3.1 Introduction:

J. P. Guilford’s 1950 address to the American Psychological Association inspired the now-thriving field of creativity research. The true genius of Guilford’s contribution was the ability to specify the vague but intriguing notion of creativity according to distinct constructs that define individual creative thinking. These constructs included fluency, flexibility, novelty, synthesis, analysis, reorganization and redefinition, complexity, and elaboration. Suddenly, the appealing but nebulous concept of creativity had scope, depth, and breadth that could be measured and explored. Guilford argued that creativity is a continuous trait in all people, and that those individuals with recognized creative talent simply have “more of what all of us have” (Guilford, 1950, p. 446). As with any founding contribution, Guilford’s choice of focus on the traits, motivations, and behaviors of the creative individual slanted the way that creativity has been conceptualized in the decades since.

Creativity research has addressed three general areas since Guilford’s time: the creative thinker’s cognitive processes; the creative personality and behavioral elements of the creative thinker; and, more recently, the broad environmental context that interacts with and supports creative work. In all these approaches, the focus has rested squarely on the
individual, highlighting individual cognitive processing, stable individual differences, and the effects of the external environment on the individual. Relatively little attention has been paid to team-level creative synergy, in which creative ideas are generated by groups instead of being generated by one mind. None of the existing perspectives considers the potential changes in the generation of creative ideas that can occur when the inputs and interactions of other people are introduced (Kurtsberg et al. 2000). Guilford’s original work, along with much of the research carried out since, has left a gap for future creativity researchers to pursue: the role of interpersonal interaction and teams.

The researcher believes that the exploration of direct interactions among individuals striving for creativity in a group can deepen our understanding of both creativity and teamwork. More specifically, the thesis presents group diversity and group conflict as relevant variables for team creative processes and products. Through this thesis, the researcher presents creativity in a group conflict situation for consideration as a next step in the progression of creativity research from Guilford into the next century.

3.2. Hints From Research on Individual Creativity

Despite the focus on the individual, each of the existing streams of research on creativity has much to offer for the study of team-level creativity. The first of these is an exploration of how creative ideas come to be. Researchers in this area have sought to understand how the human mind approaches problems and generates creative solutions. Cognitive psychologists observed early on that the human mind tends to think
consistently along predictable lines and tends to be influenced by the surface features of problems (Gick & Holyoak, 1987; Novick, 1988). Even the earliest researchers identified consistent stages of creative problem solving (e.g., Wallas, 1926). Given these constraints, how is it that creative minds think original thoughts? One possible answer to this question lies in research about the nature of insight (Perkins, 1986) and the ability to “think outside the box” when trying to solve a problem. Researchers (e.g., Mednick, 1962; Sternberg & Lubart, 1993) have explored the idea that the creative mind is skilled in “lateral” or associative thinking, in which thoughts can leap from category to category rather than simply following preexisting paths of cognition; noticing similar features in seemingly unrelated elements appear to be a crucial skill in associative thinking. Lateral thinking (de Bono, 1991) also mirrors the features of Guilford’s concept of divergent thinking, in that associations from one topic to another allow for the generation of divergent thoughts. Sternberg and Lubart (1993) described insight skills that help people to identify the key elements of a problem, figure out how the pieces fit together, and recognize the relevance of old information to the problem. Amabile (1996) described creativity as the intersection of an individual’s domain-relevant skills, creativity-relevant skills, and motivation. This work demonstrated that creativity does not occur spontaneously or randomly, but happens instead, when the appropriate combinations of knowledge, skill, and motivation enable an individual to generate new ideas. These models of individual cognitive processing have increased the understanding of how the individual creative mind processes problems and searches for solutions. This perspective easily could be broadened to explore how cognitive processes are affected by the presence of other people and by team efforts toward creative ideas. For example, the
input of other people’s ideas, knowledge structures, and perspectives at particular stages of the thought process might have important effects on how creative ideas are formed, perhaps by increasing the probability of lateral associations (Kurtsberg 2000). In addition, previous research on individual creative thinking serves as a starting point for discovering how ideas are formulated in teams and whether ideas truly can be generated by more than one person. This thesis argues that the cognitive processing perspective could lend valuable insight to the study of creative synergy in teams.

The second major approach has concerned creative personality or “style.” Early approaches to the creative personality (e.g., Barron, 1969, Barron & Harrington, 1981; MacKinnon, 1965, 1967) explored the stable set of core personal characteristics that appeared to be associated with creativity. These included internal motivation, broad interests, attraction to complexity, intuition, aesthetic sensitivity, toleration of ambiguity, risk taking, perseverance, and self-confidence (Amabile, 1983; Oldham & Cummings, 1996; Sternberg & Lubart, 1993). Kirton (1976, 1989) found that people with an “innovative” problem-solving style approach, consider, solve, and apply problems differently from those with “adaptive” styles. Whereas adaptors tend to work most comfortably within set boundaries and constraints and tend to work incrementally on problems, innovators prefer to work on problems in a novel way and even reframe the problem itself before generating solutions. Kirton described these as stable individual differences that carry across multiple situations. Kirton’s theory was one of the few that tackled the question of how team members collaborate directly for creativity.
Harrington (1990), described later, discussed collaborative creativity in the sense that individual creativity is always a product of the interactions of a larger environment.

These studies of creative personality and other individual differences can lend important insights to the examination of team-level creativity. The characteristics of team members clearly will affect the ways in which people interact, both cognitively and interpersonally. According to Kirton (1989), the different types of problem-solving styles with which individuals are most comfortable can cause communication and teamwork to become either easier or more difficult. The more individual team members differ with respect to problem-solving approaches, the harder it can be for the team to work together toward common goals. Conflict can arise when creative styles are even moderately different. For this reason, Kirton stressed the role of the “bridger” in teamwork; this is the person who happens to fall in the middle of any team’s range of creative styles. This person becomes responsible for “translating” the ideas of team members with different styles. Kirton’s research has provided a start for bringing the study of the creative personality to the team level, but much remains to be explored. For example, it will be important to understand the specific types of conflict and the effects of that conflict—and its resolution—on team creativity.

Guilford (1950), however reminded that creativity cannot happen in a vacuum. Although still focusing on the creative production of one individual, this third perspective asserts that external stimuli can affect creative production. Guilford noted the importance of a person’s knowledge or expertise, suggesting that perhaps the most obvious and direct
effect of the external environment is in its impact on an individual’s base of knowledge. However, there are other environmental influences as well. Csikszentmihalyi (1988) argued that any creative idea is affected by three main shaping forces: the field, the domain, and the individual. The field is the set of social institutions that selects only those creative products worth preserving. The domain is the knowledge base and culture that will carry the new ideas forward for the next generation; ideas must be accepted by a larger context before being considered creative. The individual is the one who brings about some change in the domain that the field will consider to be creative. In essence, this view described the impact of the external environment once creative ideas have been generated; it did not address the specific types of interpersonal interactions that can affect creative idea generation.

Similarly, Harrington (1990) argued that creative works are the products of the larger functional relationships and interdependencies that exist among people, ideas, and environments. This approach speaks more directly to the ways that interactions can affect idea generation but still does not address the specific, same-time, same-place interactions that may have a strong effect on the team creative process when team members are consciously working toward the same goal. Theories on the effects of the specific external social environment on individual creativity are more directly relevant to the question of group creativity. For example, Amabile’s (1996) research has demonstrated that individuals produce lower levels of creativity when they perceived their work environment as constraining or controlling. These same effects have been found for the relation between team creativity and aggregated team member perceptions of the work environment (Amabile, Conti, Coon, Lazenby, & Herron, 1996). It appears that creativity
can be encouraged within work groups through autonomy in the work, encouragement of creativity, mutual openness to ideas, constructive challenge to new ideas, and shared goals and commitments. These factors can promote intrinsic motivation through a positive sense of challenge and a focus on the work itself. In addition, the way a team reacts to an idea can change the progress of that idea and others that follow it.

3.3. Hints From Research on Group Brainstorming and Problem Solving

Although research on creativity as a team-level process is scarce, work in the areas of group problem solving and brainstorming has shed some light on the distinctive features of creative processes in groups.

