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WHEN COOPERATION STUMBLES:
THE EFFECTS OF GRADES ON INDICATORS OF COOPERATION

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Par
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When cooperation stumbles : the effects of grades on indicators of cooperation

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IMPRIMATUR

Vu l'accord de cotutelle conclu entre les Universités de Lausanne et Paris Ouest-Nanterre La Défense, le Conseil de la Faculté des sciences sociales et politiques de l'Université de Lausanne, sur proposition d'un jury formé des professeurs

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autorise, sans se prononcer sur les opinions de la candidate, l'impression de la thèse de Madame Anne-Sophie HAYEK, intitulée :

« WHEN COOPERATION STUMBLES : THE EFFECTS OF GRADES ON INDICATORS OF COOPERATION ».

Le Doyen de la Faculté
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Lausanne, le 28 avril 2014

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Résumé

Dans la plupart des pays occidentaux, les notes sont majoritairement utilisées pour évaluer la performance et rendre compte de la réussite scolaire des individus. Dans cette perspective, elles sont non seulement un indicateur de succès ou d'échec, mais aussi de la valeur comparative des individus. Dans cette thèse nous proposons de tester l'effet des notes lorsque celles-ci sont utilisées dans des contextes bien spécifiques de coopération. En effet, si les notes et la comparaison sociale sont pratique courante, les étudiants sont souvent encouragés et amenés à coopérer en groupe. Cependant, à notre connaissance, point d'études n'ont testé l'effet des notes sur la coopération; études qui seraient pourtant légitimes étant donné la tendance existante en milieu éducatif à encourager les pratiques coopératives. C'est précisément ce que proposent de faire les chapitres expérimentaux de cette thèse. Le premier (Chapitre 4) teste l'effet des notes au regard de leur capacité à accentuer à la fois la visibilité et la comparaison sociale. Deux expériences investiguent l'effet des notes et tentent de démêler ce qui, de la visibilité individuelle, de la comparaison sociale ou des deux, pourrait affecter un biais motivationnel qui réduit la propension à coopérer: la propension à préférer les informations qui confirment les choix de l'individu. Les résultats montrent qu'en situation coopérative, les notes accroissent ce biais comparativement à des situations où seule la visibilité individuelle est soulignée, suggérant de plus que les notes produisent une focalisation des individus sur une comparaison sociale compétitive. Le second (Chapitre 5) teste l'effet des notes sur les interactions coopératives des individus, précisément sur le partage d'information. Deux expériences montrent que dans un contexte de travail en groupe coopératif, les notes entravent le bon partage des informations entre individus, les amenant à faire de la rétention d'information. Enfin, le troisième (Chapitre 6) investigue l'effet des notes sur un autre indicateur de coopération en groupe: la coordination interindividuelle. Les résultats montrent que les notes réduisent la coordination des individus et les mènent à avoir des comportements de dominance négative entre eux. En somme, les notes entravent la coopération et réduisent les comportements coopératifs entre individus. Enfin, nous discutons des implications pour le milieu éducatif.

Mots clés: *notes, coopération, comportements, motivations-mixtes, visibilité.*

Abstract

In western societies, grades are to date the most widespread means by which achievement and performance are assessed in educational contexts. Grades are used for their capacity to provide individuals with a clear indicator of success or failure, in particular in comparison to others; in this respect, we study their impact on particular work contexts requiring cooperation. Indeed, students are often exhorted to cooperate and work in groups, while at the same time assessed with grades and focused on inter-individual comparison. However, to the best of our knowledge, no work has investigated the effects of grades on cooperation and on indicators of cooperation, a central question to be addressed given its significance for educational trends encouraging cooperative practices, and which we propose to explore in the experimental parts of this thesis. The first experimental chapter, Chapter 4, investigates the effect of grades with regards to their capacity to highlight individual visibility and at the same time social comparison. It tries to disentangle which of these facets could affect a motivated bias likely to reduce cooperation, namely individuals' preference for information confirming their own choice. In two experiments, results showed that a graded-cooperative situation increased this preference effect in comparison to other conditions where only individual visibility was manipulated, and furthermore increased individuals' perception of a competitive atmosphere. Chapter 5 investigates the effect of grades on direct cooperative inter-individual interactions, namely on group information sharing. Two experiments showed that grades hindered informational communication between individuals, leading them to withhold crucial task-information. Finally, Chapter 6 investigates the effects of grades on another indicator of group cooperation, namely inter-individual coordination. Results indicated that showcasing grades at the onset of a cooperative task necessitating inter-individual coordination decreased group performance and elicited more negative dominant behaviours amongst participants. Together these results provide evidence that grades hamper group cooperation. We conclude by discussing implications for the practice of grading in Education.

Keywords: *grades, cooperation, behaviours, mixed-motives, visibility.*

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INTRODUCTION

… Somewhere in a university locker room: Mister J., a promising basketball player, will be on the field tonight to play a very important game with his team. Nevertheless he seems to be torn between two issues: not only is the game important because his team winning is a must, he also knows that he will be observed and evaluated during the game, as a national sport-selector will be there to evaluate his play on the court to consider the possibility for Mister J. to join a basketball team of national level. Mister J., knowing he will be observed and evaluated, wonders whether he should put himself forward during the game, mainly looking to score, or whether he should balance that personal interest with providing assists and focusing more on contributing to a cooperative team-play.

… Somewhere in a classroom: the teacher has gathered Tom and his classmates in groups to work on a common project for which they have different yet complementary resources at disposal (documents, arguments, etc.). The teacher explains that during group work they will need to share those resources with one another in order to successfully complete their project. Moreover, the teacher will also grade students on their individual contributions to the project. Indeed, during group working hours, the teacher will drop by each group to observe and evaluate members based on their input to the group work. Tom, knowing he will be graded, starts wondering whether he should give his precious resources to genuinely cooperate with others on the project, or whether he should try to use them more strategically and at critical moments of group work to show how important his contribution is to the group work and thus put himself forward when the teacher comes to check on them.

How will Mister J. and Tom react to what appears to be a double-bind situation? Indeed, whether in the basketball game setting or in the group work project setting, the double-bind aspect of the situation is partly due to the fact that cooperation is an imposed requirement, embedded in the way group work is structured between individuals. In both cases, group members are bound together by the necessity to exchange the different resources possessed and by the fact that they are given a same goal to fulfil. In other words, Tom and Mister J. are tied to their

fellow members regarding the work to achieve in a positive goal interdependence which characterizes cooperative structures; D. W. Johnson & R. Johnson, 2009a). Hence, in those examples, cooperation is a must in order to reach a collective and optimal outcome. However, the expectation of being individually assessed during group work might raise self-interests that could make it tempting for members not to cooperate (the overall situation of two co-existing opposed motives resulting in what is called a “mixed-motives conflict” situation, Drolet & Morris, 2000, p.26).

Thus, could it be that the expectation of an individual grade triggers an individual motive that contradicts the cooperation motives implied by the cooperative requirements of the setting? Indeed, in practice, grades are commonly used to rank and compare outputs (Marshall & Weinstein, 1984), to which students are socialized since school benches. But because grades are individually attributed in this special cooperative group context, they might focus individuals on each of their own outputs and not on the group’s common output (introducing either a negative goal interdependence among members, which characterizes competitive structures, or an individualistic independence; D. W. Johnson & R. Johnson, 2009a). Therefore, we asked ourselves to what extent, in this particular group setting where individuals are tied together in the achievement of their work, individual grades (or their expectation) could interfere and hamper group cooperation? A question to which the work conducted in this thesis will try to answer as following.

Chapter 1 reviews grades as assessment tools, present their different components and investigates the different processes that could be enhanced when grades are expected. Chapter 2 presents groups as information processors and decision makers. It furthermore presents cooperative group work (structure, advantages) to identify the behaviours and benefits that should be at stake if cooperative group work was to be endangered. Chapter 3 presents three experimental paradigms and tasks used in the present work to observe group cooperation. Last but not least, Chapters 4, 5 and 6 successively experiment the effect of grades on variables accounting for group cooperation, at the following different levels: at intra-individual level, on information sharing group level and on inter-individual coordination.

CHAPTER 1.
GRADES AS ASSESSMENT TOOLS

1.1 The double-edged effect of grades

In educational settings, grades (e.g. score scales, letters, percentile score) are widespread assessment tools that can be used with two different purposes. They can either be used to compare different students' scores on a given task and thus gauge their work against one another (called, "norm-referenced" assessment), or they can be used to compare the work of a student against a given standard (called "criterion-referenced" assessment, Brookhart, 2004). For instance, in most Swiss educational settings, the scale on which work is evaluated ranges from 0 to 6, and the standard that one needs to reach to pass is 4. In most French educational settings, the common scale to grade students' work ranges from 0 to 20, and the standard that one needs to reach in order to pass an exam would be to score 10 out of 20. Whilst grades can have two different assessment purposes, they engender sometime positive and sometime negative effects. Grades are found to be good predictors of results to achievement tests or personality tests (De Ketele, 1993), but also to undermine students' intrinsic motivations to learn (defined as the motivation to undertake a task without any constraint and with the aim of improving learning and mastery, see Butler 1987; Kohn, 1993 in McClam & Sevier, 2010), to trigger individuals' adoption of performance avoidance goals (i.e. the goal of avoiding to be outperformed by others; Pulfrey et al., 2011) and to activate the anxiety behind the motive of avoiding failure (Atkinson & Litwin, 1960). Grades are also deleterious for performance in comparison to the performance achieved when students are evaluated with written comments (Butler & Nisan, 1986). Moreover, Butler (2006) has shown that an anticipated evaluation which has the goal to assess students relative to others (as do grades when used as a norm-referenced assessment) led individuals

to view task-achievement as an opportunity to show one's superior ability relative to others, i.e. undertaking a task with the goal of showing one's superior ability relative to others, or to avoid being inferior to others, which is called ability goals or performance goals, as opposed to mastery goals[14] (Butler, 2000). Such a finding is particularly problematic because, in turn, ability goals are associated with superior performance only if task achievement requires rote learning (e.g. in multiple choice examinations, Harackiewicz et al., 1997) or if it requires putting into practice familiar skills (Barron & Harackiewicz, 2001). But whenever the task requires problem solving or divergent thinking, the adoption of ability goals becomes deleterious for performance (Utman, 1997, in Butler, 2000).

If grades do affect individual performance (positively or negatively), the focus of the present thesis is rather to determine whether they can affect group cooperation. Precisely, the focus will be to investigate whether grades can affect variables that are known to be strong indicators of cooperation. We will start by describing some important mechanisms elicited by grades, such as visibility and comparison processes. We will then use these mechanisms to describe which effects could be expected when grades are triggered in cooperative group settings.

1.2 Disentangling different types of visibility elicited by grades

Visibility due to public handing out of grades

A first type of visibility is found in relation to grades in the literature, that relates to the potential that grades have to render social comparison information visible, or else said, the information on which one compares relative to others (e.g. the score or grade obtained on a test). More precisely, Monteil and Huguet (2002) distinguish the situations in which grades are handed out publicly (e.g. when grades are given in front of a classroom) from those in which they are handed out anonymously. On the one hand, if grades are given publicly, the social comparison information is visible. For example, the score obtained by one person is visible and accessible to the rest of the audience. Thus, the visibility of the social comparison information increases the

[14] Other labels have been used to describe the same distinction: mastery vs. performance goals (Darnon, Butera, & Harackiewicz, 2007; Darnon, Dompnier, Gilliéron, & Butera, 2010); learning vs. performance goals (Dweck, 1986); task vs. ego orientation (Nicholls, 1989).

chances of the audience to undertake comparison (i.e. social comparison, Festinger, 1954) by gauging the different pieces of information that are rendered visible by this public handing out of grades. We note by extension, that the visibility of the social comparison information is therefore potentially at stake whenever grades are expected to be given in the open of a group setting.

How does visibility interact with social comparison to affect performance? An experiment conducted by Monteil (1988, study 1) manipulated first whether evaluation was either visible (students expected to be verbally tested in front of the rest of the classroom) or anonymous (students taking a written test). Second, they manipulated the presence /absence of social comparison. When present, the experimenter told students publicly that half of them belonged to a high level of achievement (level 2) while the other half belonged to a low level of achievement (level 4). When absent, the experimenter told students publicly that the two halves had the same level of achievement. During the experiment, students attended a course, and were then individually evaluated on a 10-item questionnaire. What is interesting to our concern is that results showed that the visibility of evaluation affected the performance of students only when social comparison was made salient but not in absence of comparison. Moreover, visibility affected performance differently depending on the students' level of achievement, high or low: under visibility condition, high achievers' performance was better than under anonymous condition. The reverse was observed with low achievers performing worse under visibility than anonymous conditions. More to the point, the effect of visibility on high achievers was replicated (Monteil, 1988, study 2) in an identical experiment where only high achievers participated and where social comparison information (the previous high vs. low achievement distinction) was instead manipulated by giving a success (vs. failure) bogus feedback to students performing a first task before answering the questionnaire. The interest was to see whether the positive effect of visibility was only due to the personal competence of individuals (being high-achievers). Although the replication was not tested on low-achievers (which could have made it a full replication), the results of this second study showed that visibility is deleterious for individual performance even for high-achievers, those who carry the

reputation and the history of being high achievers, when they received a bogus failure feedback before performing.

Thus, two important points stem from those studies. Firstly, the fact that visibility of evaluation affected performance only when social comparison was made salient, it points to the fact that social comparison is rather essential to trigger the effects of visibility of evaluation. Secondly, that visibility of the social comparison information affected students differently depending on their actual level of achievement (study1, for high and low achievers) or on their bogus level of achievement (study 2, for high-achievers). Visibility resulted in a debilitating effect for low achievers (study1) and for high-achievers when they received a *bogus* failure feedback (study 2). This suggests that the deleterious effect of visibility of the social comparison information is not dependent on the objective reputation that individuals have (i.e. the one that is defined in terms of objective level of measured performance). Rather, the effect is dependent on the competence that they are given to perceive, which suggests that visibility of social comparison information is deleterious precisely when it emphasizes the weakness of a student to deal with a task. This weakness could furthermore be interpreted as reflecting his own low-competence or incompetence regarding the task to achieve, but mostly, as compared with others.

However, is visibility of evaluation the only type of visibility triggered and concerned by the situation of a public/anonymous handing out of grades? How about the situations in which they are not given publically? Do they imply that no visibility at all is triggered? More relevant to the effects of grades on cooperation, does anonymity imply that grades are a mere evaluation tool with no consequences for people's performance?

Social visibility

We report here another kind of visibility that can be distinguished from the public handing out of grades. Indeed, the visibility of individuals at work can be highlighted even when grades are given anonymously or when they are not given at all (i.e. absence of grades). It is the type of visibility that is at stake when individuals

are under the observation of a watchful audience during their task-achievement (or, is under the observation of others; Merton, 1968). In that sense, being observed implies that one is visible during task-accomplishment. This social visibility has been widely used and investigated in social facilitation-inhibition literature (e.g., Zajonc, 1965; Bond & Titus, 1983; Mullen, Bryant, & Driskell, 1997; Blascovich, Mendes, Hunter, & Salomon, 1999), especially in the use of the audience-effect paradigm that investigates the effects on individual performance of knowing that an audience is watching while one is performing a task. In that paradigm, others are present but are not actively taking part in the task, and visibility is at stake because the experimenter brings individuals' attention to the fact that they will be observed during their task-achievement. Hence, being observed implies a certain degree of visibility for individuals who are performing.

Several ways of manipulating social visibility, and hence of highlighting it, have been used in the social-facilitation literature. Either, for example, when individuals learned that a peer will be there to observe them while performing (Blascovitch et al., 1999) and to monitor them (Borden, Hendrick, & Walker, 1976 in Mullen, Bryant, & Driskell, 1997). Or, for example, when individuals learn that present spectators will be there, however without any interest in watching them perform (Cottrell et al., 1967; Zajonc & Sales, 1966; Cottrell, Wack, Sekerak, & Rittle, 1968). It is worth noting that visibility does not yield the same effects on performance depending on whether it stems from a rather evaluative presence (e.g., when individuals know that they are visible because they are being monitored) or from a rather non-evaluative presence (e.g., when they know they are visible but little attention is paid to the performance). When visibility seemed to stem from a non-evaluative presence, it produced positive and facilitating effects, namely an amelioration of quantity and quality of performance on simple tasks, on variables such as the time needed to complete an extended behaviour and the proportion of errors obtained on a given task (Bond & Titus, 1983), or producing a challenge pattern of cardiovascular activity enhancing performance on well-learned tasks (Blascovitch et al., 1999). Conversely, when visibility seemed to stem from a rather evaluative presence, the reverse effect was obtained, with visibility producing negative and inhibitory effects, namely a threat pattern of

physiological reactivity associated with an impairment of performance on unlearned tasks (Blascovitch et al., 1999).

However, individual visibility in social facilitation literature relates to individual situations of performance and does not involve individual visibility elicited in groups settings, mostly used by studies investigating social loafing phenomenon (Ringelmann, 1913). This phenomenon describes “the decrease in individual effort that occurs when individuals work within a cooperative group rather than alone” (in Kravitz & Martin, 1986, p. 936); a phenomenon that is observed when working on tasks requiring either physical (e.g., Williams, Harkins, & Latané, 1981) or cognitive efforts (e.g., Petty, Williams, & Latané, 1977). In this literature, increasing the visibility of individuals who are working in a group setting is an efficient way to reduce loafing and is done by making individual contributions identifiable. For example, Williams et al. (1981, experiment 2) ran a study where participants were asked to shout: alone or in groups, with or without microphones to identify their individual inputs. Results showed that when set in groups, individuals who knew that their inputs to group work would be identifiable and traceable back to them, invested more effort in shouting than when their individual inputs were not identifiable.

As one can see, different definitions of visibility have so far emerged from our investigation of the previous social psychological literature and all seem to be relevant to our quest of trying to understand why grades could be expected to affect cooperation. However, if they are all relevant, they are so for different theoretical and experimental purposes. Thus, in order to best experimentally investigate the effects of grades in comparison to different types of visibility that can be elicited, it was important to try to take the different types of visibility into account and compare them to a “graded and visibility” condition where grades would be manipulated. The underlying idea being to show that an increased individual visibility (whichever the type) is not deleterious per se but that it might become so when it is increased through the use of grades.

Firstly, stemming from the idea that grades have the capacity to increase the visibility of an individual during task-achievement, we have analysed visibility as

defined in the Social Facilitation-Inhibition (SFI) literature. In this literature, called social visibility, visibility is defined as the visibility of an individual at work that is emphasized by the presence of a co-actor or by the presence of a watchful audience. Thus, visibility seems to be deleterious for an individual's task-achievement, and to disturb his attention, only when the presence of a watchful other has a potential evaluative purpose (with a negative component linked to a kind of threat perception). Therefore, if we wish to test grades' effect on individual level, we need to rely on how individual visibility was operationalized in SFI literature. The rational would be to manipulate visibility in order to show that grades might have a deleterious effect because they have this evaluative facet that increases individual's social visibility, whereas overruling the possibility that other visibility situations that do not hold this facet will be deleterious. Accordingly, in studies run at an individual level (Chapter 4), we chose to operationalize visibility in terms of either mere presence (i.e., a person is present during the task to be achieved), or visibility (i.e., a person is present during the task and is interested in watching the individual achieve).

Secondly, stemming from the idea that grades have the capacity to increase the visibility of individuals (of their work, their competence, or what they are worth) in comparison to others, we have considered the distinction brought by the studies of Monteil (1981, 1988) to be highly relevant to understand what effects could grades produce when expected in the open of a group setting. Monteil's work has the particularity of addressing the type of visibility that is exacerbated in a situation of evaluation, the one generally encountered in a school setting. He addresses visibility with the interchangeable use of two different terms: (a) the term "social visibility of comparison" or *Visibilité sociale de la comparaison* (i.e. the visibility that stems from a social comparison that is undertaken or about to be undertaken), and (b) the term "visibility of evaluation". Visibility in Monteil's terms (since different visibilities are used equivalently) impacts differently an individual's performance depending on whether evaluation takes place in public (in a group; in front of others) or in a private setting. Moreover, it is important to note that the effects of a public evaluation appear in these experimental procedures by merely letting individuals *think that* they will be evaluated publicly. Thus, it is the mere expectation of a public evaluation that

produces the effects obtained in the studies that we have mentioned earlier. Hence, Monteil's conceptualization of the visibility (and its effects) as being triggered by the expectation of a feedback given to students regarding the performance, behaviour or status, was particularly useful to help us form expectations about the effect(s) of grades when these are expected in the open of a group setting. Precisely, Monteil found that visibility of the comparative information accentuated the salience of social comparison. Thus, if we wish to test grades' effect in a group setting, one would need to distinguish: a condition where individuals are graded and visible, from a condition where individuals know that they are only visible without being assessed nor compared. Indeed, if on the one hand working in a group setting naturally provides a favourable context to the rise of social comparison; on the other hand, Monteil's studies pointed to the fact that all social comparisons made salient did not necessarily impair performance. More to the point, haven't we got evidence from the literature on social loafing that increasing individual visibility and making individual contributions identifiable in a group setting has the positive effect of increasing individuals' inputs and efforts to a task undertaken collectively? Therefore, if we ultimately wish to test the effects of grades in a (cooperative) group setting, we need to rely on Monteil's definition of visibility of evaluation and distinguish it from the emphasis of inter-individual social comparison by comparing a graded condition to one where only visibility would be manipulated without any comparative component. Thus, we operationalized visibility in our group studies (Chapter 5) following the visibility definition of Monteil.

Taken together, these elements suggest that increasing individual visibility seems to be deleterious for task achievement only when linked to a social comparison that emphasizes a possible weakness of the individual, or when visibility is increased by means of an evaluative presence that induces a threat pattern reaction. But, do all pressuring and evaluative situations that increase individual visibility necessarily lead to negative effects, or could there be exceptions? To answer this question we will investigate the concept of accountability. As we will see next, this concept is of particular interest because its definition includes an evaluative component and its experimental manipulation is based on increasing the visibility of individuals (precisely, their standpoint). Hence, accountability is interesting to

compare to a grades condition because it implies both visibility and evaluation, but an evaluation that is not normative (i.e. that is not focused on comparing one's work to that of others).

1.3 Disentangling accountability from Grades

Individual accountability, in its broad sense, is about being responsible for an outcome, or being responsible for one's share of work in a cooperative setting (e.g. in cooperative learning methods, D.W. Johnson & R. Johnson, 1989; D.W. Johnson & R. Johnson, 2002). Given the various fields where individual accountability has been investigated, we will here focus on results obtained in psychological research, which has examined the effect(s) of individual accountability as producing self-critical and effortful thinking on different variables reflecting cognitive processes, such as, attribution, judgment accuracy, or attitude formation and change. Green, Visser and Tetlock (2000, p. 1380) define individual accountability as "the social pressure to justify one's views to someone else". This definition is quite interesting as it captures a pressure component that is part of individual accountability, a pressure triggered by the fact that the individuals have to justify or account for their point of view in front of an audience. Thus, we had different reasons to think that individual accountability was worth being compared to grades. First, because individual accountability induces a pressure, it seemed to provide a broad evaluative setting. Second, because, although factors used to manipulate individual accountability have varied a lot, one has been consistently used: the extent to which the point of view held by participants is made visible to an audience, which is interesting to our concern as we have until now tried to ascertain whether grades can have deleterious effects because they enhance the visibility of individuals at work. Third, because although individual visibility is part of individual accountability and that this latter holds a pressure-like component, this concept has nevertheless resulted in positive outcomes on cognitive processes. Those effects are however obtained under some specific conditions that we will shortly develop.

Accountability beneficial for cognitive variables

As we mentioned, accountability has been shown to positively affect variables of cognitive nature by overall reducing judgmental biases. For instance, in impression-formation paradigm, it has reduced primacy effect by increasing individuals' attention to all evidences available, including contradictory evidences, and has led individuals to modify their initial impression in responses to those contradictory evidences (Tetlock, 1983b). In an essay-attribution paradigm, holding individuals accountable has allowed to reduce the over-attribution effect (Jones, 1979; also called, fundamental error attribution, Ross, 1977) in comparison to individuals who were not held accountable (Tetlock, 1985b). Finally, accountability has increased the complexity of judgmental processes in an attribution of responsibility paradigm, by allowing accountable individuals to reduce their tendency to make extreme attributions of responsibility and punishment in comparison to non-accountable individuals (Lerner, Goldberg, & Tetlock, 1998).

Hence, given the previous point, individual accountability is interesting to consider because it seems to reduce reasoning biases and to promote a more effortful way of thinking, although pressure and individual visibility are at stake, which is to some extent similar to grades. However, it is worth noting an important difference: contrary to individual accountability, grades imply a type of evaluation that can be viewed as normative --that focuses on comparison of one's work with that of others-- which in turn can sometimes be cognitively paralyzing (as it will be developed in a subsequent section dedicated to social comparison). Indeed, accountability only results in high effortful thinking under a specific combination of factors, which we will now investigate with the report of two studies. We note that we precisely selected studies conducted in the realm of controversial issues (i.e., where different point of views can arise on a same topic) because a controversial issues setting is more similar to the setting of a cooperative group work in which different point of views can confront one another, and where efficient cooperative group work necessitates from individuals to be able to thoroughly investigate the different point of

views, which in turn basically requires individuals to be able to take into account different (or alternative) perspectives to their own.

Accountability, a socially pressuring factor

As Lerner and Tetlock (1999) noted, individual accountability does not always result in positive effects on thinking. More particularly, individuals made accountable do not always cope with the pressure of being accountable in the same way. Some individuals use *low-effort coping strategies*, such as using conformity (i.e. when individuals made accountable simply decide to shift their point of view towards the point of view of the audience to whom they expect to have to justify their point of view; Tetlock, 1983a; Tetlock, Skitka, & Boettger, 1989). Some use defensive bolstering (i.e. when individuals made accountable allocate most of their time and energy in terms of mental efforts to justifying their point of view). This defensive reaction occurs, for instance, when individuals are committed to the point of view to which they have been made accountable (Tetlock et al., 1989). Others use *high-effort coping strategies*, such as pre-emptive self-criticism (Tetlock 1983a): a multidimensional and flexible way of thinking, in comparison to a rigid and one-sided perspective way of thinking. Hence, it is precisely for this positive and cognitively enhancing effect that individual accountability is capable of producing, notwithstanding its pressure component, that we got interested in comparing it to grades.

In the first experiment by Tetlock (1983a), the aim was to investigate whether accountability would lead accountable-individuals to more complex thinking when facing a controversial issue and having to account for their point of view to another person. The main result obtained is that accountability—compared with an anonymous, no-accountability condition—led individuals to more complex thinking, but only when the point of view of the other remained unknown to accountable-individuals (in comparison to when the other's point of view was known).

In the second study by Tetlock et al. (1989), the aim of the authors was to test the hypotheses of the social contingency model of judgment and choice (Tetlock, 1983a) that predicted the three different coping strategies that we have previously

cited (conformity, defensive bolstering, and, the only positive coping strategy on which we chose to focus, pre-emptive self-criticism). Their expectations, for participants made accountable, were that pre-emptive self-criticism would occur only when participants ignore the point of view of the person to whom they were made accountable and are unconstrained by past commitment. Defensive bolstering would occur when individuals are committed to the positions to which they are made accountable. Whereas conforming to the point of view of others would occur whenever participants know the others' point of view, and are unconstrained by past commitment. To our interest, being individually accountable engendered a positive type of coping strategy (i.e., pre-emptive self-criticism), only when accountable individuals did not commit to an attitudinal stand (i.e., asked to defend a point of view) and when the point of view of the other remained unknown. This may have happened because no normative social comparison could take place. In this case, accountable individuals were the only ones who tried to anticipate potential critics and objections from the persons to whom they were made accountable, engaging in a more complex and flexible way of thinking.[15]

To sum up, these studies (Tetlock, 1983a; Tetlock, et al., 1989) suggest that individual accountability, manipulated by increasing the visibility of the point of view supported by a person, resulted in a socially pressuring situation (Lerner & Tetlock, 1999) for individuals (leading to different coping strategies). Nevertheless, this socially pressuring situation was able to engender positive effects. Thus, in comparison to grades that also increase individual visibility, as well as normative social comparison, individual accountability provides another pressure-like evaluation concept where individual visibility is increased and yet can result in positive outcomes.

One last important point. One should note that the concepts of accountability are various even though we already restrained the field of the literature in which we investigated it. A variation that we subsequently propose to outline and discuss in line

[15] In the other cases, individuals made accountable, either simply shifted their viewpoint toward the viewpoint of the person to whom they were accountable (when they did not commit to an attitudinal stand first), or engaged in self-justification (when they had committed to an attitudinal stand first)- "with thinking of as many reasons as they could for why they were right and potential critics were wrong" (p. 638).

with our experimental needs to show that in comparison to grades, all conditions that exhibit individual visibility are not necessarily deleterious. Precisely, we found that individual accountability in its widest definition is about being responsible for one's share of work or outcome in a cooperative setting (D.W. Johnson & R. Johnson, 1989; D.W. Johnson & R. Johnson, 2002). But we also found more accurate definitions of it, such as "the pressure to justify one's causal interpretation to others" (Tetlock, 1985, p. 227), or similarly as "the social pressure to justify one's views to someone else" (Green, Visser & Tetlock, 2000, p. 1380). And that it also exists under the form of group accountability; indeed some authors suggest that in order to increase responsibility among group members and to intensify cooperation, both individual and group accountability should be at stake (D.W Johnson, & R. Johnson, 2005a; 2009a). However, our interest is to find situations where solely individual visibility is highlighted in order to compare it to a grading situation that also highlights individual visibility and to be able to draw inferences and conclusions based on this comparison.

Therefore, a first choice was made to focus on the manipulation of an *individual* form of accountability. Hence, under its individual form, we retained the most accurate definition of accountability, that of being the pressure to justify one's point of view to others, as under this form accountability would operate on an individual level in the same way where grades operate when they are expected individually. In this case, individual accountability leads to a pressuring situation and is generally experimentally manipulated by announcing that individuals will have to justify their viewpoint to another person and hence making the point of view of the accountable person visible and identifiable to that other person. Accordingly, a second choice was made to experimentally manipulate individual accountability through the scope of the demand made to participants to justify to another person which triggers that having to justify will mean that their point of view is visible to that person. In that sense, individual accountability enhances individual visibility in a pressure-like situation, nevertheless without necessarily hampering the outputs of individuals. Under those conditions, referring to individual accountability will allow us to get closer to our goal, which is to make sure and prove that all situations that accentuate individual visibility are not necessarily deleterious, in comparison to

situations where grades are expected and which should be the only ones where individual visibility is increased and results in deleterious outputs for cooperation.

Therefore, it seems that increasing the visibility of one's point of view (or one's work) is not deleterious, including when the increase comes along with an evaluative pressure (i.e. as it is the case in the manipulation of individual accountability that we retained). But grades also elicit individuals' visibility. We thereafter develop the heuristic explanatory mechanism on which we rely to think that, it is however possible for grades to trigger deleterious effects. In the up-coming paragraph, we develop the idea that grades can potentially be expected to be deleterious for cooperation, not only because they enhance individuals' visibility but because, as they are normative comparative tools of work assessment (Brookhart, 2004), they have the capacity to activate normative comparison among individuals, which can be self-threatening. Next, we develop this idea and review social comparison literature in order to investigate when comparison with others can be deleterious (and when it is not), and when social comparison is threatening for the self (and when it is not).

1.4 Social comparison and grades

Moreover, browsing social comparison literature will enable to determine if grades, when viewed as norm-referenced assessment tools (Brookhart, 2004), could engender negative effects because they enhance a threatening type of social comparison between individuals who expect them.

Social comparison theory: two major types of comparison

According to social comparison theory (Festinger, 1954), individuals have an inherent need (i.e. a drive) to evaluate their own opinions and abilities. In other words, they have a drive to obtain accurate self-evaluation. But in the absence of any available clear and objective indices against which to test and gauge their opinions or abilities, individuals usually compare them to those of others (i.e., interpersonal comparison). But to whom do individuals compare? Social comparison theory states that individuals compare to those who are close to them in their abilities, opinions, be they those who are slightly better than them, which means that they compare to a

target of comparison that is superior to them (called upward social comparison, Tesser, Millar, & Moore, 1988; for review, see also Collins, 2000), or those who are slightly worse than them (called downward social comparison, Wills, 1981). Yet, if there are two major types of social comparison available for individuals to engage into, which one is more beneficial to them?

Self-enhancing downward social comparison. The use of downward comparison has been shown to enhance individuals' self-esteem. Evidence coming from research conducted in the field of health psychology has given support to the positive and beneficial effect of using downward social comparison, for instance in medical environments, where comparing to a worse-off patient has been shown to improve the subjective well-being of cancer patients, a way found to help them cope with their own state of health (Wood, Taylor, & Lichtman, 1985).

Self-enhancing upward social comparison. Upward social comparison can be self-enhancing in the case, for instance, where comparison to a superior other is used as a way for individuals to find hope and inspiration (Wood, 1989). Two factors explain when it can be the case. The first factor to take into account is called "the processing mindset". It refers to whether individuals who, comparing to a superior target, perceive more similarities than dissimilarities with the target (i.e. comparing to someone who is slightly better than us is more enhancing than comparing to someone who is way better than us; the first type of comparison leading to assimilation effects; the later leading to contrast effects, Morse & Gergen, 1970; Mussweiler, Rüter, & Epstude, 2004a, b; Muller & Fayant, 2010). The second factor to also take into account is the goal that one pursues while achieving a task, which impacts the way individuals perceive the higher target of comparison. As Muller and Fayant (2010, p. 622) mention, "when looking to master the task (Harackiewicz, Barron, & Elliot, 1998), individuals no longer see others as a comparison other (as standards against which to compare) but as a source of information that could be useful to improve the task (Butler, 1992; Darnon, Muller, Schrager, Pannuzo, & Butera, 2006)". Those two factors allow understanding when and why upward social comparison can be self-enhancing.

Deleterious effects of upward social comparison

However, upward social comparison can also lead to negative outcomes, such as decreasing individuals' self-esteem (Morse & Gergen, 1970), triggering more envy, fear and jealousy on self-reported emotional variables (Tesser & Collins, 1988; Muller & Fayant, 2010). Comparison also induces more negative affects when the target has a similar level of performance (called lateral comparison, Kulik & Gump, 1997; Muller & Fayant, 2010). A possible explanation regarding why upward comparison is sometimes deleterious for the performance of individuals, could be that this comparison triggers intrusive thoughts (called, ruminative thoughts; see Self-Regulation theory, Carver & Scheier, 1981, 1990; Martin & Tesser, 1996; Muller & Butera, 2007) that interfere in task-achievement. Those thoughts are described as related to the ability of individuals to reach the level of the "higher" person with whom comparison is made, because intrusive thoughts are triggered whenever this ability is questioned. This later happens when individuals' progression towards that desired level is endangered (Brunstein & Golwitzer, 1996), or when individuals fail to reach given standards (Muller & Butera, 2007). The point is that those ruminative thoughts[16] will interfere with task-achievement because they consume some of the individuals' attention, that same attention which otherwise would have been allocated to the task.

1.5 A threat to competence concern beneath deleterious social comparison?

In the following section, we put forward the concept of threat to competence as put forward in the Model representing the Dynamics of conflict, depending on perception of competence and threat to the self (Quiamzade, Mugny, & Butera, 2013). Also, we will refer to the concept of self-evaluation threat as used by Muller and Butera (2007) and Buchs et al., (2010), in order to understand the mechanism behind a deleterious social comparison, and to be able to see whether grades could

[16] But ruminative thoughts can also be useful (see, Taylor & Schneider, 1989).

trigger the same social comparison mechanism between individuals who expect them. This will help us orient our expectations regarding their effects in a cooperative group setting. Nevertheless, we need to point out that threat, as a concept, will not be manipulated in the core experimental work of this thesis (although future work should investigate its role), but used as a heuristic explanatory concept. It seemed to us that threat to competence is of key importance to understand why and when a social comparison is or is not potentially deleterious, because it allows understanding whether the social comparison process elicited by the expectation of grades could be a particularly threatening one that affects cooperative group work. Indeed, in comparison to a group where grades would not be expected, expecting to receive grades could make salient among individuals of the group that a given standard of performance needs to be furthermore met during this group work. Thus, in the absence of information relative to the level of competence of the other group members regarding the task to achieve, others could become the new standards of performance against which a member of the group would be tempted to compare. In this context, this latter type of social comparison, as we will see subsequently with the studies of Muller and Butera (2007) and Buchs et al. (2010), could well lead to trigger a threatening and deleterious social comparison. On the whole, the context in which we wish to investigate the effect of grades has a complex structure that the concept of threat to competence helps understanding.

Effects of social comparison in conflicting situations: the importance of competence or perceived competence in aptitude tasks

Aptitude tasks are for example problem solving under uncertainty (e.g., Hidden profile tasks, Toma & Butera, 2009), or developmental tasks (e.g., The Cooperative Game, Doise & Mugny, 1981). Those tasks have particular inherent characteristics, which namely have to be perceived as such by individuals, in order to be categorized as aptitude tasks: they have one correct demonstrable answer, that yet does not appear as obvious from the early moments where individuals take the task in hand; along are others potential answers, that are however incorrect; finally, being able to solve an aptitude task (or not being able to) implies from a social point of view that

the individual has attained a given level of competence (or hasn't got the right competences) to be able to solve it. Thus, taking into account the perspective of work on social comparison in conflicting situations, more precisely in aptitude tasks (Quiamzade, Mugny, & Butera, 2013), is of relevance to the present work because we think that the setting of our graded-cooperative group will be prone to threatening social comparison processes. Why?

Firstly, we think that social comparison will be particularly salient because the expectation of grades will enhance comparability among individuals of the group. Secondly, as grades serve the social function of being diagnostic of the competence of individuals (i.e., used for rank-ordering individuals and signalling the most competent ones), we think that if individuals expect to be graded during a task-achievement (even if the task does not fully respond to the definition of aptitude tasks) there is a probability for a competence threat to emerge. Moreover, it is important to note (although we will develop this later in a dedicated section) that cooperative group work is about both having to work in one same structure (the group), and being confronted with other persons who do not always share the same resources or information and/or points of view, and yet having to deal with those discrepancies for the sake of providing a more complete and rich group work. This view of cooperative group work, in terms of inter-individual confrontations, as well as aiming at reaching a better output, mirrors the definition of aptitude tasks.

But first, in order to manage to take others' conflicting points of view into consideration, individuals have to be able or inclined to decentre from their own perspective to take in consideration other ones (i.e., perspective taking, a form of decentring effect by opposition to a focusing effect that is a more egocentric). It is therefore important to see how individuals can be affected in their necessity to decentre, when they process information coming from others and when the social comparison process is taking place in a situation where others hold conflicting points of view. Hence before going any further, let us see what precisely "perspective taking" is.

Perspective taking is a decentring process[17] concerning information exchange that is "proved to stimulate individual change towards more accurate judgments" (in Butera & Buchs, 2005, p. 195) and that is beneficial for the learning processes and for cognitive development (D.W. Johnson & R. Johnson, 1995). Decentring is especially needed when one person faces another holding a contradicting point of view on a given task (i.e. social cognitive conflict); it is in this situation that the social cognitive conflict perspective (Doise & Mugny, 1984) has investigated decentring, and precisely, how different social comparison processes related to the competence of individuals (upward, downward, or lateral comparison) can affect the propensity of children to decentre (or to use decentring) during a problem- solving situation. They observed that children confronted with a source of influence are more entitled to decentre and abandon their egocentric mode of problem solving when the source of influence has a competence that is either equal to theirs (lateral social comparison) or lower (downward social comparison). Moreover, they stick to their egocentric mode of task resolution, and thus decentre less when the source of influence is of higher competence (upward social comparison) than themselves or when the differential of competence is not clearly established or signalled, which can be the case when individuals work with others for the first time without necessarily knowing their level of competence (Quiamzade, Mugny, & Butera, 2013).

Specifically, in the domain of hypothesis testing, decentring is a chore mechanism to be studied as it can overcome focusing effects such as the confirmation bias (Buchs & Butera, 2005). Confirmation bias (Wason, 1960), namely the tendency for individuals to test their hypothesis by using confirmatory rather than disconfirmatory strategies (Gorman & Carlson, 1989), is a type of process that prevents individuals from taking in consideration alternative solutions. Thus, this bias

[17] Initially, decentring as well as egocentrism, were known to be key development mechanisms of the intellect, in the early stages of childhood, described by the Piagetian approach of human development (cf. Inhelder & Piaget, 1958; Piaget, 1963; in Butera & Buchs, 2005). Egocentrism is a stage in early childhood where infants are centred on their own world and are, for instance, incapable of taking another person's perspective (for a short introduction to the two concepts, see Butera & Buchs, 2005). As Butera and Buchs (2005) explain in the literature review of their chapter, beyond the developmental stage to which egocentrism and decentring are related, the two mechanisms can be found in adult life. They can be approached under the name of "Perspective Taking" (in the case of Decentring) or, under the name of "Focusing" (in the case of Egocentrism), which in adult life are prone to be affected by influences interplay. We will focus on taking the example of perspective taking (or decentring).

can be particularly problematic in cooperative group situations where the whole point of being in a group is precisely to consider the different resources and conflicting points of view held by the persons of the group because this confirmation bias was shown to be enhanced under competitive incentives (vs. cooperative incentives, Toma, Gilles, & Butera, 2011). In the context of conflicting situations under uncertainty (i.e. when solution to the task is highly unpredictable), such as the one described by Butera, Mugny, & Tomei (2000, Study 1) it is important to note that upward social comparison (i.e. when confronted to a highly competent source that can potentially threaten one's competence) led individuals to use more confirmation and less disconfirmation than in control condition where no comment was made relative to the competence of the source. In other words, when faced with a highly competent source, individuals make use of the confirmation strategy, and thus focus more. On the other side when confronted with a novice source (i.e. a low-status source that does not threaten one's own competence), more disconfirmation is observed than in the control condition; in other words when the competence of the individual is not at stake, individuals are more open to take other's perspective and thus decentre. Interestingly, those studies have concluded that social comparison asymmetry between individuals is probably deleterious because it is perceived by individuals of lower competence as an infringement or a threat to their own competence. This later is precisely due to happen in aptitude tasks where individuals perceive that there is only one correct solution and where the solution to the task is diagnostic of the competence of the individual (i.e. information constraint). Whereas such social comparison asymmetry will not be necessarily problematic when it is not viewed as threatening (i.e. information dependence, see Quiamzade, Mugny & Butera, 2013, Chapter 6), it this situation upward social comparison can be inspiring. Back to focusing effects, an interpretation that the authors put forward to interpret why individuals defensively react by focusing more on their own point of view (or the validation of this point of view, also called confirmation bias; Wason, 1960; Frey, 1986; Frey & Schulz-Hardt, 2001) and why they decentre less (Butera & Buchs, 2005). As we will see next, threat can also come from evaluative situations (termed, self-evaluation threat; Muller & Butera, 2007) where individuals feel threatened even when they do not know what the performance level of those to whom they compare

is, and hence, that social comparison is not clearly established. As we will next see, even if only potentially at the individual's disadvantage, social comparison may induce a feeling of threat in individuals.

