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ASSESSING CREATIVITY VIA DIVERGENT THINKING IN RESIDENTIAL CAMP
SETTINGS

BY

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Baccalaureate Degree, University of Massachusetts-Amherst, 2009

THESIS

Submitted to the University of New Hampshire

In Partial Fulfillment of

the Requirements of the degree of

Master of Science

in

Recreation Management and Policy

May 2015

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On December 18th, 2014

DEDICATION

Aileen & Madra

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ABSTRACT

ASSESSING CREATIVITY VIA DIVERGENT THINKING IN RESIDENTIAL CAMP SETTINGS

By

Myles Liam Lynch

University of New Hampshire May 2015

This study assessed divergent thinking among children who attended residential summer camp over a 2 week time period. A sample of campers (n= 189) between the ages of 8-15 participated (mean age = 11.9 years old). A modified version of Guilford's Alternate Uses Task (1967) was used for both pre and post-tests. Examples of questions asked were: "Name all the uses for a plate" and "Name all the uses for a brick". Campers took the divergent thinking pre test the first full day of camp and the post test was administered on the last full day of camp. Paired t-tests were used to determine differences in means. The responses were matched from the first assessment to the second, and then each assessment was scored. Scoring was based on fluency, flexibility, and originality. Campers were also compared on gender and whether they selected artistic or non-artistic activities, and if this choice impacted their divergent thinking score. Results indicate on average a significant increase in overall mean scores for fluency, flexibility, and originality. On average girls scored significantly higher than boys across all methods of scoring. Boys had increased scores for flexibility but not in originality or fluency. Results indicate differences in gender had a greater impact on scores rather than activity choice.

Keywords: divergent thinking, creativity, residential summer camp, informal educational setting, alternate uses, activity choice

CHAPTER 1

INTRODUCTION

The American Camp Association National Board of Directors recently created a work group to focus on skills learned at camp; one of which is creativity (Sheets, 2013). Many summer camp professionals have considered the residential camp environment as a place that helps to promote creativity among youth (Sheets, 2013). However, few research studies either support or refute this long held belief. We do know, from prior research, that having more choice and opportunities to try different activities enhances creativity and imagination (Amabile & Gitomer, 1984). Camp is generally considered an environment in which children have a lot of choices, exposure to varied activities, and time to play in informal educational settings. Meanwhile, creativity, pretend play, and imagination have been devalued in school, which hinders children's abilities for self-expression and flexibility of thought (Russ, 2014). And research on children's creativity reflects this. Creativity, specifically divergent thinking, has been on a decline among US children since 1990 (Kim, 2011).

Creativity "...is the interaction among aptitude, process, and environment by which an individual or group produces a perceptible product that is both novel and useful as defined within a social context" (Plucker, Beghetto, & Dow, 2004, p. 90). A key component of creativity, and more specifically creative problem solving, is divergent thinking. Divergent thinking is the cognitive process of developing multiple responses to open-ended questions, often compared to convergent thinking, which represents the processes of developing one or a few correct solutions to given problems (Kaufman, Plucker, & Baer, 2008). Conceptualized and developed by the creativity field's pioneering researchers (i.e. J.P Guilford and Paul Torrance) divergent thinking has been linked to certain personality traits such as openness to new experiences (McCrae,

1987). Divergent thinking tests are often used in modern research to assess creativity because they are reliable indicators of creative potential (Kaufman & Plucker et. al, 2008; Runco, 2012).

Research has indicated that certain environments and programs help to promote divergent thinking and imagination in various settings (Goor & Rapoport, 1977; Russ, 2014). This research aims to test long held beliefs by exploring creativity, specifically divergent thinking, as an outcome of residential summer camp.

Residential Summer Camp

11 million children attend summer camp each year, which represents the populations of Massachusetts (6.7mill), New Hampshire (1.3 mill), and Utah (2.9 mill) combined (ACA Business Operations Report, 2012; Center for Disease Control and Prevention [CDC], 2014). Summer camp is a 15 billion dollar industry and the number of accredited summer camps has grown by 69% since 2012 (ACA Camp Statistics Report, 2012). Summer camp, in general, promotes positive youth development with more than 12,000 residential and day camp facilities in the United States (American Camp Association, 2005).

Residential camp provides an opportunity for children to spend time away from home and participate in varied activities oftentimes in a natural setting. For some children, it is their first time away from parents for an extended amount of time, while others are returning campers, who have been going to camp for years. Summer camp has potential to harbor safe risks for children to try new things such as the athlete trying out the arts or the artist trying out the less-competitive sport (Wallace, 2013, p. 15).

A number of research studies have shown how summer camp produces positive outcomes for youth. Campers reported growth in the areas of: self-esteem, independence, leadership, friendship skills, and exploration as a result of attending summer camp (Thurber, Scanlin,

Scheuler & Henderson, 2007; George & Zhou, 2001). Campers also said they did things they were afraid to do at first and were open to new experiences after attending summer camp (Thurber & Scanlin et al., 2007). Parents also perceive camp as a positive experience for their child. Parents believe summer camp aids in exploration and positive identity (Henderson, Whitaker, Bialeschki, Scanlin & Thurber, 2007).

Wallace (2013) suggests camp helps children create a sense of self and gain skills in order to create meaningful and lasting friendships. Thurber (2013) asserts the 'in-between' times or the times when children get homesick, have chores, or during free-time are an important part of the summer camp environment. Campers have many tasks to fulfill while at camp such as keeping their bunk orderly, maintaining cleanliness, and keeping track of their possessions (Thurber, 2013, p. 12).

Thompson (2012) provides detailed benefits of residential summer camp from interviews conducted with directors, counselors, and campers. Thompson (2012) highlights the importance of tradition, teamwork, and camaraderie all adding to the experience of overnight camp. The most important feature of camp is the development of youth without parent's present and the ability campers have to try new things. Many parents want to do everything for their child because they want to be the best parents they can be but parents cannot do everything for their child such as make them happy, give them self-esteem, or make them independent. Thompson (2012) along with other camp professionals (Thurber, 2013; Wallace, 2013; Sheets, 2013) suggest that summer camp is a place to help develop these types of life skills.