Essentially, this research has demonstrated that group problem solving has both potential risks and potential benefits. Whereas groups can combine the experiences, expertise, and manpower of multiple individuals in the pursuit of a common goal, certain conditions can lead groups to narrow their thinking and reduce the quality of their problem solving skills. Indeed, social influence actually can change and enhance the opinions and ideas generated by individuals and teams. For example, classic small-group research has demonstrated the potential pitfall of “groupthink,” in which dangerous decisions can result when there is no vocal dissent in groups to challenge consensus, ideas and decisions (Janis, 1972).
Effective group problem solving, however, can occur with the right combination of personalities (Brandstaetter & Farthofer, 1997), the right amount of diversity (Watson, Johnson, & Merritt, 1998), appropriate levels of resource and reward interdependence (Fan & Gruenfeld, 1998), cooperative process behaviors (Mudrack & Farrell, 1995), and effective use of time (Gersick, 1988, 1989). Thus, although groups have the potential to add value to the problem-solving process, it is clear that there are many conditions that must be met before these group benefits can be realized. By far, most research on team creativity has focused on brainstorming groups. Most of these studies have demonstrated the negative aspects of teamwork instead of the positive ones. Process losses, or the natural inefficiencies that result from multiple people trying to combine their best efforts simultaneously (Steiner, 1972), can occur in any group. On the whole, the process losses in brainstorming groups are so extreme that much of the research has concluded that brainstorming may occur more effectively (in both quantity and quality) when carried out by individuals instead of by groups (Mullen, Johnson, & Salas, 1991). These productivity losses are even greater in larger groups, groups where the experimenter is present, and groups where their opinions are tape-recorded in the absence of facilitator (Mullen et al., 1991). The general inferiority of group brainstorming to individual brainstorming has been attributed to several social psychological phenomena (Gallupe, Bastianutti, & Cooper, 1991). First, social loafing (Latane, Williams, & Harkins, 1979), or the lessening of effort of each individual team member based on the presumption that others will contribute more, can result when multiple people are working toward the same goal. In addition, evaluation apprehension (Collaros & Anderson, 1969; Diehl & Stroebe, 1987), the fear that ideas presented will be negatively evaluated, has displayed detrimental
effects. Finally, production blocking (Diehl & Stroebe, 1987; Lamm & Trommsdorff, 1973), or the danger of having thoughts lost while other people are generating and presenting ideas, may serve to undermine brainstorming. Several techniques have demonstrated that this trend can be reversed. Among these are electronic brainstorming (Gallupe et al., 1991)—in particular, anonymous electronic brainstorming (Cooper, Gallupe, Pollard, & Cadsby, 1998), use of trained facilitators (Offner, Kramer, & Winter, 1996; Oxley, Dzindolet, & Paulus, 1996), and comparative goal setting (Larey & Paulus, 1995; Paulus & Dzindolet, 1993; Sosik, Avolito, & Kahai, 1998). For example, Cooper et al. assigned mixed-sex brainstorming groups to one of four conditions: anonymous electronic brainstorming (in which participants did not have access to the identities associated with other group members’ ideas and feedback), non anonymous electronic brainstorming (in which participants were aware of the source of ideas of and feedback from other group members), verbal brainstorming (a more traditional, face-to-face setting), and nominal groups (aggregated results of individuals who brainstormed alone).

Results on an idea-generation task showed that anonymous brainstorming groups created more controversial and more non redundant ideas than did the other groups. Each of the techniques for boosting group brainstorming effectiveness, from keeping team members anonymous to providing a trained leader for structuring the team process, describes ways to either remove or control the interaction that naturally occurs in work teams. As a result, these studies seem to tell us that natural team interactions will hinder creativity. Before we can draw this conclusion, however, we must note that the vast majority of studies of group brainstorming have occurred in a laboratory setting, with groups of
participants gathered purely for the purposes of research. These teams had no history with each other, no established patterns of interaction, no knowledge of each other’s strengths and weaknesses, and no strong incentive to cooperate or create a mutual understanding that would have helped them as a team at some future time. In other words, the bulk of knowledge on this topic has been generated based on the performance of groups of people who had never met before and would likely never to meet again. It is certainly possible that this lack of context limited the success of group brainstorming.

A limited number of brainstorming studies have been carried out in natural settings (e.g., Paulus, Larey, & Ortega, 1995; Sutton & Hargadon, 1996). Sutton and Hargadon (1996) studied brainstorming in a real organizational context to explore the benefits and implications of this process, but they did not specifically compare individual and group brainstorming. Paulus et al. (1995) did compare group brainstorming to individual brainstorming in an organization that had undergone extensive change to its “team culture.” Groups for the study were formed of people in the same department, but these individuals were not necessarily on existing teams together. The results showed that on an average, groups of four produced only half as many ideas as sets of four individuals. It is interesting, however, that in this study, participants believed that they would brainstorm more effectively in groups than alone. Indeed, despite objective evidence to the contrary, research consistently has shown that people perceive brainstorming in groups to be more effective (Homma, Tajima, & Hayashi, 1995; Paulus et al., 1995) and believe that groups will help to produce higher quality ideas (Rowatt, Nesselroade, Beggan, & Allison, 1997) than individuals brainstorming alone. There is an inconsistency between the impression held by brainstorming groups about the success of their
productivity and their actual performance under laboratory conditions. Clearly, intuition
tells people that group brainstorming has something to offer over and above the simple
combination of individually generated ideas. It is possible that, indeed, teams do have
something to offer to creative tasks like brainstorming—something that has not been
captured by researching groups of people who had no history of interaction with each
other.

It is reasonable to expect that ongoing team interactions would change the experience of
any type of group work, even brainstorming. Interaction with the ideas and experiences
of other people can change the nature of thought processes, behaviors, and
communication. Although some researchers have addressed team-level creative problem-
solving efforts, most of this research has been focused on describing educational
techniques for engaging in problem-solving processes (e.g., Torrance, Bruch, & Torrance,
1976) instead of examining the specific variables that affect the team creative process.
This thesis would throw some light to the researchers to delve into the creative processes
and products of real interacting teams with a history and a future with each other.

3.4. The felt need for a Group Focus in Creativity Research

Although groups are increasingly common in organizations today, as the researcher has
noted, a little is known about how group creativity functions, the variables that affect
team-level creativity, and the optimal conditions that promote it. Indeed, most previous
theory and research on creativity have not distinguished between ideas created in an
individual mind and ideas arising from creative synergy, in which ideas are formed,
shared, adapted, and inspired simultaneously by more than one person. Central to the notion of creative synergy is the idea that a group of people has produced something that no one would have been able to do alone. This may be due to the new cognitive inputs, the combination of personality characteristics, or the interpersonal interaction that promotes creativity (Karlsberg, 2000). Some combination of each of these factors is likely to affect the processes of teams striving for creative production. Because the idea of creative synergy has much to offer in terms of both theory development and practical application, it is worthy of more specific attention by creativity researchers. It is likely that creativity in groups involves processes that are distinct from the process of individual creativity. Yet, ideas begin in individual minds, even if these ideas are later shared, changed, modified and developed within a team. Thus, researches tracking the evolution of individual ideas into team-level creative products should take on three distinct stages. First, researchers should study the ways in which the presence of other people and their ideas changes an individual’s creative thoughts. Second, research on team-level creativity must explore the evolution of ideas as they progress from one mind to another. Finally, research should address the factors that create the environments, norms, and feelings within a team’s culture that will affect the generation and sharing of ideas.

In the thesis, the researcher focuses on these social and environmental influences with the belief that any variable that affects the interaction of the team members can potentially affect the team’s creative production. In particular, the focus is on two variables that have received considerable attention in the general literature on teams: 1. diversity in the characteristics of the team members, and 2. the conflict that often arises in groups as they strive for creativity.
3.4.1 Diversity in Groups

There are many individual characteristics that can potentially affect a group’s processes and performance. Milliken and Martins (1996) listed 14 such attributes: race and ethnic background, nationality, sex, age, personality, cultural values, socioeconomic background, educational background, functional background, occupational background, industry experience, organizational membership, organizational tenure, and group tenure. Based on Kirton’s (1976, 1989) research, cognitive style should be added to this list. Research on groups has suggested that diversity among team members might affect the creativity of the team by influencing the context for communication, interaction, and collaboration. On the one hand, diversity can aid the creative process by presenting a heterogeneous set of perspectives for consideration (Amabile, 1988, 1996). Diversity can also hinder group process by limiting common understandings and shared experiences, or by creating such a divergence of ideas and styles that are detrimental to conflict can result.

Argote, Insko, Yovetich, and Romero (1995) found that groups with no membership turnover outperformed those whose membership changed on a mechanical task, in part because experienced groups already have a larger degree of shared understanding of their
processes and goals. Nonetheless, particularly for complex tasks, it maybe possible for established groups to have too much overlapping knowledge about each other and the task. Diversity, in terms of functional background, education, and company tenure, has been shown to have positive effects on group decision performance as measured by propensity for action, both in speed and magnitude (Hambrick, Cho, & Chen, 1996). Thus, whereas turnover may hinder some types of performance immediately, in the long run it may well be beneficial for increasing the new ideas and perspectives of the group—and therefore its creative production.

