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"A Study of the Effects of Processing Instruction, Traditional Instruction and Output-Based Instruction on the Instructed Acquisition of Maya Suffix Personal Pronouns"

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List of abbreviations

ANOVA	Analysis of Variance
EFL	English as a Foreign Language
EI	Explicit Information
GTM	Grammar Translation Method
IP	Input Processing
MOI	Meaning-Based Output Instruction
MTOI	Modified Traditional Output Instruction
OB	Output Based Instruction
OI	Output Based Instruction
OI	Output-oriented Instruction
PI	Processing Instruction
SI	Structured Input
SLA	Second Language Acquisition
SVO	Subject-Verb-Object
TI	Traditional Instruction
TPRS	Teaching Proficiency through Reading and Storytelling
VIE	Visual Input Enhancement

Effects of PI, OI and TI on the Instructed Acquisition of Maya Suffix Personal Pronouns

Abstract

The teaching of Amerindian languages to native speakers of Spanish is an important aspect of the maintenance and revitalization of those languages in Mexico. However, to date there has been no systematic research on the effects of empirically-supported instructional approaches on the acquisition of grammatical features of Amerindian languages by adult native speakers of Spanish. The purpose of this quasi-experimental study is to investigate the effects of the application of two instructional approaches based on psycholinguistic principles, processing instruction (PI) and output-based instruction (OI), on the acquisition of the three functions of Maya suffix pronouns: the copula function, the object function and the subject function. OI and PI were contrasted with traditional instruction (TI). Instructional packages were designed following the principles of OI and PI, and were implemented by the main author with two groups of students at the University of Quintana Roo. A third group receiving TI from a different instructor was the control group. Pre- and post-tests were designed and administered. The tests distinguished between production and interpretation of suffix pronouns in their three functions. The results of these tests were analyzed using one-way ANOVAs. The results show statistically significant superior performance by both the PI and OI groups over the TI group. However, the alpha values were in general smaller for the PI group in both production and interpretation across all functions, which shows greater significance of PI effects. It is concluded that the input processing model and PI were validated with the target structure in Yucatec Maya although further research is needed to clarify the role of the input processing principles proposed by

Van Patten in the acquisition of Yucatec Maya by native speakers of Spanish. It is suggested that the teaching of Mexican Amerindian languages would be greatly improved by the inclusion of psycholinguistically-grounded and empirically validated instructional approaches, such as PI and OI. To achieve this goal, extensive teacher training would be required.

Keywords: Instructed SLA, Maya language, Processing Instruction, Output-based Instruction, Meaning-based instruction.

CHAPTER 1. INTRODUCTION

Teaching Yucatec Maya as a second language has become a challenge among Maya language instructors. There is a constant need for accurate methods, techniques, strategies and materials for the formal teaching of the language. As there is a lack of research addressing the teaching of Mexican indigenous languages, the teaching of Yucatec Maya has become very complex since there are no scientifically supported proposals for its teaching.

In the last years, the teaching of Maya as a second language in some public universities has become mandatory. In the University of Quintana Roo, Yucatec Maya it is part of the curriculum of different undergraduate programs: Anthropology, Humanities, and Medicine are some examples. The main difficulties faced by instructors of Maya are concerned with the lack of methods, techniques, strategies, and materials with scientific support. Teachers use their empirical knowledge to design their own material, and students find it very difficult to understand and apply forms and structures that are non-existent in their mother tongue.

According to Otsuka (2000) and Grinevald & Pake (2012) in ergative languages the subject of an intransitive verb (S) and the object of a transitive verb (O) receive the same case. The main difference between ergative languages, such as Yucatec Maya, and accusative languages, such as Spanish. is the way in which grammatical roles are aligned with respect to certain morphological and syntactic characteristics. Dixon (1972, 1994 as cited in Aldridge, 2008) identifies transitive subjects (S), transitive objects (O) and intransitive subjects (A). In accusative languages S and A share important characteristics while in ergative language S and O are alike. Yucatec Maya being an ergative language, learners whose native language is Spanish find it difficult to understand the uses of ergative structures. This affects their process of acquisition of Maya. Particularly, the suffix personal pronouns of this language are very hard to process since they preform different roles in the sentence. They might be subjects, direct objects or they might have

a copulative function. Students get confused because the interpretation of the roles of these particles depends on different factors. To address this problem, one of the most recent meaning-based models to teach grammar, ProcessingInstruction (PI, which has been empirically tested with other particles in other languages), is compared with an output-based instruction and with the traditional way the suffixes are taught to students. The effects of Processing Instruction (PI), Output- Based Instruction, and Traditional Instruction (TI) on the interpretation and production of personal pronouns of Yucatec Maya were tested. Students' interpretation and production of the structure were compared before and after instruction.

The findings of previous PI research have increased the interest of more researchers to test the generalization of results with different languages in different contexts. Wong (2004) explains three main characteristics of PI. First, learners are given information about how a linguistic form or structure works, focusing on one form or use at a time. Second, students are informed about a strategy that leads them to process the input incorrectly. And third, Structured Input activities (SI) are administered to students in order to encourage them to process the input correctly. An important characteristics of PI is attention. Students' attention is focused on a linguistic form and they are provided with oral and written input. The explicit information given must explain students how a linguistic form or structure works and also must inform them about the inappropriate processing strategies they should avoid. Structured Input (SI) Activities are provided to students in order to push them away from the less-than-optimal strategies to process the target structure or form. Through the manipulation of input in SI activities, students are exposed to sentences s and connected discourse were the target structure is used. This process would lead students to the derivation of intake.SI activities are referential and affective. Referential activities help the instructor to see if students have made the appropriate meaning

connection since there is a right and wrong answer. Affective activities require students to give an opinion or belief about the real world. There is no right or wrong answer.

VanPatten (1996) uses Paulston's taxonomy to describe TI as a three main process: mechanical practice, meaningful practice, and communicative practice. Farley (2004) explains that VanPatten and Cadierno used TI in their research as a traditional output-based instruction. In other words, according to Farley, they have compared a meaning-based type of instruction versus an output-based type of instruction. Thus, for practical reasons, VanPattens' TI instruction in this research was called output-based instruction, and TI was represented by the traditional way in which Maya language instructors in the University of Quintana Roo teach Maya, which is further described in Chapter 3 (see pages 38-40)

Several studies have tested the effects of PI over interpretation and production of structures and forms in European languages such as Spanish, English, Italian, and French (Cadierno, 1992; DeMil, 2010; Oh, 2010; Santamaría, 2007; VanPatten & Cadierno, 1993; VanPatten & Wong, 2004). However, no research has been found focusing on Amerindian languages.

It has been suggested that PI alters the developing language system of learners positively, no matter the type of language. Therefore, this study intends to test this generalization concerning the Yucatec Maya language. It applies the model of input processing and compares its impact on interpretation and production with the results of an output based instruction and the traditional instruction carried out in the University of Quintana Roo. It also seeks to contribute to the design of appropriate and useful techniques, strategies and materials to teach difficult grammatical structures and forms. This might benefit instructors and students that have to deal with the lack of appropriate methods. A final purpose is to lay the foundations for future research on the instructed acquisition of Yucatec Maya by native speakers of Spanish.

The main objective of this study is to examine the effects of PI, OI and TI on the production and interpretation of the suffix personal pronouns of Yucatec Maya by Spanish-speaking university students in the first level of Maya language. The research questions are:

1. Does altering the way in which learners process input have an effect on their developing language system for suffix personal pronouns?
2. Does altering the way in which learners produce output have an effect on their developing language system for suffix personal pronouns?
3. Will there be any difference in how learners receiving Processing Instruction, Output-Based Instruction, and Traditional Instruction interpret sentences with suffix personal pronouns?
4. Will there be any difference in how learners receiving Processing Instruction. Output-Based Instruction, and Traditional Instruction produce sentences with suffix personal pronouns?

The next chapter describes and analyses previous studies about PI. It is divided in four parts: PI vs. TI, PI and output, PI vs. other types of studies, and PI and its elements. In each section, a broad description and analysis of the research and findings are offered. The content of the third chapter is concerned with the theoretical foundations behind the types of instructions addressed in this study. The principles of PI, TI and OI are explained and focused in the research context. The fourth chapter is about the research design and context. The fifth chapter presents the findings of the study and answers to the research questions, which support the generalization of the effects of processing instruction in the developing linguistic system of students. The sixth chapter includes the conclusions and discussion of the results along with directions for future research.

CHAPTER TWO. LITERATURE REVIEW

In this chapter, Processing Instruction studies are explored in order to have an overall view of what has been done since PI emerged from VanPatten's studies. Firstly, some research that contrasted the effects of Processing Instruction (PI) with what VanPatten and Cadierno (1993) called Traditional Instruction (TI) is analyzed. Then, the relevance of research concerning PI and output is showed. Thirdly, investigations that compared Processing Instruction with other types of instruction, different from Traditional Instruction, are reported. Finally, studies that have explored about the effects of Processing Instruction's elements on acquisition are examined.

It is important to say that most studies follow a quasi-experimental design, and the first studies were replications of VanPatten and Cadierno's (1993) seminal study. VanPatten and Cadierno (1993) used TI in their experiments as a traditional output-based instruction that included mechanical practice, whereas PI is basically meaning-based (Farley, 2004). In order to have a broader insight of the most relevant results gotten from the experiments in which PI has been studied, this literature review includes replication studies as well as research where PI is compared with other types of instruction, and also studies where the role of the elements of PI is analyzed. Positive and negative results are reported. This helps to obtain an objective interpretation of the results in this study.

2.1 PI vs. TI

Cadierno (1992) conducted a study to investigate the effects of instruction on L2 learners' processing of input. In fact, this was the very first study that compared PI and TI. The subjects were students from the University of Illinois enrolled in Spanish courses. The dependent variables were interpretation and production of Spanish direct object pronouns and past tense verb morphology. PI, TI and no instruction were used to teach a structure that does not follow a

SVO word order when using the direct object pronouns, and also, the use of morphological markers to interpret tense. The processing of word order and morphological aspects that are different from students first L1, according to Cadierno, causes difficulties on interpreting messages and producing utterances using those structures. So, PI was aimed to alter inaccurate processing strategies. She followed the steps of PI. The first step is to inform learners about how a linguistic form or structure works focusing on one form at a time (Explicit Information); the second step is to make students aware of their inaccurate processing strategies; and the third is to give students Structired Input Activities. Cadierno (1992) designed tructured Input Activities of both types, referential and affective. She used a pretest, an immediate posttest, a one-week late posttest and a one-month late posttest. The results she obtained revealed that PI had a greater effect on the developing system of language learners of Spanish than TI.

VasinPatten and Cadierno (1993, as cited in VanPatten, 1996) confirmed the results of Cadierno's study in 1992. This was the experiment that established PI as a promising pedagogical tool in the area of SLA and motivated the subsequent research. The main objective was to determine the effects of TI and PI on the comprehension and production of direct object pronoun sentences that do not follow the SVO word order by learners of Spanish. The participants were university students in the second year of Spanish courses, with English as their first language. They were randomly assigned in three groups: PI group, TI group, and control group. The groups' performance on interpretation and production tasks was assessed in pre, post, and delayed posttests. The findings from this study showed that PI outperformed all groups for interpretation. For the production tasks, both the PI and TI groups outperformed the control group, but there was no significant difference between the PI and TI groups. This was a particularly interesting finding since the PI group performed no production tasks in the instructional sessions.

Cadierno (1995, as cited in VanPatten, 1996) replicated VanPatten and Cadierno's study. The subjects were university students from the same place with the same characteristics. The only thing that changed was the target structure, which was the Spanish simple past tense. As in 1993, one pretest and three posttests were implemented. The results of this study confirmed the generalizability of those in 1993. PI resulted in the improvement of the processing strategies of the students and showed greater benefits in production and interpretation tasks.

Another experimental study to test the effects of PI and TI was done by Cheng (1995). The participants in this study were students from the University of Illinois too. The procedure to collect the data was very similar to the previous studies. A pre-test, an immediate post-test and a delayed post-test were implemented. The dependent variables were production and interpretation of the copular Spanish verbs *ser* and *estar*. Each of the tests contained three types of tasks: sentence interpretation, sentence production and guided composition. The conclusions that Cheng (1995) got from this inquiry confirmed once more the effects of PI on students' processing of input concerning sentence interpretation and production.. This study differed from Cadierno (1995) because it included a guided composition task in the tests, in which PI had no significant difference in comparison to TI.

VanPatten and Wong (2004) reported another research study to see whether or not the results of previous PI research generalize to other structures. They also wanted to test the effects of PI and TI on interpretation and production tasks. The participants of this study were undergraduate students from two universities in the Midwest. The researched structure was the French causative. It was a quasi-experimental study in which each participating class was assigned to one of three instructional groups: PI, TI and no instruction. A pretest and two posttests, one immediate and one delayed, were administered. However, in one of the universities, due to a scheduling conflict, it was not possible to administer one of the delayed posttests. So, a research

question about the long-term effects of PI and TI was eliminated. From this study, it was concluded that PI had more positive and superior effects on interpretation tasks than TI and no instruction. The findings on the production tasks showed that there is no significant difference between PI and TI learners, but both groups were superior to the no instruction group.

Santamaría (2007) implemented a study on PI and TI too. The inquiry's main objective was to evaluate the effects of instruction type on the acquisition of L2 French clitics and to investigate whether learners with certain working memory capacities benefit from certain types of instruction. The participant subjects were students from the University of Florida. They were randomly assigned to a PI group, a TI group and a no instruction group. All the groups had a pretest, an immediate posttest, and a delayed posttest; additionally, in the pretest they had a working memory assessment. The findings that Santamaría got from this study did not support the positive findings on the effects of PI cited above. It was revealed that the influence of instruction type depended on the task. On the posttests' results of the interpretation tasks, PI and TI made no difference while on the production tasks the TI group got better scores than PI. The findings about working memory showed that it played a role on comprehension and production activities, but students' working memory capacities did not have a relevant impact concerning the type of instruction.

DeMil (2010) performed another research study that compared TI and PI. DeMil wanted to see whether the various input treatment types (TI, PI, and no instruction) would lead to an increased performance on the correct interpretation and production of accusative and dative pronouns, and whether the effects of the treatment types would lead to improvement on a secondary form for which the participants did not receive instruction. In other words, primary and secondary effects of the different types of instructions were assessed. Students from the University of Florida were the subjects of this study. They were native speakers of English and

students of Spanish as a second language. A pretest, immediate posttest, and delayed posttest design was used to examine the impact of instruction type on learners' interpretation and production of accusative (or dative) pronouns (primary effects), as well as on their interpretation and production on a second form, dative (or accusative) pronouns, for which learners did not receive instruction (transfer of training or secondary effects). The results revealed that both the PI and TI groups improved on their interpretation of pronouns in sentences with Object-Verb-Subject word order for the primary and secondary forms, but TI showed a decrease in accuracy with sentences with Subject-Verb-Object word order. DeMil proposed that of the two treatments, only PI is effective in pushing learners to alter the way they process primary linguistic data in the input.

Oh (2010) examined the effects of PI and TI on the acquisition of the English WH questions by Korean EFL learners in a middle school in Cheongju, South Korea. The subjects of this study were 78 third grade students of 15 years of age learning English as a foreign language in a Korean mid-size city middle school. Students were randomly assigned to one of two groups, PI group and TI group. A pretest, an immediate posttest, a two-week posttest, and a six-week posttest were administered in order to collect the data. All tests contained sentence comprehension tasks, grammaticality judgment tasks, and production tasks. From this study, Oh concluded that PI had a slight edge over TI on the sentence comprehension task and generally had significant advantages over TI instruction on the production task. It supported previous research showing that PI is superior to TI.

In this first part of the review of the literature, the reported inquiries have compared PI and TI and had demonstrated the effects that Processing Instruction had on the developing system of language learners. Most of them revealed an impact of PI on comprehension, and also on production of language, though it is not as significant as on the former. The contexts of all the

previous studies were very similar. Most of them were carried out in the US with university students whose native language is English. The only exception was Oh's inquiry in South Korea, in which the subjects were high school students and where wh-English questions were the main variables. In this sense, PI activities have been used to alter the conventional way of thinking of L2 learners by changing their comprehension of the language. Input has played a very important role for this. Some researchers have included some other variables such as working memory, secondary effects and guided composition tasks; however, the effects of PI have been the same in almost all the studies. Only Santamaría (2007) argues that PI and TI do not have different effects on student's comprehension, but they do on production, in which TI is better. Santamaria's conclusion is supported by Dekeyser and Sokalski in 1996, Salaberry in 1997, and Allen (2000, as cited in Wong, 2004). They compared PI and TI and claimed that PI is not superior to TI. However, Wong (2004) stated that Dekeyser and Sokalski, Salaberry and Allen's experiments did not contain real PI activities since they misinterpreted them and got different results in their experiments because of that misintepretation.

2.2 PI and Output

Research on input processing has demonstrated PI effects on the interpretation of complex grammatical structures such as direct object pronouns, past tense morphology, and the verbs ser and estar in Spanish. Due to the input activities that raise students' consciousness and understanding of unfamiliar structures, PI has an important impact on their process of L2 acquisition. VanPatten (2004) argues that a focus on input does not suggest that there is no role for output. Both input and output play complementary roles, but the fundamental source of linguistic data for acquisition is the input that learners receive. Therefore, some research has addressed the issue of output in PI. Output in this research study is understood also as production.

VanPatten and Sanz (1995, as cited in VanPatten, 1996), measured whether or not PI results in more accurate performance during communicative tasks, and compared the effects of instruction on three output measures: sentence level task, structured question answer, interview and video narration tasks. Their subjects were students of Spanish from the University of Illinois, and the focus was on object pronouns and word order. There was a control and a Processing Instruction group. A pretest and a posttest were implemented. Results from this study revealed that PI had effects on all the three tasks, but the greatest gains showed up in the sentence-level and video-narration tasks. Subjects performed better in the written mode than the oral mode on the sentence level completion task and the video narration task.

VanPatten and Uludag (2011) also researched the effects of PI in output. The main objective was to test whether training via Processing Instruction transfers to output tasks or not. Students of English from a public university in Turkey were the participant population; their native language was Turkish. The dependent variable was the English Passive voice. Students were assigned to one of two groups: control and PI. Data was collected through a pretest, and two posttests. The assessment included three sections: interpretation tasks, production tasks and reconstruction tasks. The study concluded that PI is effective in producing change not only on interpretation tasks but also on two different kinds of production tasks. As students did not practice the target structure in production tasks, the effects of PI then transfer to Non- PI tasks.

From these two studies, it is possible to say that the effects of PI are not restricted to input oriented tasks; it might also lead to accurate production of the target structures in other types of tasks: output tasks. PI contributes to the processing of the form or meaning through the SI activities and develops the language system of L2 learners. This development is reflected on the transference of their knowledge in different situations from those of the PI formal instruction.

Farley (2004) stated that PI and TI were different types of instruction because PI is a kind of meaning based instruction while TI is an output based instruction. Farley, then, compared PI and a Meaning-Based Output Instruction (MOI) in order to see if the results obtained in previous studies of PI vs. TI were due to the fact that they are different types of instruction. The dependent variable was the subjunctive in nominal clauses after expressions of doubt in Spanish. The participants were students of Spanish from the University of Notre Dame. They were randomly assigned to two treatment groups: PI and MOI. There was a pretest before the treatment and a posttest after it. Interpretation and production were measured in the tests. The results differ from previous research (Cadierno, 1992; Cheng, 1995, VanPatten & Wog, 2004) since PI did not appear to have been more beneficial than MOI. In fact, PI and MOI in this experiment showed to have very similar effects on learners' interpretation and production of subjunctives.

Mégharby (2007) reported a study that compared PI and Output Based Instruction (OB). In this study, she investigated whether OB instruction and PI have significant effects on the learners' performance involving the interpretation and production of the French *passé composé* and *imparfait* in narration. The participants were students from the University of Texas. They were randomly assigned to a PI group, and an OB group. Data was collected through a pretest, an immediate and a delayed posttest. The results were consistent with those of Farley (2004). Mégharby found that both the OB and the PI group improved their performance significantly on the assessment tasks, and that there was no statistical difference between the groups.

Fukuda (2009), like Farley (2004), also investigated the effects of PI and Meaning-Output Based Instruction (MOI) in the acquisition of Japanese honorific expressions by 85 intermediate-low Japanese learners from a large university in the Midwest. Most of the participants had English as their mother tongue, but some were native speakers of Korean, Chinese, Arabic, or

Indonesian. They were randomly assigned to one of three groups: PI, MOI, and Control. The target grammar points of the study consisted of eight exalting irregular verbs, ten humble irregular verbs, and twenty honorific and humble forms of .../ru/ and .../u/ verbs. The PI and MOI treatments were designed to be identical except for the practice mode (input vs. output) and treatments were provided via computer-based materials. The data collection was through a pretest, an immediate posttest and a delayed posttest. The analysis of the data presented quantitative and qualitative analysis. The findings showed the superior effect of MOI over PI on production tasks and the positive effect of PI on the acquisition of the irregular verbs. Fukuda first suggested that the positive effect of PI on production might be limited. Second, PI alone may not best facilitate learners' performance on reading comprehension. Third, PI has a differential effect on the acquisition of the regular and irregular verbs of Japanese honorific expressions; and fourth, the positive effect of PI may reside in its repetitive nature of instruction as well as the SI activities that promote a form-meaning connection. The qualitative data gathered from this study revealed that PI and MOI activities are easy or difficult for students depending on the grammatical structure they study. Participants also had some positive and negative comments about the type of instruction. PI positive comments were that students think that repetition helps them understand difficult Japanese grammar structures. PI negative comments were about students' concern of their learning outcomes; they were not sure whether they were able to produce the target grammar. MOI positive comments were also about repetition and negative comments were about the lack of input before the activities. This study, in comparison to the others, was concerned with the student's opinion with respect to the type of instruction and the activities. It was a mixed approach to study PI.

Birjandi, Maftoon, and Rahemi (2011) performed a research study that tested the effects of PI and OI (Output-oriented Instruction) on the acquisition of the English passive voice (simple

present, past and future) by 111 Iranian EFL learners from Islamic Azad University of Naragh. They were students from three intact General English classes and were randomly assigned to one of three treatment groups: PI, OI and no instruction. A pretest, an immediate posttest, and a delayed posttest were administered. All tests measured production and interpretation. The findings showed that PI and OI approaches were equally effective in fostering the learners' abilities of interpretation. On the immediate posttest OI group showed significant improvement over the PI group, but this was not held in the delayed posttest. The researchers considered that there was not enough evidence to say the PI is superior to OI.

Farley (2004) and Mégharby (2007) got very similar results. They argue that PI has the same affects than MOI and OB. Fukuda (2009) however, states that MOI is superior to PI. It is clear that not all the results might be generalized, but the conclusion from them is that even though PI cannot be superior to MOI, it shows to have an effect on the developing system of learners in changing the way of their processing of input. Fukuda (2009) also reported student's opinion about PI, and learner's positive comments were that repetition in PI is beneficial for them.

2.3 PI and Other Input Treatments

White (2008) studied the effects of various input-based treatments (input flood, input flood with text enhancement, focused input, and structured input), along with a control group, on the interpretation and production of Spanish 3rd person accusative clitics. Structured input in this study was not PI, it only refers to SI activities. All his participants were adult learners of Spanish from the University of Florida. They were assigned to one of five groups: input flood, input flood with text enhancement, focused input, structured input and no instruction. There was a pretest before treatments and two posttests: an immediate and a delayed. The study revealed that although all treatment groups (except the control group) showed significant gains over time, only

the SI group significantly outperformed the control group at the second delayed posttest. On the production measures, all input-based groups (except the control group) showed improvement; however, no significant differences emerged among the four input-based treatments.

Russell (2009) investigated the effects of PI on the acquisition of the subjunctive in adjectival clauses by intermediate-level distance learners of Spanish, and examined the effects of PI when learners encountered targeted forms that were embedded in an authentic input passage that was received following the experimental exposure. Students from two universities (urban and suburban) in the southeast of the United States participated in the study. These students were assigned to one of five instructional treatment groups: processing instruction without visual input enhancement (+PI -VIE), processing instruction with visual input enhancement (+PI +VIE), structured input with visual input enhancement (+SI +VIE), structured input without visual input enhancement (+SI -VIE), and traditional output-based instruction (TI). For the data collection there was a pre-test and two posttests. Russell revealed the following findings:

- For interpretation tasks, participants exposed to +PI+VIE performed significantly better than participants who were exposed to +SI-VIE.
- For interpretation tasks, there were no significant differences between the PI groups and the TI groups.
- For production tasks, PI was found to be equivalent to TI.
- +PI+VIE group noticed the targeted forms in subsequent authentic input and explicitly stated the morphological rule for the use of the targeted grammatical form as it appeared in authentic input.
- It did not support the claim that there is a strong relationship between comprehension and input processing. In fact, no study has been able to support this claim.

It is not possible to claim that good comprehenders are also good input processors, or conversely that poor comprehenders are poor input processors.

- SI groups, although did not show a better performance in comparison to the other groups, they got better results in the delayed posttests.

This study revealed interesting results and encourages the use of processing instruction combined with visual input enhancement for the instruction of complex Spanish grammar online. VanPatten and Fernández (2004) supported one of the findings of Russell (2009). They tested the effects of PI on students from the University of Illinois in Chicago over an eight month period, and found that they still performed better than they did in their pretest, which Russell claimed also for the SI groups.

White (2008) compared Structured Input (SI) activities, which are a fundamental element in PI, with other input-based treatments, and concluded that SI might have good long term effects on students developing language system. Russell (2009), who combined PI with VIE, concluded that this combination might have positive effects on distance learners of Spanish. The effects that PI and SI have on students' process of language acquisition encourage the correct interpretation of language and thus, the modification of their possible misunderstanding of complex grammatical structures. Research has demonstrated that PI has long term effects, transferability of the knowledge gained through it, as well as an impact on learners' developing language system.

2.4 PI and other types of instructions

Quast (2009) tested the effects of PI and Grammar Translation Method (GTM) in the teaching of Qal perfect in biblical Hebrew, an ancient Semitic language. The participants were 79 students in their first year of biblical Hebrew from five separate classes held in four different Christian

colleges and seminars in the Midwestern United States. They were randomly assigned to a no instruction group, a PI group and a GTM group. In order to define the type of instruction that Quast would compare with PI, she surveyed first the most popular method for teaching biblical Hebrew, and she obtained GMT as the most used method among biblical Hebrew instructors in Christian colleges and seminars. Treatment materials were designed to be via computer-based. For the data collection, there was a pretest, an immediate posttest and a delayed posttest. Interpretation and production were measured through the tests. In general terms, Quast concluded that there were no significant differences found between the improvements showed by the PI group and the GTM group. In other words, they had very similar effects on students' production and interpretation; PI did not show to be superior to GTM.

Foster (2011) carried out a study to compare the effects of PI and TPRS (Teaching Proficiency through Reading and Storytelling) on students' receptive and productive abilities in using Spanish case markers and pronouns with the verb *gustar*. She investigated the accuracy of interpretation, the accuracy of production, and the fluency with which students can produce the mentioned structures in writing. Participants were 61 high school students between the ages of 14 to18 who were enrolled in beginning Spanish courses. Treatment included sentence-level and discourse-level input. Participants were given a pretest immediately before treatment began, a posttest immediately following treatment, and a delayed posttest 82 or 83 days after the first posttest. All tests included interpretation and production measures. Results indicated that PI treatment was significantly more effective than the TPRS treatment for the speaking test and the writing accuracy test. On reading scores, PI and TPRS did not show any significant statistical difference. However, the TPRS treatment was more beneficial to written fluency than the PI treatment.

According to Foster (2011), this seems to be in line with claims made by TPRS proponents that students instructed with TPRS demonstrate superior fluency and the ability to write more than students instructed in other methods. In general terms, the PI group made the greatest gains in production measures and in the grammaticality judgment test. The TPRS group made the greatest gains in written fluency. The PI group's statistical gains in production measures held through the delayed posttest, while the TPRS groups did not.

The reported studies compared PI with other kinds of instruction. Quast (2009) argues that PI did not seem to be superior to GTM, and Foster (2011) concluded that PI showed to be good in production, but TPRS was better in written fluency. In these cases all treatments had effects on learners, and PI once more showed to impact on the processing of input of the learners, though not superior. However, there is evidence that shows that PI had better long term effects. In Foster (2009), as well as in Birjandi et. al (2011), performance measures demonstrated that knowledge gains in PI were maintained over a period of time whereas those of TPRS and OI were not, so PI had better outcome effects than TPRS and OI. Moreover in Quast (2009) and Birjandi et. al (2011) PI did not outperform the other types of instructions, but it showed to have similar gains even though instruction was not output oriented.

2.5 PI components: Explicit Information and Structured Input Activities

VanPatten and Oikkenon (1996, as cited in VanPatten , 1996) implemented a research study to find out whether explanation or SI were the causative variables for the effects of PI. The subjects of this study were students of Spanish from a secondary school in Champaign. There were three treatment groups: a PI group, an Explicit Instruction only (EI) group, and a Structured Input Activities only (SI) group. There was a pretest and an immediate posttest to collect the data. The study showed that the SI group performed as good as the PI group and made significant gains

from the pre to the posttest while the EI group did not show any significant improvement. From this, it is concluded that the actual SI activities and form-meaning connections made during input processing are responsible for the observed effects of PI.

Wong (2004) conducted an inquiry aimed to further investigate the roles of EI and SI activities in PI to determine what element is responsible for improved performance on sentence-level interpretation and production tasks. The participants of this study were undergraduate students from six sections of a first quarter French course at a Midwestern University. Each section was randomly assigned to one of four groups: full PI, EI only, SI only, and no instruction control group. For the collection of the data there was a pretest and an immediate posttest. The findings revealed that SI activities appeared to be the causative factor on the improved performance of students on the sentence level and interpretation tasks while EI did not appear to have relevant effects.

Farley (2004) also described the role of SI activities in PI. The subjects were also university students enrolled in Spanish courses. They were assigned to two treatment groups: PI and SI. One pretest and two posttests were implemented to collect the data. From this study it was concluded that, although EI might be beneficial for students, SI remains the necessary and perhaps sufficient component of PI that leads to form meaning connections in instructed SLA.

Benati (2004) also researched about the effects of SI activities and EI in PI on the acquisition of the Italian future tense. The participants of this study were students from the university of Greenwich. They were assigned to one of three groups: PI, SI, and EI. Data was collected through a pretest and two posttests. The study also concluded that SI activities were the causative element for the effects of PI. The SI group got very similar significant gains in comparison to the PI group, while the EI got minimal gains. The effects of the treatments held one month later in the delayed posttests.

Sanz (2004) carried out a research inquiry to test the effectiveness of PI outside the classroom (in a Computer Assisted Language Learning environment) and the role of immediate explicit feedback to enhance the effects of SI in the behavior of the L2 learner. The participants of this study were students of Spanish from Georgetown University. The target structures were Spanish O-clitic pro V S and O-clitic pro V sentences. Participants were randomly assigned to an implicit or explicit feedback group. Data was collected through a pretest and two posttests. Results showed that explicit feedback provided on input-decoding performance during online sentence processing does not enhance the acquisition of morphosyntax. It is practice in decoding structured input rather than provision of explicit evidence that is responsible for the effectiveness of PI.

McNulty (2011) compared PI effects with Modified Traditional Output Instruction (MTOI) effects. The inquiry also sought to ascertain which one of the two SI activity types (referential and affective) is the causative component of SI and if their order of presentation is important to learner gains. The targeted grammatical feature for this PI study was the subjunctive/indicative contrast after *cuando*. Eighty two participants enrolled in a first semester of Spanish course were studied. They were from the University of Indiana at Bloomington. They were randomly assigned to one of five groups. One treatment group had referential + affective activities (RA), another had affective + referential activities (AR). A third treatment group (R) had only referential activities and the fourth treatment group only affective activities (A). A fifth treatment group used a Modified Traditional Output Instruction (MTOI) methodology. There was a pretest and an immediate posttest. Results revealed that PI and MTOI were effective and statistically equivalent instructional interventions. Analysis also showed that learner gains were not differentiated by the order of SI activities. However, the type of SI activity was statistically significant and quantifiable. Referential SI activities seem to be the causative component of SI.

From these studies that were examined it is possible to say that SI in PI is the main component that contributes to the effects of PI on students. Even though in one of the studies (VanPatten and Oikkenon, 1996) the participants were secondary students, while in all the other experiments were university students, the effects of SI activities were the same. McNulty (2011) also affirmed that referential activities seem to be the main component of SI activities.

Most reported research studied PI effects over European languages, particularly Spanish, French, English and Italian. There was a study focusing on ancient Hebrew, a Semitic language, and one of Japanese, which is an East Asian language. Most of the inquiries were carried out in the United States, there was one in Korea, one in Iran and one in Greenwich, but none has been found in the context of Mexico, nor with Amerindian languages. Thus, as PI has been proved to have positive effects on the developing language system of L2 learners, this study aims to examine the effects of PI, OI, and TI over university students of Yucatec Maya, an indigenous language. All the results reported and analyzed in this and the previous sections contribute on the designing of the treatment packages, and also are taken into account on the interpretation of the findings of this study.

CHAPTER 3. THEORETICAL FRAMEWORK

This chapter broadly describes the role of input in Second Language Acquisition. It goes forward with the explanation of the input processing model and the way it is introduced in PI. Afterwards, OI is described briefly, and it is established the way in which VanPattens's TI differ from the TI in this study. The suffix personal pronouns and the functions addressed in this research are also defined, and the way in which the PI principles apply in their processing and production. Finally, the principles of output production are presented.

3.1 The role of input in SLA

Krashen's Monitor Model Theory of Second Language Acquisition is one of the most complex theories that explain SLA process. Altakhaineh (2010) describes this theory through five main hypotheses. These hypotheses are: the acquisition learning hypothesis, the monitor hypothesis, the natural order hypothesis, the input hypothesis and the affective filter hypothesis.

- The acquisition-learning hypothesis states that there is a difference between learning and acquiring a language. Acquisition is an unconscious process in which there is no awareness of grammar. It occurs mainly with one's L1. Learning refers to the conscious knowledge of L2; the learners know the rules of the language.
- The monitor hypothesis asserts that what learners learn is available as a monitor. Learners might then make changes and edit what they are going to produce according to what they know about the language. This consciousness might impact on their high or low fluency.
- The natural order hypothesis, in which, according to Gass and Selinker (1994, as cited in Altakhaineh, 2010), the acquisition of grammatical structures proceeds in a

predictable order. Some grammatical structures generally tend to be acquired early while others tend to be acquired late regardless of the L1.

- The input hypothesis, in which SLA cannot take place without sufficient and necessary comprehensible input. Acquirers develop competency over time by receiving comprehensible input to move their present level to the next.
- The affective filter hypothesis states that not everyone has the same ability in learning a second language and that self-confidence, motivation and anxiety all affect language acquisition. An Affective filter acts as a barrier to language input. If the filter is high, the input will not pass through and subsequently there will be no acquisition. But, if filter is low and the input is understood, the input will take place and acquisition will have taken place.

VanPatten (1996) argues that, although the process of acquisition of a second language is not yet completely understood, one important aspect in the acquisition of grammar is input. He claims that exposure to input is essential so that acquisition occurs. Learners must be exposed to samples of language to build a mental representation of its structure. VanPatten (1996) stated that the role of input impacts on the acquisition of grammar and on the developing system of language. The developing system, according to VanPatten (1996) refers to the mental representation of the second language the learner construct overtime. Thus, the input to which learners must be exposed should be meaning-bearing since input is one of the essential building blocks of acquisition.

VanPatten (1996) also asserts that input does not simply enter the brain as the learner is exposed to it. Learners filter input. Only part of the input makes its way into the developing system at any given time. The part of input that learners process is called intake. What learners do

to input during comprehension (the derivation of intake) is called input processing. The processes involved in the incorporation of the intake into the developing system are called accommodation and restructuring. (See figure 1). VanPatten explains that PI help learners to derive intake from input. Research has suggested that there is an impact on the developing language system of students since measures of interpretation and production had demonstrated that; however the process of acquisition is a set of process. IP is the first hurdle to make a structure jump through on its path towards acquisition. If the structure is processed, this might be stored for further processing, and may be accommodated into the developing linguistic system. Accommodation might be complete, partial or it might not happen at all for reasons that are not understood yet. In this sense, input processing only offers data for the internal mechanisms that store and organize language in the brain; it does not do the storage and organization itself.

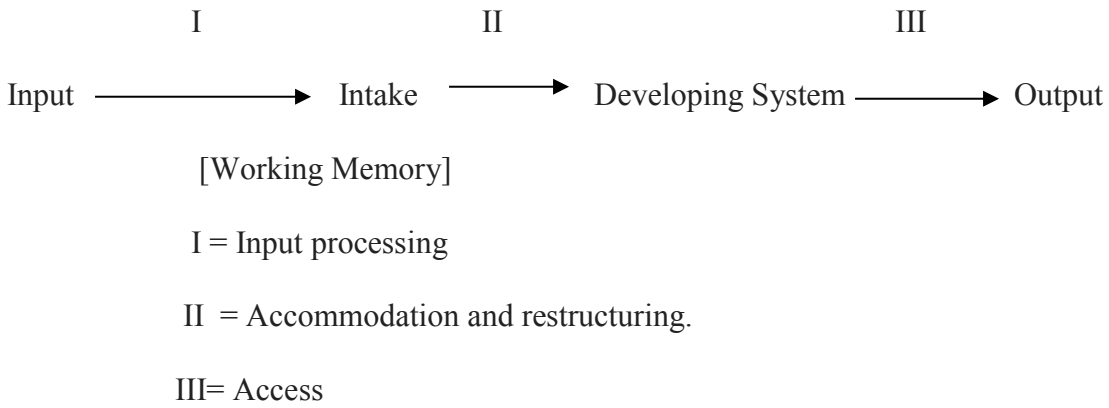

Figure 1. Three Sets of Processes in SLA . From *Processing Instruction Theory, Research and Commentary* pp. 34, by VanPatten (Ed), 2004, Mahwah, New Jersey, London: Lawrence Erlbaum Associates, Publishers.

3.2 Input Processing

Since input is a critical aspect in SLA, VanPatten has developed a model of input processing. In this model, attention is fundamental. VanPatten (1996) argues that the attention given to the

stimuli or information determines the degree of acquisition. One of the processes that are carried out during attention is detection. Detection is the "process that selects or engages, a particular or specific bit of information" (Tomlin and Villa, 1994, p. 192). VanPatten argues that it is the process by which data are registered in working memory and is what makes a particular stimulus or piece of data available for further processing; that is for accommodation. Detection is the aspect of attention directly related to the derivation of intake.

There is a set of principles that form the nucleus of the model of input processing. These principles try to explain the derivation of intake. VanPatten (2007) summarizes these principles

1. The Primacy of the Content Words Principle: Learners process content words in the input before anything else.
2. The Lexical Preference Principle: If grammatical forms express a meaning that can also be encoded lexically (i.e., that grammatical marker is redundant), then learners will not initially process those grammatical forms until they have lexical forms to which they can match them.
3. The Preference for Non-Redundancy Principle: Learners are more likely to process non-redundant meaningful grammatical markers before they process redundant meaningful markers.
4. The Meaning Before Non-meaning Principle: Learners are more likely to process meaningful grammatical markers before non-meaningful grammatical markers.
5. The First Noun Principle: Learners tend to process the first noun or pronoun they encounter in a sentence as the subject.
6. The L1 Transfer Principle: Learners begin acquisition with L1 parsing procedures.
7. The Event Probabilities Principle: Learners may rely on event probabilities, where possible, instead of the First Noun Principle to interpret sentences.
8. The Lexical Semantics Principle: Learners may rely on lexical semantics, where possible, instead of the First Noun Principle (or an L1 parsing procedure) to interpret sentences.

9. The Contextual Constraint Principle: Learners may rely less on the First Noun Principle (or L1 transfer) if preceding context constrains the possible interpretation of a clause or sentence.

10. The Sentence Location Principle: Learners tend to process items in sentence initial position before those in final position and those in medial position.

3.3 Processing Instruction

Wong (2004) claims that Processing Instruction (PI) is a type of explicit instruction that is informed by a model of how L2 learners initially process input to make form-meaning-connections, that is VanPatten's model of input processing. Wong also describes the main characteristics of PI. The first characteristic is that learners must be informed about how a linguistic form or structure works, focusing on one form or use at a time (Explicit Information). Second, EI is also needed to inform learners about an IP (Input Processing) strategy that may lead them to process the input incorrectly. The third characteristic is giving learners Structured Input activities (SI). In these activities input is manipulated so that learners are pushed away from the less-than-optimal strategies to process the target structure or form. The main goal in this last step is to help learners create intake from input; so, they do not produce the target structure. They interpret meaning by relying on form and sentence structure and making form-meaning connections.

Wong gives a detailed step-by-step procedure to develop SI activities:

Step 1. Identifying the processing problem or strategy

Step 2. Following guidelines for developing SI activiti

1. To present one thing at a time
2. To keep meaning in focus

3. To move from sentence to connected discourse

4. To use both oral and written input

5. To have learners do something with the input

6. To keep the learner's processing strategies in mind

There are two types of SI activities: referential and affective. Referential SI activities are exercises in which learners must give a right or wrong answer, so the instructor can check whether or not the learner has made the proper form-meaning connection. Affective SI activities require learners to give an opinion, belief or some other affective response about the real world, there is no right or wrong answer.

3.4 Output-Based Instruction/Traditional Instruction

Output according to Gass and Selinker (2001) accomplishes four main functions: hypothesis testing, opportunity for feedback provision, fluency and automaticity development, and grammatical processing.

Students test the way they understand language through negotiation and the feedback they receive when interacting. There are different types of feedback. White's (1991, 1993, as cited in Gass and Selinker, 2001) investigation has shown that negative evidence triggers a permanent change in learners' grammar, other studies suggest that positive evidence is not sufficient. Gass and Selinker (2001) cites different types of research concerning feedback, which in output-based instruction is an important feature to make learners automatize and focus their attention in a more syntactic rather than semantic processing.

In this study, the term "Output-Based Instruction" (OI) is used with the same meaning of VanPatten's (1996)Traditional Instruction. Stages in OI included an explicit information of the grammatical structure, mechanical practice, meaningful practice and communicative practice. They aimed to the grammatical processing of the suffix personal pronouns. Through the

mechanical, meaningful and communicative practicing students tested their own understanding of the structure and they were encouraged to the written and oral production of the structures. OI in this study also included corrective feedback with both positive and negative evidence.

