



The potential for social contextual and group biases in team decision-making: biases, conditions and psychological mechanisms

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Keywords: Team decisions; Bias; Command and control; Social cognition.

This paper provides a critical review of social contextual and group biases that are relevant to team decision-making in command and control situations. Motivated by the insufficient level of attention this area has received, the purpose of the paper is to provide an insight into the potential that these types of biases have to affect the decision-making of such teams. The biases considered are: false consensus, groupthink, group polarization and group escalation of commitment. For each bias the following four questions are addressed. What is the descriptive nature of the bias? What factors induce the bias? What psychological mechanisms underlie the bias? What is the relevance of the bias to command and control teams? The analysis suggests that these biases have a strong potential to affect team decisions. Consistent with the nature of team decision-making in command and control situations, all of the biases considered tend to be associated with those decisions that are important or novel and are promoted by time pressure and high levels of uncertainty. A concept unifying these biases is that of the shared mental model, but whereas false consensus emanates from social projection tendencies, the rest emanate from social influence factors. The authors also discuss the 'tricky' distinction between teams and groups and propose a revised definition for command and control team. Finally, the authors emphasize the need for future empirical research in this area to pay additional attention to the social side of cognition and the potential that social biases have to affect team decision-making.

1. Introduction

Teams form an important part of most people's working and social lives. Within the commercial world effective teamwork is essential if competitive advantage is to be achieved. On a wider scale, teams are an integral part of our societal infrastructure, playing a vital role within the emergency services, the armed forces and transportation; teams on which thousands of people rely everyday for their well-being, safety and protection. The complexity of many tasks demands teams of specialists that are able to effectively and efficiently implement those tasks. Certain decision problems and tasks are beyond the scope of an individual, or even a collection of individuals lacking the distinct characteristics of teams, to either understand or implement. In short, we need teams. However teams, like any individual or social unit, are not infallible or immune to error. Such errors can be

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costly. For example, Foushee and Helmreich (1988) reported that over 60% of airline accidents have been attributed to poor crew co-ordination and decision-making; because of this, we need to understand the processes that underlie team functioning and the factors that affect the performance of teams so that team effectiveness can be improved. The scale of this challenge begins to become clear when one recognizes that team performance is a function of numerous related and parallel team processes including decision-making, communication, co-ordination and co-operation, each of which may be considered a research domain in its own right. While team performance accounts for far greater activity than decision-making alone, effective decision-making is recognized as being critical for the accomplishment of team goals. The focus in this paper is on decision-making biases within teams.

Many different types of biases may afflict teams. As will be discussed later, such biases emanate from a variety of sources, for example, individual cognitive limitations, the social context or organizational policy. There are, in addition, many different types of teams, each with their own features and characteristics, that can be affected by these biases. The authors concentrate their efforts on the important category of team that operate in command and control situations. Such teams are widespread and their effectiveness has important implications for the quality of our lives and for society in general. Examples of command and control teams include military units, fire-fighting teams, emergency medical teams and cockpit crews. This paper converges on biases that may emanate from the social context of such teams. These include social inference biases as well as traditional group biases, both of which will be addressed. To the extent that both groups and teams consist of multiple individuals, social contextual and group biases are likely to have important implications for teams. Moreover, such biases have received relatively little attention within team decision-making research. This branch of decision research is itself only beginning to become established within a field that has traditionally been dominated by research at the individual and group level. However, team research to date is in turn dominated by a cognitive perspective with relatively little attention being placed on social cognitive elements. The purpose here is to examine the potential that social contextual and group biases have for command and control teams.

Since the present aims include assessing the relevance of group biases to teams, the important distinction between groups and teams is discussed first. This discussion is then extended by describing how command and control teams differ from other types of team. Next, to place the discussion in a wider context, the authors describe the various categories of bias that may affect team decision-making, beginning with a distinction between team error and team bias. In the remainder of the paper four important social contextual and group biases are extrapolated to command and control teams. The biases considered are: groupthink, group polarization, group escalation of commitment and false consensus. These biases have been widely reported in the literature and together represent a key set of biases that are likely to have important implications for teams.

2. Teams, groups and command and control

The difference between groups and teams is something of a 'grey area'. Any difference is at best not obvious and is not helped by the inconsistency in the literature on this issue. While some researchers (Orasanu and Salas 1993) do make a distinction, others (Sundstrom *et al.* 1990) decline to do so, and regard the terms

group and team as interchangeable. Johnson and Johnson (1987: 8) define a group as 'two or more individuals in face-to-face interaction, each aware of his or her group membership, each aware of the others who belong to the group, and each aware of their positive interdependence as they strive to achieve mutual goals'. According to this definition, one may be justified in concluding that a team is a group. A strict and satisfactory definition of team that distinguishes it from a group is difficult to find. More common is for researchers to highlight the differences between a group and a team, or describe the characteristics of a team, as opposed to defining team, *per se*. Along these lines, Orasanu and Salas (1993: 328) make the following distinction: 'Teams consist of highly differentiated and interdependent members; groups, on the other hand, consist of homogeneous and interchangeable members, like juries'. However, this is a polarised view. Indeed, Orasanu and Salas (1993) emphasise that the most critical feature distinguishing teams from groups is the *degree* of differentiation of roles or task-relevant knowledge, and the *degree* of interdependence. The implication is therefore that group members are merely less differentiated and interdependent than team members. In terms of the definition offered by Johnson and Johnson (1987), this distinction implies that a team is a special case of a group. However, while all teams may be considered to be a form of group, the reverse is not true. For example, a group of women who regularly go dancing on Friday evenings cannot be considered to be a team.

The distinction between teams and groups may be extended by distinguishing between group decision-making and team decision-making on the one hand, and group tasks and team tasks on the other. In groups, decision-making constitutes the task itself, e.g. the task of deciding whether someone is guilty or innocent, or the task of deciding where to locate a business. Thus the task of the group is to make a specific decision. Here the problem is one of achieving consensus. On the other hand, in teams, decision-making is embedded, to varying degrees, with a broader ongoing task, for example fire-fighting, conducting research, management consultancy. Thus a team makes decisions to accomplish a specific task. Here the problem is one of co-ordination. However, team decision-making can be seen as taking place at two broad levels: an operational level and a planning/strategic level. Those decisions made at a strategic level will often closely resemble group decision-making. Thus, the task of making group decisions may be regarded as a sub-team task. This discussion leads to an interesting paradox. In terms of the definitions and distinctions between teams and groups that have been offered, the implication is that teams are a sub-set of groups. From a decision-making context on the other hand, group decision-making is a subset of team decision-making. This is a convenient point to leave this issue and continue with the rest of the discussion.