Other research has uncovered an optimal level of diversity for some personality characteristics, as far as creative output is concerned (O’Reilly, Williams, & Barsade, 1998). For example, an inverted U-shaped relation has been discovered for the personality dimension of extraversion. Adding extraverts to a team initially adds to group performance on a creative problem-solving task, but adding more beyond a certain point leads to decreases in performance (Barry & Stewart, 1997). Finally, as noted earlier, wide diversity in the preferred problem-solving styles of individual team members can lead to considerable difficulty in the absence of effective “translators” in the group (Kirton, 1976, 1989). When team members approach a shared task with widely divergent definitions of the problem as well as divergent approaches on how to engage in the problem-solving task, they are likely to have difficulty communicating and coming to a shared understanding of what to do or how to proceed. Moreover, such diversity may result in more conflict among team members because they will find it difficult to appreciate the value of each other’s perspective. Whereas this conflict, under some
conditions, may aid the creative process, it also can create difficulties for teams if it becomes excessive or if it is the wrong form of conflict.

### 3.4.2 Creativity Process:

Creativity is the development of new ideas. The creative process is a mental process in which past experience is combined and recombined (frequently with some distortion) to form a new combination which will satisfy some need.

The creative approach is appropriate when there appears to be either no solution or more than one solution to a particular problem. The creative approach is an idea-producing process specifically intended to generate a number of solutions, any of which will solve the problem at hand. Although all solutions will work, one is the optimum solution among them. Following is the general process of Creativity:

#### Table No. 3.1: The General process of Creativity

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORIENTATION</td>
<td>Defining the problem to be solved and selecting the approach that should be taken to solve it.</td>
</tr>
<tr>
<td>PREPARATION</td>
<td>Information-gathering and fact-finding.</td>
</tr>
<tr>
<td>ANALYSIS</td>
<td>Evaluation and analysis of the data gathered.</td>
</tr>
</tbody>
</table>
3.4.3. Blocks in Creativity:

1. Habitual Blocks

   a. Continuing to use "tried and true" procedures even though new and better ones are available.

   b. Rejection of alternate solutions which are incompatible with habitual solutions.

   c. Lack of a positive outlook, lack of determined effort, conformity to custom, and reliance on authority.

2. Perceptual Blocks

   a. Failure to use all the senses of observation.

   b. Failure to investigate the obvious.

   c. Inability to define terms.

   d. Difficulty in visualizing remote relationships.
e. Failure to distinguish between cause and effect.

3. Cultural Blocks

a. Desire to conform to "proper" patterns, customs or methods.

b. Over-emphasis on competition or on cooperation.

c. The drive to be practical above all things and being too quick to make immediate judgments.

d. Belief that all indulgence in fantasy is a waste of time.

e. Having confidence and faith only in reason and logic.

4. Emotional Blocks

a. Fear of making a mistake or of appearing foolish.

b. Fear of supervisors and distrust of colleagues and subordinates.

c. Over-motivation to succeed quickly.

d. Refusal to take any detour in reaching a goal.

e. Inability to reject decisions which are adequate but which are obviously sub-optimum.

Creativity involves an element of surprise, inherent to the experience of novelty, then Lady Lovelace’s remarks seem to be more perceptive: the absence of a capacity to perceive novelty in the thought process may not be helpful in producing novel ideas. Any process that operates with a set of rules on the basis of which it could move from one state to the next does not produce creativity.
Acknowledging the role played by cultural values in the classification of ideas as creative or not (given that worthless new ideas are not considered creative), Boden is mainly concerned with the question of ‘what does it mean to say that an idea could not have arisen before?’ Lady Lovelace distinguishes ideas that are merely novel ones - that can be produced by the same set of generative rules which produced other familiar ideas (as in Mendeleyev’s classificatory procedures) - from radical and genuinely original ideas that cannot be produced in this familiar way (like Schoenberg's atonal music). The appearance of such new ideas presupposes going beyond the limitations of the pre-existing conceptual area in which they would not have found their natural space. As Boden (1996:78-79) stresses: ‘the ascription of creativity always involves tacit or explicit reference to some specific generative system. It follows … that constraints - far from being opposed to creativity - make creativity possible. To throw away all constraints would be to destroy the capacity for creative thinking. Random processes alone, if they happen to produce anything interesting at all, can result only in first-time curiosities, not radical surprises.’

Boden suggests that constraints make creativity possible, and that the surprise comes from the sudden realization that the constraints exist. The surprising events (i.e. anomalies) and conflicting view points reveal the existence of the constraints that normally and often invisibly guide our habitual actions and experiences. In this circumstance, creative systems adjust their behaviour by transcending the constraints or through abiding by them in unexpected ways, thereby drawing attention to the regularity itself. Once one becomes aware of the generative principles constituting the conceptual
space, it is possible to transform them deliberately (and not just through random processes). The most important element of creativity is variability and this variability can be best defined using the concept of divergent thinking which are as follows.

3.5. Divergent Thinking:

“The concept of divergent thinking was developed in the 1950s by psychologist J. P. Guilford, who saw it as a major component of creativity and associated it with four main characteristics”. According to him, the major characteristics of Divergent thinking are as shown in the table given below.

Table No. 3.2: Characteristics of Divergent Thinking:

<table>
<thead>
<tr>
<th>Guilford’s Characteristics of Divergent Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluency</strong></td>
</tr>
<tr>
<td>“The ability to rapidly produce a large number of ideas or solutions to a problem”</td>
</tr>
<tr>
<td><strong>Flexibility</strong></td>
</tr>
<tr>
<td>“The capacity to consider a variety of approaches to a problem simultaneously”</td>
</tr>
<tr>
<td><strong>Originality</strong></td>
</tr>
<tr>
<td>“The tendency to produce ideas different from those of most other people”</td>
</tr>
<tr>
<td><strong>Elaboration</strong></td>
</tr>
<tr>
<td>“The ability to think through the details of an idea and carry it out”</td>
</tr>
</tbody>
</table>

Source: Adapted from (Gail Group 2000)
Divergent thinking involves producing multiple or alternative answers from available information. It requires making unexpected combinations, recognizing links among remote associates, transforming information into unexpected forms, and the like. Answers to the same question arrived at through divergent thinking may vary substantially from person to person but be of equal value. They may never have existed before, and are often thus novel, unusual or “surprising”. Sometimes this is true merely in the experience of the person producing the variability in question, or for the particular setting, but it may also be true in an absolute sense. Some examples of the characteristics of divergent thinking are given in the Table shown below.

**Table No. 3.3 : Examples of the characteristics of Divergent Thinking**

<table>
<thead>
<tr>
<th>Kind of Thinking</th>
<th>Divergent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical Processes</td>
<td>- being unconventional</td>
</tr>
<tr>
<td></td>
<td>- seeing the known in a new light</td>
</tr>
<tr>
<td></td>
<td>- combining the disparate</td>
</tr>
<tr>
<td></td>
<td>- producing multiple answers</td>
</tr>
<tr>
<td></td>
<td>- shifting perspective</td>
</tr>
<tr>
<td></td>
<td>- transforming the known</td>
</tr>
<tr>
<td></td>
<td>- seeing new possibilities</td>
</tr>
<tr>
<td></td>
<td>- taking risks</td>
</tr>
<tr>
<td></td>
<td>- retrieving a broad range of existing knowledge</td>
</tr>
<tr>
<td></td>
<td>- associating ideas from remote fields</td>
</tr>
</tbody>
</table>
Typical Results for the Individual

- alternative or multiple solutions
- deviation from the usual
- a surprising answer
- new lines of attack or ways of doing things
- exciting or risky possibilities
- a feeling of uncertainty or excitement

Divergent thinking always generates variability (Cropley, 1999); otherwise it would not be divergent. Since variability is an important element of creativity, we can say that divergent thinking pattern is closer to creativity. But, variability alone does not mean creativity. It may cause “surprise” in the beholder, but this is not enough, since surprise can be produced through “blind” variability (mere unregulated self-expression or doing things differently from the usual regardless of accuracy, meaning, sense, significance, or interestingness).

Cattell and Butcher (1968) popularized the term “pseudocreativity” to refer to variability whose novelty derives only from nonconformity, lack of discipline, blind rejection of what already exists and simply letting oneself go. Heinelt (1974) added to this “quasi-creativity” which has many of the elements of genuine creativity—such as a high level of fantasy—but only a tenuous connection with reality. An example would be the “creativity” of daydreams. What is needed is not just surprising deviation from the usual, but what Bruner (1962) called effective surprise.
3.5.1. Generating and exploring variability:

Creative idea generation or what can be called ‘effective surprise’ is a two step process -
On the one hand generating novelty and, on the other, exploring this novelty, once it has
been generated.