Summer Camp: An Informal Educational Setting

Many residential summer camps provide opportunities for campers to choose activities. Choosing an activity for youth and adolescents may support the concept of intrinsic motivation

existing at summer camp. When people are intrinsically motivated they are involved in their task for the challenge and enjoyment of it (Amabile, 1996). When individuals recreate they have cited self-expression and intrinsic motivation as factors that aid in their creative leisure (Hegarty & Plucker, 2012). When a child or an adult is intrinsically motivated to do something they are more likely to think more freely in the work environment, a school setting, or an informal educational setting (Amabile, 1996; Goor & Rapoport, 1977).

Summer camp could be an ideal setting in which children are intrinsically motivated to participate in activities because they have a lot of choice. Having a lot of choice may lead to a higher sense of freedom for children. This type of motivation may allow campers to think more freely, imaginatively, and creatively while participating in a residential camp setting and could help to explain increases in divergent thinking. These types of outcomes relate to the research completed by Goor & Rappoport, 1977 and Russ & Robbins et. al, 1999 in which they found increases in imagination, play, and divergent thinking related to choice, play, and informal educational settings.

Creativity may be inhibited by external pressures that take away from the pleasures of a creative activity such as needing to complete an art project in a certain amount of time or setting stringent rules or guidelines (Sternberg, 1999). External pressures may include: extensive rules, expectations, or pressure from other people (Sternberg, 1999). Schools may have multiple external pressures including high achievement standards, grading, and social expectations (e.g. how to behave while in the classroom or limitations of what you can play with on the playground) (Russ, 2014). These types of external pressures may not be as prevalent at summer camp (an informal setting) because there are no grades for activities, no parents present, and campers often have the freedom to choose activities. Additionally, many summer camps have

allocated free-time in which campers can play a game, socialize with friends, or just relax after a long day. Free-time is important because oftentimes children may not have a lot of free time at home or time to simply play with friends. Instead, they often become bogged down with school expectations, achievement standards, and an influx of technology.

Playtime decline. In the United States playtime is decreasing based on the amount of time schools have allocated for recess (Russ, 2014). Many schools are limited in their allowance of free time because teachers have packed schedules and a long list of expectations. Students need to perform better and at a higher rate partly due to state and national standards (Russ, 2014).

In a recent survey conducted by the National Association of Elementary School Principals (NAESP) Russ (2014) quotes:

...A 2010 poll found that 92% of schools reported having recess, but over half of the respondents reported their school had 30 min or less for recess...suggesting that children are receiving minimal or no time for unstructured activities during the day. (p. 164).

Ginsburg (2007) outlined some factors that may be a cause for a decrease in play including: increases in single parents or households in which both parents work, leaving children in after school/after care activities for more hours in the day, spending more time in front of the television or video game console. Ginsburg (2007) affirms that in the American culture there is more value placed on skill building and academic achievement rather than unstructured playtime. Children have been flooded with requirements, social clubs, events, sports, after-school activities, and a heavy school work load, this leaves little to no time for play (Russ, 2014). Ginsburg (2007) says that play allows children to use their creativity while also benefiting other skills. One of the benefits of playing at a young age Russ found was that it increases imagination and creativity over an extended period of time (2014).

Residential camp may provide relief from the current trends in school and family environment of overwork and need for skill achievement. Summer camp provides a natural environment without grades that has opportunities for campers to spend time away from home.

General Creativity

Creativity is important to study because the world we live in is rapidly changing and we must think quickly and with great flexibility (Russ, 2014, p. 4). As society speeds up the need to think creatively has become more valuable than ever before (Russ, 2014, p. 4). Creativity is in high demand both in educational settings and in the workplace (Russ, 2014 & Amabile & Conti, 1999). Creativity is also an important skill as determined by the Partnership for 21st Century learning as one of the “4 C’s” of innovation skills (Framework for 21st Century Learning, 2011).

However creativity, pretend play, and imagination have been devalued in school, which hinders children’s abilities for self-expression and flexibility of thoughts (Russ, Robins & Christiano, 1999; & Robinson, 2011). Creativity, specifically divergent thinking has been on the decline since 1990 (Kim, 2011). There is a clear need to assess environments and activities that may help increase creativity and divergent thinking.

Doing more and at a higher pace does not allow much room for downtime, relaxation, and creativity. Creativity and creative environments are becoming harder to find both for children and adults because there are very high standards for output and achievement in the workplace and in school (Russ, 2014, p. 4; Amabile & Conti, 1999). But creativity, specifically divergent thinking is important to enhance creative potential (Runco, 2012 & 2007).

Robinson suggests that the current educational system is hurting children’s creative potential (2011). He says that children are told what to do all the time by teachers and parents and are not given much flexibility to think differently. Robinson (2011) believes that if you are

always told what to do and when to do it this leaves little room to think creatively. Robinson believes there needs to be more of a focus on creativity in school which will hopefully teach children (and future adults) to think more creatively and be able to generate better ideas.

Creative Environments

Some environments promote creative ideas while others may not (Amabile & Gryskiewicz, 1989). Environments that promote creativity are often the environments with more flexibility and choice (Russ, 2014). Environments that do not usually promote creativity are environments that have rigid structures that are very strict and rule based (Russ, 2014). Creativity is also a topic of wide scope that is important at both the individual and societal levels for a wide range of task domains (Sternberg, 1999, p. 2). Robinson states that schools have the potential to be a creative environment but oftentimes they are not because many teachers are stifled by rigid standardization (2011). Creativity may be overlooked because there is a demand for children to achieve certain grades or advance in tangible skills. Schools often displace children's talents and do not promote creative potential because they must adhere to rigid guidelines and curriculum (Robinson, 2011). It is important to promote creativity in school because divergent thinking is an indicator of creative potential (Runco, 2012). Residential camp has different characteristics from most traditional schools such as being outdoors and in beautiful natural settings.

Studies have assessed creative environments being linked to that of the outdoors (Atchley, Strayer, & Atchley, 2012). Atchley & Strayer et al. found that creative reasoning is improved in natural settings and perhaps the lack of technology being readily available aids this growth (2012). Most summer camps do not permit certain technologies, such as cell-phones, video game, computers, and T.V. With the influx of technology in modern society it is getting

harder to find places void of electronics and the constant connection of being online. Most camps harness different forms of entertainment such as: skit nights, theme days, or all camp games.

