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THE IMPACTS OF GROUP DIVERSITY ON PERFORMANCE OUTCOMES

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by

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ABSTRACT

THE IMPACTS OF GROUP DIVERSITY ON PERFORMANCE OUTCOMES

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Group creativity and collaboration are imperative in a society in which social networking and group business solutions are so prominent. However, one factor to consider is the possibility that both political ideology and diversity hinder group processes. The present research seeks to better understand large group creativity as well as group relations regarding political orientation. Sixty participants were recruited through Amazon's Mechanical Turk system and were placed into groups of twenty. These groups completed a survey regarding political orientation, creativity, and a brief personality inventory. Participants were then asked to generate at least five unique ideas on environmentally sustainable practices and were instructed to facilitate conversation amongst other group members. Ultimately, the results indicated that there was a positive relationship between political orientation and novelty, and there was a trending negative correlation between

political ideas generated and political orientation. The present results are relevant because of the current political atmosphere.

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CHAPTER 1

INTRODUCTION

1.1 The Benefits of Creativity on Negotiations

Creativity inspires idea generation as well as the proliferation of individual thought processes. Creativity is central to humanity because of our need to be able to collaborate with others and develop solutions to common problems. According to some research, creativity is associated with more effective negotiation (Schei, 2013) because negotiation requires an adopted alternative outlook as well as novel ideas to generate the most beneficial solution to the problem (Wilson & Thompson, 2014). In a popular example in which two sisters quarrel over an orange (Follett, 1940), the benefits of creativity in negotiations are clearly exhibited. In this scenario, one of the sisters needs the orange for the peel while another sister desires the orange for the fruit itself. Both of these requests could be met, which would effectively contribute to the happiness of both of the siblings while preventing an equal compromise of splitting the entire orange in half. This example illustrates creativity in that the desires of the sisters are both maximized without needing an even compromise. While literature has shown that the effects of creativity in negotiations are mixed at best, there exists some empirical research on the benefits of utilizing creativity for negotiations (Wilson & Thompson, 2014). The inevitability of negotiations in daily life proves for the importance of continuing research on the topic of creativity.

1.2 Creativity and Psychological Well-Being

Creativity has also been shown to increase intelligence as well as psychological well-being. Although creativity according to Jung (1984), and as cited by Gillam (2013), has often been associated with insanity regarding famous artists or musicians that were prodigies in their respective professions (i.e. Edgar Allen Poe, Vincent Van Gough, etc.), creativity has been shown to be potentially beneficial regarding psychological well-being. Research has shown that not only does creativity enhance mental wellness but also increases work performance as well as contributions to society as a whole (Mohamed, 2014). In a recent study conducted by Silvia (2015), creativity has been shown to be correlated with enhanced memory as well as with heightened intelligence. Not only is creativity beneficial in aspects of workplace performance as well as intellectual pursuits, studies have also shown that creativity is advantageous in the realm of social connections. Research conducted by Griffiths (2003) as cited by Gillam (2013) has shown that creativity not only assists the individual in regards to increasing coping strategies as well as improving self-esteem, but creativity also assists in social networking and increasing social resources. Researching creativity is necessary because of the implications in the fields of intelligence, memory, and negotiation research. Increased creative expression allows for increased psychological health as well as more efficient relationships with others.

CHAPTER 2

LITERATURE REVIEW

2.1 Factors that Determine Creativity

Despite popular belief, creativity is not solely defined by artistic influence and eccentricity. According to much of Arthur Cropley's (a notable researcher in the field of creativity) research, convergent as well as divergent thinking are both important aspects of creativity (Kaufman, 2015). Divergent thinking is the process of developing many different ideas for a solution to a problem, whereas convergent thinking is choosing among ideas in order to come up with a single useful method to solve a problem. While many researchers believe that divergent thinking is the primary dimension of creativity, Cropley claims that the active thought process of convergent thinking is equally important regarding creative idea generation (Kaufman, 2015). Arthur and David Cropley in "Fostering creativity: A diagnostic approach for higher education and organizations" (2009) claim that randomly generating unique ideas in a divergent method does not establish creativity alone and that creative ideas need to have a purpose. Even though convergent thinking is thought to be as important as divergent thinking in overall creativity, some research indicates that electronic brainstorming (EBS) involves more to the process of divergent than convergent thinking (Kerr & Murthy, 2004). Because EBS is the primary medium of the current study, the abundance of divergent thinking and lack of convergent processes should be noted.

2.1.1 Novelty and Usefulness

Cropley's research has proved vital to the field of creativity and he also developed three parameters for what constitutes creative thought processes. These three aspects are novelty, effectiveness, and ethicality (Gillam, 2013). An idea is classified as creative if the idea is different than typical thoughts regarding the topic, if the idea proves to be useful and practical, and if the idea is moral and could hypothetically be achieved in an ethical way. Paulus and Coskun (2012) emphasize the aspect of usefulness as being more important to creativity than novelty because of the ease of producing novel ideas in comparison to the difficulty of formulating those ideas into a useful solution to a problem. The research of Paulus and Coskun also suggest that developing creative ideas entails utilizing different processes. These processes are that of generating unique ideas and then channeling these ideas in order to develop ideas that are more useful and practical (Paulus & Coskun, 2012). Despite the fact that convergent as well as divergent thinking are both critical to creativity, the most widely agreed-upon necessary characteristics of a creative idea are novelty and practicality (Silvia et al., 2015). That is, a creative idea must be newly developed independent of any other pre-existing idea as well as deemed useful by multiple people. Overall, these two measures help to rule out original ideas that are not practical or obtaining practical ideas that are not entirely original. In the present study both novelty and usefulness are assessed. In the typical sense, usefulness predominantly refers to the effectiveness of the product or idea (i.e. how well the product or idea serves the purpose it was intended to serve; see Cropley & Cropley, 2008). Yet, the present study analyzed effectiveness as related to cost. The problem with establishing usefulness in the present study was that any idea generated relating to more environmental sustainability (which was

the task) would serve the purpose intended. For example, ideas generated based on increasing solar panels would naturally be effective because they would automatically benefit the environment by reducing emissions from coal plants. In this study, cost effectiveness was analyzed because many environmental sustainability practices and research methods are costly. Relative cost was measured to determine how easily the ideas could be implemented and applied by the general population to more effectively benefit the environment. Usefulness and novelty indicate how creative an idea is when analyzing creativity as a whole. Yet, when analyzing factors that are related to creativity, personality factors have been previously researched.