Threat manipulation through social comparison. Muller and Butera's (2007) main hypothesis was that what is threatening in social comparison, whatever the type of standard provided for individuals to compare their performance to, whether interpersonal (Experiment 1), or normative (Experiment 2), is realizing that one's score is below that standard of comparison. Moreover, that being in doubt regarding one's own score should also be threatening for one's self-evaluation (such as when participants are not given any information on the co-actor's score). The argument behind that latter expectation is that, in absence of a standard against which to compare, individuals will be incapable of evaluating their own score, incapable of being reassured about what their score is worth, and thus incapable of fulfilling the individual basic need for an accurate self-evaluation (Festinger, 1954). In their experiments, the authors manipulated two independent variables. Firstly, the physical presence/absence of a co-actor, played by a confederate, while participants were achieving the task. Secondly, they manipulated self-evaluation threat through different types of social comparison: Upward vs. Downward vs. Without social comparison. In upward social comparison, participants got the feedback that their score was below a given standard. In downward social comparison, their score was above that standard. In absence of social comparison, participants were given no information. Interestingly, what differed between the two experiments is the nature of the standard of performance to which individuals were led to compare their scores to. Either, in Experiment 1, participants compared their score to the score of a confederate (i.e. an inter-personal standard of performance to compare to), or in Experiment 2, participants compared their score to the mid-point of a scale (i.e. a normative standard of performance to compare to). This difference is interesting to note because it allows investigating whether the types of comparison triggered by the use of one standard of performance or the other, leads to the same effects, or to different ones. Precisely, it allows investigating whether a social comparison is threatening, particularly when inter-personal comparison is at stake, or whether this

can also be the case when comparison is made in relation to a standard that is normative.

In both experiments, the authors expected a condition that is threatening to produce attentional focusing, which given the specificity of the dependent variable of the task was expected to produce lower conjunctive error rates[18] (see Muller & Butera, 2007, p. 197-198). Thus, if a threat is perceived, a focusing effect should be observed. Results of Experiment 1 showed that both the Upward Social Comparison condition and the Mere Co-Action condition induced more attentional focusing in comparison to both the Downward Social Comparison condition and the Control condition.

In Experiment 2 (comparison to the mid-point of a scale), the authors' main hypothesis was that if what is problematic in a social comparison is the threat it induces on an individuals' self-evaluation because it highlights that the score of individuals failed meeting a given standard, then a threat should appear whatever the nature of the standard, as long as it triggers in individuals the same threat: failing or the possibility of failing. Thus, a threat should occur including if it is not stemming from an interpersonal social comparison, such as when it stems from a normative type of social comparison (i.e., when comparison is made relative to attaining a normative standard of performance). Note that, although, the manipulation of the co-actor's physical presence was maintained, in experimental conditions where the co-actor was present, individuals were not given any information on the co-actor's score; thus individuals were only given information (or not given any, in the without social comparison conditions) on their scores regarding them attaining or not the normative middle scale standard of performance.

In addition to Experiment 1, they observed two important things. First, that self-evaluation threat occurred including when the comparison was made against a

[18] The conjunctive error rate is the error made by participants on conjunctive items (vs. non-conjunctive items) on a task allowing detection of the illusory conjunctive effect (Treisman, 1988) known to be a perceptual effect of attention allocation. In a task where participants are asked to detect the presence of a symbol "$", several pictures are presented. Pictures either contain Conjunctive items, which are pictures containing separate characteristics, such as the "S" alone or the "|" of the symbol "$". The error on those items would be to see the symbol $ when only its characteristics "S" or "|"are present (for more details, see Muller et al., 2004, p. 660).

normative standard of performance. Second, that even when participants were not given any information regarding the score of the co-actor and as long as the co-actor is present during task achievement, the co-actor will remain a source of comparison for participants, and hence a source of potential self-evaluation threat. Therefore, even when individuals knew that they scored higher than the normative standard of performance, a potential self-evaluation threat remained possible due to the mere presence of the co-actor whose score is unknown. Hence, the experimental condition where attentional focusing was the lowest, was the one where participants knew they had scored higher than the normative standard of performance and where no co-actor was present to cast doubt on their own (potential) evaluation, and hence could not induce a self-evaluation threat.

Taken together, the results from Muller and Butera (2007, Experiment 1, Experiment 2) are real add-up values to our main wish to investigate the effect(s) of using individual grading in the setting of a (cooperative) group work. Indeed, in a group setting, individuals do not necessarily know the performance level of other members, and yet, they have to work with them, while simultaneously expecting an individual grade. Hence, in this setting, others become a potentially threatening standard of performance against which one could compare (or, be compared to). We therefore think that it is possible that in a group setting, the mere expectation of grades raises the possibility that a potentially threatening self-evaluation could occur for individuals.

Threat measurement in peer learning situations. In their research on peer learning, Buchs et al. (2010, Main Experiment) refer to threat to competence in terms of "evaluative pressure"(p. 427) [19] and have measured it with a self-reported questionnaire in a specific socio-cognitive conflict situation of cooperative peer learning in dyads. Hence, in the main experiment, Buchs et al. (2010), approached the concept of threat as the means by which individuals perceive confrontations and have the need to outperform others during their interaction. In a peer-learning

[19] It should be noted that if the evaluative pressure in relation with competence concerns is quite close to the explanation in terms of competence threat that was put forward in socio-cognitive research (Mugny et al. 2003), this measurement of threat is nevertheless a quite indirect measure (not a pure measure of perceived competence threat) that is part of a broader indicator of perceived competition.

context, authors tested how particular contextual cues (such as: information dependence) could affect the overall interactions that individuals had when set to work in dyads. The quality of these interactions was measured with variables such as perceived student interactions, perceived quality of the relationships, reported involvement in information transmission, reported information processing strategies, perceived degree of confrontation, and perceived competition and other learning outcomes.

Participants were given material to be studied during the experiment, and in each dyad roles were distributed and counter-balanced. Participants were either asked to play the role of summarizer (i.e., having to read and summarize a text in order to later explain it to the listener) or to endorse the role of listener (i.e., having to listen to the summarizer, asking questions, spotting errors or inconsistencies in their transmission of information). For this work, participants were either provided with identical information vs. complementary information; and were either allowed to use discussion aids (i.e., individuals asked to take notes) or not (i.e., individuals not allowed to use any material for back up; for more details on the procedure, see Buchs et al., 2010, p. 425). What is interesting for us is that results obtained showed that when individuals worked on identical information (with discussion aids), they perceived greater confrontations (in comparison to when they worked without discussion aids) during interactions, confrontation to which they have reacted by trying to outperform others. Thus, Buchs et al. (2010) results allow to understand the role that a threat to competence can play in undermining learning and interactions in a context of peer-dyad learning when precisely individuals of the dyad are given similar information to work and interact on.

Taken together, the results obtained by Muller and Butera (2007) and Buchs et al. (2010) show that a social comparison is threatening whenever individuals have the opportunity to realize that their competence was (or could be) lower than any other standards of performance to which they compare (Muller & Butera, 2007). Regarding our graded cooperative group situation where individuals are set to work on one same problem to solve, grades could enhance among group members a deleterious social comparison. This could happen because in this situation,

individuals expecting to be graded find themselves facing the possibility that they could be outperformed by others, which has been found to result in a threatening social comparison. For the time being, we now suggest to turn and to delimit the cooperative group settings in which we think it could be particularly interesting to investigate the effect of grades in order to capture strong indicators of cooperation.

CHAPTER 2.

GROUPS AND ASSESSMENT

2.1 Groups, masters in decision-making and information sharing: an illusion?

The tendency that people have to refer to groups when it comes to taking decisions or solving problems, as opposed to when individuals work alone, comes from the fact that groups are viewed as potential soils allowing to obtain better decision-quality because of all the potential diverse resources and pieces of information that lies among group members (Hill, 1982; Kerr & Tindale, 2004; Laughlin, Hatch, Silver & Boh, 2006). Furthermore, because individuals set to work in groups are expected to cooperate when making decisions (Wittenbaum, Hollingshead, & Botero, 2004) and thus are expected to take advantage of the underlying diversity of resources that individuals have. Hence, group work would allow reaching products of better quality that individuals alone wouldn't have been capable of reaching (Winquist & Larson, 1998). One explanation for this strength (Hill, 1982), or this "potential" strength (because it yet is to be exploited) is the heterogeneity and thus the richness of individuals' preferences that could be found in one single group, but also the diverse resources that are held by individuals prior to entering the group, and from which work achieved in group could benefit. Hence, if this heterogeneity is well shared and used, it will allow to stimulate divergent thinking during group work, and to bring into light scattered resources that individuals of the group do not equally possess (Brodbeck, Kerschreiter, Mojzisch, Frey & Schulz-Hardt, 2002; Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter & Frey, 2006).

Yet, whereas past researches that praise the benefits of group-work have relied on the assumption that individuals in groups cooperate, it is only recently that literature on group work has started doubting the inherent cooperative soul of individuals who find themselves working in a group structure. Thus, the present thesis work subscribes to the research trend that puts into perspective the

assumption that individuals working in groups necessarily cooperate, adopt cooperative intentions and behaviours, by trying to understand whether grades could be a factor that reduces cooperation among members set to work in groups..

Alas, groups are not always up to the expectation of being fully balanced and well-informed decision makers (Stasser & Titus, 1985; Stasser & Titus, 2003), and social psychology has long been a discipline that investigates conditions under which group decisions are impaired (Gigone & Hastie, 1997; Stasser & Titus, 1985; 1987; Wittenbaum, 2000). Two factors have been found to play a role in impairing group work, and which would therefore be of importance to take into consideration when addressing the question of grades' effect on cooperative group work.

The first factor is the reluctance that individuals have to positively evaluate information coming from others (Butera & Mugny, 1995; Ditto & Lopez, 1992; Edwards & Smith, 1996; Fischer, Schulz-Hardt, & Frey, 2008; Jonas et al., 2001; Koehler, 1993; Kunda, 1990; Lord, Ross, & Lepper, 1979; Ross & Lepper, 1980; Schulz-Hardt et al., 2000). Researchers have questioned whether this reluctance that occurs at the level of information evaluation is due to a cognitive bias (Greitmeyer & Schulz-Hardt, 2003) or a more deliberate and oriented strategic behaviour (Kunda, 1990; Toma et al., 2011).

The second factor is the reluctance that individuals have to exchange and put in common the different and scattered information they have. Researchers have wondered whether this reluctance that occurs at the level of information exchange results from a group phenomenon reaction (i.e. where information that is not equally possessed by all group members can be a threat for group consensus, Janis, 1982; and therefore neglected during group information exchanges) or more recently, whether it could be a strategically oriented and motivated behaviour (Toma & Butera, 2009). Thus we wonder whether grades could be part of the situational factors that affect group work. We will develop more those two factors in Chapter 3 of this introduction (sections 3.1, 3.2), along with the paradigms that have been used to study them, and the appropriate experimental materials to use in order to investigate how those factors might fluctuate depending on contextual variations.

2.2 Using Social Interdependence to give cooperative impulses to group work

In the early roots of Social Interdependence theory, groups are viewed as "dynamic wholes in which the interdependence among members (can) vary" (Koffka, 1935; Deutsch, 1968; Deutsch & Krauss, 1965; D.W. Johnson & R. Johnson, 2009a, p. 366). The basic assumption on which this theory relies is that "the structure of the goals of the people in the situation determines how participants interact and the interaction patterns determine the outcomes of the situation (Deutsch, 1949a, 1962; Johnson, 1970; D.W. Johnson & R. Johnson, 1989)", in D.W. Johnson and R. Johnson, (2005a p. 292). Moreover, the way goals are structured will affect the type of interaction among individuals, and the latter, will in turn affect the outcomes of the group. Accordingly, Morton Deutsch (1949a; 1962) distinguished two types of social interdependence: (1) positive social interdependence among individuals, which occurs when individuals are positively linked to one another in the attainment of their goal (i.e., individuals cannot attain their goal unless others attain it as well) and which is the basis of cooperation among individuals; the reverse is (2) negative social interdependence, which occurs when individuals are negatively linked to one another in their goal attainment (i.e., if individuals attains their goal, others will not attain it) and is for instance descriptive of a situation of competition.

Thus, positive social interdependence is known to result in overall increased achievement and productivity (cf. Hagman & Hayes, 1986; Jensen, 1996; Jensen, Johnson, & Johnson, 2002; Matsui, Kakuyama, & Onglatco, 1987; Scott & Cherrington, 1974; Slavin & Tanner, 1979; Wodarski, Hamblin, Buckholdt, & Ferritor, 1973; D.W. Johnson & R. Johnson, 2009a), and to engender promotive actions (i.e., actions undertook by individuals that increase the likelihood of each other's success in achieving the joint goal), such as mutual help and assistance, exchange of needed resources, effective communication, and constructive management conflict (Deutsch, 1949a; D.W. Johnson & R. Johnson, 2005a).

Yet, if this positive interdependence links individuals in a positive and complementary manner regarding their goal attainment, it is not sufficient to build an efficient cooperation among individuals. Indeed, cooperation establishment requires

structuring other elements that are at stake in inter-individual interactions (D.W. Johnson & R. Johnson, 2005a), such as resources, rewards and task-interdependence among individuals. These elements are included in two broader types of interdependence: The first type refers to outcome interdependence which comprises both the way individuals are tight together in the pursuit of their goal (as previously exposed), and the way the reward system is elaborated to consolidate individuals' goal achievement (positive vs. negative reward interdependence). The second type refers to means interdependence, which comprises (at least) the way resources are structured among individuals of the group (e.g., positive resource interdependence is when individuals have complementary information that they need to share to achieve a given task), and to task-interdependence (e.g., positive task-interdependence is when the task requires for its achievement complementary actions from individuals in order to be achieved).

Yet, if it is understood that group work can be structured cooperatively, all authors do not converge on the exact factors that are needed in order to have this cooperation efficiently established (Buchs, Butera, & Mugny, 2004; Buchs, Gilles, Dutrevis, & Butera, 2011). However, we can note a general agreement on the importance of establishing a positive social interdependence among individuals of the group (Deutsch, 1949; D.W. Johnson & R. Johnson, 2009a). The latter is done by structuring group work, first, through positive resource interdependence among individuals of the group, permitted by dividing resources among individuals of the group and making sure their resources are complementary; in this case, individuals would be dependent on one another's resources to achieve the work. Second, by establishing a positive goal interdependence, and by setting individuals with one common goal to achieve (e.g., solving a reasoning task or successfully achieving a coordination task). Third, by structuring group work through task-interdependence: where the task itself offers a positive resource and goal interdependence. Hence, those factors allow raising a basic cooperative group structure (other factors are still questioned and investigated, mainly in the field of cooperative learning[20]).

[20] For instance, whether positive reward interdependence is also needed (cf. Buchs, Gilles, Dutrevis & Butera, 2011, p.136-137; Buchs, Butera & Mugny, 2004). Recent developments in the field of cooperative learning have added to the basic cooperative structure, the importance of raising individual but also group accountability

Thus, if this positive social interdependence (of resources and goal to achieve) among the individuals of a group is what makes their strength in terms of group cooperation, it could well be that it also turns out to be their weakness, in certain circumstances. Indeed, when individuals are strongly made positively interdependent to achieve a task, the work cannot be achieved and the same goal attained unless all individuals contribute to it (e.g. giving and sharing their own resources), this interdependence is furthermore reinforced when the task itself requires the intervention of all the members to be successfully achieved. Likewise, being positively interdependent in such a case also means, that if only one individual does not cooperate (whatever the motive for not cooperating), then group cooperation fails and the whole advantage of group work under such cooperative impulse fails with it too.

Thus, if we hold that grades will be responsible for cooperation failure in groups' settings, there are tasks that could allow us to observe it on variables of different natures, which all account for cooperative behaviours: whether at group information sharing level and individual cognitive level (hidden profile tasks, Stasser & Titus, 1985), or at interactive coordination group level (Doise & Mugny, 1997). Those tasks that we will shortly present (Chapter 3) all have one thing in common: they have basic cooperative structures that provide precisely a cooperative group context for individuals to merge in, thus allowing to observe cooperation, but also--if this structure is impaired--a lessened cooperation.

But what are the benefits that one could expect to stem from establishing cooperation among individuals of a group? As we will develop hereunder, research has shown that cooperation (in comparison to competitive or individualistic group functioning; D.W. Johnson & R. Johnson, 1989, D.W. Johnson & R. Johnson, 2005a) leads to various benefits and better outcomes, in terms of task processing, task-achievement, as well as in terms of the quality of inter-individual relationships.

(Johnson & Johnson, 2005a; Tetlock, 1985). That is, by assessing the performance of each member and giving them back individual and group results "to compare against a standard of performance" (D. W. Johnson & R. Johnson's, 2009a, p.368) in order to increase responsibility forces between group members.

2.3 Cooperation vs. competition: the benefits of cooperation

Benefits of cooperation at level of task processing and of inter-individual relationships

At task-processing level, cooperation leads individuals to engage in more effortful reasoning and critical cognitive thinking, to persist in efforts even when individuals are facing difficult tasks, and to have overall positive attitudes regarding task-accomplishment (D.W. Johnson & R. Johnson, 2002; D.W. Johnson & R. Johnson, 2009a). Furthermore, in studies investigating group information processing, cooperation (in comparison to competition) has been found to increase the exchange of the overall amount of information related to task-achievement among individuals, particularly to increase the exchange of information that is crucial for group-task achievement (Toma & Butera, 2009, experiment 1, 2); and to reduce confirmation bias (Toma et al., 2011, Study1).

On inter-individual relations, cooperation is known to enhance more liking and positive relations among the interactants, which in turn increases group cohesiveness and individuals' efforts to achieve their goals (D.W. Johnson & R. Johnson, 2006 in Johnson & Johnson, 2005a). Cooperation is also known to favour social support among individuals, whether support regarding task-oriented needs or personal needs. Such a social support has in turn been found to lead to greater achievement and productivity (D.W. Johnson & R. Johnson, 2005a). Hence, it is noteworthy that the beneficial effects of cooperation found on inter-individual relations are also found to affect individuals' attitudes and behaviours oriented towards task-achievement. This highlights an interesting aspect of groups to take into consideration when looking to study and to make observations on groups. Given that groups function at two different levels (Oberlé & Drozda-Senkowska, 2006), obtaining complete observations of what happens in a group would require to take those two levels of group functioning in consideration: on the one side, the level which comprises all behaviours and attitudes that group members put towards task achievement, and on the other side, the level which comprises emotions, the quality

of relations among group members, or to put in broader terms, the relational aspect of groups.

To sum up, we have seen so far that individuals working in groups do not necessarily and spontaneously cooperate, and that it is important to encourage cooperative behaviour among group members given the benefits of cooperation. Does the latter mean, that when given all conditions to cooperate, members of the group will necessarily and ineluctably cooperate? To answer that question, we unfold in the next sub-section what literature has labelled, the case of mixed-motives situations.

2.4 When cooperation is hybrid: the case of mixed-motives situations

The assumption that individuals set to work in groups will automatically cooperate and adopt cooperative behaviours with other group members has recently been reconsidered in social psychology literature on decision-making (De Dreu et al., 2008; Toma & Butera, 2009). This assumption has been in part reconsidered because researchers have highlighted the possibility, that although being given a common goal to work towards and being asked to cooperate, individuals join group work with their own motives, which can be in contradiction with the cooperative stream given to group work (De Dreu et al., 2008), resulting in a mixed-motives situation (Davis, Laughlin, & Komorita, 1976; Drolet & Moris, 2000). Those mixed-motives could be particularly dilemmatic for individuals when they are in contradiction with one another and request from the individuals to balance whether to cooperate or to follow one's own personal motive.

Indeed, if Deutsch's (1949) theory of social interdependence is based on the assumption that individuals pursue one goal at a time (either cooperative, competitive, or individualistic), the boundaries between a cooperative and a competitive situation in everyday life are not always that clear. Indeed individuals will more often find themselves facing situations that result in a mixture between cooperative and competitive or individualistic demands than a purely cooperative or competitive demands (Kelley & Thibaut, 1969; Davis, Laughlin, & Komorita, 1976). Thus, according to De Dreu et al. (2008, p. 32) "the vast majority of group work on

decision making has not taken into account the fact that competitive incentives are also present (in cooperative group situations) (Stasson, Kameda, & Davis, 1997; Wittenbaum, Hollingshead, & Botero, 2004)". An example of such mixed-motives situation would be, for instance, a situation where individuals are set to cooperate in groups with other group members in order to achieve a joint outcome (common cooperative goal) while simultaneously holding another personal motive at an individual level (individual competitive goal such as wanting to impress the boss by being better than others during group work) and therefore behaving accordingly in order to be the one who takes credit for the group's successful outcome. Hence, we wondered whether the complex cooperative-graded group situation that we wish to presently investigate through the experimental work of this thesis could be a mixed-motives situation, and how the model proposed by De Dreu et al. (2008) could help us make previsions for our hypotheses. In the next sub-section, we will present how mixed-motives are viewed in this model, and how it can help us to understand our complex cooperative-graded group situation.

Groups as motivated processors of information: a presentation of the MIP-G model

Recently, De Dreu et al. (2008) have raised the question of mixed-motives situations in groups, naming them "mixed-motive interdependence" (p. 31) in the development of their model of Motivated Information Processing-Groups (see Figure 1). In their paper, authors extend the view of groups as being motivated and strategic information processors (Wittenbaum et al., 2004) and not only as being mere information processors (Hinsz, Tindale, & Vollrath, 1997). To our interest, authors explain that individuals facing a mixed-motives group situation will choose to emphasize one motive (i.e. to cooperate) or the other (i.e. to compete) according to their individual tendency to be a rather pro-self motivated person or to be pro-socially motivated (see below for more details), which in turn will differently affect social judgment and decision making processes, both at individual and group level.

Hence, in their model, they distinguish between two global types of motivation. On one hand, epistemic motivation, which concerns broadly the motivation to

thoroughly achieve a task and which, when highly triggered results in a deep and systematic processing of available information. On the other hand, the inner social motivations of individuals, which they define as being: “the individual’s preferences for a particular outcome distribution between self and others” (p.32 in De Dreu et al., 2008) and which they split into pro-self or pro-social motivations. Pro-self motivation comprises the motivation of individuals to follow competitive and purely individualistic goals, and pro-social motivation comprises the motivation of individuals to follow cooperative and altruistic goals. Hence, a pro-self motivated individual would want to maximize his/her own outcome whether (or not) at the expense of others; which transposed to a group situation, would mean at the expense of other group members. A pro-socially motivated individual would have at heart to obtain an outcome that is even for all, making sure that in a decision-making moment, the decision would have taken into account all the individuals’ point of views. Hence, according to the authors a pro-self motivated individual would view decision-making group processes as “a competitive game in which power and personal success are key”, whereas a pro-socially motivated individual view it as “a collaborative game, in which fairness, harmony, and joint welfare are key” (De Dreu et al., 2008, p. 32).

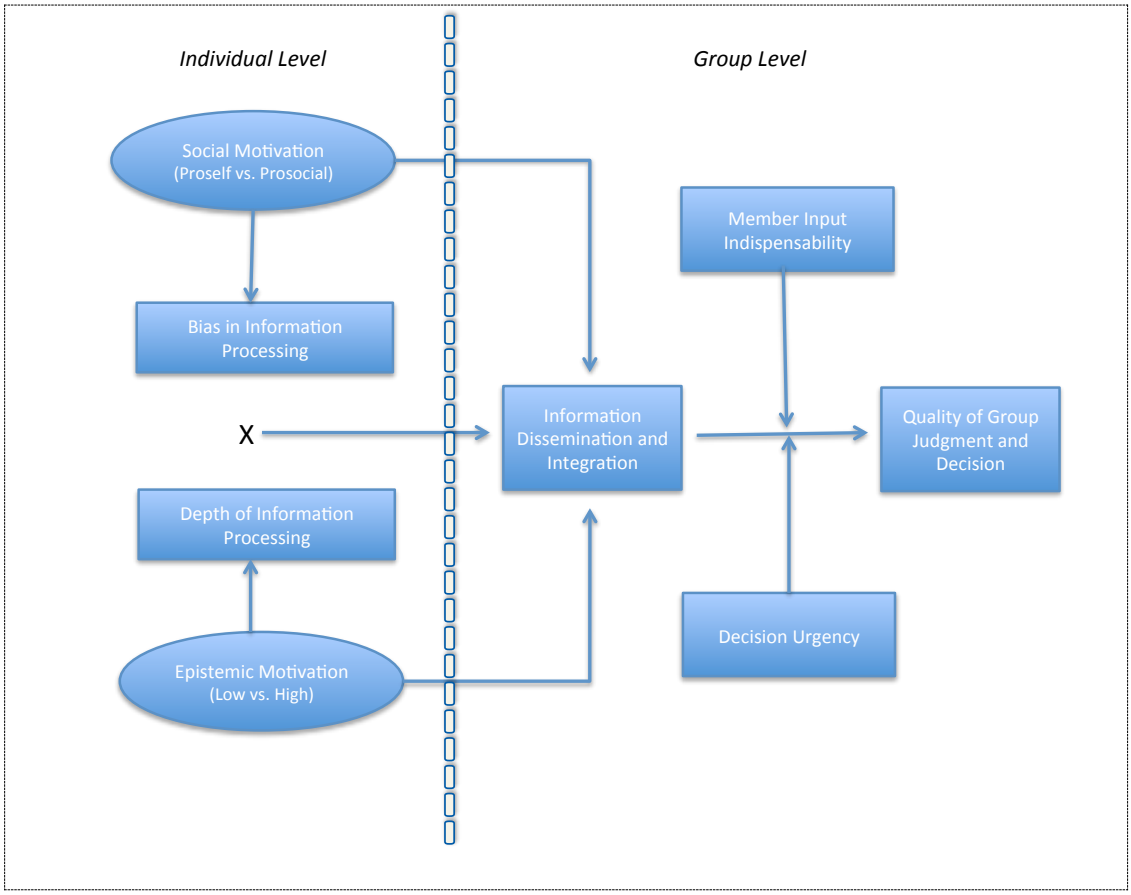

Figure 1. Overview of the motivated information processing in groups (MIP-G) model (taken from De Dreu et al., 2008, p. 25)

Thus, depending on which motivation is triggered at individual level, the MIP-G model posits that individuals will tend to react to the mixed-motives situation by being either cooperative (when pro-social motivation is triggered) or competitive (when pro-self motivation is triggered), which will affect decision making-related processes both at individual and group level. This should lead to the same results as the effects provoked by inducing cooperation versus competition, whether at individual or group level.

Overall, regarding information processing, pro-self motivated (in comparison to pro-social motivated) individuals should be more concerned with:

a) The advocacy bias, which is the tendency that individuals have to defend their own point of view and thus to prefer information that supports their point of view (Schulz-Hardt, Frey, Luthgens, & Moscovici, 2000; Stasser & Titus, 1985). This

tendency in turn will affect the information that individuals will process. For example, pro-self oriented individuals looking to defend their point of view so the group can choose it will tend to share more the positive than the negative features with others regarding their favourite alternative, whereas they will tend to share more the negative than the positive features of alternatives supported by other group members.

b) Information misrepresentation especially when individuals tend to maximize personal gains instead of joint outcomes (O'Connor & Carnevale, 1997; Steinel & De Dreu, 2004) whereas pro-socially motivated individuals should be more inclined to pass on accurate information (Toma & Butera, 2009).

c) Developing a stronger ownership bias (i.e. the individual tendency to quickly develop ownership of ideas, for instance, because having spent a lot time/energy on their development, Abelson, 1986). This ownership bias has been corroborated by Toma, Bry, and Butera, (2013), who indeed have primarily shown that giving a competitive goal for individuals led them to stronger ownership bias than when giving them a cooperative goal.

According to our aim of investigating the effects of grades in such a cooperative group setting, we wonder whether we could provide experimental evidence to, and thus hold true the assumption that grades could input a motivation at individual level that will be in contradiction with the cooperative demands of the task, and therefore impair cooperative group work. Before turning to the presentation of the experimental tasks and paradigms that could offer good conditions to observe cooperation, we suggest discussing hereunder the link between socio-cognitive and mixed-motive conflicts.

2.5 Discussing the link between socio-cognitive and mixed-motive conflicts

In the present subsection, we suggest to investigate the link between the paradoxical context of mixed-motives (e.g. the graded-cooperative situation), where two conflicting motives could be expected to trigger, and the reaction at individual level to this context in terms of decentring. In other words, we offer to try analysing the link between socio-cognitive conflict and mixed-motive conflict.

On the one hand, socio-cognitive conflict typically stems from situations where two or more persons, working together on a same problem to solve, realise that they do not have the same point of view over the given issue or over the way to handle its resolution (Doise & Mugny, 1997). Initially, and historically speaking, socio-cognitive conflict has been studied with a developmental-constructivist perspective (Piaget, 1975), where the conflict is investigated with a focus on the individual level even if it is clear that conflict can only occur and be solved "in relation to the other". The other (his view point or his answer) is the triggering factor of the conflict but also the triggering factor allowing the conflict resolution. In this setting, different individual motivations (e.g. pursuing performance goals, as it is the case when pure competition motivation is at stake vs. pursuing mastery goals, as it is the case when pure cooperation motivation it at stake) can lead individuals to focus on different elements of the socio-cognitive conflict. For example, Darnon et al., (2006) show that pursuing performance goals will mainly lead individuals to focus on the comparison of the different competence levels of the individuals involved in the socio-cognitive conflict, leading to a relational regulation of the conflict which itself has a limited efficiency as it is built on the affirmation of self-competence. Whereas, pursuing mastery goals will mainly lead individuals to focus on the comparison of the different alternative answers, leading to an epistemic regulation of the conflict and an integration of others' perspective.

On the other hand, the term mixed-motive conflict (De Dreu et al., 2008) refers to a mixed-motive group situation where individuals have to deal simultaneously with cooperative demands and the incentive of doing well personally. Initially, mixed-motive situations were studied to show that group work does not only rime with cooperation, and that in a group work setting, individuals can be sharing different, competitive or individualistic motives. Thus, technically speaking, it is important to keep in mind that the term mixed-motive situation was used to refer to the mixed-motive structure stemming from group tasks and to outline that those latter are not necessarily cooperative (Davis, Laughlin, & Komorita, 1976). Thus the focus is primary on cooperative group-structured situations and on the study of the possible declinations of such *non-pure* cooperative group-structured situations and their effects.

To make it clear, although the two terms seem to be similar, they definitely refer to two distinct concepts. In other words, in comparison to the socio-cognitive conflict, mixed-motive conflict is less focused on studying the conflict at an individual (socio-cognitive) level, and is rather interested in studying the more general picture where individual and group levels intersect. Thus, notwithstanding this difference of level of analysis, is it possible to consider that one type of conflict (e.g., mixed-motive conflict) can affect the way the other conflict (e.g., socio-cognitive conflict) will be resolved? Precisely, is it possible to imagine that, from an individual perspective, individuals who find themselves in a mixed-motive situation (as compared to a purely cooperative situation), thus facing a mixed-motive conflict, and simultaneously finding themselves facing a socio-cognitive conflict, could be led to solve this socio-cognitive conflict differently than if they were only in a cooperative situation? Put differently, if as previously mentioned, a way for the individual to solve a socio-cognitive conflict is to decentre from one's own view point to fully consider and grasp another's point of view and take in consideration the arguments that sustain it (Butera & Mugny, 2001; Kruglanski, Thompson, & Spiegel, 1999), one can wonder to which extent this decentring could be made when the individual is animated by mixed-motives by comparison to a purely cooperatively and motivated-structured situation. Thus, from a broader point of view, this is what we suggest to investigate when we wonder whether grades expected in a cooperative setting could affect the preference effect, which is a measure of individual focusing.

CHAPTER 3.

THE PRESENT WORK: PARADIGMS AND TASKS USED TO EXPERIMENTALLY OBSERVE COOPERATIVE BEHAVIOURS

With the purpose of studying the effects of grades on group cooperation, we subsequently present three experimental paradigms allowing the investigation of cooperation: the Hidden Profile paradigm (used in Chapters 4 and 5), and the Cooperative Game (used in Chapter 6).

3.1 Making use of Hidden Profile tasks to observe inter-individual cooperation in group information exchange

A hidden profile task can be defined as a "two- or multiple-alternative group discussion task(s) that contain(s) a correct or best alternative and in which the information about these alternatives is distributed among the group members such that no group members can detect the best alternative on the basis of his or her individual information set alone (cf. Stasser, 1992; Winquist & Larson, 1998)", in Greitmeyer and Schulz-Hardt (2003; p. 322). Overall, a typical hidden profile task takes place in two phases and concerns a decision-making problem to be solved (choosing among different alternatives: the best candidate for a university position, Stasser & Titus, 1985; Cruz, Henningsen, & Williams, 2000; the most appropriate medical diagnostic, Larson et al., 1996; or the person responsible for a crime, Stasser & Stewart, 1992; Stewart, Billings, & Stasser, 1998). Thus different alternatives are possible but only one is correct.

In its typical form, a hidden profile task is composed by two phases. During a first phase, where participants are set to work individually on the problem, they are provided with a subset of information to decide which alternative to choose for the problem. Each individual sub-set of information contains information equally distributed to all, hence all individuals have the same information (called, *shared* or *common* information), and information unequally distributed to all, hence each

individual has information that others do not have (called, *unshared* or *unique* information). Thus, at this individual stage, each subset of information leads individuals to choose a sub-optimal alternative.

During a second phase, participants are asked to leave their subset information sheet and to merge with others into a group to work on the decision-making problem. They learn that they did not have all the same information regarding the problem to solve; they are therefore asked to discuss the case again in groups and jointly agree on the best alternative to choose.

What is typical of a hidden profile, and which gives its name to the task, is that it is only if individuals manage to cooperate and bring into group discussion the different unshared information previously received that they will be able to uncover the profile that had been hidden from them from the start, because all unshared information pointing to it was scattered among the different individuals. Thus, combining the unshared information together will point to the optimal alternative; and on the reverse, not taking the unshared information into account will ineluctably lead to a biased group decision.

Hidden profile tasks were first used by Stasser and Titus (1985) to investigate group information processes, and typically represent a situation whereby groups can lead to taking better decisions than individuals would have taken alone, but only if group members manage to take advantage of group discussion, to cooperate and to use the various unshared information that each holds (Winquist & Larson, 1998). Indeed, Stasser and Titus' (1985) argument was based on the theory of persuasive arguments (Burnstein & Vinokur, 1977), thanks to which they claimed that new information brought in group discussion (in comparison to already known information) should be spotted and used by the overall group because the novel characteristic of a piece of information makes it more persuasive than already known information. As previously mentioned, the major result obtained by these authors is that groups mentioned significantly more shared than unshared information, which given the task characteristics systematically ended in groups making the wrong decision.

Why did that occur? We now unfold three explanations (at the level of group interactions) that have been advanced by researchers to account for groups' failure

to pull unshared information and to uncover hidden profile tasks (for more detailed explanations, cf. thesis work of Vasiljevic, 2010). According to the CIS model (Collective Information Sampling *model)* set forth by Stasser and Titus (1987), if unshared information is less exchanged during group discussion, it is because unshared information is held by a fewer number of persons than shared information. Thus, the higher the number of members who hold a certain piece of information previous to group discussion, the higher the probability for this information to be mentioned by the group during discussion. Other researchers, Schittekate and Van Hiel (1996), have tested another explanation, in terms of one type of information being perceived by group members as more reliable than the other. According to them, if shared information is more exchanged than unshared information during group discussions, it is because hearing several members mentioning the same information (i.e. shared information) makes this information look more reliable than others (and also more understandable, Larson & Harmon, 2007). Being mentioned several times by different members gives this information a social validity. On the contrary, unshared information, because fewer members mention it, cannot be socially validated nor can it be presumed to be reliable on this basis; this is why groups are reluctant to mention it during discussion (Parks & Cowlin, 1996). Lately, Toma and colleagues (Toma, 2007; Toma & Butera, 2009; Toma, Vasiljevic, Oberlé, & Butera, 2012) have investigated whether this defective information sharing during group discussions can be caused by motivational factors, such as setting members to work under cooperative or competitive instructions, and they have shown that the under-exploitation of unshared information can be a strategic behaviour given that information sharing during group discussions differs whether set in a cooperative or competitive setting. Thus, we will now present the task they have used, along with its special features that give the task its characteristic of allowing observation of information sharing during group discussions as a strategic behaviour. Hence, it is for this characteristic that we wished to use their task.

The road accident investigation case (Toma & Butera, 2009): a hidden profile task to test motivated information sharing in groups

Regarding information exchange in groups, Toma and Butera (2009) posit, that it is possible that the unwillingness of groups to take unshared information in consideration during group discussions when solving hidden profile tasks, depends on whether group members pursue a competitive goal (i.e. set by negative goal interdependence) or cooperative goal (i.e., set by positive goal interdependence) through the achievement of the task. Precisely, they put forward the general hypothesis that competition (in comparison to cooperation) will lead individuals to strategically share information during group discussions, which will lead group members to withhold unshared information intentionally. In order to test this motivated and strategic aspect of information sharing in groups, they built and pretested for that occasion a hidden profile task inspired from Stasser and Stewart (1992) with supplementary special features (see Figure 2 below).

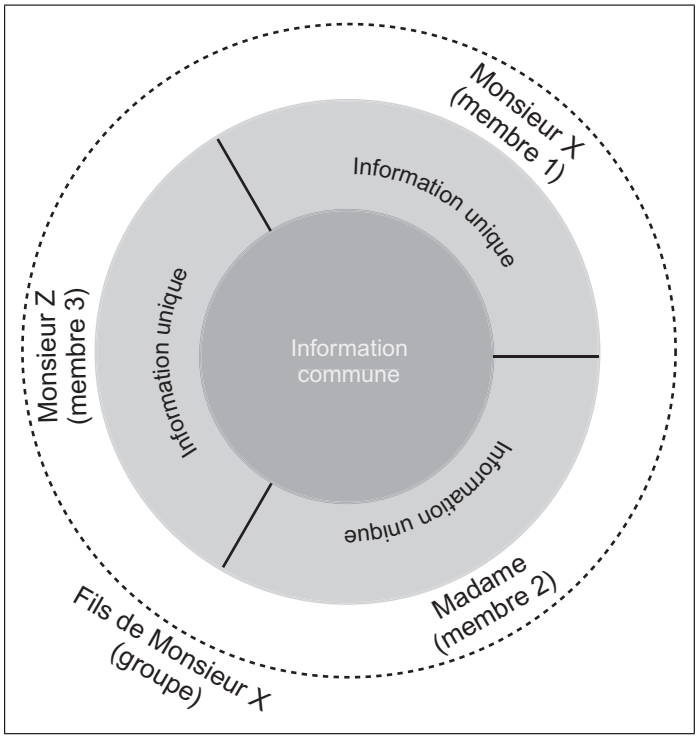

Figure 2. Information distribution and initial preferences in the "hidden profile" paradigm (taken from Toma et al., 2012, p. 678)

This hidden-profile task is to be “played” by groups of three participants and, similarly to classical hidden profiles, is divided in two phases: the individual pre-decisional phase and the group discussion phase. The cover story is about a road accident case, with 4 persons or suspects involved (Madame Y, Mister Z, Mister X and his son). In order to discriminate between them, the subset of information given to each member included each 3 unshared items of information that were critical in allowing identification of a suspect by directing each member to a different suspect (either Madame Y, Mister X or Mister Z), but if taken together the 9 items of unshared information would allow for designating only one suspect (the son of Mister X). The remaining information that was equally shared contained 19 items of shared information that described the circumstances of the accident and a brief presentation of the suspects involved.

Two main task features of the road accident Hidden Profile-task

This task had two main and special features that were pre-tested by the authors and that we now present. The first feature is *task transparency*, which refers to the fact that Toma and Butera (2009) had pre-tested in two pilot studies and shown that within the sub-set of information received, participants could identify exactly where each type of information (shared vs. unshared) was located, and that participants could discriminate well between the value of the two types of information, recognizing the superior value of the unshared items of information in allowing identification of the suspects, in comparison to the shared items of information, whose value was recognized as being descriptive of the facts that took place. This task-transparency feature is of central importance as it allows inferring that individuals act deliberately when spreading or withholding unshared information with others.