3.5 Traditional Instruction

According to VanPatten (2004) typically it involves giving learners explicit explanation of a form followed by controlled output practice. The practice activities take into account mechanical drills followed by meaningful and communicative activities. This explanation of Traditional Instruction was formulated according to a taxonomy that was codified by Paulston (1972, as cited in VanPatten, 1996). In this taxonomy Paulston claimed that mechanical practice should precede meaningful practice, which in turn, should precede communicative practice.

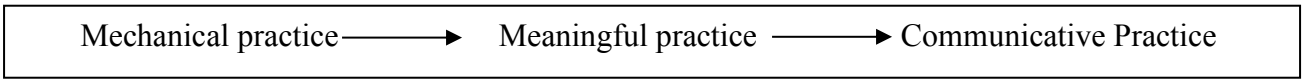

Figure 2. Paulston's practice types and sequence in TI. From Input Processsing and Grammar Instruction Theroy and Research p. 4, by VanPatten, 1996, United States of America: Ablex Publishing Corporation Norwood, New Jersey.

VanPatten (1996) criticizes TI since learners practice a form or structure without getting the input that is needed to construct a mental representation of the structure itself. TI emphasizes output practice but it little considers the role of input in acquisition.

PI, as a meaning-based type of instruction, has been compared with output-based types of instruction as well as with other meaning based types of instructions. Initially TI and PI were researched and compared. Later other output-based instructions such as Output-oriented Instruction (OI), Modified Traditional Output Instruction (MTOI), Meaning-Based Output Instruction (MBOI) were compared with PI. Some meaning based treatments that have also been

compared with PI are combinations of PI and Visual Input Enhancement (VIE) treatments and Teaching Proficiency through Reading and Storytelling (TPRS).

3.6 TI in the University of Quintana Roo

Traditional Instruction of Maya language in the University of Quintana Roo differs from what VanPatten considers to be traditional instruction in Paulston's taxonomy. Four professors were interviewed, and they mentioned some strategies they follow in order to teach the language. All of them agreed that they use some type of material to present the information they would teach (power point presentations, a song, a story, the white board, flashcards). Then, they explain grammatically the form or structure, and encourage students to practice what they have been taught through, sketches, dialogues, songs, etc. Some instructors said they work with final projects, in which students practice everything they studied during the term. A teacher mentioned that he teaches all the grammar and structures first without a context of use, and then students focus on practice activities such as translation, songs, and sketches.

According to this description, there is a difference between what VanPatten considers to be Traditional Instruction, and the practices of Maya language teachers in the University of Quintana Roo. There is mechanical practice in the latter, but it seems that there is no meaningful communicative practice at the moment of addressing the structure.

3.7 Input processing principles in this study

To make clear the way the principles and sub-principles of the model of Input Processing operate in the acquisition of the suffix personal pronouns of the Yucatec Maya language, an explanation of the functions of these particles for this study and the processing problems identified is offered.

3.7.1 Maya suffix personal pronouns

According to Briceño (2006), there are three types of subject personal pronouns in Yucatec Maya: the independent personal pronouns, the dependent personal pronouns and the suffix personal pronouns. Briceño also states that suffix personal pronouns might function as direct objects. The **independent personal** pronouns are mainly emphatic words. They emphasize the subject pronoun into the sentence.

a) **Teene'** k'aaynajen jo'oljeak----- I sang yesterday----Yo canté ayer

Teene'/I	k'aay+naj+en/I sang	jo'oljeak/yesterday
Independent pronoun with an emphatic function+ e'	Intransitive verb k'aay with the completive aspectual marking particle for intransitive verbs – naj+ suffix personal pronoun as subject -en	Adverbial complement

The dependent personal pronouns function as subjects in a sentence with a transitive verb in the completive aspect. For example:

b) Teene' tin bisajech Uqroo----I took you to Uqroo ---------Te llevé a la uqroo

Teene'/I	t/	**in/I**	Bis+aj/took	-ech/you	Uqroo/to Uqroo.
Independent pronoun with an emphatic function+ e'	Completive aspectual marking particle for transitive verbs	**Dependent pronoun as subject**	Verbal root + transitive marking -aj	Direct object	Adverbial complement

The suffix personal pronouns function as subjects in sentences with an intransitive verb in the completive aspect and as object pronouns in sentences with a transitive verb in the completive aspect too. Suffix personal pronouns, according to the empirical knowledge of the researcher as a native speaker of Maya, can also have a copular function when attached to nouns and adjectives. For example:

c) Xooknajen jo'oljeak----I studied yesterday

xook+naj+**en**/ I studied	jo'oljeak/yesterday
Intransitive verb xook with the completive aspectual marking particle for intransitive verbs – naj+ **suffix personal pronoun as subject -en**	Adverbial complement

Tin xokaj maaya jo'oljeak----I studied Maya yesterday

T/	in/I	xok+aj/studied	**-ech/you**	Uqroo/to Uqroo.
Completive aspectual marking particle for transitive verbs	Dependent pronoun as subject	Verbal root + transitive marking -aj	**Direct object**	Adverbial complement

d) Teene' Carlosen, ka'analen yéetel poloken ----I'm Carlos, I'm tall and fat----Yo soy Carlos, soy alto y gordo.

Teene'/I	Carlos+en/ I'm Carlos	ka'anal+en/I'm tall	Yéetel/and	polok+en/I'm fat
Independent pronouns + e'	Noun+-en	Adjective+en	Conjuction	Adjective+en

Personal pronouns in Yucatec Maya are shown in table 1:

Grammatical person	**Independent subject personal pronouns**	**Dependent subject personal pronouns**	**Suffix subject personal pronouns**
First singular	Teen	-in	-en
Second singular	Teech	-a	-ech
Third singular	Leti'	-u	-ij/0
First plural	To'on	-k	-o'on
Second plural	Te'ex	-a –e'ex	-e'ex
Third plural	Leti'ob	-u –o'ob	-o'ob

Table 1. Yucatec Maya personal pronouns

The independent personal pronouns might appear alone in a sentence. Most of the times, they function as emphatic words. They just emphasize the subject of the sentence; they give emphasis to the dependent subject pronouns, and it is often used with an –e' attached as in example 1). There is no further scientific research found so far that might explain the linguistic function or functions that this attached –e' performs.

1) Teene' tin xokaj maaya Uqroo----- I studied Maya at Uqroo-------Yo estudié Maya en la Uqroo

Teene'/I	t/	in/I	xok+aj/studied	maaya/Maya	Uqroo/at Uqroo.
Independent pronouns + e'	Completive aspectual marking particle for transitive verbs	Dependent pronoun	Verbal root + transitive marking -aj	Direct object	Adverbial complement

This sentence can also be used without the first pronoun, as it is shown below:

2) Tin xokaj maaya Uqroo.-----I studied Maaya at Uqroo-----Yo estudié Maya en la Uqroo

T/	in/I	xok+aj/studied	maaya/Maya	Uqroo/at Uqroo.
Completive aspectual marking particle for transitive verbs	Dependent pronoun	Verbal root + transitive marking -aj	Direct object	Adverbial complement

The meaning does not change because the pronoun "Teen" just emphasizes the subject of the sentence.

Gutiérrez and Monforte (n.d) argue that the main word order in Yucatec Maya is Subject-Verb-Object as in Spanish. So it is normal for a learner whose mother language is Spanish to

think that the first word in a sentence is the subject of the sentence, in this case, represented by the pronoun. This is not wrong; however, the first word teene' is not the essential word that accomplishes the function of subject of the sentence (teen) since it is an emphasizer. In our examples, the dependent pronoun (in) performs this function.

In sentence 3) “teen” functions also as an emphasizer

3) Teene’ p’o’najen jo’oljeak.----- I did the washing yesterday----Yo lavé ayer

Teene’/I	po’+naj+en/I did the washing	Jo’oljeak/yesterday
Independent pronoun + e’	Intransitive verb p’o’ with completive aspectual marking particle for intransitive verbs –naj+ suffix personal pronoun as subject -en	Adverbial complement

The pronoun that performs the function of essential subject pronoun is the suffix pronoun –en. So, the previous sentence is completely understandable if “teen” is omitted, and this usage (with elision of teen) is very common among native speakers of Yucatec Maya:

4) P’o’najen jo’oljeak ----I did the washing yesterday----Lavé ayer

Po’+naj+en/ I did the washing	Jo’oljeak/yesterday
Intransitive verb p’o’ with completive aspectual marking particle for intransitive verbs –naj+ suffix personal pronoun as subject -en	Adverbial complement

However, a confusing function is when suffix personal pronouns are direct objects, as in the next sentence:

5) Teene’ tin méek’ajech ------(I hugged you)---- Te abracé

Teene'/I	t/	in/I	méekaj/hugged	ech/you
Independent pronoun + e'	Completive aspectual marking particle for transitive verbs	Dependent pronoun	Transitive verb in the completive form	Direct object

In sentence 4) the suffix personal pronoun –ech is the direct object of the verb, while -in is the essential subject and teene' the emphasizer of the subject.

3.7.2 Maya suffix personal pronouns as subjects, objects and copular particles

For the purposes of this study, the functions that were addressed in the intervention are explained, but this does not mean that there are no more functions. The criteria for including/excluding pronoun functions are the difficulty found in students to process and produce sentences with suffix personal pronouns and their presence in the syllabi of the first levels of Maya in the university of Quintana Roo .

The suffix personal pronouns function as subjects of sentences when:

- They are attached to intransitive verbs

The suffix personal pronouns function as direct objects when:

- They are attached to transitive verbs.

The suffix personal pronouns function as copulars when:

- They are attached to descriptive adjectives
- They are attached to nouns.

Other categories of the previous description and other types of words are not discarded to be used with the suffix personal pronouns. As mentioned before, in this intervention, the content

considered in the syllabus of the first level of Maya was used to design the materials for the different types of instruction.

3.7.3 Processing and production problems

In this section, the processing problems for suffix personal pronouns are explained according to the principles of Input Processing. If remembered, VanPaten (2007) describes ten processing principles:

1. The Primacy of the Content Words Principle.
2. The Lexical Preference Principle.
3. The Preference for Non-Redundancy Principle.
4. The Meaning before Non-meaning Principle.
5. The First Noun Principle.
6. The L1 Transfer Principle.
7. The Event Probabilities Principle.
8. The Lexical Semantics Principle.
9. The Contextual Constraint Principle.
10. The Sentence Location Principle.

The functions that suffix personal pronouns addressed in this research study are three:

- Suffix personal pronouns as subjects
- Suffix personal pronouns as direct objects
- Suffix personal pronouns as copulas

The principles that describe the processing problems of students are 1, 2, 3, 5, and 6. The identification of processing problems are important in Processing Instruction because they are

taken into account when designing the Structured Input activities and the designing of the instruction itself.

Students find it difficult to process and produce suffix personal pronouns because of input processing constraints. Taking into account the behavior of pronouns as described in sentences 1), 2), 3), 4), and 5) and VanPatten's (2007) principles of input processing, it is assumed that students find it difficult to process and produce the suffix personal pronouns **as subjects because:**

1. Students are most likely to process first the independent personal pronouns in sentences with intransitive verbs in the completive aspect, even though they function only as emphatic words. This is because independent personal pronouns are complete words and are the first words that would appear in a sentence with a subject role. For example:

6)

Teene'/I	po'+naj+en/I did the washing	jo'oljeak/yesterday
Independent pronoun + e' (emphatic function)	Intransitive verb p'o' with completive aspectual marking particle for intransitive verbs –naj+ suffix personal pronoun as subject -en	Adverbial complement

Maybe students would think that **teene'** is the subject when in fact it is not. The subject is the suffix **–en**, consequently students would fail at producing grammatically correct sentences with intransitive verbs in the completive aspect.

Students would misinterpret sentences where independent pronouns are missing. This is because the subject is a suffix and not a complete word at the beginning of the sentence.

7)

Po'+naj+en/I did the washing	Jo'oljeak/yesterday
Intransitive verb p'o' with completive aspectual marking particle for intransitive verbs –naj+ suffix personal pronoun as subject -en	Adverbial complement

2. Students would fail at identifying the subject of the sentence since this is attached to the verb. If students do not correctly understand the way suffix personal pronouns function as subjects, it is more likely that they fail at producing grammatically correct sentences. They would produce sentences such as:

   -teene' p'onaj jo'oljeak. (Sentence without –en) (Check sentence 6)

   -teene' p'o' jo'oljeak. (Sentence without –naj and without –en) (Check sentence 6).

As direct objects students find it difficult to process suffix personal pronouns because:

3. In the completive aspect, Spanish word order of sentences with direct object pronouns are different from Maya sentences with direct object pronouns. For example:

8) Me besó-----she/he kissed me

9) Tu ts'u'uts'ajen

In	Me	besó
	Direct object pronoun for I	Verb in the past simple for a third singular person
Sp	T + u	Ts'u'ts+aj+en
	Completive aspect for transitive verbs **T** + dependent personal pronoun **u** as subject for third singular person	Verbal root + transitive marking –aj + suffix personal pronoun as direct object

In Spanish the direct object is at the beginning of the sentence and in Maya the direct object is at the end of the sentence.

4. The same suffix personal pronouns function as subjects with intransitive verbs in the completive aspect, as in the next sentences:

10) Teene' xooknajen jo'oljeak---I studied yesterday ----Estudié ayer

Teene'/I	xook+naj+**en**/I studied	jo'oljeak/yesterday
Independent pronoun with an emphatic function+ e'	Intransitive verb xook with the completive aspectual marking particle for intransitive verbs –naj+ suffix personal pronoun as subject -en	Adverbial complement

11) Leti'e'e tu méek'ajen jo'oljeak ----he/she hugged me yesterday----Me abrazó ayer.

Leti'e'	t/	u/he or she	méek'+aj/hugged	-en	jo'oljeak/ yesterday
Independent pronoun with an emphatic function+ e'	Completive aspectual marking particle for transitive verbs	Dependent pronoun	Verbal root + transitive marking -aj	Direct object	Adverbial complement

As copulatives, suffix personal pronouns are difficult to process because

5. Suffix personal pronouns might perform different functions in discourse. For example:

   *Teene' x-Araceli**en*** **(s)**. *Sabadoake' tin xíimbaltaj in chiich yéetel in nool. In chiiche' tu jan méek'aj**en*****(o)** *yéetel tu jan ts'u'uts'aj**en*****(o)** *ka' tu yilaj**en*****(o)**. *In chiich yéetel in noole' ka'analtak**o'ob*****(c)** *yéetel bek'echtak**o'ob*****(c)**.*Teene' ma', teene' polok**en*****(c)** *yéetel chan kaabal**en*****(c)**. *Leti'obe' suuka'an u muuch' u meyajo'ob. Jo'oljeake' p'o'naj**o'ob*** **(s)** *yéetel míisnaj**o'ob*****(s)** *muuch'.*

   S= subject

   O= object

   C= copular

Some sentences from the previous extract are:

12) Teene' x-Araceli**en** ----I'm Aracely--- Yo soy Aracely

Teene'	x-Araceli+ en
Independent pronoun with an emphatic function+ e'	Marking for feminine nouns + proper noun+ suffix –en with a copulative function

13) tu jan méek'aj**en**---- She hurried to hug me ---Me abrazó rápidamente

t/	u/ she	jan/(it means doing something in a hurry)	méek'+aj/hug (in the past)	-en /me
Completive aspectual marking particle for transitive verbs	Dependent pronoun	adverb	Verbal root + transitive marking -aj	Direct object

14. Jo'oljeake' p'o'naj**o'ob**

Jo'oljeak+ e'/Yesterday	p'o'+naj+**o'ob**/they did the washing
Adverbial complement + particle e'	Intransitive verb p'o' with the completive aspectual marking particle for intransitive verbs –naj+ suffix personal pronoun as subject –o'ob

15. chan kaabal**en**

chan /little	Kaabal+ en (I'm short)
Adverb	Adjective + suffix –en as copular

Considering VanPatten's principles of Input Processing, there are five principles that might explain these problems.

The Primacy of the Content Words Principle: Learners process content words in the input before anything else.

There are three types of subject personal pronouns in which the independent pronouns are complete words and the dependent and suffix pronouns are derivational morphemes. Thus, students will process first the independent personal pronouns since they are complete words and they carry the meaning of the subject of the sentence. This may cause non-target-like output and faulty input processing when the independent pronoun is missing.

The Lexical Preference Principle: If grammatical forms express a meaning that can also be encoded lexically (i.e., that grammatical marker is redundant), then learners will not initially process those grammatical forms until they have lexical forms to which they can match them. Students will first identify the independent personal pronouns as subjects of the sentence since they appear first in the sentence even though they accomplish only an emphatic function. Learners will identify as subject "teene' instead of "-en" in the sentence below since it is a complete word. It seems clear for the student that this does carry a lexical and grammatical function and will have a preference over it.

Teene' p'o'najen jo'oljeak (see sentences 6) and 7))

For the student "-en or -najen" would be redundant.

The Preference for Non-Redundancy Principle: Learners are more likely to process non-redundant meaningful grammatical markers before they process redundant meaningful markers. Students will process first the independent personal pronouns before the suffix personal pronouns since they would consider the suffix to be redundant and may not process it at all.

The First Noun Principle: Learners tend to process the first noun or pronoun they encounter in a sentence as the subject.

Learners might interpret the suffix personal pronouns to be redundant and to process the first personal pronoun they encounter as the essential subject of the sentence.

The L1 transfer principle of input processing: Learners begin acquisition with L1 parsing procedures. Students might find it difficult to process the suffix personal pronouns as objects since they are placed after the transitive verb when in Spanish they generally go before the transitive verb and after imperatives.

As explained earlier, the Primacy of the Content Words Principle, the Lexical Preference Principle, the Preference for Non-Redundancy Principle, and the First Noun Principle explain why students would find it difficult to process the suffix personal pronouns as objects. Students might process as the essential subject pronouns the independent personal pronouns in the sentences when their function is mainly as emphasizers. When the suffix personal pronouns have a copulative function in a sentence it is important to use an independent personal pronoun, but just as the examples before, they mainly function as emphasizers and the subject of the sentence is attached at the end of adjectives or nouns (see sentences 12 and 15). Students might understand that the redundant word is the suffix pronoun when it is not. These principles do not operate in isolation; they may act together or one may take precedence over the other. Processing Instruction suggests a way to alter the normal processing of students through Structured Input activities and explicit information that would help them in the derivation of intake (see section 3.3).

3.8 Principles of output production in this study.

As a result of the interviews with Maya language instructors, it seems that there is a need for more practice of grammar structures. For this reason, output based instruction (OI) focused on the immediate production of the suffix personal pronouns is compared with PI. OI, as Gass and Sellinker (2001) claim, is used to promote the automatization of structures and to focus on syntactical processing rather than semantic processing. The need to test hypothesis of structure

understanding and use is also promoted by this type of instruction. Furthermore, an opportunity for syntactic and semantic feedback from the teacher or from the classmates is also possible through the immediate production of the structure.

CHAPTER 4. RESEARCH DESIGN AND METHOD

A quasi-experimental study was implemented using an independent factorial design where three types of instruction to teach the Maya suffix personal pronouns to native speakers of Spanish is compared. There were a Processing Instruction group, a Traditional Instruction group, and an Output-Based Instruction group. The research design is shown in the table below:

Group	Pre-test	Treatment	Post-test1	Post-test 2
PI	O	X	O1	O2
OI	O	X	O1	O2
TI	O	---	O1	O2

Table 2. Research design

1. Pre-test:
    a. A pre-test of production and interpretation of suffix personal pronouns functioning as subjects, objects and copulatives.
    b. A language history questionnaire
    c. A letter of consent
2. Treatment
    a. Piloting

    In this stage of the research, an early design of materials and instruction was tested. The results obtained showed that a redesigning of materials was necessary since students did not possess the vocabulary and previous knowledge needed to focus their attention only on the suffix personal pronouns. For this reason, it was considered

necessary to add one day of instruction before the intervention itself. In this way, both groups, PI and OI groups, were at the same level of previous knowledge before the experiment.

b. Processing Instruction Group.

The instruction consisted in the Processing Instruction of the suffix personal pronouns as subjects, objects and as copulatives. Explicit information of the grammar was provided to focus students' attention and comprehension on the input. Also, referential and affective Structured Input activities were administered.

c. Output-Based Instruction Group.

It consisted on the instruction of the suffix personal pronouns as subjects, objects and as copulatives. Explicit information of the grammar and output, based activities were included. The materials encouraged mechanical practice, meaningful practice, and communicative practice of the suffix personal pronouns. Semantic and syntactic feedback of the structure was part of the instruction.

d. Traditional Instruction Group

The Traditional Instruction group was a regular group of Maya II in the university. The professor in charge of the group was informed about the research study and agreed to participate. Students were taught the suffix personal pronouns by their own professor.

3. Immediate post-test:
    a. Test of production and interpretation of suffix personal pronouns as objects, subjects and copulatives.
4. Late post-test

a. Test of production and interpretation of suffix personal pronouns as objects, subjects and copulatives.

The instrument designed to measure interpretation and production of suffix personal pronouns as objects, subjects, and copulatives was administered as pre-test, immediate post-test and late post-test.

4.1 Context and participants

a) Participants

This research study was conducted at the University of Quintana Roo, in Chetumal, Mexico. The participants were students who took Maya as part of their curriculum. 10 students were in the TI group, 17 in the OI group and 22 in the PI group. The OI and PI groups received 10 hours of instruction because that was the amount of time needed to teach the suffix personal pronouns with the functions considered in this research study. There was no control over the time in the TI group. Firstly, OI and PI groups were given a session about the simple past in order to homogenize previous knowledge about the tense and the verbs that were going to be used with the suffix personal pronouns. Then, in the next session, suffix personal pronouns as subjects was taught; in the following session, suffix personal pronouns as objects was the topic of instruction and finally, suffix personal pronouns with a copulative function was instructed. In the case of the TI group, the teacher was interviewed and asked if students have studied the suffix personal pronouns. He said they had studied several grammatical structures, among them, the suffix personal pronouns. Then, students were administered the pre-test and the first post-test at the same time of the intervention in the PI and OI groups. The delayed post-test was administered 8 days after in the TI group, 10 days after in the OI group, and 12 days after in the PI group. This was due to the fixed schedules that each group had in the scholar calendar. The differences in the

lapse of time between the different groups, might have affected scores in the last post-test; this issue is further discussed in the conclusion chapter.

b. Inclusion and exlusion criteria

The following criteria were meet by students in order to be included in the analysis of the data

- To be studying Maya as a second language.
- Students who declared themselves as native or passive speakers of Maya were excluded.
- The participant who reported no uncorrected hearing difficulties (as reported on a language history questionnaire).
- The participant who completed all tasks on all days (pretests, treatment and posttests for each topic of Instruction).
- The participant who followed all task instructions.

c. Independent and dependent variables

The two dependent variables are 1) performance in the interpretation pre- and post-tests, and 2) performance in the production pre- and post-tests. Independent variables are the type of instruction and their status as Spanish native speakers. The effects of these independent variables on the dependent variables are measured.

d. Analytic Method

A three-way repeated measures factorial ANOVA was used because the effects of three independent variables were measured (Field, 2009). Significance was calculated with the alpha value set at 0.05 and 0.01 (Larson-Hall, 2013). The omega squared test was used to calculate the effect size (Fields, 2009). The calculations were run using the JMP statistical software.

e. Materials

This section describes PI package, OI package, and the tests of interpretation and production used, which can be found in the appendices C, D, E, F and G. It also important to mention that a

language history questionnaire and a letter of consent were administered to each of the participants. These were used to see who meet the inclusion and exclusion criteria (see appendices A and B)

4.2 PI Package

Three PI packages were administered, one per each type of suffix personal pronouns' function. Each of the packages considers the explicit information of the grammatical form, information to prevent a possible form of inadequate processing of the structure and different structured input activities. These SI activities are referential, where there are right and wrong answers, and affective, where there is no wrong answer.

The order in which packages were administered were suffix pronouns as subjects first, then pronouns as objects, and finally pronouns ad copulatives. This order was followed because it was considered easier to start with suffixes as subjects, then as objects and finally as copulatives. Each package contained the explicit information of the structure, the instructions to prevent students from incorrect processing and structured input exercises. (See appendix C)

4.3 OI package

Three packages of OI were administered, one per each type of function of the suffix personal pronouns. Explicit information of the grammatical form and output based activities are included in each one. Output based activities are mainly at a sentence level (see appendix D, OI package for suffix personal pronouns as subjects, objects and copulatives)

4. 4 Tests

The pre-test and post-tests administered were all the same because in that way any progress of interpretation and production of the target structures are easier to compare between the different groups. . They included a test for each topic of the suffix personal pronouns: one for suffix personal pronouns as subjects, another for suffix personal pronouns as objects and the last test for suffix personal pronouns with a copulative function. Each test assessed interpretation and production of the suffix personal pronouns and each of them had an A, B, and C versions in order to minimize cheating. The main difference between the different versions was the order of the exercises.

4.5 Data collection

As explained earlier, after the piloting, it was considered necessary to add a session in which students were taught all the necessary knowledge they needed in order to focus their attention on the suffix personal pronouns. To the five sessions considered initially was added another which made a total of six sessions. Some of the difficulties faced during the intervention were attendance and punctuality. Students said that for most of them their main priority was the subjects of their major, and that they were in final exams. The sessions were also video recorded.

In both groups, PI and OI, the instructor was the researcher. In the TI group as explained in previous sections, the tenured professor was in charge of the instruction.

The calendar was initially planned in order to have a three week late post-test; however due students' nonattendance the calendar had to be modified to a 12 day delayed post-test at the end.

Day 1

In this first two hour-session, the language history questionnaire, and the letter of consent were administered to all the three groups. Also, the pre-test of the three topics of the suffix personal pronouns was implemented. This pre-test had an A, B, and C versions in order to minimize cheating.

Day 2

In this two-hour session OI and PI students were taught the completive aspects with transitive and intransitive verbs. The main purpose was to make them aware about the differences that exist the completive aspect with intransitive verbs and the completive aspects with transitive verbs. There was no immediate post-test since this was a session to make sure that all students had the previous knowledge necessary to focus their attention to the suffix personal pronouns.

Day 3

In this two-hour session OI and PI groups were taught the suffix personal pronouns as subject of the completive aspect with intransitive verbs. Students were provided with all the materials used. Also, a power point presentation was necessary to reinforce the grammar explanation. An immediate post-test was administered after the class. This post-test had an A, B, and C versions.

Day 4

In this two-hour session OI and PI groups were taught suffix personal pronouns as objects of the completive aspect with transitive verbs. Students were provided with all the materials used and a power point presentation was necessary to reinforce the explanations given. There was a regular attendance in both groups. An immediate post-test was administered after the class. This post-test had an A, B, and C versions.

Day 5

In this one-hour session OI and PI groups were taught the suffix personal pronouns with a copulative function. All the materials were provided to students and also a power point presentation was used by the instructor to reinforce the explanation. In both groups, the attendance was regular. An immediate post-test was implemented. The test had a A, B, and C versions.

Day 6

In this last one-hour session the delayed post-test were administered. A, B, and C versions of the test were implemented in the three groups. This session was carried out 10 days after the last day of instruction in the case of the TI group and 12 days after the last session in the case of the PI group. The control group had this last post-test 8 days after the first post-test.

CHAPTER 5 RESULTS AND DISCUSSION

This chapter presents the results of the analysis of the effects of Processing Instruction, Output-based Instruction, and Traditional Instruction in the teaching of Maya suffix personal pronouns to Spanish native speakers. Production and interpretation of the suffix personal pronouns were measured in order to test the effects of the types of instruction for the three different structural functions: as subjects, as objects and as copulatives. The main research question seeks to address whether altering the way in which students process input have an impact on their developing language system. To give an answer to this research question, an analysis of the effects of the different types of instructions on production and interpretation of the three different functions of the suffix personal pronouns were necessary. Data was collected through three tests: a pre-test, an immediate post-test and a 12-day delayed post-test. There was a sample of 38 students that met the inclusion criteria: 18 in the PI group, 13 in the OI and 7 in the TI group. All the participants were taking the second level of Maya and were students of medicine whose native language is Spanish.

For the analysis of the data, JMP statistical software was used. All the assumptions of linearity, normality, and homoscedasticity were met for all the one-way ANOVAs presented. Normality was tested using the Shapiro-Wilk test. Linearity and homoscedasticity were tested using visual inspections of a plot of the standardized residuals by regression of the standardized predicted values (Kleinbaum, 1971) which are shown in the appendix section (appendix J); an omnibus test and a post-hoc analysis were carried out with Fishers' LSD test for each ANOVA. A detailed description of each of the variables measured is provided below in Tables 3, 4 and 6.

Variables in the PI group	
Pipreprom	Average scores obtained by PI participants in the pre-test. There were interpretation and production tasks with suffix personal pronouns as subjects, objects, and copulatives. The highest possible score is 52. Through a scale of 1 to 10, averages are calculated according to the number of correct answers.
Pipostprom1	Average scores obtained by PI participants in the immediate post-test. There were interpretation and production tasks with suffix personal pronouns as subjects, objects, and copulatives. The highest possible score is 52. Through a scale of 1 to 10, averages are calculated according to the number of correct answers.
pipostprom2	Average scores obtained by PI participants in the 12-day delayed post-test. There were interpretation and production tasks with suffix personal pronouns as subjects, objects, and copulatives. The highest possible score is 52. Through a scale of 1 to 10, averages are calculated according to the number of correct answers.
pipreprомin	Average scores obtained by PI participants in the pre-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
pipostpromin1	Average scores obtained by PI participants in the immediate post-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
pipostpomin2	Average scores obtained by PI participants in the 12-day delayed post-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
pipreprompro	Average scores obtained by PI participants in the pre-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
pipostprompro1	Average scores obtained by PI participants in the immediate post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers
pipostprompro2	Average scores obtained by PI participants in the 12-day delayed post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers

Table 3. Variables in the PI group.

Variables in the TI group	
tipreprom	Average scores obtained by TI participants in the pre-test. There were interpretation and production tasks with suffix personal pronouns as subjects, objects, and copulatives. The highest possible score is 52. Through a scale of 1 to 10, averages are calculated according to the number of correct answers.
tipostprom1	Average scores obtained by TI participants in the immediate post-test. There were interpretation and production tasks with suffix personal pronouns as subjects, objects, and coputatives. The highest possible score is 52. Through a scale of 1 to 10, averages are calculated according to the number of correct answers.
tipostprom2	Average scores obtained by TI participants in the 12-day delayed post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
tiprepromin	Average scores obtained by TI participants in the pre-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
tipostpromin1	Average scores obtained by TI participants in the immediate post-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
tipostpomin2	Average scores obtained by TI participants in the 12-day delayed post-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
tipreprompro	Average scores obtained by TI participants in the pre-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
tipostprompro1	Average scores obtained by TI participants in the immediate post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
tipostprompro2	Average scores obtained by TI participants in the 12-day delayed post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers

Table 4. Variables in the TI group.

Variables in the OI group	
oipreprom	Average scores obtained by OI participants in the pre-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
oipostprom1	Average scores obtained by OI participants in the immediate post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
oipostprom2	Average scores obtained by OI participants in the 12-day delayed post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
oiprepromin	Average scores obtained by OI participants in the pre-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
oipostpromin1	Average scores obtained by OI participants in the immediate post-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
oipostpomin2	Average scores obtained by OI participants in the 12-day delayed post-test. There were interpretation tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 23. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
oipreprompro	Average scores obtained by OI participants in the pre-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers.
oipostprompro1	Average scores obtained by OI participants in the immediate post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers
oipostprompro2	Average scores obtained by OI participants in the 12-day delayed post-test. There were production tasks with suffix personal pronouns as subjects, objects and copulatives. The highest possible score is 29. Using a scale from 1 to 10, averages are calculated according to the number of correct answers

Table 5. Variables in the OI group.

In the next sections, I will present the results in three main parts. First, a description of the overall effects of the intervention both within- and between-groups is presented. Second, effects of instructions on interpretation and production tasks are analyzed. This presentation is divided into subsections as follows: 1) the within-groups effects in production and interpretation of the three main functions included in the study. 2) The between-groups effects of instructions in production and interpretation of the three functions included in the study. In the final section, the research questions are answered using the findings from the statistical analyses.

5. 1 Overall effects of the interventions within and between groups

5.1.1 Effects of Instructions within groups

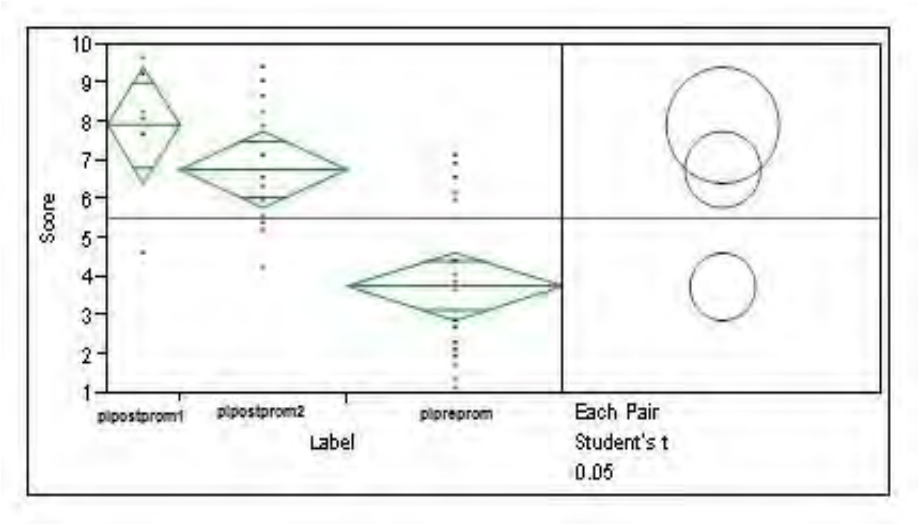

Figure 3. Differences in the averages obtained in the pre-test, immediate post-test and delayed post-test by participants in the PI group.

Figure 3 shows visually how the PI participants' scores differed in the pre-test (defined by priprepom), immediate post-test (defined by popostprom1), and delayed post-test (defined by pipostprom2), all including both, production and interpretation tasks of the three different functions of the suffix personal pronouns as subjects, objects, and copulatives. The descriptive statistics for each test were: pre-test: $\bar{x}$ = 3.76, Std error=0.43246, N=18; immediate post-test: $\bar{x}$ = 7.91, Std error=0.7495, N=6; and delayed post-test: $\bar{x}$ =6.78500, Std error = 0.49037, N=14. Comparisons using Fisher's LSD test found a statistical difference between the two post-tests and the pretest ($p<.05$), but not between the two post-tests ($p>.05$). Through looking at these numbers and the figure above, there is a clear progression of students from the pretest to the next two post-tests. Also, there seems to be good retention in the delayed post-test since the $\bar{x}$ of the first post test (7.91) is very close the second post-test (6.78500).

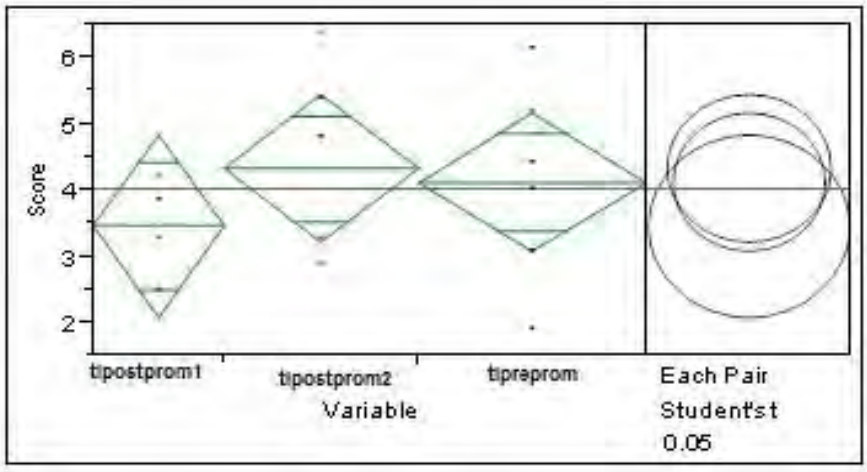

Figure 4. Differences in the averages obtained in the pre-test, immediate post-test and delayed post-test by participants in the TI group

In this second figure for ANOVA, the differences in the obtained scores by TI participants in the general average of the three different tests are shown. The statistical descriptions of each test were pre-test, $\bar{x}$ = 4.12, Std error=0.48187, N=7; immediate post-test $\bar{x}$ = 3.46250, Std error=0.63746, N=4; and delayed post-test $\bar{x}$ =4.32667, Std error = 0.52048, N=6. The means are very close to each other ($\bar{x}$ = 4.12, $\bar{x}$ = 3.46250, $\bar{x}$ = 4.32667).

There are not great differences between the means of the different tests, and this is confirmed by an absence of statistical significance ($p>.05$). Thus, the performance of the students' in the TI group, that is, their control of suffix pronouns in both production and interpretation tasks did not vary significantly during the term.

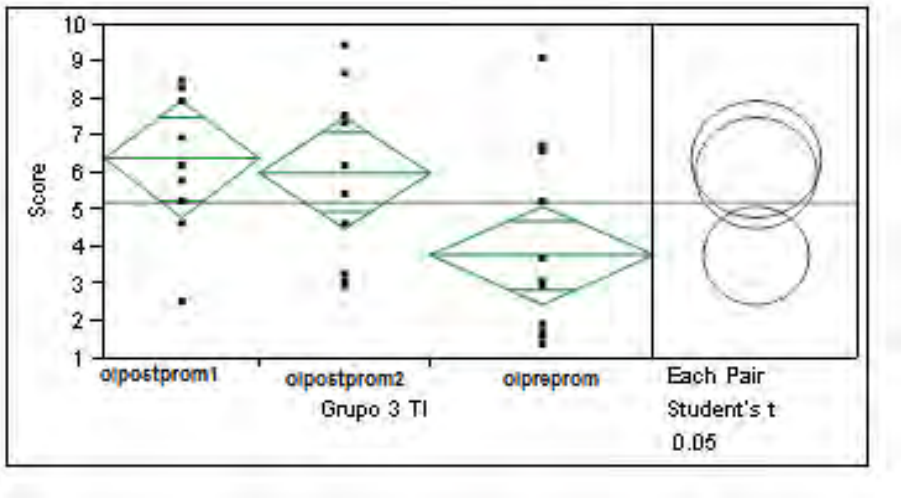

Figure 5. Differences in the averages obtained in the pre-test, immediate post-test and delayed post-test by participants in the OI group.

This third figure shows visually how the OI participants' scores differed in the pre-test, immediate post-test , and delayed post-test , all including both, production and interpretation tasks of the three different functions of the suffix personal pronouns as subjects, objects, and copulatives. The descriptive statistics for each test were pretest: $\bar{x}$ = 3.78692, Std error=0.64341, N=13; immediate post-test, $\bar{x}$ = 6.38889, Std error=0.77328, N=9; and delayed post-test $\bar{x}$ =6.02100, Std error = 0.73360, N=10. Comparisons using Fisher's LSD test found a statistical difference between the immediate post-test and the pretest and the delayed post-test and the pretest ($p<.05$), but not between the two post-tests ($p>.05$). Through looking at these numbers in the figure, there is a clear progression of students from the pretest to the next two post-tests. Also, there seems to be retention in the delayed post-test since the $\bar{x}$ of the first post test (6.38889) is very close the second post-test (6.02100).

The general performance of students within the groups showed improvement in two groups: PI and OI. The TI group had a linear performance during the intervention. The

comparisons between the effects of instructions in the different groups will be addressed in the next section.

5.1.2 Effects of Instructions between groups

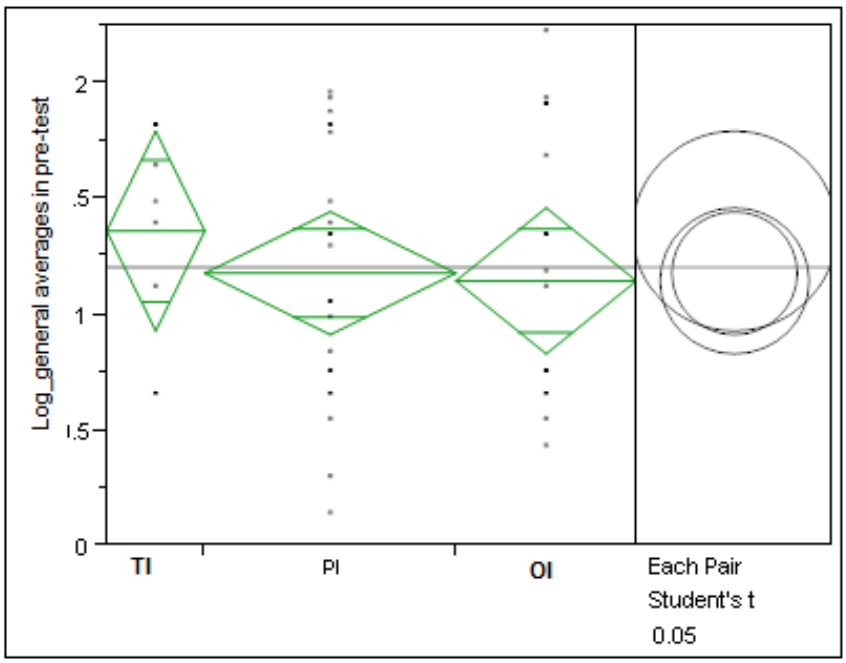

Figure 6. Comparison of the values obtained in the pre-test in the three experimental groups: TI, PI and OI.

Data transformation was used to meet the assumption of normal distribution of the data. The natural logarithms of the values were used to improve the normality of the data. In looking at the differences in the scores obtained by the participants in the three groups in the pre-tests, which include interpretation and production tasks, planned comparisons were made among all three groups. The descriptive statistics for the groups were: PI group, $\bar{x}$ = 1.17978, Std error=0.13250, N=18; Output-Based Instruction Group, $\bar{x}$ = 1.14491, Std error=0.15591, N=13; and Traditional Instruction, $\bar{x}$ =1.35987, Std error = 0.21247, N=7. Comparisons using Fishers'

LSD tests found that there is no statistical difference between TI and OI groups (mean difference: 0.2149579, Std Err difference=0.2635384, CL=-0.320053, 0.7499693, p=0.4202) or the TI and PI groups (mean difference= 0.1800856, Std Err difference = 0.2504000, CL= -0.328253, 0.6884246 p=0.4768) or the PI and OI groups (mean difference = 0.0348723, Std Err = 0.2046080, CL= -0.380504, 0.4502485, p= 0.8656. By looking at the means and p values of the comparisons, there is no statistical difference in the participants' performance in the pre-test.

