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Differences in Attention Levels between Preliminary Nurses and Pre- Service Early Childhood Teachers Using ANT (Attentional Network Test) Computer Test

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ABSTRACT

The purpose of this study was to analyze attentional network test (ANT) and to examine the difference of attention level according to the types of brain dominance between nursing college students and preservice early childhood teachers. The subjects of this study were 79 students in 3rd and 4th grades attending nursing department and early childhood education department of U university. Herrmann's BDI was used to measure the type of brain dominance and Ant (attentional network test) computer test was performed to measure the level of attention. The data were analyzed by independent t-test to determine differences in brain dominance and attentional level between preliminary nurse and pre-service early childhood teacher and to analyze differences in attention level according to types of brain dominance. The results of this study were as follows: First, there was no significant difference between the two groups in A, B, and C quadrants. In quadrant D, the pre - early childhood teacher's quadratic thinking score was significantly higher than preliminary nurse quadrant, respectively. Second, there was no significant difference between preliminary nurses and pre – service early childhood teachers in the level of alerting and executive control. At the level of orienting, the preliminary nurse's orienting score was significantly higher than the pre-service early childhood teacher's orienting score. Third, alerting effect attention was not significantly different according to the type of brain dominance, but orienting was highest in students in the quadrant A, and executive control was highest in students in quadrant D quadrant burnt.

Keywords: *ANT computer test, brain dominance thinking, attention level, preliminary nurse, preservice early childhood teacher*

Introduction

According to the model of Herrmann (1996), the left cerebral hemisphere (A quadrant) is associated with logic analysis and quantitative thinking, while the left limbic hemisphere (B quadrant) is associated with sequential, The right limbic hemisphere (C quadrant) is associated with emotional and sensory person-to-person interactions, while the right cerebral hemisphere (D quadrant) is associated with visual, intuitive, and innovative thinking[1]. In other words, the left cerebral hemisphere (A quadrant) dominant person tends to think logically, analytically, and factually, to find an efficient problem-solving method for complicated problems, it does not shake my feelings. The left limbic hemisphere (B quadrant) the dominant person is systematic, sequential, planned and detailed thinking, similar to the sedentary brain, but somewhat structured and focused on the theoretical framework and likes to work according to time and schedule. Right limbic hemisphere (C quadrant) the dominant person tends to be influenced by mood, is sensitive, talks to talk, is accustomed to persuade others, and is interested in thinking about how others will feel. The right cerebral hemisphere (D quadrant) the dominant person is global, intuitive, imaginative, and does not follow sequential procedures for making decisions.

Herrmann's brain dominance was related to the tendency of middle school students to solve technical problems. According to this study[3], students in the

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quadrant have a quadrant of a tendency to solve technical problems. This means that a student with a quadrant D quadrant is more likely to perform a job that requires technical problem resolution than a student who has a quadrant A, B, or C. It is important to consider whether the thinking itself is dominant in A, B, C, or D quadrants, but if such dominance is revealed, it correlates with any psychological, learning, This characteristic must be considered when performing or learning a job depending on the correlation.

Research related to these brains has been an important research topic not only in medicine and physiology but also in pedagogy. In fact, results from brain research provide educational implications. Attention is a basic information processing process of the brain that has different characteristics depending on its range, type, functional process, purpose, and neural network. [4]divided into alertness, arousal, sustained attention, selective attention, and resource. It has been subdivided into alerting, orienting, and executive control[5]. In particular, Eriksen and Eriksen used the adult ANT (Attentional Network Test) to measure three attentions using a computer, including the Flanker task[5-6.]

First of all, 'alertness' is focused on attention and maintaining the condition continuously. This system refers to letting the task continue to be carried out because it is related to the front part of the right hemisphere and the crown of the right hemisphere. Second, 'orienting' selects information from input stimulus, which is related to parietal lobe and frontal lobe. Orienting is operated by presenting a cue that points to a space in which a person must pay attention, and even though it may be ambiguous enough to move the eye or notice the motion of the eye. Third, 'executive control' means resolving conflicts among various reactions, which activates the frontal lobe[7-8].