Relatively little attention has been paid to environments that promote creativity among youth in camping. More attention has been paid to workplace creativity and attributes that promote or relates to workplace creativity (Amabile & Conti, 1999). Depending on the individual, certain people react to different management styles and workplace environments. Research indicates that environments that challenge a person in a supportive environment yield higher creative results (Amabile & Conti, 1999). Prior studies have shown that giving children choice increases intrinsic motivation and depth of educational engagement (Cordova & Lepper, 1996). Additionally combining self-directed learning with goal setting produced higher results of competency and intrinsic motivation among children (Bandura & Schunk, 1981). People respond better in environments where they are intrinsically motivated and passionate about something and have a desire to accomplish a task and do it well (Amabile & Conti, 1999). Camp provides opportunities for campers to choose what activities they want to participate in while living in an informal educational setting.

Goor & Rapoport (1977) hypothesized that creativity would be enhanced at summer camp; which was defined by Goor as an informal educational setting. Goor assessed differences in divergent thinking using the Torrance Test of Creative Thinking. Participants were given the creativity assessment at 3 different times: the beginning, the end, and 4 months after summer camp had ended. 94 6th and 7th graders were assessed as an experimental group in a summer camp. The 94 students participated in creative activities for 4 hours a day. The control group for this study was a group of 48 students who participated in recreational activities that had no educational framework or creative basis of instruction (Goor & Rapoport, 1977).

Creativity levels increased in the experimental group after attending camp and increased more 4 months after leaving camp. This research highlights how creative programming at summer camp (an informal setting) has the potential to increase creativity levels.

Divergent Thinking

Divergent thinking is associated with broad ideas and many responses or associations to a problem (Russ & Robins et. al, 1999). Divergent thinking is important because being able to produce more ideas and responses to complex problems is a valued trait in society and is useful in the workplace (Russ, 2014). Divergent thinking is also somewhat independent of intelligence and has a sense of fluidity of thinking (Runco, 1991, p. 3). Divergent thinking is assessed using a number of different tasks mostly developed by J.P Guilford (1967) a pioneer in creativity research. One example of divergent thinking would be coming up with as many solutions to a complex problem such as: solving world hunger, or creating the most efficient mode of transportation. Once an individual or group has exhausted their idea production they choose which solution is best and most logical. This is different from convergent thinking, in which there would be only one right answer.

Convergent thinking (the opposite of divergent thinking) permits someone to only arrive at one right answer. One example of convergent thinking is taking a multiple-choice test that has only one pre-determined answer. Convergent thinking methods are used in many schools to help track student's capabilities such as SAT results and other forms of standardized testing.

There have been numerous studies of creativity since the 1950's that have used data from creativity tests (Howieson, 1981; Plucker & Renzulli, 1999; Guilford & Hoepfner, 1971). Guilford (1967) developed a structure of intellect model that states creativity is best defined as 'divergent production': which means to come up with more ideas based on other ideas or the

generation of more information from other information. Guilford (1967) hypothesized that originality, fluency, flexibility, and elaboration of ideas are the best determinant of divergent production.

Divergent thinking tests have been found to be reliable when assessing for creative potential and other types of criteria (Runco & Acar, 2012). There are advantages to using divergent thinking tests because they have been widely used and assessed in many different settings (Runco & Acar, 2012). Summer camp allows choice, is an informal educational setting, has opportunities for intrinsic motivation, and is located in a natural setting which is why it could be an ideal location to assess divergent thinking. Below define divergent thinking scoring methods and what an increase in originality, flexibility, and fluency may indicate.

Originality. A person has a truly original idea if no one else comes up with the same idea. An idea was scored as original only if one person produced it. An idea can be novel but not necessarily useful in a social context; for example someone using a baseball bat to construct a building would not be very practical. Producing original ideas is important because there may be better and alternative solutions to a problem. Originality is also an essential facet of divergent thinking and has been used as a scoring method in numerous research studies (Runco & Okuda, 1991).

Flexibility. Flexibility is important in creativity research because it provides an extended range of options (Runco & Okuda, 1991). If an individual has higher flexibility then they will have thought of more categories of responses. For example: a respondent who states uses for a brick: to build a house, to build a church, or to build a wall would have very low flexibility because these responses are all in the same category of building or constructing something. However, a person who responds: to build a house, to throw through a window, to break apart

and recreate into a mosaic would have much higher flexibility because these responses fall under different categories of use.

Runco & Okuda (1991) also quote Weisberg & Alba's 1981 study in which flexibility may help to avoid 'functional fixity' or only coming up with conventional solutions to problems (p. 169). It is important to think 'outside the box' or come up with different kinds of responses rather than the same type of response over and over again. Having different categories of responses (flexibility) indicates being able to think of diverse ideas.

Fluency. Thinking of as many possible solutions and ideas is an integral part of creativity and divergent thinking (Guilford & Hoepfner, 1971; Runco & Okuda, 1991). Respondents who have a higher fluency could score higher on divergent thinking assessments because they may think of more flexible and original ideas. Respondents who have higher fluency are able to produce more ideas overall.

Activity Preference

Gender plays an important role in activity preference in recreational activities. Typically boys have a stronger desire to participate in physically intense activities such as sports or competitive games. (Medrich, Roizen, Rubin & Buckley, 1982). Girls, however, have a stronger desire to participate in social or "self-improvement" activities (Medrich & Roizen et. al, 1982). Girls have a tendency to choose activities that are art based or skill related whereas boys prefer physically intense and competitive activities (Offord, Lipman & Duku, 1998).

Activity preference related to gender is important to consider because most of the artistic activities at summer camp would fall into the category of skill based rather than physically demanding. Research on activity preference indicates that girls may have a higher tendency to

self-select more artistic or skill based activities rather than boys who would most likely self-select a sport or competitive activity.

Research Hypotheses. Camp is a worthy environment to assess divergent thinking because many components of creativity research relate to aspects of summer camp research. The specific aim of this study is to understand camper's divergent thinking level in a traditional residential camp setting over a 2-week program. The objectives of this study are to answer the following research hypotheses:

1. There is a significant increase in divergent thinking scores (fluency, flexibility, and originality) for youth (8-15 years old) after spending two weeks at a residential summer camp.
2. There is a significant difference between campers who select artistic activities and those who do not select artistic activities.
3. There is a significant difference between gender of campers and divergent thinking score.

