

The Effects of Group Leader Learning Style on Student Knowledge Gain in a Leadership Camp Setting: A Repeated-Measures Experiment

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Many state FFA associations conduct summer camps focusing on leadership and personal development for FFA members. Interestingly, little research has been conducted on the impact or outcomes of these common activities. The purpose of this split-plot factorial repeated-measures experiment was to assess the level of campers' learning of the curriculum taught during small group breakout sessions and to study the effects of the learning style of camp Small Group Leaders on student knowledge gain of camp curriculum measured by pre-test and post-test scores. Analysis of variance was utilized to test null hypotheses using an F-ratio to determine the significance ($\alpha = .05$). Although there was a significant difference between pre-test and post-test scores, the interaction of test scores and SGL learning style failed to produce a statistically significant interaction; therefore, there was no significant treatment effect by SGL learning style. Recommendations for camp leaders in response to study results include regular summative assessments of the camp experience, annual evaluations of Small Group Leaders and campers, and the formation of instructional standards and learning goals. Further research was recommended in the impact of teacher learning styles on student academic performance in informal educational settings.

Keywords: FFA camp; non-formal education; learning styles; experimental design

DeBello (1990) defined learning style as “the way people absorb, process, and retain information” (p. 203). Research pertaining to learning style and the effects of student learning style on academic achievement is common in the agricultural education literature (Cano & Garton, 1994; Cano, Garton & Raven, 1992; Dyer & Osborne, 1996; Friedel & Rudd, 2006; Garton, Spain, Lamberson, & Spiers, 1999; Lambert, Smith, & Ulmer, 2010; Whittington & Raven, 1995).

Whittington and Raven (1995) utilized the Group Embedded Figures Test (Oltman, Raskin, & Witkin, 1971) to study the preferred learning style of student teachers in agricultural education. The two researchers discovered that most study participants were field independent learners, meaning they value their authority and feel responsible for guiding student learning (Whittington & Raven, 1995). Cano et al. (1992) found that field independent learners achieved higher scores in a college teaching methods course. Garton et al. (1999) confirmed this finding when their research indicated that

“as students moved toward a field independent learning style their achievement in the course increased” (p. 18). Lambert et al. (2010) utilized the Gregorc Style Delineator™ (Gregorc, 1982) to determine if mind styles affected the overall relational satisfaction between mentors and protégés who were participating in a new teacher-mentoring program. They determined that Mind Style™ did not impact relational satisfaction among teachers and their protégés (Lambert et al., 2010).

Numerous studies within and beyond the discipline of agricultural education have explored the relationship between teacher/trainer and student/trainee; more specifically these studies examined the effects of teacher learning style on student learning outcomes (Hansen & Stansfield, 1982; McDonald, 1984; Mehdikhani, 1983; Paradise & Block, 1984). McDonald (1984) found that matching student learning style with teacher learning style could be beneficial. Similarly, Paradise and Block (1984) concluded that teacher learning style impacted fourth grade students' reading achievement.

While literature exists that ties teacher learning style to student learning outcomes, other studies have concluded the opposite (Hansen & Stansfield, 1982; Mehdikhani, 1983). Mehdikhani (1983) concluded that learning style of the teacher did not impact academic success of students in mathematics and English classes. Hansen and Stansfield (1982) examined the effects of matching student and teacher learning style. It was determined that students whose learning style matched their teachers learning style did not score significantly higher than those who were mismatched (Hansen & Stansfield, 1982).

While the literature is saturated with learning style research conducted in formal education environments, precious little is known about the effects of learning styles in non-formal educational settings such as an FFA leadership camp. The focus of this research was an examination of the effects of teacher learning style on student learning.

Need for the Study

The primary and historical educational purpose of the National FFA Organization is to provide non-formal leadership and personal growth opportunities to student members (Hoover, Scholl, Dunigan, & Mamontova, 2007). Hoover et al. (2007) concluded that the National FFA Organization, like many other youth organizations formed during the early years of the twentieth century, was originally organized to teach leadership development and reward students for their accomplishments. While the National FFA Organization provides this content through its annual national convention and conferences, such as the Washington Leadership Conference, many state associations host camps (Connors, Falk, & Epps, 2010). FFA members from 24 states benefit from unique summer camp experiences, which focus on leadership and recreation (Connors, Falk, & Epps, 2010). Connors et al. (2010) posited, "FFA camps have provided members with recreational, social, and leadership development for decades" (p. 32). Although much literature exists documenting and explaining the purposes and activities taking place during FFA camps, little research has been conducted exploring teaching and learning in the

FFA camp setting (Comings, 1977; Connors et al., 2010; Javornik, 1962; Keels, 2002; McCrea, 2011).