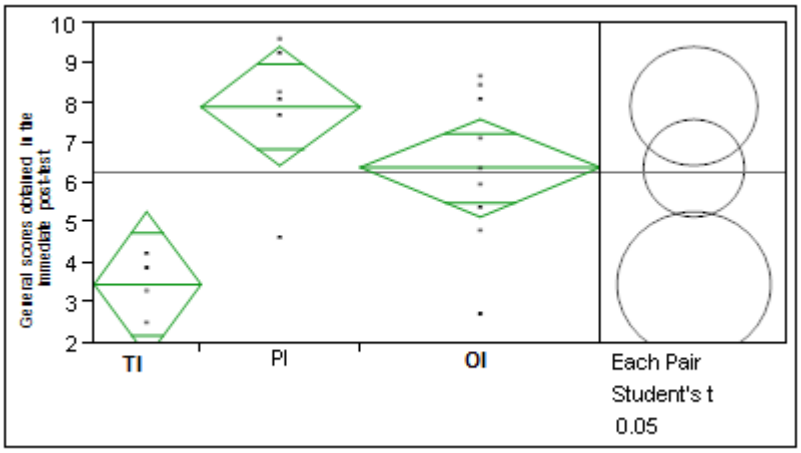

Figure 7. Comparison of the values obtained in the immediate post-test in the three experimental groups TI, PI and OI.

The general averages obtained in production and interpretation tasks by participants of the three experimental groups in the immediate post-tests are compared in this figure. The statistical descriptions of each of the groups were PI group, $\bar{x}$ = 7.91833, Std error=0.70396, N=6; Output-Based Instruction Group, $\bar{x}$ = 6.38889, Std error=0.57478, N=9; and Traditional Instruction, $\bar{x}$ =3.46250 Std error = 0.86218, N=4. Comparisons using Fishers' LSD tests found that there is no statistical difference between PI and OI groups (mean difference: 1.52944, Std Err difference=0.908813, CL=-0.39715, 3.456043, p=0.1118), but there is statistical significance between PI and TI groups (mean difference= 4.455833, Std Err difference = 1.113065, CL=

2.09624, 0.6815425 p=0.0010) and OI and TI groups (mean difference = 2.926389, Std Err = 1.036207, CL= -0.72973, 5.123049 p= 0.0122). The interpretation for this differences found is that PI and OI interventions have a greater impact on students' retention than TI. However, between PI and OI, it is not possible to assume which one had a major impact on students' retention, but it is clear that both, PI and OI, are superior to TI.

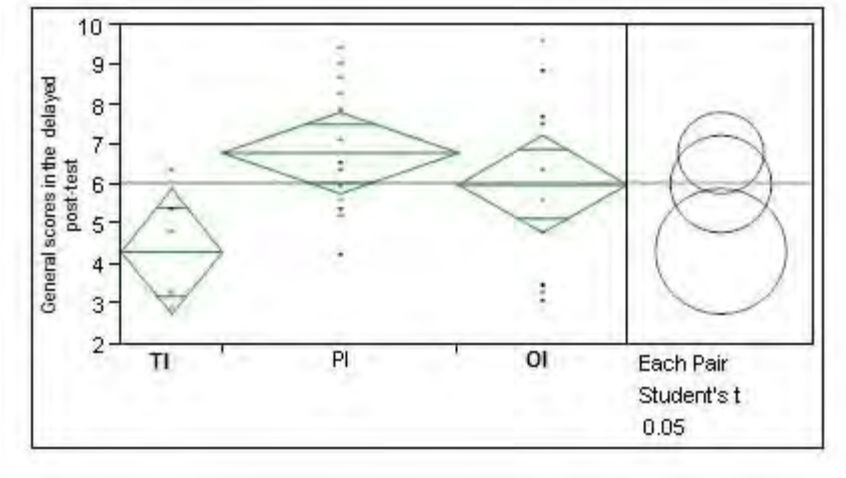

Figure 8. Comparison of the values obtained in the delayed post-test in the three experimental groups TI, PI and OI.

This is the last figure about the overall effects of the different interventions in the comparison between groups. Through looking at it, we can visually realize students' general performance in the delayed post-test in the three different groups. The statistical descriptions of each of the groups were PI group, $\bar{x}$ = 6.78500, Std error=0.50043, N=14; Output-Based Instruction Group, $\bar{x}$ = 6.02100, Std error=0.59212, N=10; and Traditional Instruction, $\bar{x}$ =4.32667 Std error = 0.76442, N=6. Fishers' LSD tests were used to compare the groups and the tests found that there is no statistical difference between PI and OI groups (mean difference: 0.764000, Std Err difference=0.7752619, CL=-0.826706, 2.354706 p=0.3331), and between OI and TI groups (mean difference = 1.694333, Std Err = 0.9669214, CL= -0.289626, 3.678292 p=

0.0911). However, there is statistical significance between PI and TI groups (mean difference= 2.458333, Std Err difference = 0.9136549, CL= 0.583668, 4.332998 p=0.0121). There is only significant difference between these last two groups, which might mean that PI has better effects on the long term memory of students than OI or TI.

The performance of students in the different groups showed us that PI is lightly superior to OI and greater superior to TI. Recalling the results obtained in the pre-test, all students had similar results. In the first post-test after the intervention it seemed that PI and OI had almost the same results, were both have superior scores over TI (PI $\bar{x}$ = 7.91833; OI $\bar{x}$ = 6.38889; TI $\bar{x}$ =3.46250) However, in the last post-test PI seems to be superior to both, to TI and to OI (PI $\bar{x}$ = 6.78500; OI $\bar{x}$ = 6.02100; TI $\bar{x}$ =4.32667). The difference between PI and OI is not statically significant, but it is still better than OI results on students in the second post-test.

5.2 Effects of instructions on interpretation and production, within and between groups

This section presents the descriptive statistics and analysis of the effects of Processing Instruction, Output-Based Instruction, and Traditional Instruction on interpretation and production. First, an analysis of the effects on interpretation and production is presented within groups. Then, an analysis of interpretation and production is presented between groups.

5.2.1 Effects of Instructions within groups

5.2.1.1 Effects on interpretation

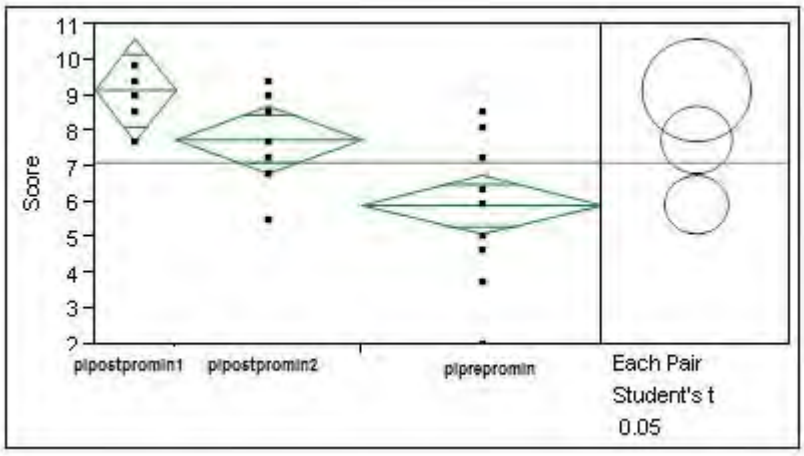

Figure 9. Differences in the obtained scores in interpretation tasks in the pre-test, immediate post-test and delayed post-test by participants in the PI group.

In this figure, it is possible to appreciate how the PI participants' scores in interpretations tasks differed during the intervention. These interpretation tasks include suffix personal pronouns as subjects, objects and as copulatives. The variables were defined as piprepromin (in the pretest), pipostpromin1 (in the immediate post-test), and pipostpromin2 (in the delayed post-test). The descriptive statistics for each test were pretest $\bar{x}$ = 5.91722, Std error=0.41325, N=18; immediate post-test: $\bar{x}$ = 9.13333, Std error=0.71577, N=6; and delayed post-test: $\bar{x}$ =7.76571, Std error = 0.46858, N=14. Comparisons using Fisher's LSD test found a statistical difference

between the two post-tests and the pretest ($p<.05$), but not between the two post-tests ($p>.05$). Students showed to have a very high performance in interpretation in the immediate post-test since the mean is $\bar{x}$ = 9.13333, which decreased in the delayed post-test with $\bar{x}$ =7.76571, but still beter than the pre-test $\bar{x}$ = 5.91722. The interpretation for this, is that PI favoured both, short and long term memories.

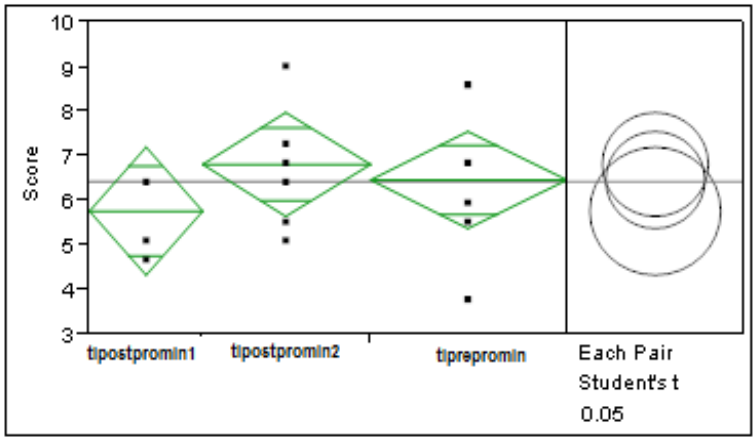

Figure 10. Differences in the obtained scores in interpretation tasks in the pre-test, immediate post-test and delayed post-test by participants in the TI group.

This figure, as the previous one, shows how the TI participants' scores in interpretations tasks differed during the intervention. Interpretation tasks include suffix personal pronouns as subjects, objects and copulatives. For this group, the variables were defined as tiprepromin (in the pretest), tipostpromin1 (in the immediate post-test), and tipostpromin2 (in the delayed post-test). The descriptive statistics for each test were pretest $\bar{x}$ = 6.46143, Std error=0.50678, N=7; immediate post-test: $\bar{x}$ = 5.76000, Std error=0.67041, N=4; and delayed post-test: $\bar{x}$ =6.81167, Std error = 0.67041, N=14. Comparisons using Fisher's LSD test found no statistical difference between the three tests.

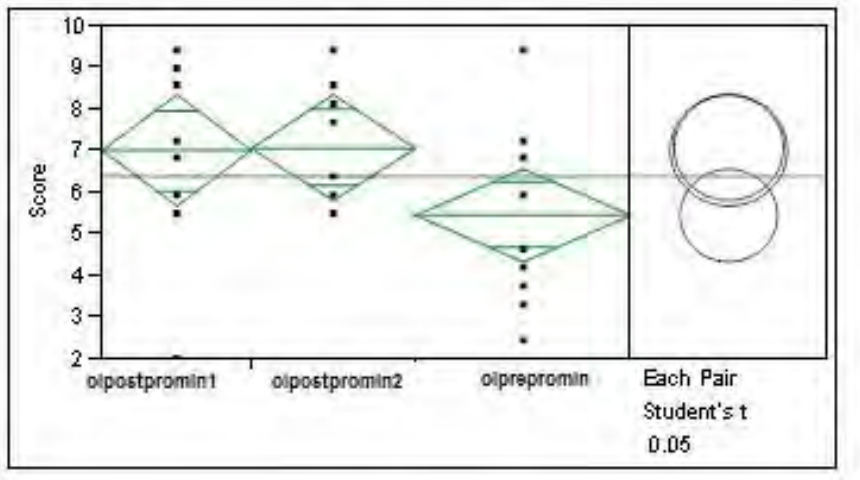

Figure 11. Differences in the obtained scores in interpretation tasks in the pretest, immediate post-test and delayed post-test by participants in the OI group.

This figure, presents visually the performance of participants in the OI group in interpretation tasks, which include the three functions of suffix personal pronouns addressed in this research study. The variables for this group, were defined as oiprepromin (in the pretest), oipostpromin1 (in the immediate post-test), and oipostpromin2 (in the delayed post-test). The descriptive statistics for each test were pretest $\bar{x}$ = 5.48538, Std error=0.54247, N=13; immediate post-test: $\bar{x}$ = 7.00556, Std error=0.65197, N=9; and delayed post-test: $\bar{x}$ =7.08800, Std error = 0.61851, N=10. Comparisons using Fisher's LSD test found no statistical difference between the three tests.

The performance of students in the different groups, in interpretation tasks, showed improvement in the post-tests in the PI and OI groups. The TI group had very similar results in the three tests. The only group that presented statistical significance between the pretest and the post-tests was the PI group. More precise comparisons between the groups are presented in subsequent sections.

5.2.1.2 Effects on production

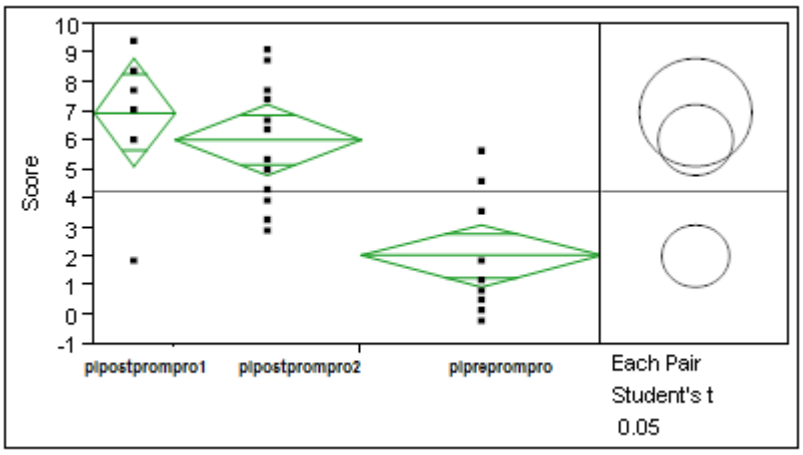

Figure 12. Differences in the obtained scores in production tasks in the pretest, immediate post-test and delayed post-test by participants in the PI group.

In this first figure of this section, it is shown PI participants' scores in production tasks, which include suffix personal pronouns as subjects, objects and as copulatives. The variables were defined as pipreprompro (in the pretest), pipostprompro1 (in the immediate post-test), and pipostprompro2 (in the delayed post-test). The descriptive statistics for each test were pretest $\bar{x}$ = 2.04833, Std error=0.52994, N=18; immediate post-test: $\bar{x}$ = 6.95500, Std error=0.91789, N=6; and delayed post-test: $\bar{x}$ =6.01000, Std error = 0.60090, N=14. Comparisons using Fisher's LSD test found a statistical difference between the two post-tests and the pretest ($p<.05$), but not between the two post-tests ($p>.05$). Students showed an improvement in the immediate post-test; also, the intervention proved to impact in long-term memory, since students' production was very similar in both, immediate and delayed post-tests.

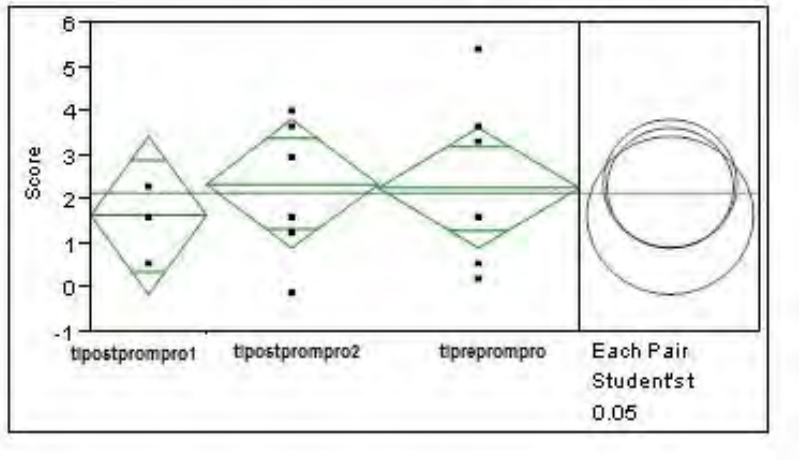

Figure 13. Differences in the obtained scores in production tasks in the pretest, immediate post-test and delayed post-test by participants in the TI group.

In this figure, performance of TI participants in production tasks of suffix personal pronouns as subjects, objects and as copulatives is shown. The variables were defined as tipreprompro (in the pretest), tipostprompro1 (in the immediate post-test), and tipostprompro2 (in the delayed post-test). The descriptive statistics for each test were pretest $\bar{x}$ = 2.26429, Std error=0.62859, N=7; immediate post-test: $\bar{x}$ = 1.63500, Std error=0.831559, N=4; and delayed post-test: $\bar{x}$ =2.35500, Std error = 0.67895, N=6. Fisher's LSD tests found no statistical difference in production in the different tests.

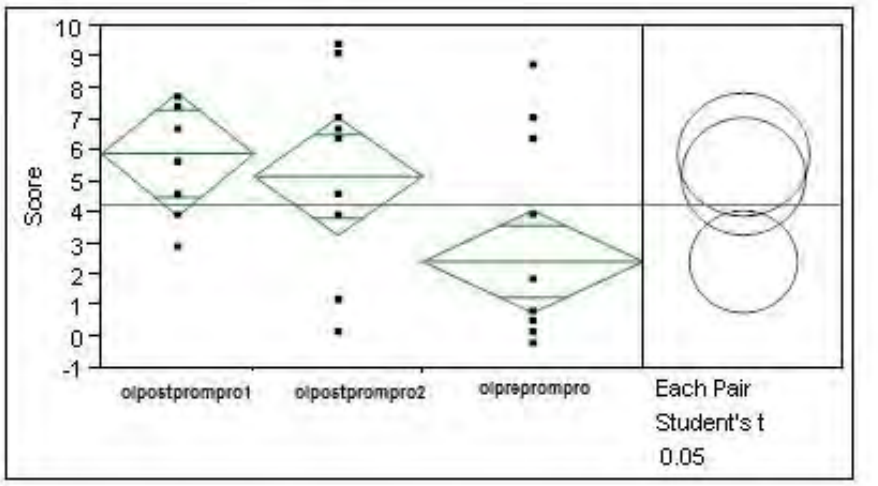

Figure 14. Differences in the obtained scores in production tasks in the pretest, immediate post-test and delayed post-test by participants in the OI group.

This final figure of this section shows the performance of OI participants in production tasks were suffix personal pronouns as subjects, objects and copulatives are included. The variables were defined as oipreprompro (in the pretest), oipostprompro1 (in the immediate post-test), and oipostprompro2 (in the delayed post-test). The descriptive statistics for each test were pretest $\bar{x}$ = 2.44000, Std error=0.80939, N=13; immediate post-test $\bar{x}$ = 5.90111, Std error=0.97277, N=9; and delayed post-test: $\bar{x}$ =5.17300, Std error = 0.92285, N=10. Comparisons using Fisher's LSD test found a statistical difference between the two post-tests and the pretest ($p<.05$), but not between the two post-tests ($p>.05$). Students showed an improvement between the pre-test and the next post-tests. The means of the immediate and delayed post-tets are very close to each other, which would mean that students gains in the intervention were retained in the second post-test.

5.2.1.3 Within-groups production and interpretation means

Variables	PI	OI	TI
$\bar{x}$ of Interpretation in the pretest	5.91722	5.48538	6.46143
$\bar{x}$ of Interpretation in the immediate post-test	9.13333	7.00556	5.76000
$\bar{x}$ of Interpretation in the delayed post-test	7.76571	7.08800	6.81167

Table 6. $\bar{x}$ of interpretation in the within group comparison

Variables	PI	OI	TI
$\bar{x}$ of production in the pretest	2.04833	2.44000	2.26429
$\bar{x}$ of production in the immediate post-test	6.95500	5.90111	1.63500
$\bar{x}$ of production in the delayed post-test	6.01000	5.17300	2.35500

Table 7. $\bar{x}$ of production in the within group comparison

The baseline scores from the pre-test shows that, as expected, comprehension is ahead of production. In the three groups, interpretation resulted with higher scores than production. Statistical significance was found in the performance of PI participants in interpretation and production between the pretest and the two post-tests. In the OI group significance was found in production between the pretest and the two post-tests. There was no significance in interpretation and production within the performance of students in the different tests in the TI group. Comparing PI and OI groups in production, were both obtained significance in the comparisons within groups, the means are lightly better in the PI group than in the OI group. The conclusion for this is that Processing and Output-based instructions had better impact on the performance of students within groups than TI. Processing had lightly better scores than OI in both, production and interpretation tasks.

5.2.2 Effects of instructions between groups

5.2.2.1 Effects of instructions on interpretation

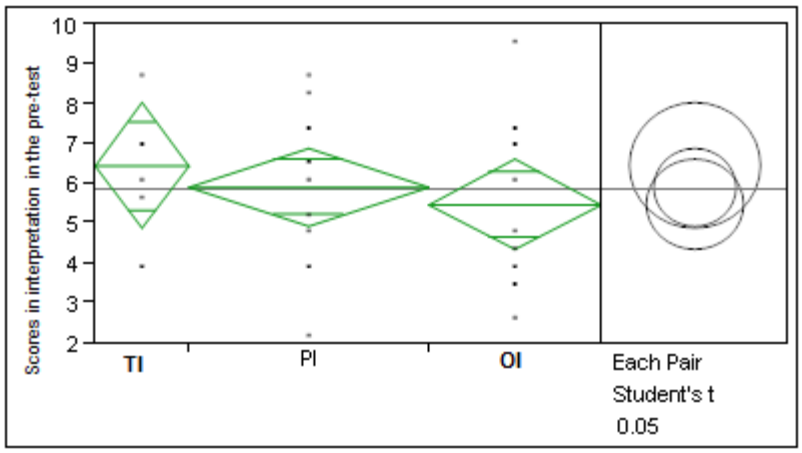

Figure 15. Differences in the obtained scores in interpretation tasks in the pretest by participants in the three experimental groups: PI, TI and OI.

This figure shows the performance of participants in the three different groups in interpretation tasks, which include the three different functions of suffix personal pronouns: as subjects, objects, and copulatives. Through looking at the figure, students' general performance in interpretation in the pretest in the three different groups can be appreciated. The statistical descriptions of each of the groups were PI group, $\bar{x}$ =5.91722 , Std error=0.48051, N=18; Output-Based Instruction Group, $\bar{x}$ = 5.48538, Std error=0.56541 N=13; and Traditional Instruction, $\bar{x}$ =6.46143, Std error = 0.77052, N=7. Fishers' LSD tests were used to compare the groups and the tests found that there is no statistical difference them.

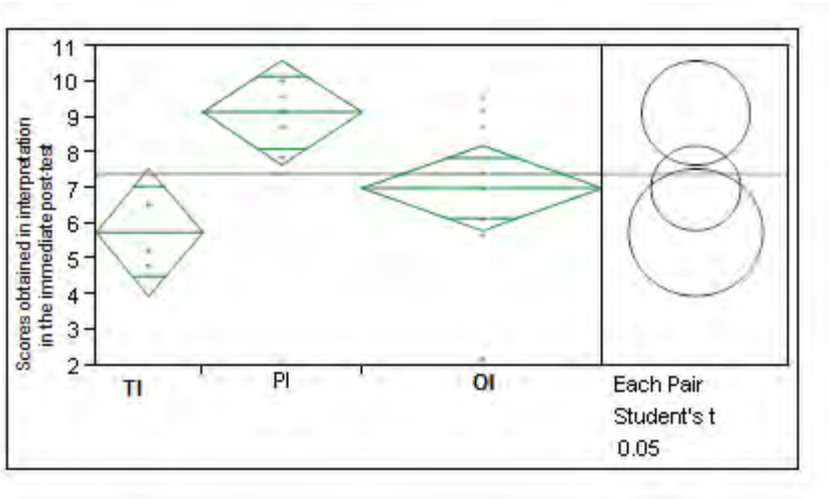

Figure 16. Differences in the obtained scores in interpretation tasks in the immediate post-test by participants in the three experimental groups: PI, TI and OI.

In this figure, performance on interpretation tasks in the immediate post-test between the three experimental groups is shown. The statistical descriptions of each of the groups in interpretation were PI group, $\bar{x}$ = 9.13333, Std error=0.69028, N=6; Output-Based Instruction Group, $\bar{x}$ = 7.00556, Std error=0.56361, N=6; and Traditional Instruction, $\bar{x}$ =5.76000 Std error = 0.84542, N=4. Comparisons using Fishers' LSD tests found that there is statistical differences between PI and OI groups (mean difference: 2.127778, Std Err difference=0.891150, CL=0.23862, 4.016932, p=0.0296), and between PI and TI groups (mean difference = 3.3773333, Std Err = 1.091432, CL= 1.05960, 5.687065, p= 0.0070). However, there is no statistical significance between OI and TI groups (mean difference= 1.245556, Std Err difference = 1.016067, CL= -0.90841, 3.399522 p=0.2380). Students in the PI group showed to have a statistical difference with OI and TI. The means in the different groups (PI $\bar{x}$ = 9.13333, OI $\bar{x}$ = 7.00556, TI $\bar{x}$ =5.76000) tell us that PI showed a higher score in interpretation than TI and OI. The interpretation for this is that PI is superior to TI and OI in interpretation tasks.

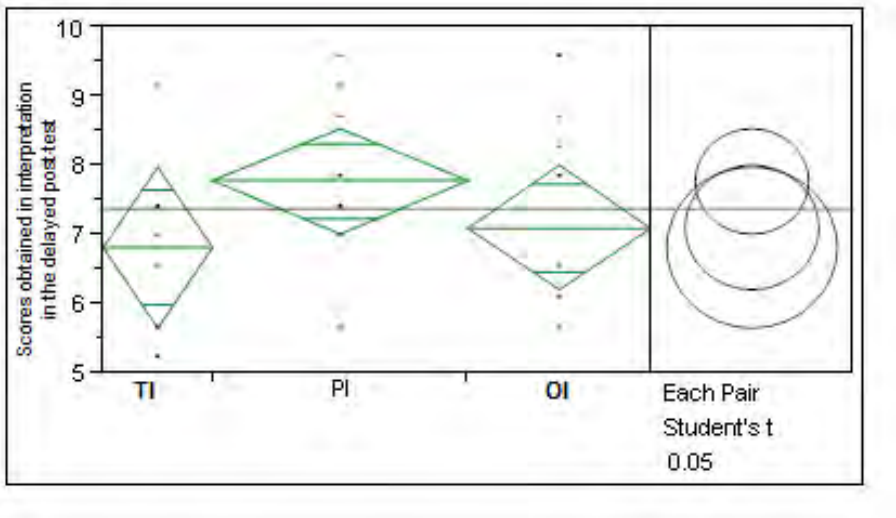

Figure 17. Differences in the obtained scores in interpretation tasks in the delayed post-test by participants in the three experimental groups: PI, TI and OI.

In looking at the differences in the scores obtained by the participants in the three groups in the delayed post-test, which include interpretation and production tasks, planned comparisons were made among all three groups. The descriptive statistics in interpretation for the groups were: PI group, $\bar{x}$ = 7.76571, Std error=0.37267, N=14; OI Group, $\bar{x}$ =7.08800, Std error=0.44095, N=10; and TI group, $\bar{x}$ =6.81167, Std error = 0.56926, N=6. Comparisons using Fishers' LSD tests found that there is no statistical difference between them. However, looking at the means obtained in each group of participants, PI shows better scores over TI and OI.

5.2.2.2 Effects of instructions on production

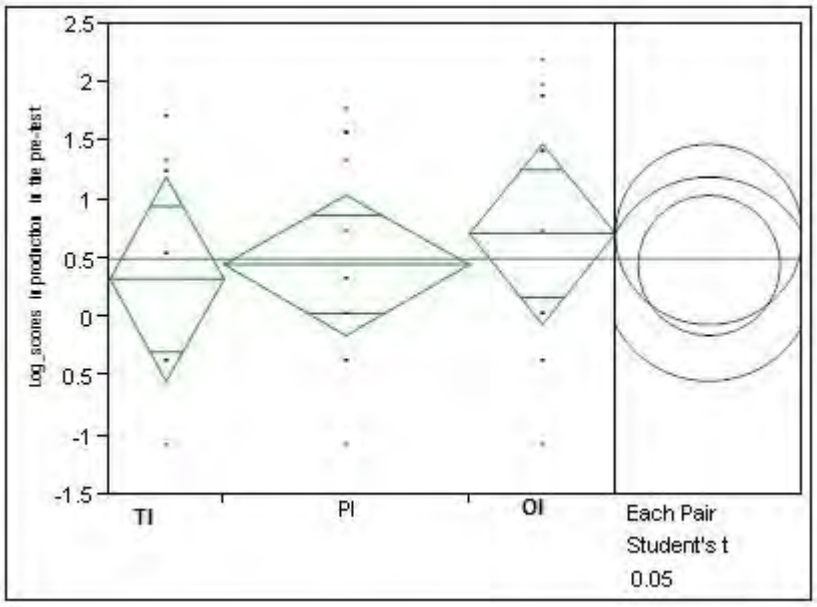

Figure 18. Differences in the obtained scores in production tasks in the pretest by participants in the three experimental groups: PI, TI and OI.

To meet the assumption of normal distribution, data transformation was used. The natural logarithms of the values were used to improve the normality of the data. In looking at the differences in the scores obtained by the participants in the three groups in the pre-tests, which include production tasks of suffix personal pronouns as subjects, objects, and copulatives, planned comparisons were made between all three groups. The descriptive statistics for the groups were: PI group, $\bar{x}$ = 0.450837, Std error=0.29034, N=15; OI Group, $\bar{x}$ = 0.712204, Std error=0.37483, N=9; and TI group, $\bar{x}$ =0.327537, Std error = 0.42502, N=7. Comparisons using Fishers' LSD tests found that there is no statistical difference the groups.

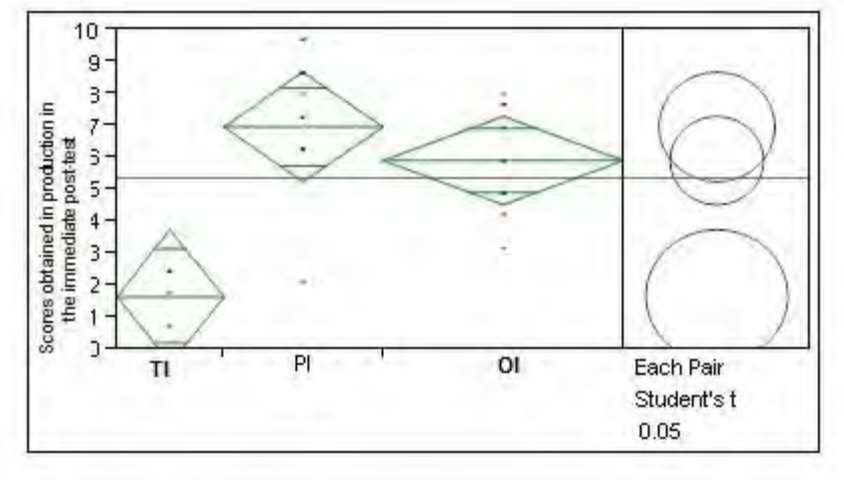

Figure 19. Differences in the obtained scores in production tasks in the immediate post-test by participants in the three experimental groups: PI, TI and OI.

In looking at the differences in the scores obtained by the participants in production tasks in the three groups in the immediate post-test, planned comparisons were made between the three groups. The descriptive statistics for the groups were: PI group, $\bar{x}$ = 6.95500, Std error=0.80606, N=6; OI Group, $\bar{x}$ = 5.90111, Std error=0.65815, N=9; and TI, $\bar{x}$ =1.63500, Std error = 0.98722, N=4. Comparisons using Fishers' LSD tests found that there is no statistical difference between PI and OI groups (mean difference: 1.053889, Std Err difference=1.040619, CL=-1.15212, 3.259903, *p*=0.3262). Nevertheless, statistical differences were found between PI and TI (mean difference= 5.320000, Std Err difference = 1.274493, CL= 2.61820, 8.021804, *p*=0.0007) and the TI and OI groups (mean difference = 4.266111, Std Err = 1.186488, CL= 1.75087, 6.781354, *p*= 0.0024). The interpretation for this data is that PI and OI are superior in production over TI, and that PI is lightly superior over OI.

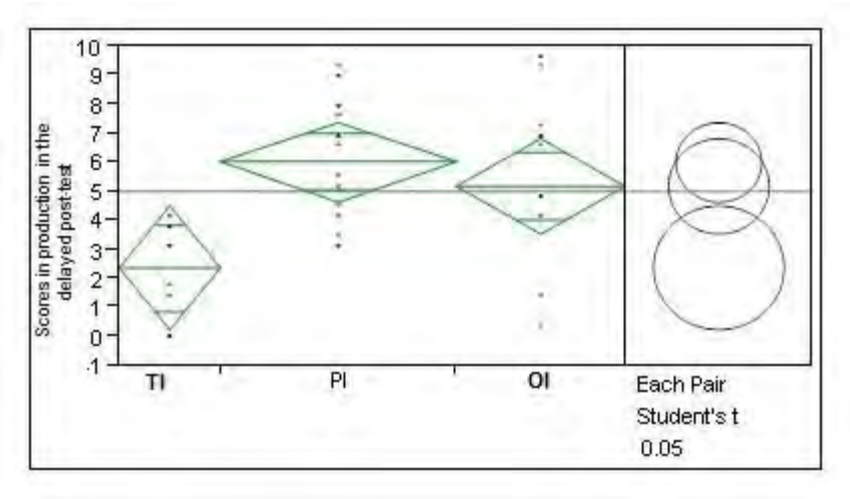

Figure 20. Differences in the obtained scores in production tasks in the delayed post-test by participants in the three experimental groups: PI, TI and OI.

This figure shows students' performance in production tasks in the delayed post-test in the three experimental groups. The descriptive statistics for the groups were PI group, $\bar{x}$ = 6.01000, Std error=0.6771, N=14; OI Group, $\bar{x}$ = 5.17300, Std error=0.8011, N=10; and TI group, $\bar{x}$ =2.35500, Std error = 1.0343, N=6. Comparisons using Fishers' LSD tests found that there is no statistical difference between PI and OI groups (mean difference: 0.837000, Std Err difference=1.048941, CL=-1.31525, 2.989249, p=0.4319), but there is statistical difference between PI and TI groups (mean difference= 3.655000, Std Err difference = 1.236188, CL= 1.11855, 6.191449, p=0.0064) and OI and TI groups (mean difference = 2.818000, Std Err difference= 1.308259, CL= 0.13367, 5.502326, p= 0.0403). By taking into account the means obtained in each group, it is possible to infer that PI is superior in production over TI, and that OI is also superior over TI. PI is lightly superior over OI.

5.2.2.3 Between-groups production and interpretation means

Variables	Pretest	Immediate Post-test	Delayed Post-test
$\bar{x}$ of interpretation in PI group	5.91722	9.13333	7.76571
$\bar{x}$ of interpretation in OI group	5.48538	7.00556	7.08800
$\bar{x}$ of interpretation in TI group	6.46143	5.76000	6.81167

Table 8. $\bar{x}$ of interpretation in the between group comparison

Variables	Pretest(natural log was used in data transformation)	Immediate post-test	Delayed post-test
$\bar{x}$ of production in the PI group	0.450837	6.95500	6.01000
$\bar{x}$ of production in OI group	0.712204	5.90111	5.17300
$\bar{x}$ of production the TI group	0.327537	1.63500	2.35500

Table 9. $\bar{x}$ of production in the between group comparison

Tables 8 and 9 show the means obtained in interpretation and production, as well as tables 6 and 7. Through comparing the means of interpretation between groups, it is possible to see that the TI group obtained the highest score in the pre-test. In the immediate and delayed post-tests, the PI group obtained the highest scores. In the case of production, the OI group obtained the highest score in the pre-test, but again, the PI group obtained the highest scores in the immediate and delayed post-tets. The small differences between the scores in the pretest between the groups, tell us that students were all almost at the same level of Maya at the beginning of the intervention, and that effects in production and interpretation were due to instructions. There were no statistical differences between the groups.

Statistical significance in interpretation was found in the immediate post-test between PI and OI (p=0.0296) , and PI and TI (p=0.007). The difference is greater between PI and TI. This might

mean that PI is superior to both, OI and TI in enabling students to interpret suffix personal pronouns.

Statistical significance in production was found in the immediate post-test between PI and TI (p= 0.0007) and OI and TI (p=0.0024). This means that PI and OI have better effects on production than TI. The significance is greater between PI and TI, which would mean that PI is lightly superior to OI. There was also statistical difference in production in the delayed post-test between PI and TI (p=0.0064) and OI and TI (p=0.0403). In this case, PI and OI showed to be superior to TI in the long-term effects of instructions. The means tell us that PI is better to both, TI and OI, but OI is better than TI.

Between interpretation and production, according to the means obtained by each experimental group, the three of them had better effects on interpretation than on production. It seems that PI had the highest scores in both, interpretation, and production tasks. After PI, OI had the next best scores, and then TI.

5.3 Effects of instructions on interpretation and production of suffix personal pronouns

The one-way ANOVA analyses presented in the previous sections suggest an answer for each of the research questions that guided this study, which are:

1. Does altering the way in which learners process input have an effect on their developing language system for suffix personal pronouns?
2. Does altering the way in which learners produce output have an effect on their developing language system for suffix personal pronouns?
3. Will there be any difference in how learners receiving Processing Instruction, Output-Based Instruction, and Traditional Instruction interpret sentences with suffix personal pronouns?
4. Will there be any difference in how learners receiving Processing Instruction. Output-Based Instruction, and Traditional Instruction produce sentences with suffix personal pronouns?

To give an answer to question 1, questions 3, and 4 are answered first. The answer to whether OI, PI, and TI have different effects in interpretation is explained here. It was demonstrated that learner's receiving Processing Instruction, Output Based Instruction, and Traditional Instruction have different results in interpretation. Comparisons within groups showed the measured gains that students have during the intervention. There was no statistical significance in interpretation in the pretest between the different experimental groups, which means that the scores gained and measured by the post-tests could be due to the effects of instruction.

In the within-groups analysis, statistical significance between the pre-test and the two post-tests was found in the PI group ($p<0.05$). Since students' scores in interpretation in the pretest were almost at the same level, this means that the gains of students during the Instructions are higher in the PI group than the gains obtained in the TI and OI groups,

Statistical significance was found in the immediate post-test between PI and OI ($p=0.0296$), and between PI and TI ($p=0.0070$). The greater significance was between PI and TI. Although there is no significance between OI and TI, if we consider the means obtained in interpretation in the groups (TI $\bar{x}$ =5.76000, OI $\bar{x}$ = 7.00556), OI seems to be better than TI. Thus, the conclusion is that students who received processing instruction performed better in interpretation tasks than those who received TI and OI, but students who received OI performed better in interpretation than those who received TI.

Question 4 investigated whether PI, OI, and TI have different effects on production. The results of the ANOVAs suggest the following. In the pretests there was no significant differences in production between the three experimental groups, which means that the groups were equivalent at the onset of instruction and that production differences measured in the post-tests are highly due to the effects of instructions.

In the analysis within groups (see section 5.2.1.2) significance was found between the pretest and the two post-tests in the PI and OI groups ($p<0.05$). This means that effects in production was higher in the PI and OI conditions.

In the analysis between groups, significance was found in the scores obtained in the immediate post-test of interpretation between PI and TI (0.007), and between PI and OI(0.0296) There was also statistical significance in production in the delayed post-test between the same groups (PI and TI, and TI and OI). The value of *p* in the immediate production post-test between PI and TI is 0.0007, and between OI and TI is 0.0024. The greater significance was between PI and TI, this means that processing instruction had better immediate effects in production over TI and OI. If we consider the means in production obtained in the TI and OI groups (TI $\bar{x}$ = 1.63500, OI $\bar{x}$ =5.9011), it is inferred that OI is better than TI in production.

In the delayed post-test the value of *p* between PI and TI is 0.0064, and between OI and TI is 0.0403. Once more, the smaller value of *p* is between PI and TI, which it is interpreted as PI being superior to OI and TI in production. Comparing the means of OI and TI groups (OI $\bar{x}$ =5.17300 TI $\bar{x}$ =2.35500), it is possible to say that OI is superior to TI in the delayed post-test. The research question 1 to whether altering the way in which learners process input have an effect on their developing language system is answered considering the conclusions for the previous two research questions. In the comparison of the three types of instructions, PI showed to be better in both interpretation and production. In the interpretation of suffix personal pronouns, PI showed to be superior to OI and TI in the immediate post-test. In the delayed post-test, it seems that the three types of instructions had similar effects on students. In production, PI seems to be better in both, the immediate and delayed post-tests. Statistical significance showed that PI is superior to OI and TI in the production of suffix personal pronouns. Thus, altering the

way in which students process input have an effect in their developing language system, which is in an improvement in their interpretation and production of suffix personal pronouns.

The research question 2 to weather altering the way in which learners produce output have an effect on their developing language system for suffix personal pronouns is answered comparing the results in production between the different groups. In research question 3 the conclusion was that PI had better immediate effects in production over TI and OI, but OI is better than TI. In the delayed post-test, PI is also superior to OI and TI, and OI is superior to TI. Therefore, altering the way in which students produce output have an effect on students developing language system, which results in an improvement in the quality of their production of suffix personal pronouns.

OI has also important effects on interpretation. The results show that even though PI is superior to OI, OI is superior to TI in both, interpretation and production. This might mean that altering the way in which students produce output can also have effects on interpretation not only on production.

This is shown by increased and superior performance in both interpretation and production vis-a-vis TI, and in production vis-a-vis PI. There was statistical significance in the immediate and delayed post-tests in production between OI and TI, but not between OI and PI.

CHAPTER 6. CONCLUSION

The purpose of this chapter is to interpret and explain the results presented in the previous chapter. The implications and limitations of the findings are also discussed. First, the effects of instructions on students' developing interlanguage system for suffix personal pronouns are explained in terms of production and interpretation. Then, the chapter discusses how findings converge with and diverge from those of previous research, and their implications for instructed Second Language Acquisition (SLA). Afterwards, the pedagogical implications of the study are explored, which is followed by a discussion of the study's limitations. Finally, possible avenues for future research are presented. .