Table No.3. 4.: Process of divergent thinking

<table>
<thead>
<tr>
<th>Generating Phase</th>
<th>Exploring Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>- browsing</td>
<td>- shifting contexts</td>
</tr>
<tr>
<td>- linking</td>
<td>- exceeding limits</td>
</tr>
<tr>
<td>- transforming</td>
<td>- crossing boundaries</td>
</tr>
<tr>
<td>- reinterpreting</td>
<td>- creating surprise</td>
</tr>
<tr>
<td>- branching out</td>
<td></td>
</tr>
</tbody>
</table>

3.6. Conflict:

Conflict is defined as the behaviors or feelings of interdependent parties in response to
imaginary or potential or actual obstructions that impede one or more of the parties
achieving their goals. While much of the research has focused on reducing the negative effects of conflict, organizational theorists emphasize that conflict can also produce positive outcomes by introducing different perspectives that produce innovative solutions.

Recent research suggests that conflict is a multi-dimensional construct. The two dimensions, or types, of conflict: (1) affective conflict and (2) task conflict.

**Affective conflict:** Affective conflicts are disagreements between team members that are based on personal incompatibilities that produce suspicion, distrust, and hostility among team members (Brehmer 1976; Guetzow and Gyr 1954; Faulk 1982). Research indicates that this type of conflict reduces team decision-making effectiveness by reducing the team’s ability to reach high-quality decisions and impeding the acceptance of decisions among team members. Affective conflict limits cognitive processing of new information, gives rise to hostile attributions concerning each other’s intentions and behaviors, reduces receptiveness to ideas advocated by others who are disliked, decreases willingness to tolerate opposition, and disturbs effective communication and cooperation within the team.

**Task conflict:** Task conflicts are disagreements among team members about the team’s goals and the activities that need to be undertaken to achieve these goals. This type of conflict arises from differences in perspective and training that result in team members viewing problems and issues differently. Since cross-functional, team members come
from different functional areas, they typically have different backgrounds and perspectives. Resolving these differences can distract attention from addressing the team’s task.

Yet another type of conflict on which only very few research work is conducted is ‘Constructive conflict’. ‘Constructive conflict’, can be considered as a functional process conflict, which generate out of an uncertainty, motivating to search actively to find out or create information to arrive at solution to the problem using divergent thinking process. Here, the creativity flushes out all of a sudden using cognitive competency.

3.6.1 Conflict in Groups

Diversity and conflict are interrelated in that high levels of diversity among team members can potentially cause conflicts through communication and coordination difficulties (e.g., Kirton, 1976, 1989). Conflict can affect a person’s mood, rapport with others, and even patterns of thinking. For example, Carnevale and Probst (1998) demonstrated that when individuals anticipate conflict, their thought processes become more narrow and rigid than when they anticipate cooperation; even the suggestion of conflict, without the actual experience, can be enough to trigger this limitation in thinking. Because creative ideas thrive on openness of thought, it would seem that conflict should limit creativity. It is surprising, however, that certain types of conflict—particularly disagreements of opinion on specific work issues and goals—can aid the creative process (James, 1995). Conflict researchers have recognized that not all conflicts are the same. Previous research has identified three main categories of conflicts: task-based conflict, which pertains to discussions and debates about the work being done;
relationship-based conflict, which pertains to the interpersonal interaction among group members; and process-based conflict, which pertains to the strategies, plans, and division of roles and responsibilities (Jehn, 1997). Research has shown a curvilinear relation between task-based conflict and group performance, indicating that some task-based conflict can be beneficial, but large amounts of it can become counterproductive (Jehn, 1995). Relationship conflict (Amason, Thompson, Hochwarter, & Harrison, 1995) and process conflict (Jehn, 1997) are seen as singularly damaging. This research has demonstrated the importance of categorizing the type of conflict present in group situations, instead of merely assessing the presence of conflict, because the different types can have vastly different effects.

Conflict is a volatile condition. Any type of conflict can easily escalate from a minor disagreement to an unmanageable and destructive event. The escalation of conflict has been parsed into levels by some theorists (e.g., Glasl, 1982), who have observed general shifts in focus over time from substantive issues, to personalized issues, to techniques for surviving combat (Thomas, 1992). The escalation of conflict tends to go from disagreements on substantive issues to emotion based negativity. Escalation also seems to be unidirectional; once individuals have moved from one level to another, there does not seem to be much chance for conflict de escalation. Thus, it is relatively easy for conflict to escalate from the more productive task-based variety to the counterproductive type. As Jehn (1997) pointed out, there is a mutually hazardous interplay between these two types of conflicts. If people disagree, they may, in turn like each other less and attribute the task-related problem to the personality of another group member or members, especially
because, according to the fundamental attribution error, most attributions about another person’s behavior tend to be personal rather than situational (Ross, 1977). Moreover, potentially beneficial conflict statements can have negative effects when interpersonal communication is difficult. Interpersonal communication can be misinterpreted based on poor language choice or through nonverbal communication cues, which can display meaning, affect, status, and strategic information (Alibali, Fleuvas, & Goldin-Meadow, 1997; Jones & Remland, 1993; Springer, Meier, & Berry, 1996).

Furthermore, negotiation research has shown that behaviors often are reciprocated (Lewicki & Litterer, 1985). In other words, hostility by one person is likely to be retaliated by another. Psychological research also has shown that decision makers tend to escalate commitment to a course of action once begun (Bazerman, 1998; Brockner & Rubin, 1985; Staw, 1981). Despite the detriments of hostile conflict, it seems to take a little to push an initially negative event into a committed course of action and behaviour.

Finally, process conflict (Jehn, 1997) can be thought of as conflict over team-level coordination issues. The presence of this form of conflict is a signal that team members are having difficulty coordinating with each other and working toward a common goal. More specifically, divergent views about who is supposed to do what, or when work is to be accomplished, can make coordination—and high-level performance —difficult or impossible. Although the typology of conflict has proven useful in understanding group process, past research has not directly addressed the effects of these differing types of conflict on creative production. This study proposes that the relations will be similar to those uncovered for other types of performance, where task conflict has certain beneficial
effects for creative output, relationship and process conflicts have detrimental effects, in general. Specifically, the proposition is that moderate and high levels of task-based conflict can be beneficial to the individuals in the team for creativity because discussion of substantive issues can yield new insights (James, 1995; Kolb & Glidden, 1986).

3.6.2 Conflict and Team Creativity

Some scholars writing on conflict have proposed a connection between conflict and creativity. They suggested that, even though it is theoretically possible to stifle all conflict in group work (Thomas, 1992), this may not be in the team’s best interest because it can hinder both the team’s productivity and its creativity (Nemeth, 1995). Others have proposed that total agreement throughout a group’s process can leave the team susceptible to the dangerous occurrence of “groupthink” (Janis, 1972), in which the psychological drive for consensus at any cost suppresses dissent and consideration of alternatives. Based on a similar logic, Kolb and Glidden (1986) argued that managers can legitimize conflict in organizations to use conflict as a creative force. Although there is no empirical research on the connection between creativity and process conflict or relationship conflict, a few studies appear to support this proposition that creativity will be aided by moderate and high levels of task conflict on teams. According to this research, groups in which task conflict results from multiple opinions produce work that is more original (Van Dyne & Saavedra, 1996), more divergent (Nemeth, 1986), and more complex (Gruenfeld, 1995), generate more ideas (Gopakumar, 2009) than do groups in which members all agree. This suggests that the presence and defense of multiple viewpoints among group members serve to make conflict, productive for
creative outcomes. This is consistent with the creativity literature’s identification of flexibility, or the number of different perspectives represented (Guilford, 1950), as an element of creative outcomes. Guilford talked about flexibility on the individual cognitive level, and some research has demonstrated a relation between individual creativity and tolerance for conflict (Sheldon, 1995). The recent research on conflict in teams expands on Guilford’s original idea by suggesting that task conflict can lead to more creative outcomes in a group setting as well by stimulating the consideration of multiple viewpoints. Despite the potentially positive effects of task conflict, conflict of all types tends to involve negative affect. This can be dangerous for groups; even the beneficial type of conflict, when not effectively managed, can easily spiral into more destructive interpersonal attacks and emotional outbursts (relationship conflict). Indeed, there is some research to suggest that conflict accompanied by negative affect might hinder creativity. Several studies have shown that positive affect increases ideational fluency (Vosburg, 1998), as well as the probability of unusual associations, set-breaking responses, heuristic problem-solving strategies, and inclusive categorization of stimuli (e.g., Isen, Daubman, & Nowicki, 1987; Isen, Johnson, Mertz, & Robinson, 1985; Isen, Means, Patrick, & Nowicki, 1982). Such positive affect may be unlikely in conflict situations. In sum, it seems that some task conflict might enhance creativity in teams, but that creativity will likely suffer under conditions of (a) relationship conflict, (b) process conflict, or (c) task conflict that leads to other forms of conflict or to negative affective states (Karlsberg, 2001).
3.6.3 Role of Conflict