Having made a distinction between groups and teams, a distinction will now be made between different types of teams. There are many types of teams, which vary in their function, their nature and their relationship with the broader organization. There are also various ways in which teams may be classified. Sundstrom *et al.* (1990) have conceptualized teams using two dimensions: differentiation of members and integration within the organizational structure. *Differentiation* refers to the degree of task specialization, independence and autonomy of team members. Highly differentiated teams require expert, role differentiated specialists, for example, command and control teams, which includes military teams, fire-fighting units, medical emergency teams and cockpit crews. A somewhat different example is a company's marketing research team in which there are typically data analysis

experts, research co-ordinators and field staff. Conversely, examples of low differentiated teams include manufacturing crews and committees, where the team members are less functionally distinct and more interchangeable. *Organizational integration* refers to the degree to which the team activities are central to the goals of the organization as a whole. Command and control teams and manufacturing are generally highly integrated whereas committees and marketing research departments tend to be located on the periphery of the organization, i.e. they are not 'what the organization does'. Two important aspects that this conceptualization does not address concern decision-making activities within the team and the central purpose of using a team to carry out a task. Moreover, the classification is not directed exclusively at either groups or teams.

An alternative conceptualization that is proposed to complement that of Sundstrom et al. (1990) uses two different dimensions as the basis for a classification and is directed specifically at teams. The first dimension is the degree to which team members actively engage in decision-making relevant to the accomplishment of the task. For example, a naval officer in a command and control team may decide that an approaching aircraft is hostile, or an analyst in a marketing research team may decide to use a particular method of analysis. On the other hand, members of manufacturing teams or theatrical teams do not tend to make task-relevant decisions. The second dimension refers to the extent to which the team is necessary, as opposed to preferable, for carrying out the task. Some tasks would be clearly impossible for a single individual to carry out (e.g. naval defence, dramatization of Shakespeare's *Othello*). Other tasks could, in principle, be carried out by a single individual (e.g. marketing research, manufacturing); the output rate per person would, of course, be disproportionately lower in the case of the 'sole trader' since production would be less efficient, and of course total output capabilities would be limited to that single individual.

The type of team that forms the focus of this paper is the command and control team. In the absence of a satisfactory definition, the classification of both Sundstrom et al. (1990) and the present authors may be used to define a command and control team as two or more individuals with specialist and interdependent roles who are necessarily brought together to perform a complex decision-rich task in order to achieve goals that are central to those of the organization. In addition, command and control teams are typically confronted with ambiguous information from multiple sources and operate in environments characterized by dynamically changing task conditions, time pressure and stress compounded by high stakes. To operate successfully, command and control teams must be well co-ordinated, have the ability to adapt and to manage internal resources.

3. Types of team biases

The notions of team bias and team error are closely related. Three sources of team error as proposed by Duffy (1993) are discussed in this section, but first an interpretation of these two terms will be given. Drawing on Reason's (1990) definition of error, it may be inferred that a team decision error refers to those occasions when the team's decision-making activities fail to achieve its intended outcome. A team decision bias, on the other hand, refers to team decision-making behaviour that deviates from what (existing) normative decision-making models imply. A bias will not necessarily result in an error but may be responsible for one. A team bias then, may be regarded as a generic source of team error. Duffy (1993)

proposed that there are three sources of team error: cognitive, organizational and social. The authors' interpretation is that both errors and biases arising within each of these three sources may lead to a team bias, which in turn may result in a team error. For example, both a cognitive error and a cognitive bias may result in a team bias.

Cognitive biases and errors stem from people's limited information processing capacity and the consequent reliance on mental simplifying strategies known as cognitive heuristics. A large proportion of these heuristics concern biases in probability judgement. Most of these individual biases are relevant to team decision-making and represent an important source of error not to be overlooked. There is a substantial literature dealing with cognitive heuristics and biases; for a general overview see, for example, Hogarth (1987) or Baron (1994) and for a discussion of cognitive heuristics from a team bias perspective, see Duffy (1993).

Errors and biases emanating from the broader organization are a second source of bias for teams. For example, Hackman (1988) pointed out that strategic and planning decisions made at higher levels of the organization might be the most significant factor governing team performance. The source of many accidents that have arisen in team environments have been attributed to errors made at a management level, e.g. the *Herald of Free Enterprise* disaster in 1987. (An account of this accident is given in Reardon (1990)). Bruggink (1985), in an analysis of 23 fatal aircraft accidents, showed that 65% of them were influenced by policy factors. Duffy (1993) also emphasizes the influence that organizational features (e.g. culture, structure, design and resources) and the physical working environment may have on the potential for team bias.

The third source of team error or bias is derived from social interaction and social contextual factors within the immediate team. Biases occurring at this level are the focus of this paper. There are two broad categories of bias emanating from this source. The first is a result of social influence, which refers to the process by which individual judgements, behaviour and attitudes change as a result of the real or implied presence of other people. Traditionally this category has been called group biases and the authors are specifically concerned with how group biases may affect the decision behaviour of the team. The second category of error emanating from social interaction and social contextual factors reflects the need, or the tendency, for individuals to make assumptions, estimates, or predictions about other team members. When they do so, the potential for bias reflects people's tendency to anchor their estimates of others on their own position. This tendency is known as *social projection*. Although not strictly a group bias in the sense that the others are, social projection has important implications for groups to the extent that people make estimates about individuals belonging to both their own group and other groups. Whereas social projection biases may be regarded as non-discussion based, social influence biases may be regarded as discussion based. For convenience these two categories of social bias are labelled collectively as 'social contextual and group biases' since this consists of terms that are relevant for both categories of bias.

Thus a team bias may have at least three specific sources. Most team biases are unlikely to be attributable exclusively to a single bias from any one category, but rather be caused by multiple sources and biases involving the interaction of specific environmental events. Although a single bias will frequently only be a contributory factor, and not the root cause of a team bias, that single bias itself may have emerged from a long and complex chain of events and decisions. Moreover, the picture is

further complicated by the possibility of yet unknown biases that are exclusive to teams. While much more research is required to achieve a better understanding of team processes, an examination of how known biases may affect team decision-making offers a useful way of gaining a greater insight into the determinants of team bias. In the remainder of the paper the authors examine the potential of four social contextual and group biases to affect team decision-making in command and control situations.

4. Social contextual and group decision biases in teams

First the potential bias emanating from social projection is addressed. This phenomenon is likely to arise when team members need to make estimates about others, either within or outside the immediate team. For example a fire chief's decision may require making an judgement about the future intended actions of another team member when such information is unavailable or impractical to access, for instance, owing to time pressure or a failure in the lines of communication. An important conceptualization of this potential bias is known as false consensus and is the one that will be examined here. After this, the biases emanating from social influential factors are addressed. Such phenomena are likely to be highly influential whenever team members engage in discussion as part of a collective, but localized decision-making process, e.g. on tactical or team management issues. The biases examined that fall into this category are: groupthink, group polarization and group escalation of commitment. For each of the four biases there follows, first, a general discussion explaining the phenomenon and a brief review of the empirical research. Second, the underlying psychological mechanisms are discussed. Various theories, theoretical perspectives and hypothesized explanations from the literature are presented. Third, the conditions that invite or contribute to the bias are examined. Finally, the relevance of the bias to command and control teams is discussed.