For more than 30 years, the Oklahoma FFA Association has conducted an annual summer camp focusing on leadership development (McCrea, 2011). The FFA leadership camp, heretofore to be referred to as camp, requires extensive planning, human capital, and substantial financial support for its four 4-day sessions (K. Boggs, personal communication, May 16, 2011). Over the course of the four sessions, approximately 1400 FFA members participate in the camp. These participants, heretofore referred to as campers, earn the opportunity to attend camp through their involvement in local chapter activities (K. Boggs, personal communication, May 16, 2011).

Since 2005, the program of the camp has included a curriculum based upon measureable learning objectives. The focus on the curriculum is typically one or more topics related to leadership and personal development. Instruction has been delivered as a part of the camp program through small group, breakout sessions taught by instructors selected by camp directors. (K. Murray, personal communication, June 10, 2011)

In recent years, the annual camp planning process has included recruiting 33 college-age youth to lead the small groups and teach the camp curriculum. These individuals, known as Small Group Leaders (SGLs), are each assigned to a group of approximately 12 campers. Camp planners indicated that they believe the SGLs were homogenous in their personality type and personal qualities (K. Murray, personal communication, June 10, 2011). Despite this perception, camp planners and state FFA staff members were interested in learning if factors exist, such as the learning style of SGLs, that may influence any variation in the amount of information learned by campers during the breakout sessions (K. Murray, personal communication, June 10, 2011).

Theoretical Foundation

Kolb (1984) posited that students become more successful in academics when their learning environment matches their personal

learning style. Although SGL learning style and camper learning were the primary interest of the researchers, the unique camp environment was considered when choosing the learning theory to frame this study. Three learning style instruments, all grounded in differing theories, were considered: (a) the Gregorc Style Delineator™ (Gregorc, 1982), (b) the Group Embedded Figures Test (Oltman, Raskin, & Witkin, 1971), and (c) the Paragon Learning Style Inventory (Shindler & Yang, 2003).

Ultimately, the Paragon Learning Style Inventory (PLSI) was chosen as the most appropriate instrument for this research because the PLSI is theoretically grounded in Jung's (1971) Psychological Type Theory, which has been used extensively as a theoretical foundation for learning style research (Kolb & Kolb, 2009; Kolb, 1984; Shindler & Yang, 2003). Jung (1971) outlined factors that affect the way people think, learn, act, and see things. First, Jung (1971) posited that there are two types of people, introverts and extraverts. The two traits are described best in Jung's own words:

The introvert's attitude is an abstracting one; at bottom, he is always intent on withdrawing libido from the object, as though he had to prevent the object from gaining power over him. The extravert, on the contrary, has a positive relation to the object. He affirms its importance to such an extent that his subjective is constantly related to and oriented by the object. (Jung, 1971, p. 330)

The object in question can be a person or material item. Stated differently, extraverts are often very oriented to the people around them and introverts tend to focus on their inner self (Jung, 1971). Second, Jung (1971) identified that people are either Sensates or Intuitives. Sensates are usually more patient, realistic and practical. Sensates rely heavily on their previous experience and common sense (Shindler & Yang, 2003). Intuitives tend to be more abstract and creative. Furthermore, Intuitives dislike routine and primarily focus on his or her vision of the future (Shindler & Yang, 2003). The third factor was Feeler versus Thinker (Jung, 1971). Shindler and Yang (2007) explained that Feelers focus on personal relationships and have a greater interest in

people than ideas. Thinkers are fascinated by ideas and make rational decisions (Shindler & Yang, 2003). Jung's (1971) final factor was Judger versus Perceiver. Judgers are very opinionated and are decisive. Perceivers are unplanned, curious people who thrive on spontaneity. According to Shindler and Yang (2007), the two factors that most affect how a person acts and learns are introversion/extraversion and sensation/intuition; therefore, the researchers chose to only focus on these two dimensions.