CHAPTER II

METHODOLOGY

Paired t-tests using SPSS determined differences in means pre and post camp. The pre-test was administered during the first full day of camp and the post-test was administered during the last full day of camp. A short demographic questionnaire was also administered, which included activities that each camper chose to take part in for the two-week session.

Participants

The responses were matched from the first assessment to the second then each assessment was scored based on responses. 189 campers participated in this study, 100 girls and 89 boys (mean age = 11.9). 13 campers whose parents had given consent decided not to take part in the study and preferred going to their regularly scheduled rest hour period. Most campers were 11 (18%), 12 (19%), or 13 (24.3%) years old. The sample consisted of mostly Caucasian children (90.3%). 40.7% of campers were in their first year while 59.3% had been at camp for 2 or more years.

Setting

Data were collected at two residential camps in New England during the summer of 2014. The camps are located on 200 acres of property with 45 buildings including 2 large dining halls where the data collection took place. Although both camps reside on the same property, they are programmed separately as two different programs. One of the researchers is the boy's camp director but did not collect data at the boy's camp. There is no electricity in the cabins where campers reside however the main buildings on camp as well as bathhouses have electricity and plumbing.

Both camps are described as being ‘traditional rustic residential camps’, which means they are not focused on teaching a specific skill or sport. Some summer camps focus on specific skills such as: sports camp, arts camp, or music camp.

Data Collection

Quantitative methods using a quasi-experimental design were used for this study. The responses from all participants (campers) helped describe the level of divergent thinking in a residential camp setting over a two-week time period. Data were collected and compiled by the researcher from the first assessment and the second assessment. In addition to these methods, a camper demographic survey was administered to all participating campers in this study. This survey was used to describe the sample.

The assessments were identified and coded using the demographic surveys that were handed out during the initial pretest. Scoring for the divergent thinking assessment was based on *fluency*- number of responses given per task. Scoring for fluency was done by summing the number of responses from the first assessment compared to the second assessment. Examples of questions asked from Guilford’s Alternate Uses Task (1967): “Name all the uses for a brick” or “Name all the uses for a plate”. Scoring was also based on *flexibility* or number of categories and *originality* or statistical infrequency of responses.

Data Analysis

Paired t-tests (using SPSS) helped to determine if there were any variances in divergent thinking among campers. The researcher matched responses from the first assessment to the second assessment then scored each assessment based on set standards of divergent thinking level (fluency, flexibility, and originality). The assessments were identified using the demographic surveys handed out at the beginning of camp. Mean divergent thinking scores

were compared to gender and whether or not a camper self-selected an artistic or non-artistic activity.

Protocols

A modified alternate uses task developed by J.P. Guilford (1967) was used at the beginning of the 2-week session and then again at the end of the 2-week session. One researcher conducted the assessment at the girl's camp and another researcher conducted the assessment at the boy's camp. The test was administered using test-like conditions and campers were prompted to come up with as many possible uses for each item. In order to maximize the responses of divergent thinking tasks it was important to give the instructions to be 'as creative as possible' or 'come up with unique ideas' to maximize the number of responses (Harrington, 1975).

The assessments took a total of 30-35 minutes to complete with 6 minutes allocated per item. The demographic survey, which was filled out at camp, was completed for the purpose of assigning each camper to an age specific groups (e.g., 8-10 year olds, 11-13 year olds, and 14-15 year olds) to help further explain differences in divergent thinking. The demographic survey took around 6-8 minutes to complete. All assessments took place during normal rest hour in the camp dining halls. Campers who did not wish to take the assessment went back to their cabins for normal rest hour and were supervised by designated counselors. The assessments did not interfere with any regularly scheduled program time.

In obtaining consent from parents, forms were sent out by e-mail via the camp office on behalf of the camp executive director one month before the start of camp. These forms instructed parents to either e-mail their consent form to the researcher in advance or to submit their form in-person to the researcher on the first day of camp (during camper registration). In obtaining child assent, camp staff collected forms from campers (who received consent from their parents)

asking for their permission to participate. The asking for a child's permission was done in-person during check-in. Additional consent forms for parents and children were available during camper registration.

Instrument

A modified version of Guilford Alternate Uses Task (1967) (Appendix A) was used at the beginning of the 2-week session and then again at the end of the 2-week session. In Guilford's Alternate Uses Task (1967) examinees were asked to list as many possible uses for common household items; such as a brick, a paperclip, and a newspaper. For this study the researcher created items for both pre and post assessments.

The responses were scored using three components:

- 1) *Fluency*- The number of responses to a given stimuli, '...the total number of ideas given on any one divergent thinking exercise' (Runco, 1991; Guilford & Hoepfner, 1971).
- 2) *Originality*- The uniqueness of responses to a given stimuli, '...the unusualness...of an examinee or respondent's ideas' (Runco, 1991; Guilford & Hoepfner, 1971). Originality is measured by the statistical infrequency of a response.
- 3) *Flexibility*- The number and or uniqueness of categories of responses to a given stimuli, or more broadly, '...a change in the meaning, use, or interpretation of something' (Guilford, 1968, p. 99; Guilford & Hoepfner, 1971).

Operationalization of Variable: Artistic & Non-Artistic Activities: the researchers designated activities as either being artistic or non-artistic based on certain criteria (Appendix D). Campers could participate in no more than three activities other than swimming (which is required) during their 2-week stay. The activities designated by the researchers as artistic: arts &

crafts, photography, woodworking, camp-craft, dance, drama, music, newspaper, leatherwork, nature, percussion. The non-artistic activities designated by the researchers were: basketball, archery, tennis, ball games, riflery, baseball, canoe & kayaking, sailing, waterskiing, ropes course, horseback, tennis, soccer, Frisbee. See appendix D for further explanation of characteristics of artistic and non-artistic activities.

Demographic Survey

A camper demographic survey was included with the divergent thinking task (Appendix B). The survey helped to describe the sample in terms of demographic data as well as used as a control for camper activities. The demographic survey was created by the researcher and was used to investigate differences in divergent thinking compared to number of years at camp; activities campers participated in, age, gender, camp affiliation etc.

Reliability

Guilford Alternate Uses Task (1967) is reliable because oftentimes there is little subjectivity when scoring the items on the tasks (Runco, 2012). The measurement of fluency is the addition of all responses and the scoring of originality is statistical infrequency of a response given (Runco, 2012). Wallach & Kogan (1965) found a reliability score of .92 when scoring for fluency and originality (Runco, 2012).