The second feature was that the task required “the use of unshared information under the form of initial preferences confirmation” (Toma & Butera, 2009, p. 797). Technically speaking, each set of unshared items provided to each different member was pre-tested to make sure that it did indeed and undoubtedly direct each individual holding it to a different sub-optimal suspect Mister X, Mister Z or Madame

Y (see Pilots 1 to 3, in the appendix of Toma & Butera, 2009), and that if individuals were given all the items of unshared information, they could correctly uncover the optimal solution, the son of Mister X (see Pilot 4, in the appendix of Toma & Butera, 2009). This feature is different from previous hidden profile tasks (e.g., Stasser & Stewart, 1992) where individual sub-optimal differences did not differ among members. Precisely, this second and last feature has its own importance, because the authors highlight that each sub-set of items of unshared information held by one individual is capable of overruling the sub-optimal decision of another. For instance, if one member is oriented to Madame Y, and that another member has an unshared item stating that the person responsible for the car accident is a man, than this later member can infer that Madame Y is not the guilty person. The fact that when all unshared information is out at once they allow individuals to easily reject the sub-optimal profiles and hence to unveil the hidden profile remaining, could be a feature that makes it difficult once unshared information is out in the group for members to intentionally avoid or deny the obviousness of the last profile unveiled.

With these two special task features in mind, Toma and Butera (2009) inserted the manipulated goal instructions at the onset of group work, either by telling the group that its objective during the session was to find the person responsible for the car accident (cooperation instructions through positive goal interdependence) or, by telling that its objective during session was to find the person responsible for the car accident but that is was important to be the first one to find the guilty person (competition instructions through negative goal interdependence). Thus, the coding of group discussions showed, regarding information exchange during group interactions, that when set to work cooperatively, groups spread and used significantly more items of unshared information than groups set to work competitively did. This result was replicated in the second experiment (Experiment 2, Toma & Butera, 2009). Those results confirm that group information sharing can be affected by motivation factors such as the goal with which the group is set to work, and that indeed, cooperation is beneficial for bringing unshared crucial information into group discussions and to spread them during that group work opportunity.

Another study by Toma et al. (2012) corroborates this view of unshared information pooling as resulting from motivated factors. In their study they used the same task, the same goal manipulation, but manipulated the level of expertise assigned to group members. But first let's see why they added expertise assignment manipulation to their experiment, as it will help us understand why the researchers expected it to highlight the motivated and deliberate aspect that information sharing processes could put on in groups. Experts are defined as such, either because they have more information than others on a given topic or domain of expertise, or because they have more competence or experience than others on a given task (Wittenbaum, 1998, 2000). Expertise affects information sharing in hidden profiles, and leads groups to pay more attention to unshared information (see Stasser & Titus, 2003). For instance, telling group members that some in the group are experts in domains that are related to their unshared information promotes the exchange of unshared information and increases the discovery of the hidden profile in Hidden Profile tasks (Stasser, Stewart & Wittenbaum, 1995; Stasser, Vaughan, & Stewart, 2000). This happens because experts have the capacity to distinguish relevant information from irrelevant one (Shanteau, 1992). Furthermore, the "expert" status assigned to a member regarding a given task gives that member a higher status within the group; Wittenbaum (1998, 2000) shows that high status individuals do not have the general tendency to refer to shared information more in group discussions but rather tend to use unshared information more, because they are more confident with their unshared information in comparison to non experts.

In their experiment Toma et al. (2012) found that expertise assignment had a positive effect on the usually biased information sharing in hidden profile discussion groups only in cooperative groups because, they suggest, members consider expertise as a major resource to dig in for the sake of task achievement (Bottger & Yetton, 1988). On the contrary, in competitive groups, these authors found that expertise had a negative effect on unshared information spreading. According to them, if in competition group members share less unshared information it is because competition "makes people more focused on standing out in the comparison of competences with others. In other words, the threat that competition poses to one's

own competence may restrict experts when pooling their unshared information, and may impair members' motivation to repeat the already-mentioned information" (p. 3, in Toma et al, 2012).

In summary, these studies have highlighted that information sharing and the reluctance to spread unshared information during group discussion in hidden profiles can be motivated by the cooperative or competitive goal that groups are given to pursue at the onset of group work. We also have confirmation at the level of hidden profiles that giving the groups cooperative instructions helps discussing more unshared information. But is groups' tendency to "under-exchange" unshared information only due to a group process?

3.2 Making use of Hidden Profile tasks to observe the intra-individual preference for consistent information effect

In this sub-section, we will briefly give a range of explanations advanced by different researchers to account for groups' failure to pull unshared information and uncover hidden profile tasks, but this time with an explanation based on an intra-individual cognitive level process (i.e. preference for consistent vs. inconsistent information). As we will argue, first considered as a cognitive bias, this process is now studied as an interesting indicator of the cooperative/competitive motivations that individuals can have to decentre from/focus on, their own point of view. More precisely, this process can be viewed as an indicator of the cooperative/competitive motivation that impacts individuals' appreciation of the diagnostic value of new information coming from others; an appreciation that differs when information is consistent or inconsistent with one's point of view.

If groups are bad at unveiling hidden profile tasks and at pooling unshared information, a possible explanation is that this is due to group discussions being focused on debating over the pre-decisional preferences of individuals instead of thoroughly analysing the information that members have in their possession. It is this idea that some researchers have put forward with the "preference negotiation model"

(Gigone & Hastie, 1993, 1997; Brodbeck, Kerschreiter, Mojzisch, Frey, & Schulz-Hardt, 2002). They sustain that if shared information is mentioned more often than unshared information, and if overall, the distribution of information prior to group work still affects decision outcome while statistically controlling for discussion of information, then this happens because collective group decisions are not based on members discussing available information but rather on members trying to negotiate the importance of their own individual pre-decisional preference in the final group decision. Hence, a group decision would stem from a combination of individual pre-decisional preference of members and not from the thorough investigation and weighing of each item of information available. In this configuration, information is only used to back up individual pre-decisional preferences when group work starts.

Intra-individual preference for consistent information. However, researchers have highlighted another explanation based on an intra-individual level. The idea is that individuals will refuse to take unshared information in consideration during group discussions and fail to uncover hidden profiles (Gigone & Hastie, 1997; Stasser & Titus, 1985, 1987; Wittenbaum, 2000), not necessarily because of a group process failure, but because of the involvement of an intra-individual mechanism occurring even in absence of group process dysfunctions. This mechanism stems from individuals' tendency to display an individual preference confirmation (e.g., Schulz-Hardt, Frey, Luthgens, & Moscovici, 2000; Schulz-Hardt, Jochims, & Frey, 2002). Precisely, they show that once members opt for a solution (a sub-optimal alternative choice in hidden profiles), they will then have a tendency to evaluate all new incoming information that is consistent with their sub-optimal alternative more favourably than information that is inconsistent with it. Thus, this intra-individual failure or bias regarding information evaluation is called preference consistent-information evaluation effect, and explains why individuals in groups are less prone to revise their first (though suboptimal) choice made. For Greitmeyer and Schulz-Hardt (2003), this bias is cognitive but non-intentional, whereby it can occur also when individuals are not instructed about others' sub-optimal preferences. This bias could be due to the allocation of a different amount of cognitive resources when analysing consistent and inconsistent information. Information that is consistent with one's

previous choice is accepted at face value, whereas inconsistent information is more thoroughly analysed as it implies that one's choice is wrong. However, even if inconsistent information manages to survive a critical analysis, the authors suggest that it will still be judged to be of lower quality and hence be evaluated as less important than consistent information.

Interestingly, other researchers (Toma et al., 2011) have held a different argument, according to which this intra-individual preference mechanism is not necessarily cognitive, but that it could be intentional and motivated. Such a motivated mechanism could fluctuate depending on the goal with which individuals are set to solve the task (competitive vs. cooperative goal) and depending on the presence (or not) of dissent within the fictitious group discussion where individuals learn about the individual preferences of the other fictitious members. In order to test this idea, Toma et al. (2011) have built and pre-tested a task, which was inspired from the one used by Greitmeyer and Schulz-Hardt (2003), and used the car accident cover story of Toma and Butera (2009).

Description of the task. Similar to the car accident case in Toma and Butera (2009), participants had to find the guilty person in a car accident investigation. The same car accident script was used, distribution of shared and unshared items of information, and the same potential suspects. But, whereas in Toma and Butera (2009) the material was adapted to group interaction, in Toma et al. (2011) the material was adapted for individual assessment.

The role-play story had participants pretend they worked as police inspectors with two other individuals in order to identify the party responsible for the car accident. A hidden profile was created by distributing three different critical clues to the participants and to the two other fictitious group members in a way that created an initial dissent: The naïve participant was oriented toward Mr X, while the fictitious participants were attributed Mrs Y and Mr Z as initial preferences. All participants were asked to express their initial preference (Mr X), and then they were informed that they did not possess the entire information, and that for this reason, they would be provided with supplementary information given by the two other participants. Goal interdependence and dissent manipulations were introduced at this point.

Participants were led to imagine that both their goal and that of the fictitious members was either to grant the group success (positive goal interdependence, i.e., cooperation) or to ensure the individual success (negative goal interdependence, i.e., competition) in the car accident investigation. It was also explained that a successful end of investigation would provide them all (cooperation) or only one of them (competition) with a very promising promotion. With regard to dissent, participants were either told that others' initial preferences were respectively Mrs Y and Mr Z (dissent, participants are oriented towards an initial preference for Mr X), or no information was provided (no dissent). Subsequently, participants received six items of information supposedly coming from the two other individuals, three were consistent and three were inconsistent with their initial preference (Mr X). Participants were asked to evaluate the items of information with regard to their importance in contributing to an optimal decision. And were asked to make a final decision based on all the information. Precisely, they were asked to come up with the best decision. The participants were free to take as much time as they needed for each phase, but they were not allowed to return to the previous phases. To test their idea, Toma and Butera (2011) manipulated in two experiments the type of goal given to the individual at the onset of the fictitious group discussion and the presence or absence of dissent.

Taken together, their studies jointly and consistently indicated that the individual preference confirmation effect appeared only in competition and dissent conditions. Such a result was observed on both measures of the individual preference-consistent information effect: individuals exhibited a greater preference for consistent than inconsistent information coming from the others fictitious members, and made more confirmatory decisions. Mediation-moderation analysis furthermore showed that preference for consistent-information mediated the confirmatory decisions of participants. Finally, results on a measure of self-enhancement (Study 2) showed that if participants in competition were all motivated by self-enhancement (in comparison to cooperation and control conditions), yet self-enhancement motivation positively predicted individual preference for consistent-information only in the dissent condition, whereas self-enhancement motives negatively predicted individual preference for consistent-information in the no dissent

condition. This latter distinction adds proof to the idea that individuals' preference for consistent-information is typically a motivated behaviour, which occurs when competition is raised, and which is especially (positively) predicted by self-enhancement motivations when dissent is at stake.

To summarize, it is important to make some clarifications. If the paradigm and the measurements to investigate the preference effect are indeed set at an individual level, the preference effect is nevertheless diagnostic of the cooperative or competitive motivations that individuals can have towards others (Toma et al., 2011). Moreover, in terms of comparison with the previous *group* paradigm, this individual one is similar in that its task structure is intrinsically cooperative. Indeed, in this task, if individuals do not take others' information into account and do not evaluate favourably inconsistent information, they will not be able to appreciate the value of those information and will not use them, nor will they consider them along with the ones they have in order to derive the optimal solution (i.e. decentring process, Butera & Mugny, 2001; Quiamzade, Mugny, & Butera, 2013). In this context, the motivation of individuals to decentre from their initial preference and then to consider other alternatives is central to solving the task. Thus, it is particularly important to grasp the extent to which grades could affect such individual motivation in a cooperative context, because holding at an intra-individual level the motivation to cooperate is a prerequisite to be motivated to cooperate at a higher and more complex interaction levels, and to ultimately be able to achieve in-group cooperation.

3.3 Making use of the Cooperative Game to investigate cooperation on inter-individual coordination

In this sub-section, we turn to develop another view of cooperation. We will highlight that cooperation is also viewed as requiring from group members to be able to coordinate their actions. Indeed, group cooperation applies not only to intellectual processes (e.g., requiring judgments formation, decision making), but also to the actions undertaken to achieve cooperation (e.g., coordination). Thus, we will next

present a task along with the features that makes it a cooperative task, and which therefore necessitates cooperative behaviours to be best achieved. This task will allow us to test whether grades could impact group cooperation when cooperation requires the coordination of the actions of its members.

Cooperation and inter-individual coordination. For individuals to cooperate, they must be able to coordinate their different actions and efforts in the perspective of the goal to attain. Indeed, the coordination of individuals' efforts, in the pursuit of a same goal, is admitted by researchers from the cooperative learning field to be one of the social skills that helps obtaining an efficient cooperation among group members (D.W. Johnson & R. Johnson, 2009a). With these principles in mind, a task measuring coordination would be of high interest because coordination can be conceived as an alternative indicator of cooperation. In the case where individuals are not given the chance or the time to explicitly discuss and prepare coordination strategies, then coordination is described as being tacit (Hackman & Morris, 1975). This is the type of coordination implied for instance when individuals participating in an experiment are put in groups to jointly achieve a task. Tacit coordination can be defined as "the synchronization of members' actions based on unspoken assumptions about what others in the group are likely to do, (Stasser & Wittenbaum, 1995)", Wittenbaum et al., (1996, p. 129). In other words, the tacit coordination of behaviours during interactions depends on anticipatory processes that individuals use to mutually adjust to one another in the achievement of a joint action. Wittenbaum et al. (1996) for instance talk about studies supporting that the attempts of group members to (tacitly) coordinate begins prior to interaction (Gersick, 1988).

This overall anticipated process concerns individuals forming expectations regarding different elements from the whole interactive situation in which they find themselves, those expectations have been extensively fleshed out by Wittenbaum et al. (1996) in their "anticipatory tacit coordination model". According to this model, the anticipated process of expectations regards several elements of the interactive situation. First, *expectations about other members* (e.g. their level of expertise regarding the task to achieve). Second, *expectations about the perception of the*

task, which individuals have about how the task will be assessed, and precisely what they perceive is needed to be done so that the task can be successfully achieved (the model stresses on the importance that task assessment concerns the subjective perception that individuals have of the task assessment and not the objective criterion given to them). Thus, task structure, whether being basically cooperative or competitive, has its own importance in individuals forming expectations regarding the task, because the "nature of coordination may change depending on whether group members see successful task completion as involving working together toward a common goal, or seeking to benefit individual goals at the expense of other members' successful goal completion" (Wittenbaum et al., 1996, p. 132). And third, *expectations about resource allocation* – by identifying the resources available, the one needed.

In the following, we build on this idea of an anticipated process of expectations formation based on elements from the overall interactive task situation that would help individuals to tacitly coordinate to draw some inferences. Following what is said in the model, if at the onset of the interactive situation, individuals perceive that (1) the task to achieve necessitates the intervention of all the members, and (2) clearly requires their cooperation to be achieved, then individuals of the group should perceive the situation as cooperative. They should perceive the need to coordinate, and hence they would be expected to be able to coordinate efficiently to achieve their joint task. But what would happen, if the salience of grades was triggered at the onset of the same interactive situation with the same task? Could they somehow change individuals' perception of the cooperative task and the perception of the overall interactive situation? Thus, if the cooperative task necessitated the coordination of individuals' actions, then wouldn't it be reasonable to think that grades could affect inter-individual coordination? Could grades lead individuals to less coordination notwithstanding the inherent cooperative base of the task? Thus, in the following we propose to present a task that we have chosen to use because it has that particular characteristic of allowing us to observe inter-individual coordination embedded in a task that requires cooperation for its achievement.

The Cooperative Game. This task developed by Doise and Mugny (1975, 1981 in Doise & Mugny, 1997) is a hand-eye inter-individual cognitive coordination task that was used to study cooperation as a dynamic process in the cognitive development of children. It was initially used to address several questions on cooperation and coordination from a cognitive-developmental perspective[21]. We propose to use it to observe cooperation as group members' capacity and willingness to successfully coordinate their actions towards the achievement of one same task.

The principle of the Cooperative Game is the following: while positioned around the game (cf. picture below), participants have to coordinate their actions by playing on the strings, by means of pulleys, in order to move a small mobile device forward on the board game. From where participants are positioned, each can pull on the string, release it, or hold it back. Hence, it is only if the actions of participants are coordinated that the participants will be able to apply a coherent movement to the small mobile device. Thus, the cooperative game intrinsically requires for its achievement, participants' coordination even if no instructions explicitly demands participants to cooperate. In this task, inter-individual cooperation is not merely an instruction given to participants but stems from a real need for coordination. Therefore the originality of this task comes from the fact that coordination is intrinsically needed to achieve the cooperative game[22].

[21] We deliberately chose not develop this approach here because it is not in this perspective that we will make use of this task (for a review see Chapter 3. in Doise & Mugny, 1997).

[22] Note that the task exists in two versions, a version for 2 players and one for 3 players, but that we will directly refer to the version for 3 players, as it is the one that we will use in our experiment to test the effect of grades on group members' capacity to coordinate their different yet complementary actions towards the achievement of one same goal.

As shown in the picture below, the cooperative game is composed of a board game on which is taped a sheet with a path drawn on it (the path comprises a three-lanes tract: inner, middle, outer lanes, delimited into squares, with a starting and finishing square), three pulleys fixed on the board game and connected together by

The Cooperative Game Device

strings linked up to a device supporting a ballpoint pen. This ballpoint pen will leave a trace on the path whenever the small mobile device moves on the board game, which will allow experimenters to keep evidence of the performance and to later calculate its relative points. Pulleys could be adjusted in two ways making it more or less hard for players to roll/unroll them: when pulleys are tightened they require more effort from players to use them compared to when they are loosened. The goal was for players to achieve a go on the board game by coordinating the rolling and unrolling of their pulleys to move forward the device supporting the ballpoint pen (from the first to the last square), whilst ensuring not to draw out of the path's middle lane. The total

score for one group achieving one go was calculated by respectively adding: (+1 point) if the line drawn was inside the middle lane, (0 point) if it went over-line reaching for the inner or outer lane, (-1 point) if it went out of the whole three-lane tract figure.

To better understand how the actions need to be coordinated in the version of the game for three players, a representation of the path made by the authors to corroborate the different possibilities is presented in Figure 3, along with the explanations provided by the authors themselves (please note that the three-lanes do not appear on this version for ease of following up).

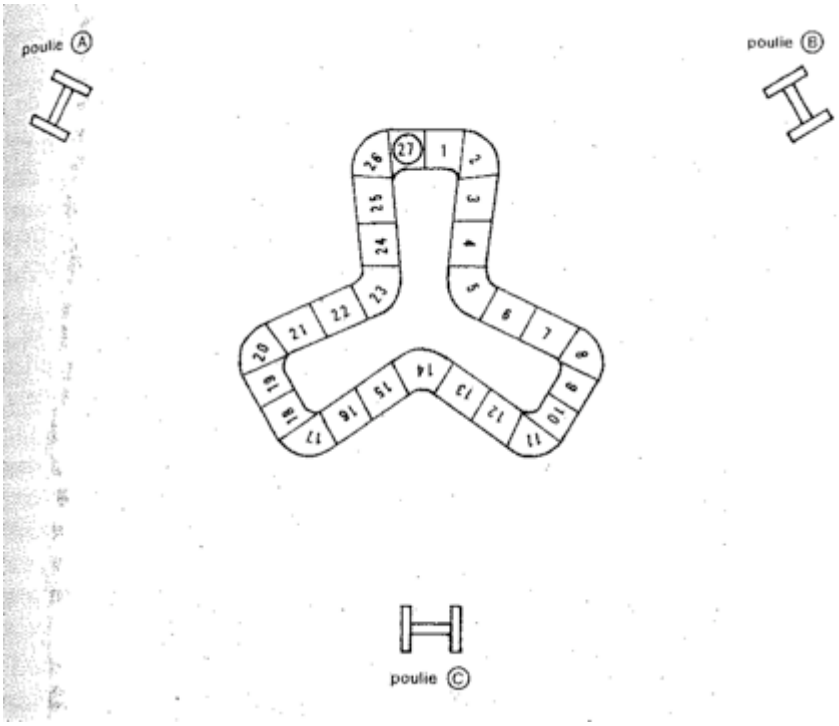

Figure 3. Graphic presentation of the path (taken from Doise & Mugny, 1997, chp.3, p. 53):

To move from square n°1 to n°2, one has to pull on pulley B, while loosening the string with pulley A, and pulling pulley C.

To move from square n°2 to n°5, one has to pull on pulley C then, loosen the string with pulleys A and B to allow the small device to move forward.

And so on with the remaining squares.

It is important to note that, similar to the previous tasks used in decision-making research, this task represents a group situation where individuals working together in groups could achieve better outcomes than individuals alone. Indeed, this task is based on a similar goal and resources structure as the other tasks described previously.

Precisely and firstly, group members are bound together through positive mean interdependence, given that individuals have each a different pulley that they need to coordinate with others to move forward the small device. Secondly, group members are bound together by positive goal interdependence, given that one same goal is given to the players: to successfully achieve a go on the board game without drawing out of the paper circuit. Hence, coordination of actions in this game is indeed another indicator of cooperation; the more participants coordinate well and the better their performance.

Moreover, this task allows us to investigate the impact of grades on the cooperative functioning of group members simultaneously at the two levels of group functioning (Oberlé & Ewa-Senkowska, 2006). As we have mentioned earlier in the introduction, when investigating or studying groups, it is generally admitted that the processes can be observed at two different levels: directed towards task achievement or directed towards the relational aspect of group functioning. The level of processes directed towards the task (i.e. task-focus level) concerns all processes that the group and its members will use to produce the work required. It is defined as an operatory level of functioning, directed towards the productive function of groups and the actions that are emitted towards the achievement of the task. The level of processes directed towards the group (i.e., group-focus level) concerns all processes involved with the relational aspect of groups. It relates for instance to the emotional dimension of a group and can concern implicit processes of group functioning. According to Oberlé and Drozda-Senkowska (2006), research in the social psychology field has a tendency, notably for practical questions of accessibility and feasibility, to investigate processes more often directed towards the task (i.e. performance) while under-investigating the emotional/relational side. Hence, even if both levels are not systematically and jointly investigated when addressing group

issues, those two levels of group functioning are nevertheless known to co-exist (Bales, 1950). However, if research in the field of goals and conflict regulation has showed the reality of these two levels (Darnon, Muller, Schrager, Pannuzzo, & Butera, 2006), it also showed how leading groups or group members to focus on one level (e.g. task) or the other (e.g., relations) affected groups' output and the way a conflict could be regulated.

Thus, with the use of the cooperative game, we undertake the challenge of investigating the effect of grades on group cooperation by observing the extent to which they could simultaneously affect players' inter-individual coordination at the two levels of group functioning. On the one hand, at task-focus level: by observing whether group performance could be deteriorated. On the other hand, on group-focus level: by observing whether the relational/emotional functioning of the group during coordination could be deteriorated. Subsequently, we develop why using this task could be particularly interesting to observe the effects of grades at the level of inter-individual coordination (by referring to Doise & Mugny, 1975, Experiment 2) and could lead us to make interesting predictions regarding the two-levels of group functioning (particularly, in terms of observing expression of negative social dominant behaviours taking place in groups where grades are triggered).

In their 2nd experiment, Doise & Mugny (1975) show that using the Cooperative Game allows observing how the quality of collective products (produced by the group as a whole) can differ depending on the nature of the relations that take place during partners' interaction. In their study (using the cooperative game adapted to 2 players), the authors manipulate the nature of interactions from the onset of the game: either by allowing groups to freely organize and structure themselves to play the game (i.e. the spontaneous duos), or by imposing different roles where one child would be assigned the chief/leader role and the other the follower role (i.e. the hierarchical duos). Putting on the role of leader, the individual will have to give orders, direct and command actions of the game. On the contrary, in the role of follower, the individual will have to strictly obey instructions of the leader. It is important to note that the children knew that the roles would be inverted during the second go of the game (the one putting on the role of chief would take on the role of follower, and vice versa). Given that we are not interested in the cognitive-

developmental perspective to which the authors were interested, we propose to directly focus on results obtained between the spontaneous vs. hierarchical older duos, aged 9-10 years, that we now know had achieved the adequate cognitive-behavioural stages of coordination to play the game. The results showed a difference in performance between the two types of duos that nearly reached significance, whereby hierarchical duos performed better (+71.63 points) than spontaneous duos (+59 points). According to the authors, this enhancement of performance observed in hierarchical duos could be attributed to the fact that in this type of duos, individuals in turn took responsibility in the proceedings of the interaction. In this perspective, organizing duos into a hierarchy is beneficial.

But does it mean that whenever a hierarchy is organized in this game, or whenever a leader emerges from duos/groups performance will necessarily be enhanced? In other terms, are leadership behaviours (i.e. under the scope of dominant behaviours) a must to manage inter-individual coordination during the cooperative game, and thus are necessary to better collective performances? We now unfold an explanation for why this might not always be the case. We think that in hierarchical duos where a chief is designated but where the children know that the roles will be inverted, the type of interaction between the two participants is built on a positive social interdependence *of roles*: they will each put on, in turn, the different yet complementary roles of leader/follower. Indeed, complementarity of roles is a factor known to be part of the pre-requisites for cooperation (Johnson & Johnson, 2009a). Hence, in itself, the resulting overall situation resembles a social dominant situation where a dominant individual (the leader) gives orders to a non-dominant individual (the follower) and where the chief's orders allow organizing work around the goal to attain (the collective task to achieve). More particularly, such situations resembles the type of pro-social dominant interaction which is a positive type of interaction and which differs from the type of negative-dominant interaction (i.e. coercive dominance, Hawley, 2002) that we think can also take place in this asymmetric type of situation. Before going any further in forming expectations regarding to what type of behaviours grades could possibly lead to during the cooperative game, let us briefly see how a social dominant individual could be

defined, to what social dominance can be related, and furthermore what distinguishes the types of pro-social and coercive dominant behaviours.

Social dominance, pro-social vs. coercive behaviours, and grades

Broadly, social dominant individuals can be defined as the ones who "successfully manage to control resources in the presence of others, regardless of how they do it" (an evolutionary adaptation view of social dominance, a traditional view, where social dominance rimes with aggression, Hawley, 2002, p.168). Yet, a more modern view of social dominance would differentiate that, in order to control those resources, two types of strategies can be used by individuals, either by making use of rather pro-social strategies or rather coercive ones. Thus, whereas both types of strategies are used by socially dominant individuals, the two differ in terms of: a) type of behaviours in relation to others, where coercive behaviours to control resources could be described for instance in terms of monopolizing, and where pro-social behaviours to control resources could be described in terms of reciprocation and cooperation; b) successful control over resources, where the pro-social behaviours serve as an effective resource control strategy (Hawley, 2002).

Moreover both types do not reflect in the same way whether an individual can be perceived as socially competent or not. Indeed, one can find in the literature that social dominance is associated with social competence and that there is a general agreement on the fact that a socially competent child is the one who is "able to achieve personal goals in social situations while simultaneously maintaining positive social relationships (Rubin & Rose-Krasnor, 1992)", Hawley (2002, p. 167). Thus, taking into account by which means (i.e. which type of social dominant behaviours) individuals manage to get control over resources and hence direct an interaction, does indeed matter. Yet, it is important to note that pro-social behaviours do not rule out the possibility that they are supported by motivations that directly involve *serving the self* (e.g., Eisenberg, 1996; Eisenberg & Giallanza, 1984; Hawley 2002). What stems from the previous is that it needs to be clearly mentioned that, as there are two different types of social dominant behaviours that can be distinguished, only one is associated with social competence, and is socially and positively evaluated by peers:

pro-social social dominance. On the contrary, only one type can be maladaptive and can disrupt cooperation: negative or coercive social dominance.

In the case of the Cooperative Game, we decide to focus only on the negative social dominant behaviour because, as previously presented, it is the type of behaviour that is expected to be disruptive for cooperation. Moreover, if grades are ego-involving and represent a potential threatening social comparison for competence, they should lead individuals to try to put themselves forward during the Cooperative game interactions, and therefore try to monopolize the ground and the resources which here are represented by the use of pulleys. Hence, these attempts to take control over available resources, should take place without necessarily waiting to coordinate with other group members and without the others' authorization. More to the point, on the one hand cooperation in terms of interaction can be defined by positive and respectful interactions among individuals, a situation where acts of mutual help are observed (D.W. Johnson & R. Johnson, 1989; Johnson, Johnson, & Maruyama, 1983; Roseth et al. 2008). Whereas on the other hand, a disruption of cooperation should be observed through less respectful interactions, more tensions and lead, in our cooperative game, to a hampered coordination (both at group performance level and at the emotional level functioning of the group).

In sum, negative social dominant behaviours can be observed through monopolization while simultaneously holding an essentially negative component that reflects on the type of interaction taking place between individuals (in comparison to positive social dominant behaviours). Therefore, when analysing the on-going interactions during the Cooperative Game, one will need to focus on "floor-taking" control indices (i.e. monopolization), but also to focus on whether those floor-taking control indices are accompanied by emotional negative tension. In other words, we will need to operationalize our variable of negative social dominant behaviours by providing an indicator that captures at once, the social dominance part of the behaviour but also its negative valence.

OVERVIEW OF HYPOTHESES

In the up-coming experimental studies, we wish to test the general hypothesis according to which grades will hamper cooperation. This general hypothesis can be specified as a function of the indices of cooperation that we used in the present thesis.

First, we used an intra-individual variable that conveys individuals' motivation to cooperate with others: being willing to cooperate echoes with a reduction of individuals' preference effect, as this later is symptomatic of individuals' willingness to decentre from their point of view to meet others' point of view (cf., 3.2.). Our hypothesis is that grades will reduce individuals' motivation to cooperate with others under the form of an increase in the preference effect. As grades are known to increase individual social visibility, we furthermore put forward that grades, but not individual visibility alone, will produce this effect *(H1)*. Moreover, we hypothesize that we will be able to replicate the effect of grades in comparison to other types of experimental conditions where individual visibility is manipulated in different ways, namely in comparison to conditions of mere presence, visibility, individual accountability *(H2)*.

Second, we used an inter-individual (group-level) variable that depicts individuals' actual cooperative behaviour during group information exchange: the exchange of information items that others do not have and that are of major importance for the task on which the group is working. Our hypothesis is that expecting to be graded will reduce individuals' motivation to cooperate with others, under the form of a reduction in the exchange of unshared, useful information in comparison to other conditions where only individual visibility or no individual visibility are manipulated *(H3)*. Moreover, given that we suspect self-evaluation threat, to be responsible for this effect, and that this mechanism is deeply anchored in individuals' basic needs to received accurate self-evaluation, we hypothesize that we could replicate this effect with a different experimental procedure: when grades are only primed *(H4)*.

Third, we used an inter-individual (group-level) variable that depicts individuals' actual cooperative behaviour during group coordination: coordinating

actions and communicating about these actions. Our hypothesis is that grades will reduce individuals' motivation to cooperate with others, under the form of a reduction in groups' level of coordination, which in the chosen task will be reflected in a deteriorated group performance *(H5)*.

OVERVIEW OF EXPERIMENTAL CHAPTERS

In the experimental parts of this thesis, we wish to test whether grades could be deleterious for cooperation and cooperative group work in tasks that are based on a positive interdependence of goals and resources.

In order to do so, we propose to use two different experimental methods to manipulate grades, either with an explicit method (through oral instructions for task achievement), or with an implicit method (priming). The underlying idea is that if both methods show a negative effect of grades, then one way to interpret this consistency throughout the two different methods used would be to think that grades are part of our everyday life, such that even when we expose individuals indirectly to them, grades still affect cooperative behaviours.

We also propose to vary dependent variables accounting for the observation of cooperative behaviours in a cooperative setting in which grades are expected or primed. First, we expect to observe the effects on an intra-individual variable, the preference effect, whose decrease would signal a more cooperative behaviour towards the evaluation of inconsistent information coming from others. Second, we expect to observe the effects of grades on an inter-individual variable intervening at group discussions level, i.e., the group's exchange of unshared information, which when exchanged more freely would signal a more cooperative behaviour towards other group members. And third, we expect to observe the effects of grades on an inter-individual variable of motor type, inter-individual coordination, which is necessary to achieve cooperation. These different levels were studied because, at some point, we wondered whether the effect of grades would be context dependant of a group environment. Else said, we wondered whether grades' effects occur only in direct interactions, built on the assumption that threatening social comparison enhanced by grades can only be triggered with the presence of others against whom to compare. Another possibility is that the effect of grades can also be observed in individual work situation and to also impact individual reasoning.

Chapters and their related studies and cooperative behaviours dependent variables will be distributed as follow:

- Chapter 4 will present two studies conducted with university students that investigate grades' effect at an intra-individual level. Across all these three studies, the same task was used: the hidden profile task in a fictitious group setting, which allows us observing whether grades could lead to an increase of the preference effect. A preference effect which decrease at intra-individual level, reflects a decentring process, as well as a willingness and motivation to cooperate with others. Hence, if grades increase the preference effect instead of decreasing it, it would signal individuals' lack of motivation to cooperate with others and appreciate others' information value.

- Chapter 5 will present two experiments conducted with university students and designed to investigate grades' effect on group processes, particularly on group information exchange within groups. These two group experiments investigated whether the deleterious effect of grades expected in a cooperative group setting with fictitious members (see Chapter 4) could also be obtained in a real cooperative group work where live and direct interactions occur. For both experiments the same task is used (i.e. the hidden profile task in real group setting). In both studies, the extent to which grades affect group cooperation is measured by the extent to which groups are reluctant to share information that is crucial to task achievement (called unshared information).

- Last but not least, Chapter 6 will present a study conducted with pupils and designed to investigate the effect of grades on group processes but this time with a different dependent variable than those used in studies presented in Chapter 5. More particularly, in this study we tested the effect of grades on inter-individual coordination as an indicator of cooperation. If on the one hand, individuals who cooperate are the ones who manage to coordinate, and that on the other hand, we expect grades to impede cooperation then grades should impede coordination. To test this hypothesis, we used the Cooperative Game (Doise & Mugny, 1997) based on inter-individual cognitive-motor coordination. The extent to which grades could affect group cooperation was measured by the extent to which group coordination

could be affected, which in turn should impact the performance of the group. Moreover, this study offers the particularity of being conducted with a sample of pupils (aged about 10 years old). Thus, it allows investigating grades' effects on a younger sample than the previous studies (university students), and therefore should give us some insights on the anchoring of grades at an earlier educational stage.

CHAPTER 4.

THE EFFECT OF GRADES ON THE PREFERENCE EFFECT[23]

Abstract

The tendency to look for evidence that supports, rather than questions, one's viewpoint (e.g., preference effect) is a pervasive phenomenon, long known to hamper people's critical thinking. Although one important goal of education is to develop critical thinking, the widespread practice of using grades might discourage students to look for disconfirming evidence. Thus, in two experiments we tested the hypothesis that individual grading increases the preference effect. Experiment 1 showed that participants who expected their work to be graded exhibited a higher preference effect compared to participants who expected their work to be merely visible. Experiment 2 replicated this effect by comparing the grading condition to other visibility conditions (mere presence, visibility, accountability), and furthermore showed that the grading condition increased participants' perception of a competitive social comparison. Implications for educational policies are discussed.

Keywords: preference effect, grades, cooperative group work, visibility

[23] Submitted as Hayek, A.S., Toma, C., Oberlé, D., & Butera, F. (9 april 2014). The effect of grades on the preference effect.

In many educational systems, students learn that in order to write a convincing essay, they must include a thesis, an antithesis and a synthesis in the development of their argument. The rationale for this recommendation is that once students have stated their main point of view, they should be able to refute it, or to propose an alternative point of view, and then to come up with a perspective that includes, compares and articulates the opposing points of view. This procedure, however, requires from students to be able to decenter from a single idea or hypothesis, i.e., to question their own point of view, an ability that is easily impaired when students are under some evaluative pressure (Butera & Buchs, 2005). In an environment where evaluative pressure is pervasive, as it is the case with grading at school and university, it is then possible that students would be motivated to confirm that their point of view is right rather than being open to information that might question their position. In the present research, we aim at testing the effects of grades on people's tendency to look for evidence that confirms initial preferences. We hypothesized that the expectation of being graded will increase this tendency compared to situations in which people's work is simply made visible.

Grades and Properties of Grades

Grades represent a form of normative assessment, or norm-referenced assessment, that allows comparing the performance of the person being evaluated to that of other persons (Glaser, 1963), be they other pupils, students, or co-workers. The main advantage of grades is the visibility they provide: They summarize performance in a number—or a letter, or a judgment—and thereby constitute an easily interpretable criterion of success (or failure). This is probably the reason why grades constitute the main method of assessment in educational and professional settings (Knight & Yorke, 2003).

The visibility afforded by grades, however, may also originate an undesired by-product: By making very clear the differences in merit across people, grades operates a switch in individuals' interest from a focus on the task to a focus on the social comparison of competences, with detrimental consequences for learning and performance. Indeed, an impressive amount of research, dating back more than twenty years, has shown that normative assessment entails a long list of nefarious

effects for learning and performance. Grades hinder improvement from one test to the following (Williams, Pollack, & Ferguson, 1975), they reduce interest in the task at hand (Harackiewicz, Abrahams, & Wageman, 1987) they impair intrinsic motivation and performance (Butler1987, 1988; Butler & Nisan, 1986).

These results have been replicated and extended by many other research teams, in both psychology (Deci & Ryan, 1985; Harter, 1978) and educational sciences (Black & Wiliam, 1998; Thomas & Oldfather, 1997).

Grades and Preference Effect

One might wonder why is it important to understand the effects of grades on the tendency to look for confirmation of one's own point of view. At least two reasons can be mentioned. First, confirmation bias—the tendency to look for evidence that supports, rather than questions, one's hypothesis or viewpoint—is a pervasive phenomenon, long known to hamper people's ability to develop critical thinking and logical argumentation (Klayman & Ha, 1987). In particular, it has been argued that confirmation is mainly used when people need to defend their point of view from an opponent or from the risk of being wrong, which impairs the ability to consider alternatives (Butera & Mugny, 2001; Mercier & Sperber, 2011). At the same time, some results suggest that standard methods of teaching (e.g., encouraging students to present reasons for opinions they hold rather than reasons against them) and standard methods of evaluation (e.g., using grades) may foster this bias (Nickerson, 1998). For example, when being graded for written essays students use more claims that contain supporting evidence than claims that contain disconfirming evidence (Narveson, 1980).

Second, confirmation bias is frequent in groups, which are often used in educational settings. When occurring in groups, this bias (also called preference effect) refers to insufficient revisions of individual preference during group discussions (Brodbeck, Kerschreiter, Mojzisch, Frey, & Schulz-Hardt, 2002). More specifically, the preference effect occurs because group members have the tendency to evaluate information that is consistent with their initial preferences more favourably than information that is inconsistent (Greitemeyer & Schultz-Hardt, 2003). In the domain of group decision-making research has shown that the preference effect

increases in situations where individuals try to prove themselves in front of others, like for example in competition (Toma & Butera, 2009; Toma, Gilles, & Butera, 2013). In their recent research, Toma et al. (2013) manipulated members' goals using either an individual (negative goal interdependence—i.e., competition) or a group promotion (positive goal interdependence—i.e., cooperation) that was offered to group members who succeeded in solving the mystery of a car accident case. Participants were also told that other (fictitious) members had either dissenting or identical initial preferences to their own. Results indicated that the preference effect was higher in competition than in cooperation, and especially when participants were facing the dissenting preferences of the other group members. This effect was mediated by self-enhancement strategies, which are known to reflect strivings to raise one's positive self-view and superiority (Alicke & Sedikides, 2009).

The aim of the present research is to determine whether a similar effect could be obtained with grades. At school, students are often defending different points of view and competing with one another for better grades, even when working on group projects. Such practices, however, can have opposite effects. On the one hand, this could be motivating because it increases students' visibility (Cameron & Pierce, 2002) and signals a situation in which grades are used to produce criterion-referenced evaluations, that is evaluation of a student in comparison with a pre-set standard (e.g., a certain level of knowledge). On the other hand, this could be threatening because it increases comparability of one's work with that of others (Marshall & Weinstein, 1984) and signal a situation in which grades are used to produce norm-referenced evaluations, that is evaluation of a student in comparison with other students. Studies have shown that contexts in which one needs to prove oneself in front of others leads to self-evaluative threats (Dickerson, Gruenewald, & Kemeny, 2004), which in turn increases the preference effect (Toma et al., 2013). This should not be the case when visibility is merely emphasized by the presence of a third-person (Dickerson et al., 2008) or when the self-evaluation threat linked to the normative facet of grades disappears, e.g., because one is assured of one's own superiority (Muller & Butera, 2007).

In sum, the visibility afforded by grades may not be a problem in itself, but that it is rather the potentially competitive social comparison elicited by grades that may

focus individuals on the defence of their own point of view. Therefore in the present research we test the hypothesis that in a group situation in which members face the dissent of others, expecting one's work to be graded should increase the preference effect compared to expecting one's work to be merely visible.

Overview of Studies

Two studies were conducted in order to test this hypothesis. The task used was the same as the one used by Toma et al. (2013). In this task participants were asked to individually solve a car accident case and to find the person responsible for it (initial preference). Then, they were informed that other team members supported different initial preferences because of the different information they possessed. Participants were asked to read and to rate the importance of the other members' information, which was either consistent or inconsistent with their own initial preference. The preference effect was calculated as the difference between the evaluation of consistent and inconsistent information.