Shindler and Yang (2003) named and described the four types of learners associated with these two Jungian dimensions:

1. *Action Oriented Realists* are people who are both extraverts and sensates. They love action packed group work. They enjoy sharing their thoughts and become impatient when tasks become too complicated or abstract.
2. *Action Oriented Innovators* are people who are extraverts and intuitives. They are motivated and love to work in groups on interesting projects. Action Oriented Innovators are open and enjoy sharing their thoughts, but are leery of detailed routines.
3. *Thoughtful Realists* are introverted sensates because of their tendency to carefully work alone or with one other. Thoughtful Realists are often unexpressive but are good with detailed work and technical concepts.
4. *Thoughtful Innovators* are introverted intuitives who are best at problem solving and prefer to work on their own ideas. They value expressing themselves through their thoughts and ideas and shy away from busy work or tasks they don't value. (Shindler & Yang, 2003)

Shindler and Yang (2003), developers of the PLSI, postulated that instructors who are aware of their own personal learning style are more successful teachers. This assertion was grounded in Jung's type theory (1971) and

assumes students learn better when the teaching style of the instructor is tailored to match their learning style. Shindler and Yang's (2003) assertion suggests that natural barriers exist when introverts and extraverts teach and learn from each other and when sensates and intuitives interact in a teaching and learning environment. According to Shindler and Yang (2003), "teachers who are aware of their own style and those of their students will be more successful with more types of students" (p. 6). This assertion closely aligned with the question about the influence of SGLs on learning outcomes of campers, thus establishing the need for this research.

Purpose, Objectives, and Hypotheses

The purpose of this study was to assess the impact of the learning styles of SGLs upon the campers in their groups. Specifically, this study focused upon (a) the learning style of SGLs and (b) campers' increase in knowledge of the camp curriculum. This study was influenced by the recommendation of Whittington and Raven (1995) who stated, "research efforts regarding learning styles and teaching styles" are needed on both the regional and national level (p. 15). Furthermore, aligns with the fourth research priority of the American Association for Agricultural Education, which focuses on research on meaningful, engaged learning in all environments (Doerfert, 2011). Three research objectives guided the study:

1. Identify the learning style of SGLs.
2. Assess the level of campers' learning of the curriculum taught during small group sessions.
3. Determine if SGL learning style affects campers' learning of the curriculum taught during small group sessions.

The following hypotheses were formulated for research objectives two and three:

Objective 2

H₀: There is no difference between campers' pre-test and post-test scores on a test of facts and

concepts associated with the curriculum taught during small group sessions.

Objective 3

H₀: There is no association between test scores of campers and the learning style of their SGL.

Methodology

The design of this study is best described as split-plot factorial repeated-measures approach. Quantitative educational research is defined as "educational research in which the researcher decides who to study; asks specific, narrow questions; collects quantifiable data from participants; analyzes these numbers using statistics; and conducts the inquiry in an unbiased, objective manner" (Creswell, 2008, p. 46). The split-plot factorial repeated-measures experimental design (Kirk, 1995) was used to measure camper learning and determine how the learning style of SGLs affected camper learning outcomes. The researcher used quantifiable data and inferential statistics to meet the three research objectives.

Population and Sampling

All campers were Oklahoma FFA members and agricultural education students who had completed the eighth grade but had not graduated from high school. Although each camper's level of FFA involvement varied, all campers had completed at least one year of agriculture coursework and one year of FFA membership. It was determined that a census study was not feasible because of the time limitations during the data collection periods during camp sessions. As a result, the researchers randomly sampled from the population ($N = 752$).

Probabilistic simple random sampling procedures were employed. Creswell (2008) explained that the simple random sampling technique is the most rigorous sampling procedure and allows the researcher to generalize the findings of the experiment to the total population. In this case, results of this study can only be generalized to the campers who attended Session 3 and Session 4 of camp

during the summer of 2011. Before campers arrived, each pre-registered camper was assigned a number. A simple random sample of the population was then generated using a web-based randomizer tool (random.org). The researchers utilized G*Power version 3.1, a computer software, to determine that a sample of 118 was needed to reach maximum statistical power during data analysis (Faul, Erdfelder, Lang, & Buchner, 2007). In an effort to remain as unobtrusive as possible while still achieving generalizability, the sample size was increased to ($n = 218$). The sample was reduced to ($n = 203$) due to an absence of parental consent from 15 campers who were consequently removed from the sample. Ultimately, 181 campers completed all elements of the experiment resulting in an 89% response rate for the study. Lindner, Murphy, and Briers (2001) concluded that when a response rate of 85% or greater is achieved no further procedures are necessary to control for non-response error.