2.1.2 The Relationship Between Creativity and Personality Traits

While there are many different factors that contribute to individual creativity, some researchers agree on the idea that individual creativity is correlated with certain personality characteristics. While researchers such as Kandler et al. (2016) suggest that creativity is mainly due to traits such as extraversion as well as openness to new experiences, these researchers also convey that creativity is a result of intelligence, behaviors, and social experiences (2016). Despite the fact that Kandler et al. argue for the correlation between the personality factors of extraversion and openness to experience with creative idea generation, the trait of agreeableness has also been argued to correlate with creativity (Toh & Miller, 2016). By contrast, other researchers believe that creativity can be learned through practice (Gillam, 2013). Overall creativity has not been shown to be based on one factor and ultimately, certain personality traits as well as environmental factors contribute to creativity. Research by Toh and Miller (2016) have further supported this idea by suggesting that risk taking is associated with creativity because risk takers are more willing

to adopt and try new ideas. Other factors contributing to creativity are the traits based on being explorative, open to new experiences despite possible harm, an abundance of persistence, being goal-oriented, and being willing to work with others (Chavez-Eakle et al., 2012). Creativity, although reliant on personality to some extent, is also dependent on factors of behavior, situation, and social environment.

2.2 Individual versus Group Brainstorming

Although a natural assumption is that group brainstorming is inherently better than individual brainstorming, research proves that the contrary is generally true. Studies have shown that although participants may feel more productive in groups, individuals are typically more productive and effective in creative idea generation tasks (Paulus & Coskun, 2012). Other researchers suggest that in groups of more than two members, brainstorming is less productive than individuals brainstorming alone (Ziegler et al., 2000). Although some researchers continue to believe that groups are more productive than individuals in the area of creativity, this belief is now known as "the illusion of group creativity" because of the falsity of the assumption (Rietzschel, 2006). Despite the fact that some research such as that of Gallupe et al. (1991) suggests that there is no difference between the performance of interacting groups as well as nominal groups, these results cannot be concluded because the nominal groups performed brainstorming by brainwriting (i.e. writing one's ideas on paper) whereas the groups discussed their ideas aloud (Ziegler et al., 2000). As defined by previous research, nominal groups are groups that brainstorm independently of interaction with others. Similarly, Dennis and Valacich (1993) conducted a study in which virtual groups performed better than nominal groups; however, there were possible influences in their study in that nominal groups performed in the same room and

virtual groups were encouraged to openly express ideas and emotions that may have affected the results (Ziegler et al., 2000). In reality, although controversial research exists that claims that virtual groups perform better than nominal groups or individuals in general, a large body of research exists that have found the opposite to be generally true.

2.2.1 Social Factors that Influence Group Brainstorming Processes

Despite the fact that oftentimes group members will feel as though brainstorming was efficient as well as creative due to the feedback and encouragement from others, the problems concerning group brainstorming stem from both social and cognitive factors. Two predominant problems in the area of group brainstorming are related to social comparison as well as production blocking (Paulus & Coskun, 2012). Production blocking occurs when groups brainstorm in a way where one person is allowed to speak at one time, and this leads to other participants forgetting their ideas or concentrating solely on their ideas and not interacting with the ideas of others. Social comparison contributes to the group dynamic because some participants will neglect to share their ideas due to fear of being ridiculed (Paulus & Coskun, 2012). Researchers also attribute potential problems with group brainstorming to what is known as "free-riding" or simply continuing the ideas of others without expanding the thought and adding one's own input or failing to contribute to the brainstorming process at all (Ziegler et. al., 2000). Alex Osborn (Osborn, 1957) did not believe free-riding to be a significant problem when he introduced the idea of brainstorming, and thus free-riding as well as the combination of ideas was encouraged in the original model (Goldenberg & Wiley, 2011). Overall, there are many harmful factors that are involved in group brainstorming processes that are largely unrealized. The aspects of social loafing (i.e. not contributing in the group and allowing others in the group to

generate all the ideas), free-riding, and the "sucker effect" (i.e. the decrease of production of ideas in a group due to other members realizing that free-riding and social loafing are occurring) are all detrimental to idea generation in groups (Goldenberg & Wiley, 2011). Nominal groups are more efficient at idea production than large groups because they lack these prominent social factors.

2.2.2 Cognitive Factors that Influence Group Brainstorming Processes

Although certain social factors lead to the failures of group brainstorming, cognitive research has shown that group brainstorming methods are effective. Despite the fact that factors such as production blocking may inhibit the sharing of ideas, group brainstorming can be good for idea generation because semantic networking in the individual is increased when ideas are shared in a group (Paulus & Coskun, 2012). Researchers have found that novelty in groups can be attributed to the priming of different semantic networks and this allows for more thoughts to be generated in groups (Dugosh et al., 2000). When an idea is mentioned that is familiar to participants, then that idea can allow for more creative ideas to be generated and for facilitation of a greater number of ideas. Semantic networking is one of the main reasons why group processing is not always harmful when compared to individual idea contribution. Similarly related, researchers have found that group brainstorming also allows for a more seamless transition to new topics, as compared to individual brainstorming (Paulus & Coskun, 2012). When individuals are brainstorming alone and contribute an unrelated idea because all other ideas had been exhausted within a certain category, they will consider their time brainstorming to be inadequate if they cannot easily transition to a new category (Paulus & Coskun, 2012). Because group brainstorming allows for new categories to be explored more efficiently,

participants feel more successful in the time spent generating ideas. While researchers have discovered that groups may be more productive in regards to reaching different categories through cognitive processes and idea generation, the major problems concerning group brainstorming are production blocking and time. Because participants are not allowed to share their ideas as they occur and have to wait their "turn" to speak, time is lost in comparison to the individual brainstorming process (Nijstad et al., 2006). Despite the fact that individuals may produce ideas that are not novel for a portion of the time they use to brainstorm, they contribute more ideas than group members because they have a greater amount of time (Nijstad et al., 2006). Because individuals may have a cognitive lull, groups perceive brainstorming sessions as more effective than do individuals (Nijstad et al., 2006). Although various social and cognitive processes seem to be crucial to researching group brainstorming, synergy is vital for the group to obtain any amount of success.