6.1 Effects of instructions on students' developing interlanguage system for suffix personal pronouns.

In the analysis within groups, the two instructional treatments (PI and OI) showed to have an impact on interpretation and production. However, statistical significance in interpretation was found between the pre-test and the two post-tests in the PI group only. Statistical significance in production was found between the pre-test and the two post-tests in the PI and OI groups. In the TI group, no statistical difference was found in interpretation or production between the different tests.

In the analysis between groups, statistical significance in interpretation was found in the immediate post-test between PI and OI (p=0.0296) , and PI and TI (p=0.007). Statistical significance in production was found in the immediate post-test between PI and TI (p= 0.0007) and OI and TI (p=0.0024).There was also statistical difference in production in the delayed post-test between PI and TI (p=0.0064) and OI and TI (p=0.0403).

From the previous comparisons of interpretation and production, within- and between-groups, statistical significances tell us that PI does have a significant effect on interpretation as well as on production, even though students in the PI condition never produced the target form during instruction. In the within-group comparisons, only the PI group showed a significant gain in interpretation tasks in the immediate and delayed post-tests. In production, PI and OI groups got significance in both, the immediate and delayed post-test, with PI students performing slightly better than those in the OI condition. Through these results, the conclusion is that, according to the model that VanPatten (2004) presents for language acquisition (see figure 21 below), the way in which students process input alters the way in which learners interpret *and* produce language in a manner that evidences interlanguage restructuring. The emphasis of PI was on the interpretation of language (first stages: input and intake), the emphasis of OI was over the production of language (later stage: storage and output). The expected results would be that the outperformance of the PI group in interpretation and the outperformance of the OI group in production; however the PI group outperformed the OI and TI groups in both production and interpretation. This means that the deep processing of a structure also leads to its accurate production.

In the between-group comparisons, interpretation was significantly different only in the immediate post-test between PI and OI ad PI and TI. This was not held in the delayed post-test, so there is no enough evidence to say that PI is superior to OI in interpretation, since it seems that the retention of the gained knowledge of suffix personal pronouns was similar for both groups at the end of the intervention; however, figures tell us that it is superior to TI. In terms of production, significance was found in the immediate post-test between PI and OI, PI and TI, and OI and TI, and also in the delayed post-test between the same groups. This means that the

production of suffix personal pronouns was held during the time period of the first and the second post-tests. It also suggest that in this study PI and OI had similar effects on production. According to these results, PI, OI and TI have a differential impact on students' developing interlanguage system for suffix personal pronouns. While TI did not show any significant impact on interpretation and production, PI and OI had significant results. PI and OI are superior in production to TI.

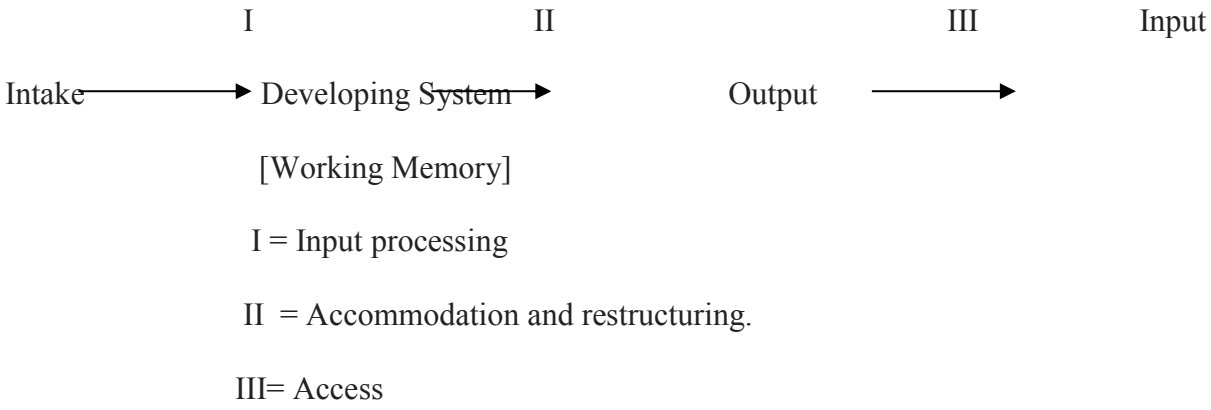

Figure 21. *Three Sets of Processes in SLA*. It shows how Input Processing fits into the acquisition process. From *Processing Instruction Theory, Research and Commentary* pp. 34, by VanPatten (Ed), 2004, Mahwah, New Jersey, London: Lawrence Erlbaum Associates, Publishers.

The findings of this study support other claims about the effects of PI over the developing language system of students. Other studies have found out that PI have effects on both interpretation and production, and that it is retained over time (Cadierno, 1992; Foster, 2009; Cheng, 1995; Oh, 2010;). Particularly, in this research study, just like in Foster (2009), PI has an effect on production, even though it is meaning based since its main emphasis is on the focus on meaning. The findings here also align with those of Oh (2010), who also found that PI has a slight edge over OI .

Since 1993, research has investigated the effectiveness of PI and structured input in overcoming non-optimal processing strategies for L2 learners of Spanish (Cadierno 1995; Cheng, 1995;

Farley, 2001; Fernández, 2008; VanPatten & Cadierno, 1993; VanPatten & Fernández, 2004; VanPatten & Oikkenon, 1996; VanPatten & Sanz, 1995), French (Benati & Lee, 2008; VanPatten & Wong, 2004), English (Benati & Lee, 2008), Italian (Benati, 2001, 2004), and Japanese (Lee & Benati, 2007). Prior to this study, the instructed learning of Amerindian languages had not been explored. By addressing the teaching and learning of Yucatec Maya with adult NSs of Spanish, this study seeks to start a line of research for the teaching of Amerindian languages as second or foreign languages.

6.2 Implications for SLA

VanPatten (2004) proposes several stages for language acquisition. Input processing and derivation of intake take place during PI for the instructed acquisition of grammatical structures, which has been proven to have an impact in both interpretation and production. It has been shown also that effects are produced by Structured Input activities and that altering the way in which learners process a structure has an impact on their developing language system, one that is powerful enough to lead to accommodation, restructuring, and access, as shown by its PI's effects on production.

The effects of PI in this study not only aimed at focusing students' attention on the suffix personal pronouns, but it pushed them to process the structure deeply and, potentially, to re-structure the ways they attended to the pronoun. This seems to have led them to derive intake that was reflected in the sentence level production exercises. Results suggest that PI is lightly superior to OI, the small high differences in scores obtained by the PI group over the OI group shows how deep the processing of the structure was, and how this processing motivated their production. PI has similar effects to OI, but the results suggest that PI is superior to the OI and TI in this research study. The main pedagogical implication of PI for the teaching of the Maya language is that, as it is proved by this research study and others about the generalizability of the

impact of PI over the developing language system of students, it can be used to avoid inappropriate processing strategies for Spanish native speakers and lead to a correct processing and accurate production of difficult structures.

The Output-Based Instruction used in this research study emphasized the production of the suffix personal pronouns. It followed the stages of what VanPatten (1996) calls TI. Nevertheless, as TI in the University of Quintana Roo differed from VanPatten's TI, it was decided to be called Output-Based Instruction. There were mechanical practice, meaningful practice and communicative practice for the suffix personal pronouns. This type of Otput-based Instruction, according to Gass and Selinker (2001) accomplishes four main functions: hypothesis testing, opportunity for feedback, development of fluency and automaticity, and grammatical processing. VanPatten(1996) argued that this type of instruction does not provide enough input to create a mental representation of the structure itself. With regard to the stages of language acquisition, according to VanPatten (2004), this type of instruction addresses the final stages for language acquisition, in other words the stage of access and output. As explained before, students test hypothesis, get feedback, develop fluency and automaticity and also process grammar. Attention is not focused on meaning, and there is no deep processing of the structure since students' mind is occupied with other types of tasks. OI and PI were both superior to TI in this study. OI is different to PI since is output-based and PI meaning based, but their impact is similar in students developing language system. The pedagogical implications for the teaching of Maya language is that OI might be used to promote the four principles that Gass and Selinker(2001) propose, which are part of language acquisition. However, the fact that OI also produced substantial gains suggest that it is possible that OI works because it may promote this kind of re-structuring unintentionally, when some learners focus on their own output and that of other learners during production (i.e. individual and whole-class output also becomes input when testing students

hypothesis) (Gass and Selinker, 2001; Ghaith and Yaghi, 1998; Martinez n.d). Nevertheless, the slightly lower results of the OI group suggest that an intentional, explicit focus on attention re-structuring during teaching leads more students to actually re-structure their attention effectively during their individual cognitive processing.

TI in this research study, as described by Maya language teachers in the University of Quintana Roo, included the stages of mechanical and meaningful practice; there was no communicative practice. This makes it different from the Output-Based Instruction described previously. It is clear that, for the learning of suffix personal pronouns, TI did not show any significant impact during the period of the intervention. Students' interpretation and production were measured in the time period when PI and OI were implemented, and results show that PI and OI were superior to TI.

From all this information it is concluded that the teaching of Yucatec Maya would improve if psycholinguistically-grounded and empirically validated instructional approaches, such as PI and OI are included. However, extensive teacher training would be necessary.

6.3 Limitations and future research

The results of this study might not be generalizable to other forms or other languages. Each grammatical structure is learned differently by students and their acquisition depends on different factors such as mother tongue and language characteristics (word-order, syntax, semantics, etc); however, the results lend weight to the strategy of teaching students using PI to avoid ineffective processing strategies The limitations that this study presents might be more than the mentioned here, but this analysis focuses on the two considered most important. The first is about sample size and the second is about the analysis of the data.

The first limitation refers to the sample. There were 22 PI participants, 17 OI participants, and 10 TI participants. Although the statistical tests showed that the data met the assumptions for ANOVA, the results might not be generalizable or used for prediction since there is a small sample in each group. Furthermore, even though students who participated were Spanish native speakers, there were some bilingual speakers of Maya in each group, both passive and active. This is a variable that was controlled through a language test (passive and active bilinguals were excluded from testing), the interaction between those bilingual students and the rest of the participants could not be controlled during and after the class sessions.

The second limitation considered in this chapter was about the way in which the analysis of the data was done. Results within and between groups were compared only by taking into account general scores for interpretation and production in the pretest, immediate post-test and delayed post-tests. There were no comparisons between the results obtained by students for each of the different functions of the suffix personal pronouns: as subjects, direct objects and copulatives. It is not possible to know the effects of instruction for the different suffix personal pronoun functions.

A final limitation concerns the assumed input processing problems facing adult NS of Spanish who are learning Yucatec Maya as a L2. Recall that these were discussed as a series of hypotheses in Chapter 3. The strong learning gains in pre- and post-test results within and across groups provide indirect evidence that the hypothesized processing instruction difficulties derived from VanPatten's input processing principles were indeed operant with the learners in this study. However, a closer, qualitative analysis of the specific incorrect answers students tended to provide would be necessary in order to better discern the accuracy of these assumed input processing difficulties. Future studies could be designed with the specific goal of identifying and eliciting input processing difficulties and testing the applicability of VanPatten's input processing

principles as a way of predicting difficulties in the acquisition of Yucatec Maya by NS of Spanish.

In addition, future research must be developed in order to identify possible differential effects of the three conditions on the different functions of suffix pronouns. Further, assessment in production in this research was done at a sentence level; it is important to explore if PI and OI have different effects in discourse level production of grammatical structures. Also, future research should consider passive speakers of Maya and the way PI might impact their developing language system. In general, there are several areas for PI researchers to discover about Amerindian languages.

To conclude, the findings of this research study provide evidence of the effectiveness of PI over OI and TI, and OI over TI for the instructed acquisition of Maya suffix personal pronouns as subjects, direct objects and copulatives. A further research is necessary to explore more about the teaching mechanisms that Maya instructors follow in the University of Quintana Roo PI showed to have changed students processing of input and it had an impact on the production of the target structure. This suggest that PI can indeed be used to alter the way in which students process input and lead them to an accurate processing and production of target structures.

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APPENDIX A

Consent Letter

Asunto: Petición de consentimiento

Estimado estudiante:
De la manera más atenta y cordial solicito su consentimiento para hacerlo partícipe de un proyecto de investigación científica que estoy llevando cabo en mis estudios de maestría en la Universidad de Quintana Roo. Le suplico realizar las actividades propuestas en los paquetes de instrucción lo mejor posible. Los resultados de las actividades no afectarán de ninguna forma su calificación, solo serán utilizados para los propósitos de esta investigación y su manejo será de estricta confidencialidad. Agradezco de antemano su disposición y participación durante la intervención.

Atentamente

Lic. Venancia Coh Chuc.
Estudiante de la Maestría en Educación
en la Universidad de Quintana Roo.

Consiento ser partícipe de este proyecto de investigación científica. Comprendo que los resultados obtenidos en las actividades no afectarán de ninguna forma mi calificación y que la información recabada se manejará de forma confidencial.

Nombre y firma

_____

APPENDIX B

Language History Questionnaire

Nombre: _____

Marca con una X o responde la pregunta

1. Género:

Masculino:_____ Femenino: _____

2. Edad:_____ años

3. ¿Tienes algún problema auditivo?

   Si ¿cuál?_____ No _____

4. País donde naciste: _____

¿cuánto tiempo tiene viviendo en México? (sólo en caso de ser extranjero)
_____

5. ¿Cuál es tu lengua materna (tu primera lengua)?
a. Español: _____
b. Maya: _____
c. Otro:_____

6. Lengua que se habla en casa:
a. Español:_____
b. Maya:_____
c. Español y Maya:_____
d. Otro: _____

7. En una escala del 1 al 10, donde 1 es nada y 10 todo el tiempo, indica la cantidad de tiempo en la que utilizas maya en tu casa

1 ☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☐ 9☐ 10☐

8. ¿Estudiaste maya anteriormente?
   Si:_____¿dónde?_____ ¿hace cuánto tiempo?_____
   ¿por cuánto tiempo?_____

   No:_____

9. ¿Te consideras hablante pasivo de la lengua maya? Es decir que lo entiendes, pero no lo habla.
   Si_____
   No_____

10. ¿Por qué estudias maya?
    _____
    _____

11. ¿Has estudiado otra lengua además de maya?
Si _____¿cuál? _____
¿por cuánto tiempo? _____
¿hace cuánto tiempo?_____
No_____

12. ¿Estás estudiando otra lengua además de maya?
Si _____¿cuál? _____
¿por cuánto tiempo lo has estado estudiando? _____

No_____

APPENDIX C

PI Package

Pronombres personales sufijados como sujeto en oraciones en pasado simple

A. Los pronombres personales son palabras que se utilizan para sustituir a los sustantivos en una oración. Los pronombres personales pueden desempeñarse como sujetos, por ejemplo:

Luisa es bonita---- **Ella** es bonita.

En este ejemplo se puede sustituir **Luisa** por **Ella**. Luisa es el sujeto de la oración por lo tanto **ella** es un pronombre personal como sujeto.

¿Cuál es el pronombre personal como sujeto de esta oración?

Miguel tiene un hermanito

_____tiene un hermanito

Si tu respuesta fue **Él**, entonces es correcto

¿Cuál es el pronombre personal como sujeto de esta oración?

Tomás y Saúl juegan en el patio.

_____ juegan en el patio

Si tu respuesta fue **Ellos**, entonces es correcto.

B. Los pronombres personales como sujetos en español y en maya yucateco se presentan en la siguiente tabla:

Español	**Maya**		
Yo	-en	Teen	-in
Tu	-ech	Teech	-a
Usted	-ech	Teech	-a
El/ella	-i'/-ij/-	Leti'	-u …-ij
Nosotros/nosotras	-o'on	To'on	k…-o'on
Ustedes	-e'ex	Te'ex	-a …-e'ex
Ellos/ellas	-o'ob	Leti'ob	-u …-o'ob

Como se puede observar, en maya hay palabras y partículas que pueden funcionar como pronombres sujeto. Nos enfocaremos en la primera columna de pronombres, los cuáles se llaman pronombres personales sufijados. Observa los ejemplos de abajo para ver cómo funcionan:

1. Teene' míisnaj**en** saamiajak / Yo barrí hace rato.
2. Leti'e' tsikbalnaj tin wéetel /Él platicó conmigo.
3. Teene' Uqroo xooknaj**en/** Yo estudié en la Uqroo
4. Te'exe' p'onaj**e'ex** jo'ol jeak, máasima'?/ Ustedes lavaron ayer, ¿verdad?
5. Te'exe' k'aaynaj**e'ex** wáa jo'oljeak?/ ¿Cantaron ayer ?
6. Teeche' páaknaj**ech** wáa jo'oljeak?/ ¿Chapeaste ayer?

En los ejemplos anteriores se pueden observar partes sombreadas en negritas. Estas partes sombreadas son los pronombres sufijados que cumplen la función de sujetos dentro de la oración. Las seis oraciones cuentan con pronombres independientes, pero éstos solo cumplen la función de enfatizar el sujeto dentro de la oración, es decir enfatizan la función de los pronombres personales sufijados. Los pronombres independientes se pueden omitir como se observa:

1. Míisnaj**en** saamiajak / Yo barrí hace rato.
2. Tsikbalnaj tin wéetel /Él platicó conmigo.
3. Uqroo xooknaj**en/** Yo estudié en la Uqroo
4. P'o'naj**e'ex** jo'ol jeak, máasima'?/ Ustedes lavaron ayer, ¿verdad?
5. K'aaynaj**e'ex** wáa jo'oljeak?/ ¿Cantaron ayer ?
6. Páaknaj**ech** wáa jo'oljeak?/ ¿Chapeaste ayer?

C. Como se observa en los ejemplos, los pronombres personales sufijados funcionan como sujeto cuando se usan con el aspecto -naj. Los verbos con los cuáles se usa este aspecto son verbos intransitivos.

ASPECTOS IMPORTANTES A RECORDAR:

- ❖ Los pronombres personales sufijados como SUJETO van unidos a un aspecto, en este caso -naj
    - P'o'naj**en**
- ❖ No se deben omitir dentro de oración.
    - Teene' p'o'naj**en.**
    - NO "Teene' p'o'naj", esta forma es incorrecta.
- ❖ El pronombre independiente se puede omitir.
    - Teene' p'o'najen o simplemente "**p'o'najen**".
- ❖ La primera palabra en la oración después del pronombre independiente, (en caso de tenerlo), es el verbo del cual se anexa el sujeto.
    - **P'o'naj<u>en</u>** (Verbo + sujeto) jo'oljeak.
    - Teene' **p'o'naj<u>en</u>** (Verbo + sujeto) jo'oljeak.

Ejercicios

Ejercicio 1. Actividad con tarjetas. “La lotería”. El instructor organiza a los alumnos por parejas y reparte las tablas de la lotería versión en español. El instructor revuelve las tarjetas individuales versión en maya. Posteriormente, extraerá una por una las tarjetas y las leerá en voz alta. Los estudiantes marcarán los recuadros equivalentes a lo que el instructor va leyendo hasta completar la tabla que les tocó. La pareja que complete primero su tabla gana. Cuando existe un primer ganador, los estudiantes intercambiarán sus tablas.

Después de haber intercambiado las tablas de lotería por tres ocasiones, el instructor recoge las tablas que están en versión español y les proporciona tablas versión “maya yucateco”. El instructor revuelve las tarjetas de lotería versión español y las lee en voz alta. Los estudiantes de nuevo marcan los recuadros equivalentes que van escuchando hasta completar su tabla e intercambian con sus compañeros.

Ejercicio 2. Indica si las siguientes oraciones aplican o no aplican en tu caso.

		Jaaj	Ma' jaaji'
1.	Páaknajen jo'oljeak.	☐	☐
2.	Xooknajen Uqroo jo'oljeak.	☐	☐
3.	P'o'najen sabadoak.	☐	☐
4.	K'aaynajen domingoak.	☐	☐
5.	Míisnajen saamiajak.	☐	☐
6.	Tsikbalnajen yéetel in ka'ansaj lunesak.	☐	☐
7.	In chiich yéetel teene' p'o'najo'on jo'oljeak.	☐	☐
8.	In suku'un yéetel teene' míisnajo'on jo'oljeak.	☐	☐
9.	In na' yéetel in taatae' páaknajo'ob jo'oljeak.	☐	☐
10	In taatae' xooknaj Uqroo.	☐	☐

Ejercicio 3. En cada oración, elige el pronombre que se maneja

1. **Míisnajo'ob** sabadoak.

   a)yo b)tu c) nosotros(as) d) ellas(os)

2. **Tsikbalnaj** tin wéetel jo'oljeak.

   a)tu b)ella(él) c)ustedes d)yo

3. **K'aaynaje'ex** juevesak.

   a)yo b)tu c)ella(él) d) ustedes

4. **Xooknajo'on** domingoak.

   a)ustedes b)nosotras(os) c) él/ella d) ellas(os)

5. **Páaknajech** wáa jo'oljeak?

a)ustedes b)ellas(os) c)nosotras(os) d)tú

6. **P'o'najo'on** ka'achil wáa?

   a)yo a)tú c)ella(él) d)nosotras(os)

7. Tu'ubten wa **k'aaynajen**

   a)yo b)ustedes c)ellas(os) d)nosotras(os)

8. Alfonsoe' **tsikbalnaj** yéetel in chiich.

   a)ellas(os) b)yo c)tú d)ella(él)

9. XMaruch yéetel u yíichame' **míisnajo'ob** te' k'íiwiko'.

   a)ella(él) b)yo c)ellas(os) d)ustedes

10. XMaruch yéetel u suku'une' **xooknajo'ob** o'onajak.

    a)tú b) ella(él) c)ustedes d)ellas(os)

Ejercicio 4. Escucha las oraciones en maya y elige la oración correspondiente en español. Recuerda que el sujeto de la oración va después de -naj.

1. a) Ayer lave b) Ayer lavamos c) Ayer lavaron d) Ayer ustedes lavaron	6. a) Ayer tú barriste. b) Ayer tú y yo barrimos. c) Ayer yo barrí d) Nosotros barrimos ayer.
2. a) Ayer lavamos juntos. b) Ayer lavó solito. c) Ayer lavé solita. d) Ayer lavaron juntos.	7. a) Jorge y a mi hermano les cantamos ayer. b) Ayer Jorge y mi hermano cantaron. c) Ayer ustedes le cantaron a Jorge y a mi hermano. d) Ayer les canté a Jorge y a mi hermano.
3. a) Ayer lavamos, ¿verdad? b) Ayer lavaron ustedes, ¿verdad? c) Ayer lavaron ellos, ¿verdad? d) Ayer lavaste, ¿verdad?	8. a) Ayer canté. b) Ayer cantaste. c) Ayer cantamos. d) Ayer ustedes cantaron.
4. a) Ayer barriste con Jorge. b) Ayer tú y Jorge barrieron. c) Ayer barrimos con Jorge. d) Ayer Jorge barrió.	9. a) Ayer no cantaste. b) Ayer no cantó. c) Ayer no canté. d) Ayer no cantamos.
5. a)Ayer barriste. b) Ayer barrió. c) Ayer barrí. d)Ayer barrimos.	10. a) Ayer cantamos con mi hermana. b) Ayer cantaron con mi hermana. c) Ayer cantaron ustedes con mi hermana. d) Ayer cantó mi hermana.

Hoja para instructor
Ejercicio 4. Escucha las oraciones en maya y elige la oración correspondiente en español. Recuerda que el sujeto de la oración va después de -naj.

1. Jo'oljeake' p'o'najo'on.
2. Jo'oljeake' p'o'najen tin júunal.
3. Jo'oljeake' p'onaje'ex, máasima'?
4. Jo'oljeake' Jorge míisnajij.
5. Jo'oljeake' míisnajen.
6. Jo'oljeake' teech míisnajech.
7. Jo'oljeake' Jorge yéetel in suku'un k'aaynajo'ob.
8. Jo'oljeake' k'aaynajo'on.
9. Jo'oljeake' ma' k'aaynajechi'.
10. Jo'oljeake' in kiik k'aaynajij.

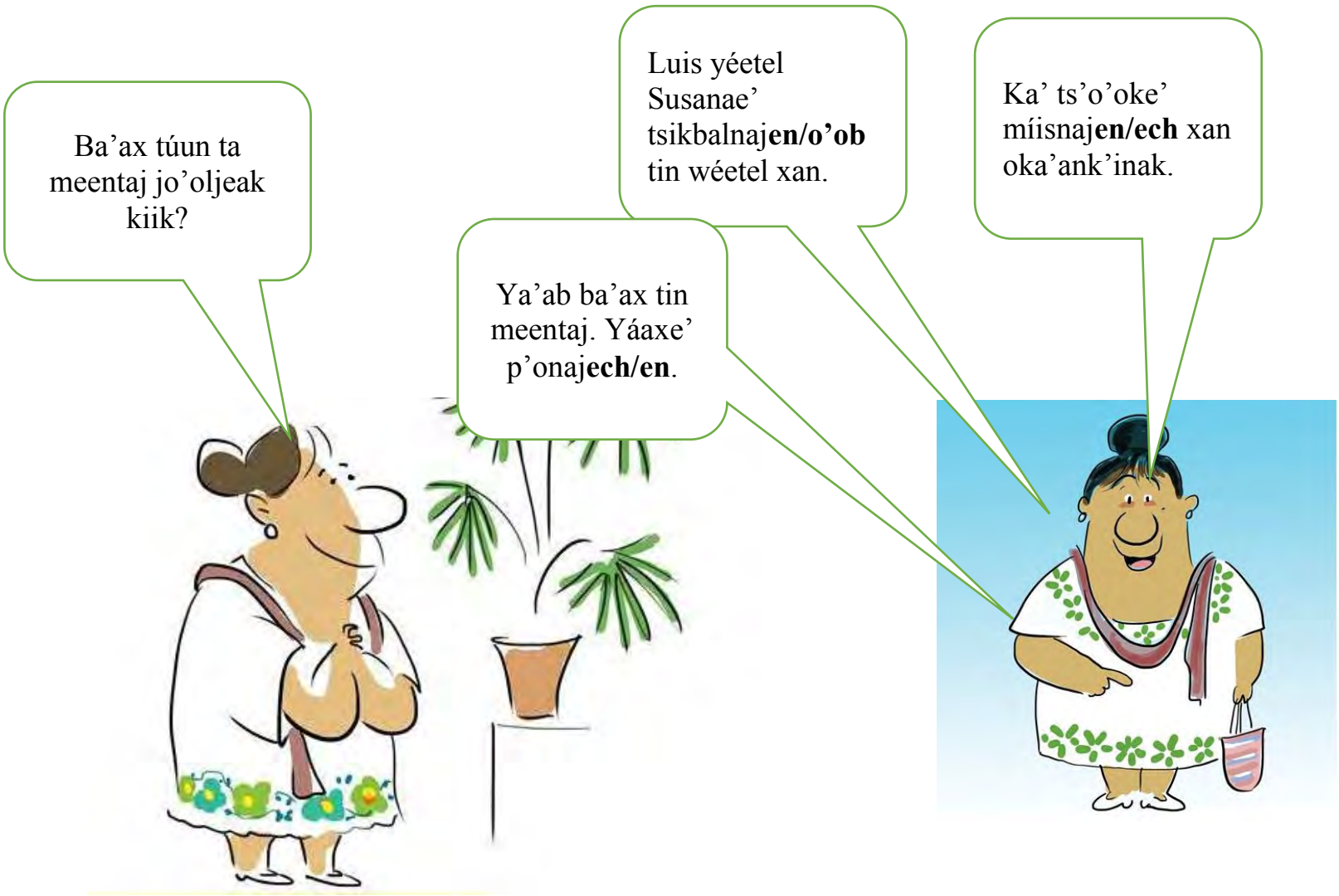
Ejercicio 5. El fin de semana estuviste estudiando con tus amigos para un examen. Escribe el nombre de tres de tus amigos con quienes estuviste estudiando.

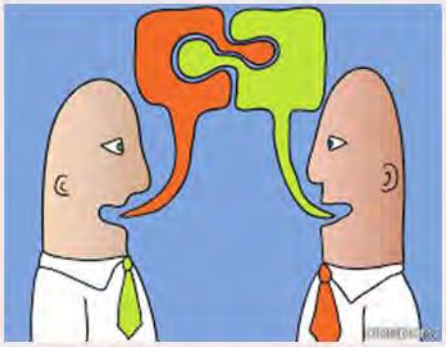
Teene' sabadoake' xooknaj**en** yéetel _____. Xooknaj**en** xan yéetel_____. Láayli' xooknaj**en** xan yéetel _____.

En las siguientes oraciones debes poner el nombre de dos de tus amigos que hayan estudiado juntos. En cada oración debes escoger el pronombre personal sufijado que exprese correctamente la idea. En las oraciones 4 y 5 oraciones estarás incluido tú.

1. _____ yéetel _____ xooknaj**o'on/o'ob** múuch' sabadoak.
2. _____ yéetel _____ xooknaj**o'on/o'ob** múuch' domingoak.
3. _____ yéetel _____ xooknaj**o'on/o'ob** múuch' viernesak.
4. _____,_____ yéetel teene' xooknaj**o'on/o'ob** múuch'
5. _____ yéetel teene' xooknaj**o'on/o'ob** múuch'

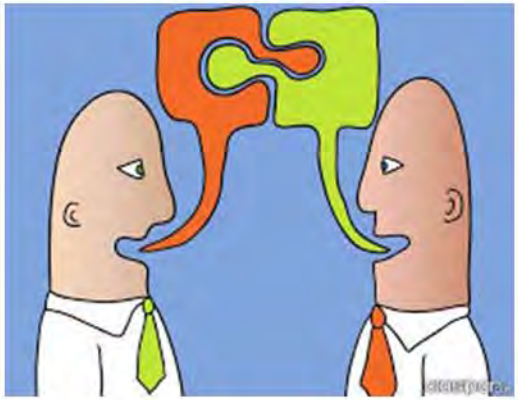
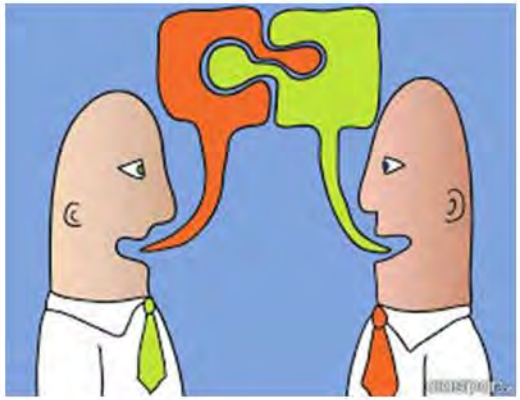
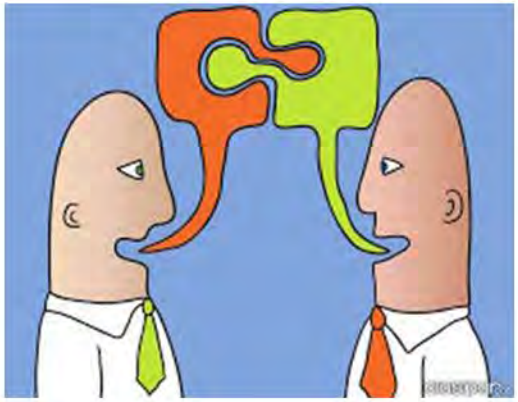
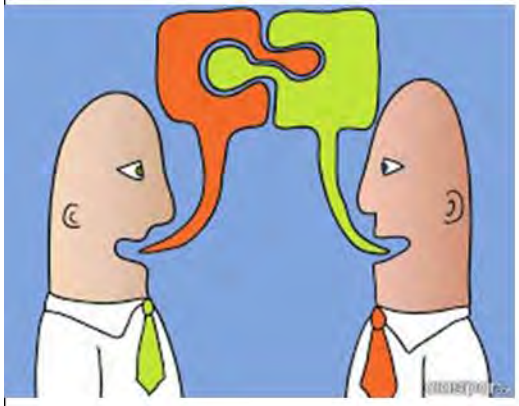
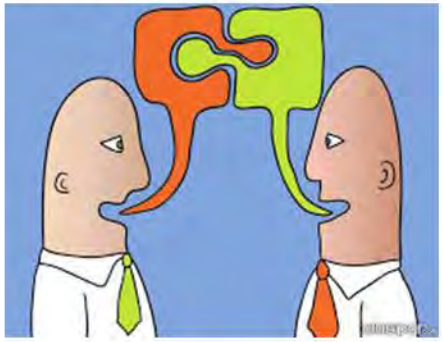
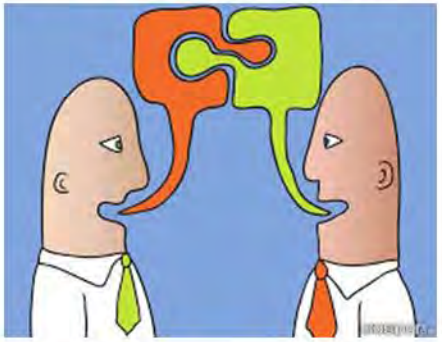
Ejercicio 6. Carmen fue a visitar a su hermana y ella está explicándole lo que hizo ayer. Subraya el pronombre personal sufijado que complete de manera correcta las oraciones expresadas en el diálogo.



P’o 	**Tsikbal** 	**Míis** 
Xook 	**Páak** 	**K’aay** 

Lavé 	**Lavaste** 	**Lavó** 
Lavamos 	**Lavaron (ustedes)** 	**Lavaron (ellas/ellos)** 

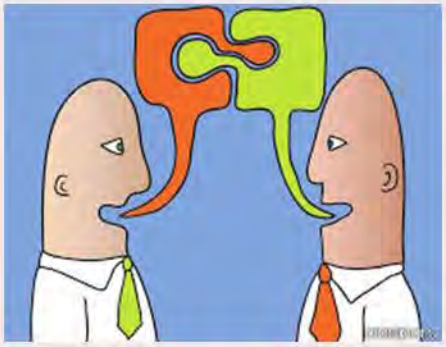
Estudié 	**Estudiaste** 	**Estudió** 
Estudiamos 	**Estudiaron (ustedes)** 	**Estudiaron (ellas/ellos)** 

Platiqué 	**Platicaste** 	**Platicó** 
Platicamos 	**Platicaron (ustedes)** 	**Platicaron (ellas/ellos)** 

Chapeé 	**Chapeaste** 	**Chapeó** 
Chapeamos 	**Chapearon (ustedes)** 	**Chapearon (ellas/ellos)** 

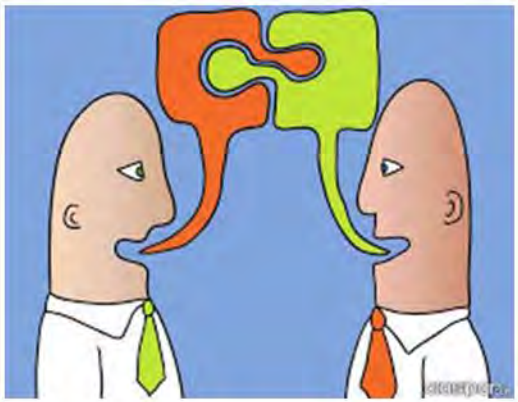
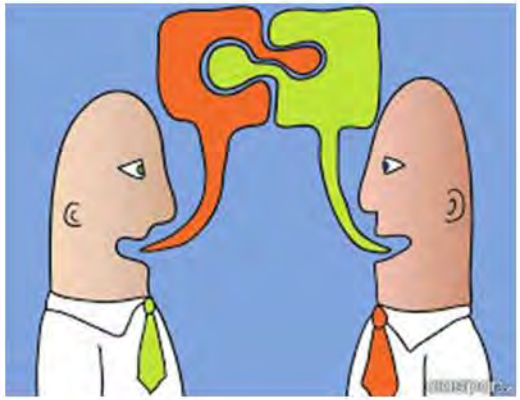
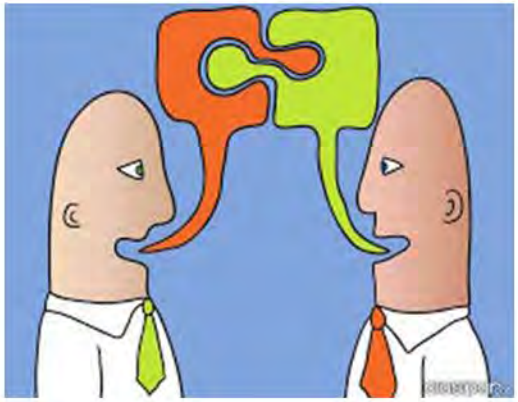
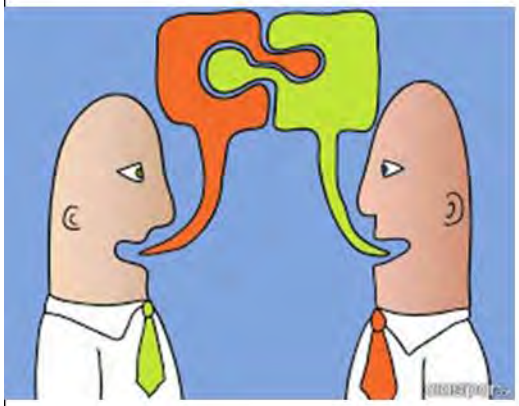
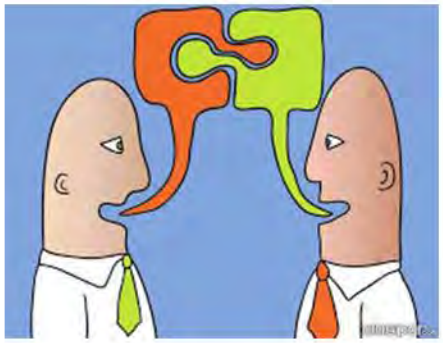
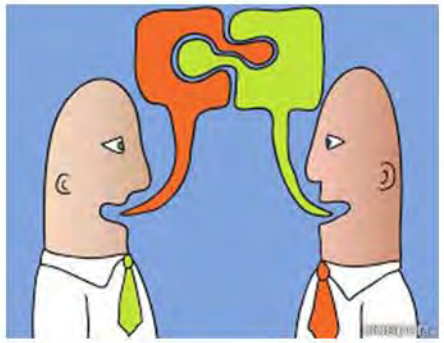
Barrí 	**Barriste** 	**Barrió** 
Barrimos 	**Barrieron (ustedes)** 	**Barrieron (ellas/ellos)** 

Canté 	**Cantaste** 	**Cantó** 
Cantamos 	**Cantaron (ustedes)** 	**Cantaron (ellas/ellos)** 

Lavar 	**Platicar** 	**Barrer** 
Estudiar 	**Chapear** 	**Cantar** 

P’o’najen 	P’o’najech 	P’o’najij 
P’o’najo’on 	P’o’naje’ex 	P’o’najo’ob 

Xooknajen 	**Xooknajech** 	**Xooknajij** 
Xooknajo'on 	**Xooknaje'ex** 	**Xooknajo'ob** 

Tsikbalnajen 	**Tsikbalnajech** 	**Tsikbalnajij** 
Tsikbalnajo’on 	**Tsikbalnaje’ex** 	**Tsikbalnajo’ob** 

Páaknajen 	**Páaknajech** 	**Páaknajij** 
Páaknajo'on 	**Páaknaje'ex** 	**Páaknajo'ob** 

Míisnajen 	**Míisnajech** 	**Míisnajij** 
Míisnajo’on 	**Míisnaje’ex** 	**Míisnajo’ob** 

K’aaynajen 	K’aaynajech 	K’aaynajij 
K’aaynajo’on 	K’aaynaje’ex 	K’aaynajo’ob 

PI package

Pronombres personales sufijados como objeto

A.

Juan: **Te** invito a comer hoy a mi casa

Pedro: Es una buena idea, hoy llega Rosaura, **le** pediré que me acompañe.

Juan: Claro, Alma preparará salbutes de relleno negro, le quedan muy sabrosos.

Pedro: Allí estaremos sin falta.

Juan: Ok. **los** esperamos a las 7:00pm.

Pedro: ¡Perfecto, **nos** vemos en la noche!

- ¿a quién invita Juan?
- ¿a quién pide Pedro que lo acompañe?
- ¿a quiénes esperan alas 7:00pm?
- ¿quiénes se verán a las 7: 00pm?

Las partes sombreadas en el diálogo son los que te permiten contestar las preguntas anteriores y se les llama pronombres personales objeto. Los pronombres personales objeto son aquellos que fungen como el objeto directo o indirecto dentro de una oración. Por ejemplo:

1. La besé
2. Lo abracé
3. Los mordí
4. Las pellizqué
5. Lo llevé

En las oraciones anteriores se distinguen en cada una un verbo transitivo y un objeto directo. Por ejemplo, en la oración 1, *besé* es el verbo transitivo y *La* es el objeto directo, que en este caso es un pronombre de objeto directo que se refiere

a *ella*. El objeto directo es el elemento de la oración donde recae directamente la acción del verbo. En las oraciones 2, 3 y 4 *Lo, Los y Las* son los pronombres objeto donde recae directamente la acción expresada en cada verbo.

A. Los pronombres personales como objeto funcionan solo con verbos transitivos y se localizan haciéndose las siguientes preguntas:

Objeto Directo: ¿qué + verbo? ¿A quién + verbo?

En la lengua maya yucateca, los pronombres que funcionan como objeto directo son los siguientes:

Maya	**Español**
-en	Me
-ech	Te
-ij/i'/ɵ	La/Lo
-o'on	Nos
-e'ex	Los/las
-o'ob	Los/Las

Ejemplos en maya y español

Maya	**Español**
Tu méek'ajen	Me abrazó
Ta chi'ajen	Me mordiste
Tu ts'u'uts'ajen	Me besó
Tu loochajen	Me abrazó (por el cuello al dormir)
Tu xe'ep'ajech	Te pellizcó
Tu bisajo'on	Nos llevó

B. En esta ocasión estudiaremos el uso de estos pronombres personales sufijados en su función como objeto directo con el tiempo pasado o aspecto T.

C. El sujeto de las oraciones con aspecto T son los pronombres dependientes. Éstos se anexan al aspecto como en los siguientes ejemplos:

1. T**in** méek'ajech. /Te abracé.
2. T**a** xe'ep'ajen. / Me pellizcaste.

Los pronombres independientes enfatizan al sujeto:

1. **Teene**' t**in** méek'ajech. /Te abracé.
2. **Teeche**' t**a** xe'ep'ajen. / Me pellizcaste.

