997) provides the following definition:

> "The study of NDM asks how experienced people working as individuals or groups in dynamic, uncertain and often fast-paced environments, identify and assess their situation, make decisions, and take actions whose consequences are meaningful to them and to the larger organizations in which they operate." (p.5).

The use of teams in organizations has become prevalent (Bettenhausen, 1991), and strategic decisions require to be made by teams given the high stakes involved (Eisenhardt, 1989; Schweiger et al., 1989). Nevertheless, both advantages and disadvantages of team decision-making have to be considered. Decisions made by teams are thought to be advantageous for at least two reasons: the pooling of knowledge, expertise, and skills, and the commitment to the team and to its decisions (i.e. team cohesion). First, the pooling of knowledge, skills, and expertise is critical to the quality of decisions taken by teams, and this pooling can only occur if team members share information (e.g., Gigone & Hastie, 1997; Kim, 1997; Larson, Foster-Fishman, & Keys, 1994; Stasser & Titus, 1985). In turn, the more diverse team members are (Guzzo & Dickson, 1996; Jackson, 1992; Jackson, May, & Whitney, 1995; Sessa & Jackson, 1995), the greater the potential amount of information could be pooled. Both pooling of knowledge and team diversity have been studied in interaction, i.e. to what extent diversity in teams influences the sharing of information processes (e.g., (Gruenfeld, Mannix, Williams, & Neale, 1996). Second, it has been argued that team members have a greater propensity to support group decisions if they participated and are listened to (Peterson, 1997), thus reinforcing the commitment to present and future decisions (Amason, 1996). These decisions, taken and accepted by all members, have better chances to be successfully implemented (Beach, 1997; Shaw, 1981; Zander, 1994).

These advantages may become disadvantages. The diversity of perspectives, skills, expertise, opinions, status, have to be integrated, which can lead to dissent, disagreement, or

conflict. Although conflict in itself is presumed to help decision quality (Eisenhardt, 1989; Schweiger, Sandberg, & Ragan, 1986; Schweiger et al., 1989; Sniezek, 1992), it can be detrimental as well, especially if group members get involve in personal disputes (Amason, 1996; Priem & Price, 1991; Schweiger, et al., 1986, 1989). In naturalistic environments, team members are confronted to uncertainty and ambiguity, which can be a source of stress. In turn, stress and autocratic leadership in a highly cohesive group that feels invulnerable, can provide antecedents for what Janis has called "groupthink" (Janis & Mann, 1977; Janis, 1982) to describe defective decision-making. The group members favor unanimity above the realistic assessment of alternatives, thus suffering momentarily from a deterioration of mental efficiency, reality testing, and moral judgment (Janis, 1982). Other pitfalls of group decision-making include group polarization and risky shift (Burnstein, 1982; Myers, 1982; Myers & Lamm, 1976), production blocking and free riding[13] (Diehl & Stroebe, 1987; Kerr & Bruun, 1983).

Despite these possible drawbacks, group decision-making is considered as one of the more important aspects of group performance (Levine & Moreland, 1990), and of all managerial activities (Furnham, 1997). The processes usually involved are gathering and sharing information, creating and identifying alternative courses of action, choosing among these alternatives by integrating the diverse perspectives of members, and finally implementing the decisions (Guzzo et al., 1995). The prescriptive approach mentioned earlier has recommended a certain number of steps, a number oscillating between four and eight. Janis & Mann (1977) have extracted seven criteria from the extensive research literature on prescriptive decision-making[14]: Based on these seven steps, Janis has extracted four steps, which he considers as a descriptive model of decision-making ((a) formulating the problem, (b) using information resources, (c) analyzing and reformulating, (d) evaluating and

[13] Both these concepts will be further defined in section 1.3.2.

[14] "The decision maker, to the best of his ability and within his information processing capabilities

1. thoroughly canvasses a wide range of alternative courses of action;
2. surveys the full range of objectives to be fulfilled and the values implicated by the choice;
3. carefully weighs whatever he knows about the costs and risks of negative consequences, as well as positive consequences, that could flow from each alternative;
4. intensively searches for new information relevant to further evaluation of the alternatives;
5. correctly assimilates and takes account of any new information or expert judgments to which he is exposed, even when the information or judgment does not support the course of action he initially prefers;
6. re-examines the positive and negative consequences of all known alternatives, including those originally regarded as unacceptable, before making a final choice;
7. makes detailed provisions for implementing or executing the chosen course of action, with special attention to contingency plans that might be required if various known risks were to materialize." (p. 11)

selecting), and which, when carefully followed, characterize vigilant decision-making, preventing decision-making groups from committing major mistakes (Janis, 1989; Janis & Mann, 1977). Researchers have attempted to empirically test either all or part of these steps (e.g., Johnston, Driskell, & Salas, 1997; Leana, 1985; Peterson, 1997; Turner, Pratkanis, Probasco, & Leve, 1992). Because the prescriptive approach takes a long time in group decision-making processes and because strategic decision-makers in a naturalistic environment do not always have time to process all seven steps, some of the steps get truncated or overlooked. But one can argue that the core of group decision-making activities is alternative generation and alternative evaluation (Jackson et al., 1995). Indeed, even when team members have to identify the problem or discuss the objectives (or the strategy), they go through a process of proposing several alternatives, of evaluating each of these alternatives, and of contributing to the discussion with information they think could add value to the decision. Furnham (1997) summarizes decision-making as the process of generating alternatives and then choosing among them; Zander (1994) states that decision-making is the selection of a preferred solution from several alternative solutions.

In summary, group decision-making is based on two core decision-making processes, alternative generation and alternative evaluation, supported by the sharing of knowledge, information, skills and expertise and by commitment of team members to each other and to decisions they make. The next section takes a closer review of the literature on these four processes is presented next, in the following order: sharing information, alternative generation, alternative evaluation, and team cohesion.

1.3.1. Sharing Information

One of the central aspects of team decision-making is information, whether information search (e.g., Janis & Mann, 1977; Johnston et al., 1997; Peterson, 1997) or information processing (e.g., Dooley & Fryxell, 1999; Sniezek, 1992). In fact, the quality of the information resources available to team members may determine whether decision-making will be successful or not (Hirokawa, Erbert, & Hurst, 1996). There is a high expectation for groups to perform in their decision tasks more effectively than individuals would, providing they share their respective knowledge, skills, expertise, and abilities (Devine, 1999; Gigone & Hastie, 1993; Gruenfeld et al., 1996; Hollingshead, 1996; Kim, 1997; Larson, Foster-Fishman, & Keys, 1994; Schulz-Hardt, Frey, Lüthgens, & Moscovici, 2000; Stasser & Titus, 1985, Stasser & Titus, 1987; Williams, Mannix, Neale, & Gruenfeld, 1997; Wittenbaum, Hubbell,

& Zuckerman, 1999). This suggests that diversity of group members is an important factor for the quality of the decisions, although it does not preclude homogeneous teams to have diverse perspectives to share. Each member does not have the exact same amount of knowledge or the exact same amount of information in his or her possession (Hollenbeck et al., 1995; Wittenbaum et al., 1999). In addition, due to limits on information processing capabilities, group members, experts or not, may not be able to evoke all the relevant information they would want to consider (Browne, Curley, & Benson, 1997).

Despite the promising potential to have more information resources available in a decision-making team, there is evidence that this potential remains often unrealized. The major findings by Stasser and Titus (1985) are that the sharing of information is inhibited by two kinds of hindrance: a) group members discuss shared information (i.e. information known by all the group members before the discussion starts) more than unshared information (i.e. information held only by one member); b) the discussion is biased in favor of the initial or current preferences of the group members, as developed by group members, based on some subsets of information that they are aware of before the discussion. Stasser and his colleagues have continued to investigate the first hindrance. Stasser and Titus (1987) found that there is a better chance for unshared information to arise in the discussion if the amount of information available to group members is not too high and if unshared information constitutes two-thirds of the total amount of information available. Stasser, Taylor, & Hanna (1989) found that the larger the size of the group, the less chances for unshared information to be brought in the discussion, and structuring the discussions only helps to further discuss already shared information. Stewart & Stasser (1995) suggest that when expert roles are assigned, more of the unshared information is recalled and correctly recognized by group members after the discussion. The fact that experts bring the unshared information forth is seemingly crucial, as group members will not give credibility to unshared information if not provided by a designated expert (Stewart & Stasser, 1995). Gigone and Hastie (1993; 1997) confirm that groups are unable to take uniquely held information into consideration for the decision, even if it has been shared during the discussion. Larson and his colleagues (Larson et al., 1994; Larson, Christensen, Abbott, & Franz, 1996; Larson, Christensen, Franz, & Abbott, 1998) also found that shared information is more likely to be discussed than unshared information. It is suggested that when the importance of the task is heightened, group members bring information forth at a slower rate and took longer to take the decision, indicating an effort to

make the decision carefully, but still with an advantage for shared information (Larson et al., 1994).

The second hindrance to effective sharing of information in groups is what Schulz-Hardt et al. (2000) have called the "confirmation bias": it means that individuals request or seek only information that will support a pre-selected alternative; to be in a group accentuates the tendency to prefer supporting information rather than conflicting information. Schulz-Hardt et al. (2000) found evidence of this phenomenon in their studies, but only within homogeneous groups. Indeed, heterogeneous groups, defined in this particular context as groups comprising either one or two minority members, had less of a confirmation bias. Due to processes such as divergent thinking[15] (Nemeth, 1986) or conversion theory[16] (Moscovici, 1980), minorities, even if they did not influence the whole decision of the group successfully, at least led the group to have a more balanced information search. This held true even for groups of experts.

In the present study, 'sharing information' is defined as a concept including the team members' willingness to share their particular knowledge, abilities, skills, and expertise with others and the sharing of any information, during a decision-making task, that could help the team make a better decision, as opposed to a decision influenced by the team members' early preferences or opinions.

1.3.2. Alternative Generation

One of the two core processes of team decision-making consists of canvassing a wide range of alternative actions (Janis, 1982; Sniezek, 1992), of promptly generating innovative responses during discussions (Hackman & Morris, 1983), of having a greater quantity and variety of ideas (Zander, 1994), and of generating ideas about alternatives (Scudder, Herschel, & Crossland, 1994).

Alternative generation serves a precise purpose within a decision-making task. Team members generate as many alternatives as they can, given the limits of their cognitive capabilities (March & Simon, 1958; Simon, 1976) or their degree of mental engagement (Scudder et al., 1994). The notion of innovation or creativity underlies the concept of alternative generation, but alternative generation cannot be equated to creativity. It is not

[15] I.e., team members have diverging thoughts or cognitive representations about issues.
[16] I.e., consistent arguing minorities produce conflict that leads the group to have a more balanced approach on an issue.

creativity to produce something original *per se*, such as an art piece; but it is rather a focused type of creativity aimed at improving decision quality, by generating the largest amount of new ideas possible. Bearing that particular aspect in mind, group creativity in the context of organizations is thus defined as the divergent thinking or the ability of individuals to generate a wide variety of ideas or responses to a particular problem (Paulus, 2000).

One particular method supposed to enhance the generation of alternatives is called brainstorming, practiced in groups. The goal is to generate as many ideas as possible without evaluating them in the first place to help find a solution to a problem (Osborn, 1957/1974). The process relies on the idea that generating alternatives is a contagious stimulation from one group member to the other. Osborn reported the efficiency of the method, based on the count of ideas generated. However, the method has been criticized, as further studies have not been able to find groups to be more prolific than individuals (Paulus, 2000). Several reasons have been proposed to explain why groups are not as successful in brainstorming: production blocking, social loafing and free riding are the most frequently mentioned (e.g., Bettenhausen, 1991; Furnham, 1997; Levine & Moreland, 1990). Production blocking (Diehl & Stroebe, 1997) refers to the fact that the larger the group, the more difficult it becomes to voice one's ideas, resulting in a potential loss of resources. Social loafing (Latané, Williams, & Harkins, 1979) results from a lack of motivation of individuals when they see that their outputs get diluted in the group output. Free riding (Diehl & Strobe, 1987; Kerr, 1983; Kerr & Bruun, 1983) results from a lesser effort on the part of individuals who estimate their contributions to be not so valuable when confronted to high performance-oriented group members. In addition to these obstacles, there are three more, described by Paulus (2000). Social anxiety of group members, or evaluation apprehension, is the fear of being evaluated by others in the group. Downward comparison occurs when the convergence of ideas among team members tends towards the low performing individuals, which impacts the group's performance negatively. Illusion of productivity of the group means that group members overestimate their performance as a group. Paulus (2000) notes, that "the majority of people believe they would generate more ideas in groups than if they were alone." (p. 241).

In order to stimulate alternative generation in teams and counter the above-mentioned obstacles, some factors have been suggested. First, Paulus (2000) suggests that higher performance can be induced by upward social comparison, rendering team members more competitive. Paulus and Yang (2000) found that, providing team members are attending, active exchange of ideas among team members could lead to cognitive benefits through

mutual stimulation of ideas (idea developed earlier by Osborn, 1957/1974). Second, diversity[17] of team members represents the ideal way of enriching the decision-making process, as briefly introduced at the beginning of this section. It is proposed that heterogeneous teams have the potential to be more innovative, thus ensuring a higher quality of their decisions (Gruenfeld et al., 1996; Jackson et al., 1995; Kim, 1997; Paulus, 2000; Sessa & Jackson, 1995). Diversity can be defined in various ways: diversity can be described in terms of age, gender, ethnicity, educational background and level, socioeconomic status, tenure and position in the organization (Sessa & Jackson, 1995). Thus the relationship between diversity and its various aspects and alternative generation can be very complex. For example, Watson, Kumar, and Michaelsen (1993) found that culturally diverse groups (members of different nationalities and ethnicities) were more effective in generating alternative solutions.

Alternative generation is one of the steps in the prescriptive decision-making model, thus considered to take either too much time by some naturalistic decision-making researchers (e.g. Zsambok & Klein, 1997), or to be difficult due to the fact that decision-makers are not aware of all the existing alternatives (see March & Simon's (1958) concept of bounded rationality). Either position seems too pessimistic. Eisenhardt (1989) has demonstrated that fast strategic decision-makers develop more alternatives than slow decision-makers, and the speed of their alternative generation leads to better decisions. Interviews of top management team members revealed that: (a) generating multiple alternatives helped executives to test their hypotheses and to ascertain whether they choose the most viable alternative(s) in the end; (b) generation multiple alternatives helped to prevent escalation of commitment by shifting opinions back and forth as opposed to remain anchored on one; and (c) generating multiple alternatives provided fallback positions, or else alternatives for contingency plans. Thus, not only is alternative generation not too time-consuming, but also it is essential to the quality of the decision-making process.

In summary, research on brainstorming shows mixed results about the idea-generating capabilities of groups. Nevertheless, there are encouraging findings, demonstrating there are specific settings in which alternative generation is enhanced.

[17] I will use the terms 'diversity' and 'heterogeneity' interchangeably.

In this study, 'alternative generation' is defined as the ability of team members to generate as wide a range of alternatives and as great a number of alternatives as they can, in order to avoid being psychologically entrapped[18] (Kameda & Sugimori, 1993) in too narrow a decision and to ensure no meaningful element has been overlooked which would have potential negative consequences for the quality of the decision.

1.3.3. Alternative Evaluation

The second core process of team decision-making consists of evaluating the alternatives proposed by the team members (Guzzo, Salas, and Associates, 1995; Hirokawa & Poole, 1996; Jackson et al, 1995). Alternative evaluation consists of carefully weighing the costs and the benefits, the positive consequences as well as the negative consequences of each alternative (Hollingshead, 1996; Janis, 1982, 1989; Janis & Mann, 1977; Maier, 1998); of thorough consideration of all available alternatives and of sufficient time devoted to evaluate each alternative (Johnston, Driskell, & Salas, 1997; Turner et al., 1992); and of systematic search for possible courses of action (McCauley, 1998).

Evaluating alternatives requires effort. Hirokawa et al. (1996) suggest that the quality of group decision-making relies on a) the quality of effort provided by group members, as they have to proceed to painstaking examination and reexamination of information; b) the quality of thinking displayed by group members, that is their ability to make the appropriate inferences from the information available so adequate choice can be made among alternatives. Schweiger et al. (1986) suggest that a rigorous process of thorough evaluations and critiques of alternatives is necessary to reach a quality decision. Information is an important component of alternative evaluation: information should be analyzed while a choice is being made, and focusing on the relevant information contributes to the effectiveness of the decision process (Dean & Sharfman, 1996).

Alternative evaluation is considered as one of the essential steps of vigilant group decision-making[19] (Janis & Mann, 1977; Janis, 1989). Yet, should inadequate alternatives be discussed, the group may converge too quickly on a suboptimal solution (Scudder et al., 1994), which in turn can be described as defective decision-making (Aldag & Fuller, 1993): group members limit their discussion to only a few alternatives, ignore new information

[18] "*Psychological entrapment* refers to a faulty decision-making process "whereby individual escalate their commitment to a previously chosen, though failing, course of action in order to justify or 'make good on' prior investments" (Kameda and Sugimori, 1993, p. 282).
[19] See introduction section 1.3 for a definition.

concerning the risks and drawbacks of the selected alternative, avoid information concerned the benefits of the rejected alternatives, and fail to develop contingency plans. One of the possible explanations for a group not to thoroughly evaluate alternatives could be that vigilant decision-making takes too much time and energy, especially in natural settings that typically involve time pressure as well as ambiguous information: group members may adopt shorter procedures (Johnston et al., 1997). Johnston et al. were able to find that teams using a more limited alternative evaluation procedure had a better performance than the teams using a more thorough procedure. Another possible explanation for a group not to evaluate alternatives optimally would be that team members focus on choosing the "best" alternative (Hollingshead, 1996). In doing so, team members are likely to select information too narrowly. Hollingshead (1996) suggests that rank ordering alternatives would force team members to more thoroughly evaluate all the available alternatives. As Roberto (2000) proposes, managers achieve higher levels of efficiency and consensus about strategic decision-making when they establish well-defined alternative evaluation criteria: the rank ordering could correspond to such a criterion.

In the present study, 'alternative evaluation' is defined as thorough an examination of the alternatives as possible, and an analysis of the costs and benefits of each alternative, thus preventing team members to ignore relevant information, to limit their discussion to only a few alternatives, and to take the risk of deciding too hastily.

1.3.4. Team Cohesion

Group cohesion[20] is an important component of group decision-making. It has been defined and operationalized in many different ways (Bettenhausen, 1991; Hogg, 1996; Levine & Moreland, 1990; Mudrack, 1989 for a review). Kurt Lewin (1951/1975) defined group cohesion as the members' positive evaluation of the group and their motivation to continue to belong to it, which in turn would motivate group members to carry out the group's tasks. The most frequently cited definition is Festinger's (1950), who described group cohesiveness as "the resultant forces, which are acting on the members to remain in the group" (p. 274). Janis (1982) defined it as a "high degree of amiability and esprit de corps among the members" which is a manifestation of "the high degree to which members value their membership in the group and want to continue to be affiliated." (p. 245).

[20] Both the terms 'cohesion' and 'cohesiveness' are used in the group literature. The label 'team cohesion' will be applied in the present study.

The criticism has been made that subsequent research has focused only on the interpersonal attraction side of group cohesion (Hogg, 1996; Mudrack, 1989). Recent studies have demonstrated that group cohesion can be a multifaceted construct, including both a task and an interpersonal component (Mullen, Anthony, Salas, & Driskell, 1994; Zaccaro & Lowe, 1988; Zaccaro, 1991). Contemporary integrative definitions – that is, those that do not separate the task and the interpersonal side of cohesion – propose that team members need to share the willingness to work together, which was originally included in the Lewin's definition, and to reach some common objectives. There seems to be a convergence toward the following definition of team cohesion: the commitment to group members to achieve common objectives, to accomplish a task together, with positive feelings about team members (Evans & Dion, 1991; Turner et al., 1992; Wech, Mossholder, Steel, & Bennett, 1998). To obtain this type of team cohesion, Mullen and Cooper (1994) have found in their meta-analytic integration of the relation between group cohesiveness and performance, that real teams, which are composed of members who have built a history of relationships, will develop stronger cohesion than ad hoc teams that have been created in the laboratory. The emphasis on the goal orientation makes the construct also better applicable to teams operating in organizations (Mudrack, 1989).

An alternative facet of commitment is described as "decision acceptance" (Priem and Price, 1991; Schweiger et al., 1986, 1989) in the strategic decision-making literature, concerned with real world decisions. Decision acceptance is important to group decision-making because team members more readily implement decisions if they have participated to the decision process, have been listened to, and accepted the final decision (Beach, 1997; Peterson, 1997; Shaw, 1981; Zander, 1994), thus enhancing the potential success of the implementation. The process of taking decisions in groups should ideally serve to win acceptance and commitment from decision-makers who have to live with the results of their decisions after implementing them and have to continue to take decisions together effectively in the future (Amason, 1996; Schweiger, Sandberg, & Ragan, 1986; Schweiger, Sandberg, & Rechner, 1989; Schweiger & Sandberg, 1991; Scudder et al., 1994; Sniezek, 1992). This notion was introduced by Maier (1963) in his formula:

$$ED = f(Q,A)$$

where ED stands for effective decision, Q for quality, and A for acceptance.

Decision acceptance is also obtained by affective acceptance among team members (Amason, 1996). It has been considered as an affective measure of group output, such as

confidence in the group decision (Peterson, 1997), as enhancing a friendlier climate, and group liking after decision-making (Priem and Price, 1991). The word 'satisfaction' is often used about decision acceptance, term that relates to a general favorable state of being, applied to life or work (Kahneman, 1999). In turn, team cohesion has been considered as the affective component of teams. For example, cohesion has been referred to as a transient affective state (Leana, 1985), as the chief affective component of group functioning (Harrison, Price and Bell, 1998), as affective bonds (Mudrack, 1989), as interpersonal liking and friendship (Cartwright, 1968; Zaccaro, 1991). However, neither decision acceptance nor cohesion can be equated to an emotion _ as defined in section 1.1. (Zaccaro, personal communication, August 1998).

One characteristic of team cohesion is that it can be studied as (a) a determinant of team performance (and decision-making can be considered as a team performance feature), (b) a process occurring while the task is performed, or (c) a result of performance. Cartwright (1968), in his review on group cohesiveness, outlined the fact that team cohesion has been investigated as either a dependent variable or an independent variable. In the first case, the objective is to identify the conditions that bring different levels of cohesiveness. In the second case, the objective is to study the effects of different levels of cohesiveness on the team and its members. For example, Mullen et al. (1994), in their meta-analysis, reported results with group cohesiveness as a determinant of decision-making, and group cohesiveness was found to have an effect on the quality of group decision-making. They also considered group cohesiveness as an outcome, as they examined certain antecedents of groupthink, and how these antecedents would influences the relationship between group cohesiveness and performance. Gully, Devine, and Whitney (1995), in an ensuing meta-analysis, considered cohesion as one of the most important component of group process. Harrison et al. (1998) investigated team cohesion as a result or an outcome of decision-making. In the present study, it was chosen to consider team cohesion as a component of the group process, i.e. a component of group decision-making.

Finally, although earlier studies have considered team cohesion only at the individual level, it is appropriate to study it at the aggregated team level, especially when attempting to relate it with a group performance measure (see Gully et al., 1995, for a review). Yet it is still individuals working in groups evaluate the degree of cohesion reached by their group, thus it is necessary to verify that an appropriate degree of consensus has been reached within the groups regarding the concept measured (Klein, Dansereau, & Hall, 1994). Thus, it is

important to adequately choose the level of analysis, as explained in Chapter 3 (see p. 67). Gully et al. (1995) address this issue by drawing attention to the fact that some researchers have been measuring team cohesion at the individual level and formulating their findings and conclusions at the group level, thus bearing the risk of "misspecification, or fallacy of the wrong level." (p. 501), unless one purposely studies cohesiveness across level. Wech et al. (1998) examined how cohesiveness affects individual's performance and organizational commitment. A possible alternative would be to measure team cohesion at the individual level, remain at the individual level for data analysis, and consider the results as the individual contribution to team cohesion.

In this study, 'team cohesion' is defined as the commitment made by all team members to the team's decisions and to the team itself. Team cohesion implies that team members have positive behaviors and feelings towards each other, and that team members' goals are to enhance present and future performance of the team.

1.3.5. Summary

Levine and Moreland (1990) state that decision-making is an important aspect of group performance in general. The particular focus in this study is primarily strategic decision-making in a quasi-naturalistic environment, which is characterized by ill-structured problems, uncertainty, dynamism, shifting of competing goals, time stress, high stakes, multiple player, and organization goals and/or norms. In summary, a strategic decision is defined as being ambiguous and complex.

Four main decision-making processes can be identified: (a) the pooling of team members' expertise, knowledge, and skills, that should in theory nurture the decision-making discussion; (b) the generation of alternatives, which represents the most creativity-oriented process; (c) the evaluation of alternatives, which represents the analytical dimension of decision-making, and (d) the cohesiveness of the team, which contributes to the acceptance and commitment to the decision by all team members.

The concept of sharing information encompasses the team members' willingness to share their particular knowledge, abilities, skills, and expertise with others, and the sharing of any information gathered during the decision-making task that could help the team make a better decision, as opposed to a decision that is influenced by the team members' early preferences. Alternative generation is the ability of team members to generate as wide a range of alternatives and as great a number of alternatives as they can, in order to avoid being

psychologically entrapped in too narrow a decision and to ensure no meaningful element has been overlooked which would have potential negative consequences for the quality of the decision. Alternative evaluation is as thorough an examination of the alternatives as possible, and an analysis of the costs and benefits of each alternative, thus preventing team members to ignore relevant information, to limit their discussions to only a few alternatives, and to take the risk of deciding too hastily. Team cohesion is the commitment made by all team members to the team's decisions and to the team itself, implying positive feelings toward team members; team member's goals are to enhance present and future performance of the team.

Emotion and individual decision-making are reviewed next, before the different researches addressing emotion and group decision-making are described.

1.4. Emotion and Decision-Making

Historically, emotions have had a negative reputation when it comes to their influence on people's behaviors, and namely on decision-making (Forgas, 2000). Decision-making is supposed to be a rational activity (Loewenstein & Lerner, 2003). In contrast, emotions have been associated with irrationality, disruption, or interruption (Ketelaar & Clore, 1998; Scherer, 1984b; Simon, 1987). Traditionally called "passions," emotions were perceived as a negative force for human behavior by disrupting and interfering "with the serene process of rational thought" (Ellsworth & Smith, 1988, p. 302). Three research domains can be held responsible for gradually changing the negative perceptions of the role of emotion in decision-making. First, decision-making theorists have demonstrated people's "bounded rationality" (Gigerenzer & Selten, 2001; March & Simon, 1958; Simon, 1976), and the limitations encountered by humans to exhaustively process all of the information available. Second, research on emotion has demonstrated the complex interrelations between emotion and cognition (see Dalgeish & Power, 1999; Forgas, 2000). Third, research on the relationships between affective processes and decision-making processes have demonstrated that these relationships can be beneficial or detrimental depending on the intensity and the quality of the affect considered (e.g., Loewenstein & Lerner, 2003). Emphasis in this study will be placed on the third research stream, considering that positive and negative affect, positive and negative mood, and emotions are representing different intensities and qualities of affect. Their respective influence on decision-making at the individual level will first be reviewed, and then their influence on group decision-making will be reviewed next.

1.4.1. Emotion and Individual Decision-Making

Considerable research has demonstrated the variety of influences of affect on decision-making at the individual level, which has mostly focused on mild affect or mood rather than emotion[21], but has also used these terms interchangeably (for reviews, see Forgas, 1995; Isen, 1993; Isen, 1987; Isen & Baron, 1991; Loewenstein & Lerner, 2003; Schwarz, Bless, & Bohner, 1991; Schwarz & Bless, 1991). Research on affect and decision-making distinguishes between two main categories of emotions: expected or anticipated emotions and immediate emotions (see Loewenstein & Lerner, 2003; Schwarz, 2000, for reviews). Expected or anticipated emotions consist of predictions about the emotional consequences of decision outcomes (e.g. Baron, 1992; Janis and Mann, 1977; van Dijk & van der Pligt, 1997;

[21] See section 1.1.1. for definitions.

Zeelenberg, Dijk, Manstead, & Pligt, 2000). Immediate emotions consist of emotions that are experienced at the time of decision-making, which will be the focus of this section. The main findings regarding the relationship between respectively positive affect/mood, and negative affect/mood, and decision-making will first be reviewed bearing in mind that the separation is sometimes slightly artificial, given the remark made above that authors have used the terms affect, affective, mood, and emotion interchangeably. A few examples of effects of emotion and decision-making will be reviewed next.

1.4.1.1. Positive Affect/mood

Isen and her colleagues have focused their research efforts on mild positive affect, defined as common positive feeling of happiness, well-being, good fortune, or enjoyment, induced by everyday events such as when one finds a coin in a public telephone, or when being offered refreshments, cookies, or candies (Isen & Baron, 1991). Mild positive affect enhances cognitive flexibility in categorizing and interconnecting information in unusual ways (Higgins, Qualls, & Couger, 1992; Isen & Daubman, 1984; Murray, Sujan, Hirt, & Sujan, 1990); improves performance in tasks involving creativity thinking and innovation (Isen, Daubman, & Nowicki, 1987); facilitates creative problem-solving by increasing the effort put into problems (Higgins et al., 1992); results in better performance in a complex decision-making task (Isen & Means, 1983) by enhancing a broader search for information and a more thorough consideration of alternatives (Isen, 1993; Isen & Baron, 1991); and encourages cooperative behavior (Isen, 1987; Isen, 1999). Convergent results have been obtained by researchers in organizational psychology: people with a high positive affective disposition (in the sense of personality trait) performed better in their decision-making task (a business simulation), searched information more broadly, requested more information when necessary, considered it more thoroughly, and had a better ability to recognize situational contingencies (Staw & Barsade, 1993). Staw and Barsade's (1993) results are congruent with Isen and her colleagues' findings; therefore dispositional affect (i.e., personality trait) and induced affect (e.g., either in daily life or in the laboratory) seem to have similar effects on decision-making and its related processes.

Two potential disadvantages can be attributed to positive affect. First, under certain circumstances, individuals in whom positive affect has been induced may not help a third party, especially if helping would jeopardize their positive feeling; it may be interpreted as protection of affective state and of independence (Isen & Baron, 1991). Second, under certain

circumstances, positive affect may lead to quick and suboptimal decision-making because of the use of heuristics[22] and hunches, resulting in "biased, incomplete, and incorrect solutions" (Isen, Means, Patrick, & Nowicki, 1982, p. 252). Isen recognizes the fact that positive affect may impair performance under certain conditions, yet she concludes that positive affect does not reduce cognitive capacity (Isen, 1987; Isen & Baron, 1991). In addition, if the task is considered important and interesting, and requires effort and care, positive affect-induced individuals will be more thorough in their decision-making (Isen, 1993).

A certain research tradition considers mood to be a source of information. Adhering to this tradition, Schwarz and Bless (1991) posit that positive mood increases the use of simple heuristics in information processing, with little attention to details, but increased creativity (the "happy and mindless" hypothesis). Based on the affect-as-information theory (Schwarz & Clore, 1983), a positive affective state may signal a benign environment, in which case a more demanding processing strategy should not be necessary. Schwarz (2000) describes the heuristic processing strategy yielded by positive mood as a top-down processing, with high reliance on pre-existing knowledge structures and usual routines (see also Bless, 2000). In a recent study, Bless et al. (1996) have brought refinement to the "happy and mindless" hypothesis: they found that even if positive mood increases the reliance on general knowledge structures (e.g., scripts or stereotypes), it does not reduce processing capabilities, which supports Isen's (1987; Isen & Baron, 1991) conclusion about positive affect. Forgas (1989) also found that positive mood resulted in faster decision-making, and greater self-confidence of individuals about their decision, but only in the case where the decision outcome was not personally relevant to them. In case of personally relevant decisions, individuals in a positive mood would probably be more systematic in their decision-making process (Elsbach & Barr, 1999).

There are potential disadvantages to positive mood. The use of heuristics or the lack of attention to details can become a disadvantage if one is to overlook important information, especially if the task at hand requires thorough analysis (Schwarz & Bless, 1991). Forgas (1989) reported that happy subjects ignored additional information to the one they already retained. In addition, individuals in a happy mood tend to overestimate the likelihood of positive, and to underestimate the likelihood of negative outcomes (Loewenstein & Lerner, 2003; Schwarz, 2000).

[22] "a simple, inexact, but practical rule", Isen (1987), p. 227.

1.4.1.2. Negative Affect/mood

Schwarz and Bless (1991) posit that negative mood enhances considerable attention to details, a careful, step-by-step analysis of information, and a high degree of consistency ("sad and smart"). Schwarz (2000) describes this systematic processing strategy as bottom-up processing, with little reliance on pre-existing knowledge structures. The close attention paid to details could be due to the fact that negative mood signals the current situation to be problematic, hence the elicitation of an analytical processing strategy (Bless et al., 1996; Schwarz, 2000). Sinclair (1988) found depressed subjects to process information more in a more controlled manner, which lead to a greater accuracy in judgments. Forgas (1989) found that negative mood resulted in motivated and selected decision strategies towards rewarding outcomes. Individuals in sad moods focused on the interpersonal aspects of the decision, and searched more intensely for interpersonal information regarding potential collaborators. In a subsequent study, Forgas (1991) also found that sad participants remembered negative features of potential partners more than happy participants did. Elsbach and Barr's (1999) findings suggest that individuals in a negative mood are more likely to use a structured decision protocol completely and correctly, which may be appropriate in the context of a complex decision-making task.

The downside of negative mood resides in inefficient and wasteful decision strategies, where sad subjects consider more irrelevant information (Forgas, 1989). In sad moods, individuals have the tendency to underestimate the likelihood of positive, and to overestimate the likelihood of negative outcomes (Schwarz, 2000). In addition, Schwarz and Bless (1991) state that sad mood impairs creativity-related tasks.

Some studies have addressed the relationship between negative affect and decision-making. For example, Stone & Ziebart (1995) showed that in a preferential choice task, a higher level of negative affect is associated with a lower choice accuracy, which may be due to impaired processing capacity, especially when a large amount of information processing is required by a complex decision task (Lewinsohn & Mano, 1993). Stone and Ziebart found that participants with a higher level of negative affect (measured with 5 labels: angry, frustrated, irritated, overwhelmed, and threatened, based on Watson and Tellegen's (Watson & Tellegen, 1985) scale processed less of the available information, ignored more attributes, and hurried the decision, which impaired its quality. Higgins et al. (1992) report negative affect to be associated with constrictive thinking, decreased creativity, and use of less information in a more routinized way.

In contrast, Isen, Daubman, & Nowicki (1987), in comparing effects of positive affect and negative affect on creativity, did not find negative affect to result in impaired creativity, at least in the conditions of their study (they acknowledged the fact that different results could have been obtained if differentiated negative affects would have considered, such as fear, sadness, or anger).

1.4.1.3. Emotion

The few emerging studies addressing the influence of emotion and decision-making rely on appraisal theories of emotions (see section 1.1.). In doing so, researchers propose differentiated effects of discrete emotions, as opposed to the research that has focused on undifferentiated positive or negative moods (Ellsworth, 1991, Ketelaar & Clore, 1998). Whereas it has been reported that emotion influences action and mood influences information processing and decision-making (Davidson, 1994; Forgas, 2000), Ketelaar and Clore (1998) propose that emotional appraisals produce particular feeling states that will influence subsequent information processing. They argue that the emotional information provided is functional, as it helps individuals to solve particular problems. For example, anger is triggered by the encounter with someone who treated one unfairly, and provides information to the individual that someone is to blame. Consequently, emotion will motivate actions, such as punishment in this case. Ketelaar and Clore suggest another example of emotion as information provider is guilt: in a prisoner's dilemma game, if the temptation of cheating arises, guilt becomes activated when present rewards of cheating are compared to long-term consequences, thus providing useful information on how to behave.

A few other studies have been able to demonstrate the influence of discrete emotions on information processing or decision-making. Ellsworth (1991) reports preliminary data suggesting differences in the way people make judgments: sad subjects estimate the likelihood of events to be more caused by circumstances, whereas angry subjects estimate the likelihood of events to be more caused by other people. Lerner and Keltner (2000) have demonstrated that fear and anger affect judgments about risk in a very different manner: individuals feeling fear tend to make pessimistic judgments about future events, whereas individuals feeling anger tend to be more optimistic. Raghunathan & Pham (1999) compared the different effect of sadness and anxiety on decision-making processes (in a gambling and in a job selection task). Sad individuals tended to prefer high-risk/high reward options, especially when the individual is personally affected by the outcome. In contrast, anxious individuals tended to

prefer low-risk/low-reward options, also when personally affected. Baron, Inman, Kao, & Logan's (1992) findings on fear and information processing run counter to Schwarz and Bless's (1991) model of negative mood being associated with increased systematic information processing (see section 1.4.1.2.). They argue that it is due to the fact they induced an intense negative emotion, i.e. fear, as opposed to inducing a milder negative affect. Thus, high-fear participants evaluated a message more on its superficial attributes than on its key arguments, confirming thereby the hypothesis that more intense emotional states increase superficial processing as opposed to careful processing.

1.4.1.4. Summary

Positive affect enhances creativity and efficient decision-making. However, it may lead to selfishness and suboptimal decision-making based on heuristics. Positive mood is also found to enhance creativity and fast decision-making, based on heuristics and routine information processing, activated when the situation is safe. Similarly to findings on positive affect, the heuristics used in a positive mood state can result in suboptimal decision-making, especially if details that may be important for the decision are overlooked. Positive affect and positive mood seem to yield the same effects on decision-making and its related processes.

Negative affect has been found to impair processing capacity and thinking in complex decision tasks, whereas negative mood is supposed to enhance detail, careful, systematic information processing, including a comprehensive and critical evaluation of alternatives Jones & George (1998), which is considered to improve decision quality (see section 1.3.3.). Thus, negative affect and negative mood seem to yield different effects on decision-making and its related processes.