4.1. *False consensus*

The false consensus effect (FCE) refers to the tendency to overestimate the degree of similarity between self and others and may result in biased judgements or decisions. Ross *et al.* (1977: 280) first coined the term false consensus and described it as people's tendency to 'see their own behavioural choices and judgements as relatively common and appropriate to existing circumstances while viewing alternative responses as uncommon, deviant, or inappropriate'. False consensus occurs when people estimate more support for their own particular position than people holding an opposing view estimate for that position. Put simply, the FCE is the tendency to see one's own behaviour as typical.

In a classic demonstration (Ross *et al.* 1977), students were asked to walk around the campus for 30 min wearing a sandwich board that read 'Repent'. Those who agreed to do so estimated that 63.5% of their fellow students would also agree, whereas those who refused to do so estimated that only 23.3% would agree (i.e. a FCE of 40.2%). Since this study, the FCE has been demonstrated many times across a wide range of descriptive items covering attitudes, personal preferences, political expectations and behavioural choices. The potential strength of the FCE is illustrated in a study by Mullen (1983) who observed the bias among contestants of a television game even when substantial prizes could be won for accurate consensus estimates. Moreover, a meta-analysis of 115 tests of the FCE (Mullen *et al.* 1985) revealed that the effect is highly reliable and of moderate magnitude. More

recently, Krueger (1998) stated that over 90% of all published and unpublished tests of the false consensus from 1991–96 showed a significant effect.

4.1.1. *Underlying psychological mechanisms—theoretical perspectives of false consensus*: As in other social cognitive domains, the possible mechanisms underlying false consensus fall into two broad, competing categories: cognitive and motivational. The first four theories considered are cognitive and the final one is motivational.

The *selective exposure and cognitive availability* perspective suggests that instances of similarity or agreement between self and others are often more easily retrieved from memory than instances of dissimilarity or disagreement. This stems from the general tendency for people to associate with similar others. As a result, people overestimate the level of consensus that exists for their own position in the population as a whole because such judgements are based on the restricted or biased sample to which they are selectively exposed. For example, Sherman *et al.* (1983) showed that people's estimate of smoking prevalence was smaller for those who associated mainly with non-smokers than for those who associated mainly with smokers. The findings of several other studies that have investigated social projection tendencies within the context of in-groups and out-groups (Holtz and Miller 1985) are also consistent with this explanation. Moreover, a number of key researchers in the field (Ross *et al.* 1977, Sherman *et al.* 1983, Marks and Miller 1987) have suggested that selective exposure is the primary factor generating the FCE. However, since exposure has never been directly manipulated, its effect on cognitive availability and its more proximate effect on consensus estimates remains inconclusive.

The notion of availability is invoked in an alternative perspective suggesting that false consensus is affected by the *salience* of particular positions or the focus of attention on one's preferred position. For example, Zuckerman *et al.* (1982) showed that observers perceived salient behavior as more common than nonsalient behavior. And Marks and Duval (1991) found that subjects perceived more consensus for their preferred alternative when their attention was more focused on that alternative. Salience and focus of attention could be attributable to a multitude of factors although a number of researchers (van der Pligt *et al.* 1983, Marks and Miller 1985) have implicated the degree of certainty a person has for a particular position. These studies suggest that people who are certain about their position are more focused on that position and are therefore less likely to think about alternatives. However, while these studies suggest that the level of certainty (and thus the level of salience) is a sufficient cause for false consensus to occur, Krueger (1998) suggests that salience is unlikely to be a necessary cause.

Differential construal (or *resolution of ambiguity*) acknowledges the fact that many social events are poorly defined and open to multiple interpretations (Griffin and Ross 1991). For example, a person's estimate of the proportion of people who enjoy driving would depend on whether that person imagines, for instance, driving an expensive, open top car along a clear stretch of country road in the summer, or stuck in rush hour traffic in an unreliable car with a leaky roof during winter. The research findings from Gilovich (1990) and Bosveld *et al.* (1996) both suggest that differential construal is capable of explaining FCEs.

The *causal attribution* perspective emphasizes the perceived nature of the reason for one's adopted position as being central to the generation of FCEs. Specifically, if one attributes the cause of one's position to the object or situation, one may perceive

a high degree of consensus for it. If, on the other hand, the cause of one's position is attributed to one's personal disposition, then there may be a lower tendency to perceive consensus. A somewhat troublesome assumption underlying this perspective is that for a false consensus to arise from a situational attribution, individuals must assume that the situation will affect themselves and others similarly. This is inconsistent with the common view that people tend to attribute the cause of their own behaviour to the situation, whereas they generally attribute the cause of others' behaviour to dispositional factors (Jones and Nisbett 1971). However, the assumption is more in line with the logical information perspective in which it is assumed that people perceive themselves and others as rational beings who behave in similar ways to a specific situation. Despite this possibility, there is limited empirical support for the causal attribution model (two exceptions are Zuckerman and Mann 1979 and Gilovich *et al.* 1983), suggesting that the theory has limited explanatory power.

The final view emphasizes the functional value that perceiving consensus may offer; that is, perceiving similarity between self and others may be *motivated* by personal needs. The findings of numerous studies support a motivational perspective. Taken together, these studies suggest that assuming *similarity* with others may 'bolster perceived social support, validate the correctness or appropriateness of a position, maintain self esteem, maintain or restore cognitive balance, or reduce tension associated with anticipated social interaction' (Marks and Miller 1987: 73). While these motivations provide possible explanations for assuming *similarity* with others, a motivational argument could also explain tendencies to assume *dissimilarity*. Mullen and Goethals (1990) suggested that people may be motivated to assume similarity on their negative characteristics (ego-protection) but to assume dissimilarity on their positive characteristics (ego-enhancement). However, Krueger (1998) suggests that the viability of motivational explanations is weak, pointing to several studies in which FCEs were demonstrated to persist after controlling for, or ruling out, motivational factors. Moreover, the meta-analyses by Mullen *et al.* (1985) and Mullen and Hu (1988) suggest that cognitive mechanisms are more likely to underlie perceptions of consensus.

More than one theoretical view may account for specifically observed FCEs. Moreover, it is unlikely that any one theoretical perspective is capable of providing a complete account of FCEs. Indeed, Marks and Miller (1987) suggest that all of the mechanisms may explain the FCE under certain conditions and that several mechanisms may operate in parallel at any one time.

4.1.2. Conditions that invite false consensus: The research findings suggest a number of conditions that invite false consensus. Specifically, FCEs are likely to be stronger in the following situations: when one is selectively exposed to similar others; when one's decision behaviour is attributed to situational as opposed to dispositional factors; when one's focus is directed towards a single position and not towards alternatives; when one is highly certain about the correctness of one's position (Marks and Miller 1985); when the issue under consideration is important to the subjects; when comparison is made on opinions as opposed to abilities (Campbell 1986); when the item being judged involves threat to self, for example, estimating prevalence of a perceived weakness (Sherman *et al.* 1984); and finally when positive qualities are involved because people assume that positive others share their positive qualities (van der Pligt 1984).