Executive control is the ability, through behavioral control and oversight, to ensure that plans are executed in order, that errors are identified, and that goals are achieved. These three levels of attentiveness (alertness, orienting, and executive control) are the basic cognitive abilities that underlie learning and information processing that affect learners differently in performing tasks. Selective attention is dependent on cognitive suppression, which involves the control of internal and external stimuli and the suppression of information that interferes with attention. In addition, sustained attention to keep attention on a single source of information is also a function to better cope with the situation of task resolution[9]. Therefore, selective attention and continuous attention are essential elements in the learning process.

Previous studies have shown that the right limbic hemispheres tend to be influenced by mood, and they prefer to talk with others, preferring to work as nurses and teachers. However, it has been found that the type of brain dominance has changed during college years, and that this variation is very large [10]. It is meaningful to examine the type of brain dominance at this point. In addition, it is considered that it is necessary to grasp the types of brain dominance, considering that the personal dominance and suitability of job fit an important role in raising job satisfaction[11]. The purpose of this study was to investigate the level of brain power and attentiveness of students who majored in different departments and to identify the level of attention according to the type of brain dominance, and to provide basic data for the development of interventions that can increase the level of attention.

The following are the specific research questions for carrying out these research objectives.

1. Is there a difference in brain dominance between the preliminary nurses and the pre-service early childhood teachers?
2. Are there differences in attentiveness between the preliminary nurses and the pre-service early childhood teachers?
3. Does the level of attention differ according to the types of brain dominance of the preliminary nurses and pre-service early childhood teachers?

Materials and Method

Designs: This study is to investigate the knowledge, attitude and performance ability for CPR of pre-service early childhood teachers.

Participants and Data Collection: The type of brain dominance was conducted by the researcher in the form of questionnaires for all students at the same time. Brain dominance type test paper was collected. Of the collected data, 79 of them were included in the analysis except for 3 items with no or no answers. The time required for testing the brain dominance is about 20 to 30 minutes. An attentional network test computer test was conducted by the researcher from May to June 2018. Students took

a 5-minute pilot test in a separate room in the computer room of U-University, and then took a total of 35 minutes for three sessions, about 10 minutes each. A total of 79 results were applied to the final analysis, except for one abnormal student who showed symptoms of attention deficit hyperactivity disorder at the first test, and one student who was absent from the test day.

Research Instruments

Brain Dominance Type Test: The research tool for measuring the type of brain dominance was based on the research tool of Yu[12], which applied the preference scores to the items based on Kim et al[13]. The total number of questions was 17, ranging from 1 to 13 in the order of preference of 4 (A, B, C, D). From the 14th to the 17th, the total score was calculated by multiplying the score by the number of items checked in the item and multiplied by 4 in each quadrant. The highest score among the four quadrants was classified as the learner 's dominance type. In order to measure the reliability of the research instrument, the internal consistency of items 1 to 13 was analyzed. Cronbach's α was found to be .85 in A quadrant, .87 in B quadrant, .85 in C quadrant, and .92 in D quadrant respectively.

ANT (Attentional network test) Computer Test: ANT is a computerized test that measures three attentions to alertness, clench, and attention-to-action by measuring response time[5]. In this study, we used the adult arrow version to show the computer screen to the learner and to react appropriately with the direction key of the keyboard. The learner presses the directional key that matches the direction of the middle arrow among the five directional arrows. One of the four cases * appears when (1) * does not appear, (2) it appears overlaid on the + sign, (3) it appears simultaneously at the top and bottom of the screen, (4) appears on the top or bottom of the screen. The learner should press the direction key as soon as possible. If the answer is correct, the loudspeaker sounds 'uhu', and if it is not correct or does not react in time, 'ppi' sounds. At the end of the test, three points are shown on the screen: border alerting effect, orientation effect, and conflict effect. The 'alerting effect' is the average reaction time without the + sign, minus the average reaction time when the + sign is below and above the screen, the 'orienting effect' is the average response time when the + sign is in the middle, minus the average response time when the + sign is at the same position as the target. And the 'conflict effect' is measured as the mean response time when the directions of the middle arrow and the remaining four arrows do not match, minus the mean response time when the directions of the five arrows are the same[5].