Research Design

The repeated-measures for this experimental design study were a pre-test and post-test. Repeated-measures designs require study participants to participate in all levels of the experiment (Field, 2009). The study was designed to meet the three research objectives by identifying the learning styles of SGLs, determining the level of camper learning using pre-test and post-test scores, and splitting the campers into four groups based upon the learning styles of their SGL to determine if the leader's learning style affected student learning. Data were collected from SGLs and campers who attended sessions three and four of camp during the summer of 2011.

Each of the 33 SGLs completed the Paragon Learning Style Inventory (PLSI). Results of the PLSI categorized each SGL into one of the four learning styles: (a) Action Oriented Realists, which are those learners who are sensing extroverts, (b) Action Oriented Innovators are learners who are intuitive extroverts, (c) Thoughtful Realists are sensing introverts, and (d) Thoughtful Innovators are those learners who are intuitive introverts.

During the registration process on the first day of camp, campers included in the sample completed a multiple choice pre-test examination created to measure their knowledge of information to be presented during small group sessions during the four-day camp. At the end of the last session of camp on day four, campers included in the study completed a post-test. The pre-test and post-test were comprised of the same questions with the items and response choices randomly rearranged.

Treatment

Kirk (1995) stated that experimental designs must include random treatment assignments of all study participants. During the camp registration process campers were randomly assigned to a small group. For the purpose of data analysis, the 33 small groups were divided into four treatment groups based upon the learning style of the SGL. In this way, all study participants were randomly assigned to one of the four treatment levels. Small groups met in seven breakout sessions throughout the four-day camp resulting in 12 hours of instruction.

Data Collection Instruments

Two instruments were employed to meet the objectives of the study. The Paragon Learning Style Inventory (PLSI), a nationally utilized learning style inventory, determined SGL learning style. The PLSI is a 52-item questionnaire that employs the four Jungian (Jung, 1971) dimensions: (a) extraversion versus introversion, (b) sensation versus intuition, (c) thinking versus feeling, and (d) judging versus perceiving (Shindler & Yang, 2003). For the purpose of this study, the researchers chose to utilize two of the four Jungian dimensions, extraversion (E) versus introversion (I) and sensation (S) versus intuition (N) because those are the factors that most affect teachers and students in academic environments (Shindler & Yang, 2003). Each item on the PLSI is comprised of a single stem statement or question and two dichotomous answers. The PLSI has been in use for more than 10 years and is constantly reviewed to improve validity and reliability. The most recent reliability tests

indicate that the split half reliability for each dimension of the PLSI is between .90 and .94 (Shindler & Yang, 2003).

A criterion-referenced test, the Camp Communications Content Examination (CCCE), was designed in cooperation with the camp curriculum author to assess camper learning of the curriculum taught during small group sessions. The lead researcher collaborated with members of Oklahoma FFA Association state staff to identify the curriculum objectives for small group sessions. As a result, a 17-item multiple-choice exam was created. The CCCE included questions that tested campers in the areas of personal communication, family communication, and team communication.

Face and content validity of the CCCE were established through the use of a panel of experts consisting of three teacher educators, two leadership curriculum development specialists, and three high school students. Teacher education faculty members at Oklahoma State University were included on the panel because of their expertise in creating summative assessments. Additionally, the faculty members were charged with the task of reviewing the instrument for face validity, as all were published researchers in the agricultural education literature field. Two leadership curriculum development specialists were considered experts due to their involvement in writing curriculum for state and national FFA conferences such as Made for Excellence, Advanced Leadership Development, and Washington Leadership Conference. Finally, three high school students were included to ensure that all directions were clearly stated and were written at an age-appropriate reading level and to review the instrument for face validity. Wiersma and Jurs (1990) outlined eight methods to establish reliability of criterion-referenced tests. Table 1 describes the actions taken by the researchers to ensure that the CCCE was a reliable instrument. Based upon the criteria set forth by Wiersma and Jurs (1990) the CCCE was considered reliable.