Before discussing the relevance of false consensus to command and control, it is important to discuss the extent to which the FCE can be regarded as false. The false consensus paradigm makes the implicit assumption that any FCE significantly different from zero constitutes a bias. However, to what extent does a FCE really suggest that people are biased? Two important points need to be made. The first involves a consideration of the accuracy of consensus estimates, i.e. estimated consensus minus the actual consensus. The second concerns the underlying irrationality implied by false consensus.

Recall that the FCE is a relative effect, computed as the mean percentage estimate of people who hold position A, say, made by those subjects who themselves hold position A, minus the mean percentage estimate of people who hold position A made by those subjects who hold position B. The issue of the accuracy of the estimates is not explicitly addressed. It is true that a FCE implies by definition some error, since not everyone can be right. It could be that the As produced more accurate estimates than the Bs, or indeed the other way around. Alternatively, both may have produced inaccurate estimates. We also do not know the direction of any inaccuracy: over- or underestimation. Another issue is the extent to which the level of actual consensus for a particular position mediates the effect. Finally, it should be pointed out that a zero FCE does not imply no error. Thus, the extent of any bias implied by a FCE requires a comparison between the estimated consensus and the actual consensus for both the 'As' and the 'Bs', so that the level of accuracy can be computed for these two groups. Alerted to this problem, Mullen and Hu (1988) observed from a meta-analysis of previous research that the majority significantly underestimates its own consensus whilst the minority overestimates its own consensus. Moreover, the minority's overestimation is substantially greater than the majority's underestimation. This suggests that if the majority's underestimation and the minority's overestimation were of equal size, there would be no FCE. Mullen and Hu (1988) also found that as the difference in the relative size of the majority and the minority increases, the majority's tendency to underestimate increases, and the minority's tendency to overestimate decreases, resulting in a smaller FCE.

The second point to be made in relation to the falsity implied by a FCE concerns the rationality of anchoring one's estimates of others on one's own position. Hoch (1987) suggested that the FCE is not necessarily false but may be a special case of inductive reasoning. The main argument is that one's own position has diagnostic value. Having no knowledge, or holding no position, is equivalent to having no information in which case the best estimate of the proportion 'agreeing' is 50%. However, since one's own position constitutes an item of information, one's estimated proportion must logically be lower or higher than 50%. Using Bayesian rules to revise the 50% estimate in the light of this additional information yields a figure of 67%, i.e. a 'false' consensus of 33% (the FCE of 33% resulting from the application of Bayesian rules yields an effect size that is remarkably similar to that observed in classic studies such as those by Ross *et al.* in 1977). This analysis implies that it is a rational (in fact, optimal) strategy for people to assume this degree of similarity since this will result in more accurate estimates in the long run. This argument recognizes that single observations have diagnostic value and implies that only FCEs greater than 33% provide evidence of bias. Dawes (1989) adopts a similar position that estimating from a sample size of one is a rational strategy, and argues that its falsity cannot be judged by its simple departure from the actual consensus.

The strategy may only be considered as false if people placed more weight on their own response than on that of someone else whose position was known to them. Thus, from this perspective, the FCE is not necessarily false and need not be attributed to faulty psychological processes. However, regardless of the rationality or otherwise of false consensus, the fact remains that people frequently base their estimates of others on their own position to a greater degree than they sometimes should across a large variety of attitude issues and behaviours, and for a variety of motivational and cognitive reasons. Moreover, the phenomenon has important implications for the way people make sense of their social world and their subsequent behaviour. The significance of the phenomenon is reinforced by Fiske and Taylor (1991: 77) who regard the false consensus effect as having 'profound implications for how people interpret social reality'.

4.1.3. *False consensus and command and control teams:* In addition to 'hard' factual information, many decisions also require social information, by which we mean the views, interpretations or intended future actions of others. This is particularly true for team decision-making in command and control situations. For example, in a fire-fighting situation, a fire chief's decision may require knowledge about what actions a particular fire-fighter intends to carry out and the fire-fighter may require instruction from the chief. Under normal conditions, the team members can simply request details from each other and exchange the necessary information. However, in a similar way that many real decisions are made with insufficient 'hard' information, the same is true of 'social' information. As a consequence of having insufficient or possibly no information about some aspect of a target group, team members are forced to make assumptions, estimates or predictions about these others. Such judgements concern both how others may interpret a particular item of information or assess a situation, and what their future actions will be in a given situation. Whether this takes place at the operational or the strategic level of the team, this is where false consensus tendencies may be activated.

An item of information may be either insufficient or lacking. Information is lacking in team decision-making situations because it is either not possible, or not practical, to obtain. This may arise for a number of reasons. In the fire-fighting situation, for instance, a communications link may have been severed. The fire chief may then have to guess what the fire-fighter has done, or intends to do, and the fire-fighter in turn may have to guess what the chief would have instructed. A second reason is that time pressure may demand immediate action without prior discussion with other team members. Another possibility is that an open communication link may not exist at all, for instance between two opposing teams in military situations; and even if it would be possible, requesting information from others in competitive situations may be unwise because the knowledge this could impart to others may jeopardize the team's goals. Alternatively, an item of information may simply be judged to be less important than the time needed to acquire it or be too expensive to obtain.

In other situations however, information may be available, but only in a partial form. Estimation will thus be required to 'fill in the gaps' and with it comes the possibility of false consensus. For example, the information may be distorted or unclear, as a result of equipment malfunction or team member stress; or time pressure may restrict the amount of communication possible. In many of these cases, whether there is no or only partial information, the cost associated with actually

obtaining, or trying to obtain, more (or indeed any) information may present a higher risk to the achievement of the team's goals than would estimating the information. The potential for team bias arises from the possibility that individual team members base their decisions on incorrect assumptions about others as a result of anchoring their judgements about others on their own position.

Although these cases imply that the team members are aware of information deficiencies, they may not perceive any deficiency at all but nevertheless make implicit or unconscious estimates of others. For example, a commander may implicitly predict that an officer will carry out a specific procedure when faced with, what he perceives to be, the situation. The situation from the perspective of the officer may look quite different, however. The commander may make such assumptions despite the availability of an active communications link. Thus the possibility of false consensus is not necessarily restricted to those situations where information is either insufficient, impractical or impossible to obtain. In these situations, it may not be necessary to make assumptions. Thus, in this case, the potential for team bias may reflect a failure to check one's assumptions. In contrast, where communication is restricted the potential for team bias may reflect an *inability* to check one's assumptions.