Independent Variables

Activities campers participate in while at camp are one independent variable.

Demographic surveys were utilized to show what activities campers participated in and whether or not these activities made a difference in divergent thinking level (artistic vs. non-artistic).

Whether a child attends residential camp is viewed as the predictor variable. This study is viewing attendance in camp, gender difference, and activities choice as a cause for a fluctuation

or variance in divergent thinking scores. It is thought that attending residential summer camp over a two-week period and taking certain activities will increase (on average) divergent thinking scores between the beginning and end of camp. Gender was also analyzed to determine if there is a difference in divergent thinking scores related to gender.

Dependent Variables

Divergent thinking scores are viewed as the dependent variable because they should vary among participants in the study in conjunction with the independent variable. Divergent Thinking scores will be assessed twice once at the beginning of the campers stay and then again at the end of the campers stay over a two-week time period.

CHAPTER III

RESULTS

This section presents results of scoring for fluency, flexibility, and originality from the modified version of Guilford's Alternate Uses Task. For each scoring method included are the overall means as well as the differences of camper scores from pre and post test using a p value of $< .05$. Additionally, camper's gender and whether or not they took 1 or more artistic activities is compared to their divergent thinking score. Tables 1-16 below present in detail the differences in gender, scoring method, and activity choice related to divergent thinking scores.

Fluency

The overall sample (Table 1) shows on average a significant increase in fluency scores. On average campers had significantly higher post camp scores than pre camp scores overall results indicate a mean of 11.640 (SD=5.11) on the pre test and a mean of 13.547 (SD= 6.26) on the post test. Campers who took one or more artistic activity had higher fluency scores than campers who did not participate in any artistic activities (Table 2 & 3). Boys did not have statistically significant scores for fluency ($p < .05$, Table 5). Boys in general had much lower fluency scores than girls but still had slight increases overall. On average girls had higher fluency scores than boys ($p < .05$, Table 5). On average girls post-test scores significantly increased from pre test to post test. These results show that overall campers thought of more responses to the divergent thinking tasks during the post test compared to the pre test and had even higher scores if they chose to take part in an artistic activity.

Table 1
Overall Sample- Fluency

Fluency	Mean	N	SD	t –score	Sig.
Fluency Pre Test (Brick)	11.709	189	5.353	-6.375	.000
Fluency Post Test (Blanket)	14.423	189	6.687		
Fluency Pre Test (Fork)	11.571	189	5.867	-2.575	.011
Fluency Post Test (Plate)	12.672	189	7.005		
Overall Fluency Pre Test	11.640	189	5.110	-5.452	.000
Overall Fluency Post Test	13.547	189	6.268		

Table 2
No Artistic Activity Fluency

Fluency No Artistic	Mean	N	SD	t –score	Sig.
Fluency Pre Test (Brick)	12.371	70	5.451	-2.111	.038
Fluency Post Test (Blanket)	13.900	70	6.536		
Fluency Pre Test (Fork)	11.471	70	6.678	-1.320	.191
Fluency Post Test (Plate)	12.428	70	6.987		
Overall Fluency Pre Test	11.921	70	5.592	-2.127	.037
Overall Fluency Post Test	13.164	70	6.165		

Table 3
1 or More Artistic Activities Fluency

Fluency 1 or more Artistic	Mean	N	SD	t –score	Sig.
Fluency Pre Test (Brick)	11.319	119	5.280	-6.600	.000
Fluency Post Test (Blanket)	14.731	119	6.783		
Fluency Pre Test (Fork)	11.630	119	5.362	-2.234	.027
Fluency Post Test (Plate)	12.815	119	7.121		
Overall Fluency Pre Test	11.474	119	4.820	-5.289	.000
Overall Fluency Post Test	13.773	119	6.342		

Table 4
Gender Boys Fluency

Fluency Boys	Mean	N	SD	t –score	Sig.
Fluency Pre Test (Brick)	11.168	89	5.879	-1.287	.201
Fluency Post Test (Blanket)	11.977	89	6.342		
Fluency Pre Test (Fork)	10.314	89	6.124	-1.349	.181
Fluency Post Test (Plate)	11.123	89	7.529		
Overall Fluency Pre Test	10.741	89	5.527	-1.706	.091
Overall Fluency Post Test	11.550	89	6.363		

Table 5
Gender- Girls Fluency

Fluency	Mean	N	SD	t –score	Sig.
Fluency Pre Test (Brick)	12.190	100	4.817	-8.388	.000
Fluency Post Test (Blanket)	16.600	100	6.245		
Fluency Pre Test (Fork)	12.690	100	5.417	-2.236	.028
Fluency Post Test (Plate)	14.050	100	6.329		
Overall Fluency Pre Test	12.440	100	4.588	-5.877	.000
Overall Fluency Post Test	15.325	100	5.642		

Flexibility

The overall sample (Table 6) shows on average there is a significant increase in flexibility scores ($p < .05$). Campers had significantly higher post camp scores than pre camp scores. Overall campers who took one or more artistic activities had higher flexibility scores than campers who did not participate in any artistic activities (Table 7 & 8). Overall boys had significant increase in flexibility ($p < .05$, Table 9). Girls flexibility scores also significantly

increased across both items ($p < .05$, Table 10). This data shows that both boys and girls thought of more categories of responses during the post test compared to the pre-test.