D. Los **pronombres personales sufijados** como **objetos directos** se adhieren al final de cada verbo. Por ejemplo:

1. Teene' tin meek'aj**ech**. / Te abracé.
2. Teene' tin ts'u'uts'aj**ech. /** Te besé
3. Teene' tin bisaj**ech** uqroo jo'oljeak / Te llevé a la Uqroo ayer)
4. Ta meek'aj**en. /** Me abrazaste.

ASPECTOS A RECORDAR:

- En las oraciones con aspecto T, los pronombres personales sufijados funcionan como objeto, en ellos recae la acción del verbo.
  - Tin bisaj**ech**

- El orden de las oraciones son distintas al español. En español el pronombre de objeto en tiempo pasado simple va antes del verbo. En maya, el pronombre de objeto siempre va al final del verbo.

Me abrazaste --- el objeto directo **me** va antes del verbo

En maya el objeto directo va después del verbo

Ta meek'aj**en**--- -en (yo) es el objeto directo.

- Los pronombres personales sufijados en oraciones con aspecto T, siempre serán pronombres de objeto, no de sujeto. Las oraciones con aspecto -naj siempre tendrán pronombres personales sufijados como sujetos.

  Tin chi'aj**ech** ---- Te mordí

  Chi'ibal<u>naj</u>**ech**--- Mordiste---

  Lista de verbos en su forma transitiva en pasado simple

Ts'u'uts'aj	Besar
Bisaj	Llevar
Méek'aj	Abrazar
Chi'aj	Morder
Xe'ep'aj	Pellizcar
Lóochaj	Abrazar (en el cuello cuando esta dormido)

Ejercicios

Ejercicio 1. ¿Quién le hace la acción a quién? Escoge entre las opciones… Recuerda que el pronombre de objeto va al final de los verbos.

1. Teene' tin méek'aj**ech** jo'oljeak.

a) Yo a tí b) Tú a mí c) Yo a él/ella d)Él/ella a mí

2. Teeche' ta méek'ajen jo'oljeak.

a)Yo a tí b) Tú a mí c) Tú a él/ella d) Tú a nosotros

3. Teene' tin loochaj**ech** jo'oljeak.

a) Yo a tí b) Tú a mí c) Yo a él/ella d) Él/ella a mí

4. Ta lóochaj**en** jo'oljeak.

a) Yo a tí b) Tú a mí c) Tú a él/ella d)Él/ella a tí

5. Tin ts'u'uts'aj**ech** jo'oljeak.

a) Yo a ustedes b) Tú a mí c) Yo a él/ella d) Yo a tí

6. Tu ts'u'uts'aj jo'oljeak

a) Él/ella a mí b) Él/ ella a Él/ella c)Yo a tí d) Tú a mí

7. Tu xe'ep'aj**ech** ka'aujeak.

a) Yo a él/ella b) Él/ella a mí c)Yo a él/ella d) Ella/él a tí

8. Tin xe'ep'aj**ech** jo'oljeak.

a)Yo a él/ella b) Ella/él a mí c) Yo a ti d) Yo a ustedes

9. Tu bisaj**ech** uqroo.

a)Tú a mí b) Yo a ti c) Él a ti d) Tú a él

10. Ta bisaj**en** Uqroo.

a) Yo a tí b) Tú a mí c) Yo a él/ella d) Tú a él/ella

Ejercicio 2. Escucha las oraciones que leerá el instructor en voz alta y escoge la equivalencia en español.

1. a) Me llevaste a la escuela. b) Te llevé a la escuela. c) Nos llevó a la escuela. d) Te llevamos a la escuela.	4. a) La/lo abracé anoche (cuando dormía). b) Me abrazó anoche (cuando dormía). c) Te abracé anoche (cuando dormía). d) Me abrazaste anoche (cuando dormía).
2. a) Te besé hace rato. b) Te besó hace rato. c) Nos besó hace rato. d) Me besaste hace rato.	5. a) Me mordiste en le mejilla b) Te mordí en la mejilla c) Me mordió en la mejilla. d) Le mordí en la mejilla.
3. a) La/lo abracé ayer. b) Me abrazó ayer. c) Nos abrazó ayer. d) Me abrazaste ayer.	6. a) Lo/la pellizqué muy fuertemente. a) Te pellizque muy fuertemente. b) Me pellizcaste muy fuertemente. c) Lo pellizcaste muy fuertemente.

Hoja instructor

Ejercicio 2. Escucha las oraciones que leerá el instructor en voz alta y escoge la equivalencia en español.

1. Teene’ tin bisajech xook.
2. Teeche’ ta tsu’uts’ajen saamiajak.
3. Tin méek’aj jo’oljeak.
4. Tin loochaj o’onakaj.
5. Tu chi’ajen tin p’u’uk.
6. Ta xe’ep’aj jach yaj.

Ejercicio 3. Tu novio(a) te mandó un poema en maya. Observa el poema y contesta las preguntas.

Tin méek'ajeche' ka'
ta ts'u'uts'ajen.
Tin chi'ajeche' ka'
ta xe'ep'ajen.
Tin loochajeche' ka'
ta bisajen ichil a puksi'ik'al.

1. ¿Quién abrazó a quién?_____
2. ¿Quién besó a quién?_____
3. ¿Quién mordió a quién?_____
4. ¿Quién pellizcó a quién?_____
5. ¿Quién abrazó a quién mientras dormía? _____
6. ¿Quién llevó a quién en su corazón? _____

Ejercicio 4. Indica si la siguiente serie de oraciones son verdaderas o no en tu caso.

	Jaaj	Ma' jaaji'
1. Tu méek'ajen in chiich	☐	☐
2. Tu ts'u'uts'ajen in na'.	☐	☐
3. Tu bisajen xook in taata.	☐	☐
4. Tu xe'ep'ajen in wíits'in.	☐	☐
5. Tu loochajen in kiik.	☐	☐
6. Tu chi'ajen juntúul xuux.	☐	☐

Ejercicio 5. Escoge el equivalente en español de las oraciones en maya

1. Tin ts'u'uts'ajech.

a. Te besé.
b. Lo/la besé.
c. Me besó.
d. Me besaste.

2. Ta ts'u'uts'ajen

a. Me besó
b. Te besé
c. Me besaste.
d. Te besó.

3. Tu ts'u'uts'ajech

a. Te besé.
b. Me besaste.
c. Lo besé
d. Te besó.

4. Tu ts'u'uts'ajo'on.

a. Lo besé.
b. Nos besó.
c. Me besó.
d. Te besó.

5. Tin ts'u'uts'aj.

a. Lo besé.
b. Me besó.
c. Te besé.
d. Me besaste.

Ejercicio 6. Pretenderás que te dejaron al cuidado de uno de tus hermanitos. Debes escoger las oraciones que expresan **lo que te hizo** y ponerles número 1. También escogerás las oraciones que expresen lo que **tú le hiciste** y ponerles número 2.

a) Tin méek'aj	b) Tu chi'ajech.	c) Ta ts'u'uts'ajen
d) Tu xe'ep'ajen.	e) Tu chi'ajen.	f) Tu ts'u'uts'aj
g) Ta xe'ep'ajen.	h) Ta chi'ajen.	i) Tin ts'u'uts'aj
j) Tu méek'ajen.	k) Tu chi'aj.	l) Tu bisajen baaxal te' *parqueo'*
m) Tu méek'aje'ex.	n) Tu ts'u'uts'ajen.	o) Tin bisaj baaxal te' *parqueo'*

PI Package

Pronombres sufijados con función copulativa

A. Los pronombres personales sufijados cuentan con una función copulativa cuando van unidos a un sustantivo o un adjetivo calificativo. Es decir, el significado del sustantivo o adjetivo calificativo se le atribuye al pronombre personal sufijado. Por ejemplo:

Carlos (sustantivo)

Carlos+en (sustantivo + pronombre yo)

Carlosen (Yo soy Carlos)

Ka'anal (adjetivo calificativo=alto)

Ka'anal+ ech (adjetivo calificativo + pronombre tú)

Ka'analech (Tú eres alto)

B. Pronombres personales sufijados

Pronombres personales sufijados		**Ejemplo con función copulativa**
Primera persona singular	-en	Ka'anal**en =** Soy alto. Taatatsil**en =** Soy padre.
Segunda persona singular	-ech	Kaabal**ech =** Eres bajo. Na'tsil**ech** = Eres madre.
Tercera persona singular	Ø	Polok = Es gordo. Íits'intsil= Es hermano(a) menor.
Primera persona plural	-o'on	Chichan**o'on =** Somos pequeños. Suku'untsil**o'on =** Somos hermanos mayores.
Segunda persona plural	-e'ex	Bek'ech**e'ex =** Ustedes son delgados. Kiktsil**e'ex** = Ustedes son hermanas mayores.
Tercera persona plural	-o'ob	K'oja'an**o'ob** = Ellos están enfermos. Xoknáal**o'ob** = Ellos son estudiantes.

ASPECTOS A RECORDAR

- En oraciones con el aspecto T, los pronombres personales sufijados son pronombres objeto.
- En oraciones con el aspecto -naj, los pronombres personales sufijados son sujeto.
- Cuando se adhieren pronombres personales sufijados a sustantivos o adjetivos tienen función copulativa.
- En una oración pueden estar presentes pronombres personales independientes, dependientes y sufijados, pero cada uno cumple con una función diferente.

Teene' ka'anal**en**	Teene' = enfatiza el sujeto **-en= función copulativa.**
Teene' t**in** bisaj**ech** Uqroo.	Teene' = enfatiza el sujeto In=sujeto de la oración -**en = función de objeto directo**
Teene' p'o'naj**en** jo'oljeak	Teene'= enfatiza el sujeto -**en = sujeto de la oración**

Ejercicio 1. Escoge la traducción correcta.

1. Ka'anal**en** a) Somos altos. b) Yo soy alto. c) Eres alto. d) Es alto(a).	2. Polok**ech** a) Esta gordo. b) Estoy gordo. c) Estás gordo. d) Ustedes están gordos.
3. Kaabal**ech** a) Eres bajo. b) Ellos son bajos. c) Ustedes son bajos. d) Somos bajos.	4. Chichan a) Esta chico. b) Están chicos. c) Estamos chicos. d) Ellos están chicos.
5. K'oja'an a) Estoy enfermo. b) Estamos enfermos. c) Estas enfermo. d) Está enfermo(a).	

Ejercicio 2. Palomea las oraciones que mejor describan la imagen en cada caso.

1.

Le xi'ipalo':
A.

1. Ka'analen
2. Ka'analech.
3. Ka'anal
4. Ka'anao'on.
5. Ka'anale'ex.
6. Ka'analo'ob

Le xi'ipalo':
B.

1. Bek'echen.
2. Bek'echech.
3. Bek'ech.
4. Bek'echo'on
5. Bek'eche'ex.
6. Bek'echo'ob.

2.

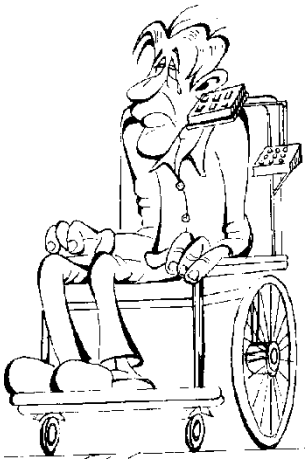
Le ko’olelo’:
A.

1. Kaabalen.
2. Kaabalech.
3. Kaabal.
4. Kaabalo’on.
5. Kaabale’ex.
6. Kaabalo’ob.

Le ko’olelo’:
B.

1. Poloken.
2. Polokech.
3. Polok.
4. Poloko’on
5. Poloke’ex
6. Poloko’ob.

3.



Le máako’:
A.

1. K’oja’anen.
2. K’oja’anech.
3. K’oja’an.
4. K’oja’ano’on.
5. K’oja’ae’ex.
6. K’oja’ano’ob.

Le máako’:
B.

1. Bek’echen.
2. Bek’echech.
3. Bek’ech.
4. Bek’echo’on.
5. Bek’eche’ex.
6. Bek’echo’ob.

Ejercicio 3. Observa la tabla. Cada columna contiene palabras que describe cómo son las personas. Subraya el pronombre personal sufijado que complete las oraciones correctamente de acuerdo con la información proporcionada

Teen	Teech	Leti'	To'on	Te'ex	Leti'ob
Ka'anal	Ka'anal	Polok	Kaabal	Bek'ech	Ka'anal
Polok	Bek'ech	K'oja'an	Chichan	Kaabal	Polok
Na'tsil	Taatatsil	Kiktsil	Íits'intsil	Xoknáal	Suku'untsil

1. Teen, teech, yéetel leti'obe' ka'anal**o'ob/o'on.**
2. Teen, leti' yéetel leti'obe' polok**o'ob/o'on.**
3. Teech yéetel te'exe' bek'ech**o'on/e'ex.**
4. Leti'e' k'oja'an**ech/Ɵ.**
5. To'one' chichan**e'ex/o'on**.
6. To'on yéetel te'exe' bek'ech**o'on/e'ex.**
7. Teene' na'tsil**ech/en.**
8. Teeche' taatatsil**en/ech.**
9. Leti'e' kiktsil**ech/Ɵ.**
10. To'one' íits'intsil**o'ob/o'on.**
11. Te'exe' xoknáal**e'ex/o'on.**
12. Leti'obe' suku'untsil**o'ob/e'ex.**

Ejercicio 4 . De los diálogos citados, escoge cuál es la forma del pronombre correspondiente

1.

Juan: Bix a k'aaba'?
XMaruch: Teene' XMaruch**en/ech**
Juan: Ba'ax meyajil ka beetik?
XMaruch: Teene' xka'ansaj**en/ech**. Kux teech?
Juan: Teene' xoknáal**ech/en**.

2.

XPilar: Jach polok**ech/e'ex** Manuel.
Manuel: Teeche' jach kaabal**en/ech.**
XPilar: Beey xan teech.
Manuel: Je'elo' jach kaabal**e'ex/o'on**, jajajaja.

3.

JSan: Bix a beel JNaas?
JNaas: Ma' jach ma'alobi'. K'oja'an**ech/en.**

Ejercicio 5. Escucha las descripciones en maya y subraya las que corresponden en español.

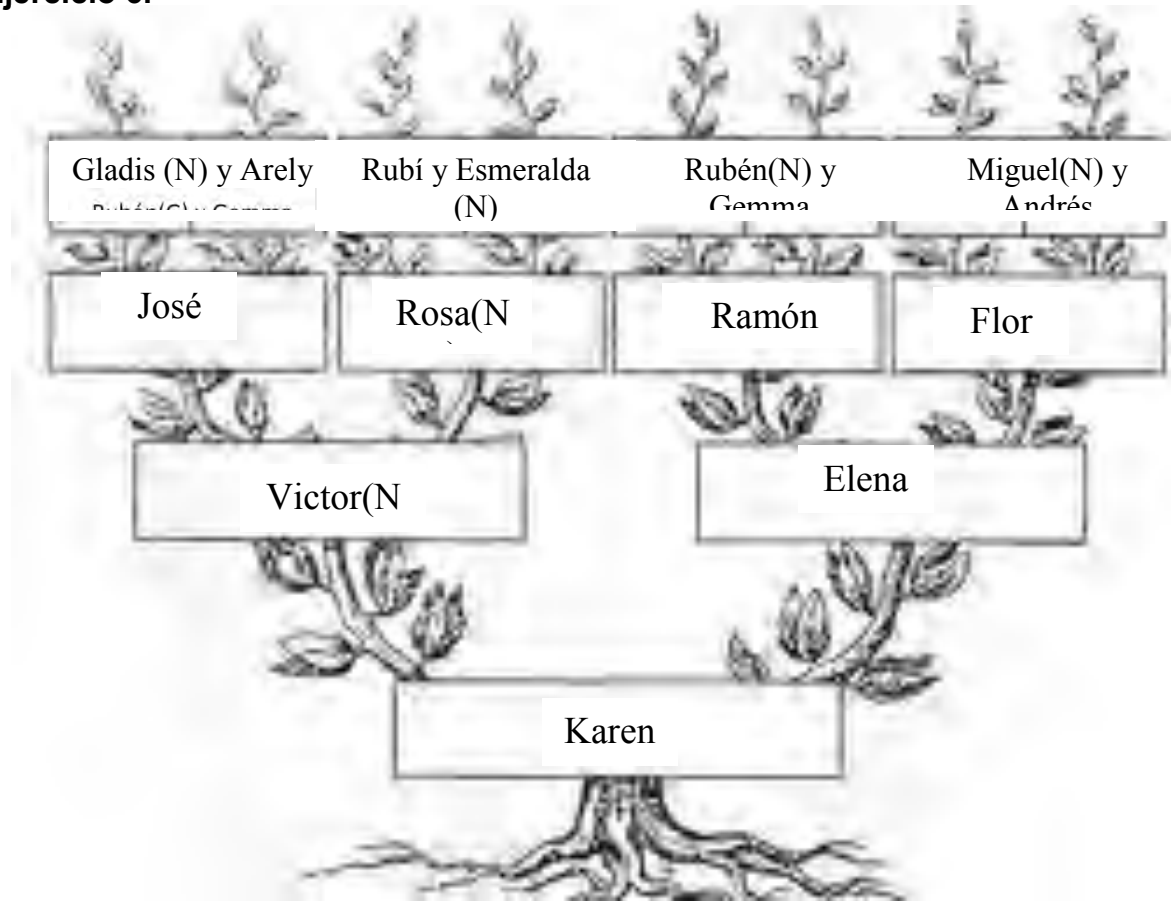
1. a) Yo soy alto y gordo. b) Tú eres alto y gordo. c) Él es ato y gordo. d) Nosotros somos altos y gordos.	5. a) Ellos son padres. b) Somos padres. c) Ustedes son padres d) Tú eres padres.
2. a) Soy padre. b) Él es padre. c) Somos padres. d) Eres padre.	6. a) Nosotros(as) somos hermanos(as) menores. b) Tú eres hermano(a) menor. c) Ellos(as) son hermanos(as) menores. d) Ustedes son hermanos(as) menores.
3. a) Somos estudiantes de la Uqroo. b) Ellos son estudiantes de la Uqroo. c) Ustedes son estudiantes de la Uqroo. d) Soy estudiante de la Uqroo.	7. a) Ellas son hermanas mayores. b) Ustedes son hermanas mayores. c) Nosotras somos hermanas mayores. d) d) Yo soy hermana mayor.
4. a) Soy gordo. b) Nosotros somos gordos. c) Ustedes son gordos. d) Ellos son gordos.	8. a) Yo estoy muy bajo. b) Nosotros estamos muy bajos. c) Ellos están muy bajos. d) Ustedes están muy bajos

Hoja instructor

Ejercicio 5. Escucha las descripciones en maya y subraya las que corresponden en español.

1. Ka’analen yéetel poloken.
2. Taatatsilech
3. Xoknáalo’ob Uqroo.
4. Poloke’ex.
5. Taatatsilo’on
6. Íits’intsile’ex
7. Kiktsilo’ob.
8. Jach táaj kaabalo’ob.

Ejercicio 6.



Éste es el árbol de la familia de Karen. En cada caso, donde se marca con una N (Nojoch), significa que esa es la persona más grande. Karen tuvo dos hijos: Victor y Elena. Victor es mayor que Elena. Él tuvo también dos hijos: José y Rosa. A su vez, José y Rosa tuvieron dos hijos cada uno. Elena, también tuvo dos hijos: Ramón y Flor, ellos también tuvieron dos hijos cada quien. De lo que se observa en este árbol genealógico, debes decir si las oraciones son falsas o verdaderas.

1. 

a)Jaaj

b) ma' jaaji'

Teene' Victoren.
Teene' suku'untsilen

Teene' na'tsilen

2.

a)Jaaj

b) ma’ jaaji’

Teene’ Rosaen. Tene’ íits’intsilen

3.

a) Jaaj

b) Ma’ jaaji

4.

Teene’ XGladisen. Teene’ kiktsilen

a)Jaaj

b)Ma’ jaaji’

Teene’ Ramonen. Teene’ taatatsilen.

5. 

a)Jaaj

b)Ma’ jaaji’.

Ejercicio 7. Contesta las preguntas de acuerdo a la información que se te proporciona

Teene’ x-Aracelien. Sabadoake’ tin xíimbaltaj in chiich yéetel in nool. In chiiche’ tu jan méek’ajen yéetel tu jan ts’u’uts’ajen ka’ tu yilajen. In chiich yéetel in noole’ ka’analtako’ob yéetel bek’echtako’ob.Teene’ ma’, teene’ poloken yéetel chan kaabalen. Leti’obe’ suuka’an u muuch’ u meyajo’ob. Jo’oljeake’ p’o’najo’ob yéetel míisnajo’ob muuch’.

1. Máax tu jan méek’aj le chan xchiicho’?

2. Máax tu jan ts’u’uts’aj le chan xchiicho’?

3. Máax kana’al yéetel bek’ech?

4. Máax p’o’naj yéetel míisnaj jo’oljeak?

5. Máax polok yéetel kaabal?

APPENDIX D
OI Package

Pronombres personales sufijados como sujeto en oraciones en pasado simple

Los pronombres personales son las palabras que pueden sustituir a los sustantivos dentro de una oración. En español los pronombres personales que se desempeñan como sujeto en una oración son las siguientes:

Yo	Tú
Usted	Él/ella
Nosotros/nosotras	Ustedes
Ellos/ellas	

Ejemplos de uso de los pronombres personales como sujeto

1. Susana es muy trabajadora.
    - Ella es muy trabajadora.
2. Carmen y Laura se pelearon.
    - Ellas se pelearon.

En la lengua maya tenemos tres tipos de pronombres personales que pueden desempeñarse como sujeto dentro de una oración. En la tabla de abajo se presentan las equivalencias:

Español	**Maya**		
Yo	-en	Teen	-in
Tu	-ech	Teech	-a
Usted	-ech	Teech	-a
El/ella	-i'/-ij/-	Leti'	-u …-ij
Nosotros/nosotras	-o'on	To'on	k…-o'on
Ustedes	-e'ex	Te'ex	-a …-e'ex
Ellos/ellas	-o'ob	Leti'ob	-u …-o'ob

La primera columna de pronombres son llamados pronombres personales sufijados. Los pronombres personales sufijados funcionan como sujetos con verbos intransitivos en pasado simple. Por ejemplo:

- P'o'najen/lavé
- Xooknajen/estudié
- Tsikbalnajen/platiqué
- Páaknajen/chapeé
- Míisnajen/barrí
- K'aaynajen/canté

En las oraciones en pasado simple también se utilizan los pronombres personales independientes para enfatizar al sujeto.

- Teene', xooknajen.
- Teeche' xooknajech.
- Leti'e' xooknajij.
- To'one' xooknajo'on.
- Te'exe' xooknaje'ex.
- Leti'obe' xooknajo'ob.

Ejemplo de uso de los pronombres sufijados con uno de los verbos:

Maya	Español
K'aaynajen	Canté
K'aaynajech	Cantaste
K'aaynajij	Cantó
K'aaynajo'on	Cantamos
K'aaynaje'ex	Ustedes cantaron
K'aaynajo'ob	Ellas (os) cantaron

Actividad 1. Conjuga los siguientes verbos con los distintos pronombres personales sufijados.

P'o'naj	Tsikbalnaj	Míisnaj
Teene'	Teene'	Teene'
Teeche'	Teeche'	Teeche'
Leti'e'	Leti'e'	Leti'e'
To'one'	To'one'	To'one'
Te'exe'	Te'exe'	Te'exe'
Leti'obe'	Leti'obe'	Leti'obe'

Actividad 2. Completa las siguientes oraciones con el pronombre personal sufijado correspondiente a las personas en paréntesis.

1. P'o'naj_____ jo'oljeak. (Luisa yéetel Pedro)
2. Uqroo xooknaj_____. (Miguel)
3. Tsikbalnaj _____ sabadoak. (Rosalba yéetel teen)
4. Míisnaj_____ jo'oljeak. (teech yéetel María)
5. K'aaynaj _____ viernesak . (teen)
6. Páaknaj_____ ka'aujeak. (teech)
7. Tsikbalnaj _____ yéetel in taata (teen)
8. Xooknaj _____(leti'ob)
9. P'o'naj_____ ka'aujeak (te'ex)
10. K'aaynaj_____ jo'oljeak (to'on)

Actividad 3. Contesta las siguientes preguntas utilizando el verbo que se te proporciona. Observa el ejemplo:

1. ¿P'o' najech jo'oljeak? (p'o'naj)

   Jaaj, p'o'najen

2. ¿Xooknaje'ex jo'oljeak? (xooknaj)

   Jaaj, _____

3. ¿Tsikbalnajo'ob jo'oljeak? (tsikbalnaj)
   Jaaj, _____

4. Jo'oljeake' míisnajij? (míisnaj)
   Jaaj, _____

Actividad 4. Completa el diálogo con los verbos que se te proporcionan

Maruch: Ba'ax ta meentaj jo'oljeak San?
San: Jo'oljeake' (páaknaj)_____. Kux teech?
Maruch: Teene' (p'o'naj) _____ yéetel (míisnaj)_____.
San: Tin wotoche', Gloria(míisnaj) _____.

Actividad 5: Pretenderás que este cuadro muestra las actividades que tú y tus hermanos hicieron la semana pasada. De acuerdo con la información, contesta las preguntas

Nombre	**Lunes**	**Martes**	**Miércoles**	**Jueves**	**Viernes**	**Sábado**
Teech_____	**P'o'naj**	**K'aaynaj**	**Tsikbalnaj**	**Páaknaj**	**Míisnaj**	
A kiik	**Míisnaj**	**K'aaynaj**	**Xooknaj**		**K'aaynaj**	**P'o'naj**
A suku'un	**Páaknaj**	**K'aaynaj**	**Tsikbalnaj**	**Míisnaj**	**K'aaynaj**	**P'o'naj**

1. Teene' _____sabadoak.
2. In kiike' _____viernesak yéetel martesak.
3. In suku'une' _____juevesak.
4. In kiik yéetel in suku'une' _____sabadoak.
5. Teen, in kiik, yéetel in suku'une' _____ martesak.

Actividad 6. Contesta las siguientes preguntas de acuerdo con la información de la tabla de la actividad 5.

1. Ba'ax ta meentaje'ex lunesak?
   Teene' _____
   In kiike' _____
   In suku'une' _____

2. Ba'ax tu meentaj a kiik yéetel a suku'un múuch' viernesak?

   Leti'obe'_____
3. Ba'ax ta meentaje'ex teech yéetel a suku'un miercolesak?
   To'one' _____

Actividad 7. Con la misma información de la tabla completa el siguiente párrafo:

In kiik, in suku'un yéetel teene' ya'ab ba'ax k meentik jun múuch'. Martesake' _____. Lunesake' in kiike' _____, in suku'une' _____ yéetel teene' _____. Miércolesake' teen yéetel in suku'une' _____. Juevesake' teene' _____, yéetel leti'e' _____. In kiik yéetel in suku'uno' viérnesake' _____ yéetel sabadoake' _____. Teene' viernesake' _____.

Actividad 8. Utiliza el pronombre personal sufijado correspondiente con la información proporcionada entre paréntesis para completar las preguntas. Posteriormente entrevistarás a tres compañeros utilizando esas preguntas para llenar el siguiente cuadro. Escribe **jaaj** o **ma'**

Nombre	P'o'naj	Xooknaj	Míisnaj	Tsikbalnaj	K'aaynaj	Páaknaj
	1____	2_____	3_____	4_____	5_____	6 _____
	1____	2_____	3_____	4_____	5_____	6 _____
	1____	2_____	3_____	4_____	5_____	6 _____

1. Po'naj(tú) _____ wáa sabadoak?

2. Xooknaj(tú y tu amigo)_____ teech yéetel a wet xook viernesak?

3. Míisnaj (tu mamá) _____ jo'oljeak?

4. Tsiknaj(tu hermana y tu hermano) _____ a suku'un yéetel a kiik jo'oljeak?

5. K'aaynaj (yo) _____ ka'ach ta wéetel jo'oljeak?

6. Páaknaj (nosotros) _____ ka'ach domingoak?

TI package

Pronombres sufijados como objeto

1. Juan: **Te** invito a comer hoy a mi casa
   Pedro: Es una buena idea, hoy llega Rosaura, **le** pediré que me acompañe.
   Juan: Claro, Alma preparará salbutes de relleno negro, le quedan muy sabrosos.
   Pedro: Allí estaremos sin falta.
   Juan: Ok. **los** esperamos a las 7:00pm.
   Pedro: ¡Perfecto, **nos** vemos en la noche!

- ¿a quién invita Juan?
- ¿a quién pide Pedro que lo acompañe?
- ¿a quiénes esperan alas 7:00pm?
- ¿quiénes se verán a las 7: 00pm?

Las partes sombreadas en el diálogo son los que te permiten contestar las preguntas anteriores y se les llama pronombres personales objeto. Los pronombres personales objeto son aquellos que fungen como el objeto directo o indirecto dentro de una oración. Por ejemplo:

6. La besé
7. Lo abracé
8. Los mordí
9. Las pellizqué
10. Lo llevé

En las oraciones anteriores se distinguen en cada una un verbo transitivo y un objeto directo. Por ejemplo, en la oración 1, *besé* es el verbo transitivo y *La* es el objeto directo, que en este caso es un pronombre de objeto directo que se refiere

a *ella*. El objeto directo es el elemento de la oración donde recae directamente la acción del verbo. En las oraciones 2, 3 y 4 *Lo, Los y Las* son los pronombres objeto donde recae directamente la acción expresada en cada verbo.

E. Los pronombres personales como objeto funcionan solo con verbos transitivos y se localizan haciéndose las siguientes preguntas:

Objeto Directo: ¿qué + verbo? ¿A quién + verbo?

En la lengua maya yucateca, los pronombres que funcionan como objeto directo son los siguientes:

Maya	**Español**
-en	Me
-ech	Te
-ij/i'/θ	La/Lo
-o'on	Nos
-e'ex	Los/las
-o'ob	Los/Las

Ejemplos en maya y español

Maya	**Español**
Tu méek'ajen	Me abrazó
Ta chi'ajen	Me mordiste
Tu ts'u'uts'ajen	Me besó
Tu loochajen	Me abrazó (por el cuello al dormir)
Tu xe'ep'ajech	Te pellizcó
Tu bisajo'on	Nos llevó

Estudiaremos cómo funcionan los pronombres personales sufijados como objeto con el aspecto T. Éste aspecto tiene como sujeto a los pronombres personales

dependientes y los pronombres personales independientes enfatizan el sujeto. Por ejemplo:

Teene t**in** chi'aj**ech**. / Yo te mordí

Teene' enfatiza

In= pronombre sujeto

-en= pronombre de objeto directo

Ejercicios:

Actividad 1. Imagina que a ti te hicieron lo que se indica en los verbos. Completa las oraciones aplicando el pronombre personal sufijado de objeto correspondiente

1. In wíits'ine' jo'oljeake' tu
   a) (xe'ep'aj)_____
   b) (méek'aj)_____
   c) (ts'u'uts'aj) _____
   d) (ch'aj) _____
2. Jo'oljeake' in suku'une' tu
   a) (bisaj) _____xook.
3. In chiiche' tu
   a) (loochaj) _____.

Actividad 2. Completa las siguientes oraciones con el pronombre personal sufijado correspondiente a los pronombres entre paréntesis.

1. Tin bisaj (teech)_____ xook jo'oljeak.
2. Ta chi'aj(teen) _____jo'oljeak.
3. Tu xe'ep'aj(te'ex) _____jo'oljeak.
4. Ta méek'aj(to'on) _____jo'oljeak.
5. Ta ts'u'uts'aj (teen) _____tin p'u'uk.
6. Ta loochaj(teen)_____ka'aujeak.
7. Ta bisaj (teen) _____tin wotoch jo'oljeak.
8. Tin méek'aj(teech) _____, tin loochaj(teech) _____xan.

Actividad 3. Completa el siguiente diálogo con la información que falta, en caso de que no necesite ningún complemento anota un 0

A

U na' X-Ingrid: Ba'ax úuchtech X-Ingrid?

X-Ingrid: Tu xe'ep'aj___ in wíits'in

U na' X-Ingrid: U'uyej! Pus ba'axten?

X-Ingrid: Tuméen tin chi'aj____

U na' X-Ingrid: ka'ayik túun!

B

Luis: Tu'ux taalech Nelsi?

Nelsi: Tin bisaj_____ in wíits'in xook.

C

Manuel: Máax yéetel weenech o'onajak?

Samuel: Yéetel in kiik

Manuel: Tu loochajecháa?

Samuel: jaaj, tu loochaj_____

D

Juan: Teech kanáantik túun a wíits'ino'ob beya'?

Rosa: Jaaj, teen.

Juan: Tin wilaj táan kan'aantiko'ob jo'oljeak

Rosa: Jaaj, jo'oljeake' in wíits'in Margarita tu xe'ep'aj_____ yéetel tu chi'aj_____.

Juan: kux túun teech, ba'ax ta meentajti'ob?

Rosa: Mixba'al, chen tin méek'aj_____.

Actividad 4. Completa el siguiente párrafo con los pronombres personales sufijados de objeto que hagan falta

In suku'une' Playa ku meyaj. Leti'e' k'uch o'onajak, Ka' u'ule' ka' tu jan méek'aj in na'. Béey xane' tu méek'aj_____ yéetel tu ts'u'uts'aj_____ ___ tuméen jach ts'o'ok u yúuchtal u yilo'on. Bey táantik u bo'ota'alo' tu bisaj_____maanal Saki'. Beey xane' tu bisaj_____ janal panuchos yéetel salbutes. Ka' ts'o'oke' ka' tu bisaj_____ cha'an cinepolis.

Actividad 5. Completa el siguiente poema con los pronombres sufijados de objeto que hagan coherente los versos.

Tin méek'aj_____e' ka'
Ta ts'u'uts'aj_____.

Tin chi'aj_____' ka'
Ta xe'ep'aj_____.

Tin loochaj_____e' ka'
Ta bisaj_____ ichil a puksi'ik'al.

TI package

Pronombres sufijados con función copulativa

Los pronombres personales sufijados cuentan con una función copulativa cuando van unidos a un sustantivo o un adjetivo calificativo. Es decir, el significado del sustantivo o adjetivo calificativo se le atribuye al pronombre personal sufijado. Por ejemplo:

Carlos (sustantivo)
Carlos+en (sustantivo + pronombre yo)
Carlosen (Yo soy Carlos)
Ka'anal (adjetivo calificativo=alto)
Ka'anal+ ech (adjetivo calificativo + pronombre tú)
Ka'analech (Tú eres alto)

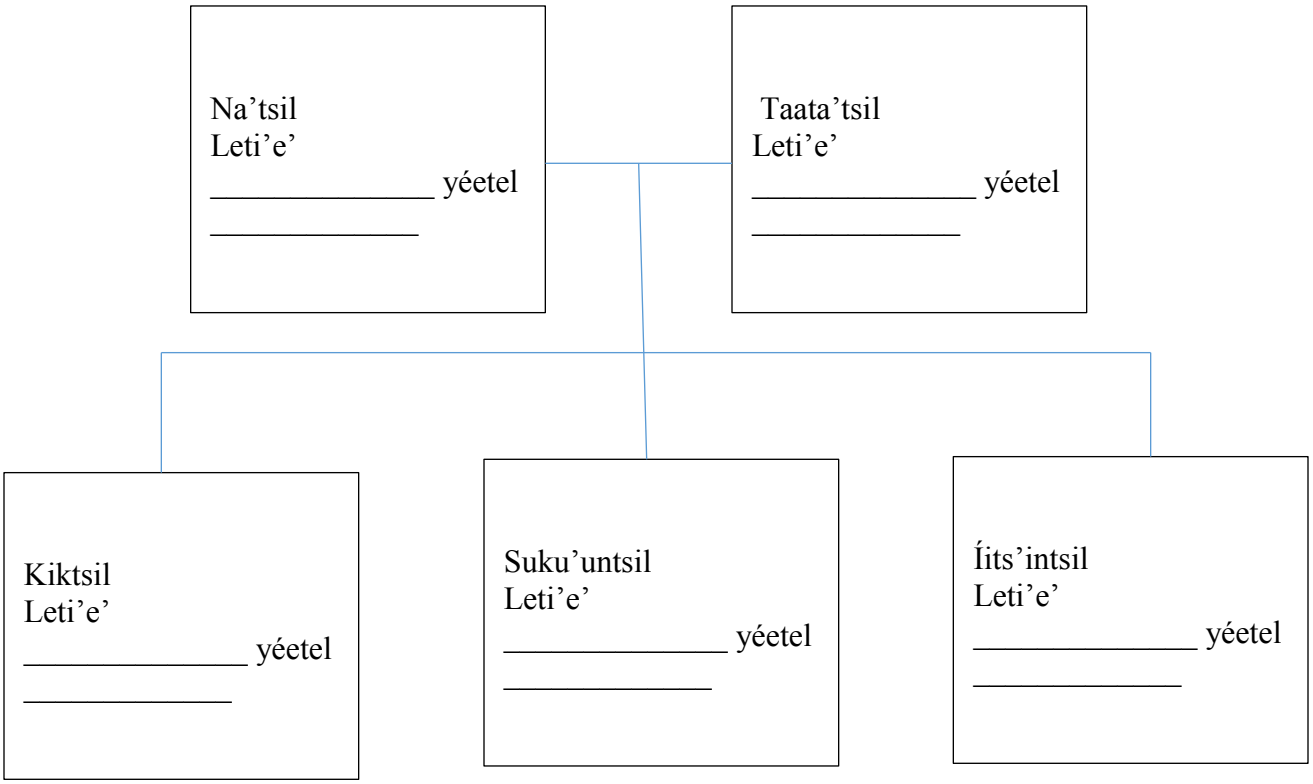
Pronombres personales sufijados

Pronombres personales sufijados		**Ejemplo con función copulativa**
Primera persona singular	-en	Ka'anal**en =** Soy alto. Taatatsil**en =** Soy padre.
Segunda persona singular	-ech	Kaabal**ech =** Eres bajo. Na'tsil**ech** = Eres madre.
Tercera persona singular	Ø	Polok = Es gordo. Íits'intsil= Es hermano(a) menor.
Primera persona plural	-o'on	Chichan**o'on =** Somos pequeños. Suku'untsil**o'on =** Somos hermanos mayores.
Segunda persona plural	-e'ex	Bek'ech**e'ex =** Ustedes son delgados. Kiktsil**e'ex** = Ustedes son hermanas mayores.
Tercera persona plural	-o'ob	K'oja'an**o'ob** = Ellos están enfermos. Xoknáal**o'ob** = Ellos son estudiantes.

Ejercicios:

Actividad 1.

Cinco de tus compañeros pretenderán formar una familia. Escucha la información que proporcionan y llena el siguiente árbol genealógico. Asimismo, **incluye los adjetivos** que describe a cada uno de los integrantes de la familia.



Cuadro que llenarán cinco de los alumnos que pretenderán formar una familia.

Teene' x_____en. Teene' na'tsilen, In wíichame' j_____, teene' kaabalen yéetel bek'echen.
Teene' j_____en. Teene' taatatsilen. In watane' x _____. Leti'e' kaabal yéetel bek'ech, teene' ka'analen yéetel poloken.
Teene' x_____en. Teene' kiktsilen. In wíitsino'obe' x_____ yéetel j_____. Teene' bek'echen yéetel kaabalen, chan chichanen.
Teene' j_____. Teene' suku'untsilen yéetel íits'intsilen xan. In kiike'x_____. In wíits'ine' x_____. Teene' poloken yéetel ka'analen.
Teene' x_____en. Teene' íits'intsilen. Teene' in kiike' x_____, in suku'une' j_____, in taatae'_____, in na'e' _____. Teene' ka'analen yéetel bek'echen.

Actividad 2. Contesta las siguientes preguntas

1. Máax íits'intsilo'ob?_____
2. Máax kaabaltako'ob?_____
3. Máax ka'analtako'ob? _____
4. Máax poloktako'ob? _____
5. Máax chan chichan? _____

Actividad 3. Completa las siguientes oraciones con tu propia información.

1. Teene' _____en.
2. In taatae' _____. Teen yéetel in taatae' _____o'on.
3. In taatae' _____, in na'e' _____. In taata yéetel in na'e' _____.
4. Teene' _____en yéetel _____en.

Actividad 4. Conjuga los siguientes adjetivos con los diferentes pronombres personales.

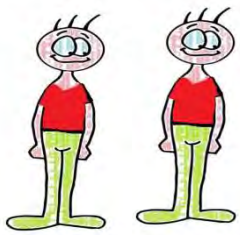
Kaabal	Ka'anal	Xoknaal
Teene'	Teene'	Teene'
Teeche'	Teeche'	Teeche'
Leti'e'	Leti'e'	Leti'e'
To'one'	To'one'	To'one'
Te'exe'	Te'exe'	Te'exe'
Leti'obe'	Leti'obe'	Leti'obe'

Actividad 5. Completa los pequeños diálogos con la información faltante

1.
-Bix yanikech Juanito?
-ma' jach ma'alobi'. k'oja'an____. Yaanten se'en.
2.
-Bix a k'aaba'
-XBrenda____. Kux teech?
-Teene' ka'ansaj_____.

Actividad 6. Escribe una oración utilizando dos adjetivos en cada caso.

1.

	_____ _____

2.

	_____ _____

3.

	_____ _____

APPENDIX E. **Tests A, B and C for suffix personal pronouns as subjects**

TEST A
Pronombres personales sufijados como sujeto en oraciones en pasado simple

NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Verbos intransitivos en pasado	P'o'naj	Lavar
	Xooknaj	Estudiar
	Tsikbalnaj	Platicar
	Páaknaj	Chapear
	Míisnaj	Barrer
	K'aaynaj	Cantar

NOTA: Los verbos en maya se encuentran en pasado, en español se encuentran en infinitivo.

Actividad 1. Observa las oraciones en maya y escoge la oración equivalente en español.

1. Jo'oljeake' míisnajech.

a) Ayer barriste.
b) Ayer barrí.
c) Ayer barrimos.
d) Ayer barrió.

2. Jo'oljeake' k'aaynajen.

a) Ayer cantaron.
b) Ayer cantamos.
c) Ayer cantó.
d) Ayer canté.

3. Jo'oljeake' páaknaje'ex.

a) Ayer chapeé.
b) Ayer chapeaste.
c) Ayer chapeamos.
d) Ayer ustedes chapearon.