Many of the research literature on creativity focuses on the individual, especially on the personality characteristics and thought processes that distinguish high vs. low creative individuals or on social factors that aid or hinder individual creativity (Amabile, 1983; Baron, 1969; Nemeth & Nemeth, 2001). There is notably little research on group creativity (Kasof, 1995; Paulus, Brown, & Ortega, 1999) despite the fact that organizations heavily depend on teams or groups to generate solutions to problems (West & Farr, 1990). The research that does exist focuses on the sub-optimality of performance by groups relative to individuals working alone (Sternberg, 1995). Compared to individuals working alone, groups generate substantially fewer solutions (McGrath, 1984) and the reasons generally suggest ways in which interaction hinders creativity (Paulus, Larey, & Dzindolet, 2000). Among the reasons for the deficits in groups are well-researched phenomena such as evaluation apprehension and production blocking (Diehl & Stroebe, 1987), social loafing (Karau & Williams, 1993) and conformity (Larey & Paulus, 1999). Thus, some attempts to raise group creativity have focused on the reduction of some of the “problems” with groups.

One such technique, brainstorming, has been widely used for over 50 years, especially in work organizations (Osborn, 1957). It is in fact the mantra for companies such as IDEO, arguably the best design firm in the world (Hargadon & Sutton, 1997). The claim is that brainstorming instructions improve group creativity because they address issues of evaluation apprehension and social loafing. To lower such apprehension and loafing,
individuals are specifically encouraged to emphasize quantity of ideas and more importantly, they are specifically instructed NOT to criticize their own or others’ ideas. Rather, they are encouraged to “freewheel” as well as to build upon and elaborate others’ ideas. Thus, brainstorming techniques have specifically admonished people “not to criticize” their own and others’ ideas, a tenet that has gone unexamined. In contrast, there is research showing that dissent, debate and competing views have positive value, stimulating divergent and creative thought (Nemeth, 2002).

As mentioned previously, researchers of group creativity and the brainstorming technique have tended to favor harmony and have long assumed that conflict, especially anything resembling criticism, reduces group creativity. Thus, there has been considerable emphasis on the elimination of such criticism and the concerns about evaluation that accompany it. As such, the specific instruction not to criticize one’s own or others’ ideas is central to the brainstorming technique. The actual research on brainstorming, however, is mixed as to whether or not brainstorming instructions increase group creativity relative to no instructions (Taylor, Berry, & Block, 1958; Dunnette, Campbell, & Jaastad, 1963). In general, brainstorming instructions do enhance idea generation relative to no instructions (Parnes & Meadow, 1959). What the research literature does show consistently is that groups, even under brainstorming instructions, rarely achieve the level of the individuals. If both individuals and groups are given brainstorming instructions, “individuals working separately generate many more, and more creative (as rated by judges) ideas than do groups, even when the redundancies among member ideas are deleted” (McGrath, 1984, p. 131).
One of the problems is that, while individuals are instructed to refrain from criticism, they may still worry about negative evaluations. Thus, the argument is that evaluation apprehension is still to be avoided or reduced; however, the admonition against voicing criticism does not eliminate the apprehension that one is being silently criticized. Camacho and Paulus (1995) lend some credence to this notion by finding that groups composed of “high-interaction anxious” individuals showed poorer performance in a brainstorming session than did groups composed of “low-interaction anxious” individuals.” Of importance is that this is a group phenomenon. Individuals who are highly anxious in interactions show poor performance in groups but this individual difference measure did not differentiate performance at the individual level.

3.7. Emphasizing the Value of Dissent and Conflict

While brainstorming instructions focus on the elimination of criticism and concerns about evaluation, it is of interest that proponents of another technique, the Nominal Group Technique, make quite a different argument (Delbecq, Van de Ven, & Gustafson, 1974). The Nominal Group Technique (NGT) has individuals work separately in the first stage and then interact as a group in the second stage. The presumption is that groups tend to get involved in social relations and, as a result, show a relative lack of focus on the task and a tendency for conformity. Thus, this technique emphasizes the individual level for idea generation and recommends groups for the evaluation and implementation stages (see McGrath, 1984). According to proponents of this technique, one of the problems of
interacting groups is that they tend to avoid conflicts between members’ ideas, or smooth them over, and spend most of their time discussing non-controversial issues (see generally McGrath, 1984, p. 129). The implication is that confrontation of competing views is to be desired.

Other research also posits the potential value of conflict, especially conflict that is related to the task rather than the person. In a longitudinal study by Jehn and Mannix (2001), for example, high performing teams were those that had low levels of relationship conflict but increasing levels of process conflict. Such teams had high levels of trust and respect and they had “open discussion” norms around conflict. Such an orientation is also evident in work by Postmes, Spears and Cihangir (2001) who found that “critical” norms improved quality of decisions while consensus norms did not. The difference between the two norms had to do with the valuing of shared vs. unshared information. It was the “critical” norms that valued the non-shared information.

The notion that groups perform better when they share and even confront differences bears some resemblance to the research on the value of dissent and diversity. Diversity is often found to aid the quality of decisions, presumably because of the multiple perspectives that it provides (Williams & O’Reilly, 1998; Milliken & Martins, 1996). The effectiveness of minority dissent is presumed to rely on the cognitive conflict that it engenders and there is now considerable evidence that it stimulates divergent thinking and enhances the quality of thought and decisions of the group (Nemeth, 1997; 2002, in press). We will expand on this literature as it provides the basis for the present studies.
3.7.1 Minority Dissent and Divergent Thought

It should be pointed out that the original work on minority influence (Moscovici & Faucheux, 1972; Moscovici, 1980; Wood, Lundgren, Ouellette, Busceme, & Blackstone, 1994) concentrated on attitude change (see generally Nemeth, 2002, in press) while the current approach stems from the tradition that emphasizes quality of judgment and decisions and which provides different predictions about cognitive activity stimulated by majorities vs. minorities (Nemeth, 1976; 1986). That line of research posits that disagreement, whether it comes from a majority or minority of individuals, induces cognitive activity; people think more about the issue.

However, the nature of that thought differs as a function of the source. In response to a majority position, people think convergently from the perspective of the majority. Thus, they search for information that corroborates the majority position, utilize the majority strategy in problem solving, focus on the issue from the majority view and tend to adopt the majority position as well. Conflict is resolved early and easily by conforming both in thought and stated position (Nemeth, 1995; 2002, ).

In contrast, minorities stimulate divergent thinking. Exposed to minority dissent, people do not necessarily scrutinize the minority message. What they do is consider the issue from multiple perspectives, one of which is that posited by the minority. This is the link between dissent and quality of thought and decisions at the individual and group levels.
People exposed to minority dissent search for information on all sides of the issue (Nemeth & Rogers, 1996); they utilize all strategies in the service of performance (Nemeth & Kwan, 1987); they search the stimulus array more carefully and they detect solutions that otherwise would have gone undetected. (Nemeth & Wachtler, 1983; see generally Nemeth, 1995; 2002,). Such thought processes have been found to result in better judgments and better decisions (Martin & Noyes, 1996; Nemeth & Staw, 1989).

In more naturalistic settings, for example, there is evidence that groups with a dissenter have been found to make better decisions (Van Dyne & Saavedra, 1996). The U.S. Supreme Court has been found to write more cognitively complex arguments when exposed to a minority opinion (Gruenfeld, 1995). Organizations fare better when dissent is valued and expressed (De Dreu, Harinck, & Van Vianen, 1999; Nemeth, 1997). Furthermore, at a societal level, dissent and the airing of conflicting views have long been recognized as a fundamental strength of democracies (Mill, 1859; Nemeth, 1985).