In Experiment 1, we tested our main hypothesis that individual grading during group work should increase the preference effect as compared with mere visibility of one's work. To test this hypothesis, we contrasted a condition of evaluation by grades with a control condition in which individual work was simply visible, but not graded. We also introduced a second control condition without grades or visibility. Indeed, as noted above, grades imply both a focus on competitive social comparison and increased visibility. If, as hypothesized, grades increase the preference effect because of the social comparison component, the condition with individual grades should differ from the condition with mere visibility. It is however possible that. contrary to our expectation, it is indeed visibility that increases the preference effect; in this case both the graded and the mere visibility conditions should induce a higher preference effect than the control condition. In Experiment 2, we aimed at replicating Experiment 1 and disentangling possible confounds in the manipulation of visibility.

Experiment 1

Method

Participants. A total of 61 university students from a Swiss University took part in this experiment. Six participants were excluded from the analyses because they did not comply with the experimental script (i.e. they did not choose Mr. X as the initial preference, to whom the script and clues oriented them). The remaining sample included 55 university students (34 women and 20 men, one student did not mention her/his gender and age, M = 18.09 years, SD = 1.20). Participants were randomly assigned to one of three-experimental conditions: Graded-Visible (N = 13), Non Graded-Visible (N = 23) and Non Graded-Non Visible (N = 19). Preliminary analyses revealed that gender did not influence our effects and therefore, this variable was not included in final analyses.

Procedure. Participants were told that they would participate in a study on the resolution of criminal investigations (for the exact materials, see Toma et al., 2013). They worked individually, and then they were led to imagine that they would work in a team with two other students. The role-play story had participants pretend they worked as police inspectors with two other people in order to identify the party responsible for a car accident. Four people were potential suspects, but three of them could be exonerated (Mr. X, Mrs. Y, Mr. Z) and the fourth (Mr. X's son) incriminated based on a critical set of nine clues. All participants were oriented toward Mr. X, while the two other fictitious members were attributed Mrs. Y and Mr. Z as initial preferences. All participants were asked to commit to their initial preference (Mr. X), and then they were informed that they did not possess the entire set of information, and that for this reason they would be provided with supplementary information given by the two other participants.

The manipulation of grades was introduced at this point. In the Graded-Visible condition, participants were told that the Chief would be present and give an individual grade (ranging from 1 to 6, which corresponds to the usual grading range in Switzerland) to each inspector at the end of the investigation. In the Non Graded-Visible condition, participants were told that the Chief would be present because he is interested to follow the investigation. In the Non Graded-Non Visible condition,

participants were told that the Chief of the police inspectors would not be able to follow the investigation.

Subsequently, participants received six items of information, three consistent and three inconsistent with their initial preference (Mr. X), supposedly coming from the two other people. An example of consistent information was that the person responsible for the accident is a man. An example of inconsistent information was that the person responsible for the accident is less than 30 years old (participants knew that Mr. X is 53 years old). The consistent and inconsistent information was presented in random order for each participant. Participants were asked to evaluate the items of information with regard to their importance in making an optimal decision. Finally, participants were asked to make a final decision based on all the pieces of information. At the end, participants were debriefed and thanked for their participation.

Measures

***Manipulation check*.** In order to check whether participants correctly perceived the Graded-Visible condition compared to the other conditions, they were asked to answer the following question: *During the investigation, did the Chief tell you that you would be individually evaluated? (Yes / No).*

***Preference for consistent information*.** Participants evaluated to what extent the six items of information they received were important in reaching the optimal decision, on a scale ranging from 1 (*not at all important*) to 9 (*very important*). This information included three items consistent and three items inconsistent with the participant's initial preference. One consistent item and one inconsistent item were dropped from the analyses as they lowered the reliability test. The preference for consistent information was computed by subtracting the ratings of the two inconsistent information items ($r = .47$, $p < .001$) from the ratings of the two consistent information items ($r = .55$, $p < .001$), and refers to the extent to which participants evaluated information in a way that confirmed their initial preference. A positive score indicates that consistent information was considered more valuable than inconsistent

information, and a negative score indicates that inconsistent information was considered more valuable than consistent information.

Results

Manipulation check. All participants in the Graded-Visible condition responded 'Yes' and all participants in the other two conditions responded 'No' to the question regarding the individual evaluation, $\chi^2(2, N = 55) = 55.00$, $p < .001$.

Preference for consistent information. To test the preference for consistent information, we used two contrasts corresponding to the focal and the alternative hypotheses (Judd & McClelland, 1989). The first contrast c1 (1, -1, 0) tested the hypothesis that the preference effect is higher in the Graded-Visible condition compared to the Non Graded-Visible condition. The orthogonal contrast c2 (1, 1, -2) opposes the Non Graded-Non Visible (control) condition to the other two conditions and tested the hypothesis that both visibility and grades will enhance the preference effect compared to the control condition. This analysis revealed that the contrast c1 was significant, $t(52) = 2.35$, $p < .05$, $\eta_p^2 = .18$, suggesting that the preference effect was higher in the Graded-Visible condition ($M = 1.46$, $SD = 2.00$) compared to the Non Graded-Visible condition ($M = -0.24$, $SD = 2.09$), as predicted. The contrast c2 was not significant, $t < 1$. However, a post-hoc analysis revealed that the preference for consistent-information was marginally higher in the Non Graded-Non Visible condition ($M = 0.86$, $SD = 2.13$) than in the Non Graded-Visible condition, LSD $t(52) = 1.71$, $p < .09$. The results are presented in Figure 1.[24]

[24] Supplementary analysis. Although our main interest was to study precisely preference for consistent information, it is common practice in the literature on the preference effect to report the existence of confirmatory decision on participants' final decision. Therefore, a dichotomous measure was derived form the final decision reported by participants. When the answer was confirming their initial preference (Mr. X), it was coded 1, whereas when the answer was not (answering: Mrs. Y, Mr. Z or Mr. X's son) it was coded (0). It appeared that, across all conditions, 49.1% of participants confirmed their initial preference (Mr. X), $\chi^2(1, N = 55) = 0.02$, $p = .89$, ns. No difference between conditions was found $\chi^2(2, N = 55) = 2.46$, $p = .29$, ns.

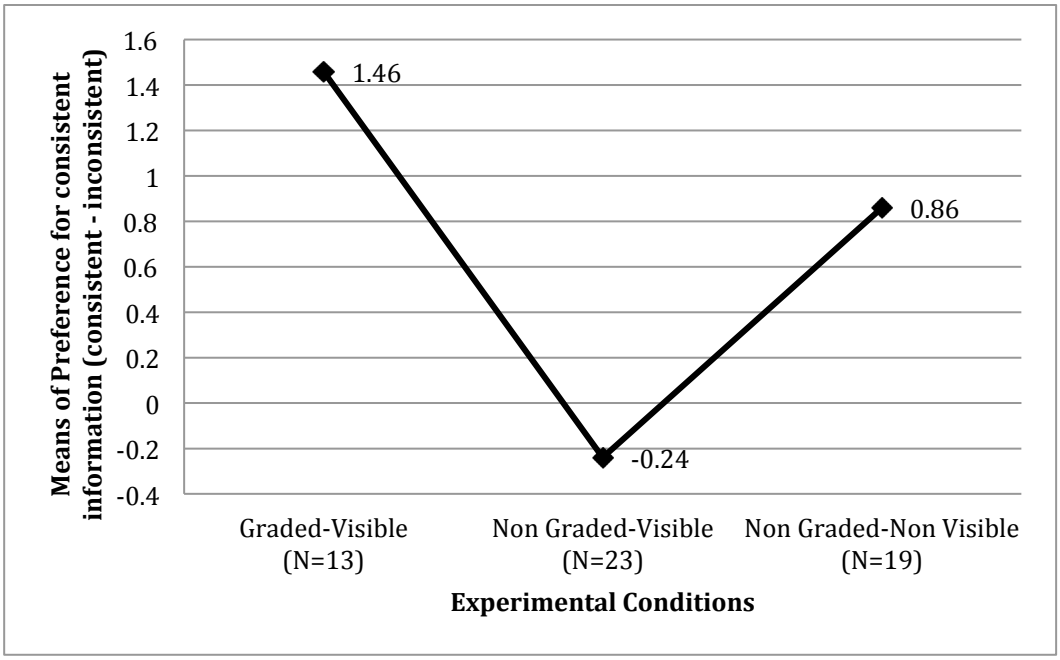

Figure 1. Experiment 1: Mean preference for consistent information as a function of the experimental conditions.

4.3 Discussion

The results of this experiment provide preliminary evidence for our focal hypothesis, tested with the first contrast. Indeed, participants who expected their work to be individually graded exhibited a significantly higher preference for consistent information compared to participants who expected their work to be only visible. The alternative hypothesis that the preference effect should increase as a function of visibility, tested with the second contrast, was not supported.

An interesting, although unexpected and only marginally significant result was that the preference effect was marginally higher in the Non Graded-Non Visible condition compared to the Non Graded-Visible condition. This may suggest that when one's work is not expected to be visible, individuals are not particularly motivated to revise their preferences. This is consistent with research on social loafing showing that people reduce their individual contribution to group work when their effort is not visible (e.g. Latané, Williams, Harkins, 1979; Karau & Williams, 1993; Williams, Harkins & Latané, 1981).

Experiment 2

The first aim of Experiment 2 was to replicate the effect found in Experiment 1 and to confirm that individual grading indeed increases the preference effect. The second aim was to test an assumption underlying our general hypothesis. We argued in the theoretical introduction that one important component of grading is the focus on competitive comparison with other group members; we therefore added a measure of perceived competition, in order to test whether participants perceive more competition in the Graded-Visible condition compared to other control conditions (see below).

The third aim was to disentangle possible confounds related to the manipulation of visibility. In the Non Graded-Visible condition of Experiment 1 participants were told that their Chief would be present because he was interested to follow the investigation. It is therefore difficult to know whether the reduced extent of the preference for consistent information was due to the expectation of one's work being visible, or to the mere presence of the Chief. Thus, in this second experiment we broke down the former Non Graded-Visible condition into a condition of Visibility and a condition of Mere Presence. Visibility, or social visibility, is at stake whenever an individual is observed while achieving a task (Zajonc, 1965; Bond & Titus, 1983), whereas mere presence of a person occurs when this person is physically present during the individual's performance and the individual knows that this person is not interested in watching performance (Cottrell, Wack, Sekerak, & Rittle, 1968). In both cases, some extent of visibility of the individual who is performing is at stake, but they are conceptually different. Interestingly, such situations that increase individual visibility are only deleterious to the extent that the observer's presence explicitly implies the possibility of a negative evaluation (e.g. when a panel of evaluators is there to observe in a critical and rejecting manner the individual perform, Gruenewald, Kemeny, Aziz, & Fahey, 2004). Otherwise, visibility situations from which explicit negative social evaluation is absent do not elicit stress (Dickerson, Mycek, & Zaldivar, 2008). Thus, although in both cases of Visibility and Mere Presence individual visibility is at stake, we should not expect any deleterious effect, that is any increase of the preference effect: Both the Visibility and the Mere

Presence conditions should then lead to a lower preference effect compared to the Graded-Visible condition.

Another confound in the Non Graded-Visible condition was due to the presence of accountability demands. Individual accountability, defined as the "pressure to justify one's causal interpretation to others" (Tetlock, 1985, p.227), is often manipulated by increasing the visibility of one's judgement or position taken. For example, participants may be told that they will have to justify their judgement or position to someone else (Tetlock, 1985), which implies both visibility and evaluation. However, contrary to a situation of grading, this evaluation is not normative: The focus of accountability is not on the comparability of one's work to that of others, but on the underlying reasons that justify one's own position, on examining and evaluating all available information that would help finding the most appropriate solution (Johnson & Johnson, 1985). Indeed, the literature investigating individual accountability has shown that asking people to be accountable for their judgments and decisions has positive effects on several tasks, specifically by reducing reasoning biases (Lerner, Goldberg and Tetlock, 1998; Tetlock, 1985; Tetlock, 1983), and results, for instance, in individuals producing more integrative complex thoughts (Tetlock, 1983; Green, Visser et Tetlock, 2000), or in becoming more responsive to additional diagnostic evidence (Tetlock & Boettger, 1989). Thus, compared to a grading situation, we expected accountability to reduce the preference effect.

In sum, we hypothesized that the preference effect will be higher in the Graded-Visible condition compared to the other three experimental conditions (Visibility, Mere Presence, Accountability).

Method

Participants. A total of 61 university students, from a Swiss University took part to this experiment (42 women and 19 men, M = 21.31 years, SD = 1.84). Participants were randomly assigned to one of the four experimental conditions: Graded-Visible (N = 18), Visibility (N = 16), Mere Presence (N = 13), Accountability (N = 14). Again gender had no effects and was not included in the final analyses.

Procedure. The same procedure as in Experiment 1 was used. However, this time the experiment was not conducted in the lab, but was part of a class exercise.

The instructions used in the experimental conditions were the following: in the Graded-Visible condition, participants were told that the Chief would be present and give each inspector an individual grade (ranging from 1 to 6) at the end of the investigation. In the Visibility condition, participants were told that the Chief would be present because he is interested to follow the investigation. In the Mere Presence condition, participants were only told that the Chief of the police inspectors would be present. In the Accountability condition, participants were told that the Chief would be present because the inspectors will have to justify their final decision to him.

Again, participants evaluated the importance of consistent and inconsistent information for the final decision. Finally, they assessed their perception of competition, and were debriefed and thanked for their participation.

Measures

Preference for consistent information. This measure was computed as in Experiment 1. The correlation between the two items of consistent information was $r = .39$, $p < .002$, and the correlation between the two items of inconsistent information was $r = .58$, $p < .001$.

Perceived competition. In order to test whether indeed the Graded-Visible condition induced perceived competition to a higher extent than the other experimental conditions, participants answered a 2-item questionnaire on a scale ranging from 1 (*not at all*) to 9 (*totally*). The questions asked whether participants perceived a competitive atmosphere, and whether they perceived the other members as rivals. The two questions were combined into a single score of perceived competition ($r = .56$, $p < .001$; $M = 3.89$, $SD = 1.94$).

Results

Preference for consistent information. The impact of experimental conditions on preference for consistent information was tested using three contrast codes. The first contrast c1 (3 -1 -1 -1) was associated with the four experimental conditions as follow: Graded-Visible / Visibility / Mere Presence / Accountability. It corresponds to

our hypothesis according to which the preference for consistent information will be higher in the Graded-Visible condition compared to the other three conditions. The other two orthogonal contrasts were c2 (0 -1 2 -1) and c3 (0 1 0 -1). The analysis revealed that the contrast c1 was significant, $t(57) = 2.16$, $p < .035$, $\eta_p^2 = .076$, suggesting that preference for consistent information was significantly higher in the Graded-Visible condition ($M = 0.89$, $SD = 1.72$) compared to the other three conditions, namely Visibility ($M = 0.01$, $SD = 2.22$), Mere Presence ($M = -0.23$, $SD = 1.82$), and Accountability ($M = -0.71$, $SD = 2.14$). The contrasts c2 and c3 were not significant ($ts < 1$). The results are presented in Figure 2. [25]

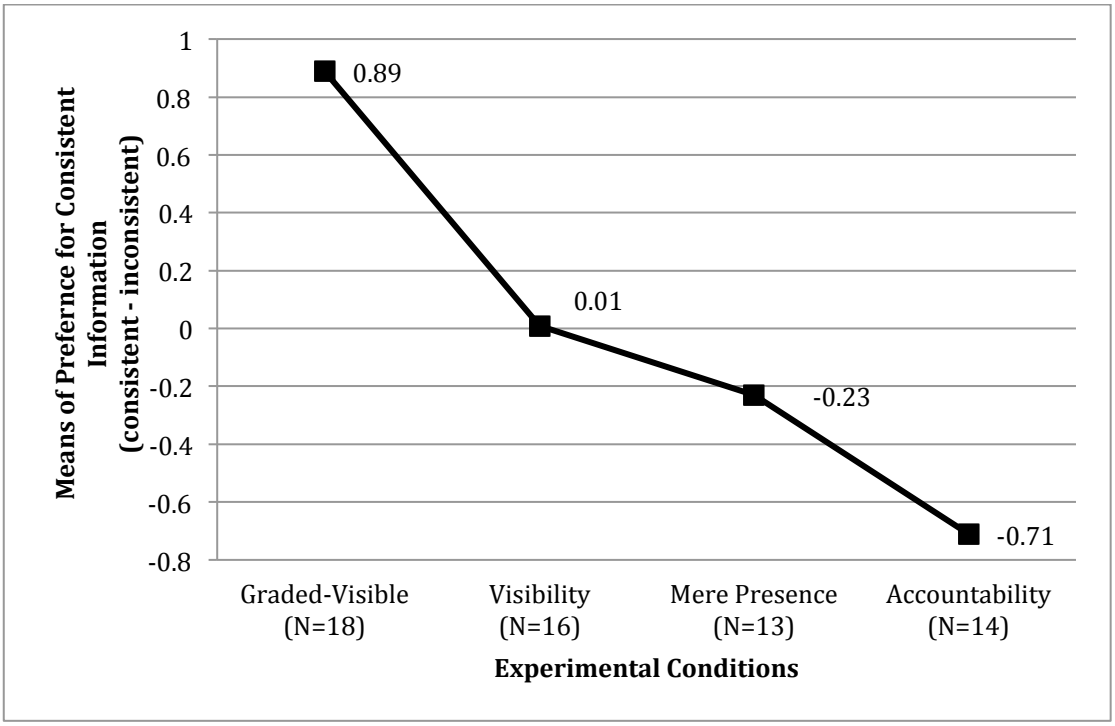

Figure 2. Experiment 2: Mean preference for consistent information as a function of the experimental conditions

Perceived competition. We tested our hypothesis regarding perceived competition with the same three contrast codes we used for the preference for consistent information. The analysis revealed that the contrast c1 was significant: $t(57) = 2.32$, p

[25] Supplementary analysis. Again, we studied confirmatory decision on participants' final decision. We found that across all conditions, 31.1% confirmed their initial preference (Mr. X), $\chi^2(1, N = 61) = 8.67$, $p < .003$. No difference between conditions was found $\chi^2(3, N = 61) = 1.98$, $p = 0.58$, ns.

< .02, η_p^2 = .086 suggesting that participants in the Graded-Visible condition perceived more competition (*M* = 4.75, *SD* = 1.96) than participants in the other three conditions, namely Visibility (*M* = 3.81, *SD* = 2.02), Mere Presence (*M* = 3.19, *SD* = 1.8), and Accountability (*M* = 3.54, *SD* = 1.75). The contrasts c2 and c3 were not significant (*ts* < 1).

4.6 Discussion

The first aim of this second experiment was fulfilled, as the results replicated the effect found in Experiment 1. Indeed, the Graded-Visible condition increased the preference for consistent information, compared to the other conditions (Visibility, Mere Presence, Accountability). Interestingly, the effects on perceived competition mirrored the effects on the preference for consistent information, suggesting that participants were more inclined to perceive competition with others when evaluated with grades than in the other experimental conditions. This supports our assumption that evaluation by grades contains a normative component to a larger extent than the other conditions.

General Discussion

In many educational systems, the goal of developing critical thinking and logical argumentation among students is often hampered by the use of standard methods of teaching and evaluation, in particular normative assessment under the form of grades. The practice of using grades was shown to hinder students' ability to develop counter-argumentation and to avoid confirmatory tendencies (Nickerson, 1998). Two experiments tested the hypothesis that the expectation of being graded in a group-work situation increases the preference for information that is consistent with one's initial solution.

Experiment 1 showed that participants who expected their work to be individually graded exhibited a higher preference effect compared to participants who expected their work to be merely visible in the group. Experiment 2 replicated this effect and showed that when participants expect their work to be visible, the presence of grades was associated with an increase in the preference effect as

compared with the mere visibility of one's work, the mere presence of an evaluative agent, or the expectancy of being accountable for one's work. This second experiment also showed that participants perceived more competition with other group members when they expected to be graded than when in the three other conditions.

Taken together, the two experiments point to the fact that the potential of grades to elicit a preference effect is not due to their visibility component, as suggested by the significant difference between the graded condition and other visibility conditions in both experiments. A possible interpretation of this effect is that it is due instead to the ability of grades to induce a competitive social comparison, as suggested by the result found in Experiment 2 that grades increased the perception of a competitive atmosphere, and of others as competitors. To support such an interpretation, future research should directly manipulate what we assume to be at the core of the facilitating effects of grades on the preference effect, namely a threatening social comparison.

The present research has important theoretical and practical implications. First, this research contributes to a better understanding of the effect of grades on information processing. By disentangling the effects of grades from the effects of visibility, this research showed that the deleterious effects of grades on the preference effect are most probably due to their normative facet, i.e. the fact that they facilitate competitive social comparison with co-workers, and not to their visibility facet. This is consistent with research showing that comparing one's performance against a normative standard, such as the midpoint of a scale or a coactor, may trigger a self-evaluation threat that subsequently results in focusing only on the central features of the task (Muller & Butera, 2007).

Second, this research also contributes to the view that confirmation bias is a motivated process both at the individual (Butera & Buchs, 2005) and at the group level (Toma et al., 2013; Toma, Vasiljevic, Augustinova, Oberlé, & Butera, 2012). We know from previous research that confirmation is mainly used when people need to defend their point of view from an opponent or from the risk of being wrong (Butera & Mugny, 2001). Confirmation is also more often used in groups when individual members have competitive, rather than cooperative goals (Toma et al., 2013). In the

present research, the expectation of being graded enhanced both the perception of competition, and the preference for consistent information.

Third, this research has important practical implications for educational policies. By using grades and ranking, institutions signal their wish to prepare students to a future competitive labour market. In this perspective, grades may be used as a tool to select promising students who could occupy valued positions in society (Arrow, 1973). And indeed, the present research reminds that grades have a double function, allowing at the same time the increase in visibility of individual work and social comparison with others. Yet, the present results also point to the fact that the use of grades, in particular the focus on competition with other group members interferes with the capacity of individuals to consider, in an unbiased way, information coming from others. This is a highly valued capacity, especially in contexts where important decisions need to be made and where, precisely, valuing different alternatives can help fighting pressure to conformity and avoiding situations of defective group decision-making in which alternative options are often not considered or too rapidly rejected, i.e., the well-known groupthink phenomenon (Janis, 1982). Hence, the present results show that grades can increase such biased individual appreciation of new information presentation, which could intervene in more complex group decision-making situations, including cooperative ones; it appears that grades may nullify the dynamics of information exchange, a skill that is extremely important in group-learning environments (Johnson & Johnson, 1985).

CHAPTER 5.

GRADES HAMPER INFORMATION SHARING: GRADING HAMPERS COOPERATIVE INFORMATION SHARING IN GROUP PROBLEM SOLVING[26]

Abstract

We hypothesized that individual grading in group work, a widespread practice, hampers information sharing in cooperative problem solving. Experiment 1 showed that a condition in which members' individual contribution was expected to be visible and graded, as in most graded work, led to more withholding of relevant, unshared information and more pooling of less-relevant, shared information than two control conditions where individual contribution was not graded, but either visible or not. Experiment 2 conceptually replicated this effect: Group members primed with grades pooled less of their unshared information, but more of their shared information, compared to group members primed with neutral concepts. Thus, grading can hinder cooperative work and lead to strategic information sharing.

Keywords: *information sharing, grades, hidden profiles, cooperation, mixed-motives*

[26] Submitted as Hayek, A.S., Toma, C., Oberlé, D., & Butera, F. (23 march 2014). Grades Hamper information sharing: Grading Hampers cooperative Information Sharing in group problem Solving.

Can people genuinely cooperate when their performance is assessed individually? This question epitomizes an interesting, albeit problematic societal phenomenon whereby cooperation is promoted as a fruitful working structure in both educational (e.g., Johnson & Johnson, 2009) and organizational settings (e.g., Wong, Tjosvold, & Liu, 2009), while at the same time individual grades are by far the dominant assessment tool used in these settings (Knight & Yorke, 2003). Indeed, students and workers are often required to cooperate on common projects, tasks, assignments and exercises, while being individually assessed with grades. Such practices, however, place students and workers in a dilemmatic situation (De Cremer, Snyder, & Dewitte, 2001), one in which two demands are to be considered at once: Acting in the interest of the group and cooperating, on the one hand, and considering self-interest and competing for good grades, on the other hand. The aim of the present research is to test the hypothesis that individuals' expectation of being evaluated by grades negatively impacts the cooperative information sharing in group problem-solving situations.

Controversial Effects of Grades

All Western citizens, with the exception of a few countries, share the experience of receiving grades (OECD, 2011)—be they numbers, letters or other labels that easily allow rank-ordering pupils and their products—right from the beginning of their education in primary school and all through their trajectory. It should be noted from the outset that, in some cases, grades can be used to produce criterion-referenced assessments and measure the degree to which one fulfils the goals of a given task (Brookhart, 2004); however the present research is limited to grades used to produce normative, or norm-referenced assessments, that is measuring people's performance in relation to others, an average or any other standard. Indeed, the latter is by far the most widely used form of assessment in the Western world (Ames, 1992; Pope, 2003; Knight & Yorke, 2003).

The practice of using grades was initially seen by educational scientists as extremely positive (Airasian, 1988): Grades were found to be good predictors of

achievement tests and ideal tools for summative assessments, to the extent that they allow a standardized measure of academic achievement (both on the short and the long term), and can also predict the results of some personality tests (De Ketele, 1993). The positive effects of grades come from their potential to increase students' visibility and motivation (Cameron & Pierce, 2002). Indeed, expecting to be graded means that one's performance is identifiable by the person assessing one's work, which has been termed by various authors "visibility of performance" (Marshall & Weinstein, 1984), "individual visibility" (Merton, 1968), or "visibility of subjects" (Bond & Titus, 1983). Thus, in the present work we will use the term "visibility" to refer to individual visibility, i.e. the visibility of one's own performance.

At the same time, rewards and grades have been found to alter students' intrinsic motivation (Deci & Ryan, 1985; Deci, Koestner, & Ryan, 1999), in particular through the reduction of perceived autonomy (Pulfrey, Darnon, & Butera, 2013), to have negative effects on performance and learning (Garbarino, 1975; Kohn, 1993), in particular when comparing groups evaluated with grades to groups evaluated with written comments (Butler & Nisan, 1986), and to impair cognitive processing (Meloth & Deering, 1992) and creativity (Amabile, 1983). Grades were also found to trigger the adoption of performance-avoidance goals, the need to avoid being outperformed by others (Pulfrey, Buchs, & Butera, 2011), which are related to the propensity to fear social comparison (Elliot & Murayama, 2008); indeed, grades render people's performance more visible among group members, by enhancing the comparability of one's work with that of others, a characteristic that Thorndike called the "relativity" of grades (Thorndike, 1913; see also Pulfrey et al., 2011). In sum, grades appear to elicit both individual visibility and a potentially threatening social comparison.

Effects of Grades on Cooperative Information Sharing in Groups

What happens, then, when educators and managers want to promote cooperation because of its potential for innovation (Wong & Tjosvold. 2009) and learning (Roseth, Johnson, & Johnson, 2008), in a system that consistently and pervasively assesses group work with individual normative grades? Grades elicit individual visibility, which in itself should not impair cooperation. Indeed, research has

shown that individual visibility can yield positive effects on group processes, such as reducing social loafing, the tendency to avoid individual effort during group work (Latané, Williams, & Harkins, 1979; Williams, Harkins, & Latané, 1981). However, grades are also involved in the processes of academic and professional selection (Randall & Engelhard, 2010), which makes relevant others potentially threatening social standards. Research has shown that when social comparison is threatening—e.g. when relevant others are superior, or even when the others' superiority is just a possibility—it distracts individuals during task achievement and consumes attentional resources that could have been allocated to the task (Muller & Butera, 2007). The ability of grades to generate both normative and social standards of comparison for individuals might therefore interfere with cooperation, to the extent that grades might motivate individuals to do well personally, instead of keeping their attention focused on emitting cooperative behaviours for the sake of group work.

Thus, we expect a negative effect of grades on cooperative behaviour; in the present research, we study a specific cooperative behaviour, namely information sharing in groups that is the sharing with others of information that has the potential to benefit the whole group. This seems an appropriate behaviour for the present study, as many group work situations require cooperation at the level of group information sharing (e.g., the jigsaw task, Aronson, Blaney, Stephan, Sikes, & Snapp, 1978; Johnson & Johnson, 2009), and an effective way of ensuring that a group is cooperating is precisely to check whether its members appropriately exchange the information that is the most relevant for the task (Greitemeyer & Schulz-Hardt, 2003; Schulz-Hardt, Broebeck, Mojzisch, Kerschreiter, & Frey, 2006).

However, the literature on *group* information sharing suggests that individuals are often reluctant to share their critical, most relevant information (e.g., Larson, Christensen, Abbot, & Franz, 1996; Stasser & Stewart, 1992; Stasser & Titus, 2003). This effect is particularly problematic in situations in which there is an asymmetric distribution of information, as it often happens in working groups, and group members need to pool their unshared information (information possessed by only one member at a time), as opposed to shared information (possessed by all members), in order to find the optimal solution (a situation that has been termed "hidden profile" in the literature on group decision making; cf. Stasser & Titus, 1985, 1987). Indeed,

although hidden profiles imply positive interdependence of resources and necessarily require cooperation to pool unshared information, the majority of research suggests that members do not effectively pool their unshared information (Lu, Yuan, & McLeod, 2012), an effect also found with children (Gummerum, Leman, & Hollins, 2013).

One important reason is that in such group situations members are facing a mixture of cooperative incentives to act in the interest of the group and competitive incentives to do well personally (Davis, Laughlin, & Komorita, 1976; Wittenbaum, Hollingshead, & Botero, 2004). In this respect, De Dreu, Nijstad and van Knippenberg (2008) have suggested that the conflict between collective and self-interests generates so-called mixed-motives that negatively impact group processes and information sharing. Some studies have shown, for example, that crucial, unshared information was shared to a lower extent under competitive than under cooperative instructions, a difference that was not found on shared information (Toma & Butera, 2009; Toma, Vasiljevic, Oberlé, & Butera, 2013). Moreover, it was shown that individuals pursuing competitive goals are less open to exchange task-relevant information with others, but are prone to show exploitative behaviour (exchanging irrelevant information, but using others' relevant information, Poortvliet, Jansen, Van Yperen, & Van de Vliert, 2007, Study 2).

We therefore hypothesize that in a hidden-profile problem-solving situation the expectation of individual grades, as compared with no grades, should result in the group pooling less unshared information, but not necessarily less shared information.

Experiment 1

5.1 Method

Participants. A total of 162 students (104 women and 57 men, one participant did not mention her/his gender, M = 23.60 years, SD = 4.01) from a large Swiss university were recruited by email and paid 20 Swiss francs for their participation. Participants were randomly assigned to 54 three-person groups, whose discussions were videotaped. Twelve groups were removed because of the bad quality of the

recording. Therefore, the remaining 42 groups were distributed to different experimental conditions as follow: 13 groups in the Non Graded - Non Visible condition, 15 groups in the Non Graded – Visible condition, and 14 groups in the Graded – Visible condition.

Task. The task used was a problem-solving task concerning a road accident structured as a hidden profile (see Toma & Butera, 2009, appendix). Four persons were potential suspects in this accident, but three of them were exonerated (Mr. X, Mrs. Y, and Mr. Z) and the fourth (Mr. X's son) incriminated based on a critical set of 9 clues. The entire set of information contained 28 items: 19 shared and 9 critical unshared items. A hidden profile was created by distributing three critical unshared items to each of the group members. The 19 shared items described the accident's circumstances and suspects' characteristics (descriptive information). The 9 unshared items if pooled together, allow for the identification of Mr. X's son as the guilty person (identification information). This task is particularly suited to measure cooperative information sharing among group members, because any neglect of unshared information can be interpreted as intentional and motivated behaviour. Indeed, task characteristics have been pre-tested in several pilot experiments by Toma and Butera (2009), which revealed that participants were able to discriminate between shared and unshared information, and between important and unimportant information; participants also understand that pooling unshared information is needed to solve the case.

Procedure. Upon their arrival in the laboratory, participants were told that they were taking part in a study on "how people who work in teams get to solve criminal cases". The experimenter explained that the study included two phases. During the first phase, the participants were individually provided with the case, and asked to identify the person responsible for the car accident. They were each provided with 19 shared information items and 3 unshared items, orienting each participant toward one specific suspect. They had a maximum of three minutes to individually derive who was the person responsible for the accident. During the second phase, participants

were asked to work as a team and to discuss the case in order to identify the guilty person for no more than 15 minutes.

They were also informed that they did not have the same information and that shared information items were presented in the first paragraph of the case description page, whilst unshared information items in the second paragraph. The groups were instructed to cooperate to reach a common solution, write down their final solution once they decided, and call the experimenter to end the session. After the introductory instructions, supplementary instructions depending on the experimental conditions were given.

The most ecological manipulation of grades requires a context of both individual visibility (because, as shown, grades usually make one's performance visible) and comparison (because, as also shown, grades usually make one's performance comparable to that of others). Thus, the grade condition was contrasted with two control conditions, to account for the two possible sources of variation.

Groups in the Graded – Visible condition, the experimental condition, were told that the teamwork was videotaped, and that the experimenter was not only interested in the group solution but also in each member's individual contribution. They were told that each contribution would be graded on a scale ranging from 1 to 6, which corresponds to the usual grading range in Switzerland.

Groups in the Non Graded – Visible condition were told that the teamwork was videotaped in order to ensure that each group member contributed in finding the group solution. They were also told that the experimenter was only interested in the group solution, and that the individual contributions were not assessed.

Groups in the Non Graded - Non Visible condition were told that the teamwork was not videotaped and that the experimenter was only interested in the group solution.

All groups were instructed to call the experimenter when the discussion ended. The experimenter then explained the purpose and design of the study. The entire experiment lasted about 45minutes.

Dependent measures: information pooling during groups discussions. Every group discussion was videotaped and fully transcribed. Two independent coders, blind to the hypotheses and to the type of information (unshared vs. shared), analysed the transcriptions. Coders had been especially trained in video coding: They were instructed to code the number of times all information items were mentioned, which included the unshared and shared items of the description, other irrelevant items, and comments of all sorts that participants made while the task was carried out. This coding thus allowed having the full group discussions coded. The inter-raters reliability was calculated by computing for each item of information an intra-class coefficient (ICC) of absolute agreement in a mixed model (McGraw & Wong, 1996). When an item had an ICC of minimum value of .4 and a p-value < .05, the two scores of the raters were combined into a mean. The disagreements between raters were solved by discussion. The intra-class correlation of the coded information items had an estimated reliability varying between 0.44 and 1.[27]

The dependent measures were derived from the coded group discussions. Participants had 28 items of information available to solve the case: 19 shared and 9 unshared information items. If participants were to respect the base-rates, they should discuss more shared than unshared information. However, because several studies suggested that participants do not follow base rates (Tversky & Kahneman, 1974; Stasser & Stewart, 1992; Toma & Butera, 2009), we computed a measure that is closer to the participants' actual behaviour. More specifically, we computed (1) the proportion of *unshared information* by dividing the number of mentioned unshared information by the total amount of all items of information actually mentioned, and (2) the proportion of *shared information* by dividing the number of mentioned shared information by the total amount of all items of information actually mentioned during each group discussion. The overall discussion time of each group was also computed, and entered in the analysis as a covariate.[28]

[27] Although a correlation of 1 seems very unlikely to happen, it is nevertheless not surprising to have some measures with a perfect correlation, for some of the items coded were not prone to subjective coding (e.g., concerning measures where coders had to count the number of times where an unshared information was stated).

[28] Discussion Time and its interaction with the two contrasts were added to the information pooling regression analysis. Indeed, one can argue that the time spent by the groups to discuss and achieve the task is directly linked

5.2 Results

Overview of analyses. To test our hypothesis we set two orthogonal contrasts: C1, the model contrast that describes our hypothesis (+1, +1, -2, corresponding respectively to the Non Graded - Non Visible, Non Graded – Visible, and Graded – Visible conditions), and C2, its orthogonal contrast (+1, -1, 0) corresponding to the residual variance (Abelson & Prentice, 1997).

Preliminary linear regression analyses on the proportion of pooled information included Groups' sexual composition (coded -1 for groups with a minority of women and +1 for groups with a majority of women), Discussion Time, as well as the interaction between Discussion time and the C1 and C2 contrasts. These analyses revealed a main effect of Discussion time, although it did not significantly interact with any of our relevant contrasts[29]. No effect of Groups' sexual composition was found. Therefore, Discussion Time as well as its interactions with the C1 and C2 contrasts were entered as covariates (Yzerbyt, Muller, & Judd, 2004), while Groups' sexual composition was dropped from the final model.

Proportion of unshared information. The model in which the proportion of unshared information was regressed on the five predictors revealed a main effect of the C1 contrast (+1, +1, -2), $b = .02$, $SE = .006$, $F(1, 36) = 9.94$, $p < .003$, $\eta_p^2 = .22$, showing that, as predicted, groups in the Graded – Visible condition pooled significantly less unshared information ($M = 0.46$; $SD = 0.05$) than did groups in the Non Graded – Visible condition ($M = 0.51$; $SD = 0.08$) and the Non Graded - Non Visible condition ($M = 0.53$; $SD = 0.07$). The effect of the residual contrast C2 was not significant, $b = .01$, $SE = .011$, $F(1, 36) = 1.49$, $p = .23$.

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to the opportunity groups had to share a given amount of information (the more time groups have spent to achieve the task, the longer the opportunity to share information).

[29] Controlling for Discussion Time regarding the proportion of Unshared Information, a significant main effect of Discussion Time was found, $b = .001$, $SE = .001$, $F(1, 35) = 14.65$, $p < .001$, $\eta^2_p = 0.3$. A marginal interaction between Discussion Time and C1 was also found, $b = -4.812^{E-5}$, $SE = .001$, $F(1, 35) = 3.05$, $p < .09$, $\eta^2_p = 0.08$. Therefore Discussion Time and its interactions with the contrasts were kept in the model (Yzerbyt, Muller, & Judd, 2004). Controlling for Discussion Time regarding the proportion of Shared Information, a significant main effect of Discussion Time was found, $b = -.001$, $SE = .001$, $F(1, 35) = 9.33$, $p < .004$, $\eta^2_p = 0.21$. A marginal interaction between Discussion Time and the residual contrast was found, $b = -.001$, $SE = .001$, $F(1, 35) = 3.87$, $p < .06$, $\eta^2_p = 0.1$. Again, Discussion Time and its interactions with the contrasts were kept in the model.

Proportion of shared information. The model in which the proportion of shared information was regressed on the five predictors revealed a main effect of the C1 contrast (+1, +1, -2), b = -.02, SE = .008, $F(1, 36) = 5.24$, $p < .03$, $\eta_p^2 = 0.13$, showing that the amount of shared information pooled during discussion also significantly differed between conditions. This time, groups in the Graded – Visible condition pooled significantly more shared information (M = 0.29; SD = 0.07) than groups in the Non Graded – Visible (M = 0.24; SD = 0.09) and Non Graded - Non Visible conditions (M = 0.22; SD = 0.08). The effect of the residual contrast C2 was not significant, b = -.01, SE = .014, $F(1, 36) = 0.97$ p = .33. No other effect reached significance. The results are presented in Figure 1.[30]

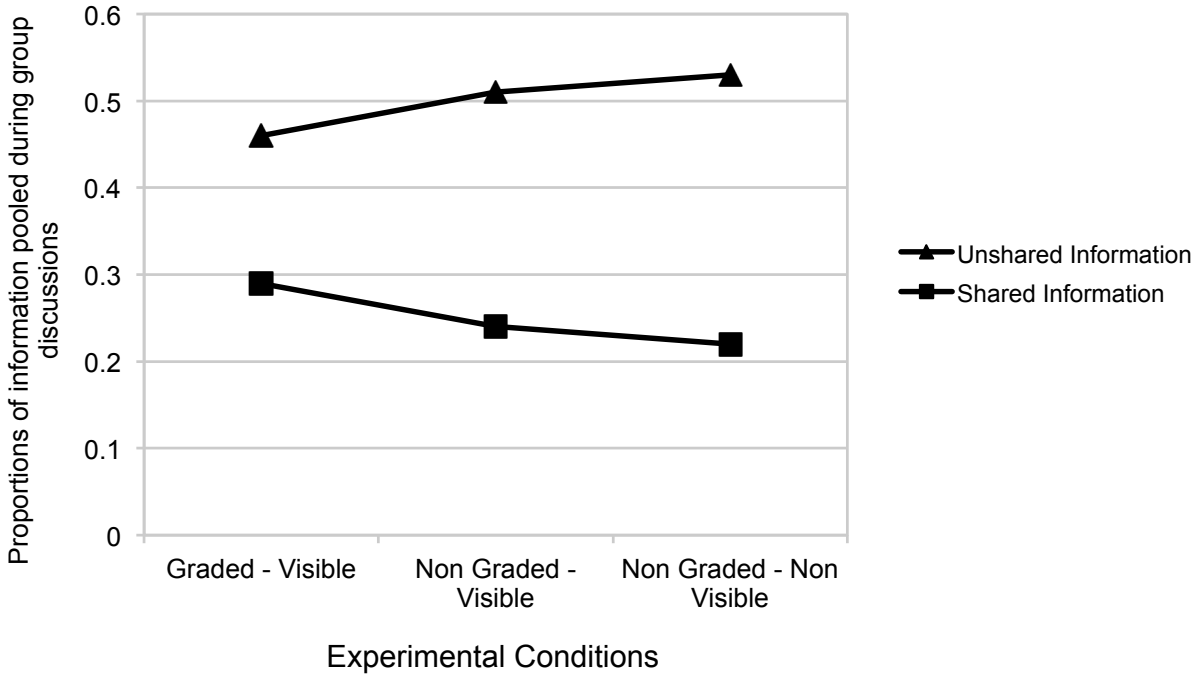


Figure 1. Proportions of unshared and shared information pooled as a function of experimental conditions (Experiment 1).