4. Jo'oljeake' tsikbalnajo'on.

a) Ayer platicamos.
b) Ayer platicaron.
c) Ayer platicaste.
d) Ayer platiqué.

5. Jo'oljeake' xooknajij.

a) Ayer estudié.
b) Ayer estudiamos.
c) Ayer estudió.
d) Ayer estudiaste.

6. Jo'oljeake' p'o'najo'ob.

a) Ayer lavé.
b) Ayer ustedes lavaron.
c) Ayer ellos lavaron
d) Ayer lavaste

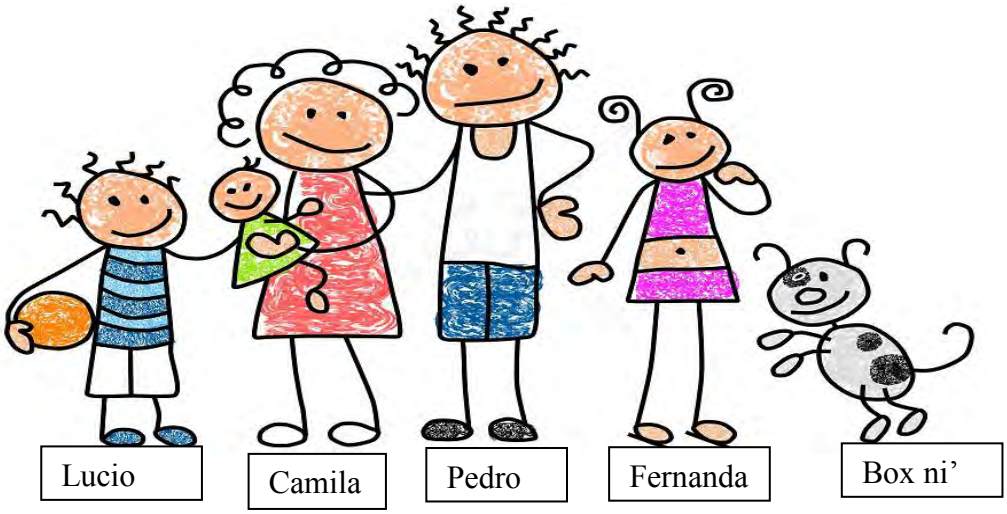
Actividad 2. Carmen está contando lo que hizo el fin de semana. Subraya el pronombre personal sufijado -que está en negritas- que complete de manera correcta las oraciones en la narración de Carmen.

Teene’ ya’ab ba’ax tin meentaj.
Yáaxe’ p’onaj**ech/en**.
Luis yéetel Susanae’ tsikbalnaj**ij/o’ob** tin wéetel xan.
Ka’ ts’o’oke’ in chiich yéetel teene’ míisnaj**o’on/e’ex** xan.
Tu ts’o’oke’ jan k’aaynaj**ech/en**.

Actividad 3. Haz una oración en maya en donde utilices el pronombre como sujeto del verbo proporcionado en cada caso**.**

1. Teech/p'o'naj
   _____
2. Leti'ob/xooknaj
   _____
3. Te'ex/míisnaj
   _____
4. Teen/k'aaynaj
   _____
5. To'on/ tsikbalnaj
   _____

Actividad 4. Escoge uno de los personajes del dibujo para que seas tú. Escribe tu selección en la línea de abajo del dibujo. Escribe 6 oraciones diferentes utilizando los pronombres y los verbos que se te proporcionan describiendo actividades pasadas.



Teene'_____en.

Teen **To'on** **Leti'** **Leti'ob** **P'o'naj** **Míisnaj** **K'aaynaj** **Xooknaj** **Páaknaj** **Tsikbalnaj**	_____ _____ _____ _____ _____ _____ _____

Test B
Pronombres personales sufijados como sujeto en oraciones en pasado simple

NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Verbos intransitivos en pasado	P'o'naj	Lavar
	Xooknaj	Estudiar
	Tsikbalnaj	Platicar
	Páaknaj	Chapear
	Míisnaj	Barrer
	K'aaynaj	Cantar

NOTA: Los verbos en maya se encuentran en pasado, en español se encuentran en infinitivo.

Actividad 1. Carmen está contando lo que hizo el fin de semana. Subraya el pronombre personal sufijado –que está en negritas- que complete de manera correcta las oraciones en la narración de Carmen.

Teene' ya'ab ba'ax tin meentaj.
Yáaxe' p'onaj**ech/en**.
Luis yéetel Susanae' tsikbalnaj**ij/o'ob** tin wéetel xan.
Ka' ts'o'oke' in chiich yéetel teene' míisnaj**o'on/e'ex** xan.
Tu ts'o'oke' jan k'aaynaj**ech/en**.

Actividad 2. Observa las oraciones en maya y escoge la oración equivalente en español.

5. Jo'oljeake' míisnajech.

e) Ayer barriste.
f) Ayer barrí.
g) Ayer barrimos.
h) Ayer barrió.

6. Jo'oljeake' k'aaynajen.

e) Ayer cantaron.
f) Ayer cantamos.
g) Ayer cantó.
h) Ayer canté.

7. Jo'oljeake' páaknaje'ex.

e) Ayer chapeé.
f) Ayer chapeaste.
g) Ayer chapeamos.
h) Ayer ustedes chapearon.

8. Jo'oljeake' tsikbalnajo'on.

e) Ayer platicamos.
f) Ayer platicaron.
g) Ayer platicaste.
h) Ayer platiqué.

5. Jo'oljeake' xooknajij.

e) Ayer estudié.
f) Ayer estudiamos.
g) Ayer estudió.
h) Ayer estudiaste.

6. Jo'oljeake' p'o'najo'ob.

e) Ayer lavé.
f) Ayer ustedes lavaron.
g) Ayer ellos lavaron
h) Ayer lavaste

Actividad 3. Haz una oración en maya en donde utilices el pronombre como sujeto del verbo proporcionado en cada caso**.**

6. Teech/p'o'naj

   _____

7. Leti'ob/xooknaj

   _____

8. Te'ex/míisnaj

   _____

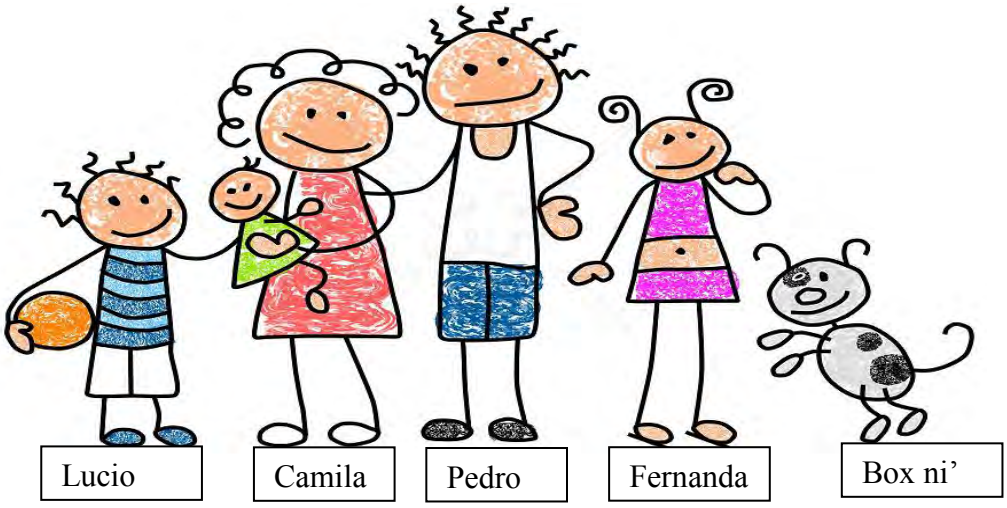
9. Teen/k'aaynaj

   _____

10. To'on/ tsikbalnaj

    _____

Actividad 4. Escoge uno de los personajes del dibujo para que seas tú. Escribe tu selección en la línea de abajo del dibujo. Escribe 6 oraciones diferentes utilizando los pronombres y los verbos que se te proporcionan describiendo actividades pasadas.



Teene'_____en.

Teen **To'on** **Leti'** **Leti'ob** **P'o'naj** **Míisnaj** **K'aaynaj** **Xooknaj** **Páaknaj** **Tsikbalnaj**	_____ _____ _____ _____ _____ _____ _____

TEST C
Pronombres personales sufijados como sujeto en oraciones en pasado simple
NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Verbos intransitivos en pasado	P'o'naj	Lavar
	Xooknaj	Estudiar
	Tsikbalnaj	Platicar
	Páaknaj	Chapear
	Míisnaj	Barrer
	K'aaynaj	Cantar

NOTA: Los verbos en maya se encuentran en pasado, en español se encuentran en infinitivo.

Actividad 1. Haz una oración en maya en donde utilices el pronombre como sujeto del verbo proporcionado en cada caso**.**

11. Teech/p'o'naj

_____

12. Leti'ob/xooknaj

_____

13. Te'ex/míisnaj

_____

14. Teen/k'aaynaj

_____

15. To'on/ tsikbalnaj

_____

Actividad 2. Carmen está contando lo que hizo el fin de semana. Subraya el pronombre personal sufijado que complete de manera correcta las oraciones en la narración de Carmen.

Teene' ya'ab ba'ax tin meentaj.
Yáaxe' p'onaj**ech/en**.
Luis yéetel Susanae' tsikbalnaj**ij/o'ob** tin wéetel xan.
Ka' ts'o'oke' in chiich yéetel teene' míisnaj**o'on/e'ex** xan.
Tu ts'o'oke' jan k'aaynaj**ech/en**.

Actividad 3. Observa las oraciones en maya y escoge la oración equivalente en español.

9. Jo'oljeake' míisnajech.

i) Ayer barriste.
j) Ayer barrí.
k) Ayer barrimos.
l) Ayer barrió.

10. Jo'oljeake' k'aaynajen.

i) Ayer cantaron.
j) Ayer cantamos.
k) Ayer cantó.
l) Ayer canté.

11. Jo'oljeake' páaknaje'ex.

i) Ayer chapeé.
j) Ayer chapeaste.
k) Ayer chapeamos.
l) Ayer ustedes chapearon.

12. Jo'oljeake' tsikbalnajo'on.

i) Ayer platicamos.
j) Ayer platicaron.
k) Ayer platicaste.
l) Ayer platiqué.

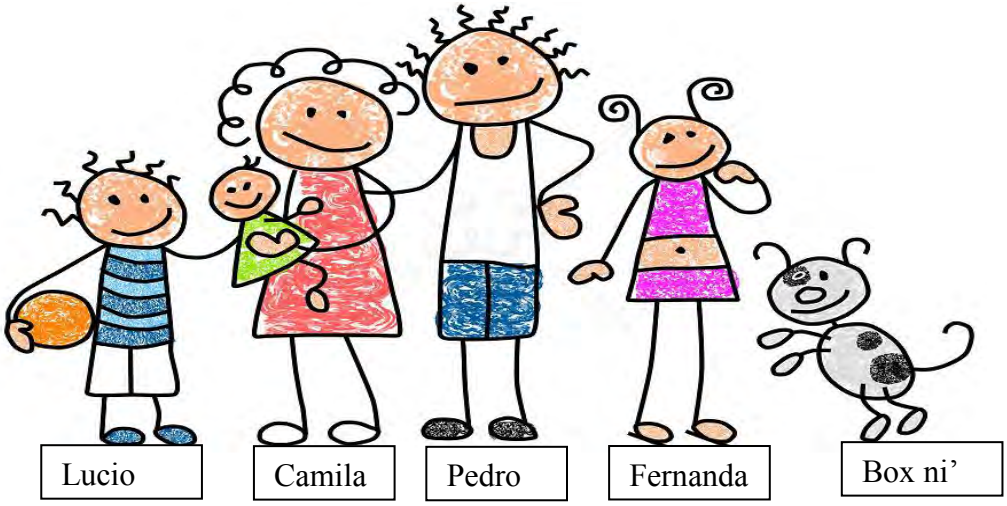
5. Jo'oljeake' xooknajij.

i) Ayer estudié.
j) Ayer estudiamos.
k) Ayer estudió.
l) Ayer estudiaste.

6. Jo'oljeake' p'o'najo'ob.

i) Ayer lavé.
j) Ayer ustedes lavaron.
k) Ayer ellos lavaron
l) Ayer lavaste

Actividad 4. Escoge uno de los personajes del dibujo para que seas tú. Escribe tu selección en la línea de abajo del dibujo. Escribe 6 oraciones diferentes utilizando los pronombres y los verbos que se te proporcionan describiendo actividades pasadas.



Teene'_____en.

Teen **To'on** **Leti'** **Leti'ob**	_____ _____ _____
P'o'naj **Míisnaj** **K'aaynaj** **Xooknaj** **Páaknaj** **Tsikbalnaj**	_____ _____ _____ _____ _____

APPENDIX F. Tests A, B, and C for suffix personal pronouns as objects

TEST A
Pronombres personales sufijados como objeto

NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Verbos transitivos en pasado	Bisaj	Llevar
	Lóochaj	Abrazar(en el cuello cuando se está dormido)
	Méek'aj	Abrazar
	Chi'aj	Morder
	Ts'u'uts'aj	Besar
	Xe'ep'aj	Pellizcar

NOTA: Los verbos en maya se encuentran en pasado, en español se encuentran en infinitivo.

Actividad 1. ¿Quién le hace la acción a quién?. Escoge entre las opciones.

9. Ta méek'ajen jo'oljeak

b) Yo a tí b) Tú a mí c) Yo a él/ella d)Él/ella a mí

10. Tu ts'u'uts'ajech

a)Yo a tí b) Tú a mí c) Tú a él/ella d) Él/ella a tí

11. Tin bisaj

a) Yo a tí b) Tú a mí c) Yo a él/ella d) Él/ella a mí

Actividad 2. Escoge la equivalencia de las oraciones en maya al español.

1. Tu méek'ajene' ka' tu ts'u'uts'ajen.
   a) Te abrazó y te besó.
   b) Me abrazó y me besó.
   c) Te abracé y te besé.
   d) Me abrazaste y me besaste.

2. Tin xe'ep'aje' ka' tu chi'ajech.
   a) Te pellizqué y me mordiste.
   b) Me pellizcó y lo mordí.
   c) Lo pellizqué y te mordió.
   d) Me pellizcaste y te mordí.

3. Ta bisajen ta wotoche' ka' ta lóochajen.
   a) Me llevaste a tu casa y me abrazaste para dormir.
   b) Te llevé a mi casa y te abracé para dormir.
   c) La llevé a mi casa y la abracé para dormir.
   d) Te llevó a su casa y te abrazó para dormir.

Actividad 3. Completa las siguientes oraciones con el pronombre personal sufijado correcto. En caso de que no lleve, escribe un 0 en la línea.

1. Tin bisaj(tú)_____ xook jo'oljeak.
2. Tu méek'aj(yo) _____ in taata.
3. Ta loochaj(él)_____ o'onajak.

Actividad 4. Escribe el equivalente en maya de las siguientes oraciones. Se te proporciona el verbo.

1. Te besé
   (tsu'uts'aj) _____
2. Lo abracé
   (méek'aj) _____
3. Me pellizcaste
   (xe'ep'aj) _____

Actividad 5. El fin de semana cuidaste a tus hermanitos. Ellos se llaman Pedro y Pablo. Escribe una pequeña descripción de lo que hicieron utilizando las palabras en la columna de la izquierda. Escribe 3 oraciones donde menciones:

1. **Las maldades que Pedro le hizo a Pablo,**
2. **Lo que ellos te hicieron a ti**
3. **Lo que tú les hiciste a ellos.**

Xe'ep'aj Chi'aj Méek'aj Ts'u'uts'aj	_____ _____ _____

TEST B
Pronombres personales sufijados como objeto

NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Verbos transitivos en pasado	Bisaj	Llevar
	Lóochaj	Abrazar(en el cuello cuando se está dormido)
	Méek'aj	Abrazar
	Chi'aj	Morder
	Ts'u'uts'aj	Besar
	Xe'ep'aj	Pellizcar

NOTA: Los verbos en maya se encuentran en pasado, en español se encuentran en infinitivo.

Actividad 1. Completa las siguientes oraciones con el pronombre personal sufijado correcto. En caso de que no lleve, escribe un 0 en la línea.

1. Tin bisaj(tú)_____ xook jo'oljeak.
2. Tu méek'aj(yo) _____ in taata.
3. Ta loochaj(él)_____ o'onajak.

Actividad 2. Escoge la equivalencia de las oraciones en maya al español.

1. Tu méek'ajene' ka' tu ts'u'uts'ajen.
   e) Te abrazó y te besó.
   f) Me abrazó y me besó.
   g) Te abracé y te besé.
   h) Me abrazaste y me besaste.

2. Tin xe'ep'aje' ka' tu chi'ajech.
   e) Te pellizqué y me mordiste.
   f) Me pellizcó y lo mordí.
   g) Lo pellizqué y te mordió.
   h) Me pellizcaste y te mordí.

3. Ta bisajen ta wotoche' ka' ta lóochajen.
   e) Me llevaste a tu casa y me abrazaste para dormir.
   f) Te llevé a mi casa y te abracé para dormir.
   g) La llevé a mi casa y la abracé para dormir.
   h) Te llevó a su casa y te abrazó para dormir.

Actividad 3. Escribe el equivalente en maya de las siguientes oraciones. Se te proporciona el verbo.

1. Te besé
   (tsu'uts'aj) _____
2. Lo abracé
   (méek'aj) _____
3. Me pellizcaste
   (xe'ep'aj) _____

Actividad 4. ¿Quién le hace la acción a quién?. Escoge entre las opciones.

1. Ta méek'ajen jo'oljeak

c) Yo a tí b) Tú a mí c) Yo a él/ella d)Él/ella a mí

2. Tu ts'u'uts'ajech

a)Yo a tí b) Tú a mí c) Tú a él/ella d) Él/ella a tí

3. Tin bisaj

a) Yo a tí b) Tú a mí c) Yo a él/ella d) Él/ella a mí

Actividad 5. El fin de semana cuidaste a tus hermanitos. Ellos se llaman Pedro y Pablo. Escribe una pequeña descripción de lo que hicieron utilizando las palabras en la columna de la izquierda. Escribe 3 oraciones donde menciones:

1. **Las maldades que Pedro le hizo a Pablo,**
2. **Lo que ellos te hicieron a ti**
3. **Lo que tú les hiciste a ellos.**

Xe'ep'aj Chi'aj Méek'aj Ts'u'uts'aj	_____ _____ _____

TEST C
Pronombres personales sufijados como objeto

NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Verbos transitivos en pasado	Bisaj	Llevar
	Lóochaj	Abrazar(en el cuello cuando se está dormido)
	Méek'aj	Abrazar
	Chi'aj	Morder
	Ts'u'uts'aj	Besar
	Xe'ep'aj	Pellizcar

NOTA: Los verbos en maya se encuentran en pasado, en español se encuentran en infinitivo.

Actividad 1. Escoge la equivalencia de las oraciones en maya al español.

1. Tu méek'ajene' ka' tu ts'u'uts'ajen.
    i) Te abrazó y te besó.
    j) Me abrazó y me besó.
    k) Te abracé y te besé.
    l) Me abrazaste y me besaste.

2. Tin xe'ep'aje' ka' tu chi'ajech.
    i) Te pellizqué y me mordiste.
    j) Me pellizcó y lo mordí.
    k) Lo pellizqué y te mordió.
    l) Me pellizcaste y te mordí.

3. Ta bisajen ta wotoche' ka' ta lóochajen.
    i) Me llevaste a tu casa y me abrazaste para dormir.
    j) Te llevé a mi casa y te abracé para dormir.
    k) La llevé a mi casa y la abracé para dormir.
    l) Te llevó a su casa y te abrazó para dormir.

Actividad 2. Escribe el equivalente en maya de las siguientes oraciones. Se te proporciona el verbo.

1. Te besé
(tsu'uts'aj) _____
2. Lo abracé
(méek'aj) _____
3. Me pellizcaste
(xe'ep'aj) _____

Actividad 3. ¿Quién le hace la acción a quién?. Escoge entre las opciones

1. Ta méek'ajen jo'oljeak

   d) Yo a tí b) Tú a mí c) Yo a él/ella d)Él/ella a mí

2. Tu ts'u'uts'ajech

   a)Yo a tí b) Tú a mí c) Tú a él/ella d) Él/ella a tí

3. Tin bisaj

   a) Yo a tí b) Tú a mí c) Yo a él/ella d) Él/ella a mí

Actividad 4. Completa las siguientes oraciones con el pronombre personal sufijado correcto. En caso de que no lleve, escribe un 0 en la línea.

1. Tin bisaj(tú)_____ xook jo'oljeak.
2. Tu méek'aj(yo) _____ in taata.
3. Ta loochaj(él)_____ o'onajak.

Actividad 5. El fin de semana cuidaste a tus hermanitos. Ellos se llaman Pedro y Pablo. Escribe una pequeña descripción de lo que hicieron utilizando las palabras en la columna de la izquierda. Escribe 3 oraciones donde menciones:

1. Las maldades que Pedro le hizo a Pablo,

2. Lo que ellos te hicieron a ti

3. Lo que tú les hiciste a ellos.

Xe'ep'aj Chi'aj Méek'aj Ts'u'uts'aj	_____ _____ _____

APPENDIX G. Tests A, B, and C for suffix personal pronouns as copulatives

TEST A

Pronombres personales sufijados con función copulativa

NOMBRE:_____
FECHA:_____

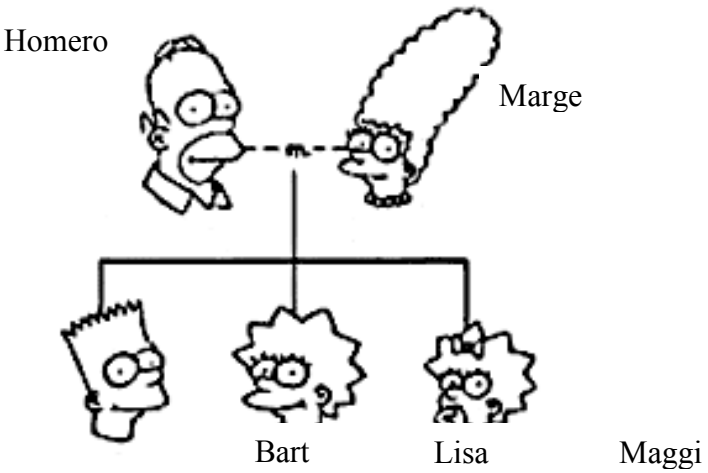
Lista de vocabulario

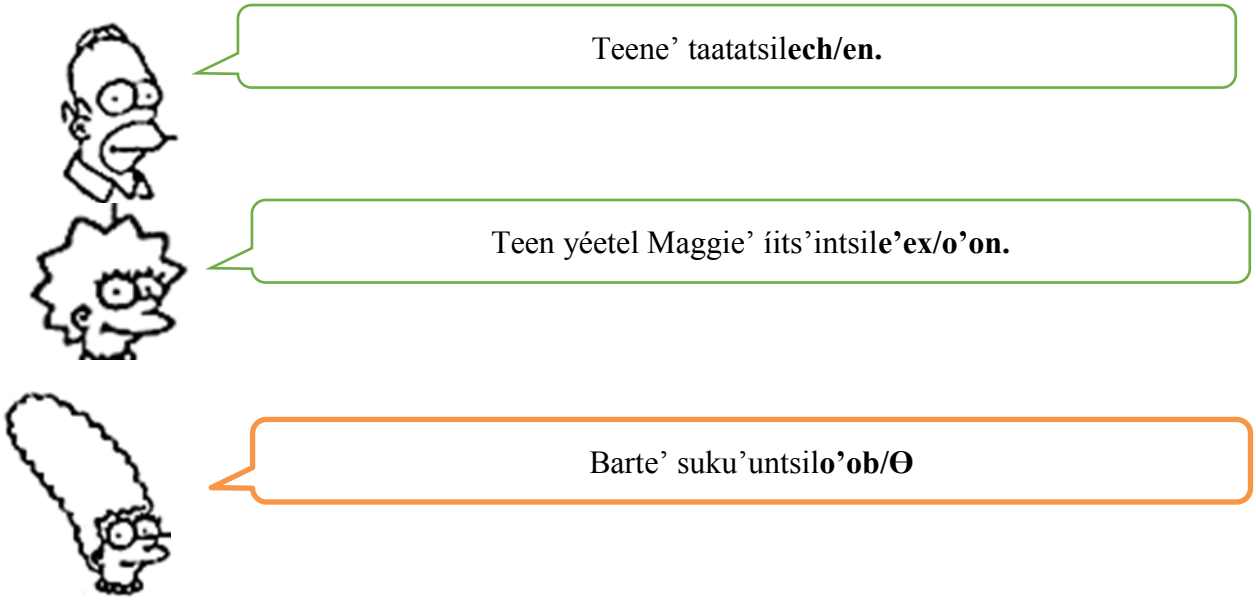
	Maya	Español
Sustantivos	Na'tsil	Madre
	Taatatsil	Padre
	Kiktsil	Hermana mayor
	Suku'untsil	Hermano mayor
	Íits'intsil	Hermano(a) menor
	Xoknáal	Estudiante
Adjetivos calificativos	Ka'anal	Alto
	Kaabal	Bajo
	Polok	Gordo
	Bek'ech	Delgado
	K'oja'an	Enfermo
	Chichan	Pequeño.

Actividad 1. Relaciona las oraciones de la columna A con las oraciones de la columna B. Sobran dos reactivos en la columna B

Columna A	**Columna B**
Poloken ( )	1. Soy gordo
Poloke'ex ( )	2. Eres gordo
Polokech ( )	3. Es gordo(a)
Poloko'ob ( )	4. Somos gordos
	5. Ustedes son gordos
	6. Ellos(as) son gordos(as)

Actividad 2. Observa cómo está compuesta la familia y subraya el pronombre personal sufijado que complete correctamente cada una de las oraciones.

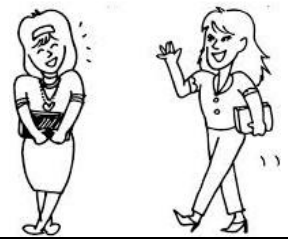




Actividad 3. Completa los diálogos. En caso de no ser necesario incluir nada, escribir un 0.

1.
-Bix a k'aaba?
-Teene' Santiago_____
2.
-Ba'ax meyajil ku meentik a kiik?
-Leti'e' xoknáal_____
3.
-Bix yanike'ex?
-Ma' ma'alobi' k'oja'an_____
4.
-Teene' kiktsil___. Kux teech?
-Teene' suku'untsil _____

Actividad 4. Describe los dibujos. Utiliza los adjetivos y pronombres que se te proporcionan.

	**To'on/kaabal/bek'ech** _____ _____
	**Te'ex /polok/ ka'anal.** _____ _____

TEST B

PRONOMBBRES SUFIJADOS CON FUNCIÓN COPULATIVA

NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Sustantivos	Na'tsil	Madre
	Taatatsil	Padre
	Kiktsil	Hermana mayor
	Suku'untsil	Hermano mayor
	Íits'intsil	Hermano(a) menor
	Xoknáal	Estudiante
Adjetivos calificativos	Ka'anal	Alto
	Kaabal	Bajo
	Polok	Gordo
	Bek'ech	Delgado
	K'oja'an	Enfermo
	Chichan	Pequeño.

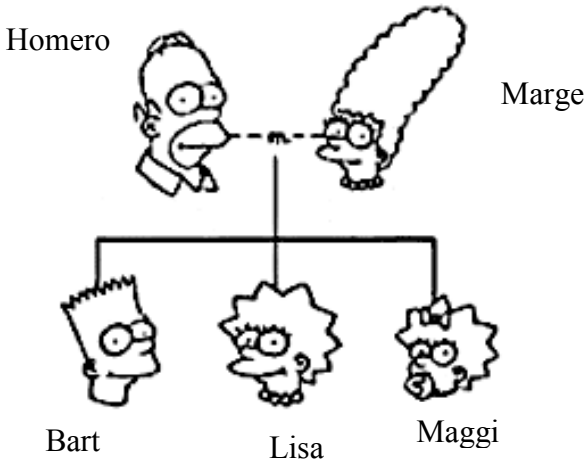
Actividad 1. Completa los diálogos. En caso de no ser necesario incluir nada, escribir un 0.

1.
-Bix a k'aaba?
-Teene' Santiago_____
2.
-Ba'ax meyajil ku meentik a kiik?
-Leti'e' xoknáal_____
3.
-Bix yanike'ex?
-Ma' ma'alobi' k'oja'an_____
4.
-Teene' kiktsil___. Kux teech?
-Teene' suku'untsil _____

Actividad 2. Relaciona las oraciones de la columna A con las oraciones de la columna B. Sobran dos reactivos en la columna B

Columna A	**Columna B**
Poloken ( )	1. Soy gordo
Poloke'ex ( )	2. Eres gordo
Polokech ( )	3. Es gordo(a)
Poloko'ob ( )	4. Somos gordos
	5. Ustedes son gordos
	6. Ellos(as) son gordos(as)

Actividad 3. Observa cómo está compuesta la familia y subraya el pronombre personal sufijado que complete correctamente cada una de las oraciones.



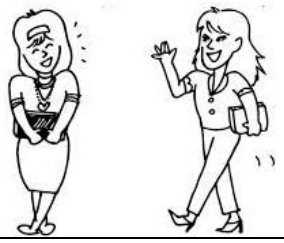
}

Teene' taatatsil**ech/en.**

Teen yéetel Maggie' íits'intsil**e'ex/o'on.**

Barte' suku'untsil**o'ob/Ɵ**

Actividad 4. Describe los dibujos. Utiliza los adjetivos y pronombres que se te proporcionan.

	**To’on/kaabal/bek’ech** _____ _____
	**Te’ex /polok/ ka’anal.** _____ _____

TEST C

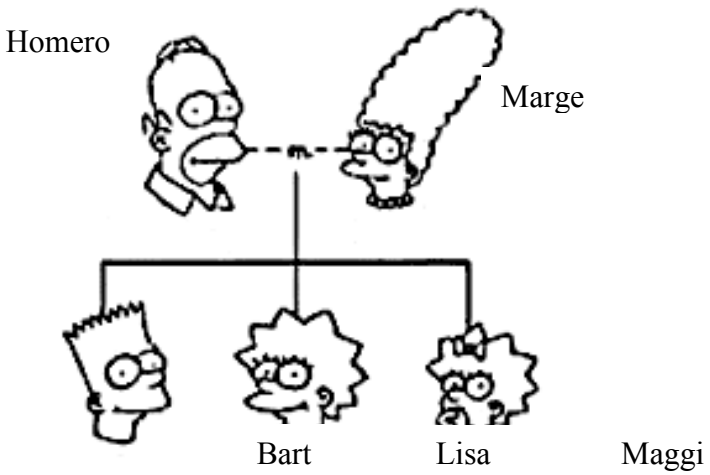
PRONOMBRES SUFIIJADOS CON FUNCIÓN COPULATIVA

NOMBRE:_____
FECHA:_____

Lista de vocabulario

	Maya	Español
Sustantivos	Na'tsil	Madre
	Taatatsil	Padre
	Kiktsil	Hermana mayor
	Suku'untsil	Hermano mayor
	Íits'intsil	Hermano(a) menor
	Xoknáal	Estudiante
Adjetivos calificativos	Ka'anal	Alto
	Kaabal	Bajo
	Polok	Gordo
	Bek'ech	Delgado
	K'oja'an	Enfermo
	Chichan	Pequeño.

Actividad 1. Observa cómo está compuesta la familia y subraya el pronombre personal sufijado que complete correctamente cada una de las oraciones.



Teene' taatatsil**ech/en.**

Teen yéetel Maggie' íits'intsil**e'ex/o'on.**

Barte' suku'untsil**o'ob/Ɵ**

Actividad 2. Completa los diálogos. En caso de no ser necesario incluir nada, escribir un 0.

1.
-Bix a k'aaba?
-Teene' Santiago_____
2.
-Ba'ax meyajil ku meentik a kiik?
-Leti'e' xoknáal_____
3.
-Bix yanike'ex?
-Ma' ma'alobi' k'oja'an_____
4.
-Teene' kiktsil___. Kux teech?
-Teene' suku'untsil _____

Actividad 3. Relaciona las oraciones de la columna A con las oraciones de la columna B. Sobran dos reactivos en la columna B

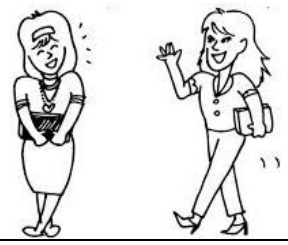
Columna A

Poloken ( )
Poloke'ex ( )
Polokech ( )
Poloko'ob ( )

Columna B

1. Soy gordo
2. Eres gordo
3. Es gordo(a)
4. Somos gordos
5. Ustedes son gordos
6. Ellos(as) son gordos(as)

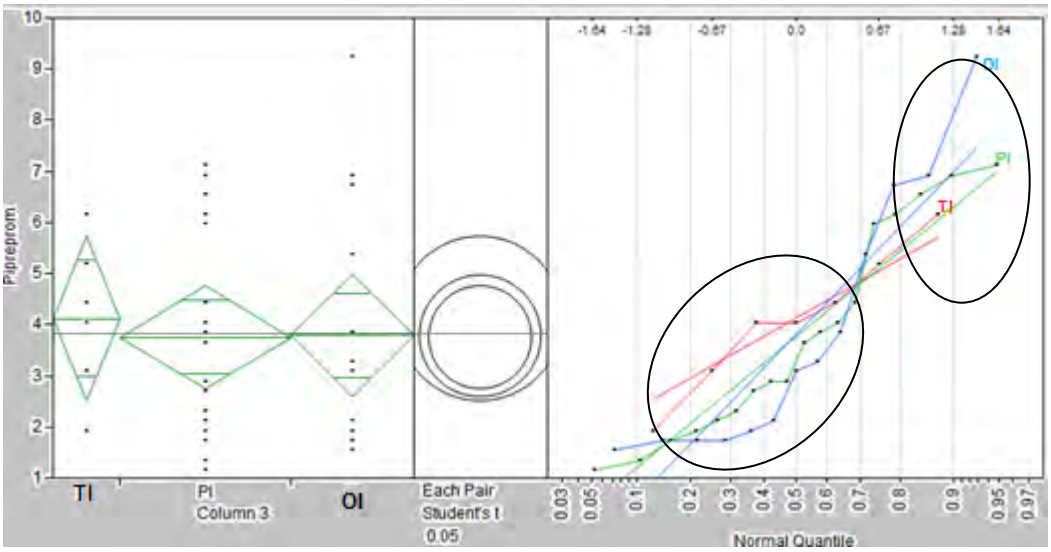
Actividad 4. Describe los dibujos. Utiliza los adjetivos y pronombres que se te proporcionan.

	**To'on/kaabal/bek'ech** _____ _____
	**Te'ex /polok/ ka'anal.** _____ _____

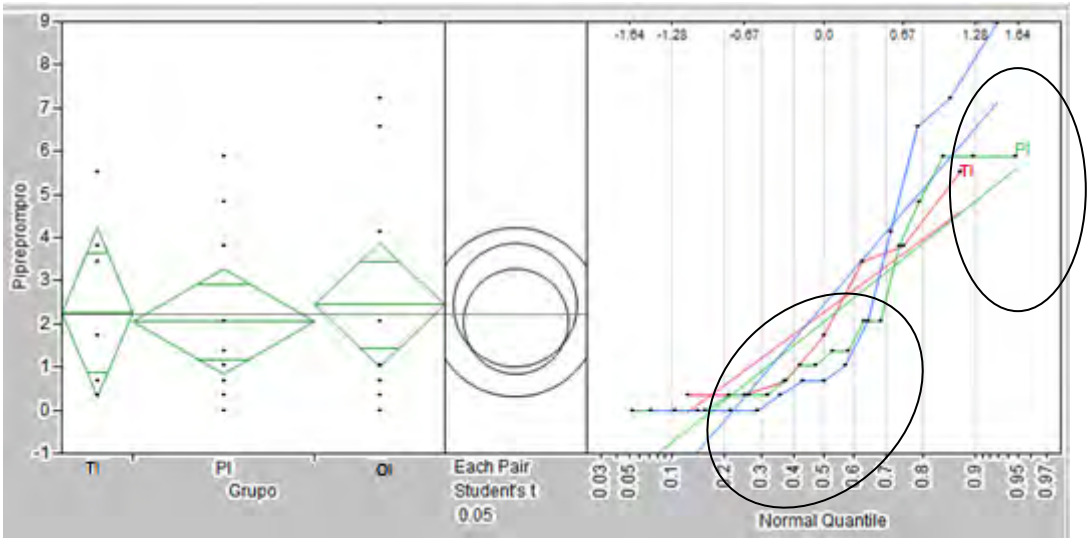
APPENDIX H Between-groups statistical descriptions

Normality

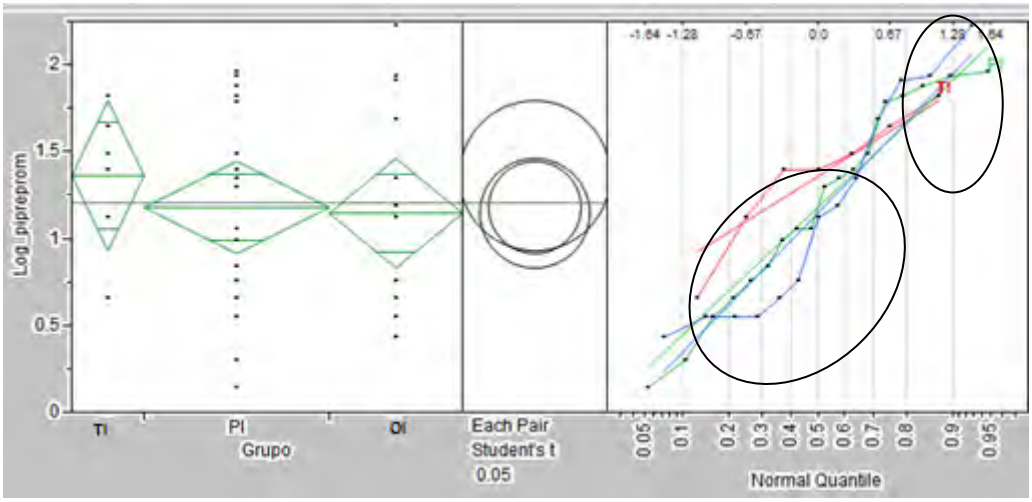
Transformation of data for normal distribution



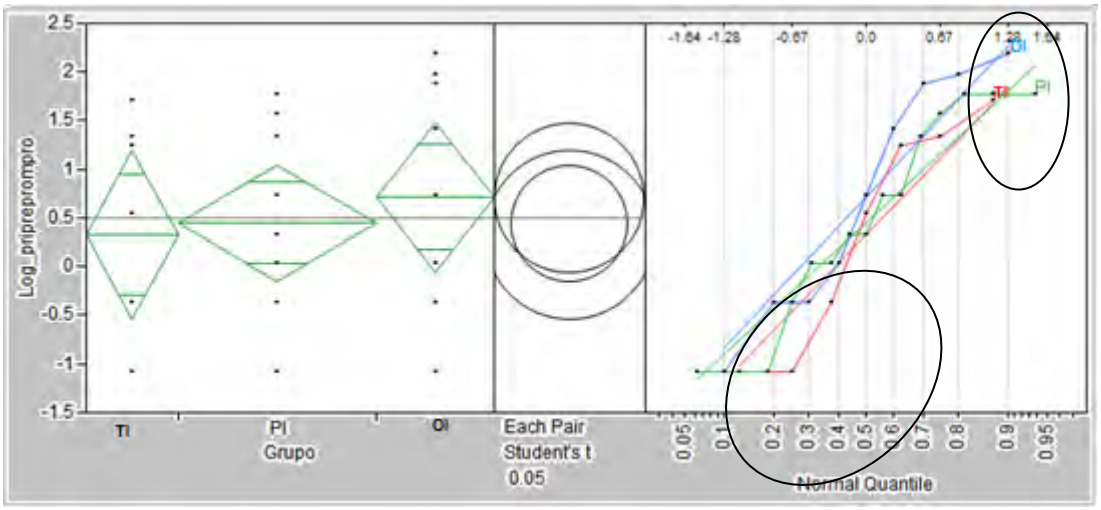
Oneway Analysis of the general average scores obtained in the pre-test in the PI, OI, and TI groups. The values do not meet the normality assumption.



Oneway analysis of the average scores obtained in production tasks in the pre-test. The values do not meet the normality assumption.



Oneway analysis where the natural logarithms of the general values obtained in the pre-test were used to transform the data and meet the normality assumption.

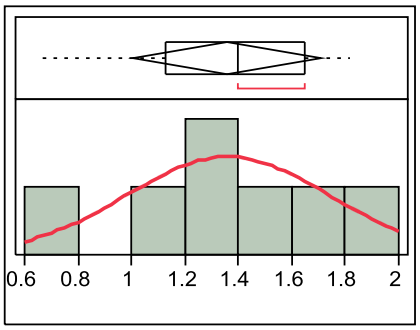


Oneway analysis where the natural logarithms of the values obtained in production in the pre-test were used to transform the data and meet the normality assumption.