2.3 Synergy and Diversity in Groups

While an amalgamation of individuals constitutes a group, synergy explores the characteristics of the group as a whole without focusing as much on the individuals involved (Kurtzberg & Amabile, 2001). There are a few different factors to take into account when attempting to maintain group efficiency and synergy. Paulus and Coskun (2012) first claim that production-blocking, social comparison, and social loafing should all be eliminated through incentivizing participation, discouraging criticism, and utilizing a non-verbal method of idea communication. The three other aspects necessary for synergy are attentiveness to all ideas shared, brief time periods for individuals to access cognitive information and make more connections to shared ideas, and a diverse group of people interacting in the group to ensure varying ideas (Paulus & Coskun, 2012). Although

diversity is emphasized to achieve different perspectives, too much diversity can be a hindrance to group processes because of the inherent conflict that is associated with group diversity (Kurtzberg & Amabile, 2001). The key with diversity is to allow for some basis of similarity to be developed between group members concerning their ideas, which in turn develops a connection between participants and also avoids completely controversial views (Miura & Hida, 2004). Group synergy provides effective group brainstorming and develops ideas that an individual could not have provided alone (Kurtzberg & Amabile, 2001). Research has shown that with synergy, idea production is more efficient in groups than individuals (Paulus & Coskun, 2012) and other methods have been proven to facilitate synergy.

2.4 Methods of Group Brainstorming

2.4.1 Facilitating and Brainwriting

Group brainstorming has been found to be more efficient in situations other than free verbal expression. Although the literature is not in support of the idea known as face to face (FTF) brainstorming, researchers have found that facilitators can enhance creativity in groups (Kurtzberg & Amabile, 2001). Facilitators have been shown to lead groups that not only are more productive than normal, interacting groups but also nominal groups(Oxley, et. al., 1996). Specifically, facilitators have been shown to heighten participation as well as encourage the group to continue generating ideas (Kramer et al., 2001). A different, yet also effective technique for group brainstorming is brainwriting, which allows for some differing methods to facilitate idea generation that occasionally include verbal brainstorming (Heslin, 2009). In brainwriting, participants write their ideas down independently of one another and then the ideas are read aloud. Researchers have

found that brainwriting can increase more novel ideas generated than both group and individual brainstorming (Heslin, 2009). Brainwriting seems to be more effective than verbal brainstorming because of the elimination of production-blocking and social comparison (Heslin, 2009). Additionally, brainwriting has been shown to be substantially efficient in idea production and has produced similar effects as electronic brainstorming (EBS) in that both reduce production-blocking and promote group synergy (Michinov, 2012). In research, brainwriting and electronic brainstorming are both methods of conveying ideas in a non-verbal form and then adding to the ideas of others. Although electronic brainstorming and brainwriting have proven similar in the realm of idea generation, EBS, through utilizing technology, naturally encourages diversity and is more simplistic concerning the recruitment of participants.

2.4.2 Electronic Brainstorming

EBS groups have the potential to be more efficient in the production of ideas relative to novelty and quantity than nominal groups under certain circumstances (Derosa et al., 2007). Research has also found that EBS groups produce a greater number of ideas as well as more novel ideas than verbal brainstorming groups of the same size (Paulus et al., 2013). Although the tendency is to attempt to compare EBS and nominal groups in order to determine the novelty and quantity of ideas for both, there is a confound in that an electronic medium is used in one condition and not the other (Derosa et al., 2007). Because possible discrepancies between different measurements should be avoided, e-nominal groups in which participants can brainstorm individually through utilizing technology are preferred (Derosa et al., 2007). Despite the fact that research is now being conducted comparing e-nominal and EBS groups, generally, EBS has been shown to be more effective

than FTF groups in the elimination of production blocking (Brown & Paulus, 2002). Also, EBS groups are more efficient compared to FTF and both types of nominal groups in regards to the exposure of many differing ideas (Brown & Paulus, 2002). The one way in which FTF groups outperform EBS groups is in the area of convergent thinking; FTF groups were more capable of developing useful ideas compared to EBS groups (Kerr & Murthy, 2004). The larger the EBS group, the more useful and unique the ideas (Coskun, 2011). Not only have EBS groups been shown to be more effective in creative idea generation, but EBS groups report more satisfaction with the outcome of the brainstorming sessions than do nominal groups (Derosa et al., 2007). The satisfaction of larger groups compared to nominal groups has been largely attributed to the social effects in which participants are able to compare their ideas to other ideas presented in the brainstorming session (Paulus & Coskun, 2012). Because EBS provides the opportunity for participants to remain anonymous, this allows for evaluation apprehension to be largely unproblematic (Michinov & Primois, 2005). Since participants are not concerned with the idea of receiving personal criticism, as they are in a FTF context, they are able to communicate in a way that may not occur through verbal brainstorming. Compared to e-nominal groups, electronic brainstorming groups produce more creative ideas over a greater amount of time because of priming of similar ideas (Baruah & Paulus, 2016). Another beneficial aspect of EBS that can only be instituted by EBS is the ability of participants to live in different places in the world and to also not be confined by a certain time limit (Michinov & Primois, 2005). Although many of these factors are shown to be beneficial to the process of EBS, many of them can also be shown to be detrimental as well.

2.4.3 Inefficiencies with EBS

One of the main problems with EBS is the abundance of ideas due to the tendency of participants to ignore a number of ideas created by other group members in the process of generating their own (Brown & Paulus, 2002). Despite the fact that groups are capable of generating a large number of novel ideas, many of these ideas are not capitalized on because of the process of the idea generation of each individual participant. Participants may convey ideas that are similar or may have to relinquish necessary time in order to read the ideas presented (Paulus et al., 2013). Studies have also shown that EBS and the production of creative ideas is only significant in groups that contain more than nine people and that nominal groups of similar sizes containing up to eight participants are equivalent in idea generation (Pinsonneault et al., 1999). Similar studies indicate that EBS groups can be considered as more creative than nominal groups when the EBS groups consist of more than eight members (Paulus et al., 2013). The major pitfalls with electronic brainstorming are due to the fact that participants are anonymous or distinguishable. While an anonymous condition may cause social loafing, a non-anonymous condition may lead to negative social comparison (Pinsonneault et al., 1999). Overall, although EBS may have inefficiencies, the cause for the development of EBS is promising as shown by research. Because EBS is capable of reducing the aspect of production blocking as well as obtaining a more diverse group of participants, the implications for diversity and novelty are significant.