Jones and George (1998) propose a beneficial accumulation of both the effects of positive and negative affect/mood on decision-making. They hypothesize that, since managers experience different affective states over time, alternatively positive and negative ones, while dealing with an issue, they may consider this issue under different angles. For example, when in a positive affective state, managers may view the problem too optimistically; thus, reviewing it when in a more negative affective state may provide them with a more balanced perspective, as they would review the issue more carefully. When in a negative affective state, managers may view the problem too pessimistically; thus, reviewing it when in a more positive affective state may provide them with a broader perspective and more confidence in the future. In summary, these different alternating affective states would lead managers to

"approach decision-making in more flexible way, generate multiple alternatives, and gain a broadened perspective on potential threats and opportunities" (p.20-21).

Although a clear pattern of findings about the influence of discrete emotions on decision-making processes does not emerge, it appears that from one discrete emotion to the other, one can expect specific influence on decision-making, which departs from the research studying effects of positive affect/mood and/or negative affect/mood (i.e. having a more general influence). In the present study, it will be attempted to identify the effects of different classes of emotions on decision-making processes.

The literature covering emotion and group decision-making will now be reviewed.

1.4.2. Emotion and group decision-making

Eisenhardt (1989) states "emotion is critical for understanding strategic decision-making" (p. 573) performed by top management teams. Yet, the general deficiency of research on affect / mood / emotion and group decision-making has been noted (Davis, 1982; Hinsz, Tindale, & Vollrath, 1997). For example, Davis observed that little emphasis had been placed: (a) on the role of emotion in group decision-making research; and (b) on the link between emotional reactions of a group member and interactions with others in the group, although these interactions form the ground of social cognition research. Hinz et al., addressing the issue of information processing in groups, recognize that social-emotional relations are a key aspect of group performance, yet has been long ignored. Hinz et al. suggest research on the functions and influences of emotion and affect in task-performing groups should be pursued. Affect/mood/emotion has been addressed in group decision-making in alternative ways, as will be reviewed now.

Research in strategic decision-making distinguishes between affective conflict and cognitive conflict. Affective conflict, also called socio-emotional conflict, is defined as a dysfunctional type of conflict, based on personal incompatibilities, disagreements, or criticisms (Amason, 1996; Priem & Price, 1991). According to Amason (1996), affective conflict leads to cynicism, avoidance, or countereffort that could jeopardize decision quality. One of the items selected to measure affective conflict is "How much *anger* (emphasis added) was there among the group over this decision?" The results of Amason's study show that affective conflict is detrimental to decision quality. According to Priem and Price (1991), social-emotional conflict may arise when team members are not able to communicate accurately the reasons for taking a decision or another; and it may be triggered by cognitive

conflict, which is supposed to foster the quality of decisions. Cognitive conflict is defined as functional (Amason, 1996), task-oriented, and enabling the emergence of all contradictory viewpoints about the goals to achieve, and the decisions to be taken (Amason, 1996; Priem and Price, 1991). Priem and Price were not able to demonstrate that social-emotional conflict has a detrimental effect on decision quality. They suggest future research to investigate this matter. Schweiger et al. (1986; 1989) do not make the distinction between affective and cognitive conflict but similarly to Priem and Price, note that in a situation where cognitive conflict is encouraged, team members' feelings can be damaged (e.g. feeling rejected or diminished, or treated unfairly), and feelings of depression or *anger* (emphasis added) can impair working relations.

Researchers investigating decision-making in teams and conflict suggest this dichotomy between cognitive and affective conflict as well. Sessa (1996) defines task-oriented conflict as the type of conflict concerned with the substance of the task (i.e. ideas or procedures concerning the task); and people-oriented conflict as the type of conflict directed toward people within the team (i.e. questioning the competence of others, arguing, and dealing with personality differences). Devine (1999) defines cognitive conflict as strategic, enhancing the examination of multiple plans to achieve the team's goals, and affective conflict as interpersonal, preventing the accomplishment of the team's goals through arguments or withdrawal. Devine found that unique information sharing was related negatively to performance (i.e., profit, in the context of a simulated strategic decision-making task) when affective conflict was high.

Janis (1989) built a theoretical framework of group decision-making that he illustrates with case study observations, mainly the comparative case studies of decision-making by US government leaders. Within this theoretical framework, he distinguishes between cognitive decision rules and emotive decision rules. Cognitive decision rules correspond to the simple decision rules used by decision-makers who want to quickly find a solution that seems satisfactory. These cognitive rules help decision-makers cope with time pressure, limitations in knowledge, social pressures, and emotional stress; factors that inhibit high-quality decision-making. Emotive decision rules correspond to decisions taken under high stress, and based on emotions such as fear, anger, shame, guilt, or elation (the only positive emotion in the model). Where Janis's model differs from the previous models presented is that cognitive rules are not fully equivalent to functional decision-making and emotive rules are not fully equivalent to dysfunctional decision-making. Cognitive rules can be functional in certain circumstances; for

example, when decisions are less important; but can be dysfunctional when decisions are of vital importance. Emotive rules can be functional in certain circumstances; for example, when emotions such as shame and guilt send signals to decision-makers that they should reconsider their decisions; but can be dysfunctional, for example, when intense anger leads to blind retaliation or high arousal of elation leads to a rapid closure in information search and incomplete deliberations.

The above-mentioned studies continue to rely on the traditional dichotomy between cognitive processes associated with rationality and affective processes associated with irrationality, or at least, impairment of rationality, although results regarding the negative impact of affective conflict on decision quality are mixed. However, it is also acknowledged that, on the one hand, a certain degree of positive affective relationships are necessary for team members to feel satisfied with their team and motivated to continue to work with each other (Amason, 1996; Priem and Price, 1991; Schweiger et al., 1986; 1989), and that, on the other hand, a moderate level of emotions can contribute to effective decision-making (Janis, 1989; Staw, Sutton, & Pelled, 1994).

Communication research suggests that the quality of the climate within groups affects decision-making. For example, Mayer (1998) found that a negative climate supported by negative socio-emotional behaviors (such as disagreement, sarcasms, attacks, expressed dislike towards group members) are perceived to decrease the quality of the decision, whereas a positive climate supported by positive socio-emotional ones (such as agreement, respect, support) are perceived to improve the decision: information exchanges are increased, and cooperation is higher. Research on group decision-making also points out the advantageous aspect of a positive climate, where team members can feel free to express themselves without fear of criticism by other team members (Moreland & Levine, 1992; Shaw, 1981).

Research on diversity in decision-making teams (e.g., Jackson et al., 1995) relies on Isen's (see section 1.4.1.1. for details) findings on positive affect, and posits that given that positive affect triggers helping behavior, it can be supposed that team members will be more motivated to work together on a decision task. In contrast, Jackson et al. posit that anxiety would inhibit team members to participate in the decision activity.

Emotion has been studied also in the general group and group decision-making literature. The main findings are: (a) group cohesiveness is positively related to emotional control and emotional stability of group members, and negatively related to anxiety and defensiveness (Shaw, 1981); (b) anxiety created by stress narrows the attention of decision-

makers, slows them down, but does not impair the quality of decisions taken if enough time is allowed (Zander, 1994); and (c) high level of emotion (namely anger and anxiety) is a condition for judgment to be impaired (Furnham, 1997). Zander (1994) describes a study suggesting that the highest quality decisions are taken in groups where members agree to delay affective demonstrations until the decision task is over, and that groups in which members express their feelings freely generate less alternatives and devote less effort to the task. Zander does not report the nature of emotions felt and/or expressed.

As far as research on collective emotion is concerned, the studies that have addressed this concept did not consider its influence on group decision-making processes such as described in section 1.3, but found relationships with different group performance indicators. The following findings are related to the studies previously described in section 1.2. In this previous section, definitions and operationalizations of collective emotion were described. Hereafter, the focus will be on the influence of collective emotion on other different team processes. For example, Barsade (2001) found that positive emotional contagion is positively related to level of cooperativeness and collectivistic behavior in the group, and is negatively related to conflict. Bartel and Saavedra (1998) found that pleasant moods (such as being happy, delighted, pleased) and activated pleasant moods (such as being excited, enthusiastic, elated) enhance the quality and the efficiency of group performance, whereas unpleasant moods (such as being sad, gloomy, unhappy) and activated unpleasant (such as being fearful, annoyed, anxious) enhance the quantity and goal attainment aspects of group performance. George (1990) has found positive affective tone to be negatively related to absenteeism, and negative affective tone to be negatively related to prosocial behavior.

1.4.2.1. Summary

In the group decision-making literature, emotion is (a) included in a broader concept called "affective conflict", (b) divided in positive vs. negative dimensions, or (c) described mostly in theoretical terms (anger, shame, guilt, anxiety, and elation are the most frequently mentioned emotions).

It appears that anger may play a negative role in decision-making teams, and may have the potential to deteriorate relationships between team members. This is confirmed by research addressing the role of anger in negotiations[23]: partners with a high anger level do not

[23] Negotiation can be compared to decision-making, as there are some common features, such as generating alternatives for example (e.g., Jackson et al., 1995), but to reach a suitable outcome for both parties, one could

want to work again with each other in the future (Allred, Mallozzi, Matsui, & Raia, 1997) or reject alternatives offered, especially if the deal is considered unfair or humiliating (Pillutla & Murnighan, 1996). In addition, anger seems to be embedded in the concept of affective conflict. Although the way researchers have operationalized affective conflict addresses several of the possible antecedents of anger, this seems to confirm the detrimental role of anger in decision-making.

Anxiety appears to deteriorate working relations, to inhibit team members' participation in the decision activities, to narrow decision-makers' attention, and to slow the decision-making process. Shame or guilt appear to provide information to decision-makers that their decisions might need to be revised, for example if they would turn out to be too unethical, or too risky. Elation appears to lead to hasty decision-making, where alternatives or information might be overlooked.

Empirical research considering both the effects of emotion as defined in section 1.1. (i.e. a dynamic process, object or event related, limited in its duration, with specific action tendencies and behavioral consequences), and of collective emotions, on group decision-making is still sparse. The present study proposes to empirically address the influence of a greater variety of emotions, at the individual and at the collective level, on team decision-making processes. In the following section, the research objective of the study and detailed hypotheses are presented.

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speculate that evaluating alternatives, sharing information, and committing to the deal are parts of the negotiation process as well.

CHAPTER 2: RESEARCH OBJECTIVE AND HYPOTHESES

2.1 Research Objective

Team decision-making consists of two core processes (alternative generation and alternative evaluation), and of two supporting factors (sharing information and team cohesion). These four elements involve a large amount of interactions among team members. At times these interactions may evoke emotion. Emotion, in contrast to affect or mood, is object and/or event-related, and plays a social role as it reflects the ongoing exchanges and mutual influences individuals experience in a social context. Thus, emotion has the potential to influence or to be influenced by any of the processes underlying team decision-making, such as generating new alternatives, evaluating these alternatives and making final choices, sharing information or experiences with team members, or committing to team decisions while enjoying to work with other team members.

The mutual influence of emotion and decision-making processes in a team context being acknowledged, the objective of this research is to determine the extent to which four classes of emotions (achievement emotions, approach emotions, resignation emotions, and antagonistic emotions) influence four decision-making processes (alternative generation, alternative evaluation, sharing information, and team cohesion) (a) at the individual level, (b) at the aggregated team level (i.e., emotions reported by individual team members aggregated at the team level), and (c) at the group consensus level (emotion reported as the result of a group discussion about the team members' perception of what the prevalent emotion(s) has been during the decision task). Although the primary interest of this study is to focus on team processes, it seems reasonable to first test the hypotheses at the individual level. Emotions and decision-making processes were measured at that level, and some meaningful interactions may be revealed at the psychological level.

The detailed hypotheses for each class of emotions in regard with each of the decision-making processes are outlined next.

2.1. Hypotheses

2.2.1. Achievement Emotions and Team Decision-Making Processes

Achievement emotions include pride, elation, joy, and satisfaction. As outlined in section 1.1. (see pp. 7 and 9), these four emotions are suggested to be representative of achievement emotions, but not to be an exhaustive list. Achievement emotions are expected to induce openness, free activation, exuberance, expansiveness, but also patience and tolerance towards others. Research on group decision-making indicates that a positive atmosphere encourages team members to share information or ideas. One can assume that achievement emotions would contribute to the formation of such an atmosphere. Sharing information, one of the four decision-making processes examined in this research, reflects the team members' willingness to share their knowledge, expertise, and skills with others, as well as any information that would prevent the team to make a decision influenced by the team members' preferences of any particular alternative. Thus, I hypothesize that:

H1a: Achievement emotions will be positively related to sharing information.

Achievement emotions enhance flexible thinking, creativity, and openness. Research on affect and decision-making has demonstrated that positive affect or mood, which is operationalized in studies with verbal labels such as "happy" or "elated", enhance cognitive flexibility, creative thinking, innovation, and broader information search. Alternative generation, one of the four decision-making processes examined in this research, reflects the ability of team members to generate a wide range as well as a wide number of alternatives in order to make sure that the team has not overlooked any important avenue, and which requires a certain form of creativity. Thus, I hypothesize that:

H1b: Achievement emotions will be positively related to alternative generation.

Achievement emotions may lead to boastful actions with low concentration and a slowing down of productive thinking. Research on positive mood has demonstrated that it is associated with the use of simpler decision rules, with little attention paid to details, and a tendency to overlook important information or to underestimate the likelihood of negative outcomes. Alternative evaluation, one of the four decision-making processes examined in this research, implies the thorough examination of all available alternatives, and an analysis of costs and benefits of each alternative, that would prevent the team to ignore some crucial

input for the decision. This decision-making process requires time and effort. Thus, I hypothesize that:

H1c: Achievement emotions will be negatively related to alternative evaluation.

Achievement emotions enhance individual and group identity and mark the celebration of success, especially when a task or a goal has been competently accomplished. Achievement emotions give team members the desire to be together, to celebrate together, and to fully participate to the team's activities. Research in strategic decision-making suggests that positive affective relationships among team members enable them to work together effectively. Team cohesion, one of the four decision-making processes examined in this research, represents the commitment by all team members to the team's decisions and to the team itself, implying positive feelings toward team members in respect to enhancing present and future performance of the team. Thus I hypothesize that:

H1d: Achievement emotions will be positively related to team cohesion.

2.2.2. Approach Emotions and Team Decision-Making Processes

Approach emotions include relief, hope, interest, and surprise. These four emotions are suggested to be representative of approach emotions[24] . Approach emotions are expected to motivate individuals toward the acquisition of new information and new competencies. Team members are involved and attending team activities, but are also relaxed. An open and relaxed atmosphere should be favorable to the exchange of information among team members. Sharing information reflects the team members' willingness to share their knowledge, expertise, and skills with others, as well as any information that would prevent the team to make a decision influenced by the team members' preferences of any particular alternative. Thus, I hypothesize that:

H2a: Approach emotions will be positively related to sharing information.

Approach emotions are associated with creative activities, accompanied with intellectual curiosity and energy; exploring behaviors are stimulated. Alternative generation reflects the ability of team members to generate a wide range as well as a wide number of

[24] See comment at the beginning of section 2.2.1., p. 60.

alternatives in order to make sure that the team has not overlooked any important avenue, and which requires a certain form of creativity. Thus, I hypothesize that:

H2b: Approach emotions will be positively related to alternative generation.

Approach emotions induce vigilance, mobilization, and persistence even in tedious tasks. Team members may be ready to expand effort if necessary. Research in affect and decision-making has demonstrated that if individuals are interested and motivated, and if they consider the task personally relevant to them or to their team, they will engage in thorough, systematic, and effortful analysis of the situation. Alternative evaluation implies the thorough examination of all available alternatives and an analysis of costs and benefits of each alternative. This decision-making process requires effort. Thus, I hypothesize that:

H2c: Approach emotions will be positively related to alternative evaluation.

Approach emotions sustain group activity as they reinforce links between people. Team members feeling approach emotions are mobilized to move forward, and are not only committed to the task, but also to work together. Team cohesion represents the commitment by all team members to the team's decisions and to the team itself, implying positive feelings toward team members in respect to enhancing present and future performance of the team. Thus I hypothesize that:

H2d: Approach emotions will be positively related to team cohesion.

2.2.3. Resignation Emotions and Team Decision-Making Processes

Resignation emotions include sadness, fear, shame and guilt. These four emotions are suggested to be representative of resignation emotions[25]. Resignation emotions are associated with behaviors such as withdrawal, hiding, avoidance, and apathy. Resignation emotions mark a phase of internal focus and re-gathering before engaging in new activities. Research on the influence of negative mood (i.e., sad mood) shows that individuals have the tendency to consider irrelevant information. Research in group decision-making has show that resignation emotions have the potential to prevent team members from expressing themselves freely, especially if the threat is felt to be exercised by other team members. In such a climate, it is unclear whether team members are willing to expose new and/or relevant information.

[25] See comment at the beginning of section 2.2.1., p. 60.

Sharing information reflects the team members' willingness to share their knowledge, expertise, and skills with others, as well as any information that would prevent the team to make a decision influenced by the team members' preferences of any particular alternative. Thus, I hypothesize that:

H3a: Resignation emotions will be negatively related to sharing information.

Resignation emotions are associated with the narrowing of thoughts, with tunnel vision, ruminations over the same thoughts, lack of confidence, and little innovation. Research on emotion and decision-making suggests that individuals feeling fear are more pessimistic about future events; research on mood and decision-making suggests that sad individuals overestimate the likelihood of negative outcomes. It appears that under the influence of resignation emotions, team members will have difficulty to propose a wide range of innovative alternatives. Alternative generation reflects the ability of team members to generate a wide range as well as a wide number of alternatives in order to make sure that the team has not overlooked any important avenue, and which requires a certain form of creativity. Thus, I hypothesize that:

H3b: Resignation emotions will be negatively related to alternative generation.

Resignation emotions promote the possibility to review team objectives realistically, and to think carefully about risks. Research on mood and group decision-making suggests that negative mood (i.e., sad mood) leads team members to proceed to a thorough analysis of the situation. Research on affect or mood and decision-making concurs as it consistently demonstrates that negative mood (i.e., sad mood) enhances considerable attention to details and a careful, step-by-step analysis of alternatives. Research on group decision-making indicates that a reasonable level of shame or guilt encourages decision-makers to revise their decisions. Alternative evaluation implies the thorough examination of all available alternatives and an analysis of costs and benefits of each alternative. This decision-making process requires time and effort. Thus, I hypothesize that:

H3c: Resignation emotions will be positively related to alternative evaluation.

Resignation emotions enhance group conformity, the reinforcement of social bonds, the request for others' support, and encourage reconciliation and empathy, concomitantly with a reduced aggressiveness. Research on mood and group decision-making has demonstrated

that individuals in a sad mood show a higher level of cooperation, especially if the group is seriously threatened. Team cohesion represents the commitment by all team members to the team's decisions and to the team itself, implying positive feelings toward team members in respect to enhancing present and future performance of the team. Thus I hypothesize that:

H3d: Resignation emotions will be positively related to team cohesion.

2.2.4. Antagonistic Emotions and Team Decision-Making Processes

Antagonistic emotions include envy, disgust, contempt, and anger. These four emotions are suggested to be representative of antagonistic emotions[26]. Antagonistic emotions are characterized by some form of aggressiveness, active or passive, and rejection. The climate based on antagonistic emotions does not encourage team members to share their knowledge or information relevant to the decision: certain team members may exert pressure on remaining team members. Sharing information reflects the team members' willingness to share their knowledge, expertise, and skills with others, as well as any information that would prevent the team to make a decision influenced by the team members' preferences of any particular alternative. Thus, I hypothesize that:

H4a: Antagonistic emotions will be negatively related to sharing information.

Antagonistic emotions are triggered when team members feel they have been treated unfairly, or harm as been done to them, or their goals have been threatened. Thus, antagonistic emotions encourage mobilization and ideas of retaliation. Team members remain very focused on the object of revenge and have a strong desire to reinstate their threatened goals. Given that the attention is centered on a narrow range of targets, it is unlikely that team members will generate alternatives outside of the scope of their revenge. Alternative generation reflects the ability of team members to generate a wide range as well as a wide number of alternatives in order to make sure that the team has not overlooked any important avenue, and which requires a certain form of creativity. Thus, I hypothesize that:

H4b: Antagonistic emotions will be negatively related to alternative generation.

Antagonistic emotions are held responsible for defective decision-making, as demonstrated by research on group decision-making. When motivated by retaliation or

[26] See comment at the beginning of section 2.2.1., p. 60.

aggression, team members may not take the time to weigh the consequences of their decisions. Alternative evaluation implies the thorough examination of all available alternatives and an analysis of costs and benefits of each alternative. This decision-making process requires time and effort. Thus, I hypothesize that:

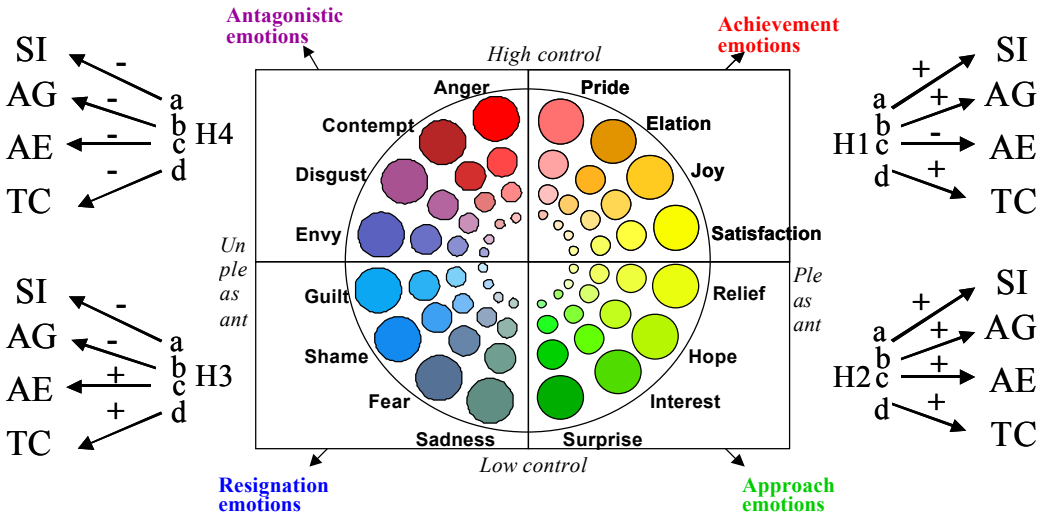
H4c: Antagonistic emotions will be negatively related to alternative evaluation.

Research on strategic decision-making suggests that affective conflict is characterized by disputes, personal attacks, verbal aggressiveness, which are typically antagonistic-related behaviors. In addition, the operationalization of affective conflict reflects the fact that anger is the underlying emotion behind affective conflict. The danger of a vicious circle based on anger may occur: team members argue over an issue, may start to verbally attack each other, thus triggering anger, which in turn motivates team members to retaliate. In such a climate, the likelihood of wanting to continue to work together is rather low, as shown by the research on anger and negotiations and by research on the role of affective conflict and strategic decision-making. Team cohesion represents the commitment by all team members to the team's decisions and to the team itself, implying positive feelings toward team members in respect to enhancing present and future performance of the team. Thus I hypothesize that:
H4d: Antagonistic emotions will be negatively related to team cohesion.

2.2.5. Summary

In summary, these 16 hypotheses will be tested at the individual level (i.e., emotions reported by individual team members), at the group consensus level (emotion reported as the result of a group discussion about the team members' perception of what the prevalent emotion(s) has been during the decision task), and at the aggregated level (i.e., emotions reported by individual team members aggregated at the team level) – see Figure 1 for a summary view.

Figure 1. Summary view of hypotheses.



The following section will describe the method used to test these hypotheses.

CHAPTER 3: METHOD

3.1. Participants

The participants were 106 managers, 96 males (90.6%) and 10 females (9.4%) taking part in executive development seminars. The participants attended the seminars in batches of successively 27, 23, 32 and 24 persons in each class. Two of the classes came from the same multinational organization, i.e. the participants came from 3 different organizations in total. The participants were selected by their top management to attend the seminars. The average age was 33.85 (SD = 5.37) for the total sample, ranging from 25 to 51 years. The participants had an average experience as managers of 10 years; they can be considered as expert decision-makers (Zsambok, 1997). The common language was English. As the headquarters of the companies were located in Germany and in The Netherlands, the percentage of participants coming from these two countries were separated: 16% of the participants came from Germany, and 40,6% came from the Netherlands. Then 29,2% of the participants came from Europe (EU and non EU, including former Eastern Europe countries), 5,7% from Asia, 3,8% from North America, 2,8% from Africa, and 1,9% from South America.

Each class was then divided in 5 teams, with 4 to 7 participants per team (M = 5.3); the total number of teams was 20. Heterogeneous teams were formed before the seminar started, and the teams remained together for the duration of the simulation (presented below in section 3.3.). The objective was to obtain the widest mix of nationalities, of functions and of business units, to ensure a balance of backgrounds, and at the same time to avoid having either too many participants of the same function or too many specialists in any of the particular functions (Fandt, Richardson, & Conner, 1990). Heterogeneous teams have been shown to be more effective and to make higher-quality decisions when dealing with non-routine, complex problems (Amason, 1996; Sniezek, 1992). In addition, there were no designated leaders. Team members operated as a self-managed team, acting as a board of directors of the company they have to manage during the business simulation, which was a main learning component of the seminar, and during which the decision-making processes were studied.

3.2. Measures

Self-report measures were used for both the independent and the dependent variables. Verbal reports of emotion represent a common methodology, although its limits have been acknowledged (Ellsworth & Scherer, 2001), as they are based on subjects' memories and

conscious subjective feeling (Scherer, 2000). However, in natural or quasi-natural settings, as is the case in the present study, this method appears to be the most appropriate one. As far as decision-making variables are concerned, self-report measures are used in research on group decision-making or strategic decision-making (e.g., Dooley & Fryxell, 1999). Amason (1996) for example argues that in the case of teams operating in an uncertain and complex environment, it is difficult to evaluate the quality of a decision objectively as criteria can vary from context to context. Thus, the group's own evaluation may the best way of assessing the decision-making processes retrospectively (Amason, 1996; Sniezek, 1992). Furthermore, the present study adopts a position similar to Dean and Sharfman's (1996):

> "… it is clearly necessary that we frame our model at the decision level of analysis, rather than at the overall firm-performance level. Doing so avoids the problem of ambiguity of causal ordering – the question of whether success is the cause or the effect of the decision process – that would accompany the choice of firm performance as focus (…) Firm performance is a function of a diverse array of factors, which may mask the effect of decision processes." (p. 371),

thus focuses on decision-making process rather than on decision outcomes (i.e. firm performance).

3.2.1. Classes of Emotion

The four classes of emotions (achievement emotions, approach emotions, resignation emotions, and antagonistic emotions) were measured with the Emotion Wheel (see Appendix A). This paper-and-pencil instrument includes 16 emotions in total (four emotions per class of emotion), and each emotion can be rated on four levels of intensity, on a scale from 1 (lowest intensity, close to the origin) to 4 (strongest intensity, at the perimeter): there are in total 64 emotions represented. The emotions are organized along two appraisal criteria selected from Scherer's (1984a) Stimulus Evaluation Checks (SECs), Pleasantness/Unpleasantness, and Low Control/High Control, in a circular form, each emotion with its four levels of intensity forming a radiant.

The Emotion Wheel was designed to represent quality and intensity, organized along two dimensions, with its advantage as a practical data collection instrument (see Appendix B for a description of its validation). Emotion labels are positioned along a radiant because intensity was taken into consideration for each of the single emotions composing the quadrants of the Emotion Wheel (each class of emotions occupying a quadrant on the Wheel), which departs from Russell's circumplex where intensity was not taken into consideration.

Russell (1980, p. 1170), however, did suggest that a wheel would be an appropriate representation of relative intensity.

3.2.2. Decision-Making Processes

All decision-making variables were measured on a 10-point Likert-type scale (0-9) two times, once after the second decision period (called Time 1[27]), and once after the sixth decision period (called Time 2[28]). Anchors were specified for each item. Mean scores were then calculated, in order to obtain global scores for each scale used in subsequent analyses.

3.2.2.1. Sharing Information

A specific scale was designed for this study. All references below are mentioned in section 1.3.1. The first item, "To what extent did team members contribute their relevant expertise/experience/insights?" (0 = very few did, 9 = everyone did) is based on Devine (1999), Gigone & Hastie (1993), Gruenfeld, Mannix, Williams, & Neale (1996), Hollingshead (1996), Kim (1997), Larson et al. (1994), Schulz-Hardt et al. (2000), Stasser & Titus (1985), Stasser & Titus (1987), Williams et al., (1997), and Wittenbaum et al. (1999). The second item, "To what extent do you think team members withhold their relevant knowledge?" (0 = not at all, 9 = a lot) is based on Leana's (1985) concept of self-censorship, which, if it occurs, is detrimental to decision-making. The third item, "To what extent did team members ignore important information that was brought in?" (0 = not much, 9 = a lot) and the fourth item, "How many team members seem to hear only the things supporting their present opinion?" (0 = not at all, 9 = a lot) are based on Gigone and Hastie (1993), Stasser and Titus (1985, 1987), supported by recent findings (Schulz-Hardt et al., 2000). The three latter items, negatively worded, were reverse-coded. The four items were averaged to create a scale measuring sharing information. The internal-consistency coefficient for the scale, Cronbach's alpha, reached .42 at Time 1 and .57 at Time 2. Thus, it was decided to eliminate this scale in subsequent analyses, in other words Hypotheses 1a, 1b, 1c, and 1d cannot be tested.

3.2.2.2. Alternative Generation

Alternative generation has not usually been measured with a self-report scale but rather in the context of tasks where the researchers could actually count the number of

[27] Then, the team had worked together in a naturalistic decision-making environment for two times three to four hours.
[28] Then, the team had worked together in a naturalistic decision-making environment for four times three to four hours.

alternatives generated (e.g. Scudder et al., 1994). Thus, a specific scale was designed for this study. All references below are mentioned in section 1.3.2. The first item, "How many alternatives do you think your team generated, compared to what one would expect?" (0 = less than expected, 9 = more than expected) is based on Osborn (1957/1974), March and Simon (1958), and Eisenhardt (1989). The second item, "To what extent did team members restrict themselves to a limited set of alternatives?" (0 = not at all, 9 = a lot) is based on the concepts of production blocking (Diehl & Strobe, 1997), social loafing (Latané et al., 1979), or free riding (Kerr & Brunn, 1983). This item was reverse-coded. The third item, "To what extent do you think your team generated non-obvious alternatives?" (0 = not at all, 9 = a lot) and the fourth item, "To what extent did your team try to come up with innovative solutions?" (0 = not at all, 9= a lot) are based on Hackman & Morris (1983), Paulus (2000), Paulus and Yang (2000), and Eisenhardt (1989). The internal-consistency coefficient for the scale, Cronbach's alpha, reached of .66 at Time 1 and .62 at Time 2. In consequence, the four items were averaged to produce a scale score.

3.2.2.3. Alternative Evaluation

Based on Janis's (1989) recommendation to conceptualize a decision criterion such as alternative evaluation in such a way that one could give a low, medium or high rating, a scale was developed. All references below are mentioned in section 1.3.3. The first item, "To what extent do you think your team may have thoroughly reviewed all alternatives before making the decision?" (0 = not reviewed, 9 = thoroughly reviewed) is based on Johnston et al. (1997), Turner et al. (1992), and Schweiger et al. (1986). The second item, "To what extent did you look at the cost and benefits of the alternatives you finally considered?" (0 = did not look, 9 = looked extensively) is based on Hollingshead (1996), Janis (1982, 1989), Janis and Mann (1977), and Mayer (1998). The third item, "To what extent do you think your team jumped too quickly to a conclusion?" (0 = not at all, 9 = very much so) is based on Aldag and Fuller (1993) and Scudder et al. (1994). This item was reverse-coded. The fourth item, "How effective was your team at focusing its attention on crucial information and ignoring irrelevant information?" (0 = not effective, 9 = very effective) is an item developed by Dean and Sharfman (1996). The four items were averaged to create a measure of alternative evaluation. The internal-consistency coefficient for the scale, Cronbach's alpha, reached .58 at Time 1 and .60 at Time 2. The third item had the lowest correlation with other items ($\underline{r}$ = .25 at Time 1 and $\underline{r}$ = .16 at Time 2), thus it was decided to eliminate it. In consequence, the three

remaining items were averaged to produce a scale score. Cronbach's alpha was recalculated and reached .60 at Time 1 and .69 at Time 2.

3.2.2.4. Team Cohesion

The four items composing this scale were borrowed from existing scales. The first item, "To what extent would you want to be a member of this team again?" (0 = never again, 9 = any time, for any project) was adapted from Leana (1985), Seashore (1954, reproduced in Cartwright and Zander, 1968), Terborg, Castore, & DeNinno (1976), Turner et al. (1992), and Wech et al. (1998). The second item, "How satisfied are you with the way decisions were reached in your team?" (0 = not satisfied, 9 = very satisfied) was adapted from Amason (1996), and Schweiger et al. (1986). The third item, "Did you enjoy working with the group on the decisions?" (0 = not at all, 9 = very much) was adapted from Amason (1996), Leana (1985), Priem and Price (1991), Schweiger et al. (1986), and Zaccaro (1991). The fourth item, "To what extent do you feel committed to your team's decisions?" was adapted from Priem and Price (1991) and Schweiger et al. (1986). The internal-consistency coefficient for the scale, Cronbach's alpha, reached .80 at Time 1 and .86 at Time 2. In consequence, the four items were averaged to produce a scale score.

3.3. Procedure

Before the simulation started, participants were instructed about the nature of the simulation. They received (a) a set of newsletters that instruct them about the market conditions and the technical aspects of the decision-making task, and (b) a booklet briefly outlining the study, including dictionary ("Oxford Advanced Learner's Dictionary of Current English") definitions for the 16 emotions of interest in this study– see Appendix C. They were told that reporting emotions over an extended period of time would be part of the learning process.

The participants operated in a quasi-naturalistic decision-making environment, defined by Johnston, Driskell, & Salas (1997) as follows: "… decisions are made under time pressure, data are ambiguous or conflicting, the consequences of error or poor performance are costly, and decision makers are familiar with the task." (p. 615) The business simulation used in the present study was designed to help participants see the integration of different functions and competencies necessary to run a multinational organization. It is a complex, large-scale simulation that requires complex decision-making strategies to deal with multiple inputs,

unpredictable events, and competing groups (Thornton-III & Cleveland, 1990). Simulations have been identified as being efficient and pivotal in the development of managers, because they provide a viable and cost-effective means to develop managers in realistic, but non-threatening situations. Furthermore, "simulations elicit overt behaviors of participants related to complex skills such as communication, decision making, and interpersonal interaction" (Thornton III & Cleveland, 1990, p. 191). The task is not only designed to practice decision-making and business analysis, but also to help participants learn about team processes and team behaviors.

Technically, each team was equipped with a PC running the simulation program called Topsim-EURO (developed by Unicon GmbH, Meersburg, Germany). It is designed to integrate decision-making across functions (marketing, sales, R&D, production, logistics, finance). The underlying computer program contains more than 7000 sigmoid equations. These curves combined with each individual team's decisions permit almost an infinite array of alternative outcomes. Thus, each team was challenged to generate as many alternatives as possible and perform "what-ifs" during each decision period.

Participants managed a company during 8 fictitious years. During the first 3 "years", they operated locally, within the country assigned to each of the teams. During the 5 next "years", they operated internationally: they could expand up to five other countries. The level of complexity increased from "year" to "year", depending on how global each team chooses to compete; that is, make complex decisions. Each fictitious year lasted between 3 and 3 ½ hours, and was called a decision period. During each period P, participants made strategic (long-term effects and organizational goals), tactical (medium-term effects), and operational decisions (short-term effects and routine decisions) (Furnham, 1997). These decisions were recorded on a 3.5 computer diskette, handed to the instructor, who then centralized all the data on a separate computer. Before the start of the next decision period, teams received a report that is the equivalent of real organizations' annual reports, containing all relevant financial figures. The exercise was very relevant to the participants, as they had to present the totality of their outcome (i.e. both business and human aspects) to a member of the real board of their respective company. The evaluation made by the member of the board may be perceived critical in their career advancement; thus, their motivation to perform well was as high as it could be in these circumstances.

In each decision room, an A3 copy of the Emotion Wheel was posted, including the 64 labels corresponding to each circle/intensity level, as a reference document indicating the

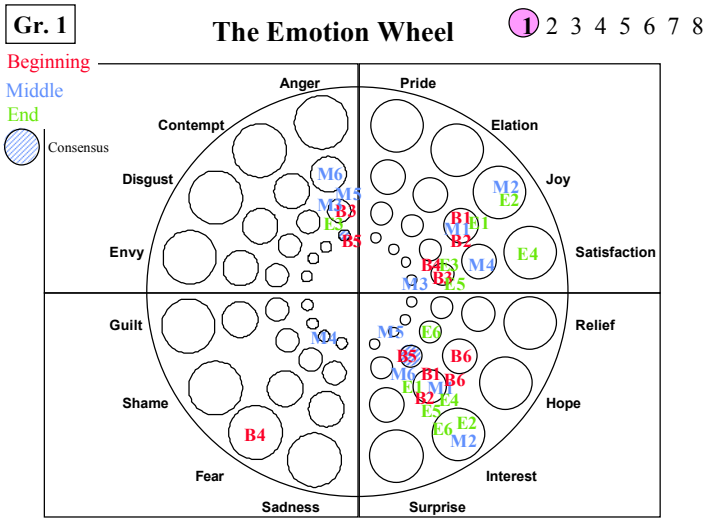
definition of each emotion. For each decision period, each team received an A4 Emotion Wheel to record their team emotion; the individual scoring sheet included 3 small Emotion Wheels, reduced so they can fit on a recto-verso A4 sheet, one for each time of measurement (Appendix D). At the beginning of each decision period, participants selected 2 emotions reported on the Emotion Wheel "B". At the mid-point of the decision period, they selected 2 emotions on the Emotion Wheel "M". At the end of the decision period, they selected 2 emotions on the Emotion Wheel "E". The sheet included a few lines for additional comments. The criterion for selecting the two emotions was their degree of importance for the participant.

