



# Grammatical sensitivity: a correlational-explanatory study on brain dominance and EFL training to improve gains

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## Abstract

This article provides a report on a finished piece of research. The study is divided into two stages. Firstly, the brain dominance and grammatical sensitivity of Pedagogy and Medical students in a Chilean university were measured. The correlation of both variables shows that Medical students are better at grammatical sensitivity than Pedagogy students and that left-brain dominance involves higher levels of grammatical sensitivity than right-brain dominance. The instruments used in this stage were: 1) a grammatical sensitivity pre- test (used to assess the students' levels in this variable), 2) a brain dominance instrument (used to determine the cerebral preferences of the students) and 3) an abstract reasoning test (which measures a person's ability to identify non numerical or verbal patterns). In the second stage, Pedagogy students underwent a five-session training aimed at improving their grammatical sensitivity. After the training was over, we administered a grammatical sensitivity post- test whose results were compared with the ones in the pre-test; the purpose was to determine if the training could improve the students' performance in this variable. It was concluded that the training was successful since their grammatical sensitivity improved in 20%. In addition, most students with high attendance to the training (over 80%) improved their grammatical sensitivity after attending it.

**Key Words:** English language Teaching, individual differences, language aptitude, grammatical sensitivity, brain dominance, abstract reasoning.

## Resumen

El presente artículo presenta un reporte de un estudio que ya ha sido completado. La investigación se divide en dos etapas. Primeramente, se midió la dominancia cerebral y sensibilidad gramatical de estudiantes de pedagogía y medicina en una universidad Chilena. La correlación entre ambas variables muestra que los estudiantes de medicina presentan una sensibilidad gramatical superior a los de pedagogía y que la dominancia cerebral izquierda involucra mayor sensibilidad gramatical que la derecha. Los instrumentos usados en esta fase fueron: 1) pre-prueba de sensibilidad gramatical (empleada para medir el nivel de los alumnos en esta variable) 2) prueba de dominancia cerebral (utilizada para determinar las preferencias cerebrales de los alumnos) y 3) prueba de razonamiento abstracto (que mide la capacidad de una persona para identificar patrones no verbales o numéricos). En la segunda etapa, los estudiantes de pedagogía asistieron a cinco sesiones de instrucción para mejorar su sensibilidad gramatical. Una vez concluidas las sesiones, se les administró una post-prueba de esta variable cuyos resultados fueron comparados con la pre-prueba ya aplicada; se buscaba determinar si estas sesiones mejoraban su rendimiento en sensibilidad gramatical. Se concluye que la instrucción fue exitosa pues los alumnos mejoraron en un 20%. Asimismo, la mayoría de los estudiantes con un alto porcentaje de asistencia a las sesiones (sobre 80%), incrementó su sensibilidad gramatical.

**Palabras Claves:** Enseñanza del Idioma Inglés, diferencias individuales, aptitud lingüística, sensibilidad gramatical, dominancia cerebral, razonamiento abstracto.

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## Introduction and Problem

The field of English Language Teaching (ELT) is always facing important challenges. It is not easy to teach a foreign language in classes where students have different abilities, learning styles and motivations. It is necessary to keep in mind that individual differences are a key factor in students' success in learning a foreign language. This study analyzes two dimensions of individual differences: brain dominance and grammatical sensitivity.

Brain dominance refers to the fact one cerebral hemisphere (left or right) tends to be dominant. This process is known as *lateralization*, that is, each hemisphere is specialized for certain cognitive functions. Therefore, subjects are normally labelled as left or right brained. Some individuals can also show a bilateral trend (both hemispheres are equally dominant); they are referred to as bilateral.

Grammatical sensitivity is an important component of language aptitude defined as "the ability to recognize the grammatical functions of words (or other linguistic entities) within sentences". It does not deal with explicit grammar knowledge but with awareness of syntactic patterns. (Robinson 2001 p.324). In the same way as individuals process information differently due to their brain dominance, they have different levels of grammatical sensitivity.

The present research intends to prove two hypotheses. On the one hand, this study is aimed at studying the relationship between cerebral dominance and grammatical sensitivity in Medicine and Pedagogy students in a university in Chile. On the other hand, it intends to prove that training can help students who show low levels of grammatical sensitivity improve this variable.