2.4.4 Benefits of EBS

The properties of EBS and FTF group brainstorming naturally encourage novelty and diversity. More researchers focus on novelty than utility in idea generation due to a fairly obvious relationship to creativity. Judging an idea by uniqueness is commonly related

to the idea of being creative. The factors of production blocking and apprehension are largely eliminated in EBS and contributes to a larger quantity of ideas as well as ideas that are more novel (Paulus et al., 2013). Synergy through the use of a computer is also increased and influences novelty because participants are not forced to recall the ideas of others and can access them on the website/database (Derosa et al., 2007). Another factor present especially in EBS is diversity. Cultural diversity has been shown to improve group creativity (Paulus & Coskun, 2012). Although EBS facilitates diversity in that participants across the globe can be involved in the study, research has shown that only a moderate amount of diversity contributes to creativity and that if participants do not share similar common values, then creativity and idea generation will likely suffer (Paulus & Coskun, 2012). Diversity has advantages in creativity but there are also significant weaknesses. A study conducted by Harvey (2013) found that "deep-level" diversity (determined predominantly by perspectives established based on educational history, workplace experience, knowledge of the topic, etc.) hinders the group's convergent processes in that deep-level diversity inhibits the combination of ideas. The research also indicated that deep-level diversity affected the interpersonal relationships formed in the group (Harvey 2013). Despite the fact that a low level of diversity is useful in creative idea generation, intergroup processes may be affected by diversity in EBS groups.

2.5 Intergroup Processes

The topic of diversity in groups is closely related to the idea of intergroup processes. Research suggests that in groups in which membership is fluid, competition is more detrimental to creative idea generation; whereas in closed groups, competition is only beneficial to a moderate level (Baer et al., 2010). More distinct factors influence

competition relative to idea generation in groups concerning the individual group membership. Gender has been shown to influence competition in that groups that are comprised of males are shown to generate more novel and useful ideas in competitive situations (Baer et al., 2014). In multiple studies, group collaboration was shown to be a mediator of group competition and alterations in the individuals participating in the groups (Baer et al, 2014; Baer et al., 2010). In comparison, a study conducted with sixth grade students found that group competition enhanced creativity as well as the ability to learn the material (Chen & Chiu, 2016). Many potential problems in group idea generation stem from individual differences. Kim et al. (2012) suggested that creativity in groups is based upon differing individual cognitive processes and how certain people manage different types of conflict. Moreover, contrary to popular research on group processes, Munkes and Diehl (2003) found that competition may be more of a predominant factor in groups than performance matching. In the first experiment conducted by Munkes and Diehl (2003) in which individuals were shown the number of ideas generated by others during a brainstorming session, competition, not performance matching was found to be prevalent throughout the study and in a second experiment, participants were placed into groups of two and were told that they would receive information regarding the number of ideas generated by other groups. This second experiment revealed that competition was increased more than performance matching. Throughout both experiments, social loafing did not occur. Ultimately, competition may be more inherent in groups as well as beneficial to groups of mixed gender.

2.5.1 Intergroup Conflict

The present study sought to specifically analyze possible intergroup conflicts as well as associations between the political nature of the ideas generated and political orientation. The potential benefits to a study such as this one are related to the ability to analyze people from multiple backgrounds and group affiliations. This study allowed for three large groups to collaborate and contribute to ideas on environmental sustainability. Research supports this collaboration and in a study conducted by Schmid et al., the indication was that contact between groups lessened conflict (2014). Moreover, the researchers also suggested that contact also contributed to less prejudicial views of the outgroup and heightened communication between the groups (2014). The current study enhances group contact in the hopes to analyze any interesting trends in idea generation and creativity. Another study conducted by Miller et al. further (2004) supports the idea that perceptions of the outgroup are improved by intergroup contact. This study also furthered conveyed that those scoring high on an SDO (social dominance orientation) scale can experience a reduction in prejudicial attitudes through establishing positive emotions towards members of the outgroup (Miller et al., 2004). Furthermore, those with high SDO are less apt to adopt a communal outlook and are less empathetic and altruistic (Pratto et al., 1994). Ultimately, the idea that individuals with high amounts of outgroup prejudice can reduce that prejudice through increasing positive emotions or enhancing intergroup contact opens the door to further research for unification despite differing political ideologies. More than just intergroup relations, this study sought to specifically determine if ingroup favoritism was present in collaborative idea generation. According to the literature, individual associations with ingroups are established when an individual

becomes depersonalized (Everett et al., 2015). According to Everett et al. (2015), in this process, the individual losses factors that identify them as a distinct person and becomes categorized in a group including other people of a certain background or preference. This ingroup favoritism is established with depersonalization and a higher level of group identification (Everett et al., 2015). According to this research making categorization factors (i.e. race, political orientation, etc.) apparent to others participating in the study increases levels of favoritism (Everett et al., 2015). Because political orientation and general demographic factors were not salient in the present study, the relationship between political orientation and the levels of conservatism and liberalism of ideas were measured in order to determine if participants would generate ideas similar to others of their ingroup.

2.6 The Present Study

The purpose of the present study is to attempt to better understand the extent of group creativity as well as analyze the effects that diversity has on intergroup processes. Despite the fact that much of the research on group idea generation focuses on the differences between nominal and interactive groups, this study intends to analyze the creativity of three different large groups as well as determine how diversity effects these brainstorming sessions. Much of the current research has focused on either proving the value of group brainstorming or debunking the myth that group brainstorming is just as effective if not more effective than individual brainstorming. This study seeks to analyze the novelty of ideas generated as well as the number of categories created of three different groups and to determine if diversity in these groups affects creativity and idea generation. This study will largely focus on electronic brainstorming because of the ability to obtain a variety of different participants as well as a proven efficiency regarding the aspect of group

brainstorming. While multiple studies have examined the extent of creative idea generation in relation to EBS, few have analyzed diversity in large EBS groups. Because of the ability of the internet to connect a wide range of people from different backgrounds with different lifestyles, this study attempts to utilize the platform of the internet in order to understand the effects of diversity on creativity.