Table 6
Overall Flexibility

Flexibility	Mean	N	SD	t –score	Sig.
Flexibility Pre Test (Brick)	4.545	189	1.998	-12.265	.000
Flexibility Post Test (Blanket)	6.656	189	2.149		
Flexibility Pre Test (Fork)	5.412	189	1.975	-4.814	.000
Flexibility Post Test (Plate)	6.195	189	2.271		
Overall Flexibility Pre Test	4.978	189	1.680	-11.297	.000
Overall Flexibility Post Test	6.425	189	1.991		

Table 7
No Artistic Activity Flexibility

Creativity Measure	Mean	N	SD	t –score	Sig.
Flexibility Pre Test (Brick)	4.928	70	2.052	-4.622	.067
Flexibility Post Test (Blanket)	6.400	70	2.209		
Flexibility Pre Test (Fork)	5.214	70	1.947	-3.727	.001
Flexibility Post Test (Plate)	6.242	70	2.169		
Overall Flexibility Pre Test	5.071	70	1.677	-5.221	.000
Overall Flexibility Post Test	6.321	70	1.983		

Table 8
1 or More Artistic Activities Flexibility

Creativity Measure	Mean	N	SD	t –score	Sig.
Flexibility Pre Test (Brick)	4.319	119	1.939	-12.954	.000
Flexibility Post Test (Blanket)	6.806	119	2.108		
Flexibility Pre Test (Fork)	5.529	119	1.990	-3.183	.000

Flexibility Post Test (Plate)	6.168	119	2.337		
Overall Flexibility Pre Test	4.924	119	1.686	-10.662	.000
Overall Flexibility Post Test	6.487	119	2.002		

Table 9
Gender Boys Flexibility

Creativity Measure	Mean	N	SD	t –score	Sig.
Flexibility Pre Test (Brick)	4.348	89	2.174	-5.132	.010
Flexibility Post Test (Blanket)	5.741	89	2.064		
Flexibility Pre Test (Fork)	4.640	89	1.707	-3.958	.000
Flexibility Post Test (Plate)	5.561	89	2.147		
Overall Flexibility Pre Test	4.494	89	1.626	-6.037	.000
Overall Flexibility Post Test	5.651	89	1.869		

Table 10
Gender Girls Flexibility

Creativity Measure	Mean	N	SD	t –score	Sig.
Flexibility Pre Test (Brick)	4.720	100	1.820	-13.878	.000
Flexibility Post Test (Blanket)	7.470	100	1.888		
Flexibility Pre Test (Fork)	6.100	100	1.951	-2.901	.000
Flexibility Post Test (Plate)	6.760	100	2.238		
Overall Flexibility Pre Test	5.410	100	1.616	-10.119	.000
Overall Flexibility Post Test	7.115	100	1.846		

Originality

The overall sample (Table 11) shows on average there is a significant increase in originality scores from the pre test to the post test ($p < .05$). Generally campers had significantly higher post camp scores than pre camp scores in originality. Overall campers who took one or

more artistic activities had higher originality scores than campers who did not participate in any artistic activities (Table 12 & 13). Boys did not have statistically significant scores for originality ($p < .05$, Table 14). Boys in general had much lower originality scores than girls. Girls on average had much higher originality scores than boys ($p < .05$, Table 15). Generally girl's post-test scores significantly increased ($p < .05$). Overall girls had more original ideas based on statistical infrequency of responses. More boys on average had similar ideas to others and therefore had fewer purely original ideas than girls.

Table 11
Overall Originality

Creativity Measure	Mean	N	SD	t –score	Sig.
Originality Pre Test (Brick)	.8730	189	1.033	-3.909	.000
Originality Post Test (Blanket)	1.370	189	1.716		
Pre Test (Fork)	.7566	189	.9752	-2.256	.025
Originality Post Test (Plate)	.9788	189	1.398		
Overall Originality Pre Test	.8149	189	.8300	-3.962	.000
Overall Originality Post Test	1.174	189	1.361		

Table 12
No Artistic Activity Originality

Creativity Measure	Mean	N	SD	t –score	Sig.
Originality Pre Test (Brick)	1.042	70	1.160	-1.054	.296
Originality Post Test (Blanket)	1.257	70	1.733		
Originality Pre Test (Fork)	.7714	70	1.023	-.793	.430
Originality Post Test (Plate)	.9143	70	1.576		
Overall Originality Pre Test	.9071	70	.9100	-1.189	.239
Overall Originality Post Test	1.085	70	1.437		

Table 13
1 or More Artistic Activities Originality

Creativity Measure	Mean	N	SD	t –score	Sig.
Originality Pre Test (Brick)	.7731	119	.942	-4.109	.000
Originality Post Test (Blanket)	1.437	119	1.710		
Originality Pre Test (Fork)	.7479	119	.9497	-2.328	.022
Originality Post Test (Plate)	1.016	119	1.288		
Overall Originality Pre Test	.7605	119	.7780	-4.115	.000
Overall Originality Post Test	1.226	119	1.317		

Table 14
Gender- Boys Originality

Creativity Measure	Mean	N	SD	t –score	Sig.
Originality Pre Test (Brick)	.8876	89	1.060	-1.277	.205
Originality Post Test (Blanket)	1.089	89	1.564		
Originality Pre Test (Fork)	.7191	89	.9998	-1.142	.256
Originality Post Test (Plate)	.8876	89	1.518		
Overall Originality Pre Test	.8034	89	.8581	-1.567	.121
Overall Originality Post Test	.9888	89	1.346		

Table 15
Gender- Girls Originality

Creativity Measure	Mean	N	SD	t –score	Sig.
Originality Pre Test (Brick)	.8600	100	1.015	-.3794	.000
Originality Post Test (Blanket)	1.620	100	1.813		
Originality Pre Test (Fork)	.7900	100	.9565	-2.038	.044
Originality Post Test (Plate)	1.060	100	1.285		
Overall Originality Pre Test	.8250	100	.8083	-3.838	.000

Overall Originality Post Test	1.340	100	1.359		
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Overall Results

Overall results (table 16) indicate on average significant increases across all scoring methods: fluency, flexibility and originality. However, when separating for gender boys only increase in flexibility and not fluency or originality. This indicates that although boys did not have higher originality or fluency scores they did, however, produce more categories of responses for each divergent thinking task. Girls significantly increased across all scoring methods.

A higher percentage of girls self-selected artistic activities (83%) whereas only 40% of boys self-selected artistic activities. These results may indicate that there may not be appealing artistic activities for boys based on the camp programs or personal interest. These results could also indicate there were less artistic offerings in the boys program. The campers who chose artistic activities increased more in divergent thinking than those campers who chose no artistic activities. The overall results show gender was a more significant factor that influenced divergent thinking scores rather than activity selection.