There is also a direct link between minority dissent and creativity. Since creative thought is marked by divergent thought (Guilford, 1950; Nemeth & Nemeth, 2001), the stimulation of divergent thinking by minority dissent suggests a vehicle for creativity. However, there is also more direct evidence. Nemeth and Kwan (1985) found more originality of ideas after exposure to minority dissent, a finding corroborated by De Dreu and DeVries (1993). A more recent study shows that people exposed to minority dissent generated more creative solutions to a workplace problem subsequent to the discussion (Nemeth, Brown, & Rogers, 2001, 2009). There is also considerable research tying
creativity to ethnic marginality, bilingualism and exposure to ideological or behavioral dissent (Campbell, 1960; Simonton, 1994; 2000).

3.7.2. Harmony, Conflict and Brainstorming

As we have seen, the role of conflict in idea generation has “conflicting” view points. Many researchers emphasize the necessity of reducing conflict especially when it comes to evaluation or criticism. Evaluation apprehension has long been viewed as inhibiting creative thought and expression (Osborn, 1957; Paulus & Dzindolet, 1993; Paulus et al., 1999). Other researchers emphasize the role of conflict for stimulating thought and creative solutions (Nemeth & Nemeth-Brown, 2002). As theorized elsewhere (Jehn, 1995), the approach is that the conflict needs to be at the level of ideas only, not on personalities. However, the researcher hypothesizes that it is not necessary to remove evaluation or even criticism. In fact, the researcher argues that the permission and even the encouragement of debate and controversy may be superior to an emphasis on harmony, which is often at the expense of authentic differences. The efficacy of such an instructional focus would be in direct contrast to the mainstream literature that emphasizes harmony and cohesion and, especially, the avoidance of criticism.

What is hypothesized is that the freedom or permission to critique, even criticize, can enhance the generation of creative ideas. It could do this at two levels. One is at the level of permitting discourse that would otherwise be monitored. A second is at the level of stimulating additional thought via the expression of competing views. If ,what brainstorming attempts to achieve is quantity of ideas without regard for their quality
(Osborn, 1957), the freedom to express thoughts without worrying whether they constitute a “criticism” of another’s ideas may be well suited to idea generation. Given that criticism is often seen as undesirable and even impolite—and normal brainstorming instructions emphasize precisely that—it is hypothesized that framing criticism in terms of its potential for group creativity would both liberate individuals to be relatively free of evaluation apprehension and stimulate them to express ideas more freely. This assumption is replicated in the performance appraisal process under the study in organizational settings, where performance of an individual for a specific period or task is criticized by his own work group members, not exceeding six in number. Rao.T.V. (2008) argues that it is high time that the term ‘appraisal’ be dropped and instead use the term ‘management’, which is broader and encompasses many things for a system. The basic purpose of such a system is not merely an evaluation of past performance, reducing the entire years or six months work of an individual into a mere magical number or letter. No two numbers are comparable in appraisals, as the numbers in performance appraisals do not follow any rules, except the rule of nominal scales (T.V.Rao-2008).

High creativity teams were predicted to engage in more task, relationship, and process conflict. Task conflict, which was predicted to have beneficial effects for the creativity and the quality of group output, is the framework on which the researcher proposes to build up the hypothesis that in a small work group if criticism about the work methods or process of an individual is inducted, the individual implicitly starts defending his deeds and actions by bringing more and more arguments in the debate. This is possible only when the individual is placed in a conflicting situation, within a small work group where all are known to each other and freedom for criticism is taken for granted as a positive
feedback for betterment of performance, without undergoing the appraisal process. At the same time, relationship and process conflict were predicted to be detrimental for all aspects of group performance. The quality of the team's output was expected to increase with increasing levels of individual creativity until a point where conflict and coordination issues undermine effective performance (Kartzberg-2001).

Further, given the prior work on dissent and creativity, it is further hypothesized that such an atmosphere might not only stimulate ideas at the group level but may stimulate creativity subsequent to the interaction.

The latter point deserves attention. Research on the brainstorming technique has emphasized the fact that groups may be sub-optimal to individuals working ideas alone because of production blocking” (Diehl & Stroebe, 1987). People can’t talk at the same time and, as such, some ideas may not be expressed. We suggest that these ideas can and should be captured and, moreover, there may be ideas stimulated by the discussion that occur subsequent to the interaction. Such an hypothesis is consistent with research showing that ideas presented in the group can prime subsequent ideas (Dugosh, Paulus, Roland, & Yang, 2000). It is also consistent with the literature on minority influence that repeatedly finds attitude change after the discussion (Moscovici, 1980; Mugny, 1982) or creative solutions subsequent to exposure to consistent minority views (Nemeth, et al., 2001).

Creativity can be analyzed from a number of different levels including the individual, the process, the product, and the response of others to the new idea. Recent research has
integrated all four of these dimensions (Feldman, 1994; Amabile, 1993), and has suggested that all of these dimensions play a role in the combination of creative individuals into a group setting. Current research (Shalley, 1991; Woodman et al., 1993) often focuses on the product or outcome of a process, and defines creative performance as either an introduction of completely new materials for an idea, process, or product, or a significant recombination of existing materials (Cummings & Oldham, 1997; Oldham & Cummings, 1996.) The idea is considered creative if it satisfies two conditions: (1) it is novel or original and (2) it is relevant for or useful to an organization.

A large body of literature focuses on the characteristics of individuals that are associated with creative production, including measures of cognitive styles and intelligence. Researchers in creativity have long presented the construct as one distinct from that of intelligence, both in theory and in terms of measurement (Cox, 1926; Wallach and Kogan, 1965; Torrance, 1969.) Oldham and Cummings (1996) summarize the set of stable characteristics which relate consistently and positively to measures of creative performance across a variety of domains: broad interests, attraction to complexity, intuition, aesthetic sensitivity, toleration of ambiguity, and self-confidence. Though social psychological research in creativity has demonstrated that individual creative production can be strongly affected by situational and environmental influences (see, e.g. Amabile, 1996), the research in creativity as an individual difference has established that even without external influences, different people do tend to produce different levels of creative ideas. When studying group work, these two streams of creativity research merge; what individual creative minds produce is relevant to the group’s creative output,
but in addition, the team process and the interaction with the other people in the team provides a context which can systematically affect the individual’s thinking. In group settings, individuals do not always act exactly as they would have acted if working alone. This research addresses all three elements of the creative process: the individual, the team processes, and the outcomes.

According to Kirton’s (1976) Adaptation-Innovation (KAI) theory, individuals with “innovative” problem solving styles approach, consider, solve, and apply problems differently from those with “adaptive” problem solving styles. While Adapters tend to work most comfortably within set boundaries and constraints and tend to work incrementally on problems, Innovators prefer to work on problems in a novel way and even reframe the problem itself before generating solutions. While both types of cognitive style can result in acceptable and even creative solutions to problems, it is understandable that individuals far apart on the continuum might have more trouble communicating with each other than will individuals with the same approach to problems (Kirton, 1976, 1989; Hammerschmidt, 1996.) This provides evidence for the idea that when we combine individuals with unique creative styles into teams, there may be some negative implications for their team processes.

Other research has shown that Innovators tend to be consistently better at idea generation and creative production than Adapters (Isaksen and Puccio, 1988; Hill, 1991), and measurement on this dimension is related to creativity. This may contribute to another reason that creative individuals may have that much more difficulty in attempts at
coordination. The insight process (Perkins, 1986), central to creative idea generation, is essentially entirely individualistic in nature. The experience of insight involves the feeling that an idea arrives in a sudden flash, highlighting the fact that the idea belongs initially only to the one individual, and likely not to the shared norms and concepts that the group has established. In addition, original ideas are, by definition, separate from the work that the group has already established as shared. Finally, as described above, Innovators also tend to be less concerned with group norms and rules than Adapters, and can often act as a catalyst to changing established group processes. The tendency to pursue new ideas, combined with a tendency to break away from established group norms and rules, may draw creative individuals away from the coordinated and agreed-upon group structure and processes that are essential for effective teamwork of any kind.

3.7.3 Team coordination processes

The task set before every team is to engage in a process that effectively harnesses the individual skills and talents and channels them into group outcomes. To do this, group members must coordinate their plans for accomplishing their work; they must come to a common understanding of the problem definition, they need to agree on the evaluation of ideas along the way, and they must work effectively interpersonally with each other. The literatures on team member socialization and shared mental models remind us how important it is for team members to overlap in their thinking in order to accomplish a common goal (Klimoski and Mohammed, 1994.) As described above, each group-level goal presents a struggle between the individual perspectives brought into the group and the convergence required for well-coordinated processes and easier
interactions. High levels of individual creativity may interfere with the establishment of a shared vision and process both because individual ideas may work counter to the shared group work, and also because highly creative individuals may also be more resistant to the establishment and respect of group norms and rules (Kirton, 1976, 1989.)