Data Analysis: The data collected in this study were used to calculate the Cronbach alpha coefficient for the reliability of the brain dominance type test using the SPSS 18.0 program. The independent sample t-test was conducted to examine the differences between the preliminary and the pre-service early childhood teacher in the level of brain dominance and attentiveness. In addition, we conducted one - way ANOVA in order to clarify the difference of attention level according to types of brain dominance of the preliminary nurses and the pre-service early childhood teacher.

Results

1. Differences in brain dominance between preliminary nurses and the pre-service early childhood teacher.

Table 1. Differences in brain dominance between preliminary and the pre-service early childhood teacher (N =7 9)

	Pre-liminary nurses (n = 36)		Pre-service early childhood teacher (n = 43)		t
	M	SD	M	SD	
A	54.92	7.80	52.00	11.78	1.27
B	51.83	9.70	47.37	15.88	1.47
C	58.39	10.57	63.79	15.60	-1.77
D	50.69	10.38	64.42	17.80	-4.08***

*p<.05, **p<.01, *** p<.001

As shown in Table 1, the results of the study were as follows: first, there was a significant difference between the preliminary nurses and the pre-service early childhood teacher in the A quadratic dominant thinking ability (t = 1.27, p> .05) and the B quadrant dominant thinking ability (t = 1.47, p>. 05) and C quadratic dominant thinking power (t = -1.77, p> .05) were not significantly different between the two groups. On the other hand, there was a significant difference between the two groups in the quadrant of D quadrant (t = -4.08, p <.001). The pre-service early childhood teacher's D quadratic thinking power score was significantly higher than preliminary nurse D quadrant dominant thinking ability respectively.

2. Differences in attention level between preliminary nurses and the pre-service early childhood teacher.

Table 2: Differences in attention level between preliminary and the pre-service early childhood teacher (N = 79)

Division	Pre-liminary nurses (n = 36)	Pre-service early childhood teacher (n = 43)	t
	Mean ± SD	Mean ± SD	
Alerting effect	47.03 ± *22.89*	57.77 ± *105.32*	-.60
Orienting effect	74.44 ± *59.65*	133.67 ± *46.96*	-4.94***
Conflict effect	93.53 ± *78.76*	92.09 ± 101.27	.07

*p<.05, **p<.01, *** p<.001

As shown in Table 2, there was no significant difference between the two groups in the alertness (t = -. 60, p> .05) between the preliminary nurses and the pre-nursery teachers. Orienting effect was found to be significantly different between the two groups (t = -4.94, p <.001). The preliminary nurses' orienting effect scores were higher than those of pre-service early childhood teachers. There was no significant difference between the two groups in the conflict effect (t = .07, p> .05).

3. Differences in attention level according to type of brain dominance between preliminary nurses and the pre-service early childhood teacher.

Table 3: Differences in differences in attention level according to type of brain dominance (N = 79)

Sub-factor		N	M ± SD	F
Alerting effect	A	9	64.39 ± 22.46	.56
	B	12	68.63 ± 19.81	
	C	25	36.24 ± 37.35	
	D	33	58.21 ± 105.21	
Orienting effect	A	9	71.22 ± 44.58	3.37*
	B	12	81.33 ± 59.70	
	C	25	103.72 ± 61.43	
	D	33	127.82 ± 57.61	
Conflict effect	A	9	124.48 ± 75.48	2.85*
	B	12	147.08 ± 124.17	
	C	25	88.88 ± 68.46	
	D	33	67.24 ± 89.06	

*p<.05, **p<.01, *** p<.001

As shown in Table 3, as a result of examining the difference of attention level according to types of brain dominance among preliminary nurses and the pre-service early childhood teacher, there was no significant difference in alerting effect attention according to types of brain dominance (F = .56, p > .05). Orienting effect attention was significantly different according to brain dominance type (F = 3.37, p <.05). And orienting effect attention was highest in learners of A quadrant type, B quadrant, C quadrant, and D quadrant dominant type. Conflict effect attention was significantly different according to brain dominance type (F = 2.85, p <.05), and conflict effect attention level was highest in students in quadrant D quadrant, followed by students in C quadrant, A quadrant, and B quadrant.