2.7 Hypotheses

Through analyzing the relevant research on creativity in large groups, usefulness (relative cost) and novelty should be related because both factors contribute to creative idea generation. Also, because novelty is largely based on how frequently ideas occur, novelty and relative cost may be related because rare ideas that include new technology may be expensive. Moreover, when analyzing political orientation and creativity, liberal ideas involving environmental sustainability may be more novel because of a large amount of support from liberal people regarding the sustainability movement and the inventing of new technology. In relation to this idea, liberal ideas also may have a higher relative cost because of the fact that pioneering new technology will naturally incur higher costs. Another hypothesis is related to openness to diversity in that those identifying as liberals should score higher on the Attitudes Toward Diversity scale because most primarily liberal policies advocate for social programs and equal rights for all people. Furthermore, those that identify with a certain affiliation will also generate ideas that are consistent with that affiliation as opposed to ideas that represent those of the outgroup. Lastly, Big Five Inventory, International Personality Item Pool, Need for Cognition, and Runco Ideational Behavior scales may correlate with how political the ideas were, how costly they were, and how novel they were.

CHAPTER 3

METHODOLOGY

3.1 Participants

A total of sixty participants were recruited through Amazon's Mechanical Turk (MTurk) program. Of the sixty initial participants, fifty participated in both the survey and generated ideas on the discussion board. Any participants that did not complete the survey and the discussion board were excluded from the study. Of the fifty participants, 36% were male and 64% were female. Twenty-nine of the participants identified as liberal, nine of the participants were conservative, and twelve participants identified as neither liberal nor conservative. The mean age of participants was 34.42. The ethnicity of participants ranged (see *Figure 3.1*). Of notable finding, when disclosing the highest level of education achieved, a majority of participants had received a Bachelor's degree (46%) followed by some college credit or no degree (26%).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	African-American	7	9.3	9.3	9.3
	American Indian or Alaska Native	2	2.7	2.7	12.0
	Asian	25	33.3	33.3	45.3
	Caucasian	37	49.3	49.3	94.7
	Hispanic or Latino	2	2.7	2.7	97.3
	Other	2	2.7	2.7	100.0
	Total	75	100.0	100.0	

Figure 3.1: Ethnicity Averages of the Sample

3.2 Procedure

Amazon's MTurk allows Internet users to participate in tasks that require opinionated answers and human involvement for monetary compensation. Participants were provided twenty-five cents for their participation in the survey and were further incentivized to earn two dollars based on their responses on the discussion board portion of the study. Participants were sent a preliminary, IRB approved survey. Participants were split into three groups of twenty for both the survey as well as the discussion boards. No particular demographic was targeted in this study and involvement was voluntary. At the beginning of the survey, participants were notified that they could discontinue participation at any time and that the survey would take thirty minutes to complete. The survey included questions inquiring about demographics as well as questions asking about the importance of protecting the environment. Questions were also included to measure creativity, attitudes towards working in diverse situations, personality factors, tendency to enjoy deep-thinking processes, and opinions on various political scenarios. The preliminary survey notified the participants that after the survey was completed, they would be emailed and asked to participate in a discussion board. The email included the link, username, and password for the participants to log onto the discussion board. They were also informed that their responses would be anonymous despite possible relations to survey information. On the discussion board, participants were instructed to: generate five new posts to add to the discussion thread, vote on five other participants' posts, and produce five comments to other participants' posts. Participants generated ideas based on preliminary posts developed by the researchers that were posted to the discussion board before the experiment began. Participants were given fifteen minutes to complete the discussion board

and were instructed to complete all three aspects of the discussion board in one time period. The topic of the discussion board asked participants to generate ideas for promoting environmental sustainability as well as the decrease of negative environmental impacts. Participants in the study were informed that the study regarded building upon the ideas of others as well as group collaboration. The study required participants to read all the ideas presented, select five of them and type *#good idea* under the posts, and then build upon any posts that the participants found to be interesting. Both the aspects of the discussion board and survey were coded and analyzed using IBM SPSS Release 19.0.0.2

3.3 Measures

3.3.1 Environmental Sustainability Attitudes Measure

Participants rated their perspectives regarding the importance of maintaining and benefitting the environment. Responses were measured on a four-item scale (1=strongly disagree, 7 strongly agree) with statements such as "I am concerned with the long-term future of the environment." This scale was used primarily to maintain the idea that the study was predominantly about environmental sustainability and to also gather as a measure if any analysis should be conducted.

3.3.2 Need for Cognition Measure

Participants rated their responses to eighteen items on the Need for Cognition (NFC) scale (Cacioppo et al., 1984). The purpose of this scale is to measure the participants' desire to engage in tasks in which a deeper level of thinking is required. Responses to items on this scale are measured on a scale from 1 to 9 with 1 meaning "very strong disagreement" to 9 meaning "very strong agreement." Questions such as "I would prefer simple to complex problems" and "The notion of thinking abstractly is appealing to me are included in the

scale. This measure was used to determine if any higher level of cognitive ability is associated with creative idea generation.

3.3.3 Personality Measures

Both the International Personality Item Pool (IPIP) (Goldberg et al., 2006) as well as the Big Five Inventory (BFI) (John & Srivastava, 1999) were used in this study. The BFI was adapted and was based on a twenty-five-item scale that contains response ranges from 1 (disagree strongly) to 5 (agree strongly). Items from this scale included statements like "Is talkative" and "Tends to be disorganized." The IPIP is a twenty-item scale ranging from 1 (very inaccurate) to 5 (very accurate). This scale includes items similar to the BFI such as "Don't talk a lot," but also includes statements such as "Get chores done right away." BFI as well as IPIP were assessed in the study in order to determine if a relationship existed between personality factors and creativity of ideas generated.