When discussing the socialization of new members into existing groups, Moreland and Levine (1988) described the relationship between individuals and groups as “reciprocal” (p. 143), and describe individuals as attempting to monitor, evaluate, and influence groups based on their own normative expectations. In this way, research has demonstrated that the relationship between individuals and group members is an ongoing evaluative process that needs attention across the course of the group’s work. Simon (1953) argued that organizing involves the process of individuals coming to share the same image or belief system as to what a new organization should look like. Similarly, in order for groups to go about the tasks required of them, group members must understand the relevant dimensions of their area of specialization, both in terms of process and content, in the same way. Each group must coordinate its efforts, which requires members to hold common or overlapping cognitive representations of task requirements, goals, procedures, and role responsibilities (Thompson and Fine, 1999.) The process that group members undergo to coordinate their creative thoughts is no exception, especially because individual creative thoughts can encourage group members to develop their own plans and goals for the group work, potentially making it that much more difficult for all individuals to converge on a common plan.
Though recent research has given an abundance of attention to team mental models and shared cognitions, there is not much agreement in the field as to the appropriate definition and operationalization of this construct (Klimoski and Mohammed, 1994.) In seeking more precision on the breadth of the construct, these authors have delineated specific characteristics of team mental models. They describe shared mental models primarily as a hypothetical construct that is an emergent characteristic of a group. The group mental model itself contains organized and categorized knowledge on a variety of content areas. The beliefs contained in the mental model must be internalized by the group members, who must be aware of their existence to at least some degree (Klimoski and Mohammed, 1994, pp. 425-426.) Rouse and Morris (1986) describe the role of the mental model as a tool to describe, explain, and predict the future of systems, while Holyoak (1984) describes the mental model as a psychological representation of the environment and its expected behavior. In all cases, the authors converge on the idea that the group must reach some consensus about the content of their work and the behaviors that will move their work towards the necessary end-state. Again, the presence of multiple streams of individual ideas being created simultaneously in the group setting may provide an obstacle to smooth coordination.

The amount of agreement necessary for a shared mental model to exist is subject to debate among theorists and researchers. The more agreement that is needed, the more the tension between individual ideas and group structures will become a problem for group work. While some feel that complete cognitive overlap must occur for a shared model to ensue, others feel that complementary models can suffice, and still others discuss
distributed knowledge as a form of a shared mental model (see Klimoski and Mohammed, 1994.) Team mental models are a fundamentally group-level construct which departs from merely the aggregation of the individual cognitions of each of the group’s members (Hutchins, 1991.) Clearly, though, some threshold level of common understanding must exist among team members for them to be able to work towards a common goal in an effective and efficient manner.

The shared knowledge structure that groups develop can allow team members to adapt to and anticipate other members’ information needs and contributions (Cannon-Bowers et al., 1993.) Groups not only need a common understanding on the process and task, but their shared knowledge structure must include group norms (Bettenhausen and Murnighan 1985, 1991) and group learning and memories (Moreland, Argote, and Krishnan 1996.) Indeed, instructing group members together can create shared memory systems that allow members to place trust in the knowledge and skills of their teammates. As described above, the individual creative style may be particularly related to the rejection of shared group norms (Kirton, 1976, 1989), making this process more difficult in teams of all highly creative members.

Some level of shared understanding needs to exist for groups of individuals to work together as one cohesive unit towards the same goal. Previous research in this area has not yet addressed the conditions that promote or hinder the development of shared understandings in group work. This research project hypothesizes that large amounts of creativity and idea generation can actually hinder this coordination process because
individual insights may serve to pull each team member further away from the group structure and alignment on processes. Furthermore, a lack of coordination or a shared model for how to accomplish a goal may inspire conflict among team members, particularly about their work processes. Though some conflict can aid the creative process (James, 1995), it can also turn out to be destructive if the intensity of it becomes too large.

3.7.4. Effects of conflict

Conflict, loosely defined, is a disagreement of any kind among two or more people. Conflict can moderate the translation of individual abilities into successful team outcomes. Groups seeking creativity will likely face some conflict as they engage in the coordination process. This dissertation suggests that conflict is caused in part because groups need, simultaneously, group coordination and individual inputs. Individuals are divided between following their own paths of thought and focusing on the group level process which is occurring. In addition, individual creativity is thought to be associated with behaviors which can discourage teamwork and hinder trust (Kirton, 1989), which may in turn spark greater levels of conflict.

The effects of conflict can be seen on both the individual and on the group level of analysis. Individually, conflict is often considered to be an unpleasant experience in that it can lead to negative affect. Engaging in conflict can affect a person’s mood, his or her rapport with others, and even patterns of thinking. For example, Carnevale and Probst
(1998) have demonstrated that when individuals anticipate a conflict, their thought processes become more narrow and rigid than when they anticipate cooperation. In their study, even the suggestion of conflict, without the actual experience, was enough to trigger this limitation in thinking. Creative ideas thrive on openness of thought (Sternberg and Lubart, 1993), yet conflict seems to be triggering the opposite effect in this case.

However, in the group context, certain types of conflict such as disagreements of opinion on specific work issue and goals, can aid the creative process (James, 1995.) Trying to conceptualize a group working on producing innovative ideas can elicit images of people engaged in heated debate and thriving in a noisy environment where conflict, argument and discussion merge to unleash creativity. Is this conflict a necessary part of creative production? Which aspects of conflict aid the creative process, and which hinder it?

Much research has been done on the idea that conflict does play a role in group work (e.g. Amason and Schweiger, 1994; van de Vliert and de Dreu, 1994), though this role is not fully understood. Conflict in this research has been shown to enhance the quality of group decision making if the disputants’ goals were positively interdependent, when tension levels were low, and when the conflict focused on task issues. Though disagreements can bring to light more diversity of opinions and may actually aid the creative production process, (James, 1995; Smith and van der Meer, 1994; Kolb and Glidden, 1986), the dangers of the negative affect that conflict can cause are a risk to the team process.
Conflict researchers have recognized that not all conflicts are the same. Previous research has identified three main categories of conflicts: task-based conflict, which pertains to discussions and debates about the work being done; relationship-based conflict, which pertains to the interpersonal interaction among group members; and process-based conflict, which pertains to how the work is accomplished (and the assignment of roles and responsibilities.) Research has shown a curvilinear relationship between task-based conflict and group performance, indicating that while some task-based conflict can be beneficial, large amounts of it can become counterproductive (Jehn, 1995), if the task is non-routine in nature. If the task is entirely routine, task conflict does not seem to have the same potential benefits. Relationship conflict (Amason, Thompson, Hochwarter, & Harrison, 1995), and process conflict (Jehn, 1997), are seen as singularly damaging. Indeed, process conflict can be thought of in much the same terms as team-level coordination issues. The presence of process conflict can be seen as a signal that the team members are having difficulty coordinating with each other and working towards a common goal. More specifically, having a multitude of individual ideas in the group may get in the way of easy coordination, and may lead to process conflict, thereby increasing the tension between the individuals and the group process. Previous research thus demonstrates the importance of categorizing the type of conflict present in group situations, instead of merely assessing the presence of conflict, since the different types can have vastly different effects.

Even despite the positive relationship demonstrated between task conflict and performance in situations when groups face non-routine tasks, conflict is still recognized
as having other negative consequences on outcomes such as individuals’ satisfaction, liking of other members, and intent to remain in the group (Jehn, 1995.) In addition, even with the potential benefits that task conflict may offer, it can also spiral into unproductive interactions which can be detrimental to group output (Jehn, 1997.) Past research has focused almost entirely on the quality of the group’s products; research has not yet directly addressed the effects of these differing types of conflict specifically on creative production.

Conflict is a volatile condition. The major detrimental effects of conflict are not merely that it exists, but that it can easily escalate from a minor disagreement to an unmanageable and destructive event. The escalation of conflict has been parsed into levels by some theorists (e.g. Glasl, 1982), who have observed general shifts in focus from substantive issues to a personalized focus to techniques for surviving combat (Thomas, 1992.) It is important to note that the escalation of conflict tends to go from disagreements on substantive issues to emotion-based negativity. Escalation also seems to be unidirectional; once individuals have moved from one level to another, it is much more difficult for the conflict to lessen.