APPENDIX I Distributions

Distributions in the general average in the pre-test

TI Group
Log_tipreprom



Normal(1.35987,0.37973)

Quantiles

100.0%	maximum	1.8165
99.5%		1.8165
97.5%		1.8165
90.0%		1.8165
75.0%	quartile	1.6467
50.0%	median	1.3962
25.0%	quartile	1.1249
10.0%		0.6523
2.5%		0.6523
0.5%		0.6523
0.0%	minimum	0.6523

Moments

Mean	1.3598671
Std Dev	0.379729
Std Err Mean	0.1435241
Upper 95% Mean	1.7110579
Lower 95% Mean	1.0086763
N	7

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	1.3598671	1.0086763	1.7110579
Dispersion	σ	0.379729	0.2446949	0.8361885

-2log(Likelihood) = 5.30897715988527

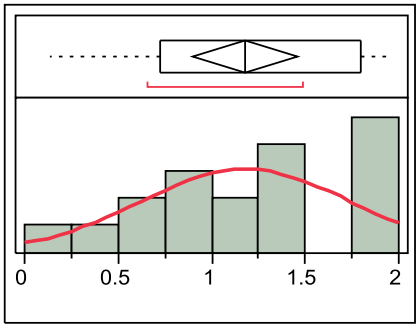
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.928305	0.5366

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI group
Log_pipreprom



Normal(1.17978,0.57002)

Quantiles

100.0%	maximum	1.9629
99.5%		1.9629
97.5%		1.9629
90.0%		1.9373
75.0%	quartile	1.7929
50.0%	median	1.1763
25.0%	quartile	0.7266
10.0%		0.2841
2.5%		0.1398
0.5%		0.1398
0.0%	minimum	0.1398

Moments

Mean	1.1797815
Std Dev	0.570016
Std Err Mean	0.1343541
Upper 95% Mean	1.4632437
Lower 95% Mean	0.8963192
N	18

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	1.1797815	0.8963192	1.4632437
Dispersion	σ	0.570016	0.4277329	0.854536

-2log(Likelihood) = 29.8465151785652

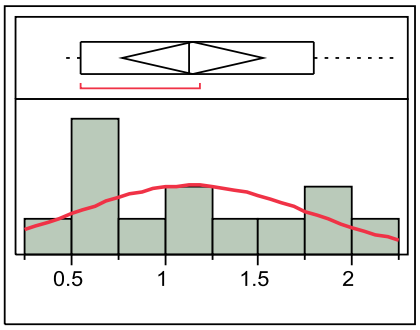
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.950908	0.4394

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI group
Log_oipreprom



Normal(1.14491,0.62393)

Quantiles

100.0%	maximum	2.2225
99.5%		2.2225
97.5%		2.2225
90.0%		2.1072
75.0%	quartile	1.7946
50.0%	median	1.1249
25.0%	quartile	0.5481
10.0%		0.4783
2.5%		0.4318
0.5%		0.4318
0.0%	minimum	0.4318

Moments

Mean	1.1449092
Std Dev	0.6239347
Std Err Mean	0.1730483
Upper 95% Mean	1.5219491
Lower 95% Mean	0.7678692
N	13

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	1.1449092	0.7678692	1.5219491
Dispersion	σ	0.6239347	0.4474148	1.0299509

-2log(Likelihood) = 23.6279519193857

Goodness-of-Fit Test

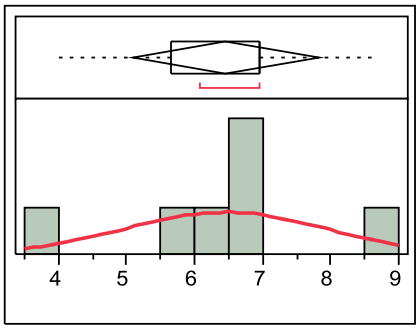
Shapiro-Wilk W Test

W	Prob<W
0.892331	0.1050

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the obtained scores in interpretation tasks in the pre-test

TI Group
tiprepromin



Normal(6.46143,1.47553)

Quantiles

100.0%	maximum	8.7000
99.5%		8.7000
97.5%		8.7000
90.0%		8.7000
75.0%	quartile	6.9600
50.0%	median	6.9600
25.0%	quartile	5.6500
10.0%		3.9100
2.5%		3.9100
0.5%		3.9100
0.0%	minimum	3.9100

Moments

Mean	6.4614286
Std Dev	1.4755273
Std Err Mean	0.5576969
Upper 95% Mean	7.8260638
Lower 95% Mean	5.0967934
N	7

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	6.4614286	5.0967934	7.8260638
Dispersion	σ	1.4755273	0.9508201	3.2492088

-2log(Likelihood) = 24.3113557569055

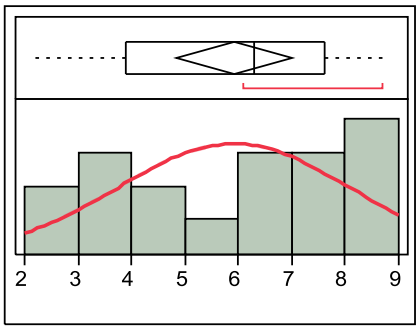
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.940125	0.6398

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI group
Piprepromin



Normal(5.91722,2.1588)

Quantiles

100.0%	maximum	8.7000
99.5%		8.7000
97.5%		8.7000
90.0%		8.7000
75.0%	quartile	7.6075
50.0%	median	6.3050
25.0%	quartile	3.9100
10.0%		2.1700
2.5%		2.1700
0.5%		2.1700
0.0%	minimum	2.1700

Moments

Mean	5.9172222
Std Dev	2.1587954
Std Err Mean	0.508833
Upper 95% Mean	6.9907659
Lower 95% Mean	4.8436785
N	18

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	5.9172222	4.8436785	6.9907659
Dispersion	σ	2.1587954	1.6199333	3.2363452

-2log(Likelihood) = 77.7856014245177

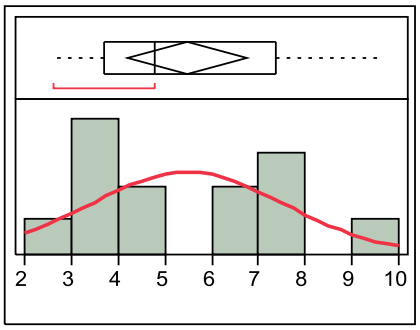
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.927928	0.1785

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI group
oiprepromin



Normal(5.48538,2.10492)

Quantiles

100.0%	maximum	9.5700
99.5%		9.5700
97.5%		9.5700
90.0%		8.6980
75.0%	quartile	7.3900
50.0%	median	4.7800
25.0%	quartile	3.6950
10.0%		2.9580
2.5%		2.6100
0.5%		2.6100
0.0%	minimum	2.6100

Moments

Mean	5.4853846
Std Dev	2.1049173
Std Err Mean	0.583799
Upper 95% Mean	6.7573734
Lower 95% Mean	4.2133958
N	13

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	5.4853846	4.2133958	6.7573734
Dispersion	σ	2.1049173	1.5094067	3.474661

-2log(Likelihood) = 55.243582760291

Goodness-of-Fit Test

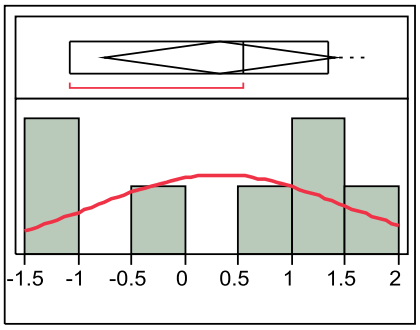
Shapiro-Wilk W Test

W	Prob<W
0.920590	0.2555

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the obtained scores in production tasks in the pre-test

TI group
Log_tipreprompro



Normal(0.32754,1.1716)

Quantiles

100.0%	maximum	1.708
99.5%		1.708
97.5%		1.708
90.0%		1.708
75.0%	quartile	1.332
50.0%	median	0.542
25.0%	quartile	-1.079
10.0%		-1.079
2.5%		-1.079
0.5%		-1.079
0.0%	minimum	-1.079

Moments

Mean	0.3275371
Std Dev	1.1715962
Std Err Mean	0.4428217
Upper 95% Mean	1.4110828
Lower 95% Mean	-0.756009
N	7

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	0.3275371	-0.756009	1.4110828
Dispersion	σ	1.1715962	0.7549689	2.5799322

-2log(Likelihood) = 21.0822785238032

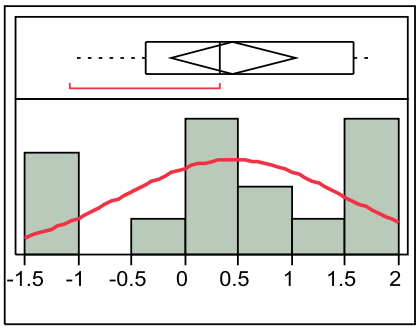
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.881546	0.2334

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI group
Log_pipreprompro



Normal(0.45084,1.05162)

Quantiles

100.0%	maximum	1.768
99.5%		1.768
97.5%		1.768
90.0%		1.768
75.0%	quartile	1.575
50.0%	median	0.322
25.0%	quartile	-0.371
10.0%		-1.079
2.5%		-1.079
0.5%		-1.079
0.0%	minimum	-1.079

Moments

Mean	0.4508367
Std Dev	1.0516195
Std Err Mean	0.271527
Upper 95% Mean	1.0332042
Lower 95% Mean	-0.131531
N	15

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	0.4508367	-0.131531	1.0332042
Dispersion	σ	1.0516195	0.7699186	1.6585081

-2log(Likelihood) = 43.0780965218494

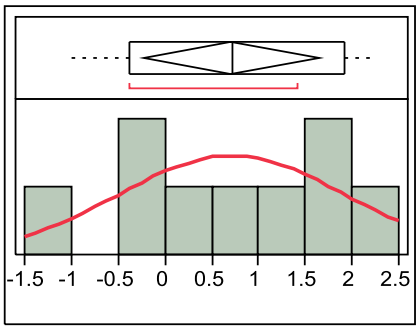
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.902595	0.1043

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI group
Log_oipreprompro



Normal(0.7122,1.20867)

Quantiles

100.0%	maximum	2.194
99.5%		2.194
97.5%		2.194
90.0%		2.194
75.0%	quartile	1.930
50.0%	median	0.728
25.0%	quartile	-0.371
10.0%		-1.079
2.5%		-1.079
0.5%		-1.079
0.0%	minimum	-1.079

Moments

Mean	0.7122042
Std Dev	1.2086715
Std Err Mean	0.4028905
Upper 95% Mean	1.6412714
Lower 95% Mean	-0.216863
N	9

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	0.7122042	-0.216863	1.6412714
Dispersion	σ	1.2086715	0.8164056	2.3155376

-2log(Likelihood) = 27.9522857673605

Goodness-of-Fit Test

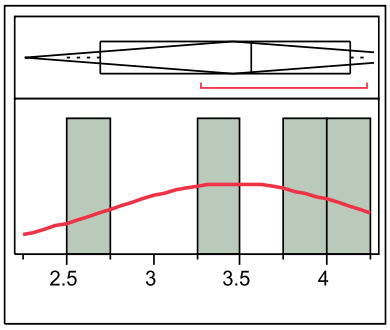
Shapiro-Wilk W Test

W	Prob<W
0.913302	0.3397

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the general average in the immediate post-test

TI Group
tipostprom1



Normal(3.4625,0.75336)

Quantiles

100.0%	maximum	4.2300
99.5%		4.2300
97.5%		4.2300
90.0%		4.2300
75.0%	quartile	4.1350
50.0%	median	3.5600
25.0%	quartile	2.6925
10.0%		2.5000
2.5%		2.5000
0.5%		2.5000
0.0%	minimum	2.5000

Moments

Mean	3.4625
Std Dev	0.7533647
Std Err Mean	0.3766823
Upper 95% Mean	4.6612713
Lower 95% Mean	2.2637287
N	4

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	3.4625	2.2637287	4.6612713
Dispersion	σ	0.7533647	0.4267732	2.8089558

-2log(Likelihood) = 8.08586128605968

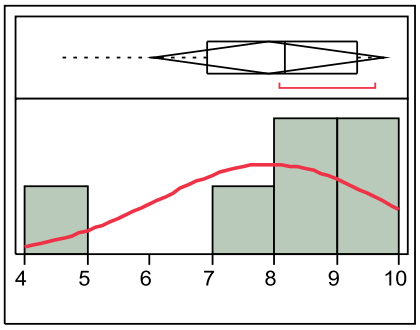
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.970451	0.8443

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI Group
pipostprom1



Normal(7.91833,1.77184)

Quantiles

100.0%	maximum	9.6200
99.5%		9.6200
97.5%		9.6200
90.0%		9.6200
75.0%	quartile	9.3275
50.0%	median	8.1750
25.0%	quartile	6.9225
10.0%		4.6200
2.5%		4.6200
0.5%		4.6200
0.0%	minimum	4.6200

Moments

Mean	7.9183333
Std Dev	1.7718399
Std Err Mean	0.7233506
Upper 95% Mean	9.7777653
Lower 95% Mean	6.0589014
N	6

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	7.9183333	6.0589014	9.7777653
Dispersion	σ	1.7718399	1.1059967	4.3456393

-2log(Likelihood) = 22.8914844447457

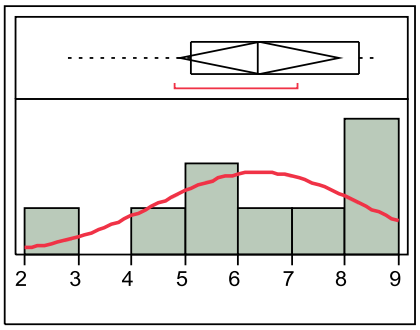
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.855211	0.1733

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI Group
oipostprom1



Normal(6.38889,1.94212)

Quantiles

100.0%	maximum	8.6500
99.5%		8.6500
97.5%		8.6500
90.0%		8.6500
75.0%	quartile	8.2700
50.0%	median	6.3500
25.0%	quartile	5.0950
10.0%		2.6900
2.5%		2.6900
0.5%		2.6900
0.0%	minimum	2.6900

Moments

Mean	6.3888889
Std Dev	1.9421151
Std Err Mean	0.6473717
Upper 95% Mean	7.8817307
Lower 95% Mean	4.8960471
N	9

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	6.3888889	4.8960471	7.8817307
Dispersion	σ	1.9421151	1.3118153	3.7206476

-2log(Likelihood) = 36.4888911800506

Goodness-of-Fit Test

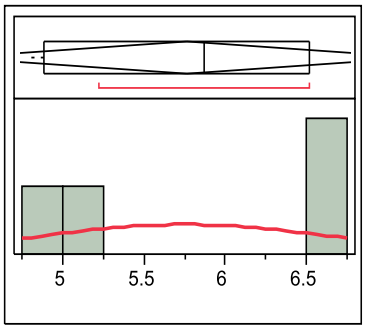
Shapiro-Wilk W Test

W	Prob<W
0.944117	0.6258

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the obtained scores in interpretation tasks in the immediate post-test

TI group
tipostpromin1



Normal(5.76,0.89577)

Quantiles

100.0%	maximum	6.5200
99.5%		6.5200
97.5%		6.5200
90.0%		6.5200
75.0%	quartile	6.5200
50.0%	median	5.8700
25.0%	quartile	4.8900
10.0%		4.7800
2.5%		4.7800
0.5%		4.7800
0.0%	minimum	4.7800

Moments

Mean	5.76
Std Dev	0.8957678
Std Err Mean	0.4478839
Upper 95% Mean	7.1853665
Lower 95% Mean	4.3346335
N	4

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	5.76	4.3346335	7.1853665
Dispersion	σ	0.8957678	0.5074431	3.3399127

-2log(Likelihood) = 9.47091609629973

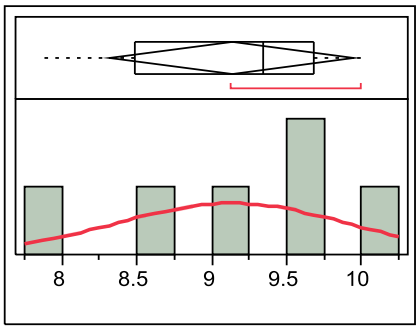
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.828332	0.1635

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI group
pipostpromin1



Normal(9.13333,0.77704)

Quantiles

100.0%	maximum	10.000
99.5%		10.000
97.5%		10.000
90.0%		10.000
75.0%	quartile	9.678
50.0%	median	9.350
25.0%	quartile	8.483
10.0%		7.830
2.5%		7.830
0.5%		7.830
0.0%	minimum	7.830

Moments

Mean	9.1333333
Std Dev	0.7770371
Std Err Mean	0.3172241
Upper 95% Mean	9.9487838
Lower 95% Mean	8.3178829
N	6

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	9.1333333	8.3178829	9.9487838
Dispersion	σ	0.7770371	0.4850328	1.9057721

-2log(Likelihood) = 13.0000563325334

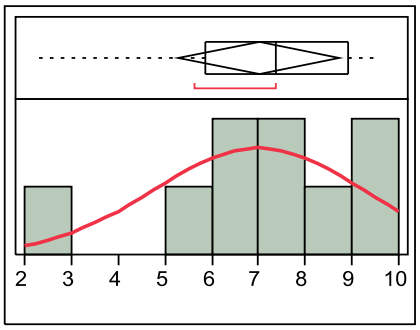
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.933007	0.6035

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI Group
oipostpromin1



Normal(7.00556,2.24491)

Quantiles

100.0%	maximum	9.5700
99.5%		9.5700
97.5%		9.5700
90.0%		9.5700
75.0%	quartile	8.9150
50.0%	median	7.3900
25.0%	quartile	5.8700
10.0%		2.1700
2.5%		2.1700
0.5%		2.1700
0.0%	minimum	2.1700

Moments

Mean	7.0055556
Std Dev	2.244906
Std Err Mean	0.748302
Upper 95% Mean	8.731143
Lower 95% Mean	5.2799681
N	9

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	7.0055556	5.2799681	8.731143
Dispersion	σ	2.244906	1.5163375	4.3007255

-2log(Likelihood) = 39.0968389830829

Goodness-of-Fit Test

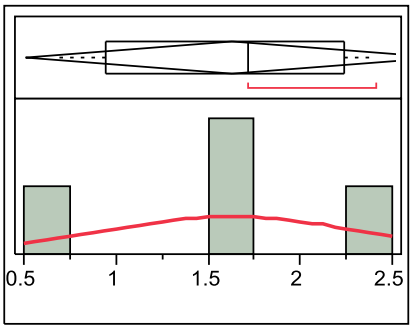
Shapiro-Wilk W Test

W	Prob<W
0.905687	0.2868

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the obtained scores in production tasks in the immediate post-test

TI Group
tipostprompro1



Normal(1.635,0.70901)

Quantiles

100.0%	maximum	2.4100
99.5%		2.4100
97.5%		2.4100
90.0%		2.4100
75.0%	quartile	2.2375
50.0%	median	1.7200
25.0%	quartile	0.9475
10.0%		0.6900
2.5%		0.6900
0.5%		0.6900
0.0%	minimum	0.6900

Moments

Mean	1.635
Std Dev	0.7090134
Std Err Mean	0.3545067
Upper 95% Mean	2.7631985
Lower 95% Mean	0.5068015
N	4

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	1.635	0.5068015	2.7631985
Dispersion	σ	0.7090134	0.4016487	2.64359

-2log(Likelihood) = 7.60046143250295

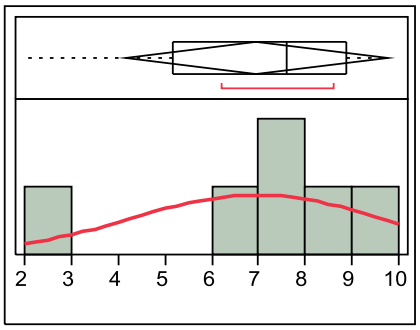
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.926562	0.5743

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI Group
pipostprompro1



Normal(6.955,2.66606)

Quantiles

100.0%	maximum	9.6600
99.5%		9.6600
97.5%		9.6600
90.0%		9.6600
75.0%	quartile	8.8800
50.0%	median	7.5850
25.0%	quartile	5.1750
10.0%		2.0700
2.5%		2.0700
0.5%		2.0700
0.0%	minimum	2.0700

Moments

Mean	6.955
Std Dev	2.6660589
Std Err Mean	1.088414
Upper 95% Mean	9.7528572
Lower 95% Mean	4.1571428
N	6

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	6.955	4.1571428	9.7528572
Dispersion	σ	2.6660589	1.6641753	6.5388133

-2log(Likelihood) = 27.7944781236977

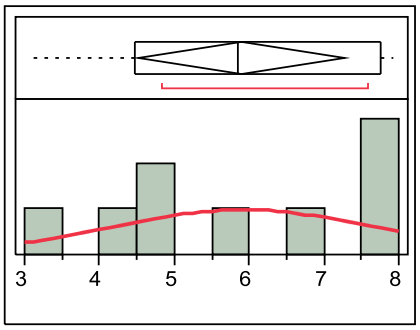
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.887946	0.3076

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI Group
oipostprompro1



Normal(5.90111,1.77929)

Quantiles

100.0%	maximum	7.9300
99.5%		7.9300
97.5%		7.9300
90.0%		7.9300
75.0%	quartile	7.7600
50.0%	median	5.8600
25.0%	quartile	4.4850
10.0%		3.1000
2.5%		3.1000
0.5%		3.1000
0.0%	minimum	3.1000

Moments

Mean	5.9011111
Std Dev	1.7792867
Std Err Mean	0.5930956
Upper 95% Mean	7.2687919
Lower 95% Mean	4.5334303
N	9

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	5.9011111	4.5334303	7.2687919
Dispersion	σ	1.7792867	1.2018317	3.4087056

-2log(Likelihood) = 34.912719422191

Goodness-of-Fit Test

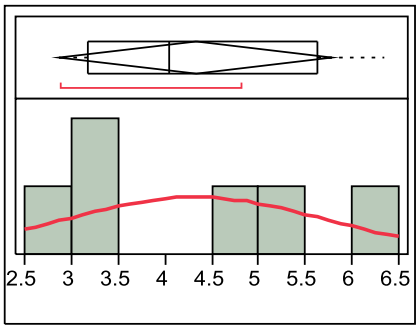
Shapiro-Wilk W Test

W	Prob<W
0.915815	0.3587

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the general average in the delayed post-test

TI Group
tipostprom2



Normal(4.32667,1.39735)

Quantiles

100.0%	maximum	6.3500
99.5%		6.3500
97.5%		6.3500
90.0%		6.3500
75.0%	quartile	5.6225
50.0%	median	4.0400
25.0%	quartile	3.1725
10.0%		2.8800
2.5%		2.8800
0.5%		2.8800
0.0%	minimum	2.8800

Moments

Mean	4.3266667
Std Dev	1.3973499
Std Err Mean	0.5704657
Upper 95% Mean	5.7930954
Lower 95% Mean	2.8602379
N	6

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	4.3266667	2.8602379	5.7930954
Dispersion	σ	1.3973499	0.872237	3.4271598

-2log(Likelihood) = 20.0421923341598

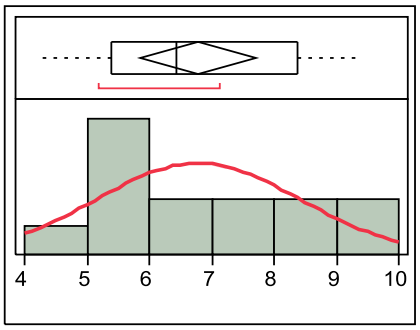
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.897025	0.3566

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI Group
pipostprom2



Normal(6.785,1.62729)

Quantiles

100.0%	maximum	9.4200
99.5%		9.4200
97.5%		9.4200
90.0%		9.2300
75.0%	quartile	8.3650
50.0%	median	6.4450
25.0%	quartile	5.3800
10.0%		4.7100
2.5%		4.2300
0.5%		4.2300
0.0%	minimum	4.2300

Moments

Mean	6.785
Std Dev	1.6272901
Std Err Mean	0.4349116
Upper 95% Mean	7.7245693
Lower 95% Mean	5.8454307
N	14

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	6.785	5.8454307	7.7245693
Dispersion	σ	1.6272901	1.1797104	2.6216334

-2log(Likelihood) = 52.3639302158011

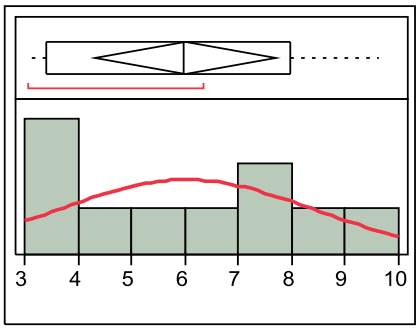
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.944431	0.4780

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI Group
oipostprom2



Normal(6.021,2.36818)

Quantiles

100.0%	maximum	9.6200
99.5%		9.6200
97.5%		9.6200
90.0%		9.5430
75.0%	quartile	7.9800
50.0%	median	5.9650
25.0%	quartile	3.4125
10.0%		3.0990
2.5%		3.0800
0.5%		3.0800
0.0%	minimum	3.0800

Moments

Mean	6.021
Std Dev	2.36818
Std Err Mean	0.7488843
Upper 95% Mean	7.7150939
Lower 95% Mean	4.3269061
N	10

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	6.021	4.3269061	7.7150939
Dispersion	σ	2.36818	1.6289176	4.3233736

-2log(Likelihood) = 44.6212054920909

Goodness-of-Fit Test

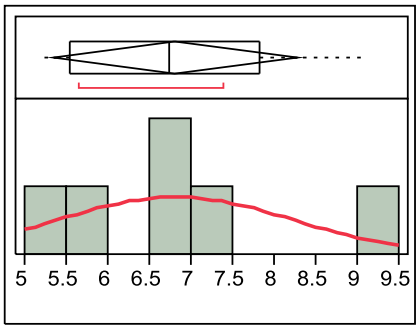
Shapiro-Wilk W Test

W	Prob<W
0.931154	0.4593

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the obtained scores in interpretation tasks in the delayed post-test

TI Group
tipostpromin2



Normal(6.81167,1.39277)

Quantiles

100.0%	maximum	9.1300
99.5%		9.1300
97.5%		9.1300
90.0%		9.1300
75.0%	quartile	7.8250
50.0%	median	6.7400
25.0%	quartile	5.5425
10.0%		5.2200
2.5%		5.2200
0.5%		5.2200
0.0%	minimum	5.2200

Moments

Mean	6.8116667
Std Dev	1.392773
Std Err Mean	0.5685972
Upper 95% Mean	8.2732923
Lower 95% Mean	5.350041
N	6

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	6.8116667	5.350041	8.2732923
Dispersion	σ	1.392773	0.8693801	3.4159346

-2log(Likelihood) = 20.0028231998048

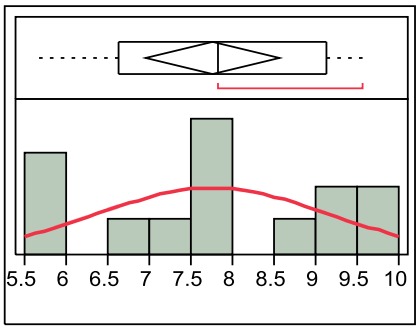
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.953640	0.7696

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI Group
pipostpromin2



Normal(7.76571,1.3962)

Quantiles

100.0%	maximum	9.5700
99.5%		9.5700
97.5%		9.5700
90.0%		9.5700
75.0%	quartile	9.1300
50.0%	median	7.8300
25.0%	quartile	6.6325
10.0%		5.6500
2.5%		5.6500
0.5%		5.6500
0.0%	minimum	5.6500

Moments

Mean	7.7657143
Std Dev	1.3962021
Std Err Mean	0.3731507
Upper 95% Mean	8.5718574
Lower 95% Mean	6.9595712
N	14

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	7.7657143	6.9595712	8.5718574
Dispersion	σ	1.3962021	1.0121822	2.2493408

-2log(Likelihood) = 48.07543973436

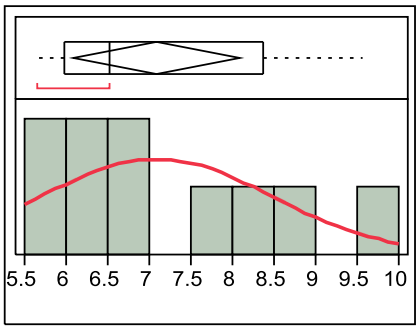
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.897104	0.1024

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI Group
oipostpromin2



Normal(7.088,1.39268)

Quantiles

100.0%	maximum	9.5700
99.5%		9.5700
97.5%		9.5700
90.0%		9.4830
75.0%	quartile	8.3700
50.0%	median	6.5200
25.0%	quartile	5.9800
10.0%		5.6500
2.5%		5.6500
0.5%		5.6500
0.0%	minimum	5.6500

Moments

Mean	7.088
Std Dev	1.3926777
Std Err Mean	0.4404034
Upper 95% Mean	8.0842616
Lower 95% Mean	6.0917384
N	10

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	7.088	6.0917384	8.0842616
Dispersion	σ	1.3926777	0.9579327	2.5424865

-2log(Likelihood) = 34.0033362668551

Goodness-of-Fit Test

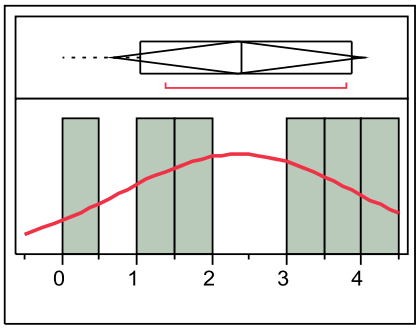
Shapiro-Wilk W Test

W	Prob<W
0.885294	0.1500

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

Distributions in the obtained scores in production tasks in the delayed post-test

TI Group
tipostprompro2



Normal(2.355,1.59376)

Quantiles

100.0%	maximum	4.1400
99.5%		4.1400
97.5%		4.1400
90.0%		4.1400
75.0%	quartile	3.8775
50.0%	median	2.4100
25.0%	quartile	1.0350
10.0%		0.0000
2.5%		0.0000
0.5%		0.0000
0.0%	minimum	0.0000

Moments

Mean	2.355
Std Dev	1.5937597
Std Err Mean	0.6506497
Upper 95% Mean	4.0275482
Lower 95% Mean	0.6824518
N	6

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	2.355	0.6824518	4.0275482
Dispersion	σ	1.5937597	0.9948376	3.9088773

-2log(Likelihood) = 21.620412236691

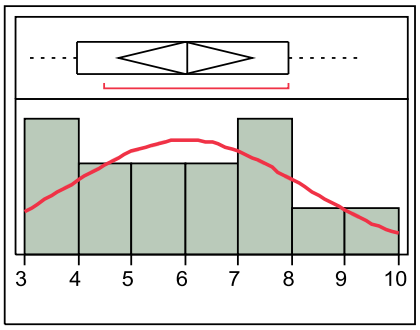
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.942733	0.6813

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

PI Group
pipostprompro2



Normal(6.01,2.164)

Quantiles

100.0%	maximum	9.3100
99.5%		9.3100
97.5%		9.3100
90.0%		9.1400
75.0%	quartile	7.9300
50.0%	median	6.0350
25.0%	quartile	3.9675
10.0%		3.1000
2.5%		3.1000
0.5%		3.1000
0.0%	minimum	3.1000

Moments

Mean	6.01
Std Dev	2.1640027
Std Err Mean	0.578354
Upper 95% Mean	7.259458
Lower 95% Mean	4.760542
N	14

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	6.01	4.760542	7.259458
Dispersion	σ	2.1640027	1.5688023	3.4863002

-2log(Likelihood) = 60.3451479926041

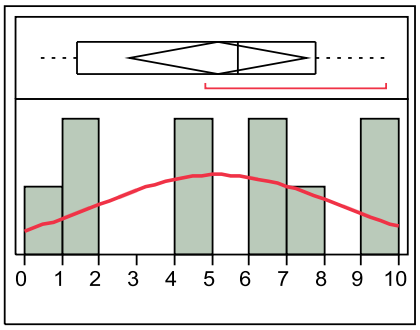
Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.931355	0.3188

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

OI Group
oipostprompro2



Normal(5.173,3.32859)

Quantiles

100.0%	maximum	9.6600
99.5%		9.6600
97.5%		9.6600
90.0%		9.6250
75.0%	quartile	7.7575
50.0%	median	5.6900
25.0%	quartile	1.3800
10.0%		0.4440
2.5%		0.3400
0.5%		0.3400
0.0%	minimum	0.3400

Moments

Mean	5.173
Std Dev	3.3285868
Std Err Mean	1.0525916
Upper 95% Mean	7.5541275
Lower 95% Mean	2.7918725
N	10

Fitted Normal
Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	μ	5.173	2.7918725	7.5541275
Dispersion	σ	3.3285868	2.2895192	6.0767019

-2log(Likelihood) = 51.4297271778826

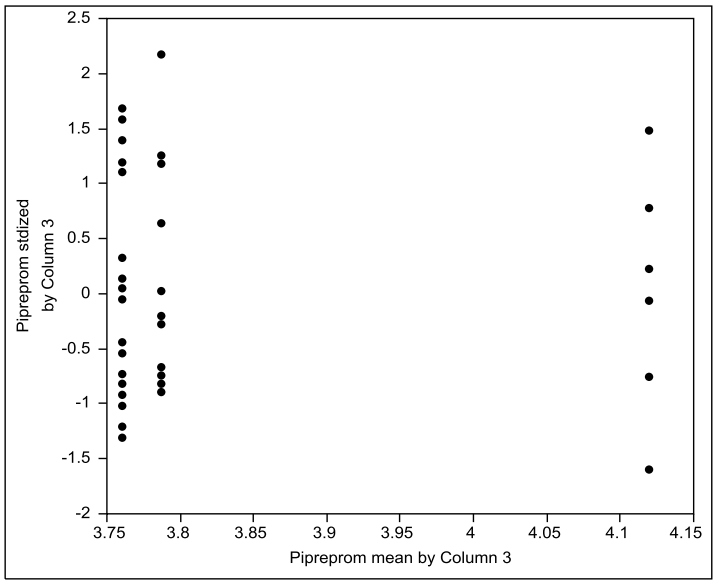
Goodness-of-Fit Test

Shapiro-Wilk W Test

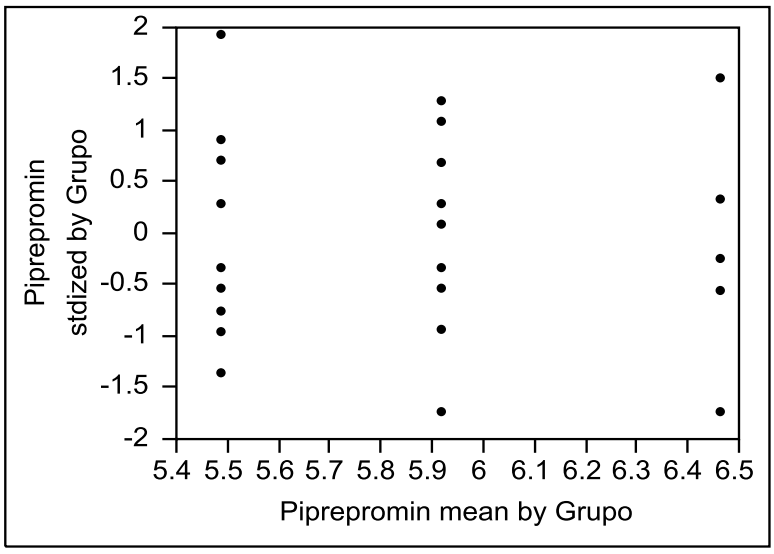
W	Prob<W
0.928026	0.4288

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

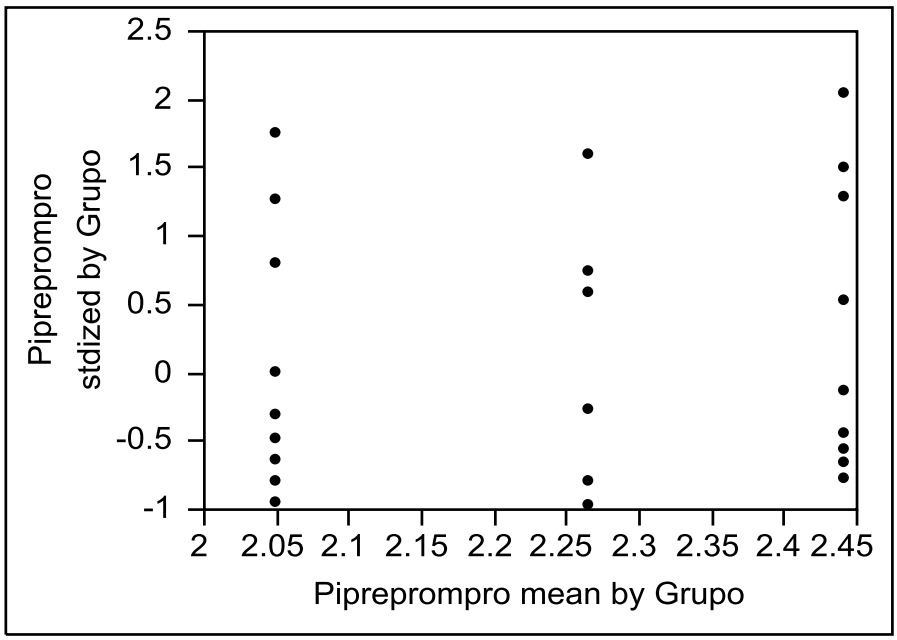
APPENDIX J Homoscedasticity and linearity



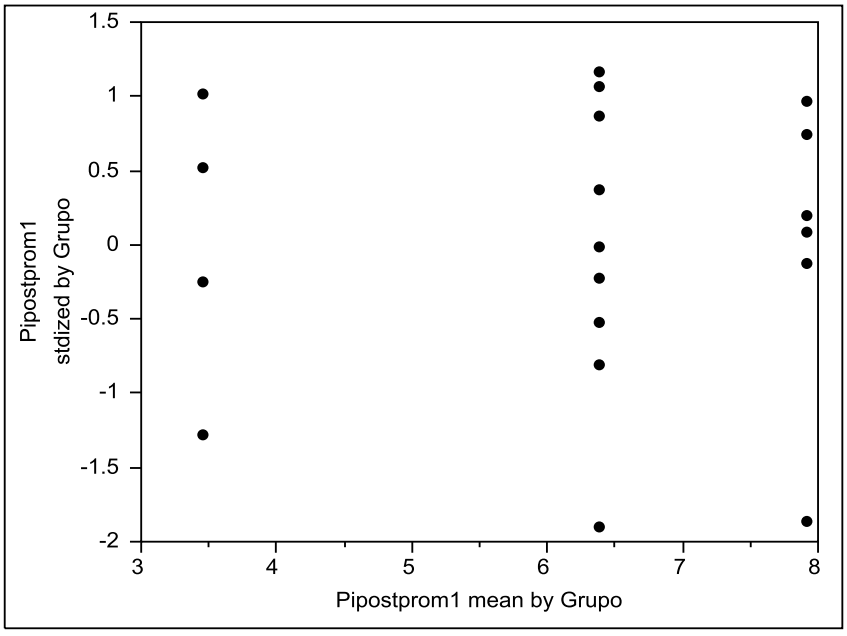
Bivariate Fit of Pipreprom stdized by Column 3 By Pipreprom mean by Column 3



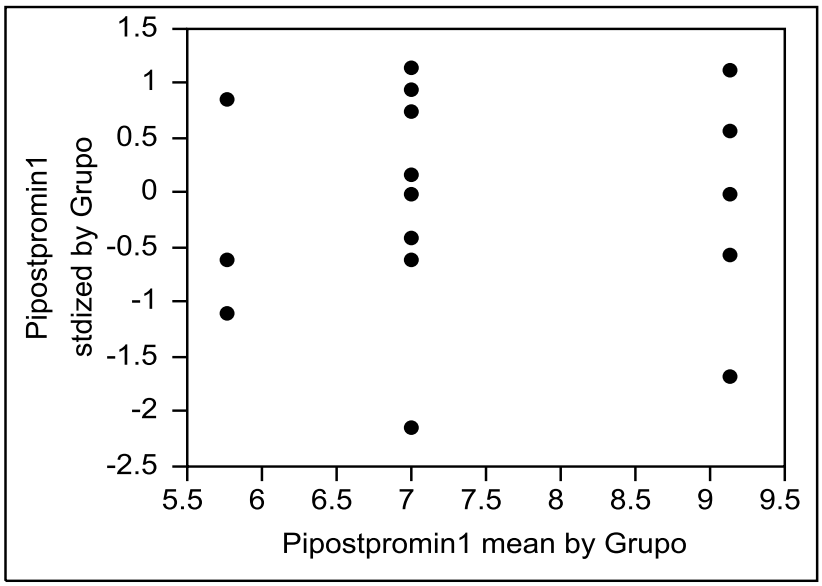
Bivariate Fit of Pipreprominstdized by Grupo By Pipreprominmean by Grupo



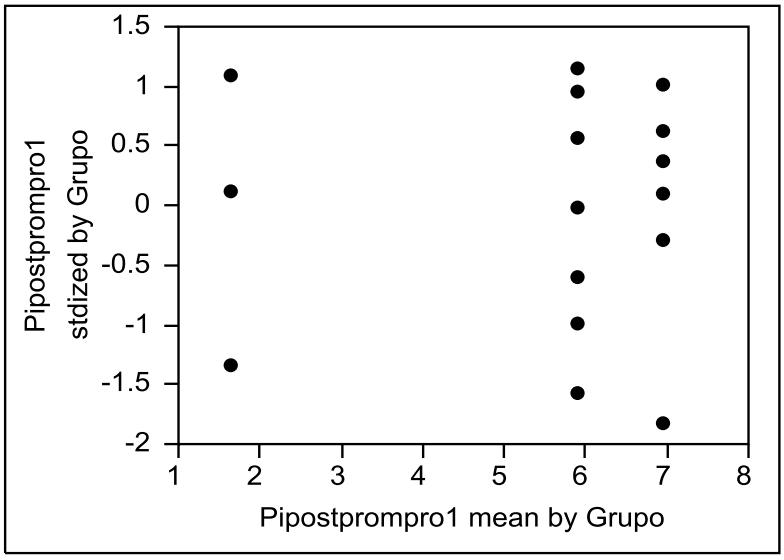
Bivariate Fit of Pipreprompro stdized by Grupo By Pipreprompro mean by Grupo



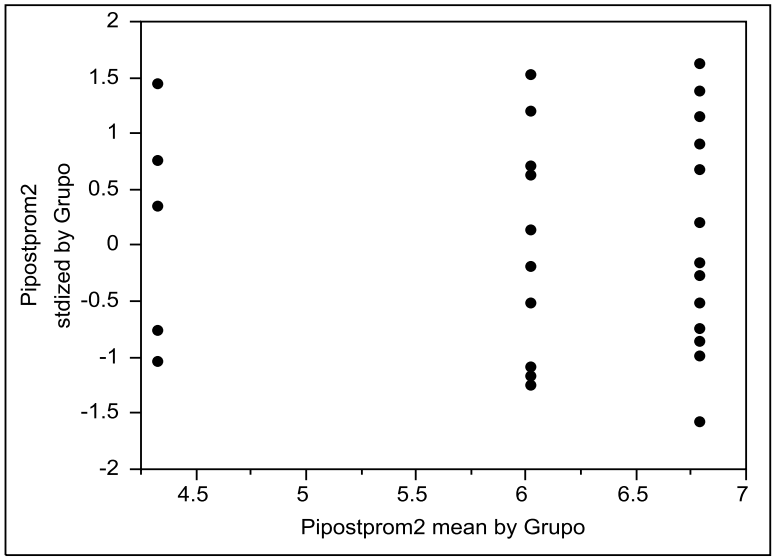
Bivariate Fit of Pipostprom1 stdized by Grupo By Pipostprom1 mean by Grupo