The scope for false consensus within command and control situations may be elaborated by considering the different types of *target groups* whose behaviour team members may be required to estimate. These target groups will vary in both their nature and their size. Members of one's own team represent an important target group. A team member may need to estimate, for example, the likelihood that a colleague has responded correctly or appropriately to a particular situation. Should the estimate be inaccurate as a result of the team member overestimating the similarity between self and the target, then any subsequent decisions made on the basis of this judgement may contribute to, or directly result in, a team decision bias. In military settings, the opponent represents another important target group on which estimates may have to be made: a commander's decision, for example, may be dependent on an estimation of the likelihood that the enemy will carry out a particular strategy or react in a particular way. Other teams, either in the same organization or in an allied organization, constitute a third type of target group. Where particular units or teams are working together, it may be necessary to make decisions on the basis of how one anticipates that other teams, or individuals within those teams, will behave. Such judgements may be affected by whether the team or individual has a similar or different function to that of the estimator. An important question, of course, is whether the potential for the bias, and its consequences for team performance, is related to target group type. In addition to needing to estimate the behaviour of various target groups, there are also numerous types of items that team members may need to make estimates on, e.g. attitudes towards risk, preference of decision strategy, anticipated behaviour or ability. The extent to which false consensus within command and control situations is relevant across different categories of item is yet to be established. In addition, it should be recognized that the types of items on which estimates are made could conceivably be linked to the particular target group.

A number of factors may affect the accuracy of team members' assumptions about others. Fischhoff and Johnson (1997) suggested that false consensus may arise when an individual's mental model of the target group is inaccurate. Both team structure and the communication patterns within that structure may play a role in

the development of such mental models and may therefore be related to the accuracy of team members' assumptions of others within the team. Within a horizontally inclined structure, lower hierarchical differentiation may promote the development of more accurate shared mental models and thus reduce the possibility of inaccurate assumptions being made. The ability for team members to freely communicate may have a similar effect. In either case, estimates made of other team members would be supported by a stronger shared mental model.

Despite limited empirical evidence, there would appear to be considerable scope and a real possibility for false consensus to occur in teams. Any tendency for false consensus reflects the extent to which team members are able, or feel the need, to check their assumptions about others. This has the potential to result in a team decision bias, which may in turn degrade the performance of the team. Even though the FCE does not directly address the issue of accuracy, such assumptions will be inaccurate to varying degrees. Thus, the probability and the extent to which performance will be affected are dependent on how inaccurate the assumption was. This in turn may be a function of numerous factors, such as the target group being estimated, the type of item being estimated and the task environment in which the estimate is made. Research findings in non-team situations also suggest that any degree of false consensus towards a particular target group may be affected by whether prior estimates of different target groups were made and the nature of those groups. The lack of research directed to the issues raised means that one is limited mainly to conjecture.

The only research that the authors are aware of in which the notion of assumed similarity has been implicated with teams was carried out by Fiedler (1954). In this study inter-personal assumptions of similarity among the members of student surveyor teams were correlated with the team's effectiveness. The results indicated that the most effective teams were those in which the most preferred member of a particular team perceived his team members to be relatively dissimilar. Fiedler suggested that members of effective teams use a basis different from that of members of ineffective teams for choosing and rejecting others as team members. This of course has implications for selecting or recruiting teams. While the teams involved were not of a command and control variety, the study nevertheless demonstrates that the issue of assumed similarity has implications for team performance.

This is a research area that clearly requires much more attention over a number of areas. The first concerns the extent to which false consensus, and social projection more generally, occurs in command and control teams and the factors that affect the strength of this tendency. The second concerns the accuracy of those assumptions generated from social projection. The third concerns the extent to which existing theories of social projection are valid in team environments and the fourth is the relationship between social projection and team performance.

4.2. *Groupthink*

One of the most well-known biases occurring in groups is *groupthink*. A concept developed by Irving Janis in the early 1970s, *groupthink* refers to a tendency for groups to produce poorly reasoned decisions and is described by Janis (1972: 9) as follows:

a mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when the members' striving for unanimity overrides their

motivation to realistically appraise alternative courses of action. . . . Groupthink refers to a deterioration of mental efficiency, reality testing, and moral judgement that results from in-group pressures.

Groups vulnerable to groupthink are more concerned with reaching consensus than with how it is formed. In general, groupthink is described by Kleindorfer *et al.* (1993) as occurring when the desire to be efficient or to not rock the boat becomes more important than the quality of the decision itself. The specific symptoms of groupthink include the illusion of invulnerability, strong pressures to conform and stereotyping people outside the group (Janis 1972). Such manifestations in turn lead to a number of symptoms of defective decision-making, such as the incomplete survey of alternatives, consideration of too few objectives and poor information search (Janis and Mann 1977).

Janis (Janis and Mann 1977, Janis 1982) developed his theory from an analysis of a number of actual political decisions and argued that groupthink contributed to several disastrous episodes in US foreign policy, such as the failure to defend Pearl Harbour from Japanese air attack in 1941. The Bay of Pigs fiasco in 1961, described below, is another example. In 1959, Castro's left wing government came to power in Cuba. His nationalization of American-owned property led the US government, under the leadership of John F. Kennedy, to develop a plan to invade Cuba. The plan that Kennedy and his advisors developed involved landing Cuban exiles at the Bay of Pigs. If the plan was unsuccessful, the invaders were to retreat to the Escambray Mountains where it was known that anti-Castro guerrillas were located. Incredibly, nobody noticed that there were 80 miles of impenetrable swamp between the landing point and the mountains. It actually transpired that the plan was so badly conceived that the entire force was virtually wiped out before an attempt could even be made to implement the retreat plan. Moreover, news of the surprise invasion had also been leaked, and was printed a number of days before in the *New York Times*. Kennedy's reaction after the fiasco was 'How could we have been so stupid?' In all such cases however, the decisions were made by cohesive groups where disagreement and criticism were suppressed in order to preserve group solidarity.

The concept of groupthink has proved to be extremely valuable both practically and academically, and has attracted widespread interest in the fields of management, law and medicine. While acceptance of the groupthink phenomenon has become almost universal (Aldag and Riggs Fuller 1993), there are problems with both the theory and the methodology used to assess the phenomenon. The retrospective case study approach used by Janis (1982) has, for example, been the subject of numerous criticisms (Tetlock 1979). Some researchers have argued that the theory itself lacks many aspects of group decision-making known to be important, e.g. group polarization (Whyte 1989). There have also been suggestions that the theory neglects a number of potentially important variables, including: group norms (Moorhead 1982), leader power (McCauley 1989), task characteristics (Callaway and Esser 1984) and the stage of group development (Leana 1985). Other researchers have drawn attention to a number of unclearly specified relationships among those variables that are defined in the theory (Longley and Pruitt 1980, Steiner 1982). Furthermore, the generalizability of groupthink is potentially limited since it was designed specifically to address major group decisions made by highly cohesive groups in political and military contexts. Overall, critics suggest that the groupthink concept is incomplete, restrictive in its scope and lacks precision in a number of key aspects.