Therefore, the two hypotheses formulated in this study are:

Hypothesis 1: EFL university Medical and Pedagogy students with left-brain dominance have higher levels of grammatical sensitivity than right-brained ones.

Hypothesis 2: EFL university Pedagogy students with right-brain dominance improve their levels of grammatical sensitivity after exposure to training in grammatical patterning and functions.

## Methodology

### Participants

In this research, the universe corresponds to students of Medicine and Pedagogy in a Chilean university. In total, there are 97 subjects (54 Medicine students and 43 Pedagogy students).



In this study, the sample was non-probabilistic since the selection of the subjects was not made at random but depended on the investigator. More specifically, this research had a quota sample since the researcher chose the sample non-randomly according to some fixed quota. The universe was divided in two samples according to the following quota:

- Sample 1: Medical and Pedagogy left-brained students were compared to right-brained students in a grammatical sensitivity test. (we evaluated if they showed a higher level of grammatical sensitivity when compared with right-brained students). This sample corresponds to stage 1 in which hypothesis 1 was confirmed.
- Sample 2: Pedagogy students with low grammatical sensitivity who underwent training (we analyzed if after training, this variable improved).

Only Pedagogy students underwent the training since as a group they scored much lower than Medical students in grammatical sensitivity. This sample corresponds to the second stage in which the second hypothesis was tested.

### **Type of study**

As this research has two hypotheses, it can be classified according to two different types of study according to each hypothesis.

If we consider hypothesis 1, this study is correlational. The two variables correlated are left-brain dominance and grammatical sensitivity. It is postulated that students with left-brain dominance have higher levels of grammatical sensitivity than subjects with right-brained dominance

According to hypothesis 2, this study is considered explanatory since it gives an account of why the grammatical sensitivity of some Pedagogy students improved. That is, because of a five-session training.

Hence, the whole study is classified as correlational-explanatory.

### **Procedures**

As it was mentioned, this study comprises two phases. In the first stage, the aim was to prove the first hypothesis regarding left-brain dominance and high grammatical sensitivity. Consequently, Medical and Pedagogy students were given a brain dominance test (see instrument section) that determined the right or left preference of the students. After that, students took a



grammatical sensitivity pre-test (see instrument section) in order to assess their performance in this variable. After administering both tests (brain dominance and grammatical sensitivity pre-test) the aim was to find out if left-brained students were better than right-brained-students at grammatical sensitivity because of their analytical ability.

After these results were available, the question whether high scores in grammatical sensitivity were actually due to their ability to recognize patterns or if it was because of a high knowledge of the target language (English) arose. In order to clarify doubts a general patterning test, called *abstract reasoning test* (see instrument section), was administered. It assessed the students' capacity to determine patterns.

With all these results available, the first hypothesis was confirmed.

After the first hypothesis was verified, the second stage started. This stage was aimed at confirming the second hypothesis regarding the trainability of grammatical sensitivity to Pedagogy students who scored lower in this variable. Consequently, Pedagogy students underwent a five-session-training whose main objective was to improve their grammatical sensitivity. Once the instruction period was over, students took a grammatical sensitivity post-test (see instrument section) in order to determine if this variable had improved after the training.

Regarding the training, the topics covered were: 1)-ing for adjectives 2) subjects 3) objects and object pronouns. These contents were chosen since they had the lowest scores in the grammatical sensitivity pre-test in Pedagogy students.

## Instruments

- 1) Grammatical Sensitivity Tests: Both the grammatical sensitivity pre and post tests have 15 questions in which test-takers need to decide which of the underlined words of the second sentence has the same function as the underlined word in the first sentence. In this example, the correct answer is A.

1) John took a long walk in the woods.

Children in blue jeans were singing and dancing in the park.

A

B

C

D

E



Most of the questions were taken from a test called *Grammatical Functions of Words in Sentences* that is part of a doctoral thesis by Gillece (2006) at University of Dublin.

High grammatical sensitivity was defined as getting over 65% of correct answers in the tests according to the researcher's choice.