[30] Supplementary analyses. Although our main interest was to study precisely the group information sharing process, it is common practice in the literature on hidden profiles to report group performance. Therefore, the solutions provided by the groups (Mr. X, Mrs. Y, Mr. Z or Mr. X's son) were studied; it appeared that 90.7% of the groups had found the correct answer (Mr. X's son), regardless of condition, χ^2 (6, N = 54) = 8.65, p = .19.

5.3 Discussion

The results revealed that information pooling was impacted differently by the experimental manipulation depending on whether this information was uniquely or jointly held by the group members. More precisely, groups in the Graded – Visible condition pooled less critical, unshared information, and more shared information compared to groups in the two control conditions. Interestingly, in the two control conditions, where individual visibility was either not enhanced, or enhanced but without the expectation of grades, groups appeared to be willing to exchange the same amount of unshared, relevant information. This suggests that individual visibility alone is not detrimental to group information sharing, unless it is accompanied by the expectation of being graded.

Although the results of this experiment were in line with our hypothesis, one could argue that the Graded – Visible condition, although closely patterning most natural situations of grading, implied negative reward interdependence between group members (Deutsch, 1979; Kelley & Thibaut, 1969; Johnson et al., 1981). Moreover, this condition also introduced two sources of individual visibility: One explicitly stated by the experimenter and one more implicit, inherent to the attribution of grades. Thus, the Graded – Visible condition differed from the others with regard to attribution of grades, enhanced individual visibility and negative reward interdependence.

Experiment 2

We therefore conducted a second study to eliminate the above confounds, using a more subtle manipulation of grades with a priming procedure, and we hypothesized that groups working in an explicitly cooperative setting will pool less unshared information, but not necessarily less shared information, when primed with grades than when primed with a neutral concept (control condition).

5.4 Method

Participants. A total of 96 students enrolled in a large Swiss university (54 women and 42 men, *M* = 21.78 years, *SD* = 3.34) with different academic backgrounds volunteered in this study. They were recruited mainly via email but also directly in cafeterias and working areas. Participants were randomly assigned to 32 three-person groups. Six-groups were removed from the analyses because of the poor quality of the recording. Therefore, the remaining 26 groups were distributed to different experimental conditions as follow: 14 groups primed with grades, and 12 primed with a neutral concept.

Procedure. The task used in this second experiment was identical to the one used in Experiment 1. In this experiment, however, upon their arrival at the laboratory, participants' attention was drawn to a poster hanging in one of the corners of the room. They were told that the poster had been previously used for an introductory training session devoted to new foreign teaching assistants, and that they were not to pay attention to it. Two different posters were presented depending on which experimental condition groups were assigned to. The two posters had exactly the same format (a vertical axis in the shape of an arrow pointing to the top) with a description on its right, but their content differed. In the Grades Prime condition the poster was entitled "Grading and ranking students", and the description displayed grades used in the Swiss educational system, ranging from (1) Poor, to (6) Excellent, and moving from bottom to top (see Appendix II). For each grade, the percentage of success it implied was mentioned. In the Neutral Prime condition the poster was entitled "Getting to know one's work environment", and the description displayed the different organizational structures belonging to the university campus, ranging from bottom, the common services provided (student associations, university restaurant), to top, the highest authorities (president of university), again in six levels.

Groups in both conditions received the same experimental instructions as in Experiment 1 with regard to group work and the task. They followed the same two-step procedure: Individual work, then group work. This time the experimenter

announced at the beginning of the study that the group work would be recorded, implying that in both conditions individual performance would be visible.

Dependent measures. The same dependent measures as in Experiment 1 were used, namely the proportion of unshared and shared information over the total items of information actually mentioned. The intra-class correlation of the coded information items had an estimated reliability varying between 0.71 and 1.

5.5 Results

Overview of analyses. As in Experiment 1, Discussion Time[31] was entered as a covariate. The Experimental conditions variable was coded (-1) for the Neutral Prime condition and (+1) for the Grades Prime condition. Preliminary analyses also included Groups' sexual composition, coded (-1) for groups with a minority of women and (+1) for groups with a majority of women, but these analyses revealed no effect of Groups' sexual composition on the proportion of pooled information. Therefore the variable was not retained in the model.

Proportion of unshared information. The linear regression model in which the proportion of unshared information was regressed on the three predictors revealed a main effect of the experimental conditions variable, b = -.03, SE= .014, $F(1, 22) = 4.28$, $p < .05$, $\eta^2_p = .16$, showing that groups in the Grades Prime condition pooled significantly less unshared information (M = 0.50; SD = 0.05) than did groups in the Neutral Prime condition (M = 0.56; SD = 0.07).

Proportion of shared information. The model in which the proportion of shared information was regressed on the three predictors revealed a main effect of the experimental conditions variable, b = .04, SE = .015, $F(1, 22) = 5.76$, $p < .03$, η^2_p = .21, showing that groups in the Grades Prime condition pooled significantly more

[31] Preliminary analyses revealed that Discussion Time was not normally distributed; therefore it was entered in the model after a square root transformation.

shared information (M = 0.27; SD = 0.07) than groups in the Neutral Prime condition (M = 0.18; SD = 0.06). The results are presented in Figure 2.[32]

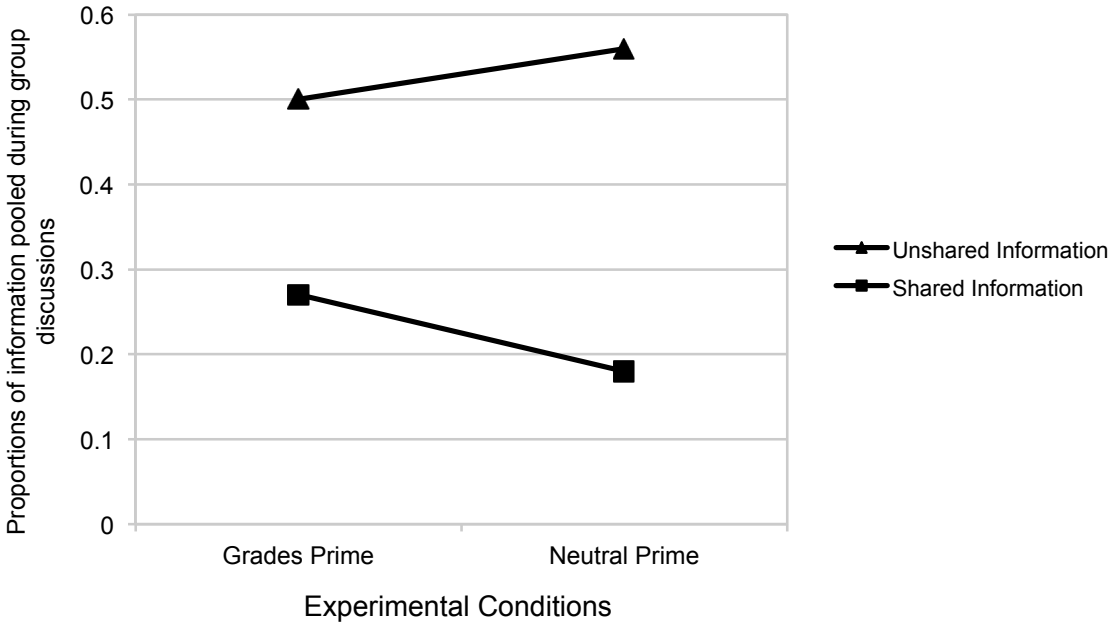


Figure 2. Proportions of unshared and shared information pooled as a function of experimental conditions (Experiment 2).

[32] Supplementary analyses. Again, we studied group performance as a supplementary analysis, but the effect of our manipulation on group performance could not be tested, since all groups, irrespective of the condition, found the correct solution.

5.6 Discussion

This second study provides supplementary evidence that in a cooperative group situation grades interfere with group's cooperative behaviour and negatively impact the pooling of the most relevant information, namely unshared information. In Experiment 1 it was difficult to disentangle whether the effect observed on information sharing was due to the presence of grades, or to the negative interdependence of reward that the manipulation of grades implied. Therefore, in Experiment 2 we rendered the two experimental conditions comparable by proposing two cooperative twin-conditions, set with the same positive resource and goal interdependences and no negative interdependence of rewards. Results found in this second study confirmed our hypothesis showing that groups primed with grades pooled significantly less unshared information, but also more shared information, than groups in the control condition.

General Discussion

The practice of using grades, whatever their form, has been considered for many years as a positive feature of performance assessment, because it was supposed to increase workers' and learners' visibility and motivation (Cameron & Pierce, 2002), and thereby facilitate achievement and cooperation (De Ketele, 1993; Johnson & Johnson, 2002). It is therefore common practice to use individual grading even for tasks that need to be carried out cooperatively. In the present research, we took the perspective of a different line of research pointing out that individual grading for cooperative tasks is particularly problematic, because it creates mixed-motives situations in which people are in fact required to act in the interest of the group and cooperate, and at the same time to consider self-interest and compete for good grades. We therefore hypothesized that the expectation of being graded hampers the cooperative information sharing behaviour in group problem solving.

In two studies we tested the effects of grading on a group cooperative behavior, namely on groups' willingness to share relevant, unshared information in hidden profiles. In Experiment 1 results revealed that groups in the Graded – Visible condition pooled less unshared information, the really valuable information in this task, and more shared information than groups in the other two conditions. In Experiment 2 we conceptually replicated this effect using a priming manipulation of grades: Group members primed with grades pooled less of their unshared, relevant information, and more of their shared, irrelevant information compared to group members primed with neutral concepts.

The results of the two studies are complementary and point to a strategic sharing of information resulting from the expectation or the mere activation of grades: When grades were present, group members withheld useful, unshared information and pooled information that the other group members already had. The first study highlights that individual visibility in itself has got no deleterious effects, and that it is the use of grades that hampers cooperative group work. The second study confirms our contention that grades are solely responsible for group members' strategic pooling of information, by showing that the mere priming of grades produces similar effects to those obtained in Experiment 1 with actual expectation of grades.

This research has important theoretical and practical implications. First, this research contributes to questioning the theoretical perspective that grades are ideal tools for summative assessments and more broadly, good normative standards for evaluation (Butler & Nisan, 1986; Covington & Omelich, 1984; Graham & Golan, 1991). At least as far as cooperative work is concerned, the present research shows that grading leads to suboptimal information sharing. This research also contributes to showing the consequences of the view that grades, by increasing students' individual visibility, increase their motivation to perform well on tasks (Cameron & Pierce, 2002). Indeed, in cooperative tasks, the motivation to perform well may very well interfere with the motivation to interact cooperatively. Our results, in particular those of Experiment 1, revealed that while individual visibility in itself was not found to impair information sharing, individual visibility associated with grades did. Taken together, the two studies point to the difficulty to create cooperative group

environments when normative evaluative standards are used with the aim to assess individuals' contribution. It seems that a cooperative structure can be easily damaged when group members expect to be individually graded.

One might ask why grades negatively impact groups' cooperative information sharing behaviours, and the lack of mediators in the present research is a limitation that calls for future studies. Although not tested in this research, one possibility is that grades induce a threatening social comparison with the other group members; the priming effect in Experiment 2 suggests indeed that grades may remind group members of previous situations in which individual evaluation had resulted in differential appreciation of people, as it often happens for instance in school. Withholding useful information and pooling useless information may then be a way to maximize the chances to be the one who discovers the correct solution and, even though the task is cooperative, to receive greater praise for this achievement. In line with this idea, a study by Fischer, Kastenmüller, Frey and Peus (2009) showed that individuals facing a threatening social comparison are more reluctant to transmit high-quality information to their colleagues. Future research should directly test this potential underlying mechanism with regard to the effect of grades.

Second, this research also contributes to the recent trend that has started considering groups as motivated information processors (De Dreu et al., 2008; Toma et al., 2012). This literature suggests that the conflict between collective and self-interests generates mixed-motives that negatively impact group information sharing (e.g., Wittenbaum et al., 2004). Some studies involving information pooling have shown, for example, that in competitive situations less unshared information is pooled than in cooperative situations, a difference that is not found on shared information (Toma & Butera, 2009; Toma et al., 2012). Other studies obtained similar results when testing the impact of cooperative and competitive individual traits on group decision processes (De Dreu et al., 2006). However, in previous research mixed-motives were represented by the confrontation of the positive resource interdependence elicited by the hidden-profiles task and the negative goal interdependence elicited by competition instructions; no study directly used a mixed-

motive situation combining positive and negative goal interdependence. In the present research, we created for the first time a group working context in which members are explicitly asked to cooperate—a context of positive goal interdependence—, while being individually evaluated by grades—a context that is most often one of negative goal interdependence, as students have learned in the course of their history of academic selection (Darnon, Dompnier, Delmas, Pulfrey, & Butera, 2009). Therefore our research adds to the previous literature on group information sharing by showing that in a mixed-motives situation, negative goal interdependence takes over positive goal interdependence, with the result of reducing the sharing of relevant information.

Finally, this research suggests that grades may represent two dangers for actual working groups. The first is to nullify the benefits of cooperation. Recent research in the area of cooperative work, and cooperative learning in particular, has shown that cooperation is a delicate structure, and that any cue that might imply some form of threatening social comparison disrupts the beneficial effects of cooperative learning (e.g., Buchs, Butera, & Mugny, 2004; Buchs, Pulfrey, Gabarrot, & Butera, 2010; Buchs, Gilles, Dutrévis, & Butera, 2011). Grades might very well be one instance of such cues. The second danger is to induce anti-social behaviours, even in potentially cooperative settings. Recent research has shown that self-enhancement values, defined as the pursuit of individual interests, personal success and power acquisition (Schwartz, 2006), predict cheating (Pulfrey & Butera, 2013). As the expectation of grades may prioritize individual interests and personal success, it is also possible that it induces cheating behaviours, even when group members are encouraged to cooperate. After all, the withholding of information that we have observed in the present two studies in the grading conditions is a form of anti-social behaviour, even if it cannot be equated to utter cheating. With this in mind, we can only recommend to avoid grading individuals in cooperative groups.

CHAPTER 6.

GRADES DEGRADE GROUP COORDINATION: DETERIORATED PERFORMANCE AND INTERACTIONS IN A COOPERATIVE COGNITIVE-MOTOR TASK[33]

Abstract

At school pupils often cooperate on common projects and must coordinate their different individual actions. However, grades are pervasively used even in cooperative situations, which makes the pupils' differences in achievement and their relative rank salient and reduce people's inclination to work constructively with others. Thus, we hypothesized that grades would disrupt performance in a cooperative cognitive-motor task necessitating inter-individual coordination of members. In a study with 5th graders, grades (vs. a neutral concept) were primed at the onset of a cooperative group interaction. Results showed that, although pupils were set to work cooperatively, priming grades (vs. neutral concepts) harmed inter-individual coordination by decreasing group performance, and elicited more negative dominant behaviours among pupils during interactions.

Keywords: grades, inter-individual coordination, cooperation, dominant behaviours.

[33] In preparation as Hayek, A.S., Toma, C., Guidotti, S., Oberlé, D., & Butera, F. (2014). Grades degrade group coordination: Performance and interactions deteriorated in a cooperative motor-task.

Teachers often require from pupils to cooperate on a common project, which may require a certain degree of coordination of the different individual actions. This practice is often built on the idea that cooperating on a group work will benefit pupils' learning, the quality of their interactions and the final product of the group (Buchs, Butera, & Mugny, 2004; Johnson, Johnson, & Smith, 2007; Roseth, Johnson, & Johnson, 2008). At the same time, grades are pervasively used in schools to assess the work of individual pupils, with the effect of making the pupils' differences in achievement and their relative rank salient (Pulfrey, Buchs, & Butera, 2011), which may reduce people's inclination to work constructively with others (Darnon, Muller, Schrager, Pannuzzo, & Butera, 2006).

Thus, whereas a cooperative group work often tacitly implies a coordination of its members' actions (McGrath, Arrow, & Berdahl, 1999), it is possible that grades alter group's cooperation, when it is defined by members' capacity to coordinate their actions and efforts towards the joint achievement of a task. However, although a fair amount of research has shown that grades may yield negative effects on individual motivation (e.g., Pulfrey, Darnon, & Butera, 2013), performance and learning (e.g., Kohn, 1993), there is a dearth of research studying the effects of grades on group work (for an exception, see Hayek, Toma, Oberlé, & Butera, 2014), and virtually no research—to the best of our knowledge—on their effect on inter-individual coordination. Hence, in the present work, we test the hypothesis that grades could undermine group cooperation under the form of inter-individual coordination, in a study with 5th graders.

Grades in Educational Settings: Comparative, Ego-involving and Threatening

Starting from elementary school, pupils are socialised to be assessed with grades, and to understand the importance of grades for their future success (Anderman & Midgley, 1997). Indeed, during this process, pupils increase their focus on concerns regarding their self-ability or their performance relative to others when achieving a task, as opposed to a focus on learning and mastering the task (Pintrich, 2000a; Anderman & Young, 1993). In other words, pupils discover the importance of

achieving relative to other students (e.g. the ranking emphasis), that is the importance of norm-referenced assessments (Brookhart, 2004).

In this respect grades hold two entwined characteristics, namely being ego-involving and enhancing social comparison. Indeed, grades are ego-involving (as opposed to task-involving; Nicholls, 1979, 1983) to the extent that they imply important consequences in terms of status and selection in the class. They focus individual's "attention on the self by emphasizing outcome or social comparison (or both), rather than process or task mastery" (Butler, 1987, p. 475). These two characteristics are important for the present research, to the extent that comparison to a normative standard may prompt a threatening comparison that has been shown to be deleterious for peer relations and learning (Butera, Darnon, Buchs, & Muller, 2006; Mugny, Butera, Quiamzade, Dragulescu, & Tomei, 2003). Hence, if grades highlight the importance of performing well as compared to others, they could be pressuring for group performance because "any factor or combination of factors that increases the importance of performing well on a particular occasion" (Baumeister, 1984, p. 610) creates pressure and may result in performance impairment (Crouzevialle & Butera, 2013). More to the point, Darnon and Butera (2007) have shown that when people disagree and should therefore coordinate their points of view, goals that focus people on performing better than others result on the contrary in the tendency to affirm one's own competence over that of the other. Thus, it is possible that grades reduce inter-individual coordination in groups.

Inter-Individual Coordination, an Indicator of Group Cooperation

Inter-individual coordination can be viewed as the means by which actions of individuals are joined towards the successful achievement of a common goal. In other words, coordination is an indicator of cooperation in that it supports and enhances cooperation when it is finely achieved (Johnson & Johnson, 2009a). Hence, in a cooperative task where coordination is necessary for good group performance (e.g., The cooperative game, Doise & Mugny, 1981), a finely achieved

coordination should impact performance on the task (task-focus level; Bales, 1950). Similarly, fine coordination reflecting group cooperation should impact the relational level of group functioning (i.e., group-focus level). It is what Barron (2000) observed when analysing interactions of 6th-grade boys triads set to work collaboratively on a problem-solving task (i.e., a trip-planning problem, cf. Barron, 2000, p. 410). The triad in which members coordinated their responses gave complete and accurate solutions, its members initiated complementary roles, had comfortable inter-individual relations, and treated common material as a "centre of coordination" (ibid. p. 430). The triad where coordination failed gave partial solutions, its members struggled with lack of control, bad communication, and treated the common material as a "contested territory" (p. 430). Hence, to study coordination as an indicator of successful cooperation, it is crucial to use a task where inter-individual coordination of actions and constructive inter-individual relations are functional to task success.

The Cooperative Game

These features are gathered in the "Cooperative Game" (Doise & Mugny, 1981), a cognitive-motor task initially created to study cooperation as a dynamic process of cognitive development in children. In its version for three players, the device requires from players to use pulleys to coordinate their hand-eye movements in order to successfully achieve a go on a board game (cf. Methods and Appendix III). Hence, the better they coordinate their movements, the higher the group performance. Furthermore, to coordinate, players are allowed to speak, gesticulate, but not to leave their position. Therefore, speech and gesture are prevailing modes of communication (Schmid Mast, 2002; Tusing & Dillard, 2000) as they facilitate monitoring one another's work (Foreman & Cazden, 1985), and the better they communicate, the higher the group performance.

Thus, in the present task, performance is dependent upon coordination at two levels. At task-focus level, performance is the direct expression of motor coordination, to the extent that the movement of the ball pen requires that the three partners roll and unroll their pulleys at the same time. All actions that attempt to show

one's superiority over the others, as for instance pulling all the time, may therefore impair performance. At group-focus level, performance depends on positive relations and communication of relevant information and action intentions. All communications that reveal a struggle for control, such as for instance giving orders to others, in terms of negative dominant behaviours may therefore impair performance. Indeed, socially dominant individuals can be defined as the ones who "successfully manage to control resources in the presence of others, regardless of how they do it" (Hawley, 2002, p.168). However in order to control resources, socially dominant individuals can use two types of strategies: Make use of rather pro-social strategies (i.e. use of pro-social behaviours as an effective resource control strategy), or use rather coercive strategies (i.e. monopolizing to control resources). Between the two types of social dominant behaviours, only the pro-social behaviour is associated with social competence and is positively evaluated by peers. On the contrary, negative or coercive social dominance can be maladaptive and can disrupt cooperation (Rubin & Rose-Krasnor, 1992). Indeed, several studies suggest that negative social dominance may interfere with group performance, under the form of behaviours such as interruptions in discussions (Brody & Smith-Lovin, 1989), authoritarian gestures (Dunbar & Burgoon, 2005), and intrusive behaviours (touching and pointing at others; Leffler, Gillespie, & Conaty, 1982).

Thus, we decided to focus only on the negative social dominant behaviours because, as previously mentioned, this is the type of behaviours that are expected to disrupt cooperation. More precisely, if grades are ego-involving and represent a potentially competitive social comparison, they should lead individuals to try to put themselves forward during the Cooperative Game interactions, and therefore to try to monopolize the action. In sum, negative social dominant behaviours can be operationalized by "floor-taking" control indices (i.e. monopolization), as well as indices of emotional negative tension, thereby capturing at once the social dominance part of the behaviour and its negative valence.

Hypotheses

We have shown in the first section of this introduction that grades create an evaluative pressure that focuses individuals on performance relative to others (Butler, 1987), which is known to promote assertion of one's own competence over that of the other (Darnon & Butera, 2007). We have also shown in the last section how performance at a cooperative task relying upon inter-individual coordination would be impaired by such a dominant behaviour, both at the motor coordination and at the communication level. Thus, we hypothesise that the presence of grades should deteriorate group performance in the cooperative game (Hypothesis 1), as well as interactions among individuals, under the form of negative dominant behaviours (Hypothesis 2) in comparison to groups working in a grades-free environment.

6.1 Method

Participants and design

Participants were 132 5th-grade pupils enrolled in two elementary schools in the Italian-speaking canton in Switzerland; before the experiment we obtained the agreement of the school's headmaster and the teachers, as well as the signed authorization of the children's parents. Participants were randomly assigned to 44 three-person groups; 2 groups were excluded, one because a member had a motor disability, and another because a member had concentration problems. The 42 groups were randomly assigned to the two experimental conditions: 20 in the Neutral Priming condition, and 22 in the Grades Priming condition (M = 10.22 years, SD = 0.23). Among the 42 groups, 26 were composed of a majority of girls and 16 by a majority of boys.

Materials and procedure

Materials. The "cooperative game" device was composed of a board game (comprising a three-lane trail: inner, middle, outer lanes, delimited into squares, with a start/finish square; cf. Appendix III, panel B), 3 pulleys fixed on the board game and

connected together by strings linked to a device supporting a ballpoint pen (cf. Appendix III. panel A). Pulleys could be adjusted in two ways making it more or less hard for players to roll/unroll them: pulleys loosened vs. strengthened[34]. Therefore, groups performed two goes: one with loosened pulleys, another with them strengthened (the order was counter-balanced). The two adjustment modes have been used to follow the original features of Doise and Mugny's materials.

Procedure. Pupils were randomly sent by their teacher to the classroom where the experiment was taking place in groups of three. Once inside, they were placed around the Cooperative Game, each standing behind a pulley. The experimenter explained that their goal was to move forward the pen, from the first to the last square, without drawing out the middle lane; to this effect, they would have to only use the pulleys and to coordinate them. The experimenter added that the label taped on the side of the board game concerned a previous experiment and that it was not to be removed (supraliminal priming[35]), following the method set by Hayek et al. (2014, experiment 2). In the *Grades Priming* condition, the label depicted a scale of grades ranging from 2 (very bad) to 6 (excellent), which is the range of grades used in the Swiss educational system (cf. Appendix III, panel C). In the *Neutral Priming* condition, the label had the same graphical appearance as in the other condition, but it represented a scale converting 1 meter into different units (ranging from millimetres to kilometres). As discussed by Hayek et al. (2014) this method has the advantage of activating grades without incurring the risk that the actual distribution of grades creates a negative goals interdependence among group members in a task that is supposed to be based on cooperation, that is positive goals interdependence.

[34] The first setting (pulleys strengthened), initially designed to restrict players' non-intentional movements (cf. Doise & Mugny, 1997), required from players to intentionally release their pulley to allow other players to pull, making it impossible for other players to pull strong enough on their own pulley and control the others' pulley's release. In the second setting (pulleys loosened), the pulleys are not locked, allowing players to unroll the others' pulley simply by pulling.

[35] In *supraliminal* priming or *conscious* priming, the participant is exposed to the priming stimuli as part of a conscious task. That is, the individual is fully aware of the priming stimuli itself, but is not aware of some underlying pattern that serves to prime the construct (Bargh & Chartrand, 2000).

Then, the experimenter demonstrated on one pulley how the device worked, pointing out that when pulleys were tightened they were difficult to roll and one had to intentionally roll and unroll one's own pulley, making it useless to pull in order to unroll someone else's pulley. On the reverse, when loosened, rolling one's pulley could exert an indirect control on the pulley of another participants. After these instructions, the experimenter withdrew to a corner of the room, leaving participants to perform the first go. Then, the experimenter inverted the pulleys' setting (strengthening or loosening them) and leaving participants to achieve their second go. The experiment ended when groups finished the second go. The overall experiment lasted about 20 minutes per group (exact time to perform each go was recorded, see below) and interactions were videotaped. The participants were thanked and debriefed; at the end of the experiment the teachers received a full written account of the experiment, to be shared with the pupils and the parents.

Dependent Measures

Overview of dependent measures. All dependent measures presented below were repeated measures, measured and computed for each go.

Performance. Group performance scores for each go were calculated by respectively adding +1 point for each square when the drawn line was inside the middle lane; 0 point, when it went over-line and entered the inner or outer lane; and -1 point, when it went out of the whole three-lane trail figure.

The task was new to the participants and likely to display an increase in performance throughout the experiment, whereby with time the group members become more acquainted with the task and with their fellow group members, and more effective at coordinating their work. To investigate the evolution of group performance during each go, the path was divided in three parts (Beginning, Middle, End). Given that the three parts did not hold an equal number of squares, sub-scores

of performance based on raw data were not comparable[36]; therefore, we calculated a percentage of performance for each part, dividing the actual performance sub-score obtained on each part by the maximum performance score that could have been theoretically expected on each part (that is, 48 points for Beginning and Middle parts, 47 points for the End part), and multiplying by 100.

Amount of Negative Dominant Behaviours (NDBs). Regarding the observation of social dominance behaviours, we decided to focus only on the emission of negative dominance behaviours, as contrary to positive dominance behaviours, they are the ones expected to disrupt cooperation. We decided to operationalize the NDB variable by computing an indicator that captures at the same time the social dominance part of the behaviour and the negative affects. We computed the amount of NBDs produced at group level, based on the observation of both verbal and non-verbal micro-level behaviours. Indeed, negative dominant behaviours can be measured by "floor-taking" indices, such as the number of oral interventions to give orders to others, and the voice intonation used (Bales, 1950).

Three micro-level behaviours were coded by two coders; disagreements were resolved by discussion. The final score consists of the sum of (a) the number of verbal orders addressed to others to tell them what to do (e.g. "Pull forward now!"), (b) the number of verbal orders simultaneously expressed with intrusive behaviours to tell others what to do (e.g., One participant telling another "Pull the pulley!" while simultaneously dropping his/her own pulley in order to mime the action), and (c) verbal interventions with tones of emotional negative tension (i.e. annoyed and scornful tones, e.g. "arrgggggghhhh, no, not that way!", "are you stupid or what?").

[36] The Start/Finish square was not included in the coding of group performance because we realized afterwards that the instructions were ambiguous as to whether the Start square was to be considered as the Finish, and some groups stopped before reaching this last square. Thus, the Beginning (from square n°1 to square n°48) and Middle of the game (from square n°49 to square n°96) both contained an equal subtotal of 48 squares, whereas the End of the game (from square n°97 to square n°143) contained a subtotal of 47 squares.

6.2 Results

Overview of Analyses

Age of participants and their school affiliation were introduced in preliminary analyses, but, as no effect was found, they were removed from the final analysis. Preliminary analysis on group performance and negative dominant behaviours revealed a significant main effect of Time to perform the 1st go. Therefore, Time to perform each go was kept in the model. No main effect of Order of goes or Group gender composition was found; thus, to the extent that they were only control variables, we removed Order and Group gender composition from the model. Thus, both the Performance and the Negative Dominant Behaviours variables were analysed with a 2 (Experimental manipulations: Grades Priming, Neutral Priming) x 2 (Goes: 1st go, 2nd go) GLM with repeated measures on the last factor and Time to perform each go as covariates.

Performance

In the mixed-model GLM that we ran, we added the within-participants contrast (-1, 0, +1) to the above model to investigate the evolution of performance on the Parts of the Game, where (-1) related to the Beginning, (0) the Middle and (+1) the End parts of the Game, a contrast that should be significant if—as it could be expected—practicing the Game produces an increase in performance. The mixed-model GLM revealed, however, that no significant main effect of the linear contrast testing the evolution of performance across the Parts of the game was found, F (1, 38) = 0.16, p = .69. Moreover, neither the effect of the experimental manipulation F (1, 38) = 0.07, p = .80, nor the effect of the goes, F (1, 38) = 0.59, p = .45, nor the interaction effect was significant, F (2, 76) = 0.31, p = .74. The only significant effect was that of the covariate Time to perform the 1st go, F(1, 38) = 7.12, p< .01, ηp^2 = .16, which confirms what was found in the preliminary analyses.

Notwithstanding the general lack of effects, it is interesting to note that we did not observe a significant increase in performance from one phase to another, and from one go to the other, which would have been reasonable to expect because of the increased familiarity with the task as the game progresses. If anything, the means

show a non-significant performance decrement between the Beginning and the End parts of the game (see Figure1).

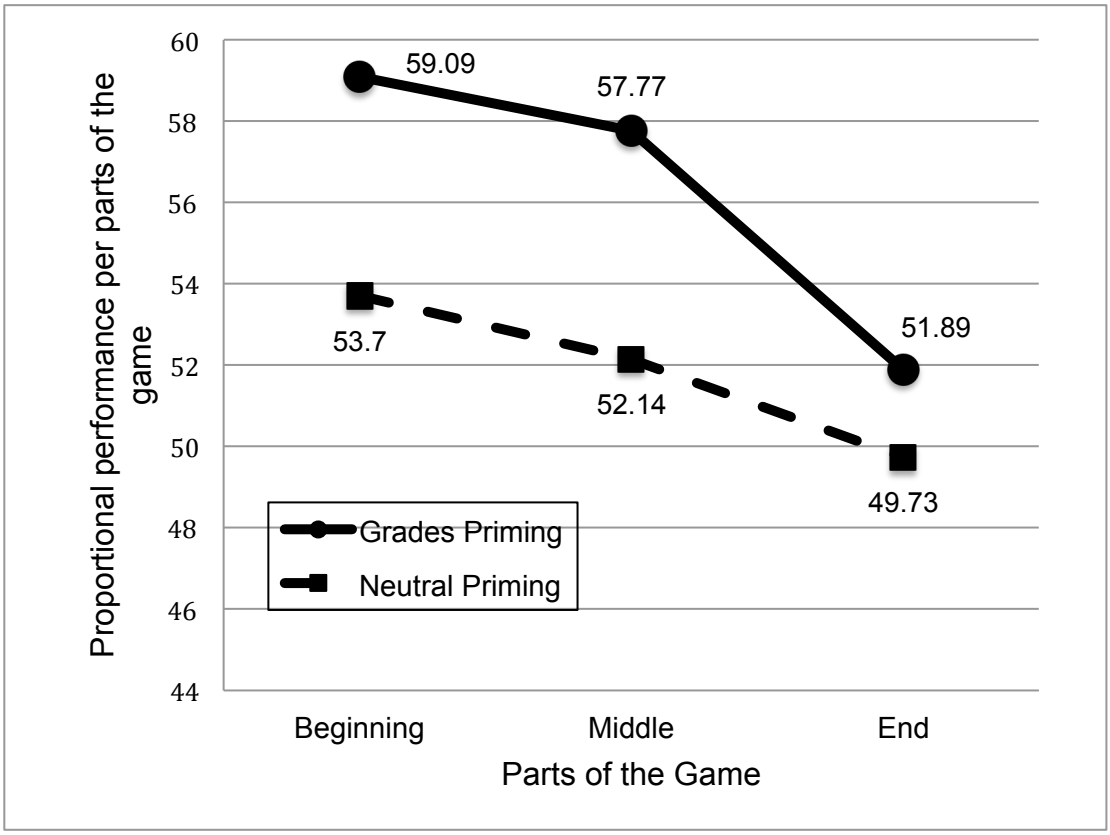


Figure 1. Evolution of groups' proportional performance across the three main parts of the game, as a function of experimental manipulations.

A possible interpretation of this decrease in performance, present in both goes, could be that pressure to achieve increases towards the end of the game and disrupts coordination and therefore performance. In order to study this possibility in more details, we divided the End part of the game in two sub-parts: the Before-Home Straight, and the Home Straight. Then, we run the same analyses with a within-participants variable comprising four parts: Beginning, Middle, Before-Home Straight and Home Straight. As the four parts do not include the same number of squares, the analyses were again run on the proportional performance during each phase; the percentages for the Beginning and Middle parts remained the same, and we computed the score for the two new parts by again dividing the raw score of

performance obtained on each part by the maximum performance score, namely 30 points for the Before-Home-Straight (square n°97 to square n°126) and 17 points for the Home-Straight (square n° 127 to square n°146), and multiplying it by 100.

In the same GLM model previously run, we entered the within-participant Helmert contrast (+3 -1 -1 -1), where (+3) related to the Beginning, (-1) the Middle, (-1) the Before-Home Straight, and (-1) the Home Straight. Again, a significant main effect of the covariate Time to perform on the 1st Go was found, $F(1, 38) = 5.89$, $p < .02$, $\eta p^2 = .13$. More importantly, the analysis showed a significant multivariate interaction effect between the contrast (the four Parts of the Game) and the Experimental Manipulations, $F(3, 36) = 4.34$, $p < .01$, $\eta p^2 = .27$. Inspection of the means suggest that this effect may be due to the differences in performance occurring within the End part of the game (see Figure 2), which was confirmed by the significant interaction effect between the within-participant contrast opposing the two last parts of the Game and the Experimental manipulation, $F(1, 38) = 12.33$, $p < .001$, $\eta p^2 = .25$.

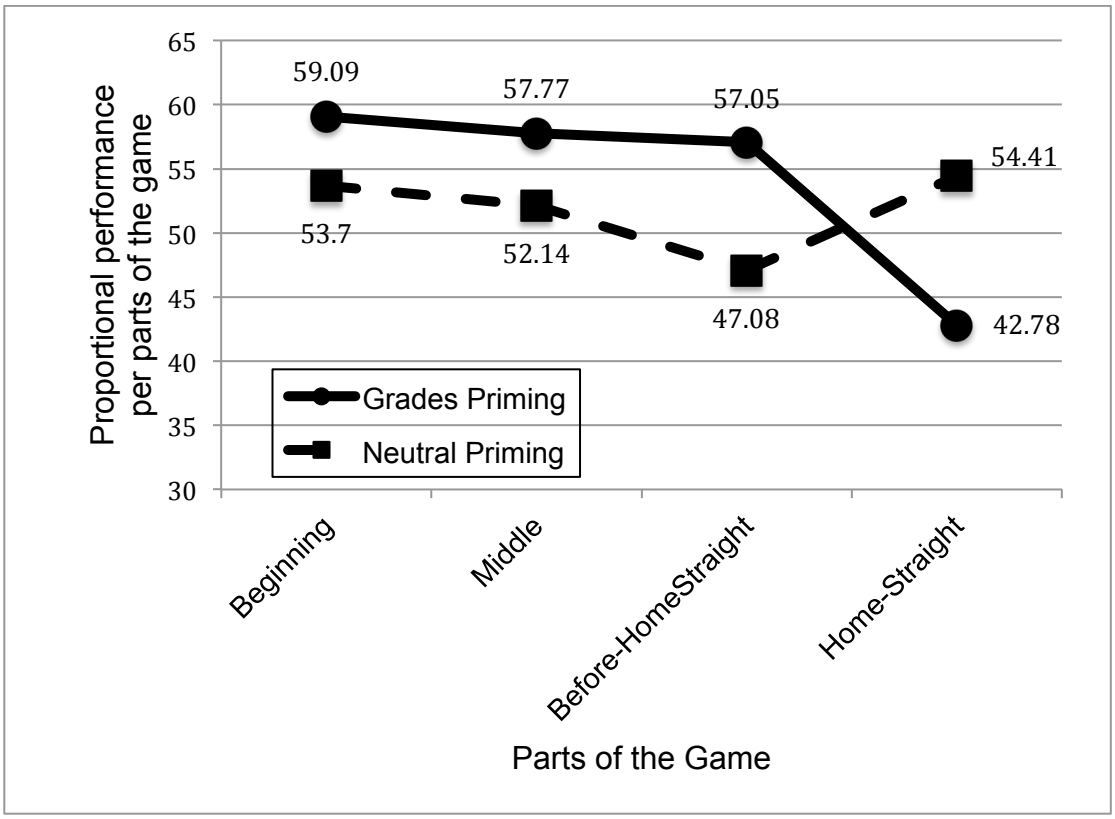


Figure 2. Evolution of groups' proportional performance across the four parts of the game, as a function of experimental manipulations.

It appeared indeed that groups in the Grades Priming condition decreased their performance from Before-Home-Straight (M = 57.05; SD = 0.18) to the Home-Straight (M = 42.78; SD = 0.19), whereas groups in the Neutral Priming condition increased their performance from Before-Home-Straight (M = 47.08; SD = 0.16) to the Home-Straight (M = 54.41 ; SD = 0.22). Finally, it is important to note that, during the Home-Straight phase, groups in the Grades Priming condition performed significantly worse than groups in the Neutral Priming condition, F (1, 38) = 5.59, $p <$ .023, ηp^2 = .13.

Amount of Negative Dominant Behaviours

The same model was applied to analyse negative dominant behaviours. However, one group was detected as an outlier (with a Studentized Deleted Residual of 3.07 and a Cook value of .23, i.e., superior to 4/N = 4/42 = 0.09), and was

removed from the analysis. The remaining sample included 41 groups, 22 in the Grades Priming condition, and 19 in the Neutral Priming condition. The analyses revealed a main effect of time to perform on the first Go, $F(1, 37) = 33.23$, $p < .001$, $\eta p^2 = .47$, and an interaction effect of the within-variable Goes with Time showing that the effect was stronger on the first Go, $F(1, 37) = 115.44$, $p < .001$, $\eta p^2 = .76$, than on the second Go, $F(1, 37) = 86.53$, $p < .001$, $\eta p^2 = .70$. More importantly, the model revealed a main effect of the priming manipulation, indicating that groups in the Grades Priming condition used significantly more negative dominant behaviours when interacting with others ($M = 89.27$; $SD = 44.14$) than groups in the Neutral Priming condition ($M = 58.92$; $SD = 24.17$), $F(1, 37) = 3.91$, $p < .056$, $\eta^2_p = .10$, thereby supporting Hypothesis 2.

6.3 Discussion

The present study investigated, on a sample of 5th grade pupils, the effects of merely activating grades prior to a cooperative task on group members' subsequent interpersonal coordination. The effect of grading individuals on individual performance has been widely studied (e.g. Butler, 1987), and so has the effect of grading groups on individual performance (for a discussion, see Buchs, Gilles, Dutrévis, & Butera, 2011), but Social and Educational Psychology have remained silent on the effects of grading on group performance. This is an important gap in the literature, to the extent that it leaves unstudied a rather frequent situation, namely that of group work at school, where grading is pervasive.

To address this question, we selected a task, the cooperative game (Doise & Mugny, 1984), which requires from individual group members to coordinate the actions of their pulleys and move a ball pen along a trail, thereby making cooperation necessary to good performance. Because grades are known to produce an evaluative pressure likely to be threatening and requiring to enhance one's competence over that of the others (e.g. Butera et al., 2006), we hypothesised that the presence of grades, as compared to the absence of grades, would hamper group performance (Hypothesis 1), as well as interactions among individuals, under the form of negative dominant behaviours (Hypothesis 2).