At the end of each decision period, before the teams were ready to hand their final sets of business decisions to the instructor, participants all together discussed and selected the 2 emotions they thought prevailed in the team during the whole decision period. The scores were obtained through open discussion among the team members (see Gibson, 1999), and one team member was recording the scores on a separate A4 Emotional Wheel. These ratings represented the group consensus score of emotion. Yammarino and Markham (1992) have recommended that a good measure of group affect might be to ask respondents to describe the group's affect. Wierba and Mackie-Lewis (1994) have raised the question regarding the possibility of establishing a relationship between members' emotions and the group's emotions. It remains to be demonstrated whether a group emotion is the equivalent of the aggregation of the individual emotions, or if a group emotion is one that members can recognize they would not need to feel or did not feel individually until discussion. The procedure of collecting business decisions, individual and group consensus emotions was repeated eight times (see p. 84 for a summary graph of the design).

The 16-item questionnaire designed to measure decision-making processes (Appendix E) was distributed to participants the first time between the second and the third decision periods, right before the financial results of the second period were provided. The same questionnaire was administered a second time between the sixth and the seventh decision periods, right before the financial results of the sixth period were provided.

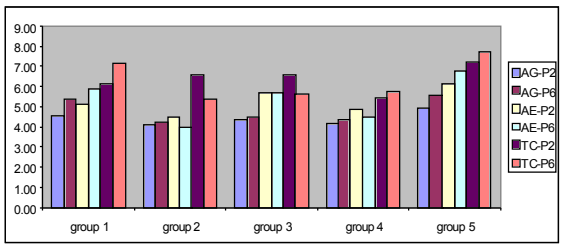
On the last day of the seminar, participants were debriefed on the study. Emotional maps per team for selected time periods and an emotional map of all teams for all time periods were drawn. An example is shown below (Fig. 2). More examples are provided in Appendix F.

Figure 2. Example of an emotional map from one team during the first period of the simulation.



Their answers to the decision-making questionnaire were represented by histograms comparing the results of the questionnaire administered after Period 2 and the one administered after Period 6. An example is shown in Figure 3. More examples are provided in Appendix G.

Figure 3. Example of a summary of decision-making data provided to participants.



AG = alternative generation
AE = alternative considered
TC = team cohesion

P2 = period 2
P6 = period 6

3.4. Overview of Analyses

3.4.1. Correlations

One-tailed bivariate correlations[29] were performed, as the purpose of this study is to determine the extent to which the four classes of emotions may influence on decision-making processes. This study is correlational. Given the fact that this study is exploratory and non-experimental, results with a p level < .10 are reported as well.

Procedures for aggregation of data to the team level will be presented below.

Regression analyses performed to assess the relative weight of each class of emotions in predicting responses about decision-making processes are reported in Appendix H.

3.4.2. Data Preparation

Individual scores for each class of emotions, based on the intensity level for each selected emotion, were created and aggregated over time in 3 categories: (a) Periods 1 to 6, which will be labeled '**Overall**'; (b) Periods 1 and 2, which will be labeled '**Starting Phase**'; and (c) Periods 3 to 6, which will be labeled '**Developing Phase**'. Each participant had a score for achievement emotions (composed of scores for pride, elation, joy, and satisfaction), approach emotions (composed of scores for relief, hope, interest, and surprise), resignation emotions (composed of scores for sadness, fear, shame, and guilt), and antagonistic emotions (composed of scores for envy, disgust, contempt, and anger). For each period (Period 1, 2, 3, 4, 5, and 6), each emotion score at the beginning, the middle, and the end of the decision period were averaged to form a Period score, then Periods 1 and 2 scores were averaged together to form **Starting Phase** scores, and Periods 3, 4, 5, and 6 were averaged to form **Developing Phase** scores. The data for Periods 7 and 8 was not taken into consideration in the analyses, as the second questionnaire measuring the dependent variables was administered after Period 6.

Participants selected only two emotions as explained in section 3.3. Zeros were entered whenever any emotion was not selected, so that the non-responses were not considered as missing values. Counting the non-selected emotions as missing values would be appropriate if the objective was to measure emotional blends such as (Scherer & Ceschi, 1997) did identify emotional blends in a naturalistic context. Thus, the solution to enter zeros

[29] The direction of the predictions is given in the hypotheses.

was considered to be best one for the purpose of this study. Let us take an example with achievement emotions, composed of pride, elation, joy, and satisfaction. If someone reported a score of 3 on pride and a score of 4 on joy at a given period, the average score for achievement emotions was M = 1.75, i.e. the average of the reported intensity for pride (score of 3) and joy (score of 4) plus scores of zero for respectively elation and satisfaction (the two non-chosen emotions).

3.4.3. Specific Treatment of Emotion Data

According to Stone, Shiffman, & De Vries (1999), there are three kinds of memory processes occurring when subjects try to remember events or emotions that occurred over a certain period of time: they may compute a kind of average; they may remember only the peak experience; or they may remember only the last experience. In order to address these characteristics of self-reports (see also Kahneman, 1999 on Peak-End evaluations), and in order to enrich the data analyses, three types of emotion scores were computed:

- The mean of all emotion scores reported over all decision periods (i.e. variables called Mean **Overall**, Mean **Starting Phase**, Mean **Developing Phase**);
- The maximum intensity of emotion scores reported over all decision periods of time concerned (i.e. variables called Max **Overall**, Max **Starting Phase**, Max **Developing Phase**);
- The last emotion score reported just before the questionnaire measuring decision-making processes (i.e. variables called Last of **Starting Phase**, Last of **Developing Phase**).

3.4.4. Levels of Analysis

Analyses were executed at three levels: 1) individual level; 2) aggregated team level; and 3) group consensus level. Multi-level or cross-level research has contributed to the methodology addressing group issues (e.g., Chan, 1998; Ilgen, Major, Hollenbeck, & Sego, 1995; James, Demaree, & Wolf, 1984, James, Demaree, & Wolf, 1993; Kenny & Voie, 1985). Researchers considering group or organizational phenomena were concerned that the statistical techniques used at the individual level were not adapted to group level analyses. These obstacles have been partially overcome during the past decade (Simpson & Wood, 1992). In the present study, Kenny and La Voie's (1985) Intraclass Correlation Coefficient

(ICC) will be calculated, as well as James, Demaree, and Wolf's (1984) Interrater Reliability Coefficient (IRR). The detailed procedure is presented next.

3.4.4.1. Aggregation to the Team Level of Analysis

To ensure the feasibility of aggregation to the team-level, two measures of within-group agreement were used (e.g., Bartel & Saavedra, 1998; Edmondson, 1996). The first measure is the intraclass correlation coefficient (ICC) (Kenny and La Voie, 1985), and the second measure is the interrater reliability (IRR) (James, Demaree, and Wolf, 1984). For the analyses at the individual level, variables were standardized because of response sets. However, ICCs and IRRs were applied to the non-standardized variables, as the standardization reduces the variance: ICCs could not reach significance, and IRRs would be artificially inflated. A different principle was applied to Maximum scores and a separate sub-section will be devoted to these variables later on.

Intraclass correlation coefficients. The formula is the following:

$$\frac{MS_{Bxy} - MS_{Wxy}}{n'}$$

where MS_{Bxy} is the mean square between groups and MS_{Wxy} is the mean square within groups; n' correspond to the number of persons in each group, when groups are of unequal size.

The formula to obtain n' is:

$$n' = \frac{N^2 - \sum_{j=1}^{k} n_j^2}{N(k-1)}$$

where $N = \sum_{j=1}^{k} nj$ (k = number of groups).

The ICC consists of a one-way ANOVA with the variables of interest as dependent variables and the team as the independent variable. If the F-test is significant, it means there is significantly less within-group variance than between-group variance, thus indicating that respondents agree about certain variables more within their team that they do between their teams (Edmondson, 1996; Kenny & Voie, 1985; Kirkman & Shapiro, 1997; Tesluk, Mathieu, Zaccaro, & Marks, 1997). In this case, aggregation of the variables at the group-level is

justified. Aggregation procedures will now be described for Mean and Last scores.

ICCs for Mean and Last scores.

A. Achievement and approach emotions

ICCs were calculated respectively for achievement and for approach emotions. Table 6 presents ICCs for these two classes of emotions, with the distinction of: 1) mean intensities for each class of emotions across all periods (i.e. Overall), and for the Starting and Developing Phases; and 2) Last emotion scores reported before the questionnaire measuring decision-making variables, at the end of the Starting Phase and of the Developing Phase respectively. Classes of achievement and approach emotions yielded significant ICC values, ranging from .12 to .46 ($p<.01$ to .001).

B. Resignation and antagonistic emotions

Table 6 presents ICCs for negative classes of emotions, with the distinction of mean intensities for each class of emotions across all periods (i.e. Overall), and for the Developing Phases. ICCs were not calculated for scores in the Starting Phase, neither for both Last scores (in the Starting and Developing Phases), as there were not enough respondents reporting negative emotions per team, rendering the calculation of an intra-group coefficient irrelevant. The ICC for Mean Overall scores of resignation emotions was statistically not significant. The ICC reached statistical significance for Mean Scores in the Developing Phase (.10) at a $p<.25$ level, which is a liberal criterion for significance suggested by Kenny and La Voie (1985). ICCs for antagonistic emotions reached statistical significance respectively in the case of Mean Overall Scores (.14) and of Means Scores in the Developing Phase (.15), at a $p<.05$ level.

ICCs for decision-making variables. ICCs of decision-making variables are reported in Table 7: they are all positive and statistically significant (with p levels ranging from .10 to .001, and .25 in the case of alternative generation in the Developing Phase).

Interrater reliability coefficients. The second measure of within-agreement, the interrater reliability coefficient (IRR) (James, Demaree, and Wolf, 1984) compares actual variance to a measure of "expected variance" to assess within-group agreement, to ensure that interrater agreement of team members on any variable of the survey is high.

The formula is the following:

$$R_{wg}\,(1) = 1 - (S_{xj}^2 / \sigma\, EU^2)$$

"Where R_{wg} (1) is the within-group interrater reliability for a group of K judges on a single Xj, S_{xj}^2 is the observed variance on Xj, and σEU^2 is the variance on Xj that would be expected if all judgments were due exclusively to random measurement error." (p. 87)

To calculate σEU^2, the following formula is used:

$$\sigma EU^2 = (A^2 - 1)/12,$$

where "EU refers to an expected error (E) variance based on a uniform (U) distribution, and A corresponds to the numbers of alternatives in the response scale for X_j, which is presumed to vary from 1 to A" (p. 87). James et al. include in this formula the assumption of discrete scales with seven plus or minus two categories (e.g. scales of 1 to 5, or 1 to 7 or 1 to 9). If one has too large a number of categories, one runs the risks of inflating IRRs, however if one uses only a few alternatives (such as a scale of 1 to 3), IRRs would be artificially low estimates of within-group agreement (James et al., 1984). As far as the measurement of emotion is concerned in the present study, the scale in the Emotion Wheel ranges from 1 to 4. However, as explained page 75, zeros had been entered whenever respondents did not select an emotion. Thus, zero was also included as a category to apply the formula described above, so that A = 5 (James, personal communication, September 2002)[30].

IRRs range from 1, indicating perfect agreement, to 0, indicating random answers by the judges or disagreement. James, Demaree, & Wolf (1993) indicate that if IRR is equal to .86, it is a high level of agreement, .47 represents a reasonably low level of agreement, whereas when an IRR close to zero, it would appear that responses are random. George (1990) suggests that values above .70 are a necessary level to allow aggregation, Bartel & Saavedra (1998) used median IRRs ranging between .51 (indicating a moderate level of agreement) to .76 (indicating a substantial level of agreement).

IRRs for Mean and Last Scores

A. Achievement and approach emotions

IRRs were calculated for each of the 20 teams and for all variables relative to positive classes of emotions (achievement and approach). Table 6 presents IRRs along the same organization as the ICCs. Median IRRs for achievement emotions were ranging from .95 to .98. Median IRRs for approach emotions were ranging from .96 to .98. These

[30] When measuring emotion, one is regularly confronted with the role the zero should play. One could argue that zero is not a point on the continuum of a scale but that there is a binary choice to be made: either one scores zero, ergo emotion is absent, or emotion is present, and one scores the emotion on a scale of variable intensity. For the purpose of this study, I will remain with the choice of including the zero as one point of the scale.

numbers appear to be higher than expected. One possible explanation is the fact that there were numerous layers of averages performed (e.g. scores for pride were average across periods, as well as scores for elation, joy, and satisfaction; then scores for these four emotions were scored per period, then again for several periods). The variance is automatically reduced, thus yielding strong IRRs.

B. Resignation and antagonistic emotions

IRRs were calculated only for the teams where the number of respondents was equal or superior to half the total size of the team: for example a team with a total of 6 members had to have 3 members at least or more reporting a resignation or an antagonistic emotion to be taken in consideration. In Table 6, new sample sizes are indicated with the number of valid teams. IRRs for negative emotions (resignation and antagonistic) represent a perfect agreement, i.e. 1.00. One technical reason for this result is that means were often very close to zero, due to the number of zero responses given by respondents across different periods of time, thus variance was very small. But whenever these emotions were reported, they were reported within a range of scores that indicates a strong agreement among the respondents. IRRs are reported only for Mean Overall scores and Means scores in the Developing Phase. There were not enough teams with Last scores in resignation or antagonistic emotions for the IRR coefficient to be calculated.

Table 6

Intraclass Coefficients and Interrater Reliability Coefficients for Classes of Emotions

	ICC	Median IRR	
Achievement emotions			
Mean Overall	.30***	.98	
Mean Starting Phase	.33***	.98	
Mean Developing Phase	.25***	.97	
Last of Starting Phase	.31***	.97	
Last of Developing Phase	.22**	.95	
Approach emotions			
Mean Overall	.46***	.98	
Mean Starting Phase	.35***	.97	
Mean Developing Phase	.44***	.98	
Last of Starting Phase	.12**	.96	
Last of Developing Phase	.24**	.96	
Resignation emotions			
Mean Overall	n.s.	1.00	n = 15 teams
Mean Developing Phase	.10++	1.00	n = 11 teams
Antagonistic emotions			
Mean Overall	.14*	1.00	n = 10 teams
Mean Developing Phase	.15*	1.00	n = 8 teams

ns = non significant; ++ p<.25 (liberal criterion for significance, recommended by Kenny and La Voie (1985); + p<.10; * p<.05; ** p<.01; *** p<.001.

IRRs for decision-making variables. The IRRs are reported in Table 7 for the three decision-making variables, for the Starting Phase and the Developing Phase respectively, ranging from .82 to .89, thus indicating a high level of agreement within the teams.

Table 7

Intraclass Coefficients and Interrater Reliability Coefficients for Decision-Making

	ICC	Median IRR
Alternative generation Starting Phase	.22**	.87
Alternation evaluation Starting Phase	.20**	.84
Team cohesion Starting Phase	.24**	.89
Alternative generation Developing Phase	.09++	.86
Alternative evaluation Developing Phase	.30***	.86
Team cohesion Developing Phase	.14+	.82

Notes. N = 20 teams

++ $p < .25$ (liberal criterion for significance, recommended by Kenny and La Voie (1985); + $p < .10$; ** $p < .01$; *** $p < .001$.

General remarks on aggregation. George (1990) suggests that theoretical justification should be provided before aggregation is performed. In section 1.2 (p. 20), theoretical underpinnings of collective emotion were outlined. There is some growing evidence that after a certain time of interaction, team members tend to share some common emotions (e.g. Bartel & Saavedra, 2000; De Rivera, 1992; Paez et al., 1995; Totterdell et al. 1998). In addition, decision-making variables, i.e. alternative generation, alternative evaluation, and team cohesion, were operationalized as a group-level construct, by anchoring the questions around the term "team" (see Chan, 1998; Tesluk et al., 1997). Thus, aggregation of the variables is at least theoretically justified. IRRs indicate a strong level of agreement inside each team, regardless of the fact that there is not enough between group variance. George (1990) argues for using only IRRs, as groups operating in the same setting or context (or groups coming from the same organization for example) would have a tendency to respond similarly to a survey. Edmonson (1996) agrees with this argument, but also indicates that a tendency to respond similarly exists as well and may inflate estimates of agreement, thus she recommends the use of both ICCs and IRRs to show which variables have greater between-group differences while having similar within-group agreement levels. James argues that IRRs are better indicated of agreement, as ICCs would underestimate interrater reliabilities in case of restricted variance (James, personal communication, September 2002).

In conclusion, all Mean scores across several periods (Overall, Starting, and Developing Phase) and Last scores (means for one given period in time) could be aggregated

to the team level. Both George and James' recommendation can be applied to the Mean scores of resignation emotions in the Developing Phase that has a non-significant ICC but a perfect level of intragroup agreement (IRR of 1.00).

Maximum scores. The objective of selecting maximum scores of emotion was to find whether these maximum scores, corresponding to what Kahneman (1999) calls the Peak experience, have a determinant influence on decision-making processes, compared to the mean experience or the last experience. However, it seems that maximum scores could not be statistically treated like the mean scores. On the one hand, if one aggregates these scores at the team level by averaging them including zeros, one obtains an artificially inflated variance, given the distance between 0 and for example the end of the scale, i.e., 4. On the other hand, if one aggregates these scores without zeros, one obtains very little variance: for example, in the case of positive emotions, most of the maximum scores range between 3 and 4. It seemed that aggregation procedure were not relevant for the maximum scores, as the idea was not to see if team members agree on the maximum but to capture the maximum intensity by team. It was thus decided to sum the maximum scores regardless of how many team members checked any given emotion in any given class. In other words, what was obtained was a sum of all intensities felt for each of the respective time periods for every team.

3.4.5. Temporal Patterns

The Experience Sampling Methodology (ESM) was used in the present study. With this method, "individuals are asked to report on what is happening at the moment in their typical environment." (Stone, Shiffman, & DeVries, p. 26). Usually a brief questionnaire is completed several times a day for several days. This was applied in this study by asking the participants to report their emotions 3 times during a 3- to 4-hour period. Multiple measures at the moment where emotions are felt are necessary to better grasp dynamic processes characterizing emotions (Fisher, 2000; Scherer, 2000). The questionnaire measuring the dependent variables was administered twice, based on the assumption that different group dynamics may occur at the beginning versus the end of the decision task (i.e. during Starting Phase versus Developing Phase). Figure 4 illustrates the design.

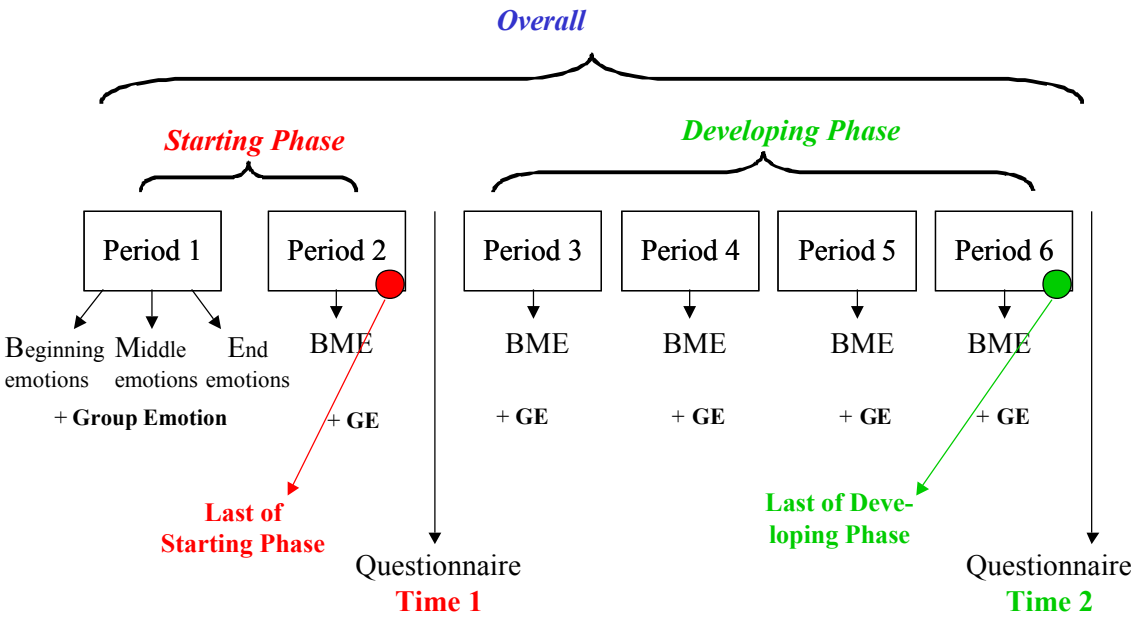


Figure 4. Illustration of design and labels attributed to the variables.

Results will be presented next.

CHAPTER 4: RESULTS

4.1. Descriptive Statistics

Both independent and dependent variables were checked for normality of distribution. All variables had skewness and kurtosis values comprised between +2 and –2, thus the assumption of normality is not rejected (SPSS Base 8.0, Applications guide, 1998[31]). Histograms were used additionally to verify normality (see Appendices I to M). A small number of outliers was found but not eliminated from the data set. These outliers were caused by biased response tendencies on the part of these participants. To correct for these tendencies, intra-individual z-scores were computed (see Appendix N for the detailed procedure), which were used to analyze data at the individual level, but not at the team level (see section 3.4.4., p. 77 for further details).

Table 8 shows the percentage of classes of emotion felt, and Figures 5 and 6 illustrate these data graphically. Means, standard deviations, and intercorrelations of classes of emotions are reported in Appendix O.

Table 8

Percentage of classes of emotions felt

	Starting Phase	**Developing Phase**
Achievement	93.4	98.1
Approach	97.2	98.1
Resignation	29.2	51.9
Antagonistic	22.6	39.6

Figure 5. Percentage of classes of emotion felt in the Starting Phase

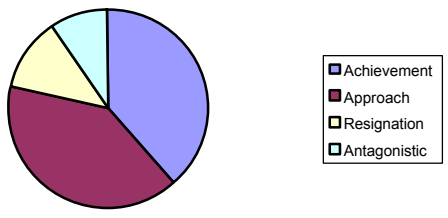


Figure 6. Percentage of classes of emotion felt in the Developing Phase

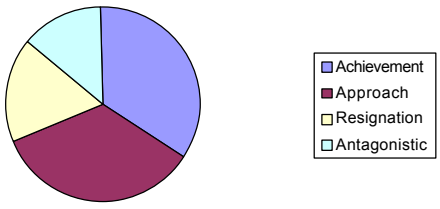


Table 9 shows the distribution of means for non-standardized decision-making variables, in the Starting Phase and in the Developing Phase, for the whole sample (see Figure

[31] In subsequent analyses, both SPSS 8.0 and SPSS 10.0 will be used.

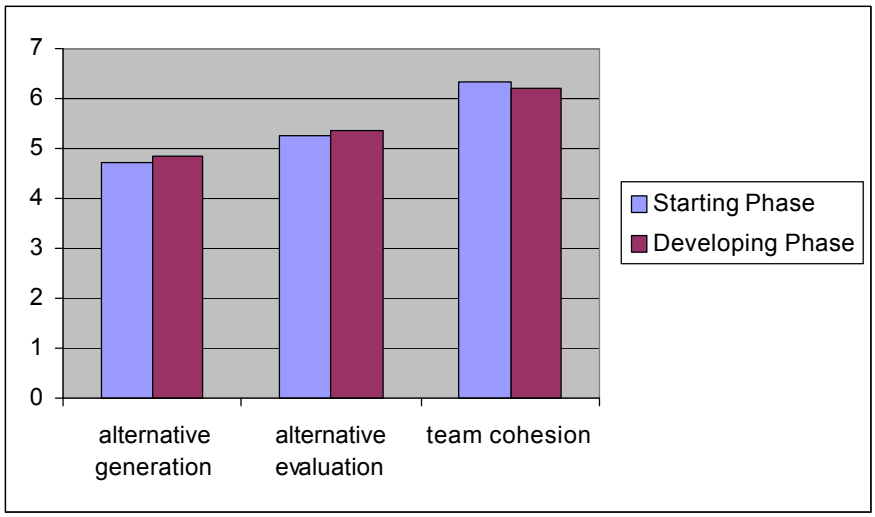
7 for a graphic representation). Means, standard deviations and intercorrelations for standardized variables are reported in Appendix P.

Table 9

Mean Comparison for Decision-Making Variables Between the Starting Phase and the Developing Phase

	Starting Phase	**Developing Phase**
Alternative generation	4.71	4.84
Alternative evaluation	5.22	5.37
Team cohesion	6.30	6.22

Figure 7. Mean comparison of decision-making variables between the Starting Phase and the Developing phase



In Appendix Q, means per team for both emotion and decision-making non-standardized scores are reported.

The results relative to relationships between each class of emotions and decision-making processes will be described next in four main sections. Within each sub-section, results will be reported in the following order[32]: first, means for the overall time (at the individual or the aggregated team level), which could be viewed as more 'conventional' (or at least close to what has been done in previous studies); second, means for the overall time at the group consensus level; and third, both intensity and time will be considered (which is an exploratory way of analyzing the data). Thus maximum intensities for the overall time, followed by means, last mean scores, and maximum intensities in the Starting Phase, and

[32] It is understood that when there are no results for any of the sub-categories, the category is skipped.

means, last mean scores, and maximum intensities in the Developing Phase will be reported successively at the individual, the aggregated team, and the group consensus levels. The same structure will be adopted for all four classes of emotion. Overall results tables (with all four classes of emotion variables and three decision-making variables) are available in Appendix Q showing all correlations performed between classes of emotions and decision-making variables.

4.2. Achievement Emotions and Decision-Making Processes

4.2.1. Achievement Emotions and Alternative Generation

Achievement emotions were predicted to be positively related to alternative generation. As shown in Table 10, achievement emotions were negatively related to alternative generation.

Table 10

Correlations of Mean, Maximum, and Last Emotion Scores of Achievement Emotions with Alternative Generation across Time Periods and across Levels of Analysis

		Mean	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	-
Group consensus	*-.32*$^{+}$	-	*-.36*$^{+}$
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		-	-
Group consensus		-	-
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	*-.32*$^{+}$
Group consensus	*-.35*$^{+}$	-	**-.39***

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20.
* = p < .05; + = p < .10.

Results with a p level < .10 revealed a consistent pattern at different levels of analysis and at different periods of time, consistently going in the opposite direction of predictions. For the Overall time period, Means (r = -.32, p < .084) and Maximum intensities (r = -.35, p < .066) at the group consensus level were negatively related to alternative generation. This negative relationship was reiterated in the Developing Phase for: 1) Means at the group consensus level (r = -.36, p < .057); and 2) Maximum intensities at the aggregated team level (r = -.32, p < .084) and at the group consensus level (r = -.39, p < .05).

It could be that although achievement emotions are supposed to be positively related, i.e. conducive to the generation of new alternatives, they might lead to complacency at the group level, especially at higher levels of intensity. Team members may be very enthusiastic

about their team and its achievements; nevertheless this enthusiasm might have a limiting effect, such as a decrease in productive thinking (Izard, 1991) or such as lack of effort to find new alternatives (Scherer and Tran, 2001).

4.2.2. Achievement Emotions and Alternative Evaluation

Achievement emotions were predicted to be negatively related to alternative evaluation. There is a contrast between results for the Overall time and the Developing Phase which were as predicted, and for the Starting Phase which were opposite to predictions, as can be seen in Table 11.

Table 11

Correlations of Mean, Maximum, and Last Emotion Scores of Achievement Emotions with Alternative Evaluation across Time Periods and across Levels of Analysis

		Mean	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	*.34*$^{+}$	-
Group consensus	-	-	-
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		*.36*$^{+}$	-
Group consensus		-	-
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	**-.51***	-	**-.47***
Group consensus	*-.34*$^{+}$	**.49***	-

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20.
* = p < .05; + = p < .10.

For the Overall time period, Maximum intensities of achievement emotions at the aggregated team level (r = -.51, p <.05), and at the group consensus level (r = -.34, p < .066) were negatively related to alternative evaluation. This negative relationship was reiterated in the Developing Phase, for Maximum intensities at the aggregated team level (r = -.47, p <.05). In contrast, relationships between achievement emotions and alternative evaluation were

positive in the Starting Phase: 1) for Means ($\underline{r}$ = .34, p < .072)[33] and Last scores ($\underline{r}$ = .36, p = 0.57) at the aggregated team level; and 2) for Maximum intensities at the group consensus level ($\underline{r}$ = .49, p < .05). Results with a p level between .05 and .10 are reported because they are consistently positive in the Starting Phase across dependent variables, thus indicating a pattern.

In behavioral decision research, confidence is defined as the belief in the quality of one's judgment or choice; group confidence describes the confidence of a group in its judgment or choice (Sniezek, 1992). The two emotions that are the most conducive to confidence are 'joy' and 'satisfaction' (see section 1.1.2, p. 9). Both were frequently selected during the Starting Phase (an average of 41% for joy, and of 61.3% for satisfaction in the Starting Phase). Achievement emotions may have fuelled this feeling of confidence team members had in their evaluating abilities.

4.2.3. Achievement Emotions and Team Cohesion

Achievement emotions were predicted to be positively related to team cohesion. As shown in Table 12, results were found for Maximum intensities only.

Maximum intensities of achievement emotions were negatively related to team cohesion for the Overall time period ($\underline{r}$ = -.50, p < .05), and in the Developing Phase ($\underline{r}$ = -.47, p < .05.). In contrast, relationships between achievement emotions and team cohesion were positive in the Starting Phase ($\underline{r}$ = .35, p< .068) at the group consensus level. These results suggest that maximum intensities of achievement emotions, including emotions such as pride and joy, may not enhance team cohesion, even though achievement emotions are considered to strengthen bonds between people by sharing successes (Fridja, 1986; Kemper, 1991; Scherer and Tran, 2001).

[33] This particular relationship becomes statistically significant when entering achievement emotions together with the three other classes of emotion in a regression model (see Appendix H)

Table 12

Correlations of Mean, Maximum, and Last Emotion Scores of Achievement Emotions with Team Cohesion across Time Periods and across Levels of Analysis

	Mean		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	-
Group consensus	-	-	-
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		-	-
Group consensus		-	-
	Maximum		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	**-.50***	-	**-.47***
Group consensus	-	*.35+*	-

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20.

* = p < .05; + = p < .10.

4.2.4 Summary

Table 13 summarizes results relative to achievement emotions and decision-making processes. No results were found at the individual level. Four statistically significant results (yielded by Maximum intensities) out of six were opposite to predictions, equally distributed between the aggregated team level and the group consensus level at different periods in time; thus, there was not a particular difference to be noted between these two levels of analysis. In regard to the relationship with alternative generation, all results were opposite to predictions. In regard to the relationship with alternative evaluation, the results were the only ones supporting the prediction: Maximum intensities were negatively related to alternative evaluation. In regard to the relationship with team cohesion, the relationship was again negative with Maximum intensities with the exception of the Starting phase, where the relationship was marginally positive.

Table 13

Summary of Findings for Achievement Emotions in Relation to Decision-Making Processes

		Overall		**Starting Phase**			**Developing Phase**		
		Mean	Max	Mean	Last	Max	Mean	Last	Max
Alternative Generation **(+)**	I								o^{+}
	A								
	C	o^{+}	o^{+}				o^{+}		**O***
Alternative Evaluation **(-)**	I								
	A		**Y***	o^{+}	o^{+}				**Y***
	C		y^{+}			**O***			
Team Cohesion **(+)**	I								
	A		**O***						**O***
	C					y^{+}			

Note. I = Individual level; A = Aggregated team level; C = Group consensus level; Y = Hypothesis confirmed; O = Result opposite to hypothesis with $p < .05$ (*) or $p < .01$ (**); y^{+} = Result in the direction of hypothesis with $p < .10$ ($^{+}$); o^{+} = Result opposite to hypothesis with $p < .10$ ($^{+}$).

4.3. Approach Emotions and Decision-Making Processes

4.3.1. Approach Emotions and Alternative Generation

Approach emotions were predicted to be positively related to alternative generation. As shown in Table 14, approach emotions were positively related to alternative generation, mainly in the Developing Phase.

Table 14

Correlations of Mean, Maximum, and Last Emotion Scores of Approach Emotions with Alternative Generation across Time Periods and across Levels of Analysis

		Mean	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	*.37*$^{+}$	-	**.44***
Group consensus	*.32*$^{+}$	-	**.42***
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		-	**.49***
Group consensus		-	-
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	**-.39***	-
Group consensus	-	-	*.36*$^{+}$

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20.
* = $p < .05$; + = $p < .10$.

For the Overall time period, approach emotions were positively related to alternative generation, both for Means at the aggregated team level ($r = .37$, $p < .052$), and at the group consensus level ($r = .32$, $p < .086$). This positive relationship is replicated in the Developing Phase: 1) for Means ($r = .44$, $p < .05$) and Last scores ($r = .49$, $p < .05$) at the aggregated team level; 2) for Means at the group consensus level ($r = .42$, $p < .05$); and 3) for Maximum intensities at the group consensus level ($r = .36$, $p < .06$). It means that the results found during the Overall period, even though with a p level <.10, were consistent with the findings in the Developing Phase (with $p<.05$). In contrast, approach emotions related negatively to alternative generation in the Starting Phase for Maximum intensities at the aggregated team level ($r = -.39$, $p < .05$). It is unclear whether this result is due to Maximum intensities (as the

pattern throughout all results is that Maximum intensities relate negatively to decision-making processes), or to the timing (i.e. Starting Phase).

The positive relationship between approach emotions and alternative generation in the Developing Phase could be explained by group development research. Teams may have reached what Gersick (1988) has described as the "punctuated equilibrium": near the halfway mark, groups incorporate previous learning; change the rhythm and the approach with which they worked; thus, make significant progress in their tasks (Gersick & Davis-Sacks, 1990). Teams in the present study might have seen these activities supported by approach emotions.

4.3.2. Approach Emotions and Alternative Evaluation

Approach emotions were predicted to be positively related to alternative evaluation. There was a contrast between results found for Mean scores in the Developing Phase, which were as predicted, and results for Maximum intensities, which were opposite to predictions (see Table 15).

Table 15

Correlations of Mean, Maximum, and Last Emotion Scores of Approach Emotions with Alternative Evaluation across Time Periods and across Levels of Analysis

		Mean	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	-
Group consensus	-	-	**.43***
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		-	**.39***
Group consensus		-	-
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	**-.52***	**-.39***	**-.44***
Group consensus	-	-	-

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20.

* = $p < .05$; + = $p < .10$.

In the Developing Phase, both Means at the group consensus level and Last scores at the aggregated team level were positively related to alternative evaluation (respectively r = .43, p < .05 and r = .39, p < .05), as expected. The tentative explanations provided in the previous section are valid here as well: after the halftime between the beginning of the task and the estimated time left to complete the task, groups find new ways of improving their processes (Gersick and Davis-Sacks, 1990).

In contrast, there was a consistent negative relationship between approach emotions and alternative evaluation for Maximum intensities across all time periods, at the aggregated team level: 1) for the Overall time period (r = -.52, p < .05); 2) in the Starting Phase (r = -.39, p < .05); and 3) in the Developing Phase (r = -.44, p < .05) – see Table #.

4.3.3. Approach Emotions and Team Cohesion

Approach emotions were predicted to be positively related to team cohesion. Results opposite to predictions were found for Maximum intensities, as shown in Table 16.

Table 16

Correlations of Mean, Maximum, and Last Emotion Scores of Approach Emotions with Team Cohesion across Time Periods and across Levels of Analysis

		Mean	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	*.33*$^{+}$
Group consensus	-	-	-
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		-	-
Group consensus		-	-
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	**-.53****	**-.53****	**-.41***
Group consensus	-	-	-

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20.

** = p < .01; * = p < .05; + = p < .10.

Maximum intensities related negatively to alternative evaluation: 1) for the Overall time period (r = -.53, p<.01); 2) in the Starting Phase (r = -.53, p < .01); and 3) in the Developing Phase (r = -.41, p < .05). Not only are the effect sizes moderate to large (Cohen, 1987), but the p level is very small. There was a weak positive relationship between Means and team cohesion in the Developing Phase (r = .33, p < .076).

4.3.4. Summary

Table 17 summarizes results relative to approach emotions and decision-making processes. No results were found at the individual level. Means and Last scores were positively related with alternative generation and alternative evaluation in the predicted direction at both the aggregated team and the group consensus level. Maximum intensities at either the aggregated team or the group consensus level were systematically negatively related to all three decision-making processes. Thus, the level of analysis was not the discriminating factor but the type of emotion scores was (Mean/Last versus Maximum).

The opposite results seem to indicate that approach (i.e. positive) emotions, when too intense, can have negative relationships with all three decision-making processes. The negative features of approach emotions are, for example, to elaborate unrealistic goals or plans, to disperse energy and scatter attention, or to take inappropriate actions (Scherer & Tran, 2001).

Table 17

Summary of Findings for Approach Emotions in Relation to Decision-Making Processes

		Overall		**Starting Phase**			**Developing Phase**		
		Mean	Max	Mean	Last	Max	Mean	Last	Max
Alternative Generation (+)	I								
	A	y^{+}				**O***	**Y***	**Y***	
	C	y^{+}					**Y***		y^{+}
Alternative Evaluation (+)	I								
	A		**O***			**O***		**Y***	**O***
	C						**Y***		
Team Cohesion (+)	I								
	A		**O***			**O***	y^{+}		**O***
	C								

Note. I = Individual level; A = Aggregated team level; C = Group consensus level; Y = Hypothesis confirmed; O = Result opposite to hypothesis with p < .05 (*) or p < .01 (**); y = Result in the direction of hypothesis with p < .10 ($^{+}$).

4.4. Resignation Emotions and Decision-Making Processes

In the case of Mean scores in the Starting Phase and of Last scores in the Starting and Developing Phases, resignation emotions could not be taken in consideration due to insufficient data points.

4.4.1. Resignation Emotions and Alternative Generation

Resignation emotions were hypothesized to be negatively related to alternative generation. Resignation emotions were found to be positively related to alternative generation at different moments of the decision-making task, as shown in Table 18.

Table 18

Correlations of Mean, Maximum, and Last Emotion Scores of Resignation Emotions with Alternative Generation for the Different Time Periods and for the Three Levels of Analysis

		Mean	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	**.47***	n.a.	*.50*+
Group consensus	n.a.	n.a.	n.a.
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		**.20***	-
Aggregated Team		n.a.	n.a.
Group consensus		n.a.	n.a.
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	-
Group consensus	n.a.	n.a.	n.a.