- 2) Brain dominance Test: The test used to assess brain dominance was an instrument designed by Carlos Jimenez, which is based on Ned Herrmann's whole brain theory. Herrmann's theory divides the brain into four quadrants (upper cerebral right, upper cerebral left, lower limbic right, lower limbic left). The students were required to answer a survey divided into four parts. In each section there were statements that described characteristics of each of the cerebral quadrants identified by Herrmann (1989). The students had to put a mark from 1 to 5 to each statement depending on how identified they felt with each proposition. The quadrant with the highest score is the one with primary dominance.

In order to get a more specific measure in brain dominance, the scores gotten in limbic and cerebral quadrants were added up. In others words, the limbic and cerebral left quadrants scores were added up, the same was done with limbic and cerebral right quadrants. Left or right brain dominance was determined by checking which side of the brain had the highest score (left or right). Bilateral students were the ones who got the same score in both, left and right brain dominance.

- 3) Abstract Reasoning test: As it was already mentioned, this test was administered to both groups (Medicine and Pedagogy) in order to support the results of the grammatical sensitivity test. Namely, when the grammatical sensitivity pre-test was taken by the students, the paradox about the cause of high grammatical sensitivity arose since a good score in this variable could imply a high knowledge of the target language rather than their ability to recognize patterns. That is why, the abstract reasoning test was applied since this test measures an individual's capacity to identify non verbal or numerical patterns.

The name of the original test is *Abstract Reasoning- Practice Test 1* and it was downloaded from Psychometric Success.com. (website on reference page). It was originally written in English and had 25 multiple-choice questions.



The test was translated into Spanish to avoid confusion among students and eleven questions were chosen to be included in this version.

The test measures a person's capacity to identify non verbal or numerical patterns. Subjects were required to find the figure that continued a sequence or the picture that did not correspond in a group of figures.

High Abstract Reasoning was described as getting more than 65% of correct answers according to the researcher's choice.

## **Review of Literature**

As it was mentioned before, grammatical sensitivity and brain dominance are components of learners' individual differences. Before discussing these two concepts, it is necessary to have a background about individual differences. Therefore, this section is organized from general to particular. First, an overview of individual differences is provided. Then, the concept of brain dominance is discussed, and finally grammatical sensitivity is reviewed.

## **Individual Differences**

EFL learners are all different since they have distinct characteristics that undoubtedly affect their second language learning. Some of the features identified by Lightbown and Spada (1999) are: intelligence, aptitude, personality, learner preferences and age of acquisition. Brain dominance is also a component of individual differences since as it was already mentioned, subjects can be left-brained, right-brained or bilateral and this affects their second language learning. Grammatical sensitivity can be defined as a person's capacity to identify linguistic patterns. Different levels of grammatical sensitivity among students can affect their language learning as well.

## **Brain Dominance**

Fromkin, V., Krashen, S., Curtiss, S., Rigler, D., & Rigler, M. (cited in Clark, V., Eschholz, P., & Rosa, A., 1985) claim that brain dominance (also known as lateralization) involves the specialization of each hemisphere for different cognitive functions. In other words, certain functions are specific for the right or left side of the brain.



Some of the characteristics of left and right brain dominance as described by Williams (1983) who is quoted by Reid (1995) are:

LEFT- BRAIN DOMINANCE	RIGHT- BRAIN DOMINANCE
1. Rational.	1. Intuitive.
2. Planned and Structured.	2. Fluid and Spontaneous.
3. Theoretical.	3. Experiential.
4. Analyzes.	4. Synthesizes.
5. Prefers established certain information.	5. Prefers elusive, uncertain information.
6. Favors logical problem solving.	6. Favors intuitive problem-solving.
7. Makes objective judgments, conclusions.	7. Makes subjective judgments, conclusions.
8. Observes details.	8. Observes overall design form.
9. Relies on language in thinking and remembering.	9. Relies on images in thinking and remembering.
10. Responsive to structure.	10. Responsive to environment, ambiance.

## Grammatical Sensitivity

There are many definitions for grammatical sensitivity. All of them refer to the concept as the ability to distinguish grammatical functions. Robinson (2001) defines grammatical sensitivity as “the ability to recognize the grammatical functions of words (or other linguistic entities) within sentences” (p.324). This definition is supported by several similar definitions. Carroll and Sapor (1959) (cited in Rodríguez & Carrasquillo, 2002) claim that grammatical sensitivity is “the individual’s ability to demonstrate awareness of the syntactical patterning of sentences of a language” (p.65). Skehan (1988) defines grammatical sensitivity as “the ability to understand the contribution that words make in sentences” (Skehan, 1998, p.200) while Gillette (2006) defines grammatical sensitivity as “the ability to handle grammar, i.e. the forms of language and their arrangements in natural utterances” (p.35).