The results showed that priming the pupils with grades from the onset of the game (in comparison to a neutral priming) indeed resulted in lower group performance, which supported our first hypothesis. However, the results also showed that this difference is not significant for the total performance across the three parts of the game, but—after dividing the game in four, rather than three parts—only for the very last part, which we have called the Home-Straight. This is, admittedly, an unexpected result. However, we decided to report both the non-significant results obtained with the a priori division in three parts and the significant results obtained with the post-hoc division in four parts, not only for reasons of clarity and transparency, but also because we believe that this unexpected result supports—rather than undermines—the theoretical rationale of our Hypothesis 1.

Let us see how this might be. The evolution of the measure of performance across the parts of the game showed that—instead of increasing, as it would be reasonable to expect when participants become more and more acquainted with the task—it stagnated from the beginning to the end of the task (it even slightly, but non-significantly decreased). We reasoned that this could be an indicator of some threat, or other form of difficulty, occurring toward the end of the game; thus, we decided to further divide the trail in four parts, so as to single out the final part that goes straight to the arrival: the Home-Straight. The results showed that the performance of the groups in the Grades Priming condition decreased their performance as they moved into the Home-Straight, a decrease that was not observed in the Neutral Priming condition; moreover, it is indeed during the Home-Straight that the groups' performance is significantly lower in the Grades Priming than in the Neutral Priming condition. We interpret this result as strong support to our hypothesis, as we hypothesized that grading may impair group coordination because it has the potential to create a threatening evaluative pressure (e.g. Pulfrey et al., 2011), and the expected impairment occurred precisely in the part of the game where the pressure is likely to be the highest.

Finally, results showed that priming the pupils with grades (in comparison to a neutral priming) resulted in tenser relations during the game, and more floor-taking

control and intrusive behaviours to direct others, which supported our second hypothesis.

These results allow discussing two important theoretical consequences. Firstly, this study shows that although work instructions called for group cooperation—and actually the very task structure required coordinating actions —the mere mention of grades in a peripheral area of the board managed to weaken that cooperative structure. The written mention of grades reduced both inter-individual coordination and the potential for group relations to be constructive. A limitation of this study is the absence of possible mediators of these effects, and future studies should definitely focus on the role of threat and achievement goals; however, this study suggests that the self-evaluation threat implied by grades is so rooted in pupils that the mere mention of grades may activate the threat, and impair group performance and intra-group relations.

Secondly, we note that the deleterious effect of grades was obtained on a sample of young participants: pupils in the 5th grade of elementary school. It would be interesting to investigate the effect of grades on samples drawn from higher academic levels where the emphasis on performance goals is even higher (Midgley, Anderman, & Hicks, 1995; Harackiewicz et al., 1998), in order to see whether grades could elicit more accentuated effects. But it would also be interesting to replicate this experiment with younger samples, to discover how many years of acquaintance with the grading system are sufficient to produce the same effect observed in the present study.

Finally, these results allow discussing the understanding of dominant behaviours in terms of resource control strategies (coercive-dominant or pro-social) as studied by developmental psychologists like Hawley (1999; 2002). According to this author, the use of one type of control strategy or another depends on personal orientation and stage of cognitive development: At different ages, children's personal social orientation and their goal structure can orient towards one strategy over the other (coercive-dominant or pro-social strategies) to control others' resources (e.g. "coercive children may be less motivated by personal relationships or motivated largely by instrumental goals such as access to material goods or power"; Hawley, 1999, p. 116). The present results showed how an environmental factor (i.e. grades)

could elicit negative-dominant behaviours. This underlines the importance of taking into account structural factors that may be taken for granted, such as the use of grading, when studying group behaviour and performance.

CHAPTER 7.

DISCUSSION

At the onset of this thesis, we wondered whether the practice of using grades to produce norm-referenced assessment (Brookhart, 2004) could put a curb on in-group cooperation. More precisely, we wondered whether having recourse to grades in a cooperative group setting could elicit less cooperative behaviours among group members. Indeed, it had occurred to us that a complex graded-cooperative group situation resembles a mixed-motive conflict situation (Drolet & Morris, 2000) whereby the motive triggered in individuals, by grades' announcement, could be in contradiction with the motive triggered by the cooperative requirements of group work (De Dreu et al., 2008), making it tempting for individuals of the group not to cooperate. Hence, we proposed to experimentally address the question of the impact of grades on group cooperation. For that purpose, we had outlined that grades, used as a norm-referenced assessment tool, have two effects when given, or expected, in the open setting of a group. First, they highlight the work achieved by an individual by making it, as well as the individual, more visible. The second stems from the previous, whereby grades increasing individual visibility also favour social comparison between graded individuals; a competitive comparison likely to induce self-evaluation threat for individuals. Seen from this angle, we wondered whether grades could be problematic for cooperation in groups setting. Precisely, the present work aimed at testing whether grades could affect *cooperative processes* between individuals of a group, be these processes the reduction of individual preference for consistent information (Chapter 4), group information exchange and the sharing of crucial information for task-achievement with other group members (Chapter 5), or inter-individual coordination and the willingness of members to jointly coordinate their actions (Chapter 6).

7.1 Main results

Throughout experiments reported in Chapter 4, we have mainly opposed grades to conditions where individuals were experimentally made visible, in an attempt to overrule that those visibility situations, where visibility alone was manipulated, will not affect group cooperation, whereas grades, which contain both components of visibility and threatening social comparison, will. Hence, Chapter 4 presented two studies were conducted with the aim of understanding under which conditions, visibility of one's performance could alter one's task-information processing. This was tested on an intra-individual variable, individual preference for consistent (vs. inconsistent) information in the setting of a fictitious cooperative group work. The main results consistently showed that emphasizing work visibility was deleterious for cooperation (i.e., increasing individual preference effect), only in conditions where the purpose behind making the individual work visible was to grade and evaluate the contributions of the different individuals of the group. Moreover, the second study showed that grades expected in a cooperative situation increase individuals' perception of competition towards other co-workers. Together, those results call for future studies and point to the possibility that the previous deleterious effect of grades is due to the emphasis put on comparing performances across members, an emphasis that relates to the function of grades when used to produce norm-referenced assessments. A mediation hypothesis, that urges us to conduct further experimental testing to investigate this potential mediator, but also others that could intervene in this process.

To summarize, the main results of this first experimental chapter showed that grades increased individual preference effect, which is problematic for individuals who are required and expected to cooperate. Indeed, grades led individuals to be biased towards information coming from other individuals of the group, whereas cooperating with others should have made individuals more open to the different opinions held by other members, but also to be open to appreciate the different arguments sustaining them, including when such information is in contradiction with individuals' own opinions.

The present results represent an interesting contribution to the understanding of conditions under which individuals manage to decentre and take other's perspective or alternative point of view into consideration, in particular when they are facing individuals who have conflicting points of views, while being in this complex mixed-motive setting. On the one hand, in this scenario, all respondents had to evaluate information coming from other fictitious police officers, that is, others with whom respondents share the same status. Sharing the same status, and being faced in this cooperative situation with an aptitude task to solve, should have led individuals to easily decentre, and to be willing to consider favourably new inconsistent information that could have led them to consider new alternatives to problem solving (Butera & Mugny, 2001). But when expecting to be graded, this occurred significantly less than under other conditions. It is particularly in this experimental condition that individuals exhibited the highest preference effect suggesting a decentring failure.

Indeed, following the conflict elaboration theory, this result could be interpreted by supposing that the expectation of being graded might have raised in respondents a perception of conflict of competence, which typically occurs when a threat or a potential threat to competence is triggered. Thus, we have evidence that when conflict of competence occurs (Butera, Gardair, Maggi, & Mugny, 1998) individuals can be found to be busy with confirming, defending their point of view, looking to prove that they are better than others (i.e. hold better view points than others, as aptitude tasks are diagnostic of competence). Thus, it seems plausible that the present mixed-motive fictitious setting has resulted in decreasing individuals' motivation to decentre, keeping them focused on relational matters (Legrenzi, Girotto, & Johnson-Laird, 1993). However, if under particular conditions, decentring is the way to fight confirmation because it can increase the use of disconfirmation strategies (Butera, Gardair, & Maggi, 1998), the results of chapter 4 obtained on preference for consistent vs. inconsistent information were not replicated on the confirmatory decision. We suggest to subsequently discussing this discrepancy in the limitations part of the manuscript.

Chapter 5 presented two studies conducted with the aim of uncovering whether the previous effect of grades obtained on an intra-individual variable in a fictitious cooperative group setting could be obtained in a real group setting, at an inter-individual level. Indeed, because in a real group setting, interactions between individuals are live and direct, comparing to others should be spontaneous given the direct presence of others. Hence, if the deleterious effect of grades found in Chapter 4 is due to a threatening social comparison component, then we furthermore expected grades to be deleterious in the setting of a real group, where the social comparison potentially triggered by grades is even more salient. Thus, in Chapter 5, the effect of being visible and graded was measured during group discussions, on the process of group information exchange as another indicator of group cooperation.

Indeed, in the hidden profile task, measuring the quantity and type of information exchanged during group discussion allows depicting a cooperative behaviour whereby behaviours of information exchange could be considered as cooperative whenever individuals freely exchange with others information that is crucial to task-achievement. On the reverse, withholding such crucial information would depict less cooperative behaviours. The main results obtained in this chapter consistently pointed to a negative effect of grades on group cooperation. This occurred in conditions where, from the onset of group work, grades were made salient, either when individuals received oral instructions announcing that each of their contributions would be graded (Study 1), or when individuals were primed with grades, hence making the presence of grades incidental with regards to the cooperative work instructions (Study 2). In both studies, grades led individuals to withhold unshared information from others and to exchange more extensively shared information with others. An effect that, interestingly, was not observed under other experimental conditions, namely when individuals expected their work to be only visible, or did not expect any grades (Study 1), or when individuals were primed with a neutral concept (Study 2). The main effect of grades obtained on information sharing, shows that expecting grades in a real cooperative group setting lowers significantly the possibilities of observing members process crucial task-information in a cooperative way. Nevertheless, it could be objected that the manipulation of grades might have been ambiguous for participants. Indeed, the instructions given to

groups in the graded condition of Study 1 stated that individuals would be visible during group work and that they would each receive a grade. However, instructions did not clearly mentioned whether grades would be (or would not be) given back publically, in front of the other individuals of the group. In other terms, this implies that the visibility of the social comparison information that is conveyed by grades when they are given publicly (Monteil, 1981) is not clearly at stake. However, the visibility of the social comparison information is not the only and core factor that could be responsible for the effect of grades that we expected and observed. Rather, it is the potential threat to competence or self-evaluation threat that stems from the expectation of being evaluated with grades that is (Muller & Butera, 2007; Pulfrey et al., 2011). It is worth considering that if, instead, instructions had made clear that grades would be made public, then this could have strengthened the effects we have obtained, and perhaps would have led to affect the ceiling effect that we have obtained on group resolution, for instance. Nevertheless, it is important to note that this ambiguity does not call into question the results obtained regarding grades' effect as they have been replicated with a priming procedure in study 2, which dispels doubt on the possible effect that this ambiguity might have played in Study1.

Hence, we expected grades to affect group information sharing by relying on the explanatory mechanism according to which, when expecting to be graded, the individuals set to work in groups will find themselves in situations that cast doubt on their own level of competence in comparison to others. This could possibly happen, either because the expectation of grades would trigger an inner self-evaluation threat linked to the fear of the individual to not be able to meet the usual normative standard required (e.g. reaching the mid-point of the scale that in practice one needs to reach in order to pass, 4points/6 in Switzerland or 10/20 in France); or, because individuals do not know what is the level of competence of the other persons of the group with whom they are working. Either ways, both situations cast doubt on the individuals' own competence and have been shown to be threatening, precisely leading to self-evaluation threat (Muller & Butera, 2007). If we postulate that threat perception is the explanatory mechanism responsible for the effect of grades in this cooperative

context, precisely *why* should self-evaluation threat have a deleterious effect on group information exchange?

A possible explanation is the following. We know that threat resulting from the concern about not reaching given standards or the goals set (Muller & Butera, 2007) can affect the individuals' working memory and its available resources (e.g., Crouzevialle & Butera, 2013); such concern produces intrusive thoughts that the individual will ruminate, and such rumination will consume a part of the attentional resources (Koole, Smeets, van Knippenberg, & Dijksterhuis, 1999) that the individual would have otherwise allocated to the processing of the task (in the case of our experiments, the processing of information). It is therefore possible that grades, that potentially have this capacity to trigger goal attainment and self-evaluation threat concerns, have resulted in a different exchange of information depending on whether this information is share or unshared. A difference that would come from the fact that, when expecting grades different amount of cognitive resources remained available to be allocated to the two types of information, in comparison to the other conditions.

One could argue that this could happen precisely because shared information can be considered as the *dominant* ones (i.e. information that is jointly possessed by all members, in comparison to unshared information that is less dominant in the interaction). In this perspective, individuals of the group would process more shared information when expecting to be graded because shared information would be the most available information in individuals' working memory. On the contrary, unshared information would be less exchanged, because less cognitive resources will remain available in the working memory after a threat perception? But could this explanation be valid for the results obtained in our experimental group settings? This interpretation would stem from a mix of results obtained in the field of Social Facilitation-Inhibition (SFI): the theory of Zajonc's Dominant Drive Theory (1965) and results obtained by Muller & Butera (2007) regarding the attentional focusing produced by self-evaluation threat, and precisely conditions under which such threat can arise. Hereunder, I suggest developing and discussing the validity of this interpretation with regards to the main aspects of the aforementioned work. We suggest to do so, on one side, by referring to Zajonc's Dominant Drive theory (1965),

which namely makes use of the “dominant” term to explain the effect produced on an individual’s performance by the presence of a third party while performing (i.e. the co-action effect). On another side, by referring to the results obtained by Muller & Butera (2007) who conducted work to explain the co-action effect in terms of attentional focusing and who contributed to the distraction-conflict theory (Baron, 1986; Geen, 1976; Muller & Butera, 2004) by showing that what is destabilizing or enhancing in the presence of a co-actor is not the presence itself but rather the threat to self-evaluation that the presence represents to the person who is engaged in task achievement. Thus, in both cases, we will try to see to what extent this theory and this late work can serve our interpretation in terms of dominant response (where shared information are viewed as the dominant available information) and in terms of different cognitive available resources allocated to information sharing.

Before going any further, it is important to bear in mind the particularity of experimental frames in which the social facilitation-inhibition (SFI) effects are generally observed, measured and discussed, which are different in our experimental settings, and which therefore point to the necessity of being precautious when referring to SFI to interpret the present effects on group information sharing. In the broad framework of SFI, studies usually take place in the context of co-action, are interested with individual performance and often experimentally compare co-action situations to ones where the individual is performing alone. In the case of studies conducted in our Chapter 5, the dynamics are not alike: studies are taking place in a group setting and individuals are not in co-action but in cooperation. Moreover, not only are individuals working in groups but they are also tied together by a positive social interdependence making them in need to cooperate with other persons of the group. Hence, relations between individuals are totally different from the relations found in the broad setting of SFI experimental contexts. One last, yet major, difference: the tasks used. In SFI studies the tasks are usually perceptual cognitive type of tasks (e.g. Stroop task, McLeod, 1991; detection tasks concerning illusory effects, Treisman, 1998, Muller & Butera, 2007) but to my knowledge, they are not what we used here, namely verbal, information sharing tasks. Those are differences that one needs to keep in mind while going through the up-coming lines.

Positing that shared information is the dominant type of information in our task triggers in our mind Zajonc's Dominant Drive theory (1965), which postulates that the presence of a co-actor will raise the level of drive of the individual. This rise will accentuate the hierarchy of behaviours available in the behavioural directory of the individual, and thus will make more salient the access to the dominant response. Hence, the dominant response will not be the same in a simple vs. complex type of task and therefore individual performance will be impacted differently in a complex vs. simple task. The theory states that in the case of simple (or well-known) tasks, the dominant response is usually the correct one, thus if accessibility to the dominant response is increased, individuals will retrieve it easily and this is why individual performance in presence of a co-actor will be improved. In the case of complex tasks (or in novel tasks), the theory states that the correct response is not necessarily the dominant one, thus increasing accessibility of the dominant response will not be beneficial to individual performance because the tendency to retrieve the dominant response will mislead the individual, and individual performance will be impaired in presence of a co-actor.

Applied to the current results of Chapter 5, the use of a hidden profile task should make this task fall (according to the dominant drive theory) in the category of complex tasks, as the task is novel to individuals and the correct response is hidden from each individual. Hence, in a hidden profile, shared information items are the dominant ones and unshared information items the non-dominant ones. Following Zajonc's theory, if the threat raised by grades (expectation or priming) leads individuals to favour the access to the dominant response and hence favour access to dominant information (shared information), then this should imply to consequences: a) in grades conditions shared information will be more exchanged than in the other conditions, and precisely, b) within the grades conditions more shared than unshared information should have been exchanged. But we only partially observed this pattern of result: a) was observed, but b) was not. Hence given the present limitations, it is difficult to use, solely, Zajonc's theory to explain how threat might have operated on group information sharing. The dominant response in terms of shared information is not fully satisfying given the ceiling effect obtained on group decision-making.

The work produced by Muller & Butera (2007) brings a socio-cognitive understanding of what might have happened. Indeed, in our experimental setting it is possible that grades could have raised a self-evaluation threat which itself could have affected information sharing by narrowing attention on the most dominant type of information, a phenomenon called attentional focusing. Indeed, we know from their work that a "threatening social comparison" could lead to attentional focusing (Muller & Butera, 2007; cf. Introduction). According to Muller & Butera (2007) what is responsible for the threatening effect of a social comparison is not necessarily the object of comparison, but rather the uncertainty that stems from such comparative situations in which the individuals' self-evaluation (regarding their competences) remains unsure. In our case, grades could have affected group information sharing because of a similar perception of threat that could have developed in this group context where social comparison is latent and where individuals' competences are not clearly established.

So far, results showed that grades, not only affected an intra-individual variable (Chapter 4), but that they were also able to affect an inter-individual variable, be grades manipulated with oral instructions or a priming procedure (Chapter 5).

Chapter 6 presented a study conducted with the aim of testing the impact of grades on another indicator of cooperation, namely inter-individual coordination. Indeed, a successful inter-individual coordination is necessary for individuals who wish to cooperate (McGrath, Arrow, & Berdahl, 1999). In this perspective, cooperation is defined as the capacity of individuals to coordinate their actions towards the achievement of one common goal (D.W. Johnson & R. Johnson, 2009a). Thus, the study reported in this chapter used a grades priming procedure and had furthermore two advantages in comparison to the previous ones. First, it allowed us to work on a younger sample of participants, elementary school pupils, in comparison to previous chapters, which reported studies conducted with university students. Second, it allowed us to test the effect of grades simultaneously on variables accounting for the two co-existing levels of functioning in a group (Oberlé & Drozda-Senkowska, 2006): the task-focus level, by allowing to observe the effect on group

performance, and at the same time on the group-focus level, by allowing to observe the behaviours triggered between individuals. Results of this chapter pointed to the fact that showcasing grades hampered once more cooperation. On the one hand, this was observed on individuals failing to coordinate well, especially on the last part of the motor task, which resulted in a drop of group performance that we proposed to interpret as a choking-under-pressure reaction to grades. On the other hand, this was observed on individuals emitting more coercive-dominant behaviours during the interaction exchanges that were undertaken to coordinate with others. Broadly speaking, this chapter highlights that grades can also affect activities requiring inter-individual motor-coordination. Furthermore, the fact that the results of this study replicated again a deleterious effect of grades, with pupils, and that the results were obtained by means of an indirect manipulation of grades (i.e., priming procedure), could support the idea that grades are heavily present in our society and are emphasized throughout the different layers of our educational settings, starting with elementary school. Indeed, authors have suggested that this emphasis regarding the valuing of grades and performance is increasingly enhanced as children move on through to the higher levels of school degrees (Midgley, Anderman, & Hicks, 1995; Harackiewicz et al., 1998; Midgley et al., 2001). Thus, the results presently obtained seem to support the view of an early influence of grades in educational settings.

7.2 Overall limitations

Although a deleterious effect of grades was consistently obtained on various types of dependant variables, a first limitation that applies to all studies concerns the need to know how participants have perceived the overall graded-cooperative situation that we posited, from the onset of this thesis, would fall in the category of mixed-motives situations. Indeed, we had opened this thesis by arguing that the graded-cooperative situation described must be dilemmatic from the point of view of individuals because in this case, individuals face at once two contradictory demands. A situation triggering different motivations within the individual is what the literature refers to, as a mixed-motives situation (De Dreu et al., 2008). Yet, the studies that we have presented never aimed at testing whether the experimental situations were

indeed perceived as mixed-motives by participants. Such perception would need to be clarified in order to rule out the possibility that grades led to deleterious effects because participants perceived it as purely competitive. Indeed, the subjective perception that individuals have of the situation in which they are, determines in turn the behaviour that they choose to emit in this particular situation. Hence determining how participants subjectively perceived our graded-cooperative situation is of utmost importance because, as D.W. Johnson & R. Johnson (2005a, p. 293) argue "the appropriate action (that will be emitted) depends on the perception of goal interdependence, which is a person's cognitive representation of the situational context (…) not how objective observers define the situation". Accordingly, the experiments that we have conducted jointly failed to measure the perception that participants had of this situation as being dilemmatic and triggering mixed-motives in individuals, a parameter that future studies could take into account and try to measure.

Hence, if we get confirmation that the graded-cooperative situation was perceived from the start as a mixed-motive and dilemmatic situation, then the fact that grades gained the upper hand on cooperation and elicited non-cooperative behaviours will furthermore reflect a powerful impact of grades. Indeed, in that case, individuals would have emitted non-cooperative behaviours that they knew would be in opposition with the cooperation instructions given by the experimenter. Thus, the previous leads us to think that emitting such behaviours must have been a costly move to undertake. There again, future research could investigate how individuals, who have emitted such behaviours in a dilemmatic situation, cope with emitting such behaviours and explain it.

The second common limitation that we wish to tackle concerns the fact that all experiments took place in educational settings. What could be problematic is that universities and schools are contexts in which the system of grades is well anchored and where there is a longstanding tradition of using grades. Hence, one could object that testing the effect of grades, specifically in educational settings, might have helped the appearance of grades' effect given that the overall experimental context was congruent with what grades refer to and trigger, in terms of ranking, comparing

and achieving excellence. For example, university policies (as grades, when used to produce norm-referenced assessment) are turned towards comparison and selection, when hiring the best researchers, or when praising the best achiever among students. Hence, this congruence might have facilitated the fact that grades have ended-up gaining the upper hand on cooperation in this mixed-motive situation. Therefore, conducting further studies in other non-educational settings could be a way to confirm that the results obtained are ecological and can be generalized to other contexts. For instance, this could be tested in an organizational setting where grades are generally not used as such, and where, yet, comparison between employees is frequent in management.

Third and last common limitation. Whilst the literature review made on visibility and social comparison showed that they both sometimes affected performance, we could have expected grades to affect and hamper not only cooperative behaviours but also group performance (i.e., the product of group work). Yet, as results show, group performance was only hindered in the study using the Cooperative Game (Chapter 6), whereas group performance (in terms of task solution and precisely in terms of uncovering the suspect to correctly incriminate) remained unaltered by the experimental manipulations of grades in the studies using Hidden Profiles (Chapter 4 and Chapter 5). In fact, in both chapters and in all conditions, a majority of participants managed to successfully uncover the hidden profile although the cooperative behaviours were significantly diminished in the graded experimental conditions when comparing them with the other experimental conditions (whether relative to the information sharing or appreciation of others' information items through the preference effect). Subsequently, we discuss reasons for why this might have occurred.

Firstly, one should note that cooperation, in those tasks, is a necessity that stems from the core nature of the task (i.e. its positively interdependent structure). The structure of HP-tasks used links group members by a positive interdependence of resources whereby group members need to exchange and take in consideration all the unshared information that is scattered among group members in order to uncover the correct profile. Thus, based partly on the videos that allowed us to review group

discussions, what literally happened is that once all items of unshared information had been stated in group discussions, the profile of the suspect became so visible and obvious that it was difficult to group members to avoid recognizing it was *THE* one, as all evidences pointed straight at it. This observation echoes with Davis' (1973) alternative cases of social decision scheme in situations of group decision-making called "truth wins". As Davis describes it, the "truth wins" model is a combination of the (intuitively known) "majority wins" rule with some features of the expression of the Lorge-Solomon (1955) Model A, the later was built to provide a theoretical model that can generate the theoretical level of performance that is expected at group vs. individual level when one's aims at studying and comparing performance discrepancies between groups and individuals performance. Thus, it is plausible that the "truth wins" rule has been applied in our groups, as Davis describes it as likely to happen whenever "the desirability of the decision is uniformly self-evident in that once proposed, such a response is so persuasive that the other group members agree to its adoption" (Davis, 1973, p. 107). The equivalent might have occurred at individual level in Chapter 4: where, on the one hand, individuals expressed preferences for consistent information, but where, on the other hand, the obviousness of the correct solution made it hard on participants to willingly and intentionally avoid it. Pushing this interpretation to the extreme, one can suppose that in such a paradoxical graded-cooperative situation, individuals might even have perceived that not recognizing the obviousness of the correct solution could have casted doubt on their own competence. This later point furthermore highlights the need to understand the extent to which individuals might have perceived this situation as paradoxical and mixed-motive one.

Yet, if this is an interpretation of what has happened and can be regarded as a potential explanation for the lack of effect of grades on performances, one could object that it cannot utterly be attributed to the particularity of the HP-task that we have chosen to use. Indeed, if the only responsible factor was task particularity, shouldn't we have observed the same type of ceiling effect on performance in the results of other studies previously conducted in literature and that have used the same HP-task (Toma & Butera, 2009; Toma, Gilles, & Butera, 2011; Toma, Bry, & Butera, 2013)? But this is not their case; in their studies no ceiling effect on task

solution was observed and, more to the point, the experimental manipulations of cooperation vs. competition did lead to differential effects in terms of task-solution. This leads us to think that instead of viewing this problem as a lack of effect of grades' manipulation on group performances, we can potentially propose a slightly different interpretation, and instead view this absence of effect on group performance as being a ceiling effect of cooperation on group performance. This slightly yet important view allows considering the possibility that the mixed-motives context created in our experimental settings might have been the reason why no effect of grades on group performance has emerged. Given that the task and the instructions of the experimenter rendered crystal clear the location and highlighted the importance of each type of information to the case resolution, it is possible that the overall situation in which participants found themselves made it hard on them to completely avoid exchanging unshared information. Indeed, if individuals were sensitive to the experimenter's instructions (i.e. highlighting how important it is to exchange the unshared information), and if they had retained that the experimenter is the person who will be attributing grades; then, not exchanging unshared information as recommended, could have been perceived as an indicator of incompetence. This point of view could lead us to think that a) the type of task was not the most suitable, and b) that grades' manipulation might not have been strong enough to fully disrupt cooperation (i.e. to disrupt not only the emission of cooperative behaviours, but also task-solution). Further studies would need to experimentally challenge it and find supporting evidence. To dispel doubts, a suggestion could be to test the effect of grades on another hidden profile task that is more difficult to solve, and where, although all unshared information are out in group discussion, unveiling the hidden profile remains less evident in comparison to the hidden profile task we have presently used.

7.3 Contributions

Subsequently, we propose to briefly discuss contributions of the present work to the already existing literature regarding to: first, regarding assessments, second, regarding cooperation, and third, regarding information sharing.

Firstly, as we have outlined it from the beginning of this manuscript, we know from literature that Grades, as assessment tools, are generally used with two main purposes. On the one hand, to produce criterion-referenced evaluation that is when they are used to evaluate the extent to which individuals' work have met a given standard. On the second hand, to evaluate the extent to which individuals' outputs are better/ worse/ equal to one another, in which case they are used to produce a norm-referenced type of evaluation (Brookhart, 2004). In the present studies, the experimental work adopted the perspective in which grades are used in the purpose of producing an inter-individual comparison type of assessment. That is, broadly, when grades allow comparing and rank-ordering individuals. Indeed, we argued that it is precisely when they are used in an inter-individual comparative purpose that they will be deleterious in the open of a cooperative group setting. Although this is what we have observed, we now know more about the nature and functioning of grades. Indeed, it is interesting to note that we have obtained similar negative effects when grades were expected but also when they were primed, thus obtaining those effects with an implicit method suggests that individuals have perceived grades under their *inter-personal comparison* aspect. This common result suggests a first contribution to understand the functioning of grades: the negative effect of grades occurs even when they are not explicitly used with the goal of undertaking inter-personal comparison. Moreover, this result also suggests that individuals have a historical experience with grades that can possibly explains why mere priming has produced similar effects than open expectation of grades. And it suggests that grades must have triggered a mechanism deeply anchored individuals' functioning: by endangering their need for an accurate self-evaluation that would preferably be positive (Festinger, 1954), or endangering their need for obtaining a positive self-evaluation that would be self-enhancing (Steele, 1988; Tesser, 1988; Muller & Fayant, 2010). Hence, this

methodological difference in grades' manipulation that led to similar effects backs up the explanatory mechanism on which we have relied to build our expectations regarding grades' negative effects (and we remind it, that awaits for direct experimental proofing): that grades have probably triggered the perception of a competence threat (Mugny et al., 2003).

However, if neither social comparison nor threat has been manipulated, it is noteworthy that grades have been manipulated in different ways, and their effects observed on different types of dependent variables. The results have consistently pointed to a general negative pattern, showing that grades are deleterious for cooperation. Hence, this point allows us to draw some inferences regarding what, within grades, has the potential to induce deleterious effects in cooperative situations where individuals are visible and evaluated. Indeed, observations derived from experimental manipulations where cooperative situations compared *graded and visible* individual work, to other various cooperative situations where individual work was expected to be *visible* allows ruling out that is it not the mere visibility component of grades that seems to be involved in triggering the negative effect of grades. Thus, this brings furthermore support to the first contribution to grades' functioning, whereby the negative effect of grades occurs even when they are not explicitly used with the goal of undertaking inter-personal comparison, and distinctively leads to a second one. One that relates to the understanding of how grades function. Indeed, in line with research investigating the effects of mere presence on individual performance (e.g. Cottrell, Wack, Sekerak, & Rittle, 1968), the results (in comparison to conditions of visibility) suggest that grades are not deleterious when expected in the open of a cooperative group setting mainly because of their capacity to enhance individual's social visibility. Rather, the results allow us to infer that grades are deleterious when they open the possibility for individuals to obtain a negative self-evaluation (Gruenewald, Kemeny, Aziz, & Fahey, 2004).

Secondly, regarding cooperation. Earlier in Chapter 2, we had underlined our interest in studying situations of cooperation in which grades would intervene to see the extent to which they would interfere with cooperation. Thus, in our will to study cooperation, we have relied on two preconceptions: firstly, that group work is

expected to be superior to individual work; secondly, that cooperation is a positive phenomenon. It is important to note that in the psychological literature, cooperation (often compared to competition, e.g., Ames, 1981) does not systematically result in a positive type of situation (e.g., Stanne, et al., 1999; Johnson & Johnson, 2005a; 2009a). Similarly, group work does not systematically result in a superior output to that provided by individuals alone (e.g. Hill, 1982; Kerr, McCoun, & Kramer, 1996; Kerr, Niedermeier, & Kaplan, 2000; Lorge, Fox, Davitz, & Brenner, 1958; Stasser & Titus, 1985; Stasser & Titus, 2003). Thus, both preconceptions are bound to be valid only under certain conditions (i.e. the case of positive social interdependence); it is under these conditions that we wished to test grades' effect on cooperation.

Hence it is important to note that the present work subscribes to the approach that tries to grasp the factors that help or hinder cooperation, under different forms: inter-individual information sharing; reduction of one's tendency to prefer information that are consistent with a previously made choice rather than inconsistent ones; or inter-individual coordination. Indeed, in our studies, more than being a simple value or a norm to follow, cooperation is a necessity that stems from the nature of the tasks used. In other words, we have particularly focused on studying cooperation when it is conceptualized as binding individuals (of a group) together through a positive social interdependence. This means that we have circumscribed our experimental investigations to situations where individuals have the necessity to share the complementary resources they possess (i.e. positive resource/mean interdependence) in order to reach the common goal they are given to thrive for (i.e. positive goal interdependence). In other words, cooperation is obligatory because if individuals do not actively cooperate (e.g. by sharing their complementary resources, by coordinating, by decentring to take other's information into account even though they are inconsistent with their own choice) they will not be able to reach their goal; in that they are strongly positively interdependent. Hence, it is specifically in such tasks, and under such conditions of positive interdependence, that the two preconceptions (i.e. group work is superior to individual work, and cooperation is positive) are valid, or shall we say, *can be valid* (as literature still discusses what factors need to be gathered in order to best achieve cooperation, Buchs, Butera, & Mugny, 2004; Buchs, Gilles, Dutrévis, & Butera, 2011; D.W. Johnson & R. Johnson, 2009a).

In this context, the present results contribute to the understanding of what factors can obstruct inter-individual cooperation and suggest that grades have this capacity. Precisely, the results show that raising a positive interdependence of goals and resources among individuals of a group (Deutsch, 1949) is not sufficient to maintain cooperation in the face of grades' expectation. Hence, in such situations, grades ended-up gaining the upper hand on the cooperative structure of group work. Why did grades prevail over cooperation? Did they reduce the beneficial effect of cooperation? Or did they break the positive interdependence that was established between individuals? Or, did something happen in between? This is what we now undertake to discuss.

From all the results we have obtained, we observed on the one hand that the graded cooperative situations have led to less cooperative behaviours but not to their absolute disappearance (e.g. groups ended up exchanging less unshared information than in the other conditions, and more shared information; but did not totally avoid unshared information). Taken alone, such result would suggest that grades rather led to a reduction of cooperation. On the other hand, in such graded cooperative situations, individuals have reported perceiving others more like competitors than in the other conditions. Taken alone, such indicator would rather suggest that grades have possibly resulted in breaking the positive social interdependence of the task, since others are no longer viewed as co-operators or partners. However, when taken together (e.g. grades in cooperative graded situations leading to reduced cooperation but not to its disappearance, but also leading to more perceptions of competition), the results suggest another, more plausible explanation. In the present cooperative situations, grades have led individuals to perceive two distinct requirements with which they simultaneously had to deal: having to cooperate and having to be better ranked than others. In fact, this could have resulted in a different perception of the situation than that of being purely cooperative; Deutsch (1949, 1962, 1973) had already remarked that what influences human behaviour is not the mere structure of the interaction but individuals' actual perception of the situation. Hence, grades in cooperative tasks might have resulted in being perceived as a mixed-motives situation (De Dreu et al., 2008), in which two goals at once were to be fulfilled.

Indeed, the vast educational research literature that studies learning through the scope of motivation and achievement goals (i.e. *why* students want to achieve performance/ learning at school) has lately developed to highlight that individuals in educational contexts might not be endorsing one type of goal (e.g. mastery) rather than another (e.g. performance) in given situations, but that individuals can endorse multiple goals at once (Darnon, et al., 2010). Moreover, literature suggests a wider categorization of the goals that adolescents endorse at school (Boekaerts, Koning, & Vedder, 2006; Mansfield, 2012; Pintrich, 2000b; for a recent, brief introduction and historical perspective on goals in learning contexts, see the editorial introduction of Wosnitza & Volet, 2012).

It is for instance the case of Mansfield (2012) who puts forward the interesting perspective according to which multiple goals are furthermore related to four domains. Thus, she reorganizes goals endorsed by adolescents into 4 distinct types of goals: First, achievement goals (mentioned above). Second, future/instrumental goals that link present activities to a visualised future (e.g., obtaining a high salary, a good job position, helping to make the world a better place; Phalet, Andriessen, & Lens, 2004). Third, social goals (Urdan & Maehr, 1995) defined as the social reasons underpinning student's desire to achieve at school (e.g., the desire to establish and maintain positive relationships with others, Wentzel, 1996; or the desire to cooperate and be helpful, also called social goals, Spera & Wentzel, 2003; or to be well regarded by others, also called status goals, Levy, Kaplan, & Patrick, 2004). Fourth, personal well-being goals that are positive goals precisely related to the self (e.g., wanting to enhance self-confidence, self-esteem; Salmela-Aro & Nurmi, 1997).

Following this typology of goals, it would furthermore be interesting to investigate whether this mixed-motive situation might not have triggered other types of goals which could be relevant to investigate given the paradoxical overall situation in which this graded-cooperative situation results: precisely, investigating whether social goals have also been triggered along with the dual mastery/performance type of achievement goals. Could it be that our graded cooperative situations have triggered at the same time performance goals (related to questions of competence that one wants to prove in comparisons to others or, precisely, to avoid being *in*competent in comparison to others; Ames, 1992b; Elliot, 1999), pro-social goals

(defined as linked to the desire to cooperate with others and being helpful; Spera & Wentzel, 2003) but also status-goals such as the goal of being well-regarded (Levy, Kaplan, & Patrick, 2004) by the experimenter?

And if so, could it be that one type of goals has dominated the others and could this domination possibly explain why the mixed-motives graded-cooperative situation has led to a decreased cooperation?

Finally, another complementary explanation could be provided to understand this overall hybrid situation in which the present graded-cooperative context seem to have resulted in. Instead of considering that grades have led to a reduction of cooperation, one could also consider that grades have not been deleterious enough to totally eliminate cooperation, or precisely, should one say to totally eliminate, the *ceiling effect of cooperation on performance*. This idea stems from the following.

On the one hand, Pulfrey, Buchs, & Butera (2011) have shown that expectation of grade-only situations of assessment have been found to increase individuals' adoption of performance avoidance goals (PAV) in comparison to no-grade assessment situations (Experiment 1). On the other hand, the comparison of conditions where individuals expected a grade-only type of assessment vs. where they expected a mixed-type of assessment situation (i.e., grades are concomitantly expected with formative comment-based feedback) showed no significant effect on the adoption of PAV goals. However, the comparison of the two types of graded situations (grade-only and grade & comment) vs. comment-only situation showed that the graded-types of situations increased significantly the adoption of PAV goals (Experiment 2, 3). In short, grades increased adoption of PAV goals; both types of graded situations increased the adoption of PAV in comparison to the comment-only situation; but no significant difference were observed between the two graded types of conditions on the adoption of PAV goals.

This suggest that it is possible that in the condition where individuals expected the mixed-type of evaluation (grade & comment), grades might have gained the upper hand on the comment-only type of situation because the grade & comment situation (along with the graded situation) still revealed an increase in PAV goals in comparison to a comment-only condition. Indeed, in their experiments the graded-

only and the graded-comment conditions produced similar levels of PAV adoption, thus one can infer that the two situations were perceived as equally avoidable, and that in the same vein, one should expect a graded-cooperative situation to be viewed as avoidable. With regards to our results, this would support the possibility that grades, in our experiments, might not have been deleterious enough to eliminate all cooperative behaviours between individuals, or cooperative attitudes within individuals.

Thirdly, regarding the literature on group information sharing and precisely the central question of the pooling of unshared information. The literature on hidden profiles (for a recent review see Toma et al., 2012; Lu, Yuan, & McLeod, 2012; Stasser & Titus, 2003) was initiated (Stasser & Titus, 1985, 1987) to investigate the reasons for group's failure to pool new relevant information when individuals give it during group discussion in order to take a group decision, which is particularly problematic when this information is crucial to task achievement or to taking better group decisions (e.g., Larson, Christensen, Abbot, & Franz, 1996; Stasser & Stewart, 1992; Stasser & Titus, 2003).

Indeed, in a group setting where individuals hold different resources, one would expect individuals of the group to be interested in hearing and receiving new information, because it could be expected to sound more convincing than information already commonly shared by all individuals of the group (Burnstein & Vinokur, 1997). Lately, Toma and her colleagues have shown that groups could be motivated information processors and that this reluctance to pool unshared information could vary depending on the goals that the group and its individuals were led to pursue. They showed that setting groups with competitive goals during the hidden profile task increased the tendency of groups to under-use unshared information in comparison to when groups were given cooperative goals (Toma & Butera, 2009). This result was particularly interesting and puzzling at the same time, because groups were explicitly told (1) that they did not possess the same information to solve the task and (2) *where* such information was located in their materials (i.e. "unshared information is located at the bottom of the second sheet"). However, competitive motives gained the upper hand on the cooperative task that necessitated unshared information to be

sufficiently exchanged between individuals, leading groups to taking bad decisions, thus wrongfully solving the task. Moreover, this difference regarding unshared information in competition (vs. cooperation) did not affect shared information (Toma & Butera, 2009; Toma, Vasiljevic, Oberlé, & Butera, 2013). This result was interesting because it allowed making a step forward into explaining that the aforementioned tendency could be of motivational concern, and that the reluctance to exchange unshared information with others could be a strategic intentional "withholding" of information, driven by mistrust, a defensive mechanism (Steinel & De Dreu, 2004). In the same vein, the same pattern of result regarding unshared information pooling was replicated when expertise assignment was moreover manipulated, by showing that in competition unshared information was even less shared in groups where experts where assigned than when none was assigned (Toma, Vasiljevic, Oberlé, & Butera, 2011), which typically suggests that a threat to competence might be beneath the tendency to withhold unshared information in groups.