Analysis of Data

SPSS for Macintosh 20.0 was utilized to analyze SGL responses to the PLSI. To reduce human error in score calculations, student pre-test and post-test scores were also computed using SPSS. Students were then assigned a treatment group code 1 – 4 determined by the learning style of their SGL. Data were analyzed using the SPSS repeated measures general linear model function. Analysis of variance (ANOVA) was used to determine differences between pre-test and post-test scores and the interaction between SGL learning style and camper test scores. A partial eta squared calculation was used to determine treatment effect size. Sphericity was not tested for because the repeated measures variable only has two levels; therefore sphericity was met (Field, 2009). All ANOVA assumptions were met.

Limitations of the Study

Learning style is a naturally occurring personal trait that cannot be assigned. As a result, the researchers were unable to control treatment group sizes. Unequal group sizes affected the overall power of the statistical analysis because of the small n found in one of the four groups.

Findings

Objective 1 - Identify the Learning Style of SGLs

As shown in Table 2, all four learning styles were represented among the 33 SGLs. Twenty-four SGLs possessed learning styles of the extravert type while nine SGLs were identified to have one of the two introvert learning styles. The most common learning style was Action Oriented Realists ($f = 14$; 43%). The next most common learning style was Action Oriented Innovators ($f = 10$; 30%). The largest introvert group was Thoughtful Realists ($f = 7$; 21%). Finally, the fewest SGLs were classified as Thoughtful Innovators ($f = 2$; 6%).

Table 1

Actions Taken to Establish Reliability of the Camp Communications Content Examination (Criterion-Referenced Test)

Method	Action Taken
Homogeneous Items	The CCCE was created to test campers in the area of social communications. Test questions were directly linked to curriculum objectives. All test items were multiple-choice.
Discriminating Items	Leadership curriculum development specialists confirmed that test items were difficult enough to be discriminative.
Enough Items	A test item represented each camp curriculum subject or objective. Careful attention was given to creating a test with enough items to assess student learning while recognizing time constraints for data collection at camp.
High Quality Copying and Format	Test were formatted into booklets and printed on a high quality laser printer. Three high school aged students assessed the tests for face validity and formatting problems.
Clear Directions for the Students	Campers were provided extensive written directions explaining how to properly respond to test items. The three high school age students were also asked to provide feedback pertaining to written test directions.
A Controlled Setting	All study participants were provided a separate area monitored by the primary researcher to complete the pre-tests during the registration setting. The post-test was also administered and monitored in a controlled setting during a time set aside for students to complete the exam on the last day of camp.
Motivating Introduction	Students were informed of the reason for the study and the positive implications the results would have on future camps. The information was included in the consent form signed by each student and again reread by the researcher before each test was administered.
Clear Directions for the Scorer	The lead researcher created a test key for scoring purposes. Furthermore, item responses for each participant were entered into SPSS version 18 to compute a test score.

Table 2

Number of Small Group Leaders Who Possessed Each Learning Style and Number of Campers in Each Treatment Group

Treatment Group Determined by SGL Learning Style	SGL		Treatment Group Size	
	<i>f</i>	%	<i>n</i>	%
Action Oriented Realists (ES)	14	43	78	43
Action Oriented Innovators (EN)	10	30	50	28
Thoughtful Realists (IS)	7	21	40	22
Thoughtful Innovators (IN)	2	6	13	7
Total	33	100	181	100

Objective 2 - Assess the Level of Campers' Learning from Small Group Sessions

As shown in Table 3, the mean pre-test scores for campers on the CCCE was 5.35 (32%) out of a possible score of 17. The mean post-test score for all participants was 9.91 (58%). ANOVA was utilized to test the null hypothesis

using an F statistic to determine the difference between the means of the two test scores (see Table 4). There was a significant difference between pre-test and post-test scores [$F(3, 1) = 309.51, p = .00$]. The effect size was ($\eta_p^2 = .64$), indicating that a large portion (~64%) of the variance can be attributed to the treatment.