Gass and Selinker (2001) state that grammatical sensitivity does not indicate the ability to name the functions, but it deals with the ability to



determine whether or not words in different sentences perform the same function.

### **Is grammatical Sensitivity a stable trait?**

Regarding the stability of language aptitude, the available literature does not show a clear view about this issue. Namely, some authors believe that aptitude is a modifiable trait whereas others just claim the opposite. For instance, according to Politzer (1969), quoted by Gillette (2006), language aptitude is enduring and cannot change. Conversely, McLaughlin (1990), also cited by Gillette (1996), argues that aptitude can be modified with experience. If we extrapolate this view to grammatical sensitivity (which is a component of language aptitude), this study supports the view that grammatical sensitivity can be modified with experience, more specifically, by means of a training. In the results section, it will be analyzed that most individuals who underwent training, improved their grammatical sensitivity in just five sessions.

### **Grammatical sensitivity and left-brain processing**

Schumann (2004) points out that individual differences in mental abilities occur due to differences across brains. “the implicit hypothesis here is that the variation in abilities manifest across individuals is caused by differences in the physical and chemical structure of the brain.” (p.9). In other words, differences in language aptitude across individuals stem from differences across their brains.

Therefore, if the differences across brains lead to changes in language aptitude, grammatical sensitivity must also be affected by brain variations in individuals since it is an important part of this construct. Hence, if a subject has a high or low level of grammatical sensitivity, this is partly determined by his neural architecture.

This study hypothesizes that brain dominance is a main source of differences in people’s levels of grammatical sensitivity. In other words, left-brain dominance can determine a higher level of grammatical sensitivity than right-brain dominance. This occurs because grammatical sensitivity requires analytic thinking and it is precisely in the left hemisphere where this kind of reasoning takes place.



## Results and Conclusions

After carrying out this two-stage study, it can be concluded that the two hypotheses were confirmed. To begin with, the first hypothesis connected to the fact that left-brained students showed higher levels of grammatical sensitivity is proved since 69.2% of Medical students with high grammatical sensitivity and high abstract reasoning are also left-brained. If we compare right-brained students with high grammatical sensitivity and abstract reasoning, the number decreases considerably because only 26.9% of Medical students belong to this category. The same phenomenon is observed in Pedagogy students since 57.1% of subjects with high grammatical sensitivity and abstract reasoning, are also left-brained. Conversely, just 14.3% of Pedagogy students who have high levels of grammatical sensitivity and abstract reasoning are also right-brain dominant.

It is also observed that a higher proportion of Medical students show higher levels of grammatical sensitivity and abstract reasoning if compared with Pedagogy students. As a matter of fact, 86.7% of Medical students display high grammatical sensitivity and abstract reasoning whereas 57.1% of Pedagogy students show a high score in these variables. First, this can be due to their global left-brain dominance trend that involves analytic and theoretical thinking and an inclination towards rules and challenging tasks. Hence, it can be concluded that the student's field of specialization is an important factor in the achievement of high scores in grammatical sensitivity and abstract reasoning tests.

With respect to the second hypotheses, it can be concluded that it was also confirmed since 55.8% of the students who took the training improved their grammatical sensitivity. Besides, the three areas to be improved showed an increase in the number of correct answer and a decrease in wrong answers. In addition, 62.5% of them show a high level of attendance to the training (over 80%). Moreover, it can be said that this improvement is significant since it corresponds to 20% in five sessions. Therefore, the training was successful. Probably, if the instruction period would have been longer, the improvement would have been higher.

The research here reported contributes the still unclear issue about language aptitude and whether it is a permanent characteristic or it can be modified with experience. In this respect, this study reports that grammatical



sensitivity (which is a component of language aptitude) can be changed if proper training is provided.