After this rapid yet recent historical overview, the present results bring the following contributions regarding unshared information exchange. (1) They replicate this tendency in the setting of a mixed-motive setting where cooperation instructions are accompanied by grades' expectation, a result that is replicated when grades are primed (a distinction already previously discussed). A result that is interesting to be interpreted in line with the fact that grades are known to be predictive of performance avoidance goals (Pulfrey et al., 2011), performance avoidance goals that are negatively predicted by perceived competence (Cury et al., 2006). Thus, we suggest that the present result contribute to the idea that withholding unshared information could be a protective/defensive motivated mechanism that is observed when individuals perceive that their competence is under evaluation, and is thus potentially incurring the risk of obtaining a negative evaluation. (2) Unlike previous results by Toma and colleagues, a reverse significant effect was found on shared information, a new result that could be considered as being of less importance because shared information are less crucial to the solving of hidden profile, but which--taken along with the fact that cooperative-graded situation did not impact group decision--could make us wonder whether it is not a specificity due to the mixed-motive situation.

Indeed, it could have been that groups in the graded-cooperative situation have reacted to the mixed-motive situation by trying to look active, trying to show one's best behaviour in comparison to the contribution of others individuals of the group, by at the same time withholding unshared information and giving other the illusion that they were actively participating in decision making.

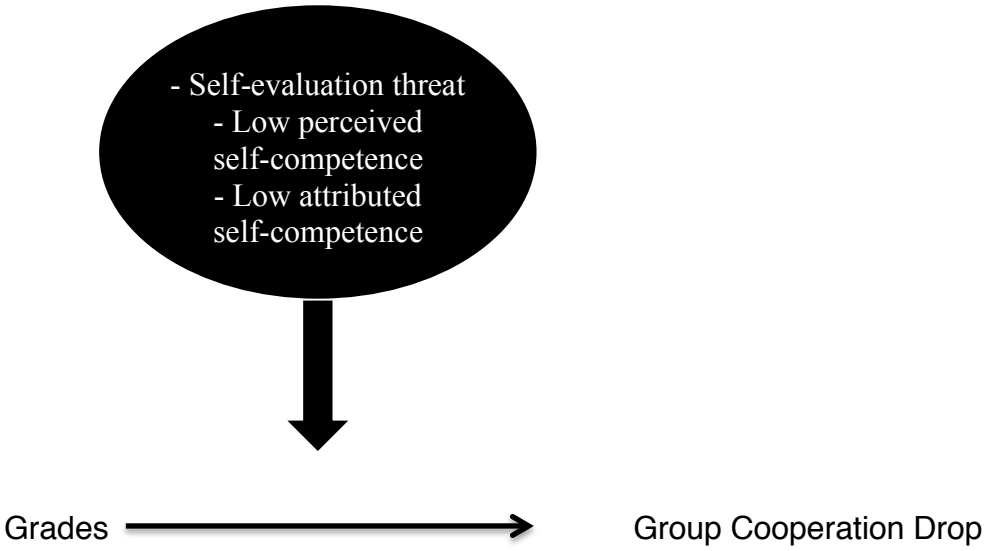
7.4 Future research perspectives

When we first initiated this thesis work, the purpose was to investigate *whether* grades *could* impact cooperation and cooperative behaviours. In the short term, it would be interesting to conduct future studies to extend and complete our understanding as to *why* grades actually *did* hamper cooperation. Future work would need to gather more proofs of the underlying processes that provoked that deleterious effect. Precisely, our main hypothesis was directed by the argument that in such cooperative context, grades (or their expectation) would trigger a threatening social comparison putting at stake the competence of individuals, and that it is indirectly or directly, this threat perception that would have been at the origins of the negative impact of grades found on cooperation. Thus, we think that it should be particularly promising to set future research to experimentally demonstrate that self-evaluation threat to one's competence is fully, or in part, responsible for grades leading to a cooperation drop in cooperative group contexts.

One way to undertake this future step could be to measure threat perception and trying to confirm the possibility that this threat refers explicitly to competence threat matters in this cooperative context. For example, if a threat is indeed perceived, are individuals aware of it? How do they actually define it? And, could we bring proof that it is, namely this perceived threat, which during the interaction process, is reported on relations with others? Finally, does it modify the perception that individuals have of other group members? These questions would necessitate experimental evidence. Moreover, we think it could be interesting to follow the rational that self-competence threat is at the basis of the deleterious effect of grades obtained on cooperation, and to link it with the results of Monteil's studies (1988, study 1 and study 2) that exhibit that visibility of the social comparison information

can be deleterious whenever it puts at stake the reputation of individuals. Particularly, it would be interesting to test the moderating role of low self-perceived competence (e.g. the subjective perception that individuals have regarding their competence in achieving a given task) on the negative relation found between grades and cooperation. In order to replicate previous results obtained by Monteil (1988, study 2), it would be furthermore interesting to oppose: a condition where self-perceived competence is measured, to a condition where competence is attributed (in terms of bogus feedback) in order to investigate the moderating role of low competence perception on the negative relation between grades and cooperation. Relying on the results previously obtained by Monteil (1988, study1 & study2), we could expect:

Firstly, that broadly competence (whether self-perceived competence, as dependent variable, or attributed-competence, as independent variable) will play a moderating role on the negative relation between grades and cooperation, *but only when* competence is perceived to be low or to be endangered. Secondly, we could expect that both perceived low self-competence and low attributed-competence would both equally (no statistical differences) lead to a hampered cooperation. Thirdly, we relied on the assumption that namely self-evaluation *threat* (cf. Chapter 1) can be the core variable and reason why grades have led to cooperation drop in such cooperative contexts. Thus, the present suggestion of experimental testing will allow to start bringing contributions to this hypothesis by possibly showing the moderating role that self-competence can play in the grades-to-cooperation negative relation. In sum, the idea will be to try to understand whether the following relations could be experimentally tested (see figure below). From a larger perspective, the previous will allow to capture the role played by self-competence, when grades are expected in a cooperative situation. Which in turn, will bring contributions to understanding the role that reputation (or the fear of avoiding bad reputation) can sometime play in normative-evaluative situations, and thus contribute to understanding why grades can sometimes lead to a hampered cooperation.



In parallel, a possible continuity for the present work could be to use threat measurements to start creating and developing a database listing different behavioural threat evidences, at individual level, and at interaction level. This could be done by using EEG measurements, individual measures of perceived threat and anxiety scales (e.g., the Palmar Sweat Index that allows measuring the level of physiological arousal in individuals, Johnson & Dabbs, 1065; Martens, 1969, Cohen & Davis, 1973), and looking to identify emotional reactions to threat. On the short and long term, it would be interesting to conduct research in which we would vary the sources of threat and the contexts in which this threat occurs, to see to what extent the type of threats vary accordingly. Conducting research in academic field for experimental purposes, and in parallel, in more applied fields where the question of threat and threat detection is of central importance (e.g., in national and governmental defence services) to contribute to already existing practices and trainings could be particularly thrilling.

Up to this point, the previous subsection has permitted to outline studies that we will need to conduct in the continuity of the present work. Next, we propose to discuss implications that the present results could have for educational settings using teaching practices that rely on the use of cooperative tasks and for organizational

settings, in situations where managers are exhorted to initiate joint actions and shared goals among employees.

7.5 Implications

Educational settings

The present work shows that cooperation and grades do not work well together. Precisely, it seems that grades in a cooperative context, when expecting to receive them or when made salient, led to a decrement in cooperation, affecting intra-individual but also inter-individual variables. These results have three key-implications for educational settings.

Firstly, the results of Chapter 4 cast doubt on the optimal conditions under which teaching exercise ought to be conducted with pupils and students. They show that grades can hamper one of the most central and basic processes concerned with learning, namely the use of decentring and perspective taking that are at stake, for instance, in exercises of hypothesis/antithesis building and defending. This suggests that even when individuals work on their own, the expectation of being graded can affect their propensity to properly evaluate and appreciate the diagnostic value of new information, as grades seem to interfere with their motivation to consider diverging points of view. In other words, grades are not only problematic to be used in direct interactions but also when individuals work on their own.

Secondly, the results of Chapter 5 have a direct implication for schools adopting cooperative learning methods as a means to increase the learning and achievement of students, while the general functioning comprises an individual evaluation. To corroborate our argument we propose to take for example the general functioning of the STAD method (i.e., Student Team Achievement Divisions; Slavin, 1990). STAD is a cooperative method used in classrooms, that encourages students to work in small groups with the goal of making sure that all the members of the

group have mastered a given number of course concepts previously explained by the teacher. Students know *from the onset of group work* that beyond group work itself, the level of mastering will be *assessed with a weekly individual examination*. One of the strengths of this method is its capacity to provide, at individual level, an overall score for each individual that will take in consideration each weekly individual score examination and the progress achieved by each student regarding the previous individual weekly scores. Nevertheless, our results highlight that using STAD as a cooperative learning method to encourage active learning might not lead individuals to elicit cooperative and helpful behaviours between individuals of a same group who are supposed to make sure that each person has mastered all the concepts. The drawback of this method (and other similar cooperative tasks) could be that foreseeing individual evaluation from the beginning of the cooperative group work could encourage individuals to elicit strategic anti-cooperative behaviours during interactions. A way to overcome such inconvenient in the use of STAD could be to make a weekly *group* examination with a common group grade (instead of a weekly *individual* examination), and to provide an individual follow up focused on issues that individuals might have encountered during their learning.

Thirdly, though not the least, the results of Chapter 6, which replicated the nefarious effect of grades on cooperation with 10-years-old pupils, show how early the effect can be triggered. Moreover, replicating this effect on an inter-individual socio-cognitive-coordination task suggests that purely intellective tasks are not the only ones to be hampered by grade expectation, and that other types of tasks, which require a coordination of cognitive and motor functions, but also those that require inter-individual communication, can also be affected by grades. Thus, a broad range of instructors, tutors, teachers and professors are to be concerned with the present results.

Organizational settings: Implications for managers exhorted to manage employees by initiating joint actions and shared goals

The main results obtained in our studies, according to which grades decrease in-group cooperation, has interesting implications regarding management techniques not to use in given contexts. On the one hand, as Luscher, Lewis and Ingram (2006) have highlighted: "(managers) particularly in times of change, are challenged to apply competing best practices, such as (…) prescriptions to build trust by initiating joint action as quickly as possible and by first developing shared goals and understandings" (pp. 494). Accordingly, if managers want to follow the challenges given to them, a possibility would be to consider cooperative group work as a working structure to initiate joint actions and shared goals between employees. On the other hand, managers have a tendency to prefer using already-established practices that promote "individual productivity and efficiency" (Luscher, Lewis, & Ingram, 2006, pp. 492), such as having recourse to management evaluation techniques based on individual grading or ranking in order to promote individual productivity by increasing competition among employees. It is the case for example of companies wrongfully using the Benchmark technique (Voss et al., 1997) to compare employees of one same branch and where employees are aware of such practice.

Thus, our results point to the fact that it could be problematic for managers to decide using cooperative group work and simultaneously maintaining the use of evaluation techniques (e.g. grades) to assess individual productivity. In fact, using individual grading in the environment of a cooperative group work will probably degrade all the benefits that the manager was initially expecting (e.g. raising trust through shared goals and actions) and that could have been raised with initiating cooperation among employees. Hence, it could be useful to run preventative interventions among general managers, their N+1, managing partners and CEOs, or more generally, among organization and their directors, to alert them to the problems that could stem from the use of such evaluation practices in cooperative teamwork.

Conclusion

Returning to the essential aspects, this work has demonstrated that the use of grades to assess contributions of individuals to a cooperative work hinders cooperation as such, as well as it hinders the emergence of certain cooperative behaviours which usually take place in cooperative contexts (i.e. behaviours related to: sharing resources, being open to the opinions of others, coordinating with others). Thus, to conclude this thesis, we suggest discussing this general result with respect to the existing views on the functional use of grades in Education. If this thesis did not aim at testing and comparing methods of evaluation: however, it would be difficult for us to conclude without asking ourselves what could be the consequences of its results on the practice of using grades within the scope of educational environments. If assigning individual grades within a cooperative context seems harmful, does it roughly mean that they should be banned?

In educational environments where grades are used as comparative tools to rank-order pupils and select the most competent ones, two ideas are implicitly (or explicitly) shared. On the one hand, the idea that grades allow students to experience the competition they will later face upon entering the labour market. In this perspective, using grades as a comparative tool, and hence experiencing them as such, would enable students to better cope with future situations of competition. This idea, but also the upcoming one are conveyed, for instance, in Deutsch (1979), or in Harackiewicz, Barron, & Elliot (1998). On the other hand, there is the idea according to which grades are relatively harmful when used for purposes of comparison. In this scope, grades would increase competition among students, a competition that would lead them to having antisocial behaviours, especially toward each other, such as cheating behaviours (cf. Chapter 4 in *L'évaluation, une menace?*), or such as delinquency behaviours, which then become "a rational choice (…) for students who

find school frustrating or difficult" (Felson, Liska, South, & McNulty, 1994, p. 169) especially when norms of the competitive climate are not integrated by students, and when pressure and frustration are experienced.

Between these two stances, what can be concluded from the results of the work conducted in this thesis? That grades should be banned within a cooperative context? This idea seems somewhat extreme, unrealistic and disconnected from reality where, as we have previously seen it, grades are strongly and traditionally rooted in the educational practices in particular (Midgley, Anderman, & Hicks, 1995; Midgley, 1993; Harackiewicz et al., 1998, Midgley et al., 2001) and in the functioning system of our society in general. Consequently, the *revolution of grades* will probably not take place tomorrow. However, we believe that there might be an intermediate stance to adopt and that it would be possible to try to alleviate this effect. Since we cannot change the functioning of the system, we might lead individuals to have other types of behaviour when faced with such mixed-motives situations.

Indeed, individuals are used to being assessed and compared with others; this is a reality that they are not likely to escape from. However, the fact that being evaluated and compared with others generally leads them to adopt certain types of anti-cooperative or anti- social behaviours is another reality on which we believe it is possible to act. Therefore, would it be possible to train individuals to have another vision of grades, without preventing them from experiencing comparative-assessment situations? Could both school and university students "learn" that this wild chase for grades does not have to systematically lead them to having anti-social behaviours? Let's take for instance and by extension, a more significant context, that of competition. Although rare, it is a fact that not all competitions have to be negative; a competition can take place within a positive competitive state of mind, where the objective is not necessarily to destroy the other, but where competition occurs while showing respect to the other and surpassing oneself (see Stanne, Johnson & Johnson, 1999; Johnson & Johnson, 2009a, p. 370, on Conditions for constructive competition). Let us put this thought in our context; would it be possible to promote such a state of mind within the context of a work individually graded and yet cooperative at the same time? In other words, would it be possible to put individuals

in situations of comparative assessment and lead them not to react with each other in an anti-cooperative manner? And if so, how can this be done?

On the one hand, what would happen if, for example, we taught individuals from an early age, and throughout their school curricula, to become aware of the impacts that grades can have on them and provoke in them? What would happen if we warned them, for example, that anti-cooperative behaviours are harmful to them, to their cooperative work and to the quality of their relationships with others? Could this awareness reduce the appearance of anti-cooperative behaviours? An experimental study could well try to test this hypothesis.

More precisely, what if, after placing individuals in a context of graded cooperative work, similarly to some studies carried out in the scope of this thesis, we drew their attention to the fact that a very useful piece of information will be communicated to them? Information according to which, when individuals know that they are being graded during a cooperative group work, they mostly start to act in a less cooperative way, etc. If we presented this information as being in their best learning interest, hence promoting a mastery oriented goal, would it allow to hinder the effect of this graded-cooperative situation that seems to result more in a performance oriented assessment (Smeding, Darnon, Souchal, Toczek-Capelle, & Butera, 2013)? Would this statement allow them to reduce the occurrence of these behaviours?

Even more, and from a preventive point of view, what would happen if we raised their awareness to the fact that these anti-cooperative behaviours are not the only behaviours they can use in comparative-assessment situations, but that they can also choose to be more fair play in their behaviours and attitudes? For example, that they can do their best to cooperate with others and sportively accept the grade that will be given to them. Could this awareness help them reduce the appearance of anti-cooperative behaviours in a comparative-assessment situation within a cooperative group work?

On the other hand, and as previously highlighted in the theoretical part of this thesis, the interest of cooperative work for individuals is to be able to take advantage

of their differences (in terms of experiences, resources, etc.). But if the practice of individual grading jeopardizes this cooperation, what other option can we choose in order to strengthen the cooperation within such a mixed-motives context? As mentioned in the recent publications of Johnson & Johnson (2009a), we believe that it is important to develop in individuals the social skills that would allow individuals who cooperate to better manage the relationships with others, relationships of coordination and communication that sustain and promote cooperation. In fact, these skills are not innate and learning them appears for us today to be essential in order to bolster together the structural factors of cooperation (e.g. the concept of positive social interdependence that may be structured in terms of goal and resources given to individuals in a group).

Thus, experimental works could be conducted to support and promote prevention approaches against the effect of grades' practice when used in a comparative way in the context of cooperative group work. All in order to better prepare individuals to face situations of comparative assessments, teaching them to hinder non-cooperative and antisocial behaviours in such contexts. Finally, if Albert Einstein said "I never teach my pupils. I only attempt to provide the conditions in which they can learn", why not show pupils that under certain conditions and situations, their choice of behavioural response is not predetermined, and that as individuals, they have the freedom to use other types of behaviour?

REFERENCES

Abelson, R. P. (1986). Beliefs are like possessions. *Journal for the Theory of Social Behavior, 16,* 223-250.

Abelson, R. P., & Prentice, D. A. (1997). Contrast tests of interaction hypotheses. *Psychological Methods, 2,* 315-328.

Airasian, P. W. (1988). The case of state-mandated, high-stakes testing. *Educational Evaluation and Policy Analysis, 10,* 301-313.

Alicke, M. D., & Sedikides, C. (2009). Self-enhancement and self-protection: What they are and what they do. *European Review of Social Psychology*, *20*, 1-48.

Amabile, T. M. (1983). *The social psychology of creativity.* New York: Springer-Verlag.

Ames, C. (1981). Competitive versus cooperative reward structures: The influence of individual and group performance factors on achievement attributions and affect. *American Educational Research Journal, 18,* 273-287.

Ames, C. (1992). Classrooms: Goals, structures, and students motivation. *Journal of Educational Psychology*, *84,* 261-271.

Anderman, L. H. (1999). Classroom goal orientation, school belonging and social goals as predictors of students' positive and negative affect following the transition to middle school. *Journal of Research & Development in Education, 32,* 89-103.

Anderman, L. H., & Anderman, E. M. (1999). Social predictors of changes in students' achievement goal orientations. *Contemporary Educational Psychology*, *24,* 21-37.

Anderman, E. M., & Midgley, C. (1997). Changes in Achievement goal orientations, Perceived Academic competence, and Grades across the transition to middle-level schools. *Contemporary educational Psychology, 22,* 269-298.

Anderman, E. M., & Young, A. J. (1993, April). *A multilevel model of adolescents' motivation and strategy use in academic domains.* Paper presented at the Annual Meeting of the American Educational Research Association, Atlanta.

Aronson, E., Blaney, N., Stephan, C., Sikes, J., & Snapp, M. (1978). *The jigsaw classroom*. Beverly Hills, CA: Sage.

Arrow, K. (1973). Higher education as a filter. *Journal of Public Economics, 2*, 193-216.

Asch, S. E. (1955). Opinions and social pressure. *Readings about the social animal*, 17-26.

Atkinson, J. W., & Litwin, G. H. (1960). Achievement motive and test anxiety conceived as motive to approach success and motive to avoid failure. *Journal of Abnormal and Social Psychology, 60,* 52-63.

Bales, R. F. (1950). A set of categories for the analysis of small group interaction. *American Sociological Review, 15,* 257-263.

Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis and C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology.* New York: Cambridge University Press.

Baron, R. S. (1986). Distraction-conflict theory: Progress and problems. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp. 1-40). New York: Academic Press.

Barron, B. (2000). Coordination in collaborative problem-solving groups. *The Journal of the Learning Sciences, 9,* 403-436.

Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80,* 706-722.

Baumeister, R. F. (1984). Choking under pressure: self-consciousness and paradoxical effects of incentives on skilful performance. *Journal of Personality and Social Psychology, 46,* 610-620.

Black, P., & Wiliam, D. (1998). *Inside the black box: Raising standards through classroom assessment*. Granada Learning.

Blake, J., & Davis, K. (1964). Norms, values, and sanctions. In R. E. L. Faris (Ed.), *Handbook of modern sociology* (pp. 456-484). Chicago, IL: Rand-McNally.

Blascovich, J., Mendes, W. B., Hunter, S. B., & Salomon, K. (1999). Social facilitation as challenge and threat. *Journal of Personality and Social Psychology, 77,* 68-77.

Boekaerts, M., de Koning, E., & Vedder, P. (2006). Goal-directed behaviour and contextual factors in the classroom: An innovative approach to the study of multiple goals. *Educational Psychologist, 41,* 33-51.

Bond, C. F., & Titus, L. J. (1983). Social facilitation: A meta-analysis of 241 studies. *Psychological Bulletin, 94,* 265-292.

Borden, R. J., Hendrick, C., & Walker, J. W. (1976). Affective, physiological, and attitudinal consequences of audience presence. *Bulletin of the Psychonomic Society, 7,* 33-36.

Bottger, P. C., & Yetton, P. W. (1998). An integration of process and decision scheme explanations of group problem solving performance. *Organizational Behavior and Human Decision Processes, 42,* 234-249.

Brodbeck, F. C., Kerschreiter, R., Mojzisch, A., Frey, D., & Schulz-Hardt, S. (2002). The dissemination of critical, unshared information in decision-making groups: the effects of pre-discussion dissent. *European Journal of Social Psychology, 32,* 35-56.

Brody, C., & Smith-Lovin, L. (1989). Interruptions in group discussions: the effects of gender and group composition. *American Sociological Review, 54,* 424-435.

Brookhart, S. M. (2004). Assessment theory for college classrooms. *New Directions for Teaching and Learning, 100,* 5-14.

Brown, R. (2000). *Group Processes: Dynamics within and between groups*, Blackwell Publishing.

Brunstein, J. C., & Gollwitzer, P. M. (1996). Effects of failure on subsequent performance: The importance of self-defining goals. *Journal of Personality and Social Psychology, 70,* 395-407.

Buchs, C., Butera, F., & Mugny, G. (2004). Resource interdependence, student interactions and performance in cooperative learning. *Educational Psychology, 24,* 291-314.

Buchs, C., Darnon, C., Quiamzade, A., Mugny, G., & Butera, F. (2008). Conflits et apprentissage. Régulation des conflits sociocognitifs et apprentissage. *Revue française de pédagogie*, *2,* 105-125.

Buchs, C., Gilles, I., Dutrévis, M., & Butera, F. (2011). Pressure to cooperate: Is reward interdependence really needed in cooperative learning? *British Journal of Educational Psychology, 81,* 135-146.

Buchs, C., Pulfrey, C., Gabarrot, F., & Butera, F. (2010). Competitive conflict regulation and informational dependence in peer learning. *European Journal of Social Psychology, 40,* 418-435.

Burnstein, E., & Vinokur, A. (1977). Persuasive argumentation and social comparison as determinants of attitude polarization. *Journal of Experimental Social Psychology, 13,* 315-332.

Butera F. (2011). La menace des notes. In: Butera F., Buchs C., Darnon C. (eds.) *L'évaluation, une menace?* Presses Universitaires de France, pp. 45-53.

Butera, F., & Buchs, C. (2005). Reasoning together: From focusing to decentering. In V. Girotto & P. N. Johnson-Laird (Eds.), *The shape of reason* (pp.193-203). Hove, UK: Psychology Press.

Butera, F., & Mugny, G. (1995). Conflict between incompetences and influence of low-expertise source in hypothesis testing. *European Journal of Social Psychology, 25,* 457-462.

Butera, F., Mugny, G. (2001). Conflicts and social influences in hypothesis testing. In: C. De Dreu & N. De Vries (Eds.). *Group Consensus and Minority Influence: Implications for innovation*. Oxford : Blackwell.

Butera, F., Mugny, G., & Tomei, A. (2000). Incertitude et enjeux identitaires dans l'influence sociale. [Uncertainty and identity stakes in social influence]. In J. L. Beauvois, R. V. Joule, & J. M. Monteil (Eds.), *Perspectives cognitives et conduits sociales* (Vol. 7, pp.205-229). Neuchâtel, Paris: Delachaux et Niestlé.

Butera, F., Darnon, C., Buchs, C., & Muller, D. (2006). Les méfaits de la compétition : comparaison sociale et focalisation dans l'apprentissage. In Joule, R.-V., & Huguet, P. (Eds), *Bilan et Perspectives en Psychologie Sociale* (pp. 15-44). Grenoble : PUG.

Butera, F., Gardair, E., Maggi, J., & Mugny, G. (1998). Les paradoxes de l'expertise : Influence sociale et (in)compétence de soi et d'autrui. [Paradoxes of expertise. Social influence and self and other's (in)competence]. In J. Py, A. Somat, & J.

Baillé (Eds.), *Psychologie sociale et formation professionnelle: Propositions et regards critiques* (pp.109-123). Rennes: Presses Universitaires de Rennes.

Butler, R. (1987). Task-involving and ego-involving properties of evaluation: Effects of different feedback conditions on motivational perceptions, interest, and performance. *Journal of Educational Psychology, 79,* 474-482.

Butler, R. (1988). Enhancing and undermining intrinsic motivation: The effects of task-involving and ego-involving evaluation on interest and performance. *British Journal of Educational Psychology, 58,* 1-14.

Butler, R. (1992). What young people want to know when: Effects of mastery and ability goals on interest in different kinds of social comparisons. *Journal of Personality and Social Psychology, 62,* 934-943.

Butler, R. (2000). What learners want to know: The role of achievement goals in shaping information-seeking, performance and interest. In C. Sansone & J. Harackiewicz (Eds.), *Intrisic and extrinsic motivation: The search for optimal motivation and performance* (pp. 161-194). San Diego, CA: Academic Press.

Butler, R. (2006). Are mastery and ability goals both adaptive? Evaluation, initial goal construction and the quality of task engagement. *British Journal of Educational Psychology, 76,* 595-611.

Butler, R., & Nisan, M. (1986). Effects of no feedback, task-related comments, and grades on intrinsic motivation and performance. *Journal of Educational Psychology, 78,* 210- 216.

Cameron, J., & Pierce, W. D. (2002). *Rewards and intrinsic motivation: Resolving the controversy.* Westport, CT. Bergin and Garvey.

Carver, C. S., & Scheier, M. F. (1981). The self-attention-induced feedback loop and social facilitation. *Journal of Experimental Social Psychology, 17,* 545-568.

Carver, C. S., & Scheier, M. F. (1990). Principles of self-regulation: Action and emotion. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of Motivation and Cognition: Foundations of Social Behavior* (Vol. 2, pp. 3-52). New York: Guilford Press.

Collins, R. L. (2000). Among the better ones: Upward assimilation in social comparison. In J. Suls & L. Wheeler (Eds.), *Handbook of social comparison: Theory and research* (pp. 253-270). New York: Plenum Press.

Cottrell, N. B., Rittle, R. H., & Wack, D. L. (1967). Presence of an audience and list type (competitional or noncompetitional) as joint determinants of performance in paired-associates learning. *Journal of Personality, 35,* 425-434.

Cottrell, N. B., Wack, D. L., Sekerak, G. Y., & Rittle, R. H. (1968). Social facilitation of dominant responses by the presence of an audience and the mere presence of others. *Journal of Personality and Social Psychology, 9,* 245-250.

Covington, M. V., & Omelich, C. L. (1984). Task-oriented versus competitive learning structures: Motivational and performance consequences. *Journal of Educational Psychology, 76,* 1038-1050.

Crouzevialle, M., & Butera, F. (2013). Performance-approach goals deplete working memory and impair cognitive performance. *Journal of Experimental Psychology: General, 142,* 666–678.

Cruz, M. G., Henningsen, D. D., & Williams, M. L. (2000). The presence of norms in the absence of groups? The impact of normative influence under hidden profile conditions. *Human Communication Research, 26,* 104-124.

Cury, F., Elliot, A. J., Da Fonseca, D., & Moller, A. C. (2006). The social-cognitive model of achievement motivation and the 2 x 2 achievement goal framework. Journal of Personality and Social Psychology, 90, 666-679. doi:10.1037/0022-3514.90.4.666

Darnon, C., & Butera, F. (2007). Learning or succeeding? Conflict regulation with mastery or performance goals. *Swiss Journal of Psychology, 66,* 145-152.

Darnon, C., Butera, F., & Harackiewicz, J. M. (2007). Achievement goals in social interactions: Learning with mastery vs. performance goals. *Motivation and Emotion, 31,* 61-70.

Darnon, C., Dompnier, B., Gilliéron, O., & Butera, F. (2010). The interplay of mastery and performance goals in social comparison: A multiple-goal perspective. *Journal of Educational Psychology, 102,* 212-222.

Darnon, C., Dompnier, B., Delmas, F., Pulfrey, C., & Butera, F. (2009). Achievement goal promotion at university: Social desirability and social utility of master and performance goals. *Journal of Personality and Social Psychology, 96,* 119-134.

Darnon, C., Muller, D., Schrager, S. H., Pannuzzo, N., & Butera, F. (2006). Mastery and performance goals predict epistemic and relational conflict regulation. *Journal of Educational Psychology, 98,* 766-776.

Davis, J. H. (1973). Group decision and social interaction: A theory of social decision schemes. *Psychological Review, 80,* 97-125.

Davis, J. H., Laughlin, P. R., & Komorita, S. S. (1976). The social psychology of small groups. *Annual Review of Psychology, 27,* 501-541.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior.* New York: Plenum.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999a). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin, 125*, 627-668.

De Cremer, D., Snyder, M., & Dewitte, S. (2001). "The less I trust, the less I contribute (or not)?" The effects of trust, accountability and self-monitoring in social dilemmas. *European Journal of Social Psychology, 31,* 93-107.

De Dreu, C. K. W., Beersma, B., Stroebe, K., & Euwema, M. C. (2006). Motivated information processing, strategic choice, and the quality of negotiated agreement. *Journal of Personality and Social Psychology, 90,* 927-943.

De Dreu, C. K. W., Nijstad, B. A., & Van Knippenberg, D. (2008). Motivated information processing in group judgment and decision making. *Personality and Social Psychology Review, 12,* 22-49.

De Ketele, J.-M., (1993). L'évaluation conjugée en paradigmes. [Evaluation: A review of the different paradigms]. *Revue française de pédagogie, 103,* 59-80.

Deutsch, M. (1949a). A theory of cooperation and competition. *Human Relations, 2,* 129-152.

Deutsch, M. (1962). Cooperation and trust: Some theoretical notes. In M. R. Jones (Ed.), *Nebraska symposium on motivation* (pp. 275-319). Lincoln: University of Nebraska Press.

Deutsch, M. (1968). Field theory in social psychology. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology* (2nd ed., Vol. 1, pp. 412-487). Reading, MA: Addison Wesley.

Deutsch, M. (1973). The resolution of conflict: Constructive and destructive processes. New Haven, Conn.: Yale University Press.

Deutsch, M. (1979). Education and distributive justice, some reflections on grading systems. *American Psychologist, 34,* 391-401.

Deutsch, M., & Kraus, R. (1965). *Theories of social psychology.* New York: Basic Books.

Dickerson, S. S., Gruenewald, T. L., & Kemeny, M. E. (2004). When the social self is threatened: Shame, physiology, and health. *Journal of Personality, 72,* 1191-1216.

Dickerson, S. S., Mycek, P. J., & Zaldivar, F. (2008). Negative social evaluation, but not mere social presence, elicits cortisol responses to a laboratory stressor task. *Health Psychology, 27,* 116-121.

Ditto, P. H., & Lopez, D. F. (1992). Motivated skepticism: Use of differential decision criteria for preferred and nonpreferred conclusions. *Journal of Personality and Social Psychology, 63,* 568-584.

Doise, W., & Mugny, G. (1975). Recherches socio-génétiques sur la coordination d'actions interdépendantes. *Revue Suisse de Psychologie, 34,* 160-174.

Doise, W., & Mugny, G. (1981). *Le développement Social de l'intelligence.* InterEditions, Paris.

Doise, W., & Mugny, G. (1984). *The social development of the intellect.* Oxford: Pergamon Press.

Doise, W., & Mugny, G. (1997). Le jeu coopératif et la coordination d'actions indépendantes. In *Psychologie Sociale & développement cognitif* (pp.47-74). Liège : Armand Colin.

Dowson, M., & McInerney, D. M. (2003). What do students say about their motivational goals? Towards a more complex and dynamic perspective on student motivation. *Contemporary Educational Psychology*, *28,* 91-113.

Drolet, A. L., & Morris, M. W. (2000). Rapport in conflict resolution: Accounting for how face-to-face contact fosters mutual cooperation in mixed-motive conflicts. *Journal of Experimental Social Psychology, 36,* 26-50.

Dunbar, N. E., & Burgoon, J. K. (2005). Perceptions of power and interactional dominance in interpersonal relationships. *Journal of Social and Personal Relationships, 22,* 207-233.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41,* 1040-1048.

Edwards, K., & Smith, E. E. (1996). A disconfirmation bias in the evaluation of arguments. *Journal of Personality and Social Psychology, 71,* 5-24.

Eisenberg, N. (1996). Caught in a narrow Kantian perception of prosocial development: Reactions to Campbell and Christopher's critique of moral development theory. *Developmental Review*, *16,* 48-68.

Eisenberg, N., & Giallanza, S. (1984). The relation of mode of pro-social behavior and other proprietary behaviors to toy dominance. *Child Study Journal*, *14,* 115-121.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34,* 169-189.

Elliot, A. J., & Murayama, K. (2008). On the measurement of achievement goals: Critique, illustration, and application. *Journal of Educational Psychology, 100*, 613-628.

Epstein, S. (1980). Aggregation and beyond: Some basic issues on the prediction of behaviour. *Journal of Personality, 51,* 360-391.

Felson, R. B., Liska, A. E., South, S. J., & McNulty, T. L. (1994). The subculture of violence and delinquency: Individual vs. school context effects. *Social Forces, 73,* 155-173.

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7,* 117-140.

Fischer, P., Kastenmüller, A., Frey, D., & Peus, C. (2009). Social comparison and information transmission in the work context. *Journal of Applied Social Psychology, 39,* 42-61.

Fischer, P., Schulz-Hardt, S., & Frey, D. (2008). Selective exposure and information quantity: How different information quantities moderate decision makers' preference for consistent and inconsistent information. *Journal of Personality and Social Psychology, 94,* 231-244.

Forman, E. A., & Cazden, C. B. (1985). Exploring Vygotskian perspectives in education: The cognitive value of peer interaction. In J. V. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (pp. 323-347). New York: Cambridge University Press.

Frey, D. (1986). Recent research on selective exposure to information. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 19, pp.41-80). New York: Academic Press.

Frey, D., & Schulz-Hardt, S. (2001). Confirmation bias in group information seeking and its implications for decision making in administration, business, and politics. In F. Butera & G. Mugny (Eds.), *Social influence in social reality* (pp.53-74). Göttingen: Hogrefe & Huber Publishers.

Forman, E. A., & Cazden, C. B. (1985). Exploring Vygotskian perspectives in education: The cognitive value of peer interaction. In J. V. Wertsch (Ed.), *Culture, communication, and cognition: Vygotskian perspectives* (pp. 323-347). New York: Cambridge University Press.

Garbarino, J. (1975). The impact of anticipated reward upon cross-age tutoring. *Journal of Personality and Social Psychology, 32,* 421-428.

Geen, R. G. (1976). Test anxiety, observation, and range of cue utilization. *British Journal of Social and Clinical Psychology, 15,* 253-259.

Gersick, C. J. G. (1988). Time and transition in work teams: Towards a new model of group development. *Academy of Management Journal, 31,* 9-41.

Gigone, D., & Hastie, R. (1993). The common knowledge effect: Information sharing and group judgment. *Journal of Personality and Social Psychology, 65,* 959-974.

Gigone, D., & Hastie, R. (1997). The impact of information on small group choice. *Journal of Personality and Social Psychology, 72,* 132-140.

Glaser, R. (1963). Instructional technology and the measurement of learning outcomes: Some questions. *American psychologist*, *18*, 519.

Gorman, M., & Carlson, B. (1989). Can experiments be used to study science? *Social Epistemology*, *3*(2), 89-106.

Graham, S., & Golan, S. (1991). Motivational influences on cognition: Task involvement, ego involvement, and depth of information processing. *Journal of Educational Psychology, 83,* 187-194.

Green, M. C., Visser, P. S., & Tetlock, P. E. (2000). Coping with accountability cross-pressures: Low-effort evasive tactics and high-effort quests for complex compromises. *Personality and Social Psychology Bulletin, 26,* 1380-1391.

Greitemeyer, T., & Schulz-Hardt, S. (2003). Preference-consistent evaluation of information in the hidden profile paradigm: Beyond group-level explanations for the dominance of shared information in group decisions. *Journal of Personality and Social Psychology, 84,* 322-339.

Gruenewald, T. L., Kemeny, M. E., Aziz, N., & Fahey, J. L. (2004). Acute threat to the social self: Shame, social self-esteem, and cortisol activity. *Psychosomatic Medicine, 66,* 915-924.

Gummerum, M., Leman, P. J., & Hollins, T. S. (2013). Children's collaborative recall of shared and unshared information. *British Journal of Developmental Psychology, 31*, 302–317.

Hackman, J. R., & Morris, C. G. (1975). Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration. In L. Berkowitz (Ed.) *Advances in experimental social psychology* (Vol. 8, pp. 45-59). New York: Academic Press.

Hagman, J., & Hayes, J. (1986). *Cooperative learning: Effects of task, reward, and group size on individual achievement* (Tech. Rep. No. 704).

Harackiewicz, J. M., Abrahams, S., & Wageman, R. (1987). Performance evaluation and intrinsic motivation: The effects of evaluative focus, rewards, and achievement orientation. *Journal of Personality and Social Psychology*, *53,* 1015.

Harackiewicz, J. M., Barron, K. E., & Elliot, A. J. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist, 33,* 1-21.

Harackiewicz, J. M., Barron, K. E., Carter, S. M., Letho, A. T., & Elliot, A. J. (1997). Predictors and consequences of achievement goals in the college classroom:

Maintaining interest and making the grade. *Journal of Personality and Social Psychology, 73,* 1284-1295.

Harter, S. (1978). Pleasure derived from challenge and the effects of receiving grades on children's difficulty level choices. *Child Development*, 788-799.

Hayek, A-S., Toma, C., Oberlé, D., & Butera, F. (23 mars 2014). Grades Hamper information sharing: Grading Hampers cooperative Information Sharing in group problem Solving. Submitted manuscript.

Hayek, A.S., Toma, C., Oberlé, D., & Butera, F. (9 avril 2014). The effect of grades on the preference effect. Submitted manuscript.

Hawley, P. H. (1999). The ontogenesis of social dominance: A strategy-based evolutionary perspective. *Developmental Review, 19,* 97-132.

Hawley, P. H. (2002). Social Dominance and prosocial and coercive strategies of resource control in pre-schoolers. *International Journal of Behavioral Development, 26,* 167-176.

Hill, G. W. (1982). Group versus individual performance: Are N+1 heads better than one? *Psychological Bulletin, 91,* 517-539.

Hinsz, V. B., Tindale, R. S., & Vollrath, D. A. (1997). The emerging conceptualization of groups as information processors. *Psychological Bulletin, 121,* 43-64.

Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking childhood to adolescence.* New York: Basic Books.

Janis, I. L. (1982). *Groupthink* (2nd ed). Boston: Houghton-Mifflin.

Janowitz, M. (1975). Sociological theory and social control. *American Journal of Sociology, 81,* 82-108.

Jensen, M. (1996). Cooperative quizzes in the anatomy and physiology laboratory: A description and evaluation. *Advances in Physiology Education, 16*(1), S48-S54.

Jensen, M., Johnson, D. W., & Johnson, R. (2002). Impact of positive interdependence during electronic quizzes on discourse and achievement. *Journal of Educational Research, 95,* 161-166.

Johnson, D. W. (1970). *Social psychology of education*. New York: Holt.

Johnson, D. W. (1977). The distribution and exchange of information in problem-solving dyads. *Communication Research, 4,* 283-298.

Johnson, D. W., & Johnson, F. (2006). *Joining together: Group theory and group skills* (9th Ed.). Boston : Allyn & Bacon.

Johnson, D. W., & Johnson, R. (1985). Classroom conflict: Controversy versus debate in learning groups. *American Educational Research Journal, 22,* 237-256.

Johnson, D. W., & Johnson, R. (1989). *Cooperation and competition: Theory and research.* Edina, MN: Interaction Book Company.

Johnson, D. W., & Johnson, R. (1995). *Creative controversy: Intellectual conflict in the classroom* (3rd edn.). Edina, MN: Interaction Book Company.

Johnson, D. W., & Johnson, R. T. (2002). Social interdependence theory and university instruction- Theory into practice. *Swiss Journal of Psychology*, *61,* 119-129.

Johnson, D. W., & Johnson, R. (2005a). New developments in social interdependence theory. *Genetic, Social, and General Psychology Monographs, 131,* 285-358.

Johnson, D. W., & Johnson, R. T. (2009a). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher, 38*, 365-379.

Johnson, D. W., Johnson, R., & Maruyama, G. (1983). Interdependence and interpersonal attraction among heterogeneous and homogeneous individuals: A theoretical formulation and a meta-analysis of the research. *Review of Educational Research, 53,* 5-54.

Johnson, D. W., Johnson, R. T., & Smith, K. (2007). The state of cooperative learning in postsecondary and professional settings. *Educational Psychology Review, 19,* 15-29.

Johnson, D. W., Maruyama, G., Johnson, R., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin, 89,* 47-62.