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20.
* = $p < .05$; + = $p < .10$.

For the Overall period of time, resignation emotions were positively related to alternative generation for Means at the aggregated team level ($r = .47$, $p < .05$), result which is moderately apparent during the Developing Phase ($r = .50$, $p < .06$).

In the Starting Phase, Last scores of resignation emotions were positively related to alternative generation ($r = .20$, $p < .05$), at the individual level. This result adds a new element regarding what is known about the influence of resignation emotions: previous research on

sad moods usually posits that sad moods have a positive influence on analytical capabilities[34] (e.g. Schwarz and Bless, 1991; Schwarz, 2000) at the individual level, except for Isen et al.'s (1987) observation that negative affect has not been proven to impair creativity.

The relationship between resignation emotions and alternative generation seems not to have been tested at the team level in previous research, thus a comparison is difficult. In the present study, this relationship remained consistently positive at the team level.

4.4.2. Resignation Emotions and Alternative Evaluation

Resignation emotions were predicted to be positively related to alternative evaluation. This hypothesis could not be supported (see Table 19).

Table 19

Correlations of Mean, Maximum, and Last Emotion Scores of Resignation Emotions with Alternative Evaluation across Time Periods and across Levels of Analysis

		Mean	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	n.a.	-
Group consensus	n.a.	n.a.	n.a.
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		n.a.	n.a.
Group consensus		n.a.	n.a.
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	-
Group consensus	n.a.	n.a.	n.a.

Note. n.a. = not applicable.

[34] Which corresponds to 'alternative evaluation' in my study.

4.4.3. Resignation Emotions and Team Cohesion

Resignation emotions were predicted to be positively related to team cohesion. As shown in Table 20, resignation emotions were positively and selectively related to team cohesion.

Table 20

Correlations of Mean, Maximum, and Last Emotion Scores of Resignation Emotions with Team Cohesion across Time Periods and across Levels of Analysis

	Mean		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	**.48***	n.a.	**.72****
Group consensus	n.a.	n.a.	n.a.
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	-
Aggregated Team		n.a.	n.a.
Group consensus		n.a.	n.a.
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	-
Group consensus	n.a.	n.a.	n.a.

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20; n.a. = not applicable.

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

Resignation emotions were positively related to team cohesion for: 1) Means during the Overall time period ($r = .48$, $p < .05$); and 2) Means in the Developing Phase ($r = .72$, $p < .01$).

These results fit with theoretical predictions and/or previous findings from the emotion literature: resignation emotions strengthen bonds between members of a group, they lead to protective behavior and reinforce social cohesion, encourage prosocial behavior, enhance conformity, compliance, and empathy (Paez et al., 1995; Lazarus, 1991a; Izard, 1991; Carlsmith & Gross, 1969; Niedenthal et al., 1994).

4.4.4. Summary

Table 21 summarizes results relative to resignation emotions and decision-making processes. Hypotheses could not be tested at the group consensus level. In regard to the relationship with alternative generation, results opposite to prediction were found both at the individual and at the aggregated team levels. In regard to the relationship with alternative evaluation, no results were found. In regard to the relationship with team cohesion, results congruent with predictions were found at the aggregated tam level.

Table 21

Summary of Findings for Resignation Emotions in Relation to Decision-Making Processes

		Overall		**Starting Phase**			**Developing Phase**		
		Mean	Max	Mean	Last	Max	Mean	Last	Max
Alternative Generation **(-)**	I				**O***				
	A	**O***					o^{+}		
	C								
Alternative Evaluation **(+)**	I								
	A								
	C								
Team Cohesion **(+)**	I								
	A	**Y***					**Y****		
	C								

Note. I = Individual level; A = Aggregated team level; C = Group consensus level; Y = Hypothesis confirmed; O = Result opposite to hypothesis with $p < .05$ (*) or $p < .01$ (**); y = Result in the direction of hypothesis with $p < .10$ ($^{+}$); o = Result opposite to hypothesis with $p < .10$ ($^{+}$).

4.5. Antagonistic Emotions and Decision-Making Processes

In the case of Mean scores in the Starting Phase and of Last scores in the Starting and Developing Phases, antagonistic emotions could not be taken in consideration due to insufficient data points.

4.5.1. Antagonistic Emotions and Alternative Generation

Antagonistic emotions were predicted to relate negatively to alternative generation. As shown in Table 22, antagonistic emotions were negatively related to alternative generation at the aggregated team level but were positively related at the individual level.

Table 22

Correlations of Mean, Maximum, and Last Emotion Scores of Antagonistic Emotions with Alternative Generation across Time Periods and across Levels of Analysis

	Mean		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	n.a.	-
Group consensus	n.a.	n.a.	n.a.
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		-	**.17***
Aggregated Team		n.a.	n.a.
Group consensus		n.a.	n.a.
	Maximum		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	**.22***	-	-
Aggregated Team	-	-	**-.42***
Group consensus	n.a.	n.a.	n.a.

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20; n.a. = not applicable.

* = $p < .05$

Antagonistic emotions were positively related to alternative generation at the individual level for: 1) Overall Maximum intensities ($r = .22$, $p < .05$); and 2) Last scores in the Developing Phase ($r = .17$, $p < .05$). In contrast, Maximum intensities at the aggregated team level related negatively to alternative generation ($r = -.42$, $p < .05$).

There is no evidence in the literature that would lead to the conclusion that anger is beneficial to alternative generation. It might be that those team members who felt anger had the impression to contribute with more alternatives to "show" their ideas to others. In contrast, the effect of accumulated antagonistic emotions from all team members is negative on alternative generation.

4.5.2. Antagonistic Emotions and Alternative Evaluation

Antagonistic emotions were predicted to be negatively related to alternative evaluation. Antagonistic emotions were negatively related to alternative evaluation, as predicted, except for individual mean scores in the Developing Phase (see Table 23).

Table 23

Correlations of Mean, Maximum, and Last Emotion Scores of Antagonistic Emotions with Alternative Evaluation across Time Periods and across Levels of Analysis

	Mean		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	**.23****
Aggregated Team	*-.47*$^{+}$	-	-
Group consensus	n.a.	n.a.	n.a.
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		**-.24****	**.26****
Aggregated Team		n.a.	n.a.
Group consensus		n.a.	n.a.
		Maximum	
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	**-.23****	-
Aggregated Team	**-.55****	*-.36*$^{+}$	**-.61****
Group consensus	n.a.	n.a.	n.a.

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20; n.a. = not applicable.

** = p < .01; + = p < .10.

A consistent pattern in the results emerged at different levels of analysis and at different periods of time. For the Overall time period, Means (r = -.47, p < .086), and Maximum intensities (r = -.55, p < .01) at the aggregated team level were negatively related to alternative evaluation. This result was reiterated: 1) in the Starting Phase, for Last scores (r = -.24, p < .01) and Maximum intensities (r = -.23, p < .01) at the individual level; for Maximum

intensities at the aggregated team level (r = -.36, p < .059); 2) in the Developing Phase, for Means (r = .23, p < .01) and Last scores (r = .26, p < .01) at the individual level; for Maximum intensities at the aggregated team level (r = -.61, p < .01).

Similarly to alternative generation, there is no evidence in the literature that would lead to the conclusion that anger is beneficial to alternative evaluation. It might be that those team members who felt anger during the second half of the simulation (i.e. the Developing Phase) thought they were better analyzing the alternatives available to their team.

4.5.3. Antagonistic Emotions and Team Cohesion

Antagonistic emotions were predicted to relate negatively to team cohesion. As shown in Table 24, antagonistic emotions were negatively related to team cohesion.

Table 24

Correlations of Mean, Maximum, and Last Emotion Scores of Antagonistic Emotions with Team Cohesion across Time Periods and across Levels of Analysis

	Mean		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	-	-	-
Group consensus	n.a.	n.a.	n.a.
		Last	
Level of analysis		**Starting Phase**	**Developing Phase**
Individual		**-.20***	-
Aggregated Team		n.a.	n.a.
Group consensus		n.a.	n.a.
	Maximum		
Level of analysis	**Overall**	**Starting Phase**	**Developing Phase**
Individual	-	-	-
Aggregated Team	**-.56****	*-.35*+*	**-.64****
Group consensus	n.a.	n.a.	n.a.

Note. Individual level, N = 106; aggregated team level, N = 20; consensus level, N = 20; n.a. = not applicable. ** = p < .01; * = p < .05; + = p < .10

The relationships between antagonistic emotions and team cohesion were found negative: 1) for Maximum intensities at the aggregated team level (r = -.56, p < .01), for the Overall time period; 2) in the Starting Phase, for Last scores at the individual level (r = .20, p < .05), and for Maximum intensities at the aggregated team level (r = -.35, p < .67); and 3) in

the Developing Phase, for Maximum intensities at the aggregated team level ($r = -.64$, $p < .01$).

4.5.4. Summary

Table 25 summarizes results relative to antagonistic emotions and decision-making processes. Contrary to the three other classes of emotions, several results were found at the individual level for antagonistic emotions. Hypotheses could not be tested at the group consensus level. In regard to the relationship with alternative generation, results opposite to predictions were found at the individual level. In contrast, results confirming predictions were found at the aggregated team level. In regard to alternative evaluation, results strongly confirmed predictions at the individual level (for Last means scores and Maximum intensities) in the Starting Phase, but were strongly opposite to the prediction in the Developing Phase. At the aggregated team level, all results were supporting predictions. In regard to the relationship with team cohesion, all results confirmed predictions, whether at the individual level or at the aggregated team level.

Table 25

Summary of Findings for Antagonistic Emotions in Relation to Decision-Making Processes

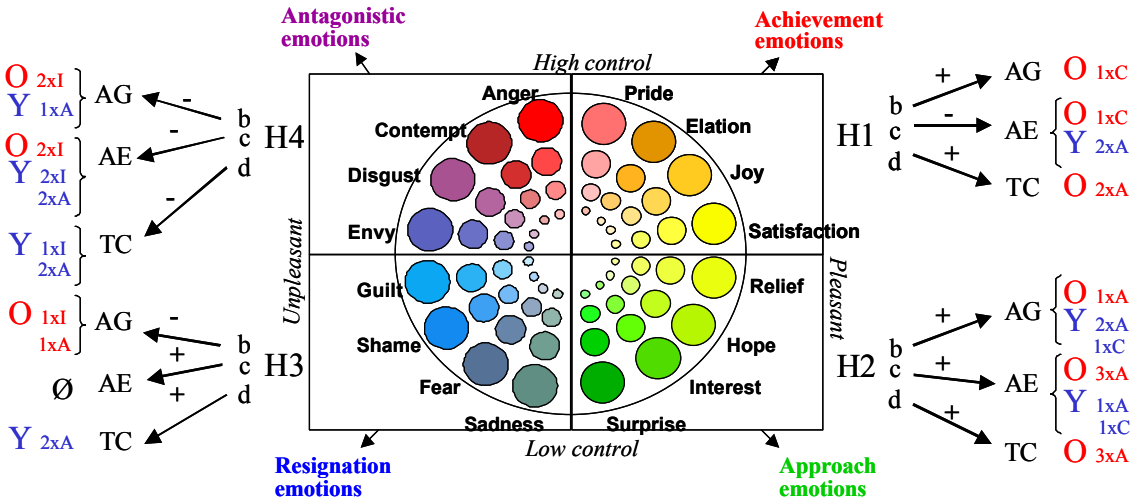
		Overall		**Starting Phase**			**Developing Phase**		
		Mean	Max	Mean	Last	Max	Mean	Last	Max
Alternative Generation **(-)**	I		**O***					**O***	
	A								**Y***
	C								
Alternative Evaluation **(-)**	I				**Y****	**Y****	**O****	**O****	
	A	y^{+}	**Y****			y^{+}			**Y****
	C								
Team Cohesion **(-)**	I				**Y***				
	A		**Y****			y^{+}			**Y****
	C								

Note. I = Individual level; A = Aggregated team level; C = Group consensus level; Y = Hypothesis confirmed; O = Result opposite to hypothesis with $p < .05$ (*) or $p < .01$ (**); y = Result in the direction of hypothesis with $p < .10$ ($^{+}$).

4.6. Overall Summary

Figure 8 summarizes the findings for all four classes of emotions and decision-making processes, showing the number of times hypotheses were confirmed, and the number of times results were in opposition to predictions, taking into consideration results at a p level of minimum .05.

Figure 8. Summary of findings.



Note. Results reported on this chart are at a p level <.05; Y = hypothesis confirmed; O = result opposite to hypothesis; I = Individual level; A = Aggregated team level; C = Group consensus level; 1x = one time; 2x = two times; 3x = three times.

Regarding positive emotions, no results were found at the individual level. Then:

- Regarding achievement emotions, four results were opposite to predictions, two supported predictions, at the team aggregated level and/or at the group consensus level and all associated with maximum intensities;
- Regarding approach emotions, seven results were opposite to predictions (all associated with maximum intensities), five supported predictions, at the team aggregated level and/or at the group consensus level.

Regarding negative emotions, a combination of results were found at the individual level and at the aggregated level (analyses at the group consensus level could not be performed due to insufficient data points):

- Regarding resignation emotions, two results were opposite to predictions (one at the individual level, one at the aggregated team level), two supported predictions (both at the aggregated team level);
- Regarding antagonistic emotions, eight results supported predictions at both the individual and at the aggregated team level; four were opposite to predictions, mainly at the individual level. In contrast to all over three classes of emotions, relationships between antagonistic emotions and decision-making processes were the most congruent with hypotheses formulated.

These results will be reviewed and critiqued in the discussion section below, and tentative explanations as well as suggestions for future research will be provided.

CHAPTER 5: DISCUSSION AND CONCLUSION

This study aimed to empirically demonstrate that certain classes of emotions associated with specific behavioral tendencies influence certain group decision-making processes, such as alternative generation, alternative evaluation, and team cohesion; and this in teams in a quasi-naturalistic environment. Three levels of analysis were considered: individual, team, and group consensus. The main findings will be discussed next, followed by contributions of this study, and directions for future research. Limitations will be described, and finally practical applications will be suggested.

5.1. Main Findings

5.1.1. Achievement Emotions

It was hypothesized that achievement emotions (mainly composed of pride, elation, joy, and satisfaction) would be positively related to alternative generation and to team cohesion, but negatively related to alternative evaluation.

The results of this study indicate that achievement emotions are not positively associated with alternative generation. These results were found mainly for maximum intensities at the group consensus level, during the second part of the simulation. They were supported by a consistent pattern of weaker results with both means and maximum intensities, during the overall duration of the simulation. Previous research on achievement emotions has stated that they could lead to complacency, overconfidence, low effort to explore new alternatives (Scherer and Tran, 2001), or decreased productive thinking (Izard, 1991), but the intensity required or the conditions in which these pitfalls would occur have not been specified. Previous research on positive affect and decision-making has stated that in certain circumstances, positive mood could lead to overlook important information (Schwarz & Bless, 1991), and to greater self-confidence (Forgas, 1989). Evidence on group emotion relating to alternative generation is scarce. The results of this study seem to confirm previous findings with at least three elements: 1) the participants in the present study may have been too self-confident, which might also be an inherent characteristic of managers who are selected by their organization as high-potentials; 2) the second part of the simulation corresponds to a rapid growth in the industry, which may lead participants to overlook information and become complacent due to an apparent easiness to get market shares

(although towards the end, the industry consolidates, and market shares shrink); 3) the vote on the group consensus emotion takes place at the end of a three to four-hour decision period, participants are usually very enthusiastic about the fact that the task is over; thus they tend to report their group emotion with a high intensity level (if not the highest). The present study has been able to identify the type of emotion, the intensity, the time, and the level of analysis at which this relationship is negative.

The results of this study indicate that achievement emotions are negatively associated with alternative evaluation. These results were found for maximum intensities at the aggregated team level, during the overall duration, as well as during the second part of the simulation. These findings come in support of Janis' (1989) idea that high arousal of elation leads to incomplete alternative evaluation. In contrast, maximum intensities of achievement emotions are positively associated with alternative evaluation during the beginning of the simulation at the group consensus level, result that is opposite to predictions. The Yerkes-Dodson Law (1908) that links performance on tasks to arousal with an inverted U function could provide an explanation. At the beginning of the simulation, there is momentum building, during which a high level of intensity of achievement emotions relates positively to alternative evaluation. As time evolves, the combination of an increased complexity of the task accompanied by high arousal (i.e. maximum intensities for the group consensus emotion) leads to a negative relationship between achievement emotions and alternative evaluation during the later part of the simulation. The present study has begun to provide a more refined analysis of the relationship between achievement emotions (versus traditionally positive affect or positive mood) and a decision-making process.

The results of this study indicate that achievement emotions are not positively associated with team cohesion. These results were found for maximum intensities at the group consensus level, and are in opposition with previous research that found positive affect to be positively associated with cooperative behavior at the individual level (e.g. Isen, 1999), and at the group level (e.g. Barsade, 2001; George, 1990). The reason for this discrepancy is probably the level of intensity. Even though achievement emotions are typically associated with cohesion, too much of them can be an inhibiting factor (see paragraph above regarding the U-shaped curve hypothesis).

In summary, although achievement emotions are very important for the well-being of an individual, and for his/her self-esteem, they can have a negative influence at the collective level, particularly at high levels of intensity.

5.1.2. Approach emotions

It was hypothesized that approach emotions (mainly composed of relief, hope, interest, and surprise) would be positively related to alternative generation, alternative evaluation, and team cohesion.

The results of this study indicate that approach emotions are positively associated with alternative generation. These results were found during the second part of the simulation, both for means at the aggregated level and means at the group consensus level. This positive relationship is also found for means measured at the last period before the end of the simulation, at the aggregated team level. Previous research on positive affect or positive mood at the individual level has not discriminated among achievement "affect/mood" and approach "affect/mood"; thus, it is possible to draw some explanatory elements from this literature, and extend them to the team level. Research on positive affect has shown that it enhances cognitive flexibility, interconnecting information in unusual ways, creative thinking, and innovation (Higgins et al., 1992; Isen and colleagues). Thus, assuming some of these findings apply to emotion, a moderate level of approach emotions should enhance alternative generation. Given the void of research on both approach emotions and on their relationship to group decision-making processes, the present findings are exploratory. It can be conjectured that interest, one of the approach emotions, plays a key role in knowledge acquisition and competence development (Izard, 1991). As team members progress in the decision-task, they are possibly more and more involved in the task, and motivated to generate new alternatives that help them improve and obtain competitive advantages over the other teams. Hope, another approach emotions, also helps to sustain activities, and to maintain morale, even in difficult circumstances. With its core relational theme "fear the worst but yearn for better", hope is an important emotion in an organizational context where fear of disapproval, of not performing, or of losing one's job are current events (Lazarus & Cohen-Charash, 2001). In the present study, both hope and interest probably fuelled team members' motivation to generate new alternatives, especially if team members operate under the belief that there is room for improvement (Lazarus and Cohen-Charash, 2001).

In contrast, maximum intensities of approach emotions are negatively associated with alternative generation during the first part of the simulation, at the aggregated team level. At the beginning of the simulation, the strategy of the teams is still in formation, and even though this time offers a perfect opportunity to have broad alternative generation, the teams often limited themselves in their options, trying to apply familiar models or even the existing strategy of their real organization[35]. This can be illustrated by the relative low level of the average ratings of alternative generation for the first part of the simulation. Thus, it appears logical that a high level of approach emotions will relate negatively to a low level of alternative generation.

The results of this study indicate that approach emotions are positively associated with alternative evaluation. These results were found for means at the group consensus level, during the second part of the simulation, and for means measured at the last period before the end of the simulation, at the aggregated team level. Previous research on positive affect at the individual level has shown that it enhances thorough consideration of alternatives (Isen & Baron, 1991). In addition, both Isen (1993) and Elsbach and Barr (1999) have suggested that in case of personally relevant decisions, individuals in a positive affect or mood are more systematic in their decision-making process. Thus, given the fact that interest sustains engagement, group activity, and persistence (Izard, 1991), it is plausible to conclude that a moderate level of approach emotions relates positively to alternative evaluation.

The results of this study indicate that maximum intensities of approach emotions are consistently negatively associated with both alternative evaluation and team cohesion at the aggregated team level, during each phase of the simulation (overall, first part, and second part). Scherer and Tran (2001) have hypothesized that approach emotions can lead to dispersed attention or in the contrary to excessive focus, and to unrealistic goals. Thus, high intensity levels of approach emotions may lead the team members to divert their attention towards too many different alternatives, and it may even lead to conflicts among team members, which have a negative impact on team cohesion.

In summary, collective approach emotions appear to be an enhancing factor, in the context of which team members are willing to compete as successfully as possible with both the capability to generate new alternatives and to go through the painstaking analysis and review of alternatives. Yet, the same phenomenon is observed in the case of approach

[35] I was able to observe this phenomenon on site.

emotions as it was for achievement emotions: there is the probability of an inverted U function taking place.

5.1.3. Resignation Emotions

It was hypothesized that resignation emotions (mainly composed of fear, sadness, shame, and guilt) would be negatively related to alternative generation, and positively related to alternative evaluation and team cohesion.

The results in this study indicate that resignation emotions are not negatively associated with alternative generation. These results were found for means at the aggregated team level, during the overall duration of the simulation, and for means measured at the last period in the first part of the simulation, at the individual level. Previous research at the individual level has posited that sad mood impairs creativity-related tasks, that negative affect is associated with constrictive thinking and decreased creativity (Higgins et al., 1992; Schwarz and Bless, 1991) and that high levels of fear increase superficial information processing (Baron et al. 1992). It appears that fear is the dominant representative emotion of its class (i.e. resignation) at that particular point in time[36]. Fear enhances adaptation, as it helps individuals to be more perceptive about the environment and the useful signals it provides (Paez et al., 1995), and to be more careful about risks (Izard, 1991). A mild degree of fear may actually be beneficial to the generation of alternatives, as the team has to find new solutions and new ideas to improve their performance. The type of fear probably prevalent in this situation may be fear to appear less competent compared to peers in competitive circumstances.

Two other resignation emotions, shame and guilt, have behavioral consequences that support these findings. Shame leads to improvement and encourages avoidance of incompetence (Izard, 1991); and guilt contributes to constructive endeavors (Kemper, 1991). These characteristics seem compatible with the activity of generating more new alternatives, in order to better cope with the increasing complexity of the decision-making task.

At the individual level, resignation emotions were positively related to alternative generation at the end of the first part of the simulation. At the aggregated team level, resignation emotions were positively related to alternative generation throughout the entire

[36] Sadness was selected in Period 1 by one respondent (.9%) and by two respondents in Period 2 (1.8%). Fear was selected by 16% of the respondent in Period 1, and by 10.4% in Period 2. Shame was selected by 4.7% of the respondents and guilt by 2.7% of them.

simulation; thus, a reasonable level of resignation emotions may have helped team members to collectively generate a wider range of alternatives. This constitutes evidence that different levels of analysis and different times are necessary to better understand the role of emotion in group decision-making.

The results in the present study indicate that resignation emotions are positively associated with team cohesion. These results were found at the aggregated team level, for both the overall duration and the second part of the simulation, and are in congruence with previous research on resignation emotions in relation to emotional climate (see Paez et al., 1995), which has shown that both climates of sadness and fear reinforce cohesion. In addition, research on shame has argued that it encourages prosocial behavior and reinforces cohesion by enhancing conformity and social responsibility (Izard, 1991; Lazarus, 1991a); research on guilt has shown that it reinforces social bonds, interpersonal obligation, and empathy (Baumeister et al., 1994; Niedenthal et al., 1994). During the simulation, despite their probable self-confidence, participants nevertheless felt resignation emotions to a minor extent: they probably felt fear to appear incompetent, to loose from one period to another (market shares, the competition…), sadness to miss the targets, or to have misunderstanding with other team members, shame and guilt of not being up to par; yet enough for resignation emotions to have positive relationships with their alternative generation and their team cohesion.

In summary, collective resignation emotions influence alternative generation and team cohesion positively and consistently over time. Contrary to the results found with achievement, approach, and antagonistic emotions, no high levels of intensity of resignation emotions were reported. Thus, these findings corroborate the fact that a moderate level of emotions can contribute to effective decision-making (Janis, 1989).

5.1.4. Antagonistic Emotions

It was hypothesized that antagonistic emotions (composed mainly of envy, disgust, contempt, and anger) would be negatively related to alternative generation, alternative evaluation, and team cohesion.

The results of this study indicate that antagonistic emotions are not negatively associated with alternative generation at the individual level, but they are at the aggregated team level. First, at the individual level, positive relationships were found for maximum intensities during the overall duration of the simulation, and for means measured at the last

period of the second part of the simulation. A partial explanation for these results may be that some participants felt encouraged to "rock the boat" in the context of the simulation (characterized as 'non-threatening') and to share ideas boastfully even if discussions became conflict-oriented. Lerner and Keltner (2000) have found that individuals feeling anger tend to be more optimistic in regard to risk-taking. Second, at the aggregated team level, negative relationships were found for maximum intensities during the second part of the simulation, result that is congruent with predictions and with the previous results relative to maximum intensities.

The results of this study indicate that antagonistic emotions are negatively associated with alternative evaluation at the individual level during the first part of the simulation, but they are positively associated during the second part of the simulation. First, negative relationships were found for means reported at the end of the first part, and for maximum intensities. These findings are congruent with previous research in group decision-making. Janis (1989) postulated that anger prevents team members from evaluating alternatives. Amason (1996) argued that anger inhibits the process of considering all contradictory viewpoints and of making decisions.

Second, positive relationships were found for means of the second part, and for means reported at the end of the second part. This positive relationship has not been addressed very often by previous research. It may be due to increased task interdependence, represented by the interconnections among the work of individual members (Bartel and Saavedra, 2000; Gersick, 1988). In parallel, when team cohesion improves, there is more freedom for team members to express and feel their emotions, including negative ones, without being criticized and without these emotions having negative impact on the team spirit. The increase of task interdependence, creating a sense of affiliation and fosters norms of collaboration (Gersick, 1988), together with team cohesion, may have buffered the negative influence of anger on team decision-making. Furthermore, Lazarus and Cohen-Charash (2001) have suggested that in organizational contexts, anger often replaces fear and sadness. Thus, it could be hypothesized, although very prudently, that anger in that particular context takes on some of the attributes of fear and sadness, which are to carefully review alternatives.

In contrast, at the aggregated team level, antagonistic emotions are negatively associated with alternative evaluation, for maximum intensities during the overall duration and the second part of the simulation. It can be hypothesized, as it is the case for the other

classes of emotions that a moderate level of antagonistic emotions contributes to a positive relationship with decision-making processes, whereas intense levels of antagonistic emotions contribute to a negative relationship.

The results of this study indicate that antagonistic emotions are negatively associated with team cohesion. These results were found both at the individual and at the aggregated team level, during each phase of the simulation (overall, first part, and second part). They are congruent with previous research addressing anger in a negotiation context. Allred et al. (1997) found that high levels of anger are detrimental to future working relationships. In the context of the simulation, it can occur either when participants have anger-in, that is they are not satisfied with themselves (their performance for example), or anger-out (hostility towards other team members or toward competing teams).

In summary, individual antagonistic emotions influence alternative generation and alternative evaluation positively when team members have worked a long time enough together. Adversely, when team members are starting to work together, antagonistic emotions influence alternative evaluation and team cohesion negatively. An intense level of collective antagonistic emotions is detrimental to all decision-making processes.

5.1.5. Collective Emotion

The present study found that positive collective emotions (both achievement and approach emotions) converged rapidly, as soon as the teams started to work together as shown by the convergence measures used. Future research will have to refine the definition and the measurements of convergence. However, the working definition of collective emotion in this research was that shared emotions are embedded in interrelated behaviors associated with the accomplishment of a task over time, and this study may have found empirical confirmation of this working definition. If one considers Paez et al.'s (1995) definition of emotional climate, one assumes emotions are accompanied by the predominance of certain action tendencies that permeate social interactions, and these action tendencies translate into behaviors shared by a given group. Thus, the fact that convergence was also found on decision-making processes within the 20 teams may be an indicator that emotional convergence is sustained by behavioral similarities. This convergence of positive emotions contrasts with Bartel and Saavedra's (2000) findings: they found convergence of both positive and negative moods in working groups.

In the present study, the convergence may be due to certain norms that groups develop very early on in the process of working together (Moorhead, Neck, & West, 1998). The participants had already been together between 2 and 5 days before starting the simulation. Early studies on climate emphasize the importance of a positive climate for good group performance. Vraa (1974) suggest that an optimal climate enables team members a certain freedom of expressing their emotions without fear of rejection. Contemporary research echoes this view: Shaw (1981), Moreland and Levine (1992), or Jones, Stevens, and Fischer (2000) suggest that it is necessary for team members to act independently and express themselves without fear of negative feedback. Luft (1970) described how important a good climate is for good collaboration where feelings of insecurity leading to anger and defensiveness can be eliminated. In the present study, it can be argued that the elimination of anger is not an issue. The fact that the predominance of positive collective emotions instills a positive climate probably plays the role of buffer and enables individuals to report their anger (i.e., they feel free to do so). Anger was then positively related to decision-making processes during the second part of the simulation, precisely when team members have had time to establish this positive climate. This may be an illustration of what Heath and Jourden (1997) have described as the buffer effect, played by positive affect to prevent negative performance evaluations by team members after a disappointing event.

5.2. Theoretical and Methodological Contributions

5.2.1. Emotion and Group Decision-Making

Several authors have commented about the deficiency of research on affect/mood/ emotion and group decision-making (e.g. Davis, 1982, Hinsz et al., 1997), although there has been interest for the role of emotions in decision-making at the individual level over the last decade (Loewenstein & Lerner, 2003). In a recent review, Kelly and Barsade (2001) describe the fact there is "virtually no empirical research examining the influence of intense emotions in work teams. This is most likely due to the methodological difficulties of being allowed into organizations to study such emotions." (p. 103) This study contributes to the development of this research area. The scale used was graded from 1 to 4, which might not reflect a large enough band of intensities; yet the size of the circle drawn on the Emotion Wheel plus the label attached to it suggests an intensity of 4 is strong. Thus, intense emotions have been measured in an organizational context.

Dunegan, Duchon, and Barton (1992) suggest two points that support what was accomplished in this study. First, they argue that affective states that directly emanate from the decision task would be more proximal indicators of decision behaviors. Loewenstein and Lerner (2003) share this view, as they argue that immediate emotions influence decision-making by modifying the decision maker's perception of probabilities, decision-relevant cues, or decision outcomes. In this study, emotions were measured during the decision-making process: the results appear to be consistent with Loewenstein and Lerner. Second, Dunegan et al. argue that a certain level of affective arousal may be necessary before it begins to influence decision-making. They suggest that research should find criterion measures that would require different intensities of emotion before any relationship can emerge. This idea, as well as Loewenstein and Lerner's (2003) proposition that both quality and intensity of emotions have to be considered when studying effects on decision-making, was implemented in this study and different results were yielded depending on the type of class of emotions (i.e. quality) and on the type emotion scores used (Mean, Maximum, or Last score, i.e. intensity).

5.2.2. Types of Emotion Scores

In order to provide a more refined series of self-report measures on emotion, three different types of scores were created, based on the assumption that there are three kinds of memory processes occurring when subjects try to remember events or emotions that occurred over a certain period of time: 1) an average of emotions experienced over a given period of time; 2) peak experiences; or 3) end experiences (see Stone, Shiffman, & De Vries (1999). These assumptions were tested in the present study. Measurements made at the end of decision periods yielded the least number of statistically significant results (8), whereas maximum intensities yielded the most results (27). Average reports yielded an average number of results (15). It appears that the intensity of the experience may be more relevant to people than the latest experience. Hedonic psychology already addresses these issues (Kahneman, Diener, & Schwarz, 1999); future studies applied to organizational settings should explore these assumptions further.

5.2.3. Curvilinear Relationships

Each of the classes of emotions has positive and negative behavioral consequences, as it was described in Chapter 1. In addition, findings in the present study show rather

systematically that intense levels of emotion, positive or negative, appeared detrimental to group decision-making processes. Thus, it can be assumed that this study has begun to find curvilinear relationships between emotion and decision-making processes. Future studies should further examine these inverted U-shaped functions, as suggested by Frijda (1986), and consider influencing factors such as the context, the length of time team members spend working together, the type of task, etc.

5.2.4. Specificity of Emotions

In the research domain of strategic decision-making in teams, studies have not yet addressed the role of specific emotions. In parallel, Barsade and Gibson (1998), when addressing the issue of collective emotion, have suggested that studying group emotion based on specific emotions (e.g. anger, fear, sadness, joy) could improve our knowledge on group emotions and their effects on behaviors. The present research has contributed to advances of knowledge in this direction. In strategic decision-making literature, the dichotomy between cognitive conflict and affective conflict (e.g. Amason, 1996) relies on the fact that anger leads to interpersonal conflict (or affective conflict), which in turn is detrimental to decision-making. The present study shows that anger (or related emotions, such as antagonistic emotions) can be both helping and hindering decision-making processes, depending on the type of decision-making process (alternative generation, alternative evaluation, or team cohesion), on the timing (beginning or end of a task/project), and on the emotion intensity (means vs. maximum intensities).

5.3. Limitations and Future Research

The first limitation of this study is that it cannot be ascertained that participants reported emotions, as they were defined in Chapter 1. This is the challenge of using self-report measures to measure emotion or any other affective construct, as mentioned earlier. Whether researchers measure affect, mood, or emotion, many terms are similar: terms such ‘happy’, ‘sad’, ‘elated’, ‘fearful’, ‘angry’ are used to measure all three constructs. Even when researchers attempt to manipulate the inducement of sadness as a mood for example, even if they apply manipulation checks, they may have not measured emotion[37]. Future investigation should tackle the issues: of 1) more rigorous definitions; and 2) more rigorous measurements.

[37] See section 1.4.

The second limitation is that participants were constrained to report two emotions. Theoretically, I argued that at any given point in time, it is not possible to feel more than two emotions given the investment made by the organism to produce an emotion. However, Scherer and Ceschi (1997) suggest that emotion blends may be the kinds of emotional response subjects have in naturalistic situations. Scherer and Ceschi acknowledge that timing could be a critical issue and that more sophisticated ways of measuring emotions at very precise moments in time will have to be devised. A combination of laboratory experiments where it is possible to use technological instruments to detect micro-mechanisms and of field studies will have to be conducted to further explore this issue. In the latter case, the Emotion Wheel could be used as an instrument to measure blends by allowing participants to report as many emotions as they wish by class of emotions and by asking them to rank order their choices.

The third limitation is that there were a limited amount of data points for resignation emotions and antagonistic emotions. In a quasi-field study with no experimental manipulation, it is very difficult to create the conditions in which participants will feel resignation and/or antagonistic emotions as often as achievement and approach emotions. Even in an experimental setting, Barsade (2002) could not find that negative moods lead to a stronger emotional contagion than positive moods. Although negative emotions serve an adaptive purpose, organizational norms would rather regulate or suppress them and give preference to neutral or positive emotions (see Ashforth & Humphrey (1995) and Barsade & Gibson (1998), for reviews on normative control of emotion). Negative emotions, when they reach a high intensity, have usually negative consequences, at the individual level (e.g. fight, disease, mental disorder, stress) or at the collective level (e.g. riots, demonstrations, wars, etc.). Future research bear the responsibility of finding either experimental designs to trigger anger while remaining in the boundaries of ethical rules on the use of human subjects or to access field settings where antagonistic emotions are already present for contextual reasons (such as organizations going through turbulent situations, or union workers demonstrating in the streets). For example, Tjosvold (2002) used critical incident interviews of employees and managers to investigate how anger is managed in the context of teamwork. His results suggest that open-minded discussion of the anger-inducing incident actually fosters productivity and reinforces relationships among team members.

The fourth limitation is that both emotions and decision-making variables were self-report measures. Thus, all the above-mentioned conclusions have to be seen as the influence of participants' emotion on their perception of decision-making processes occurring in their teams. Weingart (1997) recommends that observation of group processes is a more informative data collection method than self-report measures. Larsen and Fredrickson (1999) point out that the advantage of external observers is that they are unobtrusive in naturalistic environments. Huy (1999) also suggests that external observations constitute a reasonable solution to provide additional objectivity in the assessments of emotions in teams or organizations.

Finally, research on team diversity and organizational literature (e.g. Milliken & Martin, 1996) might bring a new perspective on collective emotion. Barsade and Gibson (1998) in reviewing various forms of collective emotion, refer to the affective composition of team. This approach can be split in two sub-categories: 1) group emotion can be considered from a homogeneity perspective, i.e. as the sum of its parts, and individual emotions are either summed or averaged; 2) group emotion can be considered from a heterogeneity perspective, i.e. as the amount of variance in emotions between team members. This latter approach implies that homogeneity is not the only answer. Gibson and Barsade have suggested integrating the perspective on maximum or minimum emotional rating into the minority influence literature (see Wood, Lundgren, Ouellette, Busceme, & Blackstone (1994) for a review on minority influence). They question the influence team members having the maximum and minimum rating on the affective dimension of interest may have on other team members. In the present study maximum ratings were extracted and put in relation to decision-making processes. Due to the fact that team members voted on their group consensus emotion, it is likely that both minority influence and vote by majority strategies were played out. However, these processes were neither captured, nor analyzed. Future research needs to explore this question.

5.4. Practical Applications

The Emotion Wheel revealed itself as a useful instrument for field studies, to be used with managers in a quasi-naturalistic environment. In addition, to obtain almost 100% response rates from these managers during 8 to 10 days everyday was a positive accomplishment, and a possible indicator of their involvement in their task. The method of

either filling a diary or the Emotion Wheel should address Kelly and Barsade's (2001) concern that "even if researchers are allowed to study the emotions, measuring them is difficult, given their generally brief nature." (p. 103-104)

Two practical applications for the use of the Emotion Wheel as a data-gathering tool in the present study can be envisaged. First, the Emotion Wheel could be conceived as medium to help develop managers' emotional intelligence. Second, the Emotion Wheel could contribute to the further understanding of the influence of emotion on teams' output (e.g., actual decisions, productivity, performance).