In addition, it can be concluded that a major aim mentioned in the introduction was fulfilled, that is, students with low grammatical sensitivity could improve this variable irrespective of their brain dominance. This opens a big challenge for teachers since it is proved that students can improve their weaknesses under proper training. This is a challenge not only for the field of language aptitude, but for any area of EFL. Teachers have the challenge and the responsibility of enhancing most of their students' learning and not just the talented ones. Determining the students' brain dominance can be a useful tool since the teacher can know about how they process information and their preferred ways to learn.

Finally, it can be stated that the present study was successful due to the fact that it gives new insights about the field of brain dominance and grammatical sensitivity. However, these results are preliminary, and long-scale studies are needed in order to support these findings.

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## Appendix A

Grammatical Sensitivity (Pre-test)

Look at the following two sentences:

i. **Mary likes to go to school.**

ii. (A) He likes to go (B) fishing in (C) Maine.

In sentence ii, the word 'He' has the same grammatical function as the word 'Mary' in sentence i. They both act as the subject of the sentence – Mary likes, He likes.

You must decide which of the words in bold in sentence 2 fulfills the same grammatical function as the underlined word in sentence 1.

On the answer sheet provided, put a tick in one of the boxes marked A, B, C or D. Please attempt all questions.

1. **Sad people cry.**

Happy people are often seen laughing and smiling.

A                      B                      C                      D

2. **She hopes to buy a car when she gets the money.**

After you left at 6.00 most of the group remained in the pub.

A                      B                      C                      D

3. **His friend bought her a new car.**

Why won't you tell me something yourself?

A                      B                      C                      D

4. **The basic rules of the game are not hard to learn.**

She had great difficulty in finding the proper exit she should to through.

A                      B                      C                      D

5. **It's not to be taken away from here.**

She talked to me about how I need to realize matters have gone too far.

A                      B                      C                      D

6. **A number of people arrived at the theatre late.**

I have experienced many strange things in my life.

A                      B                      C                      D



**7. My foot became sore from the infection.**

The plant quickly grew strong in the warmth from the sun.

A                      B                      C                      D

**8. The woman fell down and hurt herself.**

You know yourself that she will win prizes if she does your work.

A                      B                      C                      D

**9. The playground was full of screaming children.**

Usually constant practice is the best method for fast learning.

A                                      B                      C                      D

**10. Jane has gone to make a telephone call.**

Two people will be needed to carry this bed because it is too heavy for one.

A                                      B                                      C                      D

**11. She calls her mother Margaret.**

Mary telephones him every day according to her sister.

A                                      B                      C                                      D

**12. I can see you from my front window.**

You can hear her from outside the door.

A                                      B                      C                                      D

**13. Money seems to make her happy.**

Years ago most farming was done by hand.

A                                      B                                      C                                      D

**14. James sold Liam his bike.**

I will guarantee them a huge bonus.

A                                      B                                      C                                      D

**15. She was late.**

Because of the huge demand for the product the manager is ordering more stock.

A                                      B                                      C                                      D



## Appendix B

### Grammatical Sensitivity (Post Test)

Look at the following two sentences:

i. Mary likes to go to school.

ii. (A) He likes to go (B) fishing in (C) Maine.

In sentence ii, the word 'He' has the same grammatical function as the word 'Mary' in sentence i. They both act as the subject of the sentence – Mary likes, He likes.

You must decide which of the words in bold in sentence 2 fulfills the same grammatical function as the underlined word in sentence 1.

On the answer sheet provided, put a tick in one of the boxes marked A, B, C or D. Please attempt all questions.

#### 1. Mary is happy.

From the look on your face, I can tell that you must have had a bad day.

A B C D E

2. We wanted to go out, but we were too tired.

Because of our extensive training, we were confident when we were out sailing,

A B C

yet we were always aware of the potential dangers of being on the lake.

D E

#### 3. John said that Jill liked chocolate.

In our class, that professor claimed that he knew that girl on the television news

A B C D E

show.

#### 4. The officer gave me a ticket!

When she went away to college, the young man's daughter wrote him the most

A B C

beautiful letter that he had ever received.

D E

5. He spoke very well of you.

Suddenly the music became quite loud.

A B C D

#### 6. John took a long walk in the woods.

Children in blue jeans were singing and dancing in the park.