Discussion and Conclusion

The purpose of this study was to analyze the differences between the types of brain dominance and attention level, and to analyze the difference of attention level according to the type of brain dominance. The results of this study are as follows. First, there was no significant difference between the two groups in the A, B, and C quadrants in the difference of the brain dominant between the preliminary nurses and the pre-service early childhood teacher. On the other hand, in quadrant D, the pre - service early childhood teacher's quadratic thinking score was significantly higher than the pre-service nurse' s quadratic thinking score. The difference in the type of brain dominance among the subjects of this study seems to be different according to the learning contents and method of the major subject which is currently being studied in the university. This result is similar to the results of this study in the results of [13], which examined the types of brain dominance in current pre-service early childhood teacher, in the C and D quadrants. The quadrant D is mainly judged holistically, subjective, and intuitively, and the more dominant the imaginative brain is, the more creative it is to be able to generate many ideas within a limited time, to think creatively, and to think openly. The curriculum of the department of nursing mainly focuses on comprehension and memorization such as pathophysiology, pharmacology, and physiology. Most of the lessons require analytical and critical thinking such as predicting the cause of a patient's disease and finding a treatment method. Therefore, the problem solving ability of the situation is high, but it is judged

that originality or creativity is lower than that of the pre-kindergarten teacher. [14] suggested that students who are creative thinkers can perform well in clinical practice. Therefore, a new educational plan should be sought to activate the right brain for the preliminary nurses.

Second, the difference of attention level between preliminary nurses and the pre-service early childhood teacher showed that there was no significant difference between the two groups in the level of alerting effect and conflict effect. In the conflict effect level, the preliminary nurse' the higher the score was, the more significant difference than the orienting score. Direct comparison is difficult because there are no studies on the prevalence of brain dominance among prospective nurses. Orienting effect attention quickly selects information from input stimuli, which is related to the parietal and frontal lobes. This can be interpreted as the need to solve the problem of accurately calculating the dose of the drug according to the patient's weight, and to improve the functions and skills such as blood pressure measurement, injection, and accuracy.Third, the difference of attention level according to the type of brain dominance of preliminary nurses and the pre-service early childhood teacher showed that there was no significant difference in alerting effect attention according to type of brain dominance, and students in the quadrant of the quadrillion type were the highest. In other words, the tendency of analytical thinking is high when executive control is high, and the higher the executive control, the higher the tendency of creative thinking. Given the study that the brain is specialized according to the way the brain works, the instructors must try to make the learner a master of the integrated mindset that is dominant in all quadrants A, B, C, D. Although not statistically benign, the subjects in this study preferred C-quadrant accidents. A person with a dominance in the quadrant C can participate in group activities rather than working alone, and it can be seen as having an importance to the relationship. Nurses work with patients, caregivers, other medical staff, and teachers are important examples of human relationships, such as working with students, students' parents, and other teachers. In previous research, it was confirmed that academic achievement varies according to individuals' brain dominance type, and job preference and job satisfaction can be changed. In Korea, researches on the relationship between brain dominance type and creativity have been conducted for infants and pre-service early childhood teacher. The results of this study are expected to be applicable to education and research programs of nursing department and early childhood education department. Especially, if you perform this test before going on to college, you will be able to guide the appropriate course for each type considering the type of brain dominance of the learner, and then you will be able to increase your major satisfaction and educational effect. It is important to note that this study was the first attempt to identify the types of brain dominance and attentiveness of learners majoring in nursing and early childhood education.

Limitations of this study and suggestions for future research are as follows. This study was aimed at a specific department of a university, but it is necessary to use more samples in subsequent studies to compare grade, major, and gender.

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Conflict of Interest: The authors declare no conflict of interest.

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