Emotional intelligence represents a growing field of research. It is only logical that this concept is further investigated in the area of organizational behavior in order to find out what the implications of emotional intelligence could be on work processes and outcomes, whether at the individual level or at the group level (Kelly & Barsade, 2001). For example, Huy (1999) proposes to consider both levels in a theoretical model where emotional intelligence at the individual level should facilitate adaptation and change; and at the organizational level where what he termed emotional capability should be helpful to realize radical change. One of the first theoretical papers on group emotion intelligence (Wolff & Druskat, 1999) defines it as "the ability of a group to generate a shared set of norms that shape how members interpret and respond to their own emotions and to the ones exhibited by other members and individuals outside of the group." (p. 3) In a second paper designed for a more practical-oriented managerial audience they suggest to create a structure that let the group express its emotions and all group members should be able to share perspectives before making decisions. That is where the Emotion Wheel may play a role in real project teams or may play a role in any meeting taking place in organizations. It could be observed during the simulation that participants often used the Emotion Wheel as a medium to discuss their emotions freely with their colleagues and it became part of the norms of the teams to do so. Thus, discussing emotions yields self-awareness and awareness at the group level when, for example, participants discuss their group consensus emotion. In addition, by mapping emotions on the Emotion Wheel on a regular basis, everyone can see the evolution of the emotional climate and team members can proactively manage it. Since one of the pillars of emotional intelligence is awareness of own emotions and awareness of others' emotions, the Emotion Wheel provides support in this direction and could be seen as a tool to help managers

develop their emotional intelligence, individually and as a team, which in turn would help them in change processes as suggested by Nguyen Huy's paper.

The second practical application is one that is very much expected by practitioners. What is the influence of emotion on productivity, performance, or actual decisions? Until now, studies focusing on emotions are still scarce. Forgas & George (2001), in a recent review, report studies demonstrating that affect and mood are key components of organizational behavior (including motivation, employee flexibility, helpfulness, absenteeism, negotiation behaviors, and decision-making), and not solely a source of disruption. However, they reiterate the idea that high-intensity emotions have complex and varied effects that are not as easy to predict as low-intensity moods. The question remains whether this is the right question: why are emotions automatically qualified as "high-intensity"? In the present research, relationships between emotions at different intensities and perceived decision-making processes were studied. Future research should further investigate the relationships between emotions (not affect nor mood) and decisions' outcomes.

5.5. Conclusion

The present study has demonstrated the feasibility to measure emotions in teams repeatedly in a quasi-naturalistic environment thus providing ecological validity to a research question often studied in laboratory settings. At the outset of this research, it was argued that the objective was to study the influence of emotions on team decision-making processes, yet acknowledging that no causal link could be inferred due to the correlational nature of the study. Nevertheless, relationships were identified, some congruent with previous literature; for example, that antagonistic emotions are detrimental to decision-making processes. But some shed a new light on this area of research; for example, that achievement emotions are not detrimental to analytical tasks (i.e. alternative evaluation) or that antagonistic emotions are not necessarily impeding decision-making. Emotion was measured at multiple levels and different response patterns were identified; thus, a contribution has also been brought to the study of individual-level emotion versus group emotion. The challenge remains in the future to study the influence of emotions on actual decision outcomes as it is probably one of the most frequently asked questions when it comes to real-life implications of this study.

RESUME FRANÇAIS

1. Cadre théorique

L'objectif de cette recherche est de déterminer la mesure dans laquelle les émotions influencent les processus de prise de décision dans les équipes de cadres. D'une part, quatre différentes classes d'émotions (émotions d'accomplissement, émotions d'approche, émotions de résignation, et émotions antagonistes); d'autre part, quatre processus de prise de décision (le partage de l'information, la génération d'alternatives, l'évaluation d'alternatives, et la cohésion de l'équipe) ont été pris en considération. Cette recherche est appliquée et exploratoire. Bien que les processus individuels soient importants et traités dans ce travail, il s'agira surtout de découvrir comment les émotions combinées en processus collectifs dynamiques peuvent avoir un impact sur les processus de prise de décision des cadres.

Récemment, un certain nombre de chercheurs ont investigué comment les affects, les humeurs ou les émotions ressentis au sein d'équipes se combinent en un processus collectif qui influence comment les équipes vont fonctionner. De Rivera (1992) définit le climat émotionnel comme étant constitué des relations émotionnelles entre les membres d'une nation. Paez, Asun, et Gonzales (1995) postulent qu'un climat émotionnel est basé sur des émotions, des croyances et des représentations sociales partagées, représentant un phénomène collectif qui n'est pas juste une aggrégation d'émotions individuelles. Barsade (2002) a étudié la contagion émotionnelle dans les équipes de travail, utilisant la définition de la contagion émotionnelle de Hatfield (Hatfield, Cacioppo, & Rapson, 1994), à savoir un processus d'imitation inconscient et automatique des comportements non-verbaux d'autrui. Bartel et Saavedra (1998, 2000) définissent les humeurs collectives comme des humeurs partagées par les membres d'une équipe. George (1990) définit la tonalité affective d'un groupe comme des réactions affectives consistentes de la part des membres du groupe. Totterdell, Kellett, Teuchmann, et Briner (1998) définissent les liens entre les humeurs des membres d'une équipe de travail comme des influences interpersonnelles d'humeurs similaires.

Dans le cadre de ces concepts multiples et variés, certaines de ces études ont révélé une influence de l'affect collectif sur des processus ou produits de groupe. Par exemple, la contagion émotionnelle positive est positivement liée au niveau de

comportement coopératif dans les groupes et à une perception d'une meilleure performance dans l'accomplissement de la tâche; elle est négativement liée au conflit dans le groupe (Barsade, 2001). Les humeurs plaisantes favorisent la qualité et l'efficience de la performance du groupe, tandis que les humeurs déplaisantes entraînent par exemple une motivation du groupe à attteindre ses buts et à fournir la quantité prévue de produits ou de services (Bartel et Saavedra, 1998). La tonalité affective positive est négativement corrélée à l'absentéisme et la tonalité affective négative est négativement corrélée au comportement pro-social (George, 1990). Cependant, la plupart des études étudient l'influence de l'affect collectif sur divers processus ou produits de groupe, mais pas l'impact de l'émotion collective sur les processus de prise de décision en équipe.

D'autres études parmi la littérature sur les groupes et la prise de décision en groupe ont tenu compte de l'aspect affectif du travail en équipe. Bien que l'affect collectif ne soit pas explictement traité, un processus d'influence affective pourrait cependant émerger et mener les membres d'une équipe à bien s'entendre ou à ne pas bien s'entendre, à être satisfait ou dissatisfait de l'équipe. Dans ces études, l'affect est étudié en relation avec les processus et les produits groupaux. Heath et Jourden (1997) ont trouvé que les activités de groupe favorise l'affect positif (ce qu'ils ont appelé «l'effet d'enthusiasme») mais plus important encore est le rôle de tampon que cet affect positif joue: il atténue le fait que l'affect négatif généré par la déception post-performance puisse se traduire en évaluations négatives de la performance. D'autres dimensions affectives incluent: a) la satisfaction avec le leader et la confiance en la décision du groupe (Peterson, 1997); b) l'acceptation affective des autres membres de l'équipe, qui est considérée comme essentielle à la qualité de la décision dans les équipes dirigeantes (Amason, 1996); c) l'«affect groupal», défini comme la sympathie, le plaisir et la mesure dans laquelle les membres du groupe s'apprécient (Priem et Price, 1991), que les décisionnaires pensent être plus élevé lorsqu'ils prennent leur décisions basées sur le consensus, en comparaison à des conditions de prise de décision plus conflictuelles; et d) le conflit affectif ou socio-émotionnel, défini comme un type de conflit dysfonctionnel, basé sur des incompatibilités personnelles, des désagréments et des critiques incluant une dimension de colère, qui semble être néfaste à la qualité de la décision (Amason, 1996; Devine, 1999, Priem et Price, 1991). Ces études examinent

les processus de prise de décision en équipe influencé par une forme quelconque d'affect mais pas par l'émotion collective.

Les études traitant explicitement ou implicitement du problème de l'affect collectif influençant les processus ou performances groupaux, tels que les comportements coopératifs, l'absentéisme, le conflit ou l'acceptation des décisions, par exemple, ont essentiellement choisi l'humeur ou l'affect comme concepts affectifs, mais pas l'émotion. Les études se focalisant sur l'humeur la définissent comme un état affectif diffus, n'ayant souvent pas d'objet particulier (par ex. Bartel et Saavedra, 2000). Les études se focalisant sur l'affect le définissent comme un trait de personnalité (par ex. George, 1990), et le mesurent avec des dimensions telles que l'Affect Positif et l'Affect Négatif (voir Watson, Clark, et Tellengen, 1988). Cependant, les résultats obtenus avec l'humeur ou l'affect ne sont pas nécessairement généralisables à l'émotion.

Les théoriciens de l'émotion ont suggéré le besoin de recherches traitant de l'influence de l'émotion sur la prise de décision (par ex. Ellsworth, 1991; Ketelaar et Clore, 1998). Au niveau individuel, par exemple, Lerner et Keltner (2000) ont démontré que des individus ressentant de la peur émettent des jugements plus pessimistes sur des événements futurs, tandis que des individus ressentant de la colère émettent des jugements plus optimistes. Au niveau du groupe, la recherche sur la prise de décision groupale prend l'émotion en considération. L'émotion est reconnue comme faisant partie de la prise de décision, par exemple la confiance ou l'anxiété (Eisenhardt, 1989), ou la colère (par ex. Amason, 1996; Janis, 1989; Priem & Price, 1991). L'effet néfaste d'émotions telles que l'élation, l'anxiété, la honte, la culpabilité et la colère ressenties de manière intense ou du stress aigu ont été abordé par Janis (1989). Cependant, bien que le terme émotion soit employé, il n'est souvent pas bien défini.

En résumé, il existe encore à l'heure actuelle peu de travaux empiriques sur l'émotion collective et sa relation aux processus de prise de décision en équipes.

2. Objectif de la recherche et définitions

2.1. Objectif

L'***objectif*** de cette recherche sera le suivant: déterminer dans quelle mesure certaines classes d'émotions ont une influence sur les processus de prise de décision dans les équipes de management. Les bases théoriques reposent donc sur trois volets: l'émotion, telle que définie plus haut (individuelle et collective), la prise de décision en équipes et l'émotion en relation avec la prise de décision.

2.2. Définitions opérationnelles

Emotion. L'émotion est définie dans ce travail comme étant de nature épisodique, d'une durée relativement courte, et générée par un objet ou un événement spécifique (Lazarus, 1991; Frijda, 1994; Scherer, 1984). L'émotion comporte plusieurs composantes: la cognition, la physiologie, l'expression motrice, les tendances à l'action, et le sentiment subjectif (Scherer, 2000). Le fait que la cause soit exacte et le contenu cognitif a des implications sur les comportenements, qui seront à leur tour spécifiques (Forgas, 1991). Par ailleurs, Frijda (1986) a défini les tendances à l'action comme des états de préparation «dans le but d'exécuter un certain type d'action.» (p. 70). Les tendances à l'action sont un élément pertinent de l'émotion, surtout lorsqu'il s'agit de comprendre les comportement potentiels ou réalisés dans le contexte d'une tâche de prise de décision en équipe.

Classes d'émotions. Scherer (1994) suggère le terme d'émotions «modales» pour décrire des familles d'émotions partageant des schémas d'évaluation cognitive similaires et récurrents. Dans ce travail, quatre classes d'émotions pouvant être considérées comme représentant des émotions modales sont proposées.

Les émotions d'accomplissement sont représentées par exemple par la fierté, l'exhaltation, la joie et la satisfaction. Elles sont ressenties au cours de situations telles que les personnes ont accompli quelque chose personnellement ou professionnellement, et ont un désir de célébrer avec d'autres. Les émotions d'approche sont représentées par exemple par le soulagement, l'espoir, l'intérêt et la surprise. Elle sont ressenties lorsque l'on est attentif, alerte, en phase d'exploration, désireux d'apprendre, et se réjouissant du futur. Les émotions de résignation sont représentées par exemple par la tristesse, la

peur, la honte et la culpabilité. Elles sont ressenties au cours de situations telle qu'une perte personnelle (par exemple le décès d'un proche) ou une perte professionnelle (par exemple la perte de son emploi ou la restructuration de l'entreprise entraînant la perte de collègues). Les émotions antagonistes sont représentées par exemple par l'envie (ou jalousie), le dégoût, le mépris ou la colère. Elles sont ressenties lorsque l'on estime que soi ou les siens sont attaqués, moralement ou physiquement, et que la cause de cette attaque semble injuste.

La prise de décision managériale et ses composantes. Le cadre théorique concernant la prise de décision sur lequel repose ce travail est la prise de décision naturalistique (Zsambok, 1997), qui décrit comment les cadres prennent leurs décisions de manière concrète et comment ils les mettent en œuvre. Il s'agit ici donc de connaissances pratiques et d'expérience des décisions dans un monde réel où tout va très vite et où règne beaucoup d'incertitudes. La décision managériale est liée à des problèmes complexes et ambigus, mobilisant d'importantes ressources de la part de l'entreprise (Mintzberg, 1975) et qui affecte les résultats de cette dernière (Furnham, 1997).

Les quatre composantes de la prise de décision sont: le partage de l'information, la génération d'alternatives, l'évaluation d'alternative, et la cohésion de l'équipe.

Le concept du partage de l'information inclut la volonté des membres d'une équipe de partager leurs connaissances, leurs capacités, leurs compétences et leur expertise avec les autres, de même que le partage de toute information récoltée pendant la prise de décision qui pourrait aider l'équipe à prendre une meilleure décision, au lieu d'une décision qui serait influencée par les préférences pré-décisionnelles des membres de l'équipe (voir Devine, 1999; Gigone & Hastie, 1993; Gruenfeld, Mannix, Williams, & Neale, 1996; Hollingshead, 1996; Kim, 1997; Larson et al., 1994; Schulz-Hardt et al., 2000; Stasser & Titus, 1985, 1987; Williams et al., 1997; Wittenbaum et al., 1999).

La génération d'alternatives est la capacité pour les membres d'une équipe de générer un large spectre d'alternatives ainsi que le plus grand nombre d'alternatives possible, de manière à éviter qu'ils se trouvent psychologiquement enfermés dans une décision trop étriquée, et à ce qu'aucun élément pertinent ne soit omis, ce qui pourrait aussi avoir des conséquences négatives sur la qualité de la décision (voir Bettenhausen,

1991; Eisenhardt, 1989; Hackman & Morris, 1983; Janis, 1982, 1989; Paulus, 2000; Paulus & Yang, 2000; Scudder, Herschel, & Crossland, 1994).

L'évaluation d'alternatives est une activité au cours de laquelle on procède à un examen de chaque alternative aussi systématique que possible et à une analyse des coûts et des bénéfices de chaque alternative. Les membres d'une équipe peuvent ainsi éviter d'ignorer une information pertinente, de limiter leurs discussions à peu d'alternatives et à courir le risque de décider trop hâtivement (voir Aldag & Fuller, 1993; Hirokawa & Poole, 1996; Hollingshead, 1996; Janis & Mann, 1977; Janis, 1982, 1989; Johnston, Driskell, & Salas, 1997; Schweiger, Sandberg, & Rechner, 1986, 1989; Turner, Pratkanis, Probasco, & Leve, 1992).

La cohésion d'équipe représente l'adhésion par tous les membres d'une équipe à ses décisions, à l'équipe elle-même, impliquant des sentiments positifs entre les co-équipiers. Les objectifs de l'équipe deviennent alors de permettre la performance présente et future de l'équipe (Amason, 1996; Leana, 1985; Mullen, Anthony, Salas, & Driskell, 1994; Priem and Price, 1991; Seashore, 1954, reproduit par Cartwright & Zander (1968); Schweiger, Sandberg, & Rechner, 1986, 1989; Terborg, Castore, & DeNinno, 1976; Turner et al. 1992; Wech, Mossholder, Steel, & Bennett, 1998; Zaccaro, 1991; Zaccaro & Lowe, 1988).

3. Hypothèses

Quatre hypothèses ont été sélectionnées parmi les 16 élaborées dans la thèse.

Les émotions d'accomplissement peuvent mener à des actes de vantardise, accompagnées d'une moins bonne concentration et d'un ralentissement de la pensée constructive. Les recherches antérieures ont démontré que l'humeur positive est associée avec une prise de décision intuitive, avec peu d'attention portée aux détails, et une tendance à passer outre certaines informations importantes ou encore de sous-estimer la probabilité d'une issue négative. Par ailleurs, l'évaluation d'alternatives implique un examen systématique de toutes les alternatives, ainsi qu'une analyse des coûts et des benefices, ce qui requiert du temps et des efforts. C'est pourquoi, l'hypothèse suivante est formulée:

H1c: Les émotions d'accomplissement seraient négativement liées à l'évaluation d'alternatives.

Les émotions d'approche soutiennent l'activité de groupe et renforce les liens entre les personnes. Les membres d'une équipe qui ressentent ce type d'émotions sont mobilisées dans un but d'avancer ensemble, non seulement ils sont dévoués à la tâche mais aussi à travailler ensemble. La cohésion de l'équipe represente l'engagement vis-à-vis des autres membres de l'équipe et des decisions qu'ils prennent ensemble. C'est pourquoi, l'hypothèse suivante est formulée:

H2d: Les émotions d'approche seraient positivement liées à la cohésion de l'équipe.

Les émotions de résignation sont associés à un rétrécissement des pensées, à une vision de type «tunnel», à des ruminations, à un manque de confiance, et à peu d'innovation. Les recherches antérieures sur émotion et prise de décision suggèrent que les individus ressentant de la peur sont plus pessimistes quant aux événements futurs; les recherches sur l'humeur et la prise de décision suggèrent que les individus tristes sur-estiment la probabilité d'événements négatifs. Il semble donc que les individus sous l'emprise d'émotions de resignation auront de la difficulté à proposer un grand spectre de nouvelles alternatives. Or, la génération d'alternatives est la capacité pour les membres d'une équipe de générer un large spectre d'alternatives ainsi que le plus grand nombre d'alternatives possible. C'est pourquoi, l'hypothèse suivante est formulée:

H3b: Les émotions de résignation seraient négativement liées à la génération d'alternatives.

Les émotions antagonistes sont responsables d'une prise de décision défectueuse, comme le montre les recherches sur la prise de décision en groupes. Quand les membres de l'équipe sont motivés par la vengeance ou l'agression, ils ne prennent sans doute pas le temps de peser les pours et les contres de leurs décisions, alors que l'évaluation des alternatives requiert justement du temps et des efforts. C'est pourquoi, l'hypothèse suivante est formulée:

H4c: Les émotions antagonistes seraient négativement liées à l'évaluation d'alternatives.

4. Méthode

106 participants répartis en 20 équipes gèrent une entreprise pendant 8 années fictives. Chaque années fictive (appelée Période) dure en réalité 3 à 4 heures. Les équipes sont composées de 4 à 7 personnes, qui opèrent comme équipe dirigeante de leur entreprise respective. Les participants engagent d'intenses discussions en groupe pour prendre leurs décisions et atteindre leurs objectifs.

On a considéré trois niveaux d'analyse:

- Individuel (émotion et prise de décision);
- Equipe (scores moyens individuels agrégés, émotion et prise de décision);
- Consensus de groupe (émotions seulement, scores obtenus par une discussion entre les membres de l'équipe).

Les scores individuels et agrégés ont été créé pour chaque classe d'emotions, sur la base de l'intensité de chaque emotion sélectionnée, couvrant 3 catégories temporelles: (a) Les périodes 1 to 6, appelées '**Totalité**'; (b) Les périodes 1 and 2, appelées '**Phase de Démarrage**'; et (c) les périodes 3 to 6, intitulées les '**Phase de Développement**'.

Trois types de scores d'émotion ont été calculés pour tenir compte des problèmes de reconstitution d'événements passés (voir Kahneman, 1999):

- Un score émotionnel moyen
- Un score émotionnel maximum
- Un score émotionnel final, reporté juste avant le questionnaire mesurant les processus de prise de décision.

5. Résultats

L'hypothèse H1C ne s'est pas vérifiée au niveau du consensus de groupe dans la phase de démarrage: les intensités maximales des émotions d'accomplissement sont liées positivement à l'évaluation d'alternatives. La confiance en la qualité de la décision est basée sur des émotions comme la joie et la satisfaction. Il se peut donc que les émotions d'accomplissement aient entretenu le sentiment de confiance que les membres de l'équipe ont eu dans leur capacité d'évaluer les alternatives, au cours de la

phase de démarrage. Ces résultats diffèrent de ce qui a été traditionnellement trouvé sur l'affect ou l'humeur positifs et la prise de décision.

L'hypothèse H2d ne s'est pas vérifiée au niveau de l'équipe et pour toutes les périodes de la simulation: les intensités maximales des emotions d'approche sont liées négativement à la cohesion de l'équipe. Scherer and Tran (2001) ont postulé que les emotions d'approche peuvent engendrer une attention dispersée, ou au contraire une focalisation excessive, et des objectifs irréalistes. Il se peut donc que d'intenses émotions d'approche aient entraîné les membres de l'équipe à envisager trop d'alternatives différentes, ce qui peut être propice aux conflits et donc à une détérioration de la cohésion de l'équipe.

L'hypothèse H3b ne s'est pas vérifiée: les émotions de résignation sont positivement liées à la génération d'alternatives, aussi bien au niveau individuel (phase de démarrage) qu'au niveau de l'équipe (toute la durée de la simulation). Ces résultats diffèrent des résultats sur l'influence de l'humeur triste sur la prise de décision (par ex. Forgas, 1989; Schwarz, 2000). La peur, pour autant qu'elle ne soit pas trop intense (ce qui est le cas ici), améliore les capacités d'adaptation des individus et les rends plus perceptifs aux signaux donnés par l'environnement (voir Paez et al., 1995). Un faible degré de peur peut donc être bénéfique à la génération d'alternatives et pousser les membres de l'équipe à trouver de nouvelles idées pour améliorer leur performance. Par aillleurs, la honte et la culpabilité ont aussi pour conséquence un désir de l'améliorer pour éviter l'incompétence. Ceci est aussi compatible avec la génération de nouvelles alternatives, dans le contexte de la simulation qui devient de plus en plus complexe au fil du temps.

L'hypothèse H4c s'est vérifiée de manière consistente pendant toute la simulation au niveau de l'équipe: les intensités maximales sont négativement liées à l'évaluation des alternatives. Par contre, au niveau individuel, un schéma différent a émergé: la relation est négative dans la phase de démarrage (avec les scores finaux) mais positive dans la phase de développement (avec les moyennes). Les relations négatives au niveau de l'équipe sont congruentes avec les recherches sur la prise de décision en groupe: Janis (1989) postule que la colère empêche les membres de l'équipe d'évaluer les alternatives. Amason (1996) argumente que la colère inhibe le processus qui consiste à prendre tous les points de vue contradictoires en considération

et à prendre les décisions. Les relations positives au niveau individuel sont peut-être dues au fait que les membres de l'équipe se sont sentis libres d'exprimer leurs emotions negatives sans être critiqués et sans pour autant que l'esprit d'équipe en souffre. Ce phénomène peut être expliqué par une interdependence axée sur la tâche, augmentant au fur et à mesure que les individus travaillent ensemble (Bartel and Saavedra, 2000; Gersick, 1988). Par ailleurs, Lazarus and Cohen-Charash (2001) ont suggéré que dans un contexte organisationnel, la colère remplace souvent la peur et la tristesse. Il se peut donc que la colère dans ce contexte particulier entraîne une évaluation des alternatives méticuleuse, comme ce serait le cas avec la peur ou la tristesse. Ceci n'est qu'une hypothèse à considérer avec prudence.

6. Limites, contributions et futures recherches

6.1. Limites

La limite inhérente au rapport verbal est reconnue. Il serait judicieux de le compléter par des enregistrements vidéo ou des interviews a posteriori.

Les participants ont rapporté 2 émotions par mesure, ce qui pourrait apparaître comme une limitation. Il faudrait collecter les données de telle manière que plusieurs émotions puissent être rapportées et analyser les mélanges d'émotions.

C'est une étude quasi-naturalistique. Une ou des étude(s) devraient être effectuer avec un contrôle expérimental, comme par exemple l'induction de certaines émotions (comme par ex. Barsade, 2002). L'intention de départ était de mesurer le climat émotionnel: l'aspect statistique demeure difficile. Cependant, dans la présente recherche, un climat émotionnel positif a pu être identifié. Il est important de continuer à la fois la conceptualisation et l'opérationnalisation du climat émotionnel.

6.2. Contributions et futures recherches

De manière générale, trois classes d'émotion (accomplissement, approche, et antagonistes) sont négativement liées à la prise de décision quand il s'agit d'intensités maximales. Les émotions de résignation forment une exception, car aucune intensité maximale n'a été obtenue pour cette classe d'émotions. Plus spécifiquement, les émotions d'accomplissement intenses sont négativement liées à la prise de décision, sauf dans la phase de démarrage. Ces résultats démontrent que la joie et la fierté par

exemple ne suffisent pas à rendre les gens plus productifs, en tout cas pas lorsque ces émotions sont ressenties de manière intense. On pourrait supposer que cela contribue au bon moral des équipes, mais sans pour cela les rendre plus efficientes dans leur prise de décision. Les émotions d'approche sont généralement positivement liées à la prise de décision, lorsqu'on prend en compte soit les moyennes, soit les scores finals. Ainsi, la présence bénéfique des émotions d'approche s'est révélée conformément aux attentes, mais pour autant que l'intensité ne soit pas trop forte, auquel cas les relations avec les processus de prise de décision se sont avérées négatives. Les émotions de résignation ont une relation positive avec la génération d'alternatives, contrairement à ce qui a été précédemment trouvé concernant les humeurs tristes (ce qui est une des contributions de cette recherche) et avec la cohésion de l'équipe (ce qui est congruent avec des phénomènes identifiés au niveau du climat émotionnel - ref. Paez et al., 1995). Les émotions antagonistes ont en général une relation négative avec la prise de décision, sauf aussi cas précis: au niveau individuel pendant la phase de développement. Ces relations négatives sont conformes aux attentes formulées.

Nous pouvons ainsi mieux comprendre les conditions dans lesquelles nos hypothèses peuvent être confirmées ou infirmées, grâce aux différents niveaux et différents types de scores. La contribution majeure de ce travail est que des relations curvilinéaires entre l'émotion et les processus de prise de décision ont put être identifiées. Ainsi, la réputation des émotions comme ayant une influence néfaste sur les comportements en général et la prise de décision en particulier (voir Forgas, 2000) est sans doute justifiée si l'on considère des émotions intenses. Cependant, la présente recherche a aussi pu montré que cette influence des émotions est modulée en fonction du type d'émotion et en fonction de l'intensité (voir Loewenstein et Lerner, 2003). Ces relations curvilinéaires doivent être davantage investiguées dans de futures recherches. Pour ce faire, il serait par exemple utile d'étendre l'échelle de mesure des émotions, par exemple à 9 points, au lieu des 4 existants (y compris la possibilité d'indiquer un score de zéro). Des mesures objectives devraient être également utilisées en complément de l'Emotion Wheel, par exemple des enregistrements vidéo des interactions entre les membres des équipes.

7. Implications

7.1. Implications Théoriques

L'émotion en relation avec la prise de décision, en contraste avec les recherches précédentes qui se focalisaient sur l'affect et l'humeur.

L'accent a été mis sur les propriétés communes des émotions qui composent chaque classe, concept qui s'avère pertinent pour étudier la convergence émotionnelle.

7.2. Implications Pratiques

Le fait de pouvoir démontrer aux managers qu'ils peuvent rapporter leurs émotions et que c'est tout à fait légitime contribue au développement de leurs compétences émotionnelles.

Une meilleure prise de conscience de l'influence des émotions sur les processus de prise de décision contribue à l'amélioration de la performance des équipes.

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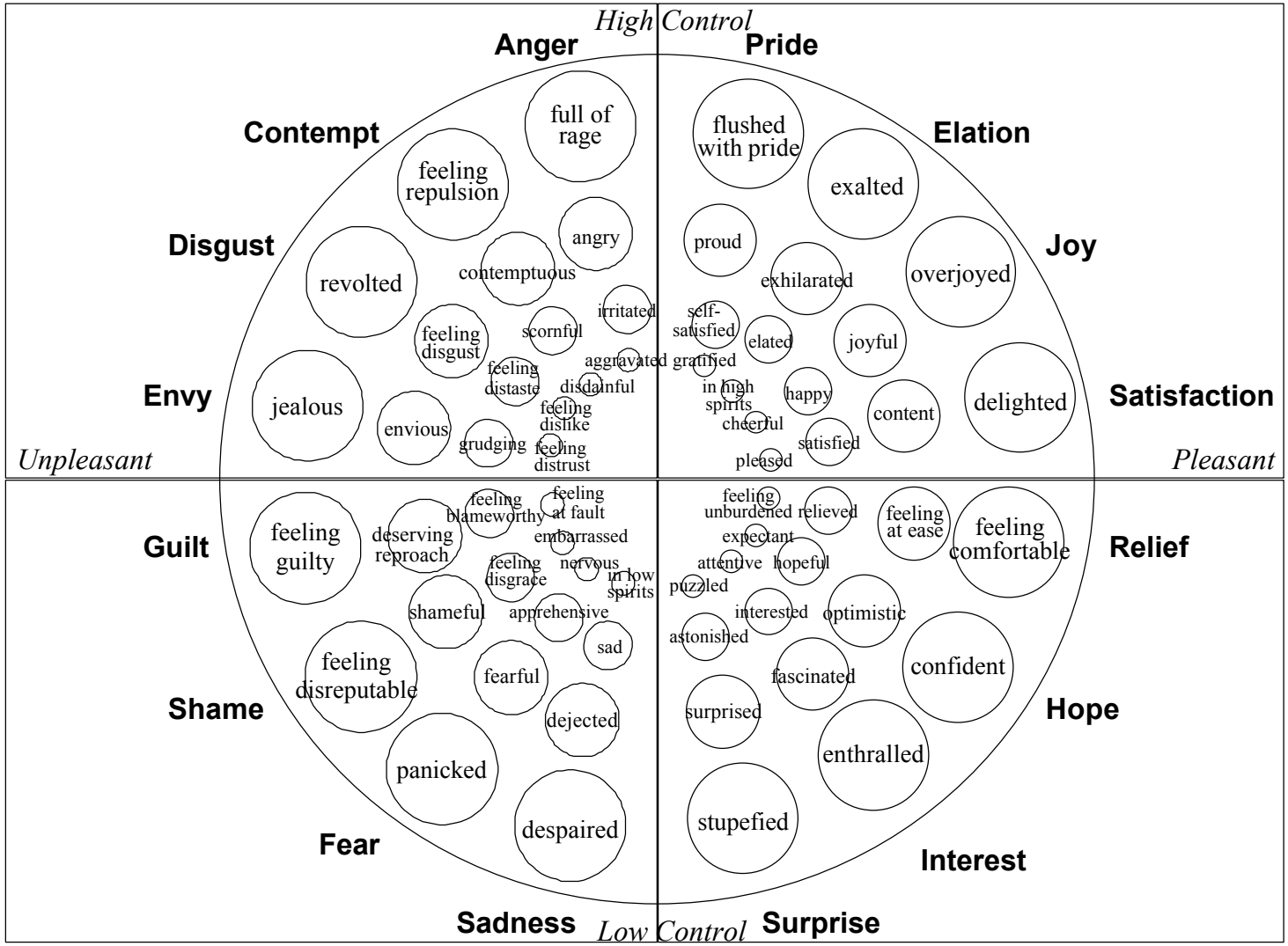
APPENDICES

TABLE OF CONTENTS

Appendix A: The Emotion Wheel



Appendix B: Validation of the Emotion Wheel[38]

The objective of this appendix is to report of the use of the Emotional Wheel as an equivalent data collection format to other types of formats, such as Likert-type questionnaires (pen and pencil or computerized) or columnar lists of labels to check. The Emotion Wheel was originally designed to measure emotion reactions linked to emails sent and received[39], thus in a computerized format. The Emotion Wheel was then used in management seminars in a paper and pencil format as a self-report instrument in the specific context of a business simulation. The instrument was well accepted by more than 500 managers and proved to be a convenient tool to measure emotions in a context where participants were under time pressure and where data had to be collected repeatedly over time, as it is the case in the present study. In order to determine that no particular bias was introduced either by the circular configuration of emotion labels or by the order in which they are presented, a study was conducted to demonstrate construct validity. This study is based on the ability of the participants to recognize the targeted emotions from 48 different scenarios, using different reporting formats.

Method and measurements

The sample consisted of 80 business students in an Organizational Behavior course at a Swiss university. Seventy-one students reported their gender and their nationality: 52.5% were male, 36.3% were female; 38 students were Swiss, 33 were of a different nationality. The average age was 24 years.

Forty-eight vignettes were created in total (i.e. three vignettes for each of the 16 emotions composing the Emotion Wheel). Twenty-one vignettes for the following seven emotions: joy, fear, anger, sadness, disgust, shame, and guilt were created based on the antecedent circumstances triggering these emotions reported by respondents in the International Study of Emotion Reactions and Antecedents (ISEAR) (see Gehm & Scherer, 1988). Twenty-seven vignettes for the following nine emotions: contempt, envy, surprise, interest, hope, relief, satisfaction, elation, and pride were created based on theoretical

[38] The development of the Emotion Wheel was supported by a grant from the Gottlieb-Daimler-und- Karl-Benz-Stiftung to Klaus Scherer.
[39] See Gottlieb-Daimler-und- Karl-Benz-Stiftung research report.

predictions made by emotion researchers (see Chapter 1, pp. 11-18). The vignettes were written in English.

Seven experimental conditions were created. First, in the 'Emotion Wheel' condition, participants could select the emotion corresponding to each vignette by ticking the chosen emotion in one of the circles on the 'Emotion Wheel'. In addition, respondents were provided with an additional sheet showing a more complete version of the Emotion Wheel, which included detailed labels indicating the intensities for each emotion. Twenty-seven participants received the corresponding response booklet (Appendix B1). Second, in the 'Circle' condition, emotion labels were displayed in a column, in a randomized order. To provide their responses, participants could answer on a scale of 1 to 4, with each point of the scale being illustrated by circles of increasing diameter. Twenty-six participants in total were in the 'Circle' condition. This condition was split into three sub-samples with three different random orders of the emotion labels. There were respectively 5, 8 and 13 participants per sub-sample (the corresponding response booklets are shown as Appendices B2, B3, and B4). Third, in the 'Word' condition, emotion labels were also displayed in a column and in a randomized order. In addition, verbal descriptions, adapted to each emotion label indicating the intensity, were placed under each point of the scale. For example, the first point on the scale for pride, indicating the smallest intensity, was labeled 'gratified'; the second point, the second smallest level of intensity, 'self-satisfied', etc. Twenty-seven participants in total were in the 'Word' condition. This condition was also split into three sub-samples with three different random orders of the emotion labels. There were respectively 7, 14 and 6 participants per sub-sample (the corresponding response booklets are shown as Appendices B5, B6, and B7).

Pilot study

Twelve female students in psychology were asked to be participants for the pilot study. The 48 vignettes were separated in three sets (3 times 16), and for each sub-category, four participants were administered 16 vignettes, with the wheel condition only. The pilot test was performed in order to check if the vignettes were representative of the targeted emotions. The aim was also to time participants and estimate how much time it would take to administer 48 vignettes. Results are displayed in Table B1. For 12 out of 48 vignettes, the targeted emotion was identified by 100% of the respondents. In 18 cases, the class of emotions was identified by 100% of the respondents (with different proportions, such as 75/25, 50/50, or 25/75 respectively for the targeted emotion and an emotion of the same class). In 9 cases, the

targeted emotion was identified by 75% of the respondents. Thus, for 81.3% of the vignettes, the recognition of the emotion was appropriate. On the basis of these preliminary results, the decision was made to use all the vignettes as they were conceived in this pilot study. Furthermore, it should be noted that it is difficult to obtain a 100% response rate for any given vignette, due to inter-individual differences in appraisal processes (see Scherer, Schorr, & Johnstone, 2001 for a review).

Results

The objective of this validation study was to ensure that the participants would not be biased by the circular shape of the instrument or by the particular ordering of the emotion labels. First, the three sub-samples of the 'Circle' condition were compared to ensure that there was no effect due to the different orders. Chi-square tests revealed no statistically significant difference between the three sub-samples. Thus they were collapsed for further analyses into one single category called the 'Circle' condition. Second, the same procedure was followed for the 'Word' condition, with the same results. Thus they were collapsed into one single category, called the 'Word' condition. Consequently, the 'Emotion Wheel', the 'Circle', and the 'Word' conditions were compared with Chi-square tests.

Results are displayed in Table B2. Next to the column where results from Chi-Square analyses are reported, there is column split among the three conditions, for percentages of responses for the targeted emotion, for an emotion of the same class, and for an emotion of a different class. Numbers of respondents[40] are shown in parentheses.

In 46 cases out of 48, no statistically significant differences between the three conditions were found, with the exception of two cases, where the number of respondents was not large enough to perform the Chi-square test. In the case of vignette #32, only 6.3% of the respondents chose the targeted emotion (i.e. envy), but 87.3% chose another emotion in the same class (i.e. antagonistic emotions). Due to the small number of responses in favor of envy, it was not possible to perform the Chi-square test. Thus, envy scores were grouped with the ones for the three other antagonistic emotions (i.e. disgust, contempt, and anger), then yielding a Chi square of χ^2 (2, $\underline{N}$ = 74) = .84 $\underline{ns.}$ This result demonstrated that for vignette #32,

[40] Whenever the total per cell did not equal the total sample size for each condition (27 for the Wheel condition, 26 for the Circle condition, and 27 for the Word condition), it was because some respondents, who appeared to have misunderstood the vignette and/or systematically selected an emotion opposite to the targeted emotion, were eliminated from the data. The researcher's judgment was applied in this selection process.

there was also no statistically significant difference between the three conditions (i.e. 'Emotion Wheel', 'Circle', and 'Word'). In the case of vignette #46, only 16% of the respondents chose the targeted emotion (i.e. surprise), but 54.7% selected fear (and in total 62.7% a resignation emotion), thus indicating that the vignette was interpreted with an appraisal of negative surprise (e.g.Teigen & Keren, 2002).