A B C D E



**7. I gave Mary some flowers**

Mary ask them to clean their shoes before coming in her house

A            B            C            D

**8. We visit our grandmother Linda once a week**

Laura sees them every morning taking the bus to school

A            B            C            D

**9. My back become sore after lifting some heavy boxes**

The meat was raw after 10 minutes heat

A            B            C            D

**10. I wrote Paul a letter.**

She promised them immediately that she would be there.

A            B            C            D

**11. She can run fast when she tries.**

The girl is upset that she cannot see at all well in her new contact lenses.

A            B            C            D

**12. The moon did appear after all.**

When you are next after some advice, I might advise you against it.

A            B            C            D

**13. Rarely does he go out these days.**

I should like to take the opportunity to thank you most sincerely.

A            B            C            D

**14. Many people saw the film.**

Several children liked the new book.

A            B            C            D

**15. The room was full of boring people**

Usually constant practice is the best method for fast learning.

A            B            C            D



## Appendix C

Instrumento sobre Dominancia Cerebral  
Perfil Personal de Estilo de Pensamiento Teoría del Cerebro Total  
Prueba diseñada por Carlos Alberto Jiménez V con base en lineamientos teóricos de Herrmann.

El siguiente instrumento permite identificar el estilo preferencial del uso del pensamiento o de la forma como cada persona procesa información en el cerebro. No se trata de un test o prueba, de manera que no hay respuestas correctas o incorrectas sino preferencias y expectativas personales en cada uno de los aspectos que componen esta prueba.

### INSTRUCCIONES:

Elabore un proceso de auto-evaluación de cada uno de los aspectos o actividades que aparecen a continuación de acuerdo con su desempeño en ellos. Utilice una escala numérica de 1 a 5 (ponga el número sobre la línea).

Lo que HAGO MEJOR: 5. Lo que HAGO BIEN: 4. Lo que HAGO REGULAR: 3. Lo que MENOS BIEN: 2. Lo que HAGO PEOR: 1.

**NOTA: Del grado de sinceridad depende la objetividad de esta prueba.**

### CUADRANTE A SUPERIOR IZQUIERDO CEREBRAL

1. Tengo Habilidades específicas en el campo de las matemáticas y las ciencias \_\_\_\_
  2. Pienso que la mejor forma de resolver un problema es siendo analítico \_\_\_\_
  3. Me inclino hacia la crítica en todos los asuntos \_\_\_\_
  4. Tengo habilidades para solucionar problemas complejos de manera lógica \_\_\_\_
  5. Antes de tomar algo como verdadero, lo compruebo, e indago otras fuentes \_\_\_\_
  6. Tengo capacidad de comprender, y manipular números y estadísticas de acuerdo con un fin \_\_\_\_
  7. Me gusta solucionar problemas inclinándome a conocerlos y buscar mediciones exactas \_\_\_\_
  8. Tengo la capacidad frente a los problemas de razonar en forma deductiva, a partir de alguna teoría \_\_\_\_
  9. Ante un problema; al descomponer las ideas las relaciono con la totalidad \_\_\_\_
  10. Seleccione alternativas sobre la base de la razón-inteligencia; en oposición al instinto, a la emoción \_\_\_\_
- Subtotal: \_\_\_\_\_

### CUADRANTE B INFERIOR IZQUIERDO LÍMBICO

1. La planificación y la organización son prioritarias en mis actividades \_\_\_\_



2. Es importante para mí tener un lugar para cada cosa y cada cosa en su lugar \_\_\_\_
  3. Acostumbro escuchar las opiniones de los demás y hacer aclaraciones \_\_\_\_
  4. Prefiero las instrucciones específicas en lugar de aquellas generales que dejan muchos detalles opcionales \_\_\_\_
  5. Pongo mucha atención en los pequeños detalles o partes de un proyecto \_\_\_\_
  6. Tengo capacidad de control y dominio de mis emociones cuando elaboro un plan o proyecto \_\_\_\_
  7. Pienso que trabajar con un método paso a paso es la mejor manera de resolver mi problema \_\_\_\_
  8. Tengo habilidades específicas en el manejo de auditorio o hablar en público \_\_\_\_
  9. Formulo métodos o medios para alcanzar un fin deseado, antes de pasar a la acción \_\_\_\_
  10. Tengo la capacidad de coordinar a las personas o de ordenar los elementos para lograr relaciones coherentes y armoniosas \_\_\_\_
- Subtotal: \_\_\_\_\_