3.3.4 Diversity Measure

The Attitudes Toward Diversity Scale (ATDS) (Montei et al., 1996) was utilized in this study. This scale consists of seventeen items with responses ranging from 1 (strongly disagree) to 5 (strongly agree). This measure includes responses that discuss a preference to participate in diverse working conditions as well as responses that establish an avoidant attitude towards working in diverse groups. Responses include statements such as "In general, I prefer socializing with people like myself" and "I find interacting with people from different backgrounds very stimulating." Ultimately this measure was used predominantly to establish if those producing more creative ideas enjoyed working in diverse groups or if political orientation was related to preferences for greater diversity.

3.3.5 Creativity Measure

In the survey, a measure was included to assess creativity despite the fact that the main method for determining creativity was based on analyzing the ideas posted in the discussion board. Creativity was measured in the Runco Ideational Behavior Scale (RIBS) (Runco et al., 2001), which is a nineteen-item scale with answers ranging from 1 (Never) to 5 (Just about every day, and sometimes more than once each day). Items in this survey include "I have ideas for a new invention" and "I have ideas about what I will be doing in the future." This self-report measure was included to compare perceived creativity with actual creativity regarding idea generation.

3.3.6 Discussion Board

In order to measure novelty of the ideas generated on the discussion board, a five-point scale (1=least novel, 5= most novel) was used to rank ideas for each participant. Two researchers coded for all five ideas generated by each participant. Inter-rater reliability was established at .685. This process was also conducted for determining how conservative or liberal participants' ideas were as well as how useful participants' ideas were in terms of relative cost. The relative cost scale was similar to that of novelty with 1 meaning "least costly" to 5 meaning "most costly." Inter-rater reliability for relative cost was established at .772. Lastly, the spectrum for conservative/liberal ideas was a seven-item scale ranging from 1 being "liberal" to 7 being "conservative." The inter-rater reliability for this measure was .944. Ultimately, relative cost and novelty were measures established for judging creativity and the measure concerning liberal or conservative ideas was compared to creativity.

CHAPTER 4

RESULTS

Through analyzing the data on differences in diversity between groups, ultimately, no significant differences were found. The affects of individual diversity on creativity were measured due to this lack of significance. The results were not in support of the first hypothesis. In order to test the hypothesis, a Pearson's correlation coefficient was used and the data did not reveal a significant correlation, r (50) = .26, $p > .05$, $r^2 = .07$. Interestingly, although a relationship between political ideas and novelty existed, the hypothesis was not supported between liberal ideas being more novel. A Pearson's correlation coefficient was used and a significant correlation was revealed, r (50) = .41, $p < .01$, $r^2 = .17$. The data conveyed that conservative ideas were more novel than liberal ideas in this study. Similarly, conservative ideas were also found to be less cost effective compared to liberal ideas, which does not support the hypothesis. A Pearson's correlation coefficient was used to analyze the data and a significant correlation was conveyed, r (50) = .45, $p < .001$, $r^2 = .20$. For correlations between these measures, refer to *Figure 4.1.* The data revealed that although conservative ideas were more novel, they were also more costly compared to liberal ideas. When survey measures were compared to those obtained by the survey, the data indicated that the two personality surveys and the diversity survey were not related to the political nature, novelty, or relative cost of the ideas. However, when analyzing the relationships between discussion board ratings and the NFC and RIBS, significance was found. A Pearson's correlation coefficient found significance regarding the NFC and

novelty scores r (50) = -.28, $p < .05$, $r^2 = .08$, indicating that those who scored higher on the NFC had generated ideas lower in novelty (see *Figure 4.2*). Regarding the RIBS, two significant correlations were found. A Pearson's correlation coefficient found that there was a significant negative relationship between RIBS and novelty scores, r (50) = -.30, $p < .05$, $r^2 = .09$, indicating that those who scored higher on the RIBS creativity measure conveyed ideas that were less novel than those scoring low on the RIBS (see *Figure 4.3*). Lastly, another significant correlation was found between RIBS and political orientation using a Pearson's correlation coefficient, r (53) = -.31, $p < .05$, $r^2 = .10$. This means that those who scored higher on the RIBS generated ideas that were more liberal and those who scored lower on the RIBS conveyed ideas that were more conservative.

	Relative Cost	Political Ideas	Novelty	Political Orient.
Relative Cost		.45**	.26	-.14
Political Ideas			.41**	-.29
Novelty				.03
Political Orient.				

Figure 4.1: The Relationships between Discussion Board Measurements and Political Orientation. The symbol ** denotes significance.

Correlations

		novel	NFC
novel	Pearson Correlation	1	-.282*
	Sig. (2-tailed)		.047
	N	50	50
NFC	Pearson Correlation	-.282*	1
	Sig. (2-tailed)	.047	
	N	50	75

Figure 4.2: The Significant Negative Relationship between Novelty and NFC Scores

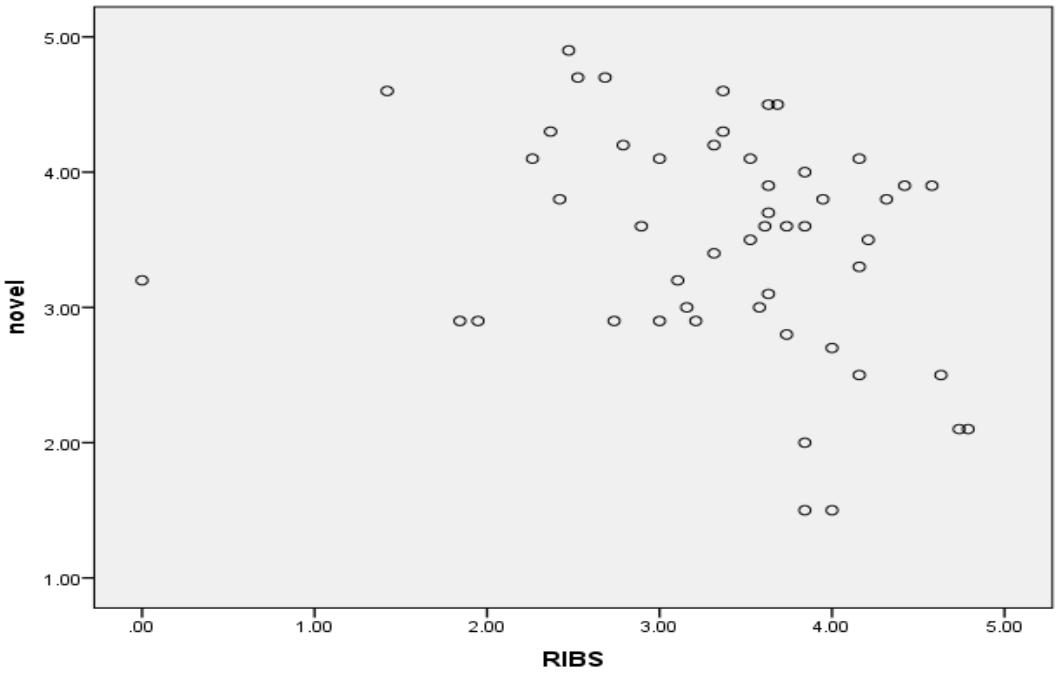

Figure 4.3: The Significant Negative Relationship between Novelty and Scores on the RIBS