In general, 64.5% of the vignettes, more than 50% of the respondents selected the targeted emotion. In 89.6% of the vignettes, more than 50% of the respondents selected an emotion belonging to the same class as the targeted emotion.

In order to verify that the participants in the present study would appraise the vignettes congruently with the subjects of the validation study, 74 of them (i.e. three sub-groups of size varying between 23 and 27 persons) received a simplified version of the 'Emotion Wheel' response booklet described on p. 2, with 16 scenarios instead of 48 (one per emotion). A few words were changed to adapt to the population of interest. For example, in vignette #16, the word 'cousins' was replaced by the word 'colleagues'; in vignette #11, the words 'little sister' were replaced by the word 'customer'. The percentages of recognized emotions are displayed in Table B3 and compared to the results of the 'Emotion Wheel' condition of the present validation study. In 12 cases out of 16, the response pattern is very similar. In the 4 other cases, there was an opposite pattern between the responses to the 'Emotion Wheel' validation study condition and the three sub-groups of participants the present research. However, there was a consistent pattern of results among the three sub-groups, thus indicating a common appraisal of the vignettes among these participants.

Conclusion

This study contributed to demonstrate that there was no statistically significant difference between using the Emotion Wheel for data collection or any of the two alternatives formats, thus the Emotion Wheel can be used as a valid instrument to measure emotions.

Gehm, Th., & Scherer, K. R. (1988). Factors determining the dimensions of subjective emotional space. In K. R. Scherer (Ed.), Facets of- emotion: Recent research. (pp. 99-114). Hillsdale, NJ: Erlbaum.

K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), Appraisal processes in emotion: Theory, methods, research (pp. 350-365). New York: Oxford University Press.

Teigen, K. H., & Keren, G. (2002). When are successes more surprising than failures? Cognition and emotion, 16(2), 245-268.

Table B1
Frequencies by Emotion Vignette Reported by Subjects in Pilot Study

Vignettes	**Targeted emotion**		**Wheel condition (n)**
1: During the Christmas holidays this year, some friends that I hadn't seen for 6 years came to visit me and we had a wonderful time together.	Joy	- on target - same class - other	4 0 0
2: We have worked so hard, so our project should be a success.	Hope	- on target - same class - other	1 3
3: I was coming back late from a party one night, and I was walking. All of the sudden, three men followed me, starting to yell at me, asking for money. They were drunk, so I ran as fast as I could.	Fear	- on target - same class - other	4 0 0
4: My boss unfairly accused me of having mishandled a certain task that was actually supposed to be the responsibility of my colleague.	Anger	- on target - same class - other	3 1
5: I have successfully passed all the exams I needed to apply to an excellent university abroad.	Pride	- on target - same class - other	3 1 0
6: After all the trauma caused by my son's illness and stay at the hospital, the doctor finally gave some good news and we then knew he was going to recover.	Relief	- on target - same class - other	2 1 1
7: The teacher started to make jokes about my behavior as I was presenting something at the blackboard, in front of all the other students.	Shame	- on target - same class - other	2 1 1
8: Yesterday I read in the newspaper that a 30 year-old woman had abused her 2 month-old son and had caused his death. To abuse such a fragile creature cannot be considered as a human act and should not be forgiven.	Contempt	- on target - same class - other	1 2 1

9: I had not seen my fiancé(e) for 3 months, it had been the first time we were separated for such a long time. And now I am standing at the airport, waiting… and I can see my fiancé(e) coming out of the door, we run in each other's arms, and nothing else would matter.	Elation	- on target	4
		- same class	
		- other	

10: I could not stop reading this book, I was totally absorbed.	Interest	- on target	3
		- same class	1
		- other	

11: I was supposed to pick up my little sister at school and I totally forgot. She stood all by herself in the street for two hours, anything could have happened to her.	Guilt	- on target	3
		- same class	1
		- other	

12: I walked in the forest the other day, and my dog became very nervous. We discovered the dead body of a deer, starting to rot. I nearly fainted.	Disgust	- on target	3
		- same class	
		- other	1

13: I had done all the things I had to do on my list, so I left my work with a good impression.	Satisfaction	- on target	4
		- same class	
		- other	

14: I came home yesterday night, the apartment was dark, and as I switch the light on, all my friends were standing in the living-room and sang "Happy Birthday" to me, holding a big cake in their hands.	Surprise	- on target	1
		- same class	
		- other	3

15: The day I lost my mother was the most horrible day in my life, I thought I would not overcome the pain.	Sadness	- on target	4
		- same class	
		- other	

16: I could not understand why my cousins could go on a trip to the Seychelles and enjoy the sun in the midst of the winter, and I had to stay in Switzerland to work on my exams.	Envy	- on target	3
		- same class	1
		- other	

17: We had rehearsed that play for one year, and tonight was THE night, the premiere. We received a standing ovation and the public called us back five times! It was the most wonderful day of my life.	Elation	- on target	2
		- same class	2
		- other	

18: Anthropology was a course I would not miss for the world; I could listen and read about it for days.	Interest	- on target	4
		- same class	
		- other	

19: We had a party at work for a colleague's birthday, and I drank too much, I started to dance on the tables. I didn't remember I had done that, and my colleagues told me about it the next day.	Shame	- on target	3
		- same class	
		- other	1

20: I saw a documentary on TV yesterday on living conditions in some very poor regions: the people would drink, wash, and urinate, all in the same river water.	Disgust	- on target	3
		- same class	
		- other	1

21: I shopped all day and I found some very good bargains.	Satisfaction	- on target	1
		- same class	3
		- other	

22: If only I would get that grant I have applied for, I could go on with my studies!	Hope	- on target	3
		- same class	
		- other	1

23: It is been four months that I have promised my grandmother to visit her, I know she is ill and that she may not live very long anymore, but I just have not taken the time.	Guilt	- on target	3
		- same class	1
		- other	

24: I was on holiday; somebody broke into my car, and stole my wallet.	Anger	- on target	4
		- same class	
		- other	

1: My best friend came to see me, we had a wonderful afternoon sitting in the garden and having a drink.	Joy	- on target	2
		- same class	2
		- other	

26: My cat had disappeared for two days. We finally found him in the next village. He had lost his way and had been taken care of by nice people who called us.	Relief	- on target	3
		- same class	
		- other	1
27: I was in the garden one evening and I saw a snake coming towards me.	Fear	- on target	4
		- same class	
		- other	
28: I have to work with someone on this project but I have never seen someone so incompetent.	Contempt	- on target	2
		- same class	2
		- other	
29: A colleague asked me if I was interested to work on a special project, the boss had mentioned he needed "clever people" and my colleague had "immediately thought of me".	Pride	- on target	4
		- same class	
		- other	
30: During my stay at the hospital, a friend I really did not expect has visited me.	Surprise	- on target	1
		- same class	
		- other	3
31: I was devastated when my partner announced to me that our relationship was over.	Sadness	- on target	4
		- same class	
		- other	
32: I work much longer hours than my colleague but get only half the money.	Envy	- on target	1
		- same class	3
		- other	
33: There were only three candidates left after a series of exams. I was among these three and I finally got chosen as the nominee.	Pride	- on target	1
		- same class	3
		- other	
34: A friend of mine had important things to confide to me. I listened to her very carefully.	Interest	- on target	4
		- same class	
		- other	

35: I was not able to answer a question on a topic I know very well, and I stayed dumb-founded in front of everyone.	Shame	- on target	3
		- same class	
		- other	1
36: I recently paid a visit to the tax authorities: they really know how to make you feel totally powerless, and treat you like you are at their service.	Contempt	- on target	1
		- same class	2
		- other	1
37: I am going to move to California to continue my studies, I have been looking forward to this for a long time.	Joy	- on target	4
		- same class	
		- other	
38: I thought I was going to miss my train but I finally caught it, just in time. Otherwise I would have had to wait two hours.	Relief	- on target	3
		- same class	1
		- other	
39: I am waiting in the room to pass an oral exam, my head is empty, my legs are trembling, I have the impression I know nothing.	Fear	- on target	3
		- same class	
		- other	1
40: I was two days away from an important exam, a colleague took the books I needed and when I told him that I would need them urgently, he told me he had lost them!	Anger	- on target	4
		- same class	
		- other	
41: We have managed to rent exactly the house we want, right on the beach, for our next summer holidays.	Satisfaction	- on target	1
		- same class	3
		- other	
42: I wish I could see my parents to celebrate Christmas this year.	Hope	- on target	2
		- same class	1
		- other	1
43: Last year, during my summer job, I was responsible to order some merchandise. I made a miscalculation, but didn't tell anyone. I ordered too much and most of the things had to be thrown away.	Guilt	- on target	3
		- same class	1
		- other	

44: I really don't like to see people spit on the sidewalks.	Disgust	- on target	4
		- same class	
		- other	
45: I went to a concert of my favorite band. I was so energized I danced all night.	Elation	- on target	1
		- same class	3
		- other	
46: We were mountain hiking and all of the sudden, a huge thunder storm caught us off guard.	Surprise	- on target	3
		- same class	
		- other	1
47: We had a fire in the house, I lost all my belongings.	Sadness	- on target	3
		- same class	
		- other	1
48: My colleague was chosen to do a video-clip about the school, and I wanted to do this for months. I told our supervisor, but obviously he made his choice.	Envy	- on target	1
		- same class	3
		- other	

Table B2

Percentages of Emotion Identification per Questionnaire Format

Vignettes	Targeted emotion	Chi-square		Wheel condition	Circle condition	Word condition
1: During the Christmas holidays this year, some friends that I hadn't seen for 6 years came to visit me and we had a wonderful time together.	Joy	χ^2 (2, N = 58) = .45 ns	% on target	74% (20)	68% (17)	78% (21)
			% same class	26% (7)	20% (5)	15% (4)
			% other	(0)	12% (3)	%7 (2)
2: We have worked so hard, so our project should be a success.	Hope	χ^2 (2, N = 33) = .54 ns	% on target	37% (10)	50% (13)	37% (10)
			% same class	15% (4)	12% (3)	15% (4)
			% other	48% (13)	38% (10)	48% (13)
3: I was coming back late from a party one night, and I was walking. All of the sudden, three men followed me, starting to yell at me, asking for money. They were drunk, so I ran as fast as I could.	Fear	χ^2 (2, N = 61) = .03 ns	% on target	78% (21)	80% (20)	74% (20)
			% same class	4% (1)	4% (1)	0
			% other	8% (5)	16% (4)	26% (7)
4: My boss unfairly accused me of having mishandled a certain task that was actually supposed to be the responsibility of my colleague.	Anger	χ^2 (2, N = 48) = .87 ns	% on target	67% (18)	50% (13)	65% (17)
			% same class	26% (7)	23% (6)	23% (6)
			% other	7% (2)	27% (7)	12% (3)
5: I have successfully passed all the exams I needed to apply to an excellent university abroad.	Pride	χ^2 (2, N = 41) = .05 ns	% on target	48% (13)	54% (14)	70% (14)
			% same class	37% (10)	38% (10)	15% (3)
			% other	15% (4)	8% (2)	15% (3)
6: After all the trauma caused by my son's illness and stay at the hospital, the doctor finally gave some good news and we then knew he was going to recover.	Relief	χ^2 (2, N = 57) = .74 ns	% on target	63% (17)	72% (18)	82% (22)
			% same class	11% (3)	8% (2)	7% (2)
			% other	26% (7)	20% (5)	11% (3)

7: The teacher started to make jokes about my behavior as I was presenting something at the blackboard, in front of all the other students.	Shame	χ^2 (2, N = 31) = .84 ns	% on target % same class % other	44% (12) 0 56% (15)	33% (8) 0 67% (16)	41% (11) 0 59% (16)
8: Yesterday I read in the newspaper that a 30 year-old woman had abused her 2 month-old son and had caused his death. To abuse such a fragile creature cannot be considered as a human act and should not be forgiven.	Contempt	χ^2 (2, N = 72) = .33 ns [41]	% on target % same class % other	19% (5) 70% (19) 11% (3)	4% (1) 84% (21) 12% (3)	15% (4) 81 % (22) 4% (1)
9: I had not seen my fiancé(e) for 3 months, it had been the first time we were separated for such a long time. And now I am standing at the airport, waiting… and I can see my fiancé(e) coming out of the door, we run in each other's arms, and nothing else would matter.	Elation	χ^2 (2, N = 27) = .22 ns	% on target % same class % other	45% (9) 45% (9) 10% (2)	38% (8) 43% (9) 19% (4)	43% (10) 48% (11) 9% (2)
10: I could not stop reading this book, I was totally absorbed.	Interest	χ^2 (2, N = 62) = .61 ns	% on target % same class % other	81% (21) 0 19% (5)	72% (18) 0 28% (7)	88% (23) 0 12% (3)
11: I was supposed to pick up my little sister at school and I totally forgot. She stood all by herself in the street for two hours, anything could have happened to her.	Guilt	χ^2 (2, N = 53) = .50 ns	% on target % same class % other	63% (17) 26% (7) 11% (3)	77% (20) 23% (6) 0	61% (16) 31% (8) 8% (2)
12: I walked in the forest the other day, and my dog became very nervous. We discovered the dead body of a deer, starting to rot. I nearly fainted.	Disgust	χ^2 (2, N = 74) = .45 ns	% on target % same class % other	37% (10) 0 63% (17)	54% (14) 0 46% (12)	37% (10) 8% (2) 55% (15)

[41] Due to the low number of respondents for the contempt column, I grouped the results for disgust, contempt and anger, based on Izard's (1991) description of these 3 emotions constituting a hostility triad. It is to be noted though that 62,5% of the respondents chose "disgust".

13: I had done all the things I had to do on my list, so I left my work with a good impression.	Satisfaction	χ^2 (2, N = 59) = 1.76 ns	% on target % same class % other	85% (23) 4% (1) 11% (3)	81% (21) 11% (3) 8% (2)	55% (15) 26% (7) 19% (5)
14: I came home yesterday night, the apartment was dark, and as I switch the light on, all my friends were standing in the living-room and sang "Happy Birthday" to me, holding a big cake in their hands.	Surprise	χ^2 (2, N = 47) = 2.72 ns	% on target % same class % other	50% (13) 0 50% (13)	84% (21) 0 16% (4)	50% (13) 0 50% (13)
15: The day I lost my mother was the most horrible day in my life; I thought I would not overcome the pain.	Sadness	χ^2 (2, N = 74) = .19 ns	% on target % same class % other	96% (25) 4% (1) 0	92% (23) 4% (1) 4% (1)	96% (26) 0 4% (1)
16: I could not understand why my cousins could go on a trip to the Seychelles and enjoy the sun in the midst of the winter, and I had to stay in Switzerland to work on my exams.	Envy	χ^2 (2, N = 53) = .04 ns	% on target % same class % other	75% (18) 21% (5) 4% (1)	72% (18) 12% (3) 16% (4)	85% (17) 5% (1) 10% (2)
17: We had rehearsed that play for one year, and tonight was THE night, the premiere. We received a standing ovation and the public called us back five times! It was the most wonderful day of my life.	Elation	χ^2 (2, N = 25) = 1.04 ns	% on target % same class % other	37% (10) 63% (17) 0	19% (5) 81% (21) 0	26% (6) 74% (17) 0
18: Anthropology was a course I would not miss for the world; I could listen and read about it for days.	Interest	χ^2 (2, N = 68) = .03 ns	% on target % same class % other	88% (23) 0 12% (3)	92% (22) 0 8% (2)	92% (23) 4% (1) 4% (1)
19: We had a party at work for a colleague's birthday, and I drank too much, I started to dance on the tables. I didn't remember I had done that, and my colleagues told me about it the next day.	Shame	χ^2 (2, N = 59) = .54 ns	% on target % same class % other	78% (21) 0 22% (6)	65% (17) 4% (1) 31% (8)	78% (21) 0 22% (6)

20: I saw a documentary on TV yesterday on living conditions in some very poor regions: the people would drink, wash, and urinate, all in the same river water.	Disgust	χ^2 (2, N = 29) = 1.93 ns	% on target % same class % other	52% (13) 0 48% (12)	28% (7) 12% (3) 60% (15)	33% (9) 4% (1) 63% (17)
21: I shopped all day and I found some very good bargains.	Satisfaction	χ^2 (2, N = 53) = 1.17 ns	% on target % same class % other	70% (19) 22% (6) 8% (2)	56% (14) 40% (10) 4% (1)	74% (20) 22% (6) 4% (1)
22: If only I would get that grant I have applied for, I could go on with my studies!	Hope	χ^2 (2, N = 41) = .34 ns	% on target % same class % other	57% (12) 5% (1) 38% (8)	61% (14) 0 39% (9)	65% (15) 0 35% (8)
23: It is been four months that I have promised my grandmother to visit her, I know she is ill and that she may not live very long anymore, but I just have not taken the time.	Guilt	χ^2 (2, N = 46) = 2.26 ns	% on target % same class % other	74% (20) 18% (5) 8% (2)	54% (14) 42% (11) 4% (1)	46% (12) 42% (11) 12% (3)
24: I was on holiday; somebody broke into my car, and stole my wallet.	Anger	χ^2 (2, N = 68) = .21 ns	% on target % same class % other	89% (24) 11% (3) 0	84% (21) 12% (3) 4% (1)	85% (23) 15% (4) 0
25: My best friend came to see me, we had a wonderful afternoon sitting in the garden and having a drink.	Joy	χ^2 (2, N = 55) = .25 ns	% on target % same class % other	70% (19) 30% (8) 0	65% (17) 35% (9) 0	74% (20) 26% (7) 0
26: My cat had disappeared for two days. We finally found him in the next village. He had lost his way and had been taken care of by nice people who called us.	Relief	χ^2 (2, N = 57) = .74 ns	% on target % same class % other	74% (20) 0 26% (7)	62% (16) 11% (3) 27% (7)	81% (21) 0 19% (5)

27: I was in the garden one evening and I saw a snake coming towards me.	Fear	χ^2 (2, N = 58) = .97 ns	% on target % same class % other	81% (22) 4% (1) 15% (4)	64% (16) 0 36% (9)	74% (20) 0 26% (7)
28: I have to work with someone on this project but I have never seen someone so incompetent.	Contempt	χ^2 (2, N = 24) = 1.25 ns	% on target % same class % other	20% (5) 60% (15) 20% (5)	42% (11) 46% (12) 12% (3)	40% (8) 60% (12) 0
29: A colleague asked me if I was interested to work on a special project, the boss had mentioned he needed "clever people" and my colleague had "immediately thought of me".	Pride	χ^2 (2, N = 69) = .61 ns	% on target % same class % other	96% (26) 0 4% (1)	81% (21) 11% (3) 8% (2)	81% (22) 19% (5) 0
30: During my stay at the hospital, a friend I really did not expect has visited me.	Surprise	χ^2 (2, N = 32) = 1.19 ns	% on target % same class % other	30% (8) 0 70% (19)	42% (11) 4% (1) 54% (14)	48% (13) 0 52% (14)
31: I was devastated when my partner announced to me that our relationship was over.	Sadness	χ^2 (2, N = 57) = .42 ns	% on target % same class % other	78% (21) 4% (1) 18% (5)	68% (17) 12% (3) 20% (5)	73% (19) 0 27% (7)
32: I work much longer hours than my colleague but get only half the money.	Envy	χ^2 (2, N = 5)[42]	% on target % same class % other	4% (1) 92% (25) 4% (1)	9% (2) 86% (19) 5% (1)	8% (2) 92% (25) 0
33: There were only three candidates left after a series of exams. I was among these three and I finally got chosen as the nominee.	Pride	χ^2 (2, N = 48) = 3.38 ns	% on target % same class % other	48% (13) 48% (13) 4% (1)	52% (13) 40% (10) 8% (2)	81% (22) 19% (5) 0

[42] Given the too small number of responses for envy, the Chi-Square cannot be calculated. However, if one groups the envy scores together with the ones for disgust, contempt, and anger (emotions corresponding to the class of antagonistic emotions), the result would be χ^2 (2, N = 74) = .84 ns

34: A friend of mine had important things to confide to me. I listened to her very carefully.	Interest	χ^2 (2, N = 57) = .10 ns	% on target % same class % other	72% (18) 0 28% (7)	76% (19) 12% (3) 12% (3)	77% (20) 0 23% (6)
35: I was not able to answer a question on a topic I know very well, and I stayed dumb-founded in front of everyone.	Shame	χ^2 (2, N = 44) = .60 ns	% on target % same class % other	77% (17) 9% (2) 14% (3)	56% (14) 24% (6) 20% (5)	48% (13) 4% (1) 48% (13)
36: I recently paid a visit to the tax authorities: they really know how to make you feel totally powerless, and treat you like you are at their service.	Contempt	χ^2 (2, N = 24) = 1.75 ns	% on target % same class % other	38% (10) 62% (16) 0	22% (5) 74% (17) 4% (1)	35% (9) 65% (17) 0
37: I am going to move to California to continue my studies; I have been looking forward to this for a long time.	Joy	χ^2 (2, N = 29) = 3.38 ns	% on target % same class % other	35% (9) 46% (12) 19% (5)	25% (6) 46% (11) 29% (7)	52% (14) 33% (9) 15% (4)
38: I thought I was going to miss my train but I finally caught it, just in time. Otherwise I would have had to wait two hours.	Relief	χ^2 (2, N = 54) = .33 ns	% on target % same class % other	62% (16) 0 38% (10)	73% (19) 8% (2) 19% (5)	76% (19) 0 24% (6)
39: I am waiting in the room to pass an oral exam, my head is empty, my legs are trembling, I have the impression I know nothing.	Fear	χ^2 (2, N = 65) = .21 ns	% on target % same class % other	81% (22) 0 19% (5)	80% (20) 8% (2) 12% (3)	85% (23) 4% (1) 11% (3)
40: I was two days away from an important exam, a colleague took the books I needed and when I told him that I would need them urgently, he told me he had lost them!	Anger	χ^2 (2, N = 66) = .28 ns	% on target % same class % other	85% (23) 4% (1) 11% (3)	83% (20) 4% (1) 13% (3)	85% (23) 7,5% (2) 7,5% (2)
41: We have managed to rent exactly the house we want, right on the beach, for our next summer holidays.	Satisfaction	χ^2 (2, N = 28) = .50 ns	% on target % same class % other	31% (8) 65% (17) 4% (1)	38% (9) 50% (12) 12% (3)	41% (11) 59% (16) 0

42: I wish I could see my parents to celebrate Christmas this year.	Hope	χ^2 (2, N = 50) = 1.96 ns	% on target % same class % other	48% (13) 4% (1) 48% (13)	64% (16) 12% (3) 24% (6)	78% (21) 0 22% (6)
43: Last year, during my summer job, I was responsible to order some merchandise. I made a miscalculation, but didn't tell anyone. I ordered too much and most of the things had to be thrown away.	Guilt	χ^2 (2, N = 41) = .93 ns	% on target % same class % other	64% (16) 32% (8) 4% (1)	61% (14) 26% (6) 13% (3)	44% (11) 52% (13) 4% (1)
44: I really don't like to see people spit on the sidewalks.	Disgust	χ^2 (2, N = 53) = 1.85 ns	% on target % same class % other	56% (14) 28% (7) 16% (4)	74% (17) 22% (5) 4% (1)	81% (22) 15% (4) 4% (1)
45: I went to a concert of my favorite band. I was so energized I danced all night.	Elation	χ^2 (2, N = 37) = 1.03 ns	% on target % same class % other	58% (1) 42% (11) 0	52% (12) 44% (10) 4% (1)	37% (10) 63% (17) 0
46: We were mountain hiking and all of the sudden; a huge thunderstorm caught us off guard.	Surprise	χ^2 (2, N = 12)[43]	% on target % same class % other	15% (4) 0 85% (22)	21% (5) 4% (1) 75% (18)	12% (3) 0 88% (22)
47: We had a fire in the house and I lost all my belongings.	Sadness	χ^2 (2, N = 49) = .04 ns	% on target % same class % other	59% (16) 0 41% (11)	68% (17) 0 32% (8)	59% (16) 11% (3) 30% (8)
48: My colleague was chosen to do a video-clip about the school, and I wanted to do this for months. I told our supervisor, but obviously he made his choice.	Envy	χ^2 (2, N = 18) = 1.0 ns	% on target % same class % other	26% (7) 48% (13) 26% (7)	17% (4) 71% (17) 12% (3)	27% (7) 46% (12) 27% (7)

[43] There are not enough respondents in the surprise column, but it is to be noted that 54.7% of them chose fear (the vignette was "We were mountain hiking and all of the sudden, a huge thunder storm caught us off guard.").

Table B3

Comparative Results between 'Emotion Wheel' Condition in the Validation Study and Emotion Recognition Exercise with Participants of the Main Study Sample

Vignettes	**Targeted emotion**		**Wheel condition (n = 27)**	**Class #1 (n = 27)[44]**	**Class #2 (n = 23)**	**Class #3 (n = 24)**
1: During the Christmas holidays this year, some friends that I hadn't seen for 6 years came to visit me and we had a wonderful time together.	*Joy*	% on target	74% (20)	81.5% (22)	73.9% (17)	79.2% (19)
		% same class	26% (7)	11.1% (3)	21.7% (5)	20.8% (5)
		% other	(0)	3.7%(1)	4.3% (1)	0
2: We have worked so hard, so our project should be a success.	Hope	% on target	37% (10)	40.7% (11)	47.8% (11)	54.2% (13)
		% same class	15% (4)	7.4% (2)	8.6% (2)	0
		% other	48% (13)	51.9% (14)	43.5% (10)	45.8% (11)
3: I was coming back late from a party one night, and I was walking. All of the sudden, three men followed me, starting to yell at me, asking for money. They were drunk, so I ran as fast as I could.	Fear	% on target	78% (21)	88.9% (24)	87.0% (20)	91.7% (22)
		% same class	4% (1)	0	0	0
		% other	8% (5)	11.1% (3)	13% (3)	8.4% (2)
4: My boss unfairly accused me of having mishandled a certain task that was actually supposed to be the responsibility of my colleague.	Anger	% on target	67% (18)	77.8% (21)	60.9% (14)	79.2% (19)
		% same class	26% (7)	14.8% (4)	17.4% (4)	16.7% (4)
		% other	7% (2)	7.4% (2)	21.7% (5)	4.2% (1)
5: I have successfully passed the assessment center I needed to get a promotion in a affiliated company abroad.	Pride	% on target	48% (13)	25.9% (7)	26.1% (6)	41.7% (10)
		% same class	37% (10)	59.2% (16)	65.2% (15)	41.6% (10)
		% other	15% (4)	14.8% (4)	8.7% (2)	16.7% (4)

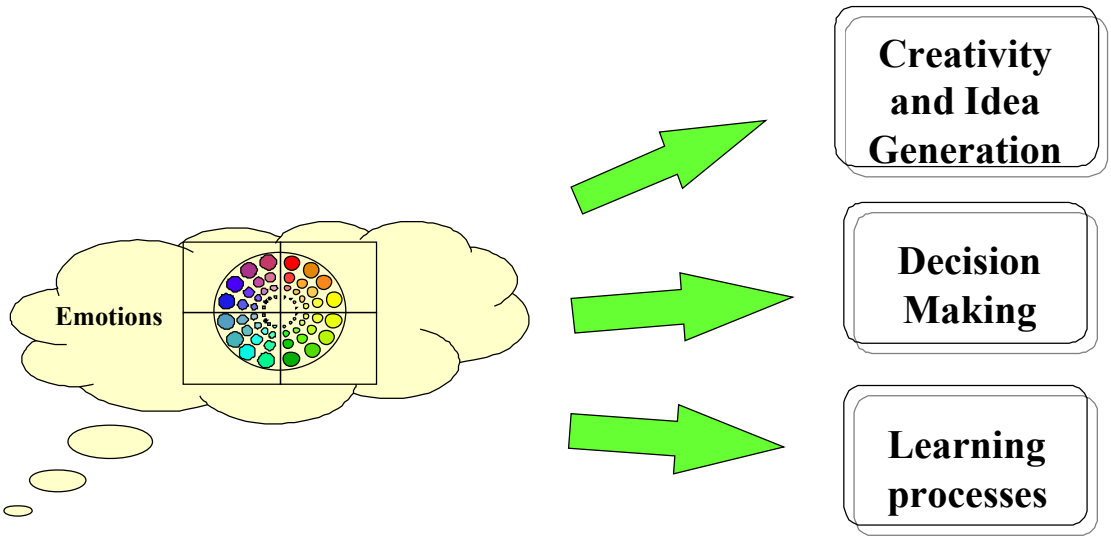
[44] For situation #1 (joy) and situation #14 (surprise), n = 26; for situation #15 (sadness), n = 25.

6: After all the trauma caused by my child's illness and stay at the hospital, the doctor finally gave some good news and we then knew he was going to recover.	Relief	% on target	63% (17)	51.9% (14)	56.5% (13)	62.5% (15)
		% same class	11% (3)	14.8% (4)	4.3% (1)	8.3% (2)
		% other	26% (7)	33.3% (9)	39.1% (9)	29.2% (7)
7: My boss started to make jokes about my behavior as I was presenting a new concept in front of all the other colleagues.	*Shame*	% on target	44% (12)	18.5% (5)	17.4% (4)	25.0% (6)
		% same class	0	11.1% (3)	4.3% (1)	8.3% (3)
		% other	56% (15)	70.4 % (19)	78.3% (18)	66.7% (16)
8: Yesterday I read in the newspaper that a 30 year-old woman had abused her 2 month-old son and had caused his death. To abuse such a fragile creature cannot be considered as a human act and should not be forgiven.	Contempt	% on target	19% (5)	3.7% (1)	8.7% (2)	4.2% (1)
		% same class	70% (19)	74.0% (20)	69.5% (16)	75.0% (18)
		% other	11% (3)	18.5% (6)	21.7% (5)	20.9% (5)
9: My team and I had worked day and night to ensure a successful launch of this new product. And the news came: we did it!! Market share was exploding, orders fully loaded!!"	Elation	% on target	45% (9)	22.2% (6)	17.4% (4)	16.7% (4)
		% same class	45% (9)	77.7% (21)	82.6% (19)	83.3% (20)
		% other	10% (2)	0	0	0
10: I could not stop reading this book as I was totally absorbed.	Interest	% on target	81% (21)	74.10% (20)	78.3% (18)	75.0% (18)
		% same class	0	0	4.3% (1)	0
		% other	19% (5)	22.2% (6)	17.3% (4)	20.9% (5)
11: I was supposed to pick up this important customer at the airport and I totally forgot. He was still standing there at the arrival level when I finally came two hours later.	Guilt	% on target	63% (17)	33.3% (9)	43.5% (10)	45.8% (11)
		% same class	26% (7)	66.7% (18)	56.5% (13)	54.2% (13)
		% other	11% (3)	0	0	0
12: I walked in the forest the other day, and my dog became very nervous. We discovered the dead body of a deer, starting to rot. I nearly fainted.	Disgust	% on target	37% (10)	44.4% (12)	60.9% (14)	79.2% (19)
		% same class	0	7.4% (2)	0	0
		% other	63% (17)	48.2% (13)	39.1% (9)	20.8% (5)

13: I had done all the things I had to do on my list, so I left my work with a good feeling..	Satisfaction	% on target	85% (23)	74.1% (20)	73.9% (17)	79.2% (19)
		% same class	4% (1)	18.5% (5)	21.7% (5)	12.5% (3)
		% other	11% (3)	3.7% (1)	4.3% (1)	8.3% (2)
14: I came home yesterday night, the apartment was dark, and as I switch the light on, all my friends were standing in the living-room and sang "Happy Birthday" to me, holding a big cake in their hands.	Surprise	% on target	50% (13)	48.1% (13)	56.5% (13)	54.2% (13)
		% same class	0	0	4.3% (1)	0
		% other	50% (13)	48.1% (13)	39.0% (9)	45.8% (11)
15: The day I lost my mother was the most horrible day in my life, I thought I would not overcome the pain.	Sadness	% on target	96% (25)	88.9% (24)	95.7% (22)	100% (24)
		% same class	4% (1)	3.7% (1)	0	0
		% other	0	0	4.3% (1)	0
16: I could not understand why my colleague could go on a trip to the Seychelles as an incentive reward, and I have to stay at the office. We are in the same team and we both worked hard to get there.	Envy	% on target	75% (18)	48.1% (13)	52.2% (12)	50.0% (12)
		% same class	21% (5)	40.7% (11)	43.5% (10)	41.7% (10)
		% other	4% (1)	7.4% (2)	4.3% (1)	8.4% (2)

Note: the red numbers indicate a similarity in the responses.

The Influence of Emotion in Managerial Group Decision-Making



Véronique Tran
Geneva Emotion Research Group
University of Geneva

Dear Participants,

The objective of this exercise is to be able to identify the influence of emotion in managerial group decision-making. We suggest that emotions may affect processes such as idea generation, sharing of information, decision-making, facilitation or inhibition of learning processes (Fig.1). Hence, it influences performance, both individual and organizational.

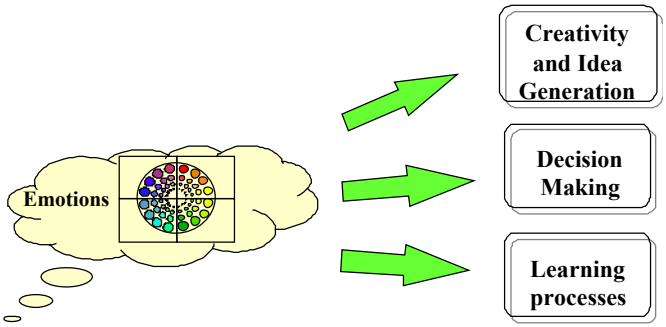


Fig. 1

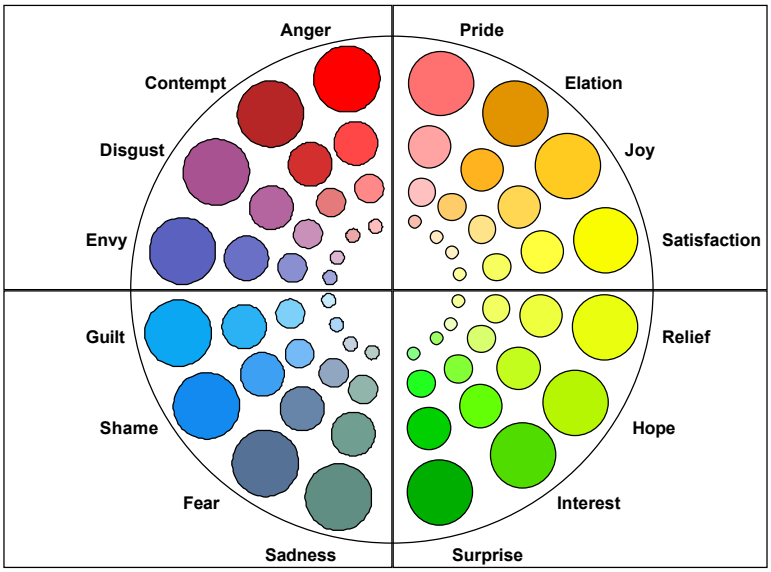
Although it has not been the habit to integrate the emotional dimension into management practices, the awareness of its importance is growing.
For example, when Jack Welch, CEO of General Electric, dedicated his shareholders' letter in GE's 1991 Annual Report to the theme of building GE's future on "mutual trust and respect", he was met with considerable surprise and skepticism. Welch added: ". . . getting ideas to flow means thawing out those parts of the company still frozen by fear." And: ". . . Inside and outside the company, trust creates the invisible ties that bind people and companies together and convert mere transactions into personal relationships."
Trust is not an emotion per se, but constitutes the ground base for an array of emotions to develop.

Andy Grove, the CEO of Intel, said in an interview for Fortune on July 8, 1996: " (at Microsoft), they are terribly defensive (…). Unless it's a particularly benign set of circumstances, the slightest difference of opinion will create very defensive emotional responses out of them, that kind of shutdown productive discussions for a while. After doing this together for 15 years, we've learned that it will blow over; just stay cool, let them sputter away, and sooner or later they'll listen."

It seems important to us to understand how individual emotions may converge towards a group emotion, which in turn influences the decisions the team will make.

We have developed a tool to measure emotions in a group or in an organization. This instrument is called the "Emotion Wheel", composed of 16 main emotions represented by color circles, arranged in the order of increasing intensity. The 16 words are like the heads of a 'family' of emotions and each circle corresponds to a particular emotion label. We have 64 labels in total (an A3 sheet will be posted in your study room).

The Emotion Wheel



We are also providing definitions of the 16 main emotions, so that each participant has a common and clear idea of what is meant by each of the main labels.

Here are the instructions regarding this exercise:

- We provide you with a one-page document with 3 black and white "Emotion Wheels" and a few lines for comments, for you to individually rate how YOU feel.
- The letters **B**, **M**, and **E** at the left upper corner of each emotion wheel stand for **Beginning**, **Middle**, and **End**.
- **Beginning** means that you select maximum 2 emotions by placing a tick mark inside the appropriate circles at the beginning of the simulation, right after you received the results from the facilitator.
- Then, approximately half way through, which will correspond to the **Middle**, please select two emotions again.
- At the **End**, once the decision is made and the diskette given back to the facilitator, select two emotions one more time.

When the decision is printed and copied to the diskette, the group gathers, and **decides collectively** which emotions (you tick 2 emotions on an A4 black and white emotion wheel) represent the group emotions of your study group **during** this decision period. This is the result of a **consensus**.

The 8 sequential numbers at the upper right corner of each "Emotion Wheel" correspond to the number of periods in the simulation. When you are in Period 1, you circle 1, when you are Period 2, you circle 2, etc. This process will be repeated 8 times, i.e. the 8 years/periods of the simulation.