Table 16
 Combined Overall Results

Variable	Overall: N= 189 Mean (SD)	Male N= 89 Mean (SD)	Female N= 100 Mean (SD)
Creativity			
Fluency Pre Test	11.640 (5.110)	10.741 (5.527)	12.440 (4.588)
Fluency Post Test	13.547 (6.268)	11.550 (6.363)	15.325 (5.642)
Flexibility Pre Test	4.978 (1.680)	4.494 (1.626)	5.410 (1.846)
Flexibility Post Test	6.425 (1.991)	5.651 (1.869)	7.115 (1.846)
Originality Pre Test	0.815 (0.830)	0.8034 (0.858)	0.825(0.808)
Originality Post Test	1.174 (1.361)	0.989 (1.346)	1.340 (1.359)
Artistic Activity			
Average number of Artistic Activities	0.979 (0.928)	0.528 (0.724)	1.380 (0.908)
Artistic Activity* % (N)	62.9% (119/189)	40% (36/89)	83% (83/100)

* Participant indicated that they participated in one or more artistic activity or did not.

CHAPTER IV

DISCUSSION

Implications for Educational Settings

Informal Educational Settings. Findings may relate to the influence of creativity enhancement in informal environments similar to the Goor & Rapoport, 1977 and Thomas & Berk, 1981 studies and the processes (activities) that Plucker et al. (2004) describe in their definition of creativity. Goor & Rappoport (1977) and Thomas & Berk (1981) found that programs that have artistic or creative options enhance divergent thinking in informal or semi-formal environments. This study supports prior research findings that environments that are less structured could help to enhance divergent thinking production among boys and girls ages 8-15 years old. Because the camps where data was collected have similar characteristics to the aforementioned studies these findings could relate and help to explain the present research.

Plucker et al. (2004) define creativity in part as "...something novel and useful in a social context..." (p. 90). This definition of creativity relates to many of the campers responses on the divergent thinking tasks. Overall campers thought of original and unique ideas as well as more categories on the post test. This increase in divergent thinking, especially in campers who participated in artistic activities, shows how environment and activities may play an important role in divergent thinking.

Past research demonstrated that informal and semi-formal environments, as opposed to formal environments, supported growth in creativity (Thomas & Berk, 1981). Traditional camp is considered an informal educational environment (Goor & Rapoport, 1977) where children have choice, exposure to varied activities, and time for free play. Free play and pretend play have been empirically related to measures of creativity and divergent thinking (Russ & Robins et al.,

1999). The combination of all of these characteristics of choice, sense of freedom, creative programming, and activity selection in an informal setting could help to explain why there was an increase in divergent thinking.

Results show on average statistically significant increases in overall mean in fluency, flexibility, and originality scores in children from the first day of camp compared to the last full day of camp. Campers who chose to participate in 1 or more artistic activity had higher divergent thinking scores than those who did not participate in any artistic activities. Overall girls' scores were higher than boys. Although boys' scores on average were lower, they had significant increases in flexibility but not in originality or fluency.

One important discovery was that participants thought of more ideas and had more original responses on the post test. Fluency, flexibility, and originality are measures of divergent thinking and creative potential (Runco, 2012 & 2007). These findings could also relate to Guilford's (1967) theory of divergent production and coming up with many responses (fluency) to open-ended questions. The sheer number of ideas on average increased (fluency) and so did the variety of responses (flexibility) and the uniqueness of each response (originality). These findings support the research hypothesis as well as relate to Goor & Rappoport's 1977 finding that creative activities positively affect divergent thinking in an informal camp setting.

The camps where this study took place offer a variety of activities, which are mostly non-competitive and allow self-direction. On the first day of camp the campers get to choose which activities they want to participate in. Counselors then create a daily schedule based on the campers' choices. Aside from certain limitations based on age limits or swim level campers have a choice between 16-20 activities and have little pressure from adults or leaders as to which

activities to participate in. For some campers having choice could be a unique opportunity to they do not experience in more formal settings.

These characteristics could relate to why divergent thinking scores on average increased. Having more options to choose has been linked to increases in divergent thinking (Amabile & Gitomer, 1984). This data could be explained based on a number of factors including: the camp's informal setting, the activities campers participated in, perceived sense of freedom (choice), intrinsic motivation, and the framework of creative leisure.

Choice: The current study supports prior research that indicates having choice and opportunities to try different activities enhances creativity and imagination (Amabile & Gitomer, 1984). The camps where the study took place allow choice of activity in a non-competitive environment, which could be a factor in the findings of increased divergent thinking. Amabile & Gitomer (1984) found that giving children the opportunity to choose materials rather than assigning materials resulted in more creative outcomes. This parallels our data from the current study because campers who chose artistic activities scored higher on the creativity measures.

Activity: Woodworking class, one of the artistic activities, provides campers with certain parameters for a project. A camper may decide to create a birdhouse, a stool, or coat hooks for their family. The projects they decide to create have a sense of structure (based on materials provided and time constraints) but they also have a sense of freedom and flexibility within the activity. Campers have the option to decide which paint to use or how big to make their stool or even what to name their birdhouse.

Artistic activities could have a higher sense of freedom, which could provide the participant with more freedom of choice. The features of artistic activities could help to explain why campers who took 1 or more artistic activities had higher divergent thinking scores. Artistic

activities such as woodworking, photography, and arts & crafts may not have rigid structure and defined outcomes

Non-artistic activities such as basketball, archery, and sailing may have more rigid guidelines and rules. There appears to be less flexibility of choice in the non-artistic activities and more rules, guidelines, and obvious outcomes – score a goal, shoot a bulls-eye, and steer your boat. The artistic activities align most to divergent thinking whereas the non-artistic activities relate most to convergent thinking.

Gender The results of this study support previous research that indicates girls have a higher preference in taking skill based activities and boys prefer physically demanding activities. Although there were more girls who chose artistic activities (83%) there was also a substantial number of boys who chose artistic activities (40%). These results indicate a need to provide more artistic options for boys in this particular camp setting. Gender results may indicate differences in programming and offerings at the summer camps where data collection took place.

Gender was a significant factor in this research and helped to explain variations in the divergent thinking results. Overall girls scored much higher on the divergent thinking tests and came up with much more responses.

External Demands. The residential camps may have an environment with less outside pressures due to lack of grades and freedom of choice. Thompson (2012) also noted how it is important to experience camp without parents present. Sternburg (1999) and Russ (2014) outlined how a lack of these types of demands may help to increase creativity and imagination. Having less external demands and a higher sense of intrinsic motivation could help to promote experiences of creativity and increases in divergent thinking production. Campers who participated in this study were given choice of an activity in an informal environment and if they

chose a more artistic activity on average their divergent thinking scores increased. Having a desire to do something (intrinsic motivation) a perception of freedom, and self-expression within that activity relates to the theory of creative leisure described by Hegarty & Plucker (2012) and could help to explain some of the finding of this research.