A further issue of concern for groupthink is that most experimental research has involved only partial tests of the theory, with results that have offered only mixed support. While most support for groupthink has come from case studies, this approach is subject to the same methodological criticisms as Janis's approach (1982). Experimental studies have provided less convincing support, however. For example, most indicate that group cohesiveness, hypothesized by Janis (1982) to be the major antecedent factor, does not affect groupthink (Park 1990). The mixed empirical support may be in part due to the numerous methodological difficulties faced by researchers. It is therefore premature to discount altogether the groupthink concept, and even though the theory itself may be incomplete, it has provided researchers with an important basis for a revised theory of defective group decision-making (Aldag and Riggs Fuller 1993).

4.2.1. Underlying psychological mechanisms—groupthink from a mental model perspective: Fischhoff and Johnson (1997) suggested that a psychological concept underlying groupthink (and indeed other group biases) is the notion of *shared mental models*. These may be defined as common knowledge structures held by members of a group. For the individual, a mental model allows perceived phenomena to be explained. However, a mental model will inevitably represent an incomplete view of the world. Given the assumption that the mental model of each group member is capable of explaining a specific subset of observed phenomena, then the higher the degree to which members' mental models are shared, the lower the explanatory power (or completeness) of the combined model. Even in the absence of pressures to conform, it has been suggested that a significant overlap of group members' mental models may lead them to think similarly—but incorrectly—whilst at the same time bolstering their confidence in their positions. Thus group members united by a shared mental model are hypothesized to be especially vulnerable to groupthink. Alternatively, when there is no shared mental model among the group members, the combined mental model would represent a less inaccurate view of the world, and this is argued to reduce the risk of groupthink. However, in such situations, the disparity in beliefs, knowledge and experience would create different problems. In practice, models will be neither completely shared nor completely independent.

Fischhoff and Johnson (1997) suggested that where groupthink occurs, there is only a perception of completely shared models. In other words, mental models do not in reality completely overlap; this in principle moderates the effects of groupthink. However, this situation introduces additional problems. For example, group members may use particular words or terms (such as 'risk', 'threat' or 'likelihood') under the assumption that the other group members attach the same meaning to such terms, when in actual fact this is not necessarily the case. While such discrepancies in understanding may appear to be subtle, they may be significant enough to induce unrecognized drift in the group members' mental models, which may ultimately result in unpredictable group decisions.

4.2.2. Conditions that invite groupthink: According to Janis (1982), groupthink occurs in moderate to highly cohesive groups when certain secondary antecedent conditions are present; these include strong directive leadership, time pressure, and the importance and complexity of the decision. Group cohesion, however, is hypothesized as being the primary condition and refers to the overall strength of positive relationships within the group (Baron *et al.* 1993). Put more simply, a

cohesive group is one whose members know each other well and like each other. Important conditions favourable to cohesion include similar norms, attitudes and shared experiences. Small team size has also been suggested as a contributory factor (McGrath 1984). Furthermore, Noorderhaven (1995) indicated that group cohesion could be bolstered in situations where group membership allows individuals to achieve their own personal goals or provides a level of status sufficient for members to accept the pressures to conform to group norms. Noorderhaven (1995) also suggested that the level of cohesion may be augmented when group members have specific work-related goals that are relevant and compatible with that of the whole group. Physical proximity has been found to be another factor that promotes cohesion (Sundstrom 1986). Contextual factors likely to foster cohesion include external pressure (Glickman *et al.* 1987) and rewards for team performance (Shea and Guzzo 1987).

Another dimension related to the level of cohesiveness is the degree of familiarity among team members. Familiarity could arise because the team is in an advanced stage of development or because the roles of the team members demand frequent interaction. It seems plausible that a highly familiar group would be more likely to be cohesive than one that is not. If this were true, the level of group familiarity would have a role to play in groupthink. However, Leana (1985) argued that unfamiliar groups, whilst lacking cohesion, may be susceptible to groupthink symptoms because of insecurity concerning member roles and group norms. Cohesive groups (to the extent that they are familiar) on the other hand, may exhibit far fewer symptoms of defective decision-making than groupthink would suggest because members are secure enough in their roles and status to challenge one another, but have well developed methods of reaching agreement (Aldag and Riggs Fuller 1993).

4.2.3. Groupthink and command and control teams: Groupthink, as originally conceived by Janis (1972), is a theory of defective decision-making in *groups* faced with major decisions in political and military contexts. Since the theory refers specifically to groups, one may question its relevance to teams (although the decision context is at least consistent with military command and control teams). To the authors' knowledge no research has tested the validity of groupthink at a team level. However since empirical support is mixed even at a group level, the extent to which groupthink can be generalized to teams is questionable.

Sundstrom *et al.* (1990: 127) suggested that group biases such as groupthink may be more prevalent in autonomous groups, 'especially high ranking teams who make decisions with little outside help'. It is argued that this stems from their greater reliance on internal group processes. Such groups typically operate in parallel to the central activities of the organization. Examples include task forces, committees and project teams. Conversely, it is argued that teams that are more integrated with the central activities of the organization on the other hand (e.g. command and control teams) will be less liable to groupthink. Sundstrom's suggestion (Sundstrom *et al.* 1990: 127) is also supported by the argument that the functional division of team tasks may foster a diverse set of mental models amongst its members that may in turn reduce the potential for groupthink. While plausible, limited empirical support exists for this hypothesis.

However, many of the factors hypothesized to contribute to group cohesion (and furthermore the secondary factors themselves) are consistent with the characteristics

of command and control teams. On the basis of this match, one could expect command and control teams to be cohesive and liable to groupthink in discussion-orientated team activities, although this alone may not be sufficient for groupthink to occur. However, group cohesiveness may be linked to other aspects of command and control teams. For example, the hierarchical and disciplined environment typical of many command and control teams may foster an unwillingness to disturb any perceived cohesion and may inhibit team members from offering information thought to be unusual, but which could be highly relevant to the team decision. Stasser and Titus (1987) found that group members tend to offer information already shared by the group rather than novel information, thereby preserving group cohesion. Overall, the potential for groupthink in teams is unclear. However, it would be premature to underestimate the potential for groupthink, or indeed a variant of groupthink, to occur in team decision-making.

4.3. *Group polarization*

Group polarization refers to the phenomenon that occurs when the position that is held on an issue by the majority of the group members is intensified as a result of discussion (Lamm 1988). For example, the theory would predict that if group members are initially generally in favour of a particular preference, then group discussion will further enhance the favourability of this preference at an individual level.

There are two special cases of group polarization. One is termed *risky shift* and occurs when a group, overall, becomes more risk seeking than the initial average risk seeking tendencies of the individual members. The other is termed *cautious shift* and occurs when groups become more risk averse than the initial average risk averse tendencies of the individual members. In both cases the average response of the individual group members is more extreme after discussion. Such shifts in preference have been demonstrated by an overwhelming number of studies. Among other things, the effect has been demonstrated for attitudes towards issues such as war, capital punishment, judgements of facts and the perception of people. For detailed reviews of the literature see Lamm and Myers (1978) or Isenberg (1986).