### **CUADRANTE C DERECHO INFERIOR LÍMBICO**

1. Prefiero trabajar en equipo que hacerlo solo \_\_\_\_
  2. Es importante para mí estar en muchas oportunidades acompañado \_\_\_\_
  3. Creo en la trascendencia humana, en algo superior o espiritual \_\_\_\_
  4. Soy emotivo frente a las situaciones difíciles \_\_\_\_
  5. A menudo actúo para solucionar problemas de tipo social \_\_\_\_
  6. En muchas ocasiones prima más en mis decisiones, lo emotivo que lo lógico y lo racional \_\_\_\_
  7. Disfruto, observo y me emociono frente a la belleza de la naturaleza \_\_\_\_
  8. Tengo habilidades para percibir, entender, manipular posiciones relativas de los objetos en el espacio \_\_\_\_
  9. Utilizo todos mis sentidos con frecuencia para resolver problemas (olfato, vista, gusto, tacto, oído) \_\_\_\_
  10. Tengo la capacidad de desarrollar y mantener buena comunicación con diferentes tipos de personas \_\_\_\_
- Subtotal: \_\_\_\_\_

### **CUADRANTE D DERECHO SUPERIOR CEREBRAL**

1. Tengo interés muy fuerte o talento para pintar, dibujar, esquematizar, con la música, poesía, escultura, etc. \_\_\_\_
2. Tengo la capacidad de razonar en forma avanzada y creativa, siendo capaz de adquirir, modificar y retener conocimientos \_\_\_\_
3. Produzco nuevas ideas e innovaciones en mi trabajo \_\_\_\_
4. Tengo la capacidad de entender y hacer uso de imágenes visuales y verbales para representar semejanzas y diferencias \_\_\_\_
5. Tengo la capacidad de percibir y entender una problemática global sin entrar en el detalle de los elementos que la componen \_\_\_\_



6. A menudo mis mejores ideas se producen cuando no estoy haciendo nada en particular \_\_\_\_
  7. Prefiero ser conocido y recordado como una persona imaginativa y fantasiosa \_\_\_\_
  8. Puedo frecuentemente anticiparme a la solución de los problemas \_\_\_\_
  9. Tengo la capacidad de utilizar o comprender objetos, símbolos y señales complejas \_\_\_\_
  10. Utilizo el juego y el sentido del humor en muchas de mis actividades \_\_\_\_
- Subtotal: \_\_\_\_\_



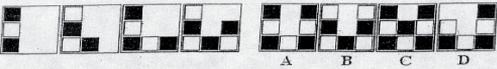
## Appendix D

**TEST DE RAZONAMIENTO ABSTRACTO**

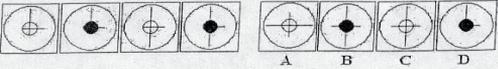
NOMBRE: \_\_\_\_\_ CARRERA: \_\_\_\_\_

Instrucciones: Marque la alternativa correcta en cada caso. Intente responder la mayor cantidad de preguntas en 10 minutos.

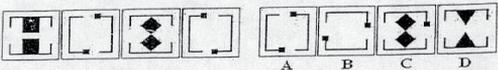
1) ¿Cuál de estas figuras completa la serie? :



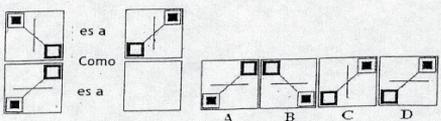
2) ¿Cuál de estas figuras completa la serie?



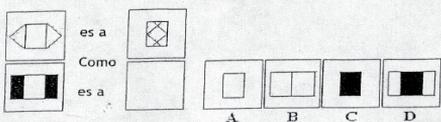
3) ¿Cuál de estas figuras completa la serie?



4) ¿Cuál de estas figuras completa la relación?



5) ¿Cuál de estas figuras completa la relación?



### ABOUT THE AUTHOR

**Muriel Oyarce Pirud**, M.A. candidate in English Linguistics from Universidad de Santiago de Chile. She is currently working as an English teacher at Universidad Católica del Maule in Talca, Chile.