Table 3

Mean Raw Test Scores and % Correct by Treatment Group

Group		<i>n</i>	<i>M</i>	<i>SD</i>	% Correct
Pre-Test	Action Oriented Realists (ES)	78	5.53	2.02	33
	Action Oriented Innovators (EN)	50	5.02	2.08	30
	Thoughtful Realists (IS)	40	5.53	2.03	33
	Thoughtful Innovators (IN)	13	5.00	1.63	29
	Total	181	5.35	2.01	32
Post-Test	Action Oriented Realists (ES)	78	9.97	2.62	59
	Action Oriented Innovators (EN)	50	9.98	2.48	59
	Thoughtful Realists (IS)	40	10.20	2.78	60
	Thoughtful Innovators (IN)	13	8.38	1.56	49
	Total	181	9.91	2.58	58

Objective 3 - Determine if SGL Learning Style Affects Campers' Learning During Small Group Sessions

As shown in Table 3, the mean pre-test score for the group led by Action Oriented Realists was 5.53 ($SD = 2.02$) and the mean

post-test score was 9.97 ($SD = 2.62$). The mean of the pre-test scores for the group led by Action Oriented Innovators was 5.02 ($SD = 2.08$) and the post-test mean score was 9.98 ($SD = 2.48$). The group led by Thoughtful Realists had a mean pre-test score of 5.53 ($SD = 2.03$) and mean post-test score of 10.20 ($SD = 2.78$).

Finally, the group led by Thoughtful Innovators had a mean pre-test score of 5.00 ($SD = 1.63$) and post-test mean score of 8.38 ($SD = 1.56$).

Analysis of variance was utilized to test the null hypothesis using an F-ratio to determine the significance ($\alpha = .05$) of the four treatment levels (see Table 4). There were no significant

differences between test scores among the four treatment groups [$F(3, 1) = 1.49, p = .22$]. Furthermore, the interaction of test scores and SGL learning style was non-significant [$F(3, 3) = 1.25, p = .29$]. There was, therefore, no significant treatment effect by SGL learning style and the researchers failed to reject the null.

Table 4

Analysis of Variance Summary Table

Source	Type III Sum of Squares	df	MS	F	p	η_p^2
Between Subjects Effects						
Learning Style	31.12	3	10.37	1.49	.22	
Error (Learning Style)	1233.28	177	6.97			
Within Subject Effects						
Test Scores	1132.31	1	1132.31	309.51*	.00	.64
Test Scores * SGL Learning Style	13.73	3	4.58	1.25	.29	
Error (Test Scores)	647.53	177	3.66			

* $p < .05$.

Although SGL learning style was not found to have a statistically significant affect student learning during small group sessions, it

is notable that the group led by Thoughtful Innovators scored 9% lower than the total mean post-test scores (see Figure 1).

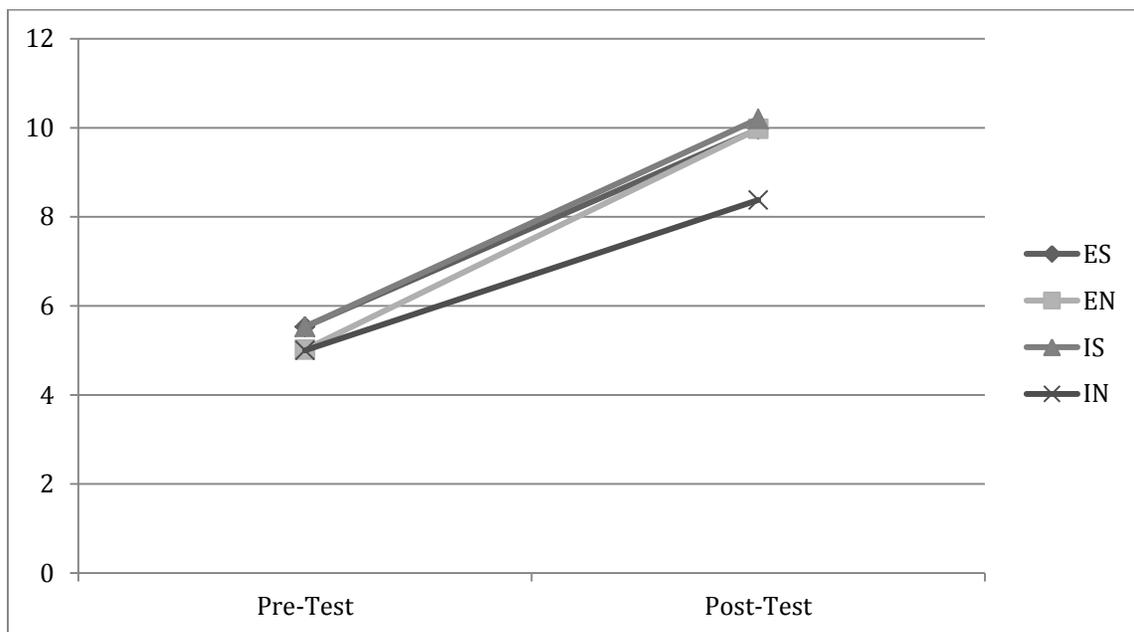


Figure 1. Mean raw test scores by treatment group.