4.3.1. *Underlying psychological mechanisms—theories of group polarization:* There are two main theories of group polarization: *social comparison* theory and *persuasive arguments theory*. According to the social comparison theory, group polarization stems from people's motivation to be perceived, and to present themselves, in a favourable light. Through a process of comparison with others, individuals endeavour to present themselves in a way that they perceive to be more favourable than the average position, i.e. more extreme than the group mean but in the majority direction. This allows an individual to feel both similar to the group and distinctive in the approved direction. When each member of a group is engaging in such a process of comparison, the result is a shift in the direction of greater perceived social value. There are two variations of this theory, one emphasizing pluralistic ignorance and the other emphasizing one-upmanship (Isenberg 1986). The persuasive arguments theory emphasizes an informational influence and states that polarization is a function of the number and the persuasiveness of the arguments presented. Burnstein (1982) argued that the persuasiveness of an argument is determined by its perceived validity and its novelty. However, since the majority position is more likely to be represented, an individual is more exposed to the arguments favouring the view

of the majority, causing that individual to shift in that direction. The review of the literature by Isenberg (1986) indicates that there is substantial empirical support for both theories. While on balance the research probably favours the informational perspective, it is likely that an interaction of both processes mediate group polarization.

The relative influence of one process over another is likely to be contingent on the nature of the group and the decision situation, although there remain a number of unanswered research questions in this area. Kaplan (1987) suggested that the two processes appeal to two different aspects of human functioning (emotive and cognitive) and argued that the extent to which one or the other of the processes is likely to be influential is dependent on the group/problem interaction. If the interaction within the group is predominantly of a socio-emotional nature, a social comparison influence is more important. Task orientated interaction, on the other hand, is more strongly associated with an informational influence. As far as the nature of task is concerned, Kaplan (1987) suggests that a social comparison influence is likely to be relatively important for tasks of a judgmental or subjective nature (e.g. is the stock market morally defensible?), whereas an informational influence is likely to dominate more intellectual or objective tasks (e.g. choice of investment plans on the stock market).

4.3.2. *Conditions that invite group polarization:* Group polarization is induced from the process of group discussion. However, the potential for polarization exists only if the initial view of the individual group members is in the same direction. The effect also appears to be confined to relatively important decisions. If the issue is sufficiently unimportant, group depolarization can occur where the average position is less extreme after discussion (Kerr 1992). However, the literature says little about more specific conditions under which a shift will or will not occur and the factors affecting the relative magnitude of a shift. The extent to which polarization effects are domain specific is also unclear. Thus, there remain a number of outstanding questions regarding the relationship between the magnitude of polarization and the characteristics of both the decision situation and the group.

4.3.3. *Group polarization and command and control teams:* Group polarization is a bias emanating specifically from group discussion and may therefore have little relevance for team task execution *per se*. However, the bias may be highly relevant in command and control teams to the extent that the members engage in discussion orientated activities, e.g. over tactical or strategic/planning issues. The literature says little, however, about how tendencies towards polarization may be affected by factors relevant to command and control situations, such as time pressure, level of uncertainty and information incompleteness.

4.4. *Group escalation of commitment*

Escalation of commitment refers to the tendency for individuals or groups to continue to support a course of action despite evidence that it is failing. In other words, it is the tendency for a decision to support a previous decision for which there was a negative outcome. Since such behaviour may not, up to a point, be necessarily irrational, the specific concern is with *non-rational* escalation of commitment, defined by Bazerman (1994: 79) as 'the degree to which an individual escalates commitment to a previously selected course of action *beyond that which a rational*

model of decision making would prescribe'. (This definition is also assumed to extend to the group case.)

Staw (1976) was the first to demonstrate escalation in a study that required subjects to allocate a second stream of research and development funds to a hypothetical company division following the initial decision to invest three years ago. Subjects were either responsible for the initial investment or not. When the outcome of the initial decision was negative, those individuals responsible for that decision subsequently allocated more funds to that course of action than did those who were not responsible for the initial decision. Since then, the tendency to escalate commitment has been demonstrated by many studies across numerous domains including interpersonal relations, waiting situations, gambling, economic investment and policy-making. While there seems to be little doubt as to the prevalence and diversity of tendencies to escalate commitment, research in this area has tended to focus at an individual level (i.e. independent of social context).

Departing from this trend, the studies by Bazerman *et al.* (1984) and Whyte (1993) have demonstrated escalation tendencies at a group level. Interestingly, while Bazerman *et al.* (1984) found no evidence that groups escalate commitment more than individuals, Whyte's (1993) findings indicated that in terms of both frequency and severity, there was a greater tendency for groups to escalate commitment. The inconsistency of these findings suggests that the extent to which individuals and groups differ in their relative tendencies to escalate commitment is likely to be contingent on other factors.

However, both the groupthink and the group polarization literature support Whyte's (1993) finding that groups escalate more than individuals. First, from a groupthink perspective, given that a majority view is sufficient to induce any dissenters to conform to a decision to escalate, reliance on a group rather than an individual to resolve an escalation dilemma will increase the frequency with which escalation occurs in groups as opposed to individuals (Whyte 1993). Second, drawing on the findings of 'risky shift' indicating that groups make riskier decisions than individuals, since the decision to escalate can be viewed as risk seeking, one could hypothesize that groups escalate more than individuals. As far as teams are concerned, however, no research to date has investigated the potential for escalation.

4.4.1. *Underlying psychological mechanisms—theories and explanations of escalation of commitment:* Staw (1976) concluded that the mechanism underlying escalation in individuals is a *cognitive dissonance* (Festinger 1957) or *self-justification* (Aronson 1972). That is, escalation is an attempt to make previous behaviour appear rational. This could be interpreted as a way of demonstrating to others that one's previous decision was not a mistake (i.e. 'saving face'). At an individual level, several studies have demonstrated that self-justification motives contribute to escalation (Staw and Fox 1977, Bazerman *et al.* 1982, Ross and Staw 1986).

At a group level, on the other hand, Whyte (1993) suggested that self-justificatory motives are likely to be of reduced importance, pointing to studies such as that of Mynatt and Sherman (1975), which indicates that group members experience less personal responsibility for the actions of the group than they experience for their own individual behaviour. However, the strength of this argument is weakened when applied to teams, where the members are mutually dependent on each other. Whyte's (1993) argument is challenged further by Bazerman *et al.* (1984) who provided strong evidence that dissonance processes may also be important at a group level.