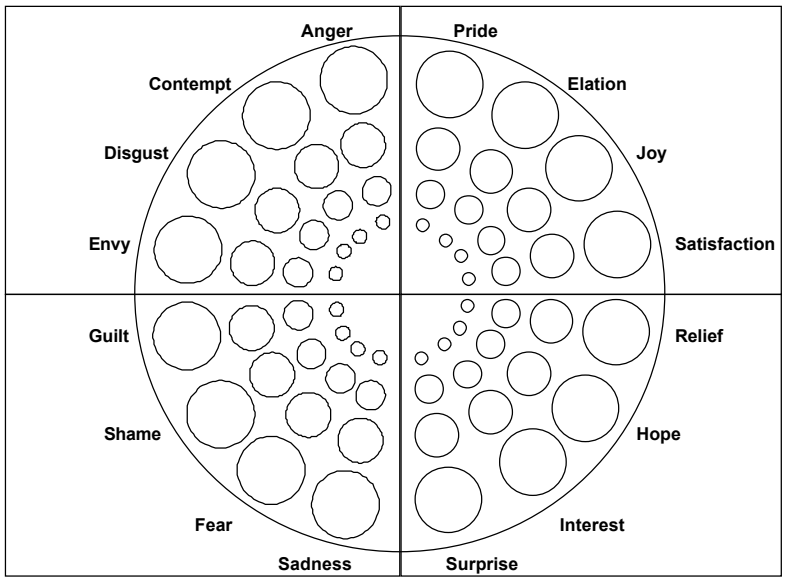
We will reveal insights into the underlying importance of emotions in the decision-making process in a diverse management team, as in daily situations.

We thank you in advance for your collaboration.

Appendix D: Emotion Wheel Formatted for Data Collection During Simulation

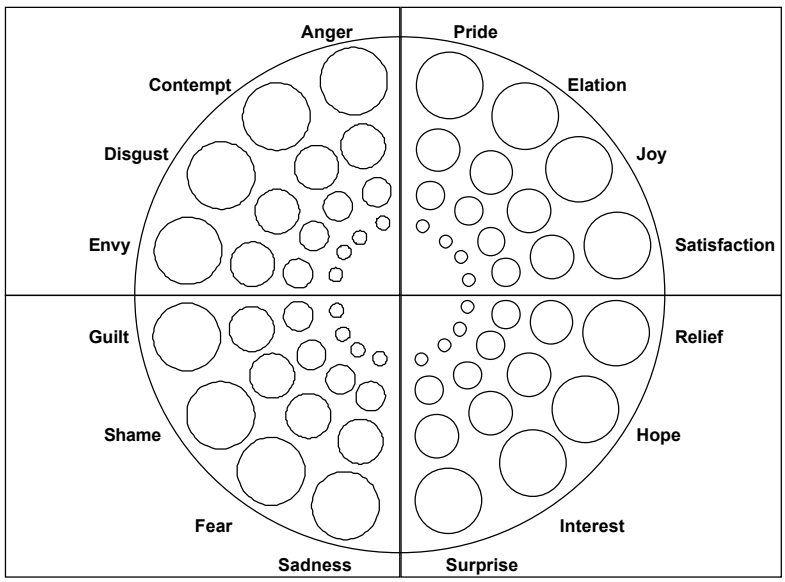
The Emotion Wheel 1 2 3 4 5 6 7 8

B



The Emotion Wheel 1 2 3 4 5 6 7 8

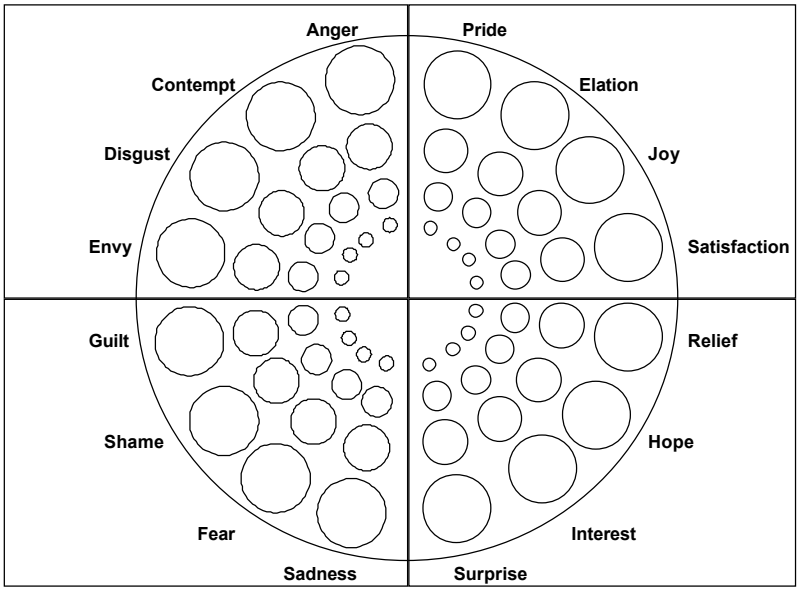
M



The Emotion Wheel

1 2 3 4 5 6 7 8

E



Appendix E: Decision-Making Questionnaire

Decision-Making in Teams

My group number is: _____ My initials are: _____

Please answer the following questions (circle the appropriate number).

1. How many alternatives do you think your team generated, compared to what one would expect?

   0 1 2 3 4 5 6 7 8 9
   less than expected — as expected — more than expected

2. To what extent do you think your team may have thoroughly reviewed all alternatives before making the decision?

   0 1 2 3 4 5 6 7 8 9
   not reviewed — somewhat reviewed — thoroughly reviewed

3. To what extent did team members contribute their relevant expertise / experience / insights?

   0 1 2 3 4 5 6 7 8 9
   very few did — some did — everyone did

4. How satisfied are you with the way decisions were reached in your team?

   0 1 2 3 4 5 6 7 8 9
   not satisfied — quite satisfied — very satisfied

5. To what extent do you think your team jumped too quickly to a conclusion?

   0 1 2 3 4 5 6 7 8 9
   not at all — a little — very much so

6. To what extent do you think team members withhold their relevant knowledge?

   0 1 2 3 4 5 6 7 8 9
   didn't withhold — withheld — withheld a lot

7. Did you enjoy working with the group on the decisions?

   0 1 2 3 4 5 6 7 8 9
   not at all — pretty much — very much

8. To what extent did team members restrict themselves to a limited set of alternatives?

   0 1 2 3 4 5 6 7 8 9
   not at all — quite a bit — a lot

Please turn over

9. To what extent did team members ignore important information that was brought in?

0	1	2	3	4	5	6	7	8	9
not much				pretty much					a lot

10. To what extent do you feel committed to your team's decisions?

0	1	2	3	4	5	6	7	8	9
not committed at all				quite committed				very committed	

11. To what extent do you think your team generated non-obvious alternatives?

0	1	2	3	4	5	6	7	8	9
not at all				quite a bit					a lot

12. To what extent did you look at the costs and benefits of the alternatives you finally considered?

0	1	2	3	4	5	6	7	8	9
not at all				quite a bit					a lot

13. To what extent would you want to be a member of this team again?

0	1	2	3	4	5	6	7	8	9
never again			only for selective activities				any time, for any project		

14. To what extent did your team try to find innovative solutions?

0	1	2	3	4	5	6	7	8	9
not at all				quite a bit					a lot

15. How effective was your team at focusing its attention on crucial information and ignoring irrelevant information?

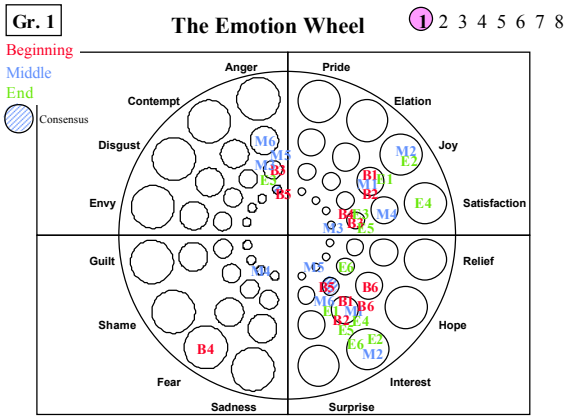
0	1	2	3	4	5	6	7	8	9
not effective				quite effective				very effective	

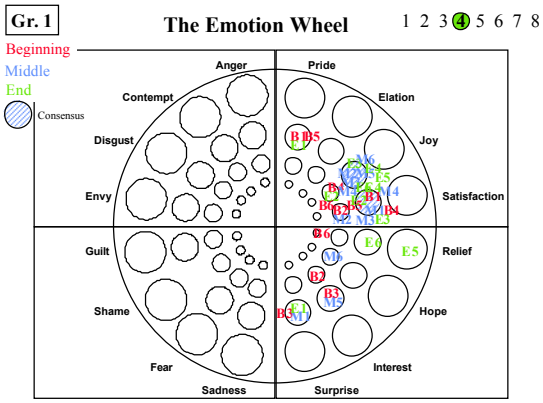
16. How many team members seem to hear only the things supporting their present opinion?

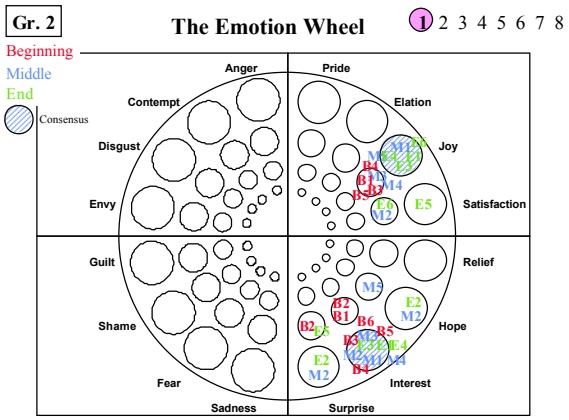
0	1	2	3	4	5	6	7	8	9
not at all				a little					a lot

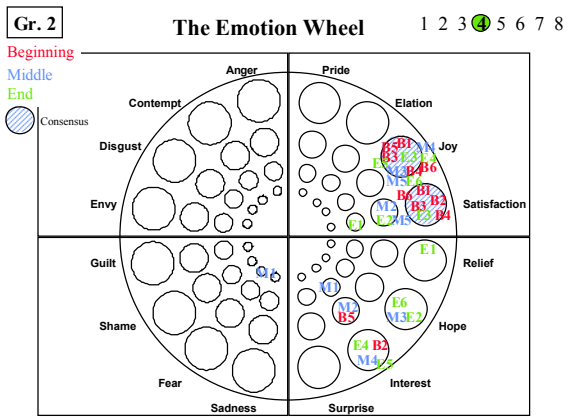
Thank you!

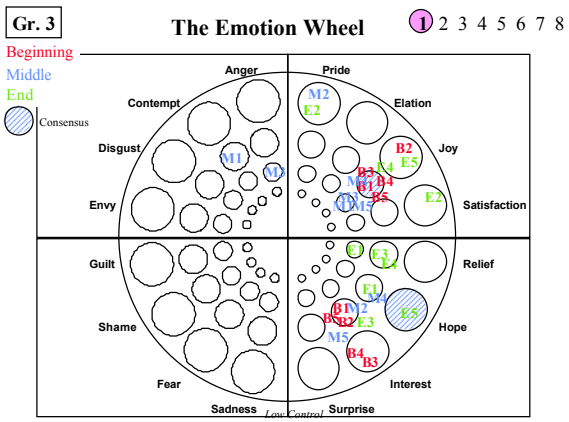
Appendix F: Examples of Emotion Maps for 5 Teams Extracted from the Sample, Comparing Emotions in the First Period and in the Fourth Period of the Simulation

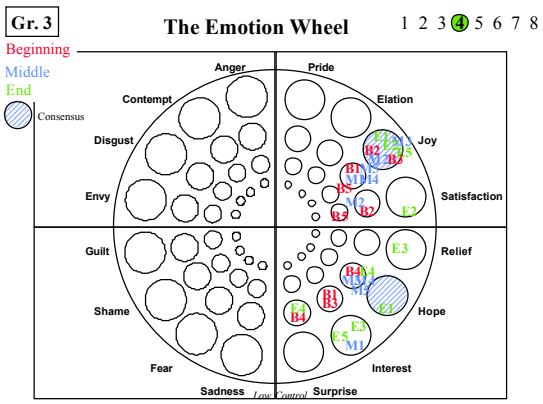




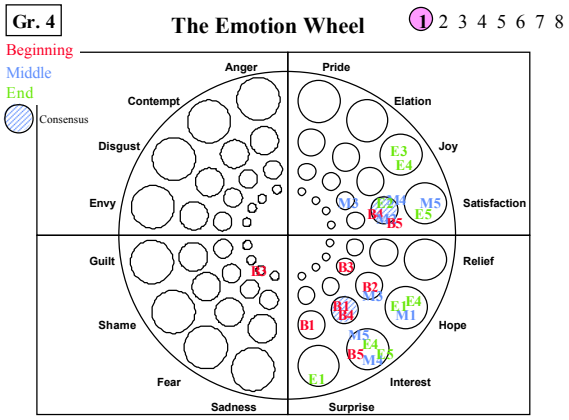








Gr. 4



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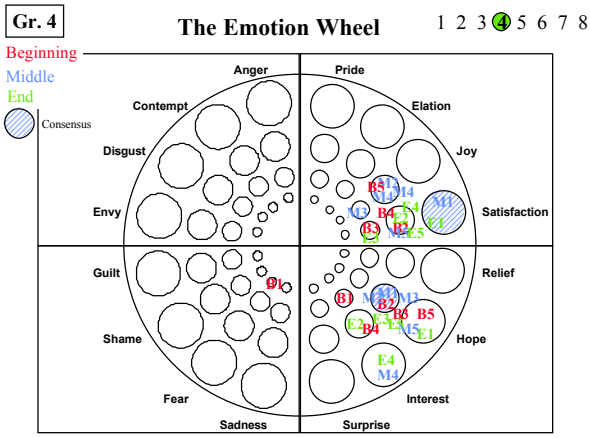

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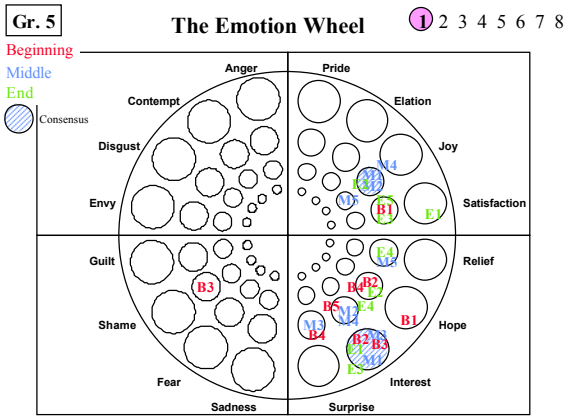
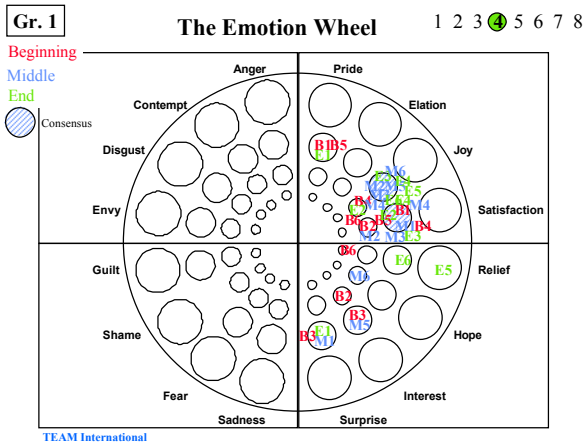
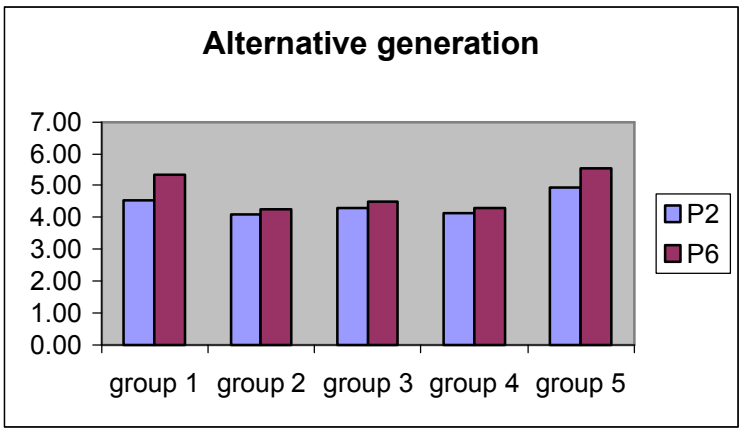
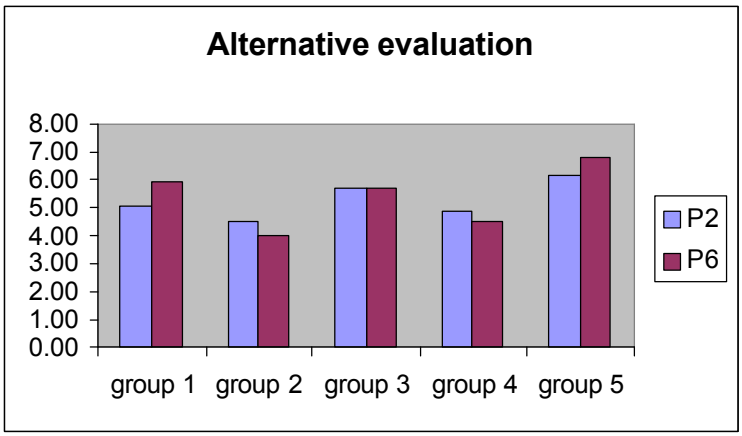


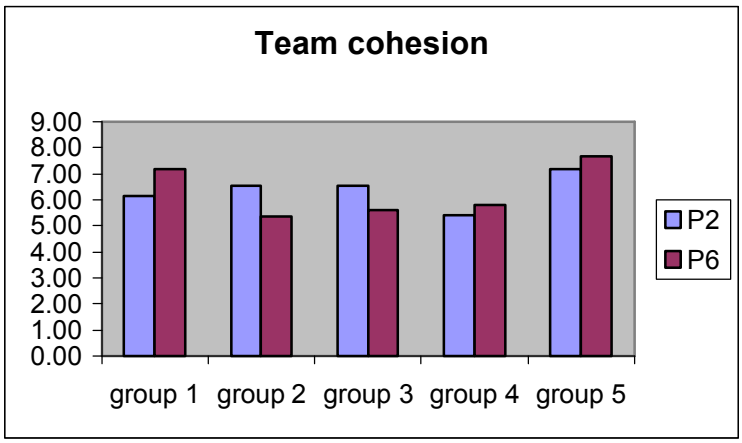
Gr. 1



Appendix G: Examples of Reports of Decision-Making Data Provided to Participants in the Present Study







Appendix H: Classes of Emotions and Decision-Making Variables

This section presents the results of the regression analyses in which all four classes of emotion were entered at the same time in each equation (a model was tested for each different type of scores and for each phase) to assess the relative weight of each class of emotions in predicting responses about decision-making processes.

A stepwise procedure was used for these regression analyses. To increase the chances for any variable to be entered in the model, the entry criterion was defined as the probability for the F values to reach significance at $p<.10$, and the removal criterion was defined as the probability for the F values to reach significance at $p<.20$. However, only results at a $p < .10$ level which are congruent with the hypotheses outlined in section 2.2. will be reported.

Multiple regressions at the individual level

First, the potential influence of control variables (age, company, and nationality) had to be verified, and eventually eliminated. Three dummy variables were created for the type of company (Company 1: 'yes' = 1, 'no' = 0; etc.) and four dummy variables were created for the type of nationality. Because two out of the 3 companies have a Dutch headquarters, there was a greater number of Dutch participants (40.6% of the total sample, see Method p. 81), therefore one nationality category was devoted to Dutch ('yes' = 1, 'no' = 0). The second largest group was German ('yes' = 1, 'no' = 0). The third group was labeled 'European' ('yes' = 1, 'no' = 0), and the fourth 'Other' ('yes' = 1, 'no' = 0), which would include nationalities such as North American, South American, Asian, and African. Control variables were entered in the regression model in a first block, and emotion variables in a second block, and then both regressed on each decision-making variable with a stepwise procedure. The variables 'Dutch' and 'Age' had a strong influence (e.g. the variable 'Dutch' was a statistically significant predictor in most models), which had to be eliminated. Thus, all control variables were regressed on each class of emotions. Non-standardized residuals were saved for subsequent analyses. Twenty-four regression models were tested, using the four classes of emotions as the independent variables, which were regressed on each decision-making variable, for each of the types of emotion scores (Mean Scores, Maximum Scores, and Last Scores). Betas, R^2s and adjusted R^2s are displayed in Table H1.

There was only one instance where two classes of emotions remained in the final regression model. It occurred when regressing the four classes of emotions on alternative evaluation in the Developing Phase: achievement and antagonistic emotions were positive predictors of alternative evaluation. These two variables explained 10% of the variance in alternative evaluation during the Developing Phase. Betas are provided below.

Table H1

Regression Analyses for Classes of Emotions and Decision-Making Processes at the Individual Level

	Mean Overall	**Mean Developing Phase**	**Max Overall**	**Max Starting Phase**	**Last of Starting Phase**			**Last of Developing Phase**
	TC	AE	AG	AE	AG	AE	TC	AE
Independent Variables								
Achievement		*.19*$^{+}$						
Approach	**-.20***							
Resignation					**.20***			
Antagonistic		**.30****	*.19*$^{+}$	**-.20***		**-.25***	**-.20***	**.30****
R^2	.04	.10	.04	.04	.04	.06	.04	.09
Adjusted R^2	.03	.09	.03	.03	.03	.06	.03	.08

Note. N = 106; AG = Alternative Generation; AE = Alternative Evaluation; TC = Team Cohesion.

* = $p < .05$; + = $p < .10$.

In all remaining models tested, only one class of emotions remained in the final regression.

The main finding was that antagonistic emotions were the most constant predictor of decision-making processes, primarily of alternative evaluation, secondarily of team cohesion, and marginally of alternative generation. First, the same trend was found in the regression analyses as in the simple correlations, where antagonistic emotions were negatively related to alternative evaluation in the Starting Phase _ Maximum scores and Last scores in the Starting Phase were negative predictors of alternative evaluation (respectively $\beta = -.20$, $p < .05$, and $\beta = -.25$, $p < .05$) _, and became positively related to it in the Developing Phase _ Mean scores and Last scores

in the Developing Phase were positive predictors of alternative evaluation (in both cases, $\beta = .30$, $p < .01$).

Second, Last scores of antagonistic emotions in the Starting Phase were negative predictors of team cohesion ($\beta = -.20$, $p < .05$).

Third, Maximum Overall scores of antagonistic emotions were predictors of alternative generation ($\beta = .19$, $p < .053$). This result is similar to the one obtained with the simple correlation but slightly weaker. In both cases, one can suppose that maximum intensities are associated with "heated" discussions, perhaps giving the impression that more alternatives were generated.

Secondary findings pertaining to the three other classes of emotions are: 1) Mean scores of achievement emotions were a marginal predictor of alternative evaluation in the Developing Phase ($\beta = .19$, $p = .055$); 2). Mean Overall scores of approach emotions were significant predictors of team cohesion ($\beta = .20$, $p < .05$): it may be that the mixed influence of each of the four emotions composing approach emotions needs to be reconsidered one by one, especially in a team context; and 3) Last scores of resignation emotions were significant predictors of alternative generation in the Starting Phase ($\beta = .20$, $p < .05$).

Summary and comments

The objective of performing multiple regressions was to assess the relative contribution of each class of emotions in predicting decision-making processes. The focus of this section was placed on the influence of classes of emotions on team decision-making variables at the individual/psychological level, after the possible influence of control variables had been eliminated. It appeared that antagonistic emotions were the most consistent predictor of decision-making processes across time, even though the percentage of variance explained is very small. The interpretation proposed here remains consistent with the one proposed for the correlational analyses: the results in the Starting Phase are consistent with predictions, and reflect the idea that a certain degree of frustration occurred at the beginning of the simulation; in the Developing Phase, results are opposite to predictions: the energy released by antagonistic emotions may have been focused to better analyze alternatives, with team members in a competitive mindset. Concerning the other classes of emotions, results

were generally congruent with correlations, except when approach emotions were found to be a negative predictor of team cohesion for Mean scores Overall. Table H2 summarizes findings compared to predictions. Three results were confirming hypotheses, and four were in opposition to predictions.

Table H2

Summary of findings for classes of emotions in relation to decision-making processes at the individual level

	Mean Over all	**Mean Develo-ping Phase**	**Max Over all**	**Max Star-ting Phase**	**Last of Starting Phase**			**Last of Develo-ping Phase**
	TC	AE	AG	AE	AG	AE	TC	AE
Independent Variables								
Achievement		o^+						
Approach	**O***							
Resignation					**O***			
Antagonistic		**O****	o^+	**Y***		**Y***	**Y***	**O****

Note. Y = Hypothesis confirmed; O = Result opposite to hypothesis with $p < .05$ (*) or $p < .01$ (**);o^+ = Result opposite to hypothesis with $p < .10$.

Multiple regressions at the aggregated team level

Regressions were performed without taking control variables into consideration. The influence of average age, company and nationality at the team level was not partialled out as it was not meaningful to do so at the team level. Eighteen regression models were tested, using the four classes of emotions as the independent variables, which were regressed on each decision-making variable, for each of the types of emotion scores (Mean Scores, Maximum Scores, and Last Scores). Betas, R^2s, and adjusted R^2s are displayed in Table H3. There were no significant results obtained for Last scores.

Table H3

Regression Analyses for Classes of Emotions and Decision-Making Processes at the Aggregated Team Level

	Mean Overall			**Mean Starting Phase**	**Mean Developing Phase**		**Max Overall**		**Max Starting Phase**	**Max Developing Phase**		
	AG	AE	TC	AE	AG	TC	AE	TC	TC	AG	AE	TC
Independent Variables												
Achievement Approach	*.42*$^{+}$			**.47***	**.51***	*.42*$^{+}$			**-.53***			
Resignation Antagonistic		*-.42*$^{+}$	*-.41*$^{+}$				**-.55***	**-.56***		*-.42*$^{+}$	**-.61****	**-.64****
R^2	.17	.17	.17	.22	.26	.17	.30	.31	.28	.18	.37	.41
Adjusted R^2	.13	.13	.12	.18	.21	.13	.27	.27	.24	.13	.33	.38

Note. ** = p < .01; * = p < .05; $^{+}$ = p < .10; N = 20.

Mean and Last scores. Mean scores of achievement emotions were significant predictor of alternative evaluation in the Starting Phase (β = .47, p<.05). The same phenomenon occurred when regressing achievement emotions together with the other classes of emotions on alternative evaluation at the individual level, but at the team level, the effect was stronger (the percentage of variance explained at the team level is 22%, whereas it was 10% at the individual level). Team members were probably under the influence of an "enthusiasm" effect associated with achievement emotions, which perhaps made them rate their evaluating abilities higher.

Mean Overall scores of approach emotions were marginal predictors of alternative generation (β = .42, p<.067). Mean scores of approach emotions in the Developing Phase were positive predictors of alternative generation (β = .51, p<.05), and marginal predictors of team cohesion (β = .42, p<.067). Mean Overall scores of antagonistic emotions were marginal predictors of alternative evaluation (β = -.42, p<.068); and of team cohesion (β = -.41, p<.071). These four marginal findings were reported because they were in the predicted direction.

Maximum Scores. Maximum scores of approach emotions in the Starting Phase were negative predictors of team cohesion (β = -.53, p<.05). These results are reverse of the ones found for Mean scores in the Developing Phase.

Maximum Overall scores, and Maximum scores of antagonistic emotions in the Developing Phase were significant predictors of alternative evaluation (respectively β = -.55, $p < .05$, and β = -.61, $p < .01$); and of team cohesion (respectively, β = -.56, $p < .05$, and β = -.64, $p < .01$). Maximum scores in the Developing Phase were marginal predictors of alternative generation (β = -.42, $p < .10$), in the predicted direction.

Summary and comments

The percentages of variance explained are higher at the aggregated team level than they were at the individual level, ranging from 17% to 26% for Mean Scores, and ranging from 15% to 41% for Maximum Scores. The pattern of results is different from the regressions performed at the individual level: 1) Mean scores of achievement emotions were a positive predictor of alternative evaluation in the Starting Phase (which was not the case at the individual level, and not the case for correlations); 2) Mean scores of approach emotions were a positive predictor of alternative generation and team cohesion in the Developing Phase; in contrast, Maximum intensities of approach emotions in the Starting Phase were a negative predictor of these two variables (whereas at the individual level, approach emotions were a negative predictor of team cohesion for Overall Mean scores); 3) Maximum intensities of antagonistic emotions were a consistent negative predictor of alternative evaluation and of team cohesion, during the whole simulation, including the Developing Phase (whereas at the individual level, antagonistic emotions were a positive predictor during the Developing Phase). These results demonstrate that what may be occurring at the group level is distinct from individual level processes, as suggested by George (1990). Table H4 summarizes findings compared to predictions.

Table H4

Summary of findings for classes of emotions in relation to decision-making processes at the aggregated team level

	Mean Overall			**Mean Starting Phase**	**Mean Developing Phase**		**Max Overall**		**Max Starting Phase**	**Max Developing Phase**		
	AG	AE	TC	AE	AG	TC	AE	TC	TC	AG	AE	TC
Independent Variables												
Achievement				**O***								
Approach	y^+				**Y***	y^+			**O***			
Resignation												
Antagonistic		y^+	y^+				**Y***	**Y***		y^+	**Y****	**Y****

Note. Y = Hypothesis confirmed; O = Result opposite to hypothesis with $p < .05$ (*) or $p < .01$ (**);o^+ = Result opposite to hypothesis with $p < .10$.

Multiple regressions at the group consensus level

The same regression models as at the aggregated team level were tested at the group consensus level. The main finding was that Maximum scores of achievement emotions in the Starting phase were a positive predictor alternative evaluation ($\beta = .49$, $p < .05$). This result departed from the one found at the aggregated team level, in which case maximum intensities were a negative predictor of alternative generation. At the group consensus level, maximum intensities of achievement emotions appeared to enhance alternative evaluation.

A secondary finding consisted of Mean Scores of approach emotions in the Developing Phase, which marginally predicted alternative evaluation ($\beta = .43$, $p < .056$), but was consistent with the main finding (see Table H5). Both findings confirmed the hypothesis formulated about the relationship between approach emotions and alternative evaluation (see Table H6).

Table H5

Regression Analyses for Classes of Emotions and Decision-Making Processes at the Aggregated Team Level

	Mean Developing Phase	**Max Starting Phase**
	AE	AE
Independent Variables		
Achievement Approach	.43+	**.49***
R^2		
Adjusted R^2		

Note. * = p < .05; + = p < .10; N = 20.

Table H6

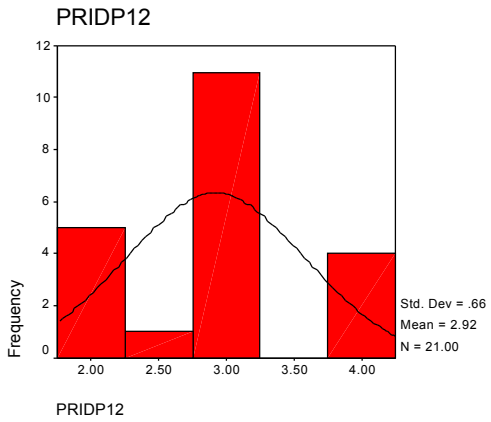
Summary of findings for classes of emotions in relation to decision-making processes at the group consensus level

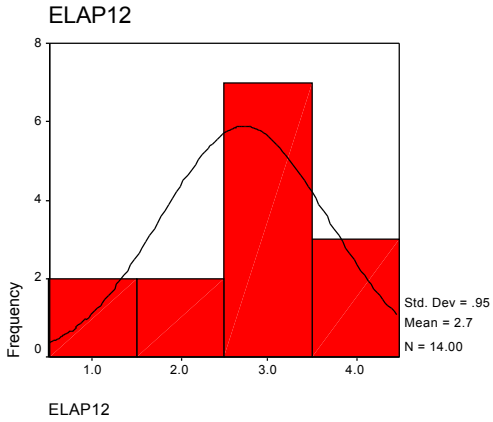
	Mean Developing Phase	**Max Starting Phase**
	AE	AE
Independent Variables		
Approach	y+	**Y***

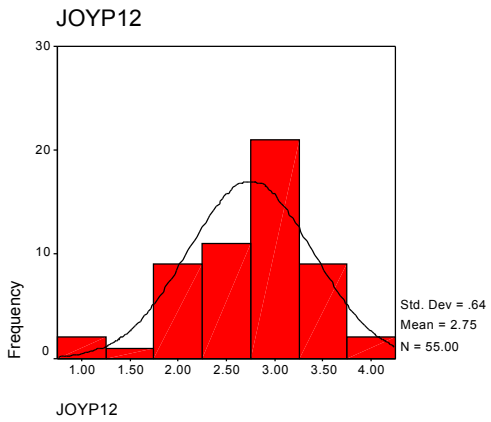
Note. Y = Hypothesis confirmed; O = Result opposite to hypothesis with p < .05 (*) or p < .01 (**);o+ = Result opposite to hypothesis with p < .10.

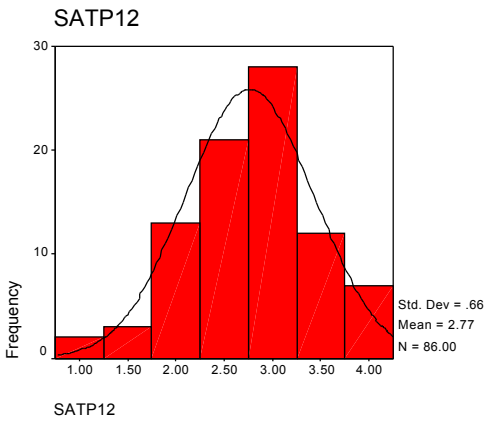
In summary, regression analyses at the individual, at the aggregated team level, and at the group consensus level brought limited additional information, compared to Pearson correlations.

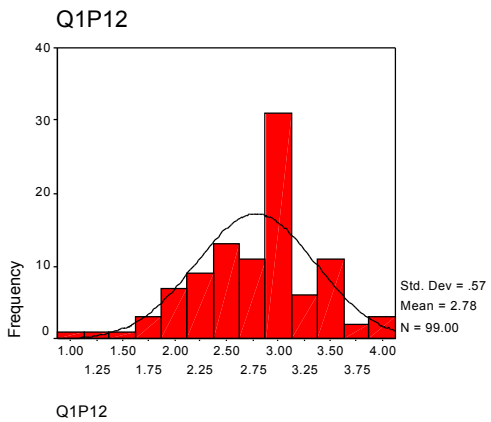
Appendix I1: Histograms Representing Means of Non-Standardized Scores for Achievement Emotions in the Starting Phase (Emotion by Emotion plus a Summary per Class)





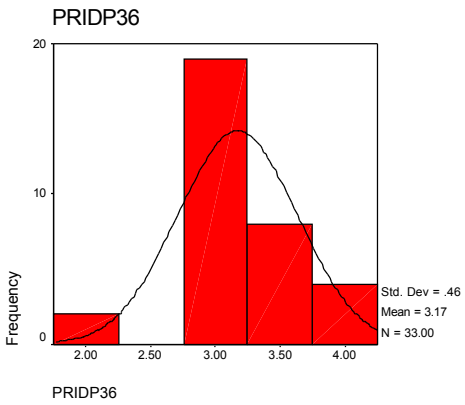


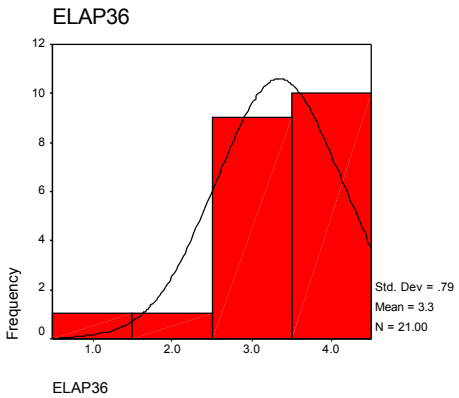


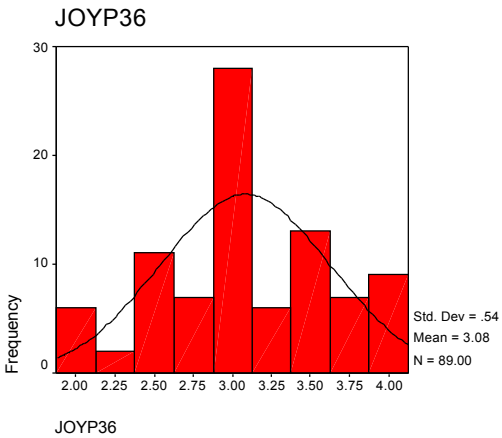


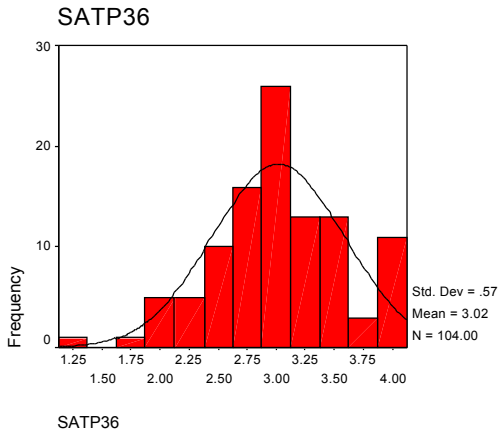
Note. Q1 = achievement emotions; P12 = Starting Phase.