Conclusions, Implications, and Recommendations

Results of this study lead to the conclusion that SGLs have an extraverted learning style. In fact, this group is exceptionally extraverted in its learning style. According to the findings of Shindler and Yang (2003), normal populations are close to evenly split between extraverted (52%) and introverted (48%) learning styles. Comparatively, more than 75% of the SGLs had an extraverted learning style. These conclusions raise some interesting questions. First, does the SGL selection process favor applicants who are extraverts? It is quite possible that extraverts respond to the volunteer selection process at higher rates than introverts due to their affinity for sharing thoughts and working in action groups. The highly-charged camp environment provides that milieu in which an extrovert thrives. Second, are extraverts attracted to situations like those provided by the opportunity to lead small groups at camp? As Jung's (1971) type theory asserted, extraverts orient themselves to the people around them. The camp's energetic environment, mentorship opportunities, and social setting comply with the extravert's preferences.

The second objective of the study was to assess the level of campers' learning from small group sessions. It is concluded that campers gained knowledge about the concepts and facts taught in small group breakout sessions. Because the difference between the average score on campers' pre-test and post-test was statistically significant, the researchers reject the null hypothesis that there is no difference between campers' pre-test and post-test scores on a test of facts and concepts associated with the curriculum taught during small group sessions. Although the average post-test score nearly doubled the average pre-test score, the researchers question if the amount of the content learned is satisfactory. The average post-test score was 58% correct. In the traditional educational setting, such a score would result in a failing grade. It is recommended that camp planners consider the following questions. First, is the average post-test score a satisfactory outcome of the instruction provided during small group breakout sessions? If not, what is the

satisfactory score? Second, what factors influence the post-test score? More specifically, does the camp setting create or provide too many distractions to be conducive to learning? Do SGLs need more training in the content of the curriculum and pedagogical concepts? Is the material too difficult for campers to master?

No significant differences were found to exist between test means of the four treatment groups; therefore, the null hypothesis that there is no association between test scores of campers and the learning style of their SGL is not rejected. The findings of this study do not agree with Shindler and Yang's (2007) assertion that teacher learning style has any effect on student-learning outcomes. Furthermore, the results of this study indicate that although the group of SGLs is largely homogenous in learning style there is no negative impact on camper learning outcomes. This conclusion is in alignment with Mehdikhani (1983) who concluded that learning style of teachers did not impact academic achievement of students in English and mathematics courses. Nevertheless, caution should be observed regarding this component of this research. As mentioned earlier, the number of SGLs who possessed each learning style is a limitation of this study. The small group size ($n = 13$) of the fourth group of campers who were taught by Thoughtful Innovators (IN) limited the power of the statistical analysis. As a result, it is possible that a type II error was committed leading the researchers to fail to reject a false null hypothesis (Kirk, 1995).

Considering the divergence of conclusions generated from previous studies examining the impact of instructor learning style upon student achievement (Hansen & Stansfield, 1982; McDonald, 1984; Mehdikhani, 1983; Paradise & Block, 1984) the researchers recommend that similar studies of this nature be conducted. Care should be taken to assure that each test group is large enough to provide the statistical power needed. The stratified sampling technique (Creswell, 2008) would be appropriate for this situation. Stratification can be used when the population displays an imbalance of a sample characteristic (Creswell, 2008).

Based on the results of this study, it is recommended that camp planners establish a strategy to include a summative assessment of

camp, SGLs and campers. If one of the goals of camp is to develop campers' knowledge of leadership and personal development, then outcome and factors influencing it should be evaluated each year. Faculty members and research associates in the Department of Agricultural Education, Communications and Leadership at Oklahoma State University should be involved in designing and administering this evaluation plan. Data collected as a result of summative assessments will provide vital

information for camp planners and curriculum directors who make budgetary and educational decisions. It is further recommended that camp planners establish learning standards and set camper learning achievement goals to serve as benchmarks to measure learning success in future camps. Further research is needed in the area of camper learning style and factors that contribute to cognitive gain in an FFA camp setting.

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