A second theory offered for both group and individual escalation of commitment is based on *Prospect Theory* (Kahneman and Tversky 1979). Central to the theory is the notion that risk-taking behaviour is dependent on whether the decision is positively or negatively framed, i.e. whether the perceived choice is one between certain/uncertain gains or one between certain/uncertain losses. In terms of escalation, negative outcome information on a previous decision represents a negatively framed decision situation; that is, the choice is one between certain and uncertain losses. Under such circumstances, prospect theory predicts that people prefer the risky option. This choice is consistent with a tendency to escalate.

However, there is no unified explanation. Both theoretical views are able to account for specifically observed incidences of escalation. The validity of each theory may therefore be contingent upon the specific circumstances in which escalation occurs. Although it is unlikely that either theory is capable of providing a complete account of group escalation, they can be viewed as being complementary as opposed to competitive.

4.4.2. *Conditions that invite escalation of commitment:* A dissonance explanation predicts that escalation will be greater in situations where a decision to escalate is made by the same group that was responsible for the initial decision that is now failing. This was supported by the research findings of Bazerman *et al.* (1984). Whyte (1993) however suggested that responsibility is not a necessary condition for inappropriate escalation. The prospect theory explanation, on the other hand, suggests that the conditions that invoke the framing of decision outcomes are the important determinants.

A number of other studies suggest additional situations where escalation tendencies may be more pronounced. For example, Staw and Ross (1978) showed that the tendency to escalate was greater when an explanation could be developed for the initial failure that showed the outcome to be beyond the control of the decision maker(s). Similarly, Schwenk (1984) showed that escalation is strongest if the cause of the failure is attributed to external events as opposed to any fault in the policy, *per se*. Bazerman *et al.* (1980) found that the tendency to escalate was significantly affected by three factors: the degree of disappointment felt by the decision maker when the negative feedback was provided; the perceived importance of the decision; and the perceived relationship between the two decisions. Finally, the connection between escalation and groupthink as discussed above suggests that a more cohesive group would be more prone to escalation than one that was not.

4.4.3. *Group escalation of commitment and command and control teams:* Individual escalation of commitment has obvious relevance for command and control teams to the extent that its members have personal responsibility for specific decisions. The issue of leadership skills is also a relevant issue here. In no other situation is good leadership, both actual and as perceived by the team members, more important than where people's lives are at stake. Escalating commitment can be argued to demonstrate consistency and is a quality shown by Staw and Ross (1980) to be one that people associate with good leadership. To the extent that commanders perceive this to be the case, the price for demonstrating consistency may be extreme and unparalleled with that in other teams.

However, the potential for group escalation of commitment in teams is, as with groupthink and group polarization, likely to be more closely associated with

discussion orientated activities as opposed to the execution of team tasks themselves. The relevance of group escalation in command and control situations is therefore likely to be restricted to those situations where there is organized or formal discussion between team members, e.g. on strategic, planning or tactical issues. There are, however, a number of situational conditions specific to command and control teams that may interact with a tendency to escalate (e.g. time pressure and level of certainty) although such relationships currently amount to conjecture and remain a question for further research.

A special case of escalation, which is especially relevant to command and control teams, occurs in competitive situations. This variant involves two parties engaged in a battle of some kind and has obvious parallels to a military combat situation. A price war scenario provides a particularly good illustration of this form of escalation. Here, two companies successively reduce the price of their product in response to the price reductions of their competitor. At a certain stage the respective parties enter into a 'no win' situation, but they both continue to escalate despite the heavy losses that each is incurring. In such situations the desire to win represents a very powerful additional motivation to escalate. The price war between American Airlines and Northwest Airlines in 1992 is illustrative of this type of escalation. The rationality of engaging in such a 'war' is contingent on one's estimation of the probability of the opponent pulling out. While in a military context there may be other influences and factors at stake, the message is that situations that may look like opportunities may prove to be traps. In other domains, where the 'enemy' is either not human (e.g. fire) or under the direct control of humans, the relevance of competitive escalation is unclear.

5. Summary and conclusions

This paper has reviewed four important social contextual and group biases that are likely to be relevant to team decision-making in command and control situations. For each bias the authors discussed its descriptive nature, its influencing factors and underlying psychological mechanisms, and how it may arise in command and control situations. The analysis suggests that these biases have a strong potential to affect team decision-making performance and may arise in a number of different situations, at both strategic and operational levels of the team. As part of the analysis the author discussed the somewhat 'tricky' distinction between teams and groups, culminating in something of a paradox in which teams may be regarded as a subset of groups whereas group decision-making may be regarded as a subset of team decision-making. Nevertheless, the authors believe that some progress has been made in clarifying these terms. The discussion is complemented with an attempt to define, as oppose to characterize, a command and control team.

As part of the main discussion, a distinction was made between those biases emanating from social projection (i.e. assuming similarity with others) and those emanating from social influential factors (traditionally known as 'group biases'). One way of looking at these two categories of biases is to regard them respectively as non-discussion based and discussion based social biases. Biases emanating from social projection, namely false consensus, may arise when team members need to make estimates about others, either within or outside the immediate team. For instance, a team member's decision may require making an judgement about the future intended actions of another team member when such information is unavailable or impractical to access, owing to time pressure or a failure in the

lines of communication. Biases emanating from social influential factors (i.e. groupthink, group polarization and group escalation of commitment) would appear to be, not surprisingly, highly relevant for decision-making made at higher levels of the organization on issues of strategy or planning. To the extent that these decisions filter through to the team level, they will have an important and direct impact on team decision-making behaviour. However, it also seems plausible that such biases may arise directly at the level of the team whenever its members engage in discussion as part of collective, but localized, decision-making processes.

It is conceivable that some biases have more potential to affect team decision-making than others do. Moreover, the specific features and task environments of command and control teams suggest that different types of team may be affected in different ways and to varying degrees. Although this is a question for future research, biases in command and control teams more generally appear to be promoted by decisions that are important or novel, and where high levels of uncertainty exist. Time pressure and team cohesion are also likely to be important factors. All of these conditions are consistent with those of command and control teams. In terms of the underlying source of team biases, Fischhoff and Johnson (1997) suggested that a useful unifying concept is that of a shared mental model.

As a final comment, it should be stressed that most research on decision biases has focused on the individual level and the group level. While of undoubted relevance to team decision-making, research on decision biases by teams *per se* remains comparatively limited, and the research that has been conducted has adopted the traditional cognitive perspective with the social cognitive elements being largely neglected. Nevertheless, an important initial research objective would be to empirically assess the potential for both cognitive and social biases at both the operational and strategic levels of teams. It is also important to gain a better understanding of how situational factors relevant to command and control (e.g. uncertainty, information incompleteness, and time stress) interact with these biases. A more radical requirement, however, is for decision research to direct more of its effort towards those biases which are unique to teams with the aim of gaining an insight into the impact of such biases, the conditions under which they arise and their underlying cause. Within such an agenda, the current cognitive emphasis should be complemented by additional emphasis on the social side of cognition. If something like false consensus is described as having 'profound implications for how people interpret social reality' (Fiske and Taylor 1991: 77), it may also have some important implications for teams.

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