CHAPTER 5

DISCUSSION

The notable findings of this study did not support the hypotheses overall. However, the data revealed that more novel ideas were more conservative and costly. Also, other significant findings were that higher novelty scores were related to lower NFC scores, higher novelty scores were related to lower RIBS scores, and more conservative ideas were related to lower RIBS scores. When analyzing the term "cost effective," although not directly applicable to usefulness, something can only be directly useful in the case that it can be implemented. Although ideas that are not economically feasible can be useful in the sense of generating other relevant ideas, since the idea cannot be directly implemented due to financial reasons, it is not useful in itself. Research is in support of this, according to an article written by Cropley and Cropley (2008), useful ideas need to be practical as well as "relevant" and "effective." Despite the fact that relative cost has a direct relationship to effectiveness, the cost of an idea may also be indirectly related to relevancy. Suppose an idea was suggested in which hunger in third world countries was eradicated. Even though this idea may be particularly relevant in that it would be helpful and beneficial to many if implemented, the fact that the idea is largely unlikely to occur insights the question of how relevant the idea actually is. For example, when politicians discuss the implementation of an extremely popular and beneficial idea, yet fail to develop the funding to implement it, the argument could be made that the idea was neither effective nor directly relevant to anyone. Therefore, the link between novelty and cost effectiveness is largely unsurprising.

Because novelty and cost effectiveness were positively related, the more novel the idea, the more costly the idea would be to implement. Since novelty in this study was judged based on how often the idea occurred in the discussion boards and because outlandish ideas tend to be more costly, this correlation was also expected. In regards to the idea that novel ideas are more conservative, the idea that liberals run on a political platform in favor of maintaining the environment for many years is fairly common knowledge. An article written by Avner de-Shalit conveys the idea that liberalism in itself contributes to more environmentally friendly ideas (de-Shalit, 287). Also of interest, Republicans were shown to be far less concerned with the environment compared to liberals in a study conducted by Franzen and Vogl (2013). Because of this idea as well as the inherent knowledge that Republicans are more likely to advocate business solutions, when expensive and novel ideas (i.e. a business solution in which more research and design is necessary) occur, naturally, these ideas would be rated as conservative ideas when looking at a political spectrum. Also of note, liberals are more known to advocate for social programs than conservatives due to lower income rates amongst some of the Democratic Party. Because of this trend amongst the Democratic Party, one would expect liberals to be more concerned with implementing reasonably affordable ideas, whereas conservatives would be more concerned with making large amounts of money through investing in new research.

5.1 Results Regarding the Scales

The idea that NFC scores have a negative relationship with novelty in this sample is a new finding regarding previous literature. An article written by Madrid and Patterson conveys the idea that NFC as well as certain personality traits contributes directly to novel idea production (2016). This difference in findings may be attributable to differences in

novelty scoring. Because the method of scoring novelty in the present research relied on the number of times the idea occurred as opposed to how creative each individual idea was, may be the reason why NFC and novelty were not positively correlated. In two studies conducted using the RIBS scale and creativity, researchers found that the RIBS scale correlated positively to malevolent creativity (Hao et al., 2016) and that novelty and the RIBS related to lying (Walczyk, 2008). Because the prompt was directed towards helping the environment and not related to malevolent creativity, the idea that the two were not related in a positive context should be further explored. Since novelty and the political nature of ideas were positively correlated, it naturally follows s for that the political nature of ideas would also be negatively correlated with the RIBS scale.

5.2 Limitations

The limitations present in the current study were largely a result of the sample. Because one of the main factors analyzed was political orientation, the data was naturally affected due to significantly fewer conservatives compared to liberals that participated in the study. This may have been primarily due to the lack of interest expressed by conservatives concerning environmental issues as is evident in the research of Franzen and Vogl (2013). Another political factor that could have encouraged more liberals than conservatives to participate, may have been socio-economic status and the country the participants were living in. Also, because more liberals than conservatives were present in the study and novelty was measured based on how often the idea occurred, naturally, conservative ideas were bound to be more novel due to fewer conservatives in the sample. Multiple participants were from countries other than the United States and this may have influenced their involvement in MTurk as well as the nature of political parties in that

country. In regards to measuring usefulness, because of a lack of knowledge regarding the implementation of certain environmental sustainability methods, usefulness was difficult to calculate and relative cost/cost effectiveness was calculated instead. Another factor that posed a major limitation to the study was that the size of the study was too small to effectively analyze factors such as political orientation and personality factors. Although the present study originally had sixty participants, after discussion board posts and the responses to the surveys were coded, only the scores of fifty participants were analyzed. Another large limitation with any study researching creativity is that creativity is fairly difficult to measure and relies on analyzing many different factors. Despite the fact that significant relationships were found regarding novelty and cost effectiveness, these measures should not be utilized as a definitive way for measuring creativity.

5.3 Future Research

Any possible future research using similar measures would need a larger sample size in order to analyze the effects of political orientation/ideology on creativity. Because this study presents relatively new research regarding creativity and diversity, this study should not only be conducted with a larger sample size, but should also consist of predominantly American participants in one of the early studies in order to research possible tension between American political parties as well as how intergroup interactions effect creativity. Future studies could also analyze socio-economic status in regards to creativity as well as ingroup favoritism. Although Amazon's MTurk seemed to be an efficient way to obtain a diverse sample for this study, when analyzing the demographic data, it seems as though some of the categories are fairly uniform. In the future, this study could be conducted in a laboratory in which participants are isolated from each other in

order to attempt to better control for extraneous factors. Ultimately, the link between intergroup conflict and creativity is still a vast area of research that needs to be explored and this study could be used as a framework for future studies.