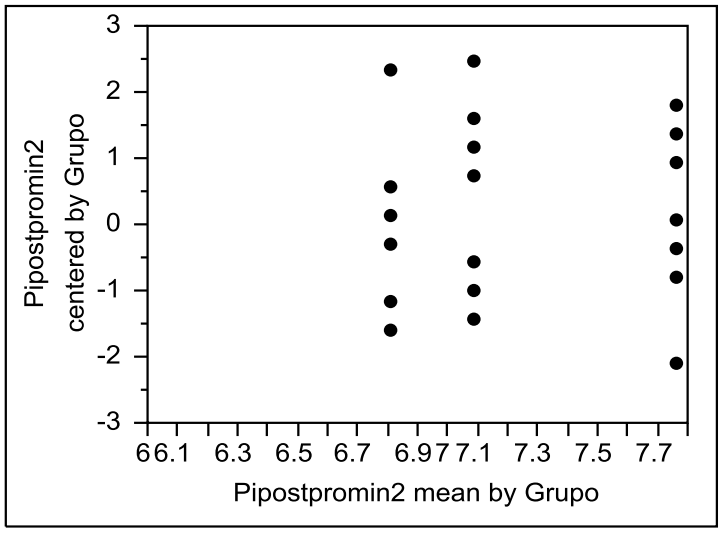
Bivariate Fit of Pipostpromin1 stdized by Grupo By Pipostpromin1 mean by Grupo



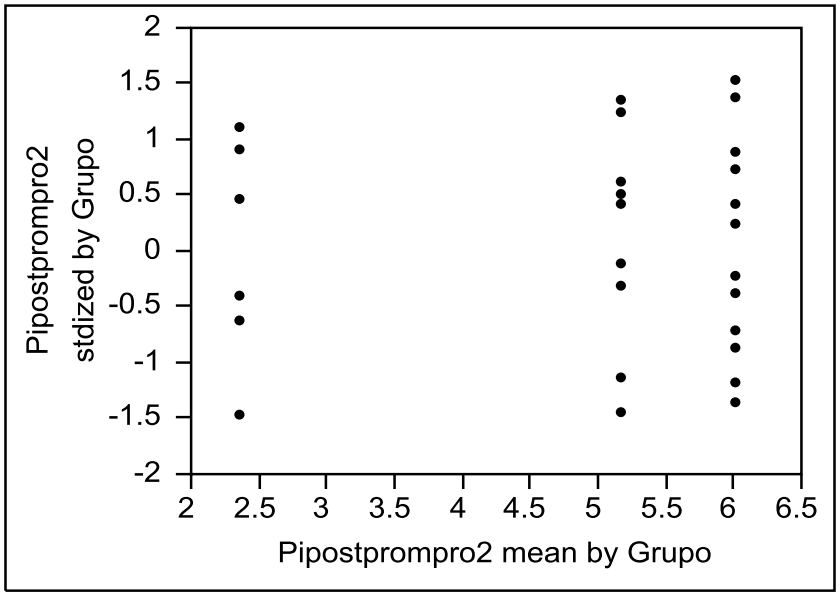
Bivariate Fit of Pipostprompro1 stdized by Grupo By Pipostprompro1 mean by Grupo



Bivariate Fit of Pipostprom2 stdized by Grupo By Pipostprom2 mean by Grupo



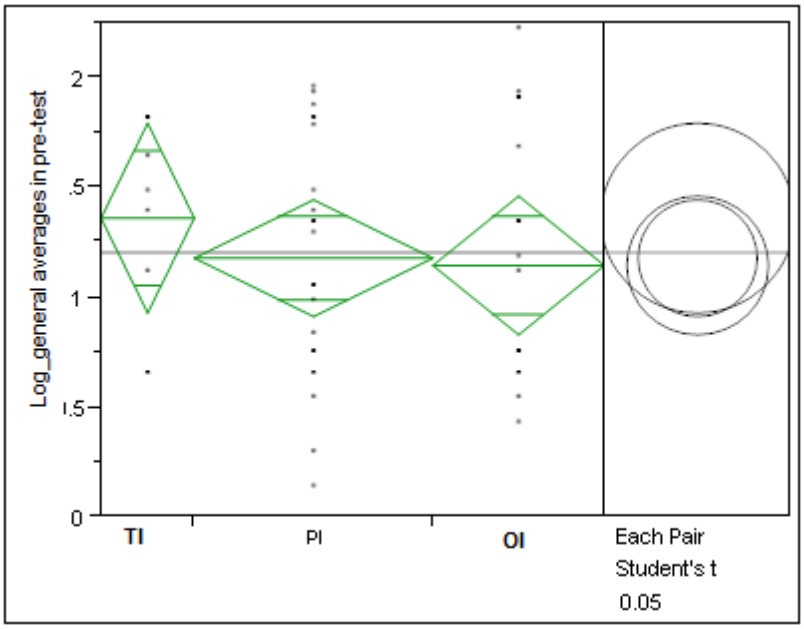
Bivariate Fit of Pipostpromin2 centered by Grupo By Pipostpromin2 mean by Grupo



Bivariate Fit of Pipostprompro2 stdized by Grupo By Pipostprompro2 mean by Grupo

APPENDIX K Between-groups ANOVA

pipreprom vs. tipreprom vs oipreprom



Oneway analysis of general averages in the pre-test by group

Oneway Anova
Summary of Fit

Rsquare	0.019996
Adj Rsquare	-0.036
Root Mean Square Error	0.562147
Mean of Response	1.201025
Observations (or Sum Wgts)	38

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	0.225676	0.112838	0.3571	0.7022
Error	35	11.060308	0.316009		
C. Total	37	11.285984			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	7	1.35987	0.21247	0.92853	1.7912
PI	18	1.17978	0.13250	0.91079	1.4488
OI	13	1.14491	0.15591	0.82839	1.4614

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.03011	0.05

Abs(Dif)-LSD	TI	PI	OI
TI	-0.61001	-0.32825	-0.32005
PI	-0.32825	-0.38041	-0.3805
OI	-0.32005	-0.3805	-0.44762

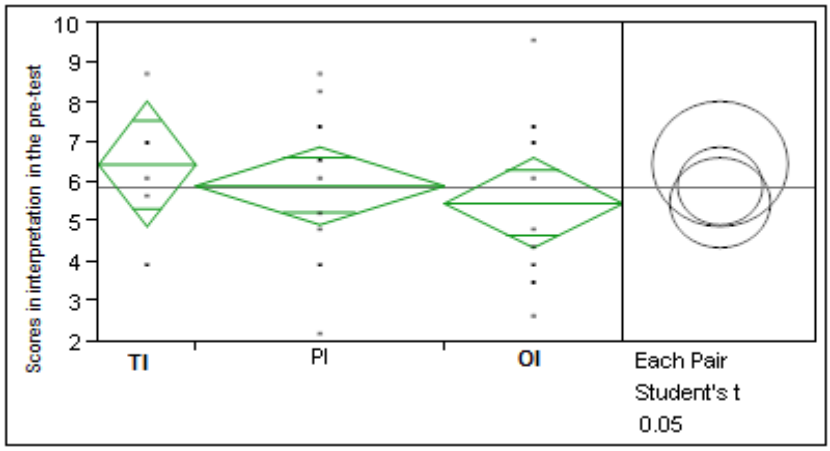
Positive values show pairs of means that are significantly different.

Level		Mean
TI	A	1.3598671
PI	A	1.1797815
OI	A	1.1449092

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
TI	OI	0.2149579	0.2635384	-0.320053	0.7499693	0.4202	
TI	PI	0.1800856	0.2504000	-0.328253	0.6884246	0.4768	
PI	OI	0.0348723	0.2046080	-0.380504	0.4502485	0.8656	

Between groups ANOVA: piprepromin vs. tiprepromin vs. oiprepromin



Oneway analysis of scores in interpretation in the pre-test by group

Oneway Anova
Summary of Fit

Rsquare	0.029437
Adj Rsquare	-0.02602
Root Mean Square Error	2.038613
Mean of Response	5.869737
Observations (or Sum Wgts)	38

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	4.41173	2.20586	0.5308	0.5928
Error	35	145.45797	4.15594		
C. Total	37	149.86970			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	7	6.46143	0.77052	4.8972	8.0257
PI	18	5.91722	0.48051	4.9417	6.8927
OI	13	5.48538	0.56541	4.3375	6.6332

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.03011	0.05

Abs(Dif)-LSD	TI	PI	OI
TI	-2.21218	-1.29927	-0.96416
PI	-1.29927	-1.37953	-1.07452
OI	-0.96416	-1.07452	-1.62329

Positive values show pairs of means that are significantly different.

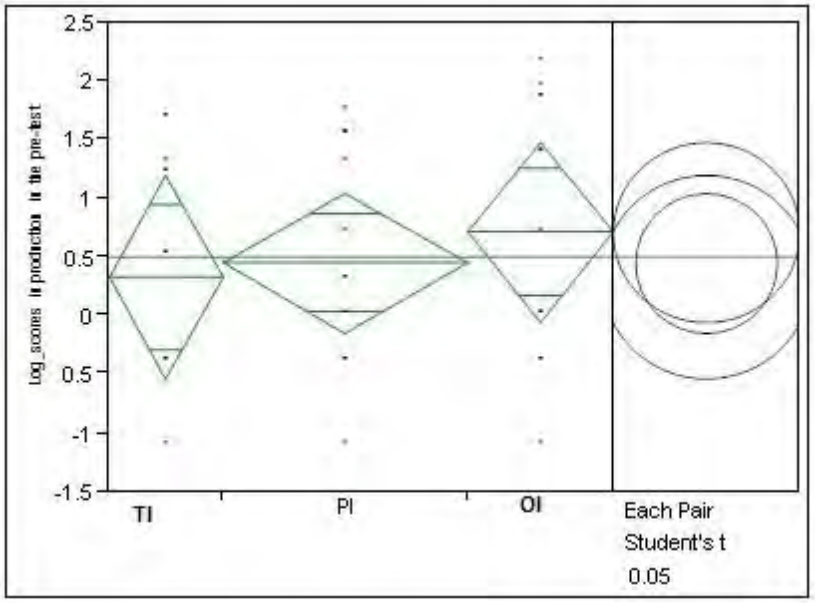
Level		Mean
TI	A	6.4614286

Level		Mean
PI	A	5.9172222
OI	A	5.4853846

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
TI	OI	0.9760440	0.9557164	-0.96416	2.916251	0.3141	
TI	PI	0.5442063	0.9080703	-1.29927	2.387687	0.5528	
PI	OI	0.4318376	0.7420064	-1.07452	1.938191	0.5643	

Between groups ANOVA: piprepromprо vs. tiprepromprо vs. oiprepromprо



Oneway analysis of scores in production in the pre-test by group

Oneway Anova
Summary of Fit

Rsquare	0.018019
Adj Rsquare	-0.05212
Root Mean Square Error	1.124493
Mean of Response	0.498876
Observations (or Sum Wgts)	31

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	0.649696	0.32485	0.2569	0.7752
Error	28	35.405569	1.26448		
C. Total	30	36.055265			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	7	0.327537	0.42502	-0.5431	1.1981
PI	15	0.450837	0.29034	-0.1439	1.0456
OI	9	0.712204	0.37483	-0.0556	1.4800

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.04841	0.05

Abs(Dif)-LSD	OI	PI	TI
OI	-1.08584	-0.70984	-0.77615
PI	-0.70984	-0.84109	-0.93106
TI	-0.77615	-0.93106	-1.23123

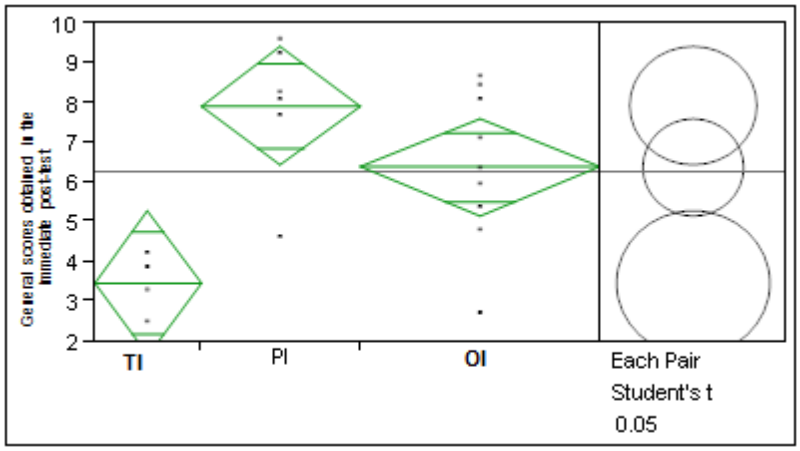
Positive values show pairs of means that are significantly different.

Level		Mean
OI	A	0.71220423
PI	A	0.45083670
TI	A	0.32753706

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
OI	TI	0.3846672	0.5666912	-0.776147	1.545482	0.5028	
OI	PI	0.2613675	0.4741279	-0.709839	1.232575	0.5858	
PI	TI	0.1232996	0.5147229	-0.931062	1.177662	0.8124	

Between groups ANOVA: pipostprom1 vs. tipostprom1 vs. oipostprom1



Oneway analysis of general scores in the immediate post-test by group

Oneway Anova
Summary of Fit

Rsquare	0.501986
Adj Rsquare	0.439734
Root Mean Square Error	1.724352
Mean of Response	6.255789
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	47.953616	23.9768	8.0638	0.0038*
Error	16	47.574247	2.9734		
C. Total	18	95.527863			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	4	3.46250	0.86218	1.6348	5.2902
PI	6	7.91833	0.70396	6.4260	9.4107
OI	9	6.38889	0.57478	5.1704	7.6074

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.11991	0.05

Abs(Dif)-LSD	PI	OI	TI
PI	-2.11048	-0.39715	2.096242
OI	-0.39715	-1.7232	0.729729
TI	2.096242	0.729729	-2.5848

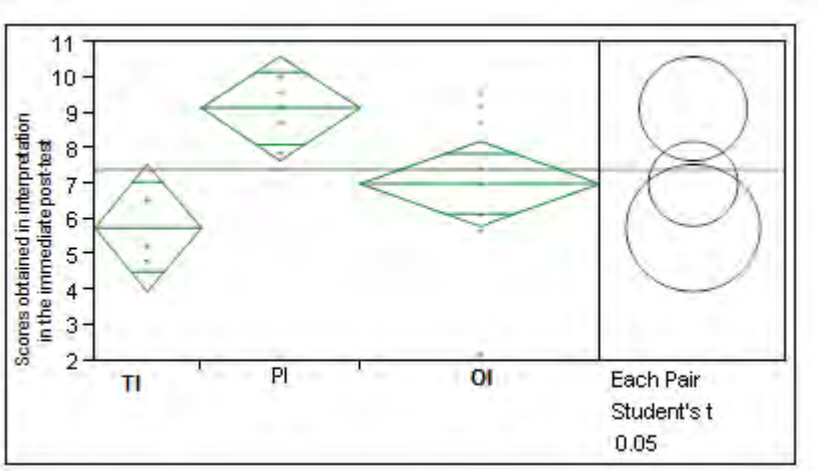
Positive values show pairs of means that are significantly different.

Level			Mean
PI	A		7.9183333
OI	A		6.3888889
NI		B	3.4625000

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
PI	TI	4.455833	1.113065	2.09624	6.815425	0.0010*	
OI	TI	2.926389	1.036207	0.72973	5.123049	0.0122*	
PI	OI	1.529444	0.908813	-0.39715	3.456043	0.1118	

Between groups ANOVA: pipostpromin1 vs. tipostpromin1 vs. oipostpromin1



Oneway analysis of scores in interpretation in the immediate post-test by group

Oneway Anova
Summary of Fit

Rsquare	0.397516
Adj Rsquare	0.322205
Root Mean Square Error	1.690838
Mean of Response	7.415263
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	30.180918	15.0905	5.2784	0.0174*
Error	16	45.742956	2.8589		
C. Total	18	75.923874			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	4	5.76000	0.84542	3.9678	7.552
PI	6	9.13333	0.69028	7.6700	10.597
OI	9	7.00556	0.56361	5.8107	8.200

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.11991	0.05

Abs(Dif)-LSD	PI	OI	TI
PI	-2.06946	0.238624	1.059602
OI	0.238624	-1.68971	-0.90841
TI	1.059602	-0.90841	-2.53457

Positive values show pairs of means that are significantly different.

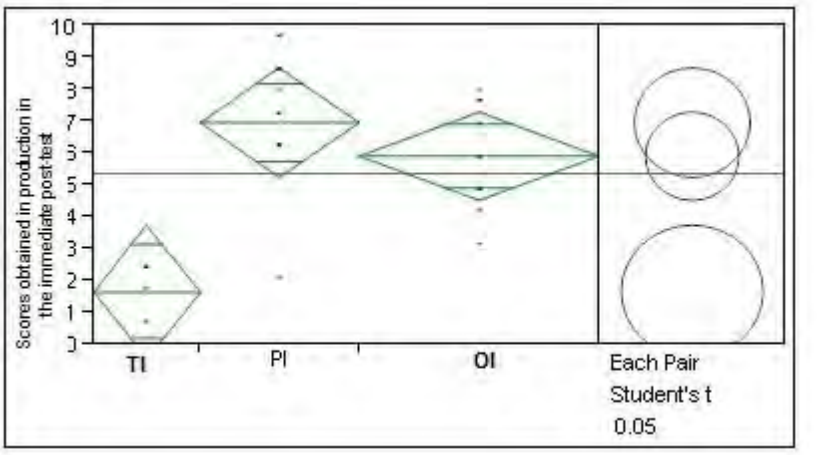
Level			Mean
PI	A		9.1333333
OI		B	7.0055556
TI		B	5.7600000

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
PI	TI	3.373333	1.091432	1.05960	5.687065	0.0070*	
PI	OI	2.127778	0.891150	0.23862	4.016932	0.0296*	
OI	TI	1.245556	1.016067	-0.90841	3.399522	0.2380	

Between groups ANOVA: pipostprompro1 vs. tipostprompro1 vs. oipostprompro1

Oneway Analysis of Pipostprompro1 By Grupo



Oneway analysis of scores in production in the immediate post-test by group

Oneway Anova
Summary of Fit

Rsquare	0.540572
Adj Rsquare	0.483143
Root Mean Square Error	1.974436
Mean of Response	5.335789
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	73.39072	36.6954	9.4129	0.0020*
Error	16	62.37434	3.8984		
C. Total	18	135.76506			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	4	1.63500	0.98722	-0.458	3.7278
PI	6	6.95500	0.80606	5.246	8.6638
OI	9	5.90111	0.65815	4.506	7.2963

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.11991	0.05

Abs(Dif)-LSD	PI	OI	TI
PI	-2.41657	-1.15212	2.618196
OI	-1.15212	-1.97312	1.750869
TI	2.618196	1.750869	-2.95968

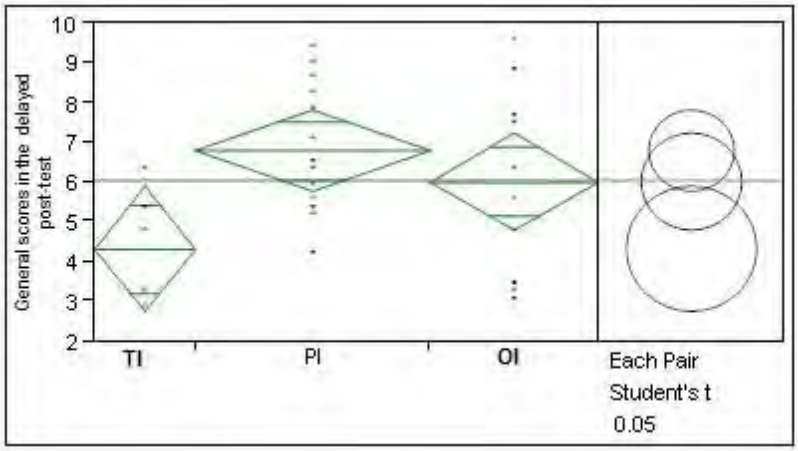
Positive values show pairs of means that are significantly different.

Level		Mean
PI	A	6.9550000
OI	A	5.9011111
TI	B	1.6350000

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
PI	TI	5.320000	1.274493	2.61820	8.021804	0.0007*	
OI	TI	4.266111	1.186488	1.75087	6.781354	0.0024*	
PI	OI	1.053889	1.040619	-1.15212	3.259903	0.3262	

Between groups ANOVA: pipostprom2 vs. tipostprom2 vs. oipostprom2



Oneway analysis of general scores in the delayed post-test by group

Oneway Anova
Summary of Fit

Rsquare	0.211471
Adj Rsquare	0.153062
Root Mean Square Error	1.872435
Mean of Response	6.038667
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	25.38697	12.6935	3.6205	0.0405*
Error	27	94.66237	3.5060		
C. Total	29	120.04935			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	6	4.32667	0.76442	2.7582	5.8951
PI	14	6.78500	0.50043	5.7582	7.8118
OI	10	6.02100	0.59212	4.8061	7.2359

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.05183	0.05

Abs(Dif)-LSD	PI	OI	TI
PI	-1.45211	-0.82671	0.583668
OI	-0.82671	-1.71816	-0.28963
TI	0.583668	-0.28963	-2.21813

Positive values show pairs of means that are significantly different.

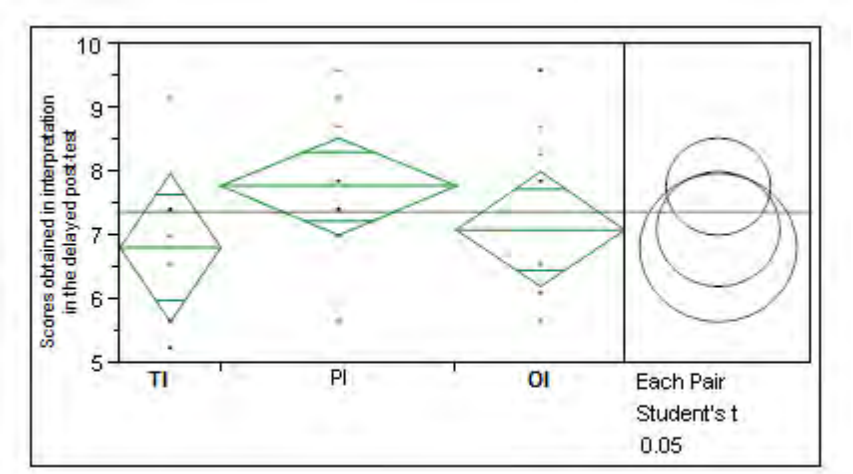
Level		Mean
PI	A	6.7850000

Level			Mean
OI	A	B	6.0210000
TI		B	4.3266667

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
PI	TI	2.458333	0.9136549	0.583668	4.332998	0.0121*	
OI	TI	1.694333	0.9669214	-0.289626	3.678292	0.0911	
PI	OI	0.764000	0.7752619	-0.826706	2.354706	0.3331	

Between groups ANOVA: pipostpromin2 vs. tipostpromin2 vs. oipostpromin2



Oneway analysis of scores in interpretation in the delayed post-test by group

Oneway Anova
Summary of Fit

Rsquare	0.084488
Adj Rsquare	0.016672
Root Mean Square Error	1.394393
Mean of Response	7.349
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	4.844684	2.42234	1.2458	0.3037
Error	27	52.496986	1.94433		
C. Total	29	57.341670			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	6	6.81167	0.56926	5.6436	7.9797
PI	14	7.76571	0.37267	7.0011	8.5304
OI	10	7.08800	0.44095	6.1833	7.9927

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.05183	0.05

Abs(Dif)-LSD	PI	OI	TI
PI	-1.08138	-0.50688	-0.44201
OI	-0.50688	-1.2795	-1.20111
TI	-0.44201	-1.20111	-1.65183

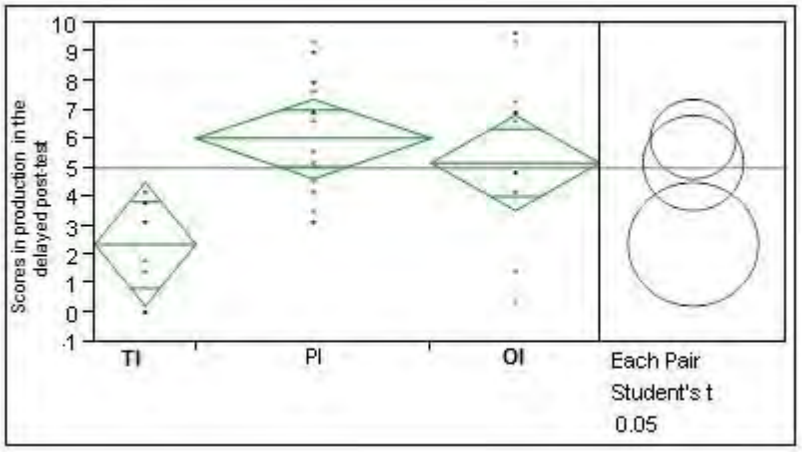
Positive values show pairs of means that are significantly different.

Level		Mean
PI	A	7.7657143
OI	A	7.0880000
TI	A	6.8116667

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
PI	TI	0.9540476	0.6803943	-0.44201	2.350101	0.1722	
PI	OI	0.6777143	0.5773337	-0.50688	1.862305	0.2507	
OI	TI	0.2763333	0.7200616	-1.20111	1.753778	0.7042	

Between groups ANOVA: pipostprompro2 vs. tipostprompro2 vs. oipostprompro2



Oneway analysis of scores in production in the delayed post-test by group

Oneway Anova
Summary of Fit

Rsquare	0.246059
Adj Rsquare	0.190212
Root Mean Square Error	2.533432
Mean of Response	5
Observations (or Sum Wgts)	30

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo	2	56.55684	28.2784	4.4059	0.0221*
Error	27	173.29356	6.4183		
C. Total	29	229.85040			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
TI	6	2.35500	1.0343	0.2329	4.4771
PI	14	6.01000	0.6771	4.6207	7.3993
OI	10	5.17300	0.8011	3.5292	6.8168

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.05183	0.05

Abs(Dif)-LSD	PI	OI	TI
PI	-1.96473	-1.31525	1.118551
OI	-1.31525	-2.32469	0.133674
TI	1.118551	0.133674	-3.00117

Positive values show pairs of means that are significantly different.

Level			Mean
PI	A		6.0100000
OI	A		5.1730000
TI		B	2.3550000

Levels not connected by same letter are significantly different.

Level	- Level	Difference	Std Err Dif	Lower CL	Upper CL	p-Value	Difference
PI	TI	3.655000	1.236188	1.11855	6.191449	0.0064*	
OI	TI	2.818000	1.308259	0.13367	5.502326	0.0403*	
PI	OI	0.837000	1.048941	-1.31525	2.989249	0.4319	

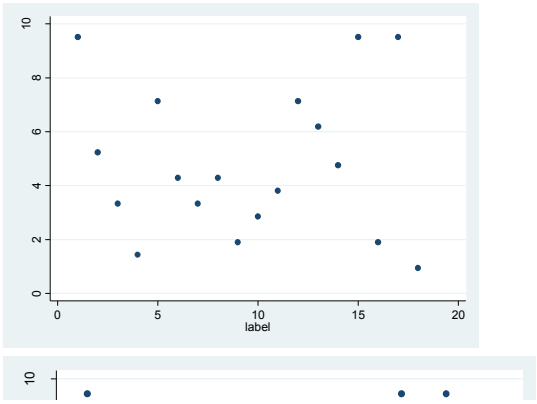
Within-groups statistical descriptions and ANOVAs

APPENDIX L PI Group Descriptive statistics

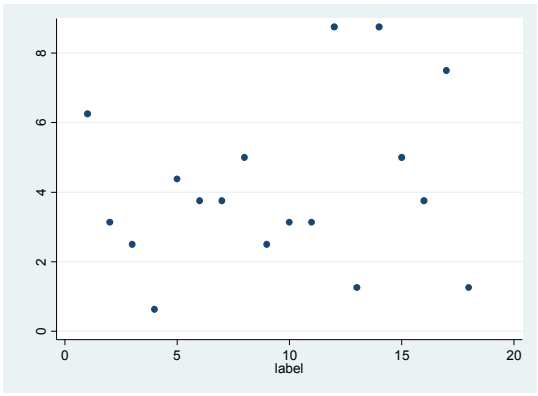
Test	Variable	n	mean	ED	Min	50%	Max
pre	20 piprepromsub	18	4.84	2.79	1	4.29	9.52
pre	21 piprepromobj	18	1.85	1.83	0	1.33	6.67
pre	22 piprepromcop	18	4.13	2.39	0.63	2.75	8.75
pre	23 piprepromin	18	5.91	2.16	2.17	6.3	8.7
pre	24 pripreprompro	18	2.04	2.17	0	1.2	5.86
pre	25 pipreprom	18	3.76	1.99	1.15	3.26	7.12
post	26 pipostpromsub1	10	8.57	1.47	4.76	8.57	10
post	27 pipostpromobj1	15	6.97	2.31	3.33	6.67	10
post	28 pipostpromcop1	11	7.84	2.28	2.5	8.75	10
post	29 pipostpromin1	6	9.13	0.77	7.83	9.35	10
post	30 pipostprompro1	6	6.95	2.66	2.07	7.58	9.66
post	31 pipostprom1	6	7.91	1.77	4.62	8.17	9.62
post	32 pipostpromsub2	14	7.68	1.64	4.76	7.62	10
post	33 pipostpromobj2	14	5.38	2.41	2	5.33	9.33
post	34 pipostpromcop2	14	6.92	2.15	3.13	7.5	10
post	35 pipostpromin2	14	7.76	1.39	5.65	7.83	9.57
post	36 pipostprompro2	14	6.01	2.16	3.11	6.03	9.31
post	37 pipostprom2	14	6.78	1.62	4.23	6.44	9.42

Scatter plots of variables with a high ED in the PI group

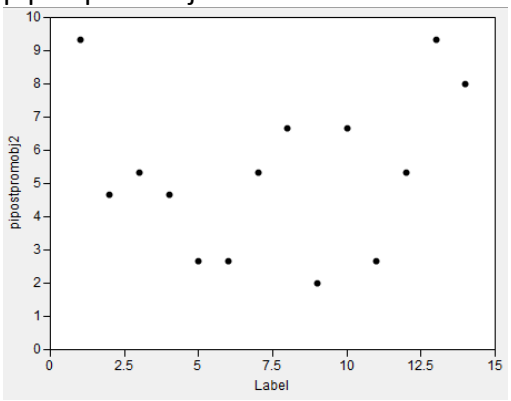
pipreprom sub



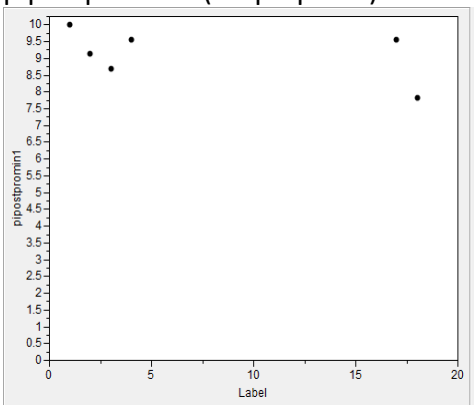
pipreprom cop



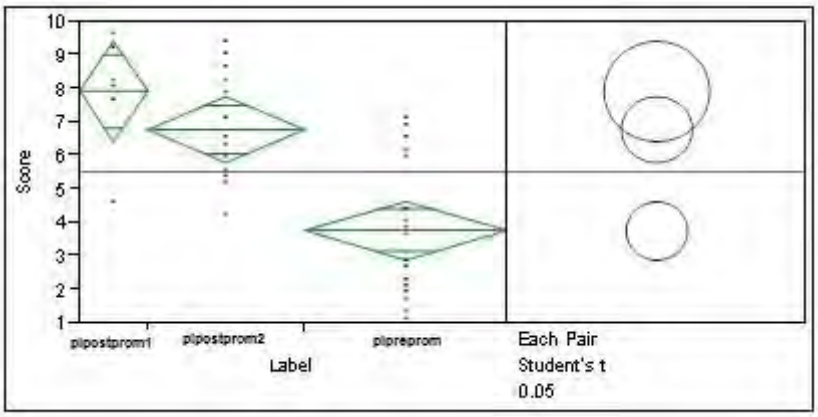
pipostpromobj2



pipostpromin1 (DE pequeña)



Oneway ANOVA within PI group: pipreprom vs. pipostprom1 vs. pipostprom2



Oneway analysis of general scores between pre and post-tests within PI group

Oneway Anova
Summary of Fit

Rsquare	0.488813
Adj Rsquare	0.459602
Root Mean Square Error	1.834779
Mean of Response	5.531053
Observations (or Sum Wgts)	38

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Label	2	112.66732	56.3337	16.7340	<.0001*
Error	35	117.82443	3.3664		
C. Total	37	230.49176			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
pipostprom1	6	7.91833	0.74905	6.3977	9.4390
pipostprom2	14	6.78500	0.49037	5.7895	7.7805
pipreprom	18	3.76000	0.43246	2.8821	4.6379

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.03011	0.05

Abs(Dif)-LSD	pipostprom1	pipostprom2	pipreprom
pipostprom1	-2.15051	-0.68418	2.402446
pipostprom2	-0.68418	-1.40784	1.697674
pipreprom	2.402446	1.697674	-1.2416

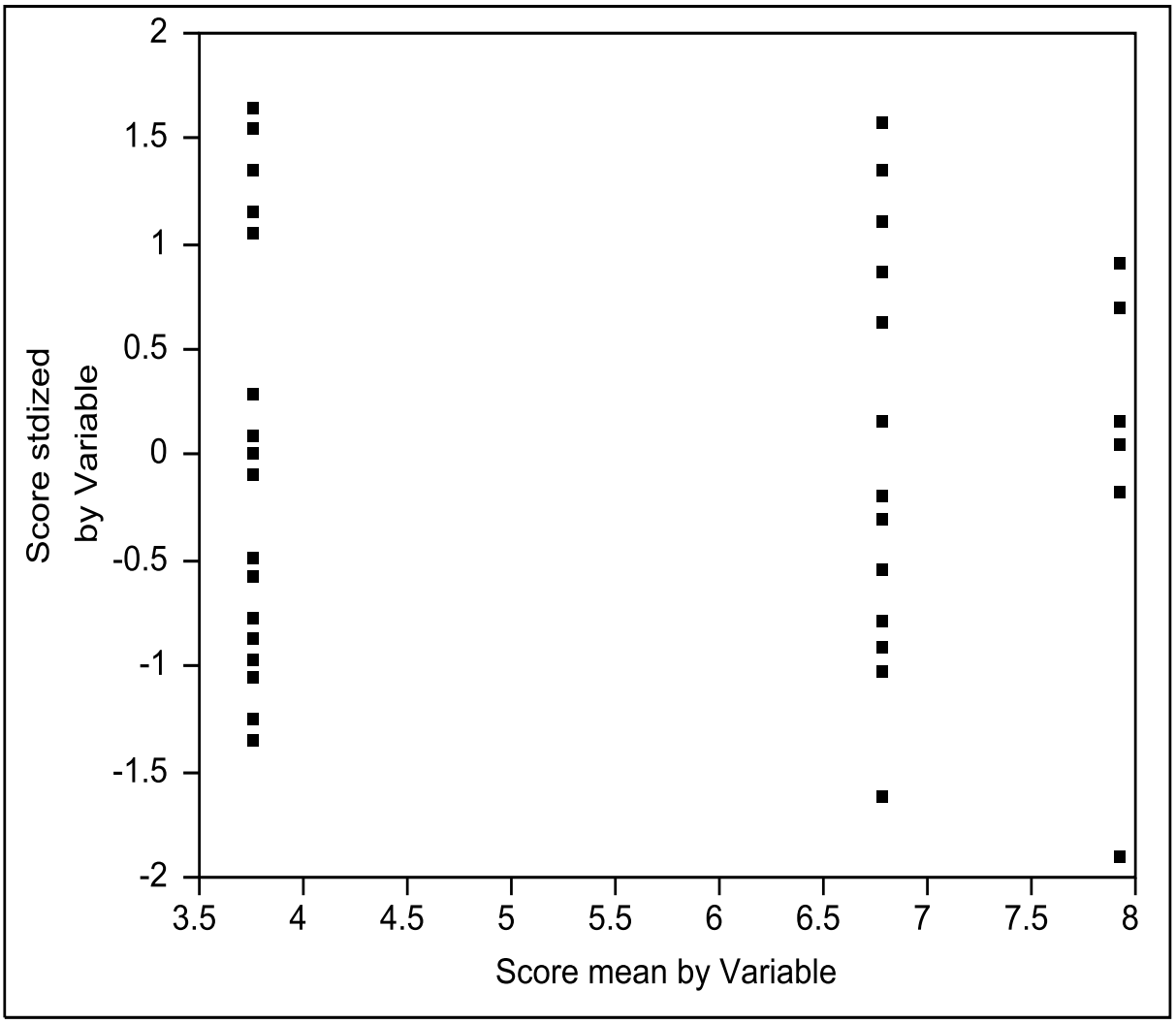
Positive values show pairs of means that are significantly different.

Level		Mean
pipostprom1	A	7.9183333
pipostprom2	A	6.7850000
pipreprom	B	3.7600000

Levels not connected by same letter are significantly different.

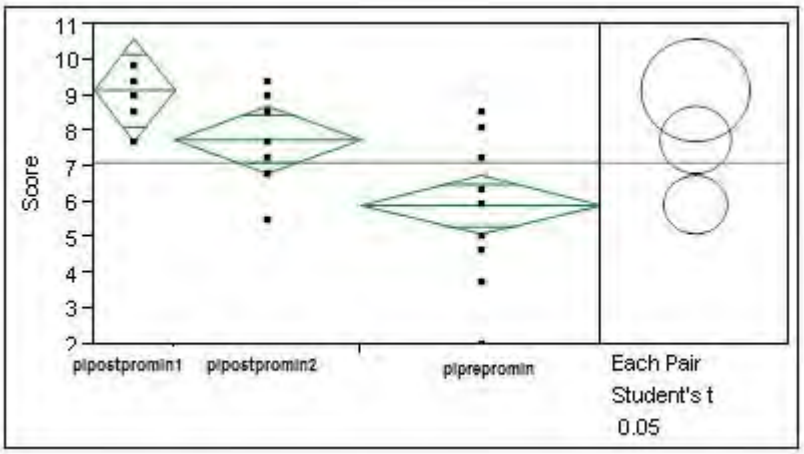
Residual vs. predicted values

Bivariate Fit of Score standardized by Variable By Score mean by Variable



Normality within the groups

pipreprepromin vs. pipostpromin1 vs. pipostpromin2



Oneway analysis of interpretation between pre and post-tests within PI group

Oneway Anova
Summary of Fit

Rsquare	0.343091
Adj Rsquare	0.305554
Root Mean Square Error	1.753263
Mean of Response	7.106053
Observations (or Sum Wgts)	38

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Variable_PI	2	56.19107	28.0955	9.1399	0.0006*
Error	35	107.58764	3.0739		
C. Total	37	163.77871			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
pipostpromin1	6	9.13333	0.71577	7.6802	10.586
pipostpromin2	14	7.76571	0.46858	6.8144	8.717
pipreprepromin	18	5.91722	0.41325	5.0783	6.756

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.03011	0.05

Abs(Dif)-LSD	pipostpromin1	pipostpromin2	pipreprepromin
pipostpromin1	-2.05497	-0.36915	1.538234
pipostpromin2	-0.36915	-1.34529	0.580137
pipreprepromin	1.538234	0.580137	-1.18644

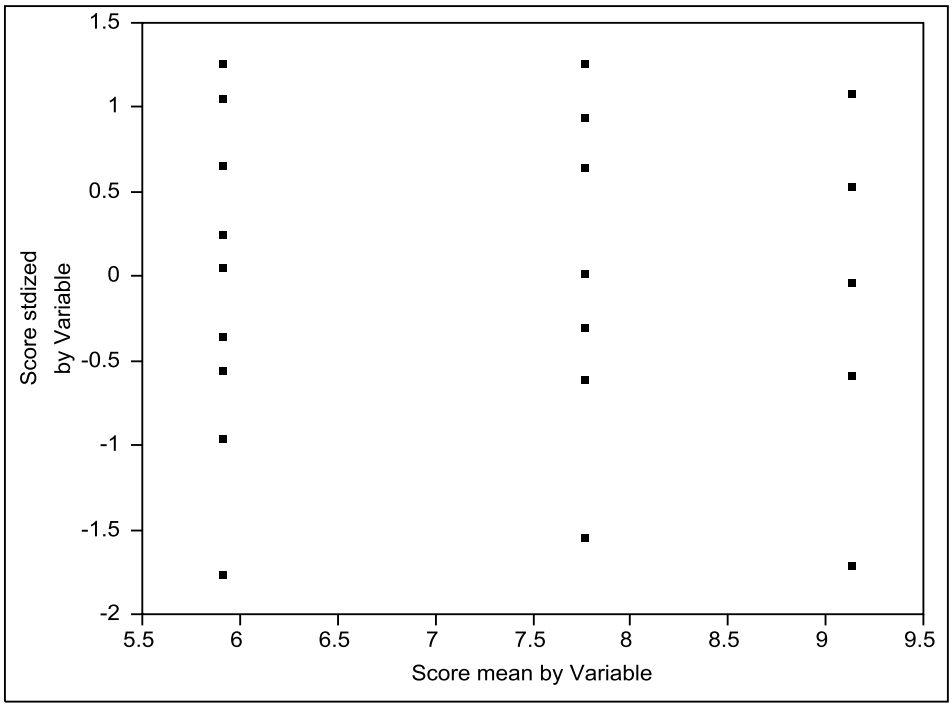
Positive values show pairs of means that are significantly different.

Level		Mean
pipostpromin1	A	9.1333333
pipostpromin2	A	7.7657143
pipreprepromin	B	5.9172222

Levels not connected by same letter are significantly different.