Implications for Camp Professionals

This study suggests that there is a difference in activity preference related to gender in the camp setting. Many girls chose more artistic activities. As a result, girls had much higher divergent thinking scores than boys. Camp activity preference did not seem to have as high of an impact on divergent thinking scores. Camp professionals could use these findings to enhance the variety of activity offerings in their respective programs. Camp Directors could create more creative programming for boys. Camp professionals could use this research to promote the role that creativity plays in informal settings such as camp, which may appeal to parents who are choosing a summer camp for their child.

Staff Training. This research could be incorporated into staff trainings and workshops to encourage staff to give campers choice over activities and to incorporate opportunities for creativity into programming. Staff could tailor their teaching style to encourage choice in both artistic and non-artistic activities while simultaneously building the skills of campers. In addition staff themselves may benefit from participating in creative activities during staff training.

Results show there are differences in scores based on gender and activity choice. Camp professionals could alter their programs based on filling the need for boys to have more artistic activity options. Camp professionals could offer more artistic activities and re-evaluate current activities based on materials used, instructor, and function of the activity.

Divergent Thinking. Camp professionals have often claimed creativity as an outcome of camp, but little empirical research has validated this claim. This research will help to promote camp in general because it provides tangible data related to some of the benefits of youth attending a residential summer camp. This research should be used to help further the mission of the camping industry as well as provide a different way of studying and assessing divergent thinking and creativity.

Future Research

Before more definitive conclusions may be drawn, this research should be replicated across more (and a more diverse sample) of residential camps, as well as other types of camps (i.e. day camps, travel camps, camps in other areas of the U.S, etc.). Research could focus on camps that are purely skill focused. The region and socioeconomic climate of New England, where this study took place, did not provide enough ethnic or socio-economic diversity within the sample to draw any conclusion about the impact of these factors on divergent thinking. Future studies could assess camps that are more ethnically diverse or in different geographical locations to determine whether there are any demographic variables other than gender that impact divergent thinking. There should be a study done using a control group, which could include replicating the study in a more formal educational environment.

This study represents an exploration in assessing divergent thinking in residential camp settings building upon Goor & Rapoport's study in 1977. Future research could include variations on testing conditions; for example timed vs. non-timed assessments. Assessing divergent thinking using a 'take home' assessment could be utilized to give campers more time on each item instead of only 6 minutes. Further research could also explore how divergent thinking changes based on number of activities offered - for example more than 3 activities or less than 3

activities. Researchers could examine whether camps with longer sessions such as 3-8 weeks has an impact compared to this 2-week study. This study could have follow up divergent thinking tasks for campers 4-6 months after leaving camp to assess whether or not there is a lasting effect.

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APPENDICES

Appendix A

Modified Alternate Uses Task Used for Study (**pre-test**)

(6 minute time allowance for each item)

Name all of the uses for a *brick*

Name all of the uses for a *fork*

Appendix B

Modified Alternate Uses Task Used for Study (**post-test**)

(6 minute time allowance for each item)

Name all of the uses for a *plate*

Name all of the uses for a *blanket*

APPENDIX C

CAMPER DEMOGRAPHIC SURVEY

Instructions: Please answer each question about yourself by either filling in the blank or circling your answer.

Your name: _____

Are you male or female? (Circle one)

Male

Female

What is your age?

What grade in school are you entering this coming fall?

What is your race?

White

African American

Hispanic

Asian Pacific – Islander

If other, please write in here: _____

How many years have you attended this camp?

a) This is my first year at camp

b) 2 years

c) 3 years

d) 4 or more years

How did you hear about camp?

a) Website/Search Engine

b) Camp advertisement (e.g., e-mail, newsletter)

c) Family or Friend

d) If other, please write in here: _____

What were your 3 activity periods while at camp? (Other than swimming)

A) _____

B) _____

C) _____

APPENDIX D

Activity Synopsis

This appendix highlights a few artistic and non-artistic activities that campers choose. Artistic activities are most related to features of divergent thinking whereas non-artistic activities are most related to features of convergent thinking.

Artistic activities:

Woodworking – Campers decide upon a project to complete. They are taught how to use different tools and learn woodworking methods in order to complete their project. Campers are aided by the Woodshop Director as well as other teachers to complete their project.

Drama – Campers collectively decide what play they would like to perform based on interest and feasibility. Campers work together and practice their lines and create props for the performance. At the end of the 2 week program campers perform the play in front of the entire camp. (Around 400 people)

Camp Craft- Campers learn basic survival skills: build shelters, light fires, and outdoor cooking techniques. They also participate in a day hike in the local area.

Non-Artistic Activities:

Riflery – Campers shoot at a target twice per each class. They shoot 5 bullets per round and the highest score they can achieve is a 50/50 (perfect score). They are taught about different techniques to improve their shot and are awarded based on performance.

Basketball – Campers are taught the fundamentals of basketball: dribbling, passing, shooting etc. They also play games against themselves and other camps in the area.

Sailing - Campers are taught about different sailing knots as well as how to sail various boats within a certain area. Campers also compete in sailing races against themselves and sometimes with other camps.

Appendix E
IRB APPROVAL

University of New Hampshire

Research Integrity Services, Service Building
51 College Road, Durham, NH 03824-3585
Fax: 603-862-3564

01-Apr-2014

Lynch, Myles
RMP, Hewitt Hall
191 State Street
Portsmouth, NH 03801

IRB #: 5954

Study: Creativity in Residential Camps

Approval Date: 01-Apr-2014

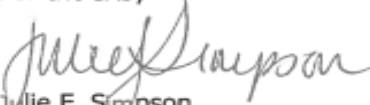
The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Expedited as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 110.

Approval is granted to conduct your study as described in your protocol for one year from the approval date above. At the end of the approval period, you will be asked to submit a report with regard to the involvement of human subjects in this study. If your study is still active, you may request an extension of IRB approval.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects*. (This document is also available at <http://unh.edu/research/irb-application-resources>.) Please read this document carefully before commencing your work involving human subjects.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,


Julie F. Simpson
Director

cc: File
Hegarty, Charles