In addition, it is relatively easy for conflict to escalate from the more productive task-based variety to the counterproductive relationship type. As Jehn (1997) points out, there is a mutually hazardous interplay between these types of conflict. If people disagree, they may in turn like each other less and attribute the task-related problem to the personality of other group member(s), especially since, according to the Fundamental
Attribution Error, most attributions about another tend to be personal rather than situational (Ross, 1977.) Potentially beneficial conflict statements can also come in the form of an interpersonal exchange fraught with its own communication difficulties. Interpersonal communication can be misinterpreted based on poor language choice or through nonverbal communication cues, which can display meaning, affect, status, and strategic information (Jones and Remland, 1993; Springer, Meier, and Berry, 1996; Alibali, Flevares, and Goldin Meadow, 1997.)

Furthermore, negotiation research has shown that behaviors are often reciprocated (Lewicki and Litterer, 1985), so hostility by one person will likely be retaliated. Psychological research has also shown that decision makers tend to escalate commitment to a course of action once begun (Bazerman, 1998; Brockner and Rubin, 1985; Staw, 1976.) Despite the detriments of hostile conflict, it seems to take little to push an initially negative event into a committed course of action and behavior.

### 3.7.5 Why task conflict be good for team creativity?

Conflict is an integral part of group dynamics, and though it is theoretically possible to stifle all creativity in group work (Thomas, 1992), lack of disagreements of any kind can hinder both the team’s productivity and their creativity (Nemeth, 1995.) This can even leave teams susceptible to the dangerous occurrence of “groupthink” (Janis, 1972), in which the psychological drive for consensus at any cost suppresses dissent and consideration of alternatives.
Research continues to demonstrate a relationship between creativity and conflict, both in terms of creative individuals having a higher tolerance for conflict (Sheldon, 1995), and creative products stemming from the presence of conflict (James, 1995; Smith & van der Meer, 1994.)  Kolb and Glidden (1986) have argued that managers can legitimize conflict in organizations in order to use conflict as a creative force. Groups in which task conflict is created by multiple opinions are shown to be more original (Van Dyne and Saavedra, 1996), more divergent (Nemeth, 1986), and more complex (Gruenfeld, 1995) in their products than groups in which members all agree, because they tend to use multiple perspectives simultaneously. As such, the presence of and the defense of multiple viewpoints among group members can be thought of as one of the elements that makes task conflict potentially productive for creative outcomes. This is consistent with the creativity literature’s identification of flexibility, or the number of different perspectives represented (Guilford, 1950), as one element of a creative outcome. Though Guilford talks about flexibility on the individual cognitive level, it makes sense that this type of task conflict can lead to more creative outcomes in a group setting as well by stimulating the development of and defense of multiple viewpoints.

Individuals trying to coordinate their activities into group processes are likely to encounter multiple types of conflict along the way, and it would be useful to group members to know what kinds of conflict are most helpful to their creativity goals and which are detrimental. As described above, separate research studies have shown both that creative individuals are more tolerant of conflict (Sheldon, 1995), and that conflict
can, in certain circumstances, actually be helpful for generating creative outcomes (James, 1995). In this way, research has demonstrated that conflict may be a common part of the creative process on a team level. These studies have not, however, combined these two ideas in the same study. This research project attempts to do just that, and hypothesizes specifically that teams of highly creative individuals will have more conflict overall, and that task-based conflict can benefit creative production, but that relationship and process conflict are detrimental to creative production.

3.7.6 **Optimizing diversity: The non-creative moderator to team processes**

Up to this point, individual creativity in teams has primarily been discussed in terms of adding more individual creativity to a team, and the likely effects on both the process and the outcome of the team’s work. This perspective leaves out the potential importance of the other, non-creative team members. As Kirton describes, the opposite end of the spectrum from Innovators is Adapters, who are described to have an entirely different thinking style. While Kirton only discusses the potential communication drawbacks for having members of the same team with widely divergent scores, the literature on diversity in teams suggests that there may be some potential benefits, as well as the potential drawbacks, to combining people with vastly different creative thinking styles.

In terms of the potential drawbacks, Argote, Insko, et al., (1995) found that closed groups with no membership turnover outperformed open groups on a mechanical task, or those whose membership changed, in part because experienced groups already have a larger
degree of shared understanding on their processes and goals. That being said, it may be possible for established groups to have too much overlapping knowledge and alignment about each other and the task. Thus, in terms of the potential benefits, diversity, in terms of functional background, education, and company tenure, is known to have some positive effects on group decision performance (Hambrick, Cho, & Chen, 1996.) Thus, while turnover may hinder performance immediately, it may well be beneficial for increasing the new ideas and perspectives of the group, perhaps through the addition of new members.

Along these same lines, it is important to manage the diversity of team members in order to optimize the benefits. Research has shown that in terms of group composition, there may be an optimal mix of diverse characteristics (O’Reilly, Williams, & Barsade, 1998), even for the goal of producing creative output. For example, when exploring the personality dimension of extraversion, research has demonstrated an inverted U-shaped relationship in which extraverts add to group performance on a creative problem-solving task to a point and then decrease from this performance level once a critical composition has been reached (Barry and Stewart, 1997.) Diversity can make the tension between individual ideas and group structures worse because it potentially provides that many more points of diffusion among team members in their approach to their work, thereby working against a shared understanding of how to proceed.

Diversity on a large number of characteristics about individuals may affect the group’s processes and performance. Milliken and Martins (1996) have listed 14 different
attributes on which individuals differ: race/ethnic background, nationality, gender, age, personality, cultural values, socioeconomic background, educational background, functional background, occupational background, industry experience, organizational membership, organizational tenure, and group tenure. Conspicuously absent from this list is any mention of ability, or cognitive style, or creativity. This research will investigate the question of whether individual creative style is yet another dimension of diversity that needs to be managed in the group context for effective functioning.

3.8. Special Case: Creativity in a Negotiation Context

The effects of conflict on creativity are also dependent on the type of task that the group engages in. As described above, previous research has shown that conflict has different effects on routine versus non-routine tasks (Jehn 1995), or based on the social orientation of the task and the group’s goal (James, 1995.) As such, to investigate the effects of conflict on creativity in teams requires a clear task context. Negotiation situations have a tremendous amount of clarity in the task goal. In addition, the effectiveness of the outcome hinges on the ability to resolve conflicts creatively. Because of the creative and practical requirements for successful negotiations, these situations provide a fruitful area of study for this topic.

Negotiations is a context in which creativity can be directly applied to organizational life. One of the goals of negotiation processes is to find integrative solutions which maximize the value of the agreement for all parties (Bazerman and Neale, 1992.) Creativity is a
skill that aids the negotiation process and the search for integrative solutions (Kurtzberg, 1998.) In many organizational negotiation settings, negotiation activities happen through teams instead of simply having one person prepare the negotiation. Particularly when preparing for negotiation sessions, multiple individuals often work together designing a strategy and establishing a set of priorities for a lead negotiator or a team to use. Examples include a team of attorneys preparing a case for one litigator, a union committee putting together possible packages and negotiating plans for the head negotiator, or politicians preparing for one representative to engage in trade negotiations. Teams are also increasingly required to negotiate together as one unit, requiring a strong sense of cognitive overlap on the issues and strategies in order to present a unified front to the other side. The better the role of creativity in team work is understood, the more we will know about how effective team negotiation sessions can occur. In addition, studying creative teams working on negotiation tasks can provide evidence for the power of combining creative talents towards an end that is useful to the organization.

Research has shown that in the search for integrative solutions, having only one highly creative member of a negotiating dyad can reap as much benefit for the dyad as having both members be highly creative (Kurtzberg, 1998), indicating that it may be enough to have one person recognize the creative potential of the situation. This finding can have implications for organizational and negotiating teams as well, when combined with the lesson from the diversity literature that it may be better to have a mixed group of individuals than an entirely homogeneous group; teams may be best off with fewer
creative individuals who can elaborate the creative potential of the work, rather than having all members specialize in creativity.

3.9. The Future of Creativity Research

Guilford’s (1950) early thinking on creativity led scholars down the path of investigating individual creativity as it relates to cognitive processes, personality traits, and environmental contexts. Today, researchers must look to the next horizon to understand how creativity occurs in natural settings. Situations where individuals must work together, share ideas, and be creative in team contexts are increasingly important in the modern workplace and are worthy of more investigation by creativity researchers. In recent years, researchers have made great strides to better our understanding of how groups function. In this article, we have outlined some components of group behavior that may impact team-level creativity, including the diversity of team members and the types and amounts of conflict present during group processes. To take creativity research to the next level, researchers must now accept the challenge of dissecting team-level creativity and understanding the components of creativity as they occur with multiple individuals. In helping us to understand the importance of investigating creativity in individuals, Guilford opened the door to a world of personality traits and cognitive processing models. It is now up to us as creativity researchers to expand the scope of this field and explore creativity in all of its manifestations, from single individuals working together, to small teams, to large and complex groups.