Jonas, E., Schulz-Hardt, S., Frey, D., & Thelen, N. (2001). Confirmation bias in sequential information search after preliminary decisions: An expansion of dissonance theoretical research on selective exposure to information. *Journal of Personality and Social Psychology, 80,* 557-571.

Jones, E. E. (1979). The rocky road from acts to dispositions. *American Psychology, 34,* 107-117.

Judd, C. M., & McClelland, G. H. (1989). *Data analysis: A model comparison approach.* San Diego, CA: Harcourt Brace Jovanovich.

Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, *65,* 681-706.

Kelley, H. H., & Thibaut, J. W. (1969). Group problem solving. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology.* Vol. 4 Reading, Mass.: Addison-Wesley.

Kerr, N. L., & Tindale, R. S. (2004). Group performance and decision making. *Annual Review of Psychology, 55,* 623-655.

Kerr, N. L., MacCoun, R. J., & Kramer, G. P. (1996). Bias in judgment: Comparing individuals and groups. *Psychological Review, 103,* 687-719.

Kerr, N. L., Niedermeier, K. E., Kaplan, M. F. (2000). On the virtues of assuming minimal differences in information processing in individuals and groups. *Group Processes & Intergroup Relations, 3,* 203-217.

Klayman, J., & Ha, Y.-W. (1987). Confirmation, disconfirmation and information in hypothesis testing. *Psychological Review, 94*, 211-228.

Knight, P., & Yorke, M. (2003). *Assessment, learning and employability*. Maidenhead, UK: Open University Press.

Koehler, J. J. (1993). The influence of prior beliefs on scientific judgments of evidence quality. *Organizational Behavior and Human Decision Processes, 56,* 28-55.

Koffka, K. (1935). *Principles of gestalt psychology*. New York: Harcourt, Brace.

Kohn, A. (1993). Why incentive plans cannot work. *Harvard Business Review, 71,* 54-63.

Koole, S. L., Smeets, K., Van Knippenberg, A., & Dijksterhuis, A. (1999). The cessation of rumination through self-affirmation. *Journal of Personality and Social Psychology*, *77,* 111.

Kravitz, D. A., & Martin, B. (1986). Ringelmann rediscovered : The original article. *Journal of Personality and Social Psychology, 50,* 936-941.

Kruglanski, A. W., Thompson, E. P., & Spiegel, S. (1999). Separate or equal? Bimodal notions of persuasion and a single-process" unimodel". In S. Chaiken, & Y. Trope (Eds.), *Dual-process theories in social psychology*. New York, NY, US: Guilford Press.

Kulik, J. A., & Gump, B. B. (1997). Affective reactions to social comparison: The effects of relative performance and related attributes information about another person. *Personality and Social Psychology Bulletin, 23,* 452-468.

Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin, 108,* 480-498.

Larson, J. R., & Hamon, V. M. (2007). Recalling shared vs. unshared information mentioned during group discussion: Toward understanding differential repetition rates. *Group Processes and Intergroup Relations, 10,* 311-322.

Larson, J. R., Jr., Christensen, C., Abbott, A. S., & Franz, T. M. (1996). Diagnosing groups: Charting the flow of information in medical decision-making teams. *Journal of Personality and Social Psychology, 71,* 315-330.

Latané, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology, 37,* 822-832.

Laughlin, P. R., Hatch, E. C., Silver, J. S., & Boh, L. (2006). Groups perform better than the best individuals on letters-to-numbers problems: Effects of group size. *Journal of Personality and Social Psychology, 90,* 644-651.

Leffler, A., Gillespie, D. L., & Conaty, J. C. (1982). The effects of status differentiation on nonverbal behavior. *Social Psychology Quarterly, 45,* 153-161.

Legrenzi, P., Girotto, V., & Johnson-Laird, P. N. (1993). Focusing in reasoning and decision making. *Cognition, 49,* 37-66.

Lerner, J. S., & Tetlock, P. E. (1999). Accounting for the effects of accountability. *Psychological Bulletin, 125,* 255-275.

Lerner, J. S., Goldberg, J. H., & Tetlock, P. E. (1998). Sober second thought: The effects of accountability, anger, and authoritarianism on attributions of responsibility. *Personality and Social Psychology Bulletin, 24,* 563-574.

Levy, I., Kaplan, A., Patrick, H. (2004). Early adolescents' achievement goals, social status, and attitudes towards cooperation with peers. *Social Psychology of Education, 7,* 127-159.

Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology, 37,* 2098-2109.

Lorge, I., Fox, D., Davitz, J., & Brenner, M. (1958). A survey of studies contrasting the quality of group performance and individual performance 1920-1957. *Psychological Bulletin*, *55*, 337-372.

Lorge, I., & Solomon, H. (1955). Two models of group behaviour in the solution of eureka-type problems. *Psychometrika, 20,* 139-148.

Lu, L., Yuan, Y. C., McLeod, P. L. (2012). Twenty-five years of hidden profiles in group decision making: A meta-analysis. *Personality and Social Psychology Review, 16,* 54-75.

Luscher, L. S., Lewis, M., & Ingram, A. (2006). The social construction of organizational change paradoxes. *Journal of Organizational Change Management, 19,* 491-502.

Mansfield, C. (2012). Rethinking motivation goals for adolescents: Beyond achievement goals. *Applied Psychology: An International Review, 61,* 564-584.

McLeod, C. M. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin, 109,* 163-203.

Marshall, H. H., & Weinstein, R. S. (1984). Classroom factors affecting students' self-evaluations: An interactional model. *Review of Educational Research, 54,* 301-325.

Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In R. S. Wyer Jr (Ed.), *Ruminative Thoughts. Advances in Social Cognition* (Vol. 9, pp. 1-47). Mahwah, NJ: Lawrence Erlbaum.

Matsui, T., Kakuyama, T., & Onglacto, M. (1987). Effects of goals and feedback on performance in groups. *Journal of Applied Psychology, 72,* 407-415.

McClam, S., & Sevier, B. (2010). Troubles with grades, grading, and change: Learning from adventures in alternative assessment practices in teacher education. *Teaching and Teacher Education, 26,* 1460-1470.

McGrath, J. E., Arrow, H., Berdhal, J. L. (1999). Cooperation and conflict as manifestations of coordination in small groups. *Polish Psychological Bulletin, 30,* 1-14.

McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological Methods, 1,* 30-46.

Meloth, M.S., & Deering, P.D. (1992). Effects of two cooperative conditions on peer group discussions, reading comprehension, and metacognition. *Contemporary Educational Psychology, 17,* 175-193.

Mercier, H., & Sperber, D. (2011). Why do humans reason? Arguments for an argumentative theory. *Behavioral and Brain Sciences, 34,* 57-74.

Merton, R. K. (1968). The Matthew effect in science. *Science, 159,* 56-63.

Midgley, C. (1993). Motivation and middle level schools. In P. Pintrich & M. L. Maehr (Eds.), *Advances in motivation and achievement: Vol. 8. Motivation in the adolescent years* (pp. 219-276). Greenwich, CT: JAI Press.

Midgley, C., Anderman, E., & Hicks, L. (1995). Differences between elementary and middle school teachers and students: A goal theory approach. *Journal of Early Adolescence, 15,* 90-113.

Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-approach goals: Good for what, for whom, under what circumstances, and at what cost? *Journal of Educational Psychology, 93,* 77-86.

Miller, R.B., Greene, B., Montalvo, G., Ravindran, B., & Nichols, J. (1996). Engagement in academic work: The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology, 21,* 388-422.

Monteil, J. (1987). À propos du conflit socio-cognitif : d'une heuristique fondamentale à une possible opérationnalisation. Dans Beauvois, R., Joule, R.J. et Monteil, J. (dir.). *Perspectives cognitives et conduites sociales 1. Théories implicites et conflits cognitifs* (p. 199-210). Paris, France : Cousset DelVal.

Monteil, J-M. (1988). Social comparison, individual strategies and socio-cognitive mediations: An effect of behavioural differentiations at schools. *European Journal of Psychology of Education, 3,* 3-18.

Monteil, J-M., & Huguet, P. (2002). *Réussir ou échouer à l'école : une question de contexte?* Grenoble: PUG.

Morse, S., & Gergen, K. J. (1970). Social comparison, self-consistency, and the concept of self. *Journal of Personality and Social Psychology, 16,* 148-156.

Mugny, G., Butera, F., Quiamzade, A., Dragulescu, A., & Tomei, A. (2003). Comparaisons sociales des compétences et dynamiques d'influence sociale dans les tâches d'aptitudes. *L'année psychologique, 103,* 469-496.

Mullen, B., Bryant, B., & Driskell, J. E. (1997). Presence of others and arousal: An integration. *Group Dynamics: Theory, Research, and Practice, 1,* 52-64.

Muller, D., & Butera, F. (2004). On being concerned about bragging. *Current Psychology of Cognition, 22,* 159-179.

Muller, D., & Butera, F. (2007). The focusing effect of self-evaluation threat in coaction and social comparison. *Journal of Personality and Social Psychology, 93,* 194-211.

Muller, D., & Fayant, M-P. (2010). On being exposed to superior others: Consequences of self-threatening upward social comparisons. *Social and Personality Psychology Compass, 4,* 621-634.

Muller, D., Azteni, T., & Butera, F. (2004). Coaction and upward social comparison reduce the illusory conjunction effect: Support for distraction-conflict theory. *Journal of Experimental Social Psychology, 40,* 659-665.

Mummendey, A., & Wenzel, M. (1999). Social discrimination and tolerance in intergroup relations: Reactions to intergroup difference. *Personality and Social Psychology Review, 3,* 158-174.

Mussweiler, T., Rüter, K., & Epstude, K. (2004a). The man who wasn't there: subliminal social comparison standards influence self-evaluation. *Journal of Experimental Social Psychology, 40,* 689-696.

Mussweiler, T., Rüter, K., & Epstude, K. (2004b). The ups and downs of social comparison: Mechanisms of assimilation and contrast. *Journal of Personality and Social Psychology, 87,* 832-844.

Narveson, R. D. (1980). Development and learning: Complementary or conflicting aims in humanities education? In R. G. Fuller, R. F. Bergstrom, E. T. Carpenter, H. J. Corzine, J. A. McShance, D. W. Miller, D. S. Moshman, R. D. Narveson, J. L. Petr, M. C. Thornton, & V. G. Williams (Eds.), *Piagetian programs in higher education* (pp. 79-88). Lincoln, NE: ADAPT Program.

Nicholls, J. G. (1979). Quality and equality in intellectual development: the role of motivation in education. *American Psychologist, 34,* 1071-1084.

Nicholls, J. G. (1983). Conceptions of ability and achievement motivation: A theory and its implications for education. In S. G. Paris, G. M. Olson & H. W. Stevenson (Eds.), Learning and motivation in the classroom (pp. 211-237). Hillsdale, NJ: Erlbaum.

Nicholls, J. G. (1989). *The competitive ethos and democratic education*. Cambridge: Harvard University Press.

Nickerson, R. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology, 2,* 175–220.

O'Connor, K. M., & Carnevale, P. J. (1997). A nasty but effective negotiation strategy : Misrepresentation of a common-value issue. *Personality and Social Psychology Bulletin, 23,* 504-515.

O'Donnel, A. M. (1996). Effects of explicit incentives on scripted and unscripted cooperation. *Journal of Educational Psychology, 88,* 74-86.

Oberlé, D., & Drozda-Senkowska, E. (2006). Processus orientés vers la tâche *vs* processus orientés vers le groupe : une vieille distinction toujours fructueuse? *Les Cahiers Internationaux de Psychologie Sociale, 70,* 63-72.

OECD (2011). *Education at a Glance 2011: OECD indicators.* Retrieved from: http://www.oecd.org/edu/highereducationandadultlearning/educationataglance2011oecdindicators.htm.

Parks, C. D., & Colwin, R. A. (1996). Acceptance of uncommon information into group decision when that information is or is not demonstrable. *Organizational Behavior and Human Decision Processes, 66,* 307-315.

Petty, R., Harkins, S., Williams, K., & Latané, B. (1977). The effects of group size on cognitive effort and evaluation. *Personality and Social Psychology Bulletin,* 3, 579-582.

Phalet, K., Andriessen, I., & Lens, W. (2004). How future goals enhance motivation and learning in multicultural classrooms. *Educational Psychological Review, 16,* 59–89.

Piaget, J. (1963). *The psychology of intelligence.* New York: Routledge.

Piaget, J. (1975). *L'équilibration des structures cognitives: problème central du développement* (Vol. 33). Presses universitaires de France.

Pintrich, P.R. (2000a). An achievement Goal Theory Perspective on Issues in Motivation Terminology, Therory, and Research. *Contemporary Educational Psychology, 25*, 92-104.

Pintrich, P. R. (2000b). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92,* 544-555.

Pope, D. C. (2003). "*Doing school": How we are creating a generation of stressed-out, materialistic, and miseducated students*. London: Yale University Press.

Pulfrey, C., Buchs, C., & Butera, F. (2011). Why grades engender performance-avoidance goals: The mediating role of autonomous motivation. *Journal of Educational Psychology, 103,* 683-700.

Pulfrey, C., & Butera, F. (2013). Why neo-liberal values of self-enhancement lead to cheating in higher education: A motivational account. *Psychological Science*, in press.

Pulfrey, C., Darnon, C., & Butera, F. (2013). Autonomy and task performance: Explaining the impact of grades on intrinsic motivation. *Journal of Educational Psychology,* Published Online.

Quiamzade, A., Mugny, G., & Butera, F. (2013). *Psychologie sociale de la connaissance. Fondements théoriques.* Grenoble: Presses universitaires de Grenoble.

Randall, J., & Engelhard, G. (2010). Examining the grading practices of teachers. *Teaching and Teacher Education, 26,* 1372-1380.

Ringelman, M. (1913a). Appareils de culture mécanique avec treuils et cables (résultats d'essais) [Mechanical tilling equipment with winches and cables (results of tests)]. *Annales de l'Institut National Agronomique, 2^{e} série – tome XII,* 299-343.

Ringelman, M. (1913b). Recherches sur les moteurs animés : Travail de l'homme [Research on animate sources of power : The work of man].

Roseth, C. J., Johnson, D. W., & Johnson, R. T. (2008). Promoting early adolescents' achievement and peer relationships: The effects of cooperative, competitive, and individualistic goal structures. *Psychological Bulletin, 134*, 223-246.

Ross, L. (1977). The intuitive psychologist and his shortcomings: Distortions in the attribution process. In L. Berkowitz (ed.), *Advances in Experimental Social Psychology*. Vol. 10. New York: Academic Press.

Ross, L., & Lepper, M. R. (1980). The perseverance of beliefs: Empirical and normative considerations. *New directions for methodology of social and behavioral science*, *4*, 17-36.

Roth, W.-M., & McGinn, M. K. (1998). >unDELETE science education: /lives/work/voices. *Journal of Research in Science Teaching, 35,* 399-421.

Rubin, K. H., & Rose-Krasnor, L. (1992). Interpersonal problem solving. In V.B.V. Hassett & M. Hersen (Eds.), *Handbook of social development* (pp. 283-323). New York: Plenum.

Salmela-Aro, K., & Nurmi, J.E. (1997). Goal contents, well-being, and life context during transition to university: A longitudinal study. *International Journal of Behavioral Development, 20,* 471–491.

Schachter, S. (1951). Deviation, rejection, and communication. *Journal of Abnormal and Social Psychology, 46,* 190-207.

Schittekate, M., & Van Hiel, A. (1996). Effects of partially shared information and awareness of unshared information on information sampling. *Small Group Research, 27,* 431-449.

Schmid Mast, M. (2002). Dominance as Expressed and inferred through speaking time. *Human Communication Research, 28,* 420-450.

Schulz-Hardt, S., Jochims, M., & Frey, D. (2002). Productive conflict in group decision making: genuine and contrived dissent as strategies to counteract biased information seeking. *Organization Behavior and Human Decision Processes, 88,* 563-586.

Schulz-Hardt, S., Frey, D., Lüthgens, C., & Moscovici, S. (2000). Biased information search in group decision making. *Journal of Personality and Social Psychology, 78,* 655-669.

Schulz-Hardt, S., Brodbeck, F. C., Mojzisch, A., Kerschreiter, R., & Frey, D. (2006). Group decision making in hidden profile situations: Dissent as a facilitator for decision quality. *Journal of Personality and Social Psychology, 91,* 1080-1093.

Schwartz, S. H. (2006). Les valeurs de base de la personne: Théorie, mesures et applications [Basic human values: Theory, measurements, and applications]. *Revue française de sociologie*, *47,* 929-968.

Scott, W., & Cherrington, D. (1974). Effects of competitive, cooperative, and individualistic reinforcement contingencies. *Journal of Personality and Social Psychology, 30,* 748-758.

Shanteau, J. (1992). How much information does an expert use? Is it relevant? *Acta Psychologica, 81,* 75-86.

Slavin, R. E. (1990). *Cooperative learning: Theory, Research, and Practice.* Prentice Hall International Editions.

Slavin, R., & Tanner, A. (1979). Effects of cooperative reward structures and individual accountability on productivity and learning. *Journal of Educational Research, 72,* 294-298.

Smeding A., Darnon C., Souchal C., Toczeck-Capelle M-C., & Butera F. (2013). Reducing the socio-economic status achievement gap at university by promoting mastery-oriented assessment. *PLoS ONE* 8(8), p. e71678, 2013.

Spera, C., & Wentzel, K.R. (2003). Congruence between students' and teachers' goals: Implications for social and academic motivation. *International Journal of Educational Research, 39,* 395-413.

Stanne, M. B., Johnson, D. W., & Johnson, R. T. (1999). Does competition enhance or inhibit motor performance: A meta-analysis. *Psychological Bulletin, 125,* 133-154.

Stasser, G. (1992). Pooling of unshared information during group discussion. In S. Worchel, W. Wood, & A. Simpson (Eds.), *Group process and productivity* (pp. 48-67). Newbury Park, CA: Sage.

Stasser, G., & Stewart, D.D. (1992). Discovery of hidden profiles by decision-making groups: solving a problem versus making a judgment. *Journal of Personality and Social Psychology, 63,* 426-434.

Stasser, G., & Titus, W. (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology, 48,* 1467-1478.

Stasser, G., & Titus, W. (1987). Effects of information load and percentage of shared information on the dissemination of unshared information during group discussion. *Journal of Personality and Social Psychology, 53,* 81-93.

Stasser, G., & Titus, W. (2003). Hidden profiles: A brief history. *Psychological Inquiry, 14,* 304-313.

Stasser, G., & Wittenbaum, G. M. (1995, May). Tacit coordination in teams: Using task, social, and self knowledge. In R. L. Moreland (Chair), *Learning by groups: Socially shared cognition at work.* Symposium conducted at the annual meeting of the Midwestern Psychological Association. Chicago, IL.

Stasser, G., Stewart, D. D., & Wittenbaum, G. M. (1995). Expert roles and information exchange during discussion: The importance of knowing who knows what. *Journal of Experimental Social Psychology, 31,* 244-265.

Stasser, G., Vaughan, S. I., & Stewart, D. D. (2000). Pooling unshared information: The benefits of knowing how access to information is distributed among group members. *Organizational Behavior and Human Decision Processes, 82,* 102-116.

Stasson, M. F., Kameda, T., & Davis, J. H. (1997). A model of agenda influences on group decisions. *Group dynamics, 1,* 316-323.

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 21, pp. 261–302). San Diego, CA: Academic Press.

Steinel, W., & De Dreu, C. K. W. (2004). Social motives and strategic misrepresentation in social decision making. *Journal of Personality and Social Psychology, 86,* 419-434.

Steiner, I. D. (1972). *Group process and productivity.* New York, NY: Academic Press.

Stewart, D. D., Billings, R. S., & Stasser, G. (1998). Accountability and the discussion of unshared, critical information in decision-making groups. *Group Dynamics: Theory, Research, and Practice, 2,* 18-23.

Taylor, S. E., & Schneider, S. K. (1989). Coping and the simulation of events. *Social Cognition, 7,* 174-194.

Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 21, pp. 181-227). San Diego, CA: Academic Press.

Tesser, A., & Collins, J. E. (1988). Emotion in social reflection and comparison situations: Intuitive, systematic, and exploratory approaches. *Journal of Personality and Social Psychology, 55,* 695-709.

Tesser, A., Murray, M., & Moore, J. (1988). Some affective consequences of social comparison and reflection processes: The pain and pleasure of being close. *Journal of Personality and Social Psychology, 54,* 49-61.

Tetlock, P. E. (1983a). Accountability and complexity of thought. *Journal of Personality and Social Psychology, 45,* 74-83.

Tetlock, P. E. (1983b). Accountability and the perseverance of first impressions. *Social Psychology Quarterly, 46,* 285-292.

Tetlock, P. E. (1985b). A social check on the fundamental attribution error. *Social Psychology Quarterly, 48,* 227-236.

Tetlock, P. E., & Boettger, R. (1989). Accountability: A social magnifier of the dilution effect. *Journal of Personality and Social Psychology*, *57*, 388-398.

Tetlock, P. E., Skitka, L., & Boettger, R. (1989). Social and cognitive strategies for coping with accountability: Conformity, complexity, and bolstering. *Journal of Personality and Social Psychology, 57,* 632-640.

Thomas, S., & Oldfather, P. (1997). Intrinsic motivations, literacy, and assessment practices: That's my grade. That's me. *Educational Psychologist*, *32,* 107-123.

Thorndike, E. L. (1913). *Educational psychology: Vol. 1. The original nature of man.* New York, NY: Teachers College, Columbia University.

Toma, C. (2007). *Strategic information sharing and use in group decision making: the role of cooperation and competition* (unpublished doctoral dissertation version). Université Pierre Mendès France - Grenoble 2, Grenoble - France.

Toma, C., & Butera, F. (2009). Hidden profiles and concealed information: Strategic information sharing and use in group decision making. *Personality and Social Psychology Bulletin, 35,* 793 – 806.

Toma, C., Bry, C., & Butera, F. (2013). Because I'm worth it! (More than others…): Cooperation, competition, and ownership bias in group decision-making. *Social Psychology, 44,* 248-255.

Toma, C., Gilles, C., & Butera, F. (2013). Strategic use of preference confirmation in group decision making: The role of competition and dissent. *British Journal of Social Psychology, 52,* 44-33.

Toma, C., Vasiljevic, D., Augustinova, M., & Oberlé, D. (2012). Le traitement motivé de l'information dans la prise de décision en groupe : Le cas du paradigme des « profils cachés ». *L'Année Psychologique, 112,* 665-695.

Toma, C., Vasiljevic, D., Oberlé, D., & Butera, F. (2013). Assigned experts with competitive goals withhold information in group decision making. *British Journal of Social Psychology*, *52*, 161–172.

Treisman, A. (1988). Features and objects: The fourteenth Bartlett memorial lecture. *Quarterly Journal of Experimental Psychology, 40A,* 201-237.

Tusing, K. J., & Dillard, J. P. (2000). The sounds of dominance: vocal precursors of perceived dominance during interpersonal influence. *Human Communication Research, 26,* 148-171.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185,* 1124-1130.

Urdan, T., & Maehr, M.L. (1995). Beyond a two-goal theory of motivation and achievement: A case for social goals. *Review of Educational Research, 65,* 213-243.

Utman, C. H. (1997). Performance effects of motivational state: A meta-analysis. *Personality and Social Psychology Review, 1,* 170-182.

Vasiljevic, D. (2010). *A quelles conditions les groupes échappent-ils aux biais dans le raisonnement ? Le rôle des méta-informations* (unpublished doctoral dissertation version). Université Paris Ouest Nanterre La Défense, Paris – France.

Voss, C. A., Åhlström, P., & Blackmon, K. (1997). Benchmarking and operational performance: some empirical results. *International Journal of Operations and Production Management, 17,* 1046-1058.

Wason, P. C. (1960). On the failure to eliminate hypotheses in a conceptual task. *Quaterly Journal of Experimental Psychology, 12,* 129-140.

Wentzel, K.R. (1996). Social goals and social relationships as motivators of school adjustment. In J. Juvonen & K.R. Wentzel (Eds.), *Social motivation: Understanding children's school adjustment* (pp. 226–246). New York: Cambridge University Press.

Williams, K., Harkins, S., & Latané, B. (1981). Identifiability as a deterrent to social loafing: two cheering experiments. *Journal of Personality and Social Psychology, 40,* 303-311.

Williams, R. G., Pollack, M. J., & Ferguson, N. A. (1975). Differential effects of two grading systems on student performance. *Journal of Educational Psychology*, *67*(2), 253.

Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin, 90,* 245-271.

Winquist, J. R., & Larson, J. R. Jr. (1998). Information pooling: When it impacts group decision making. *Journal of Personality and Social Psychology, 74,* 371-377.

Wittenbaum, G. M. (1998). Information sampling in decision-making groups: The impact of members' task-relevant status. *Small Group Research, 29,* 57-84.

Wittenbaum, G. M. (2000). The bias toward discussing shared information: Why are high-status group members immune? *Communication Research, 27,* 379-401.

Wittenbaum, G. M., Hollingshead, A. B., & Botero, I. C. (2004). From cooperative to motivated information sharing in groups: Moving beyond hidden profile paradigm. *Communication Monographs, 71,* 286-310.

Wittenbaum, G. M., Stasser, G., Merry, C. J. (1996). Tacit coordination in anticipation of small group task completion. *Journal of Experimental Social Psychology, 32,* 129-152.

Wong, A., Tjosvold, D., & Liu, C. (2009). Innovation by teams in Shanghai, China: Cooperative goals for group confidence and persistence. *British Journal of Management, 20,* 238-251.

Wong, A., Tjosvold, D., & Yu, Z.-Y. (2005). Organizational patnerships in China: Self-interest, goal interdependence, and opportunism. *Journal of Applied Psychology, 4,* 782-791.

Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin, 106,* 231-248.

Wood, J. V., Taylor, S. E., & Lichtman, R. (1985). Social comparison in adjustment to breast cancer. *Journal of Personality and Social Psychology, 49,* 1169-1183.

Wordarski, J., Hamblin, R., Buckholdt, D., & Ferritor, D. (1973). Individual consequences contingent on the performance of low-achieving group members. *Journal of Applied Social Psychology, 3,* 276-290.

Wosnitza, M., & Volet, S. (2012). Editorial introduction: Mutiple goals in learning contexts. *Applied Psychology: An International Review, 61,* 513-519.

Yzerbyt, V. Y., Muller, D., & Judd, C. M. (2004). Adjusting researchers' approach to adjustment: On the use of covariates when testing interactions. *Journal of Experimental Social Psychology, 40,* 424-431.

Zajonc, R. B. (1965). Social facilitation. *Science, 149,* 269-274.

Zajonc, R. B., & Sales, S. M. (1966). Social facilitation of dominant and subordinate responses. *Journal of Experimental Social Psychology, 2,* 160-168.

APPENDICES

APPENDIX I - Material used in Chapter 4
(NB: reporting the one exhibiting the graded-visibility instructions)

Etude sur la résolution d'enquête en sciences criminelles

Vous trouverez ci-dessous la description d'un accident de la route issue d'un rapport de la police routière. Conformément à ce rapport, plusieurs personnes sont impliquées dans l'accident et plusieurs informations relatives à ces personnes ont pu être recueillies.
Vous allez devoir jouer le rôle d'un policier. Vous allez lire la description de l'accident et vous allez déterminer, à partir des informations fournies, et uniquement à partir de ces informations quelle est la personne, et une seule, qui a produit l'accident.

Collision lundi soir à 19h00, au carrefour Saint Georges. La chaussée est étroite et non éclairée. Deux voitures et une moto sont impliquées. Dans une des voitures, Monsieur X, 53 ans, 30 ans d'expérience de conduite et son fils, 17 ans, rentrent chez eux. Le père vient de consommer plusieurs verres d'alcool lors d'un dîner avec ses amis. Dans l'autre voiture, Madame Y, 27 ans, titulaire du permis de conduire depuis seulement 1 an, va faire ses courses. Les feux avant de sa voiture sont déficients. En moto, Monsieur Z, 28 ans, titulaire du permis de moto depuis 5 ans, va retrouver son père gravement malade qui l'a sommé de venir. Il conduit à vive allure sur la N13.
La personne responsable conduisait une voiture. Lors du contrôle de la police, la personne propriétaire du véhicule en tort avait une alcoolémie de 1,5g/l sang. La personne en tort affirme avoir manqué de vigilance au moment de la collision.

Quelle est la personne, et une seule, qui a produit l'accident ?

_____

Tournez la page après avoir répondu →

Imaginez maintenant qu'on vous mette en équipe avec deux autres policiers afin de trouver la personne qui a produit l'accident. Pendant la première réunion de travail, vous discutez du cas présenté antérieurement. Les deux autres policiers disposent d'informations identiques aux vôtres (informations communes), mais aussi d'informations différentes de celles dont vous disposez (informations uniques). Au vu de la totalité des informations dont votre équipe dispose, une seule solution est possible quant à la personne qui a produit l'accident.

Sur la base des informations fournies avant la formation de l'équipe, **l'un** des policiers a trouvé que la personne qui a produit l'accident est **Madame Y**, et **l'autre** a trouvé que c'est **Monsieur Z**.

Votre chef annonce que pour résoudre cette enquête, il va falloir faire un travail d'équipe. Vous, ainsi que les deux autres policiers allez donc devoir travailler ensemble pour trouver le responsable de l'accident.
Votre chef annonce également, qu'il sera présent et qu'à l'issue de l'enquête, il attribuera à chacun une note individuelle (allant de 1 à 6).

Tournez la page après avoir lu attentivement ce scénario →

*Rappelez-vous que vous **travaillez en équipe** avec les **deux autres policiers,** et que vous allez **également recevoir une note individuelle** à l'issue de l'enquête !*

A présent, voici les informations uniques dont vous disposez.

Veuillez évaluer la pertinence de ces informations : Indiquez pour chaque information dans quelle mesure elle vous semble importante pour déterminer la personne qui a produit l'accident, en entourant le chiffre qui correspond.

- « La personne responsable conduisait une voiture »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

- « Lors du contrôle de police, la personne propriétaire du véhicule en tort avait une alcoolémie de 1,5g/l sang »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

- « La personne en tort affirme avoir manqué de vigilance au moment de la collision »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

Tournez la page après avoir évalué les informations →

*Rappelez-vous que vous **travaillez en équipe** avec les **deux autres policiers,** et que vous allez **également recevoir une note individuelle** à l'issue de l'enquête ! Voici les informations uniques, différentes des vôtres, que les deux autres vous ont communiqué pendant la réunion de travail. Veuillez indiquer la mesure dans laquelle chaque information vous semble importante pour déterminer la personne qui a produit l'accident.*

- « La personne responsable a moins de 30 ans »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

- « En raison de son inexpérience, la personne fautive n'arrive pas à éviter la collision »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

- « La personne en tort affirme ne pas avoir vu les autres s'approcher du carrefour »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

- « Le responsable est un homme »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

- « C'est un père qui semble être impliqué dans cet accident »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

- « La personne responsable conduisait à une vitesse de 110 Km/h »

1	2	3	4	5	6	7	8	9
Peu importante								Très importante

Tournez la page après avoir évalué les informations →

En somme, voici la totalité des informations dont vous disposez, après que les deux autres policiers vous aient donné leurs informations :

Collision lundi soir à 19h00, au carrefour Saint Georges. La chaussée est étroite et non éclairée. Deux voitures et une moto sont impliquées. Dans une des voitures, Monsieur X, 53 ans, 30 ans d'expérience de conduite et son fils, 17 ans, rentrent chez eux. Le père vient de consommer plusieurs verres d'alcool lors d'un dîner avec ses amis. Dans l'autre voiture, Madame Y, 27 ans, titulaire du permis de conduire depuis seulement 1 an, va faire ses courses. Les feux avant de sa voiture sont déficients. En moto, Monsieur Z, 28 ans, titulaire du permis moto depuis 5 ans, va retrouver son père gravement malade, qui l'a sommé de venir. Il conduit à vive allure sur la N13.

- La personne responsable conduisait une voiture.
- Lors du contrôle de la police, la personne propriétaire du véhicule en tort avait une alcoolémie de 1,5 g/l sang.
- La personne en tort affirme avoir manqué de vigilance au moment de la collision.
- La personne responsable a moins de 30 ans.
- En raison de son inexpérience, la personne fautive n'arrive pas à éviter la collision.
- La personne en tort affirme ne pas avoir vu les autres s'approcher du carrefour.
- Le responsable est un homme.
- C'est un père qui semble être impliqué dans cet accident.
- La personne responsable conduisait à une vitesse de 110 Km/h.

Tournez la page après avoir lu attentivement toutes les informations →

Répondez de nouveau à la question :

Quelle est la personne, et une seule, qui a produit l'accident ?

……

Tournez la page après avoir répondu →

Dans le questionnaire suivant, nous nous intéressons à savoir comment vous avez perçu le déroulement de l'enquête.
Répondez aux questions suivantes en entourant le chiffre correspondant :

(Below manipulation check of Experiment 1)

- Est-ce que dans le déroulement de l'enquête, votre chef vous a annoncé que vous seriez évalué(e) individuellement ?

OUI NON

(Below items of perceived competition of Experiment 2, also manipulation check of Experiment 3)

- Dans quelle mesure pensez-vous que dans une situation identique lors d'un travail d'équipe réel, il y aurait eu une atmosphère de compétition ?

1 2 3 4 5 6 7 8 9
Pas du tout Tout à fait

- Dans quelle mesure avez-vous perçu les autres policiers comme des rivaux ?

1 2 3 4 5 6 7 8 9
Pas du tout Tout à fait

(Below manipulation check of Experiment 2)

- Votre chef, vous a-t-il précisé :
  a) Qu'il sera présent pour suivre les investigations ?
     OUI NON
  b) Qu'il donnera à chacun une note individuelle pour son travail d'investigation ?
     OUI NON
  c) Que vous aurez, par la suite, à lui signifier les raisons qui vous auront amené à choisir votre propre suspect ?
     OUI NON

APPENDIX II - Material used in Chapter 5

*(Phase 1: Case individually provided before group discussion**)***

Etude sur la perception des accidents de la route

Vous trouverez ci-dessous la description d'un accident de la route issu d'un rapport de la police routière. Conformément à ce rapport, plusieurs personnes sont impliquées dans l'accident et plusieurs informations relatives à ces personnes ont pu être recueillies.

Vous allez devoir jouer le rôle d'un enquêteur. Vous allez lire la description de l'accident et vous allez déterminer, à partir des informations fournies, et uniquement à partir de ces informations quelle est la personne, et une seule, qui a produit l'accident.

(Below shared information items)

Collision lundi soir à 19h00, au carrefour Saint Georges. La chaussée est étroite et non éclairée. Deux voitures et une moto sont impliquées. Dans une des voitures, Monsieur X, 53 ans, 30 ans d'expérience de conduite et son fils, 17 ans rentrent chez eux. Le père vient de consommer plusieurs verres d'alcool lors d'un dîner avec ses amis. Dans l'autre voiture, Madame Y, 27 ans, titulaire du permis de conduire depuis seulement 1 an, va faire ses courses. Les feux avant de sa voiture sont déficients. En moto, Monsieur Z, 28 ans, titulaire du permis moto depuis 5 ans, va retrouver son père gravement malade qui l'a sommé de venir. Il conduit à vive allure sur la N13.

(Below 3 unshared information items provided per participant)

(Unshared information pointing to Mr. X)

La personne responsable conduisait une voiture. Lors du contrôle de la police, la personne propriétaire du véhicule en tort avait une alcoolémie de 1,5 g/l sang. La personne en tort affirme avoir manqué de vigilance au moment de la collision.

(Unshared information pointing to Mrs. Y)

La personne responsable a moins de 30 ans. En raison de son inexpérience, la personne fautive n'arrive pas à éviter la collision. La personne en tort affirme de ne pas avoir vu les autres s'approcher du carrefour.

(Unshared information pointing to Mr. Z)

Le responsable est un homme. C'est son père qui est indirectement responsable de l'accident. La personne responsable conduisait à une vitesse de 110 Km/h.

Quelle est la personne, et une seule, qui a produit l'accident ?

……

(Phase 2: Final group solution sheet)

SOLUTION DU GROUPE

Quelle est la personne, et une seule qui a produit l'accident ?

……

(Poster for the Grades priming condition of Experiment 2)

GRADING AND RANKING STUDENTS

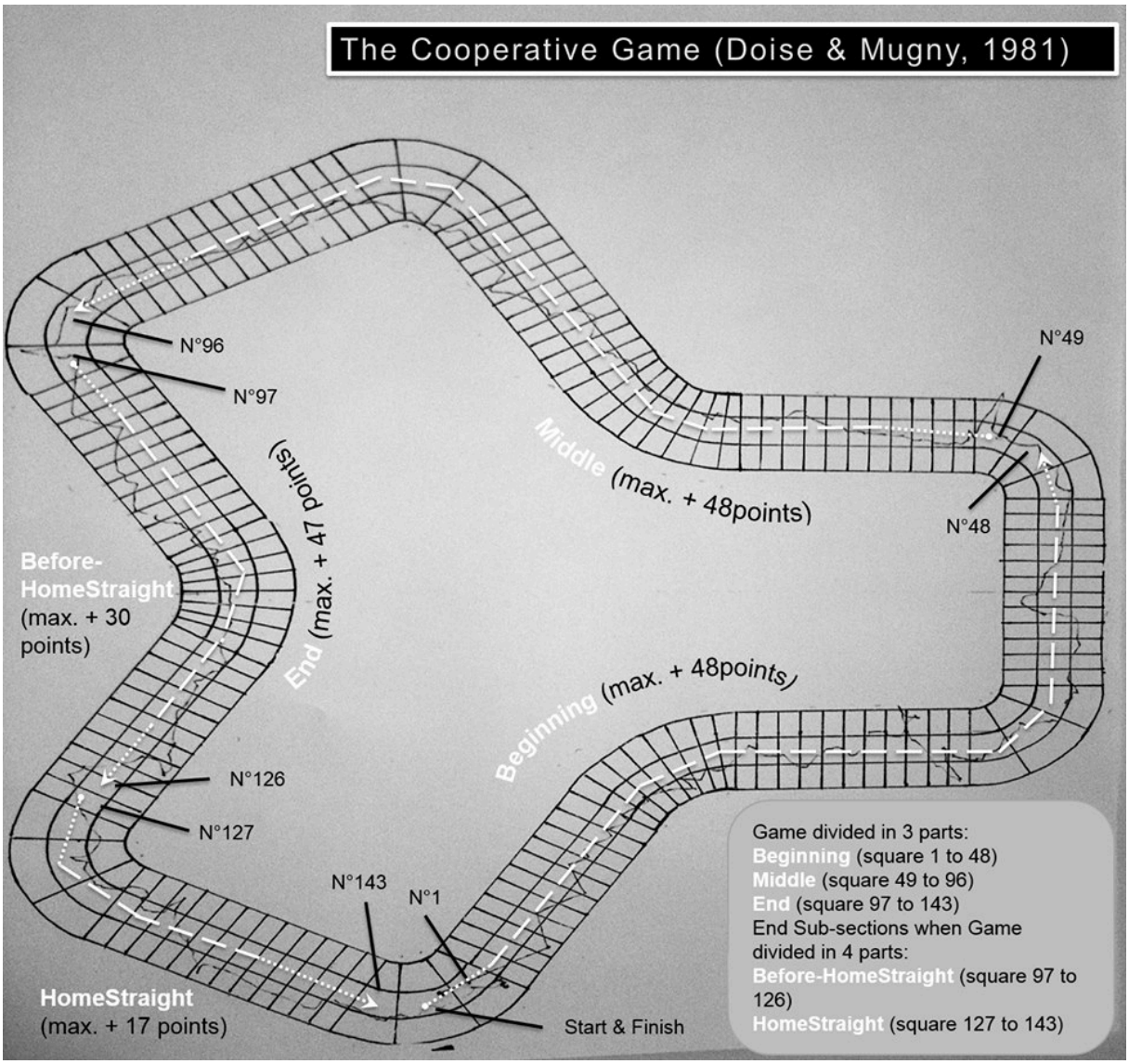
Grades	Remarks	Percentage of success	Distinctions
6	Excellent	90-100%	***
5	Good	70-90%	**
4	Enough	50-70%	*
3	Insufficient	40-50%	
2	Mediocre	30-40%	
1	Poor	10-30%	

APPENDIX III - Material used in Chapter 6

*Picture of the Cooperative Game (adapted from Doise & Mugny, 1984), kindly lent by Gabriel Mugny. Panel **A**: the device. Panel **B**: the trail. Panel **C**: the Grades prime.*

A

B


The Cooperative Game (Doise & Mugny, 1981)
N°96
N°97
N°49
N°48
Middle (max. + 48points)
End (max. + 47 points)
Before-HomeStraight (max. + 30 points)
Beginning (max. + 48points)
N°126
N°127
N°143
N°1
HomeStraight (max. + 17 points)
Start & Finish
Game divided in 3 parts:
Beginning (square 1 to 48)
Middle (square 49 to 96)
End (square 97 to 143)
End Sub-sections when Game divided in 4 parts:
Before-HomeStraight (square 97 to 126)
HomeStraight (square 127 to 143)

c

6	Excellent *(Ottimo)*
5,5	Very good *(Molto buono)*
5	Good *(Buono)*
4,5	Average *(Discreto)*
4	Pass *(Sufficiente)*
3,5	Unsatisfactory *(Insufficiente)*
3	Very Unsatisfactory *(Molto insufficiente)*
2,5	Bad *(Male)*
2	Very bad *(Molto male)*