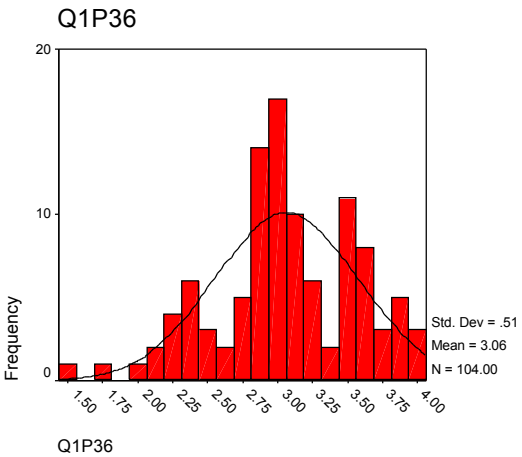
Appendix I2: Histograms Representing Means of Non-Standardized Scores for Achievement Emotions in the Developing Phase (Emotion by Emotion plus a Summary per Class)





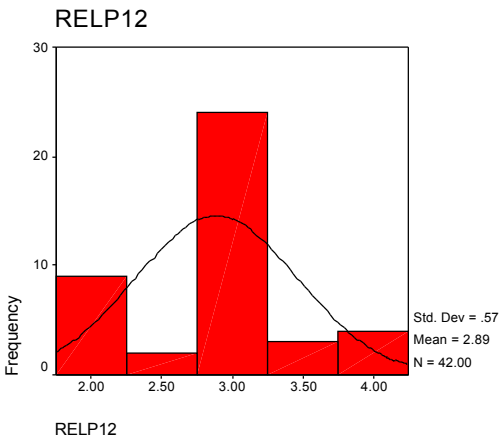


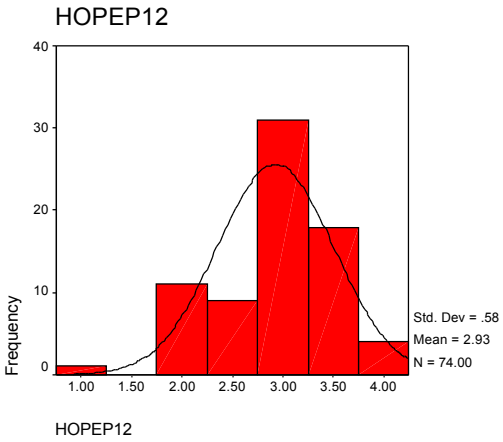


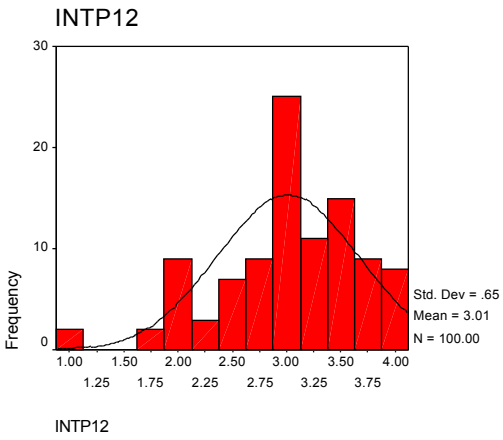


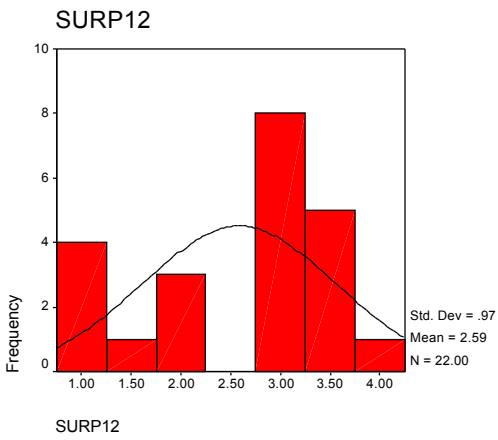
Note. Q1 = achievement emotions; P36 = Developing Phase.

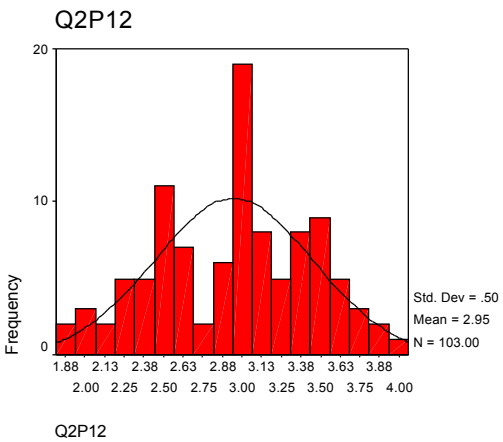
Appendix J1: Histograms Representing Means of Non-Standardized Scores for Approach Emotions in the Starting Phase (Emotion by Emotion plus a Summary per Class)





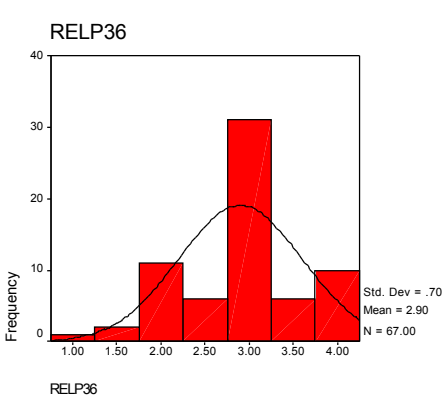


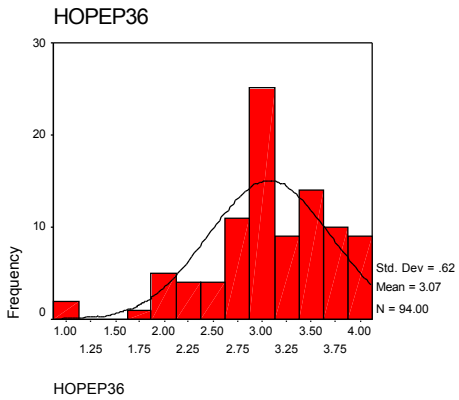


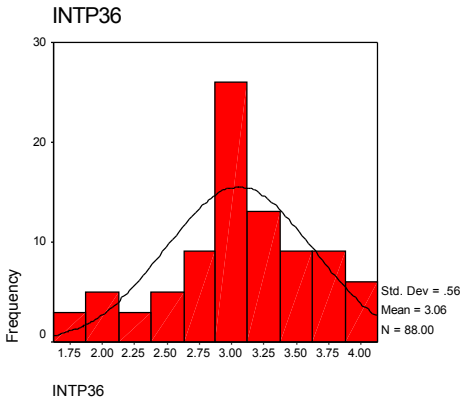


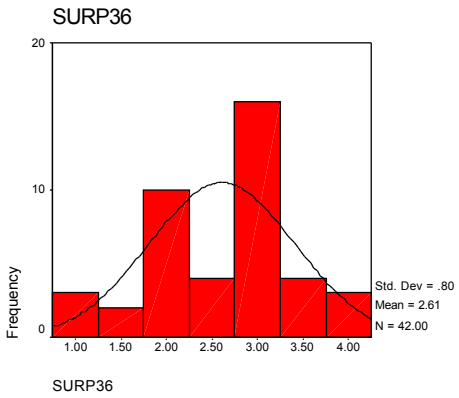
Note. Q2 = approach emotions; P12 = Starting Phase.

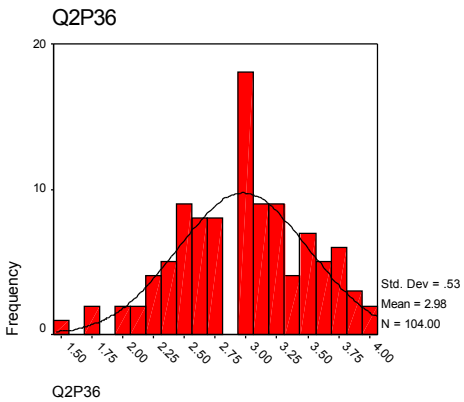
Appendix J2: Histograms Representing Means of Non-Standardized Scores for Approach Emotions in the Developing Phase (Emotion by Emotion plus a Summary per Class)





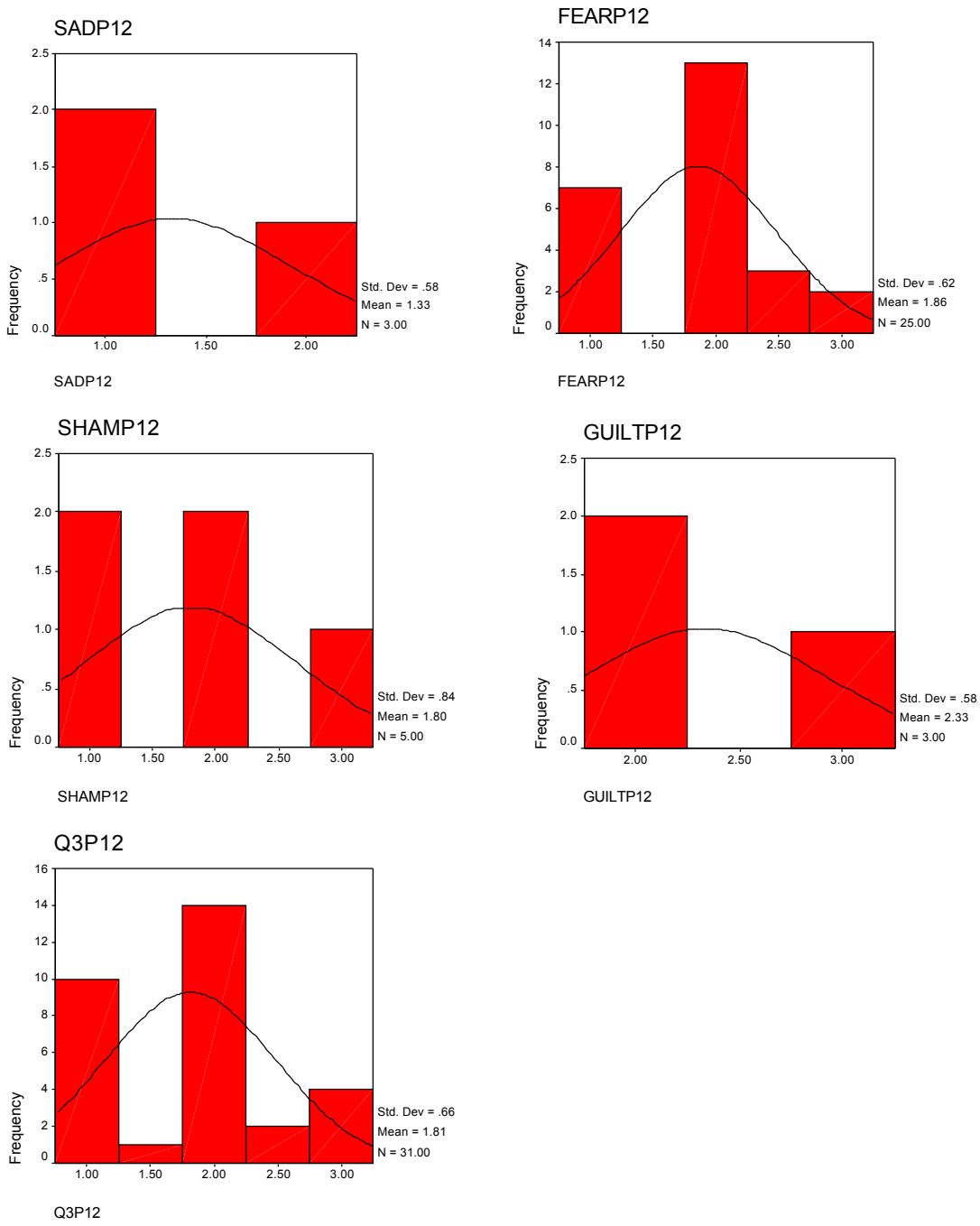






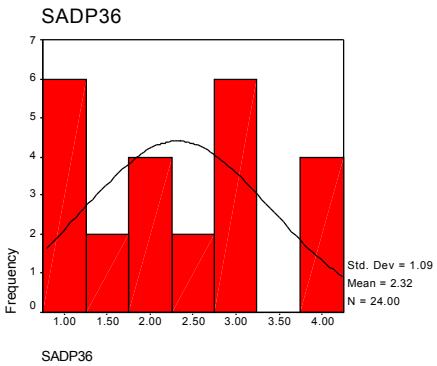
Note. Q2 = approach emotions; P36 = Developing Phase.

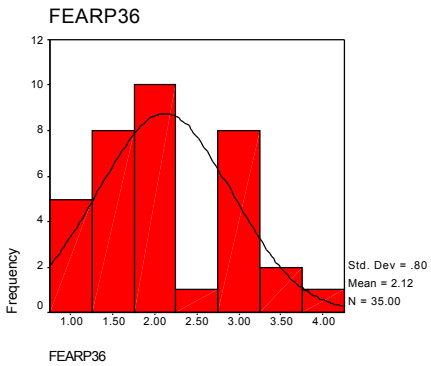
Appendix K1: Histograms Representing Means of Non-Standardized Scores for Resignation Emotions in the Starting Phase (Emotion by Emotion plus a Summary per Class)

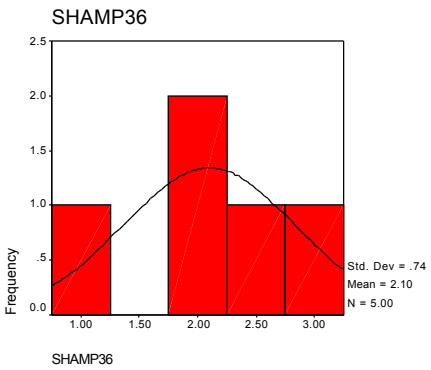


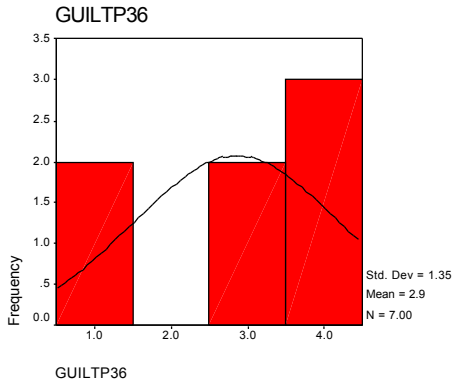
Note. Q3 = resignation emotions; P12 = Starting Phase.

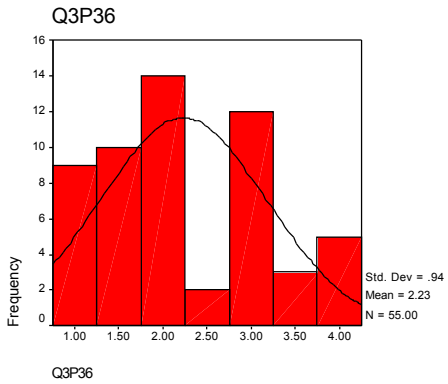
Appendix K2: Histograms Representing Means of Non-Standardized Scores for Resignation Emotions in the Developing Phase (Emotion by Emotion plus a Summary per Class)





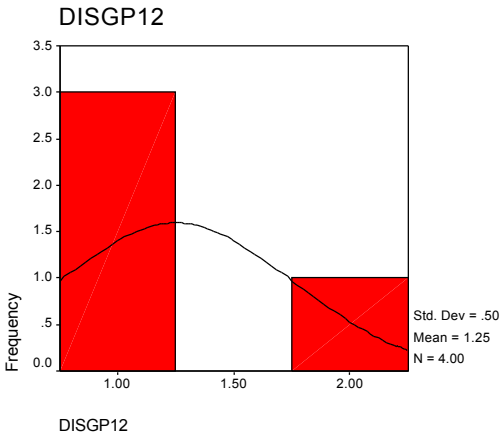


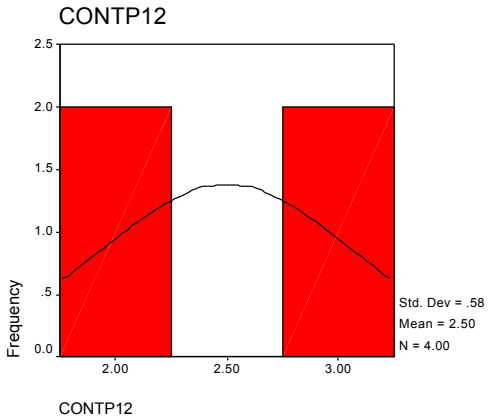


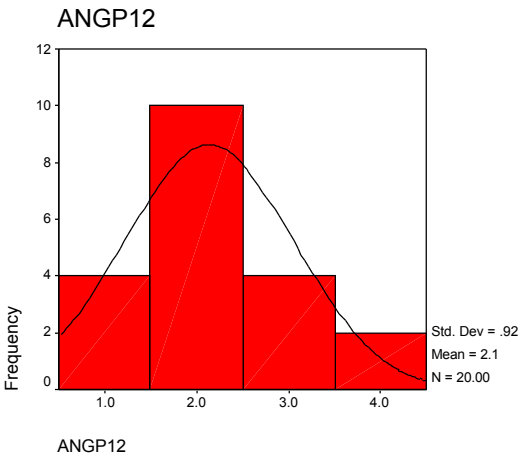


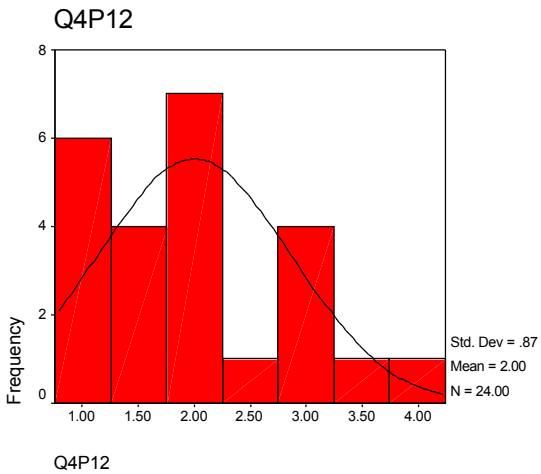
Note. Q3 = resignation emotions; P36 = Developing Phase.

Appendix L1: Histograms Representing Means of Non-Standardized Scores for Antagonistic Emotions in the Starting Phase (Emotion by Emotion plus a Summary per Class)



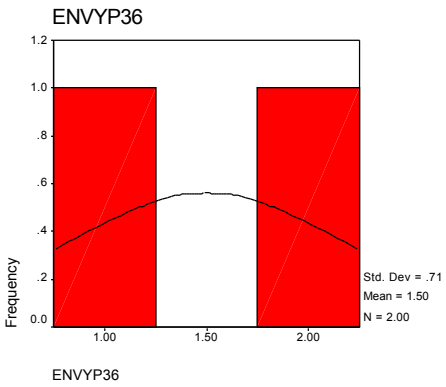


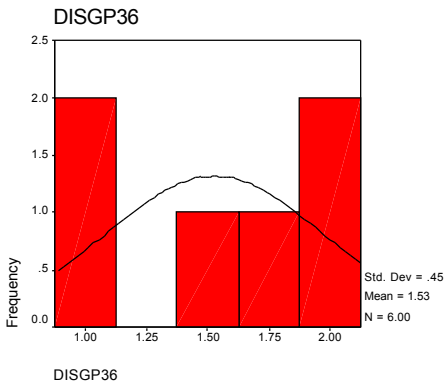


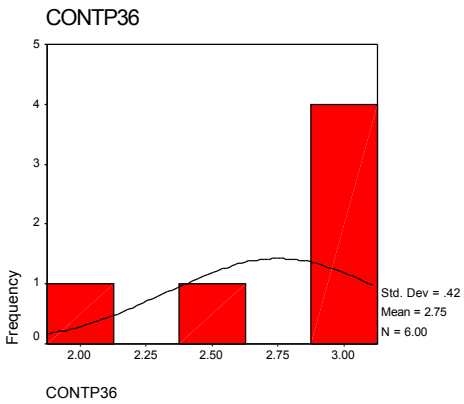


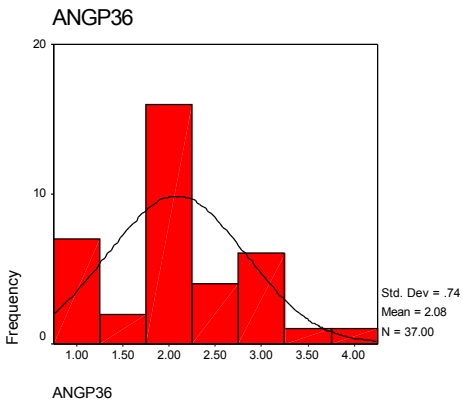
Note. Q4 = antagonistic emotions; P12 = Starting Phase.

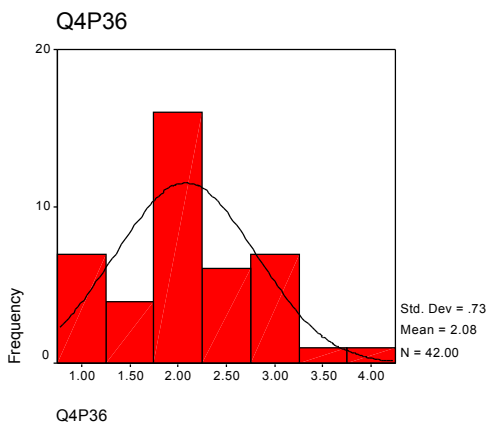
Appendix L2: Histograms Representing Means of Non-Standardized Scores for Antagonistic Emotions in the Developing Phase (Emotion by Emotion plus a Summary per Class)





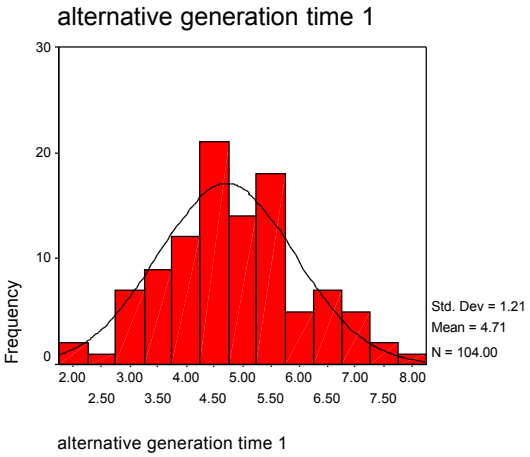


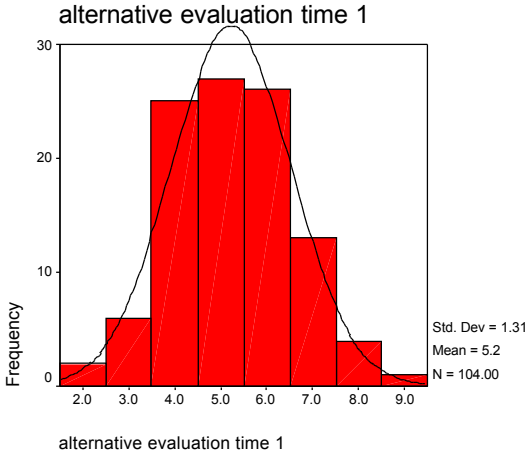


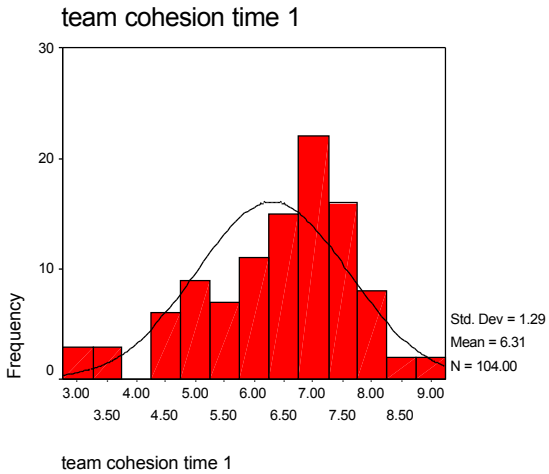


Note. Q4 = antagonistic emotions; P36 = Developing Phase.

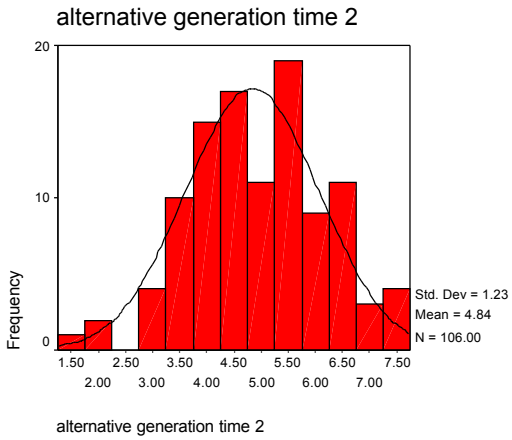
Appendix M1: Histograms Representing Mean Distribution of Non-Standardized Decision-Making Scores in the Starting Phase

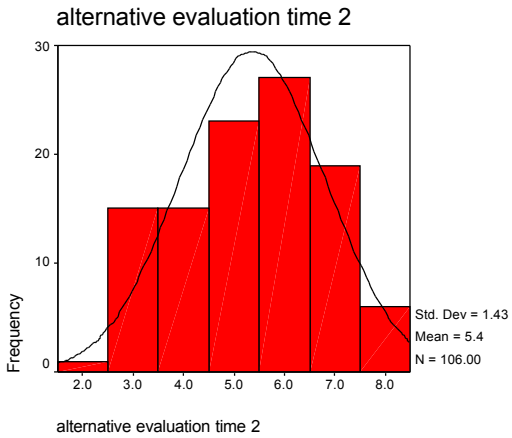


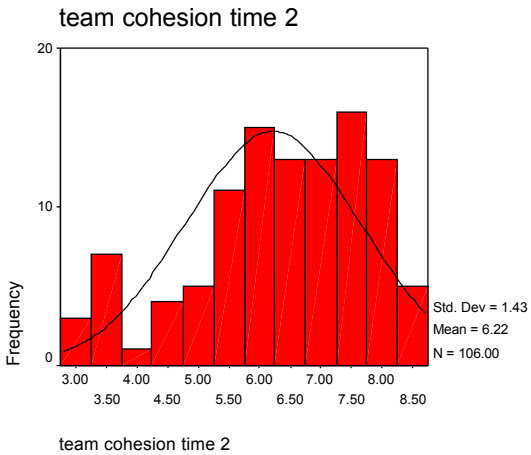




Appendix M2: Histograms Representing Mean Distribution of Non-Standardized Decision-Making Scores in the Developing Phase







Appendix N: Procedure for Data Standardization

As mentioned in Chapter 4, a small number of outliers was found but not eliminated from the data. Preliminary results from a first series of correlations showed that these outliers were apparently caused by systematic biased response tendencies on the part of these participants. To correct for these tendencies, intra-individual z-scores were computed. This procedure, which will be explained below, was first applied to both the emotion and the decision-making variables.

Classes of emotions

Data exploration revealed that 20 participants out of 106 systematically reported emotion scores with intensities of 3 or 4 (4 is the maximum) for positive emotions; 7 out of these 20 participants scored also high on negative emotions. Thirteen participants out of 78 who reported negative emotions gave scores with intensity above 3. This may be explained either by the fact that events causing these emotions were salient enough for the participants that they felt the emotions with strong intensity or these participants were systematically using the highest end of the scale, thus introducing a bias. Thus, it was decided to perform intra-individual z-scores in order to correct for within-subject variability (Scherer, personal communication, July 2001). It is justified especially when there are multiple repeated measures. It eliminates the bias in use of scale, without eliminating the variability due to events or social interactions. The means and standard deviations for classes of emotions after standardization are displayed in Table N1. Figures A and B illustrate the percentage of classes of emotion felt.

Table N1
Means (and Standard Deviations) for Classes of Emotion by Phase, Before and After Standardization

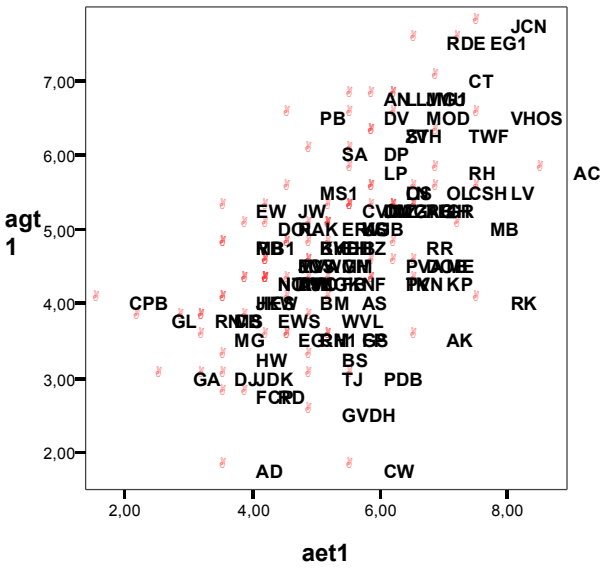
	Before standardization		**After standardization**	
Phase	Mean	Sd	Mean	Sd
Starting				
Achievement	1.04	.43	.17	.19
Approach	1.33	.67	.36	.28
Resignation	.08	.16	.005	.003
Antagonistic	.07	.16	.009	.004
Developing				
Achievement	1.09	.50	.28	.17
Approach	1.17	.53	.34	.23
Resignation	.13	.18	.001	.004
Antagonistic	.08	.12	.007	.003

Decision-making variables

The results reported for the first questionnaire administered after Period 2 will be called Time 1, and the results for the second questionnaire administered after Period 6 will be called Time 2. Two subjects did not turn their questionnaire in at Time 1, thus the means for their respective teams is calculated on the basis of 5 subjects instead of 6 in one case, and on the basis of 6 subjects instead of 7 in the other case. At Time 2, all participants responded, thus there is no missing data.

Given the widespread occurrence of response bias in the use of scales, the procedure of computing intra-individual z-scores was also applied for the decision-making variables. First, intercorrelations between raw scores were performed: they were positive and statistically significant, ranging from .21 to .73. Second, data exploration was performed in order to identify the participants who systematically gave higher scores, with the potential of biasing these results. Figure N1 shows the relationship between Alternative Generation at Time 1 and Alternative Evaluation at Time 1.

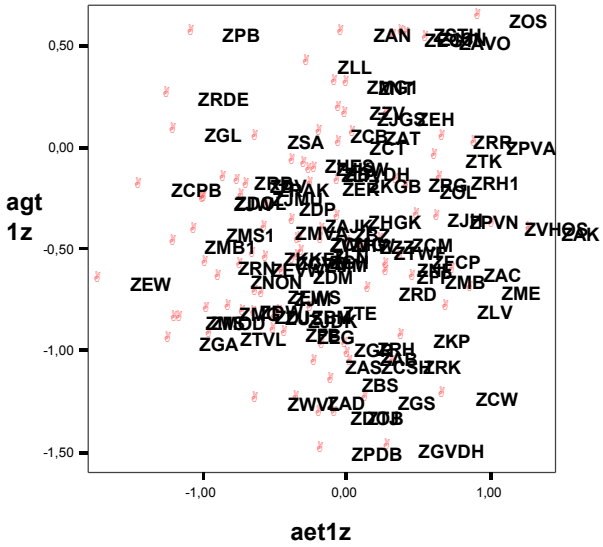
Figure N1. Relationship between Alternative Generation and Alternative Evaluation at Time 1



Note. Participants are represented by their initials.

For example, the participant "RDE", located on the upper right corner of the graph, had a minimum score of 6.67 (scale of 0 to 9), and a maximum of 7.75 (M = 7.3) for all his responses (Time 1 and Time 2). His score on Alternative Generation at Time 1 was 7.50 and on Alternative Evaluation was 6.67. Second example, the participant "JCN", placed above RDE in the upper right corner of the graph, had a minimum score of 5.50 and a maximum of 7.75 (M = 7.04). His score on Alternative Generation was 7.75 and on Alternative Evaluation was 7.67. Thus, intra-individual z-scores were performed to correct for the use of extreme values on the scale. Figure N2 shows the new relationships pattern between Alternative Generation and Alternative Evaluation at Time 1.

Figure N2. Relationship between Z-scores of Alternative Generation and Alternative Evaluation at Time 1



Note. Participants are represented by their initials.

The means and standard deviations for decision-making variables before and after standardization are displayed in Table N2.

Table N2

Means (and Standard Deviations) for Decision-Making Variables by Phase Before and After Standardization

	Before standardization		After standardization	
Phase	Mean	Sd	Mean	Sd
Starting				
Alternative	4.71	1.21	-.46	.50
Alternative	5.22	1.31	-.16	.60
Team cohesion	6.30	1.29	.51	.48
Developing				
Alternative	4.84	1.23	-.35	.50
Alternative	5.37	1.43	-.05	.51
Team cohesion	6.22	1.43	.46	.53

Appendix O: Means, Standard Deviations, and Intercorrelations of Standardized Mean, Last, and Maximum Emotion Scores Across Time Periods at the Individual Level

Mean Overall

	Mean	Sd	1	2	3
AC	.008	.05			
AP	.03	.07	**-.63****		
RE	-.02	.03	**-.35****	**-.34****	
AN	-.01	.02	**-.26****	**-.27****	.03

Mean Starting Phase

	Mean	Sd	1	2	3
AC	-.03	.08			
AP	.02	.12	.09		
RE	-.02	.04	-.03	.02	
AN	-.01	.04	.08	.04	-.06

Mean Developing Phase

	Mean	Sd	1	2	3
AC	.03	.06			
AP	.02	.07	**-.17***		
RE	-.02	.04	**-.24****	**-.17***	
AN	-.01	.03	*-.15*	-.08	**.16***

Last of Starting Phase

	Mean	Sd	1	2	3
AC	-.04	.12			
AP	.07	.16	**.28****		
RE	-.02	.08	-.02	-.11	
AN	-.005	.07	-.03	-.01	.05

Last of Developing Phase

	Mean	Sd	1	2	3
AC	.03	.12			
AP	.02	.15	*.16*$^{+}$		
RE	-.03	.08	.04	.08	
AN	-.01	.07	.10	-.01	**.22***

Max Overall

	Mean	Sd	1	2	3
AC	1.07	.58			
AP	1.2	.66	**-.18***		
RE	.14	.39	.13	-.12	
AN	.11	.36	.13	-.02	**.22***

Max Starting Phase

	Mean	Sd	1	2	3
AC	.56	.60			
AP	.92	.61	.03		
RE	.03	.21	*.16*$^{+}$	-.10	
AN	.05	.24	-.10	**.17***	-.03

Max Developing Phase

	Mean	Sd	1	2	3
AC	1.02	.60			
AP	1.04	.66	*-.16*$^{+}$		
RE	.12	.34	-.01	-.02	
AN	.07	.29	.14	**-.21***	.11

Note. AC = Achievement emotions; AP = Approach emotions; RE = Resignation emotions; AN = Antagonistic emotions; bold italic r = p < .01 (1-tailed); bold r = p < .05 (1-tailed); italic r = p < .10 (1-tailed). N = 106.

Appendix P: Means, Standard Deviations, and Intercorrelations for Standardized Decision-Making Variables in the Starting Phase and in the Developing Phase at the Individual Level

	Starting Phase				**Developing Phase**			
	Mean	SD	1	2	Mean	SD	1	2
1. AG	-.46	.50			-.35	.50		
2. AE	-.16	.60	.12		-.05	.51	**.20***	
3. TC	.51	.48	.13	.10	.46	.53	-.02	**.22***

Note. * $p < .05$ level. One–tailed bivariate correlations. N = 104.

Appendix Q1: Means of Non-standardized Emotion Scores per Team in the Starting Phase

	AC[a]	AP[b]	RE[c]	AN[d]	AG[e]	AE[f]	TC[g]
Team 1	.66	.54	.03	.08	4.5	5.4	6.2
Team 2	.61	.96	.00	.01	4.1	4.8	6.5
Team 3	.99	.57	.00	.05	4.4	6.1	6.6
Team 4	.58	*.86*	.008	00	4.2	5.1	5.4
Team 5	.55	.97	.06	.00	5.0	6.2	7.2
Team 6	.51	.72	.08	.02	5.3	5.0	6.4
Team 7	.38	.57	.05	.05	3.4	5.5	6.3
Team 8	.28	1.1	.07	.00	4.8	5.7	5.2
Team 9	.23	1.1	.02	.03	4.8	4.3	6.5
Team 10	.49	.78	*.03*	.01	6.3	6.5	7.9
Team 11	.35	.93	.07	.17	4.1	3.8	5.2
Team 12	.53	.49	.03	.01	4.7	4.9	5.8
Team 13	.17	.74	.01	.00	4.2	4.5	6.1
Team 14	.10	.15	.00	.00	4.1	4.8	6.0
Team 15	.44	.54	.01	.03	4.3	4.4	5.0
Team 16	.37	.73	.08	.008	4.8	5.2	7.0
Team 17	.32	.62	.008	.03	5.6	5.4	7.0
Team 18	.55	.68	.04	.00	5.8	6.3	7.8
Team 19	.33	.49	.00	.03	6.3	6.7	7.4
Team 20	.54	.83	.04	.00	5.0	4.7	6.3

Note. [a] AC = Achievement emotions; [b] Approach emotions; [c] Resignation emotions; [d] Antagonistic emotions; [e] AG = Alternative generation; [f] AE = Alternative evaluation; [g] TC = Team cohesion.

Appendix Q2: Means of Non-standardized Emotion Scores per Team in the Developing Phase

	AC[a]	AP[b]	RE[c]	AN[d]	AG[e]	AE[f]	TC[g]
Team 1	.85	.52	.00	.00	5.3	6.3	7.2
Team 2	.83	.50	.03	.11	4.3	4.4	5.4
Team 3	.83	.71	.03	.01	4.2	5.7	5.5
Team 4	.75	.75	.02	.008	4.3	4.5	5.8
Team 5	.82	.74	.08	.00	5.5	7.5	7.7
Team 6	.75	*.73*	.03	.02	4.2	4.7	6.1
Team 7	.60	.40	.02	.06	4.3	5.1	6.2
Team 8	.33	.87	.07	.02	4.5	5.1	5.5
Team 9	.33	1.2	.03	.04	5.3	5.5	6.8
Team 10	.53	.76	.14	.06	5.4	6.2	7.3
Team 11	.58	1.03	.07	.03	5.6	4.8	5.9
Team 12	.66	.38	.05	.04	4.5	4.9	5.2
Team 13	.42	.48	.08	.02	4.1	4.4	5.6
Team 14	.28	.28	.10	.02	4.2	5.0	6.0
Team 15	.71	.26	.06	.05	4.4	4.0	5.1
Team 16	.53	.75	.13	.008	5.2	5.6	7.0
Team 17	.50	.71	.00	.03	6.0	6.9	7.0
Team 18	.34	.78	.04	.03	5.6	6.4	7.0
Team 19	.29	.46	.02	.04	5.7	5.7	7.0
Team 20	.77	.64	.03	.00	5.1	6.1	6.9

Note. [a] AC = Achievement emotions; [b] Approach emotions; [c] Resignation emotions; [d] Antagonistic emotions; [e] AG = Alternative generation; [f] AE = Alternative evaluation; [g] TC = Team cohesion.