APPENDIX A

SHORT FORM NEED FOR COGNITION SCALE

1. I would prefer complex to simple problems.
2. I like to have the responsibility of handling a situation that requires a lot of thinking.
3. Thinking is not my idea of fun.
4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities?
5. I try to anticipate and avoid situations where there is a likely chance I will have to think indepth about something."
6. I find satisfaction in deliberating hard and for long hours.
7. I only think as hard as 1 have to.
8. I prefer to think about small, daily projects to long-term ones?
9. I like tasks that require little thought once I've learned them?
10. The idea of relying on thought to make my way to the top appeals to me.
1 I. I really enjoy a task that involves coming up with new solutions to problems.
12. Learning new ways to think doesn't excite me very much?
13. I prefer my life to be filled with puzzles that I must solve.
14. The notion of thinking abstractly is appealing to me.
15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
16. 1 feel relief rather than satisfaction after completing a task that required a lot of mental effort?
17. It's enough for me that something gets the job done; I don't care how or why it works?
18. I usually end up deliberating about issues even when they do not affect me personally.

APPENDIX B

ATTITUDES TOWARD DIVERSITY SCALE

1. In general, I prefer socializing with people like myself.
2. Conversations in diverse groups tend to be somewhat uncomfortable.
3. I prefer to socialize with people from my own ethnic group.
4. The experience of group members who come from different countries can be helpful in groups that are trying to generate novel ideas.
5. I find interacting with people from different backgrounds very stimulating.
6. I prefer working with people who are very similar to me.
7. Working in diverse groups can increase one's understanding of those who are different from me.
8. Workgroups from members with different cultural backgrounds are likely to be effective.
9. Differences in political ideology within groups can stimulate one's thinking.
10. Being a leader of a diverse group should enhance a person's leadership ability.
11. Diverse groups can provide useful feedback to one's ideas.
12. The experience of working with diverse group members will prepare me to be a more effective employee in an organization.
13. I don't enjoy working with people who come from different countries.
14. It is easier to be motivated when working with people who are like me.
15. For complicated problems, diverse groups will be able to solve the problem more easily.
16. Groups whose members are diverse will be more creative.
17. Solutions of complex problems require groups with diverse experiences or backgrounds.

APPENDIX C

INTERNATIONAL PERSONALITY ITEM POOL SCALE

1. Am the life of the party.
2. Sympathize with others' feelings.
3. Get chores done right away.
4. Have frequent mood swings.
5. Have a vivid imagination.
6. Don't talk a lot.
7. Am not interested in other people's problems.
8. Often forget to put things back in their proper place.
9. Am relaxed more of the time.
10. Am not interested in abstract ideas.
11. Talk to a lot of different people at parties.
12. Feel others' emotions.
13. Like order.
14. Get upset easily.
15. Have difficulty understanding abstract ideas.
16. Keep in the background.
17. Am not really interested in others.
18. Make a mess of things.
19. Seldom feel blue.
20. Do not have a good imagination.

APPENDIX D

SHORT FORM BIG FIVE INVENTORY SCALE

1. Is talkative

2. Tends to find fault with others

3. Is curious about many different things

4. Has an active imagination

5. Can be somewhat careless

6. Is reserved

7. Starts quarrels with others

8. Is full of energy

9. Is ingenious, a deep thinker

10. Tends to be disorganized

11. Is generally trusting

12. Has a forgiving nature

13. Worries a lot

14. Tends to be lazy

15. Generates a lot of enthusiasm

16. Can be tense

17. Does a thorough job

18. Is inventive

19. Is a reliable worker

20. Is depressed, blue

21. Is original, comes up with new ideas

22. Tends to be quiet

23. Is relaxed, handles stress well

24. Is emotionally stable, not easily upset

25. Is helpful and unselfish with others

APPENDIX E

RUNCO IDEATIONAL BEHAVIOR SCALE

1. I have ideas for making my work easier.

2. I have ideas for a new business or product.

3. I have ideas about what I will be doing 10 years from now.

4. When reading books or stories I have ideas of better endings.

5. When reading the newspaper or a letter that someone wrote, I often have ideas for better wording.

6. I read something (written by someone else) and realize there are alternative perspectives.

7. I have ideas for arranging or rearranging the furniture at home.

8. I have ideas about a new invention.

9. I often see people and think about alternative interpretations of their behavior.

10. I have trouble staying with one topic when writing letters because I think of so many things to say.

11. I have ideas about a good plot for a movie or TV show.

12. I make plans (e.g., going to a particular restaurant or movie), but something messes it up, yet it is easy for me to find something to do instead.

13. I have ideas about what I will be doing in the future.

14. I have ideas for stories or poems.

15. I see a cloud, shadow, or similar ambiguous figure and have SEVERAL ideas about what the shape or figure could be.

16. I consider alternative careers (or career changes).

17. I have an idea about a new route between home and school (or work).

18. I have trouble sleeping at night, so many ideas keep showing themselves keep me awake.

19. I hear songs and think of better lyrics.

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BIOGRAPHICAL INFORMATION

Through studying and researching in the field of psychology, Brittany Wright has discovered that her career aspirations include opening her own practice and counseling adolescents and families in Waco, Texas. People of lower income in this area have little access to effective counseling, and she would like to change this and assist those who may not be able to afford quality-counseling services for their adolescent or for themselves.

Brittany received an Associate's degree at McLennan Community College and began her Honors involvement there. Since then, she has researched the economic factors involved in relationships, the relationships between substance abuse and personality traits, the effects of perceptions on obesity, as well as this project on creativity and diversity in group brainstorming processes. She would like to continue her research on relationships as well as psychological disorders. Brittany earned an Honors Bachelor of Arts in Psychology from the University of Texas at Arlington in May 2017 and plans to further her academic pursuits in graduate school. After earning her Masters in counseling, she hopes to pursue a Doctorate in clinical counseling and move back to Waco in order to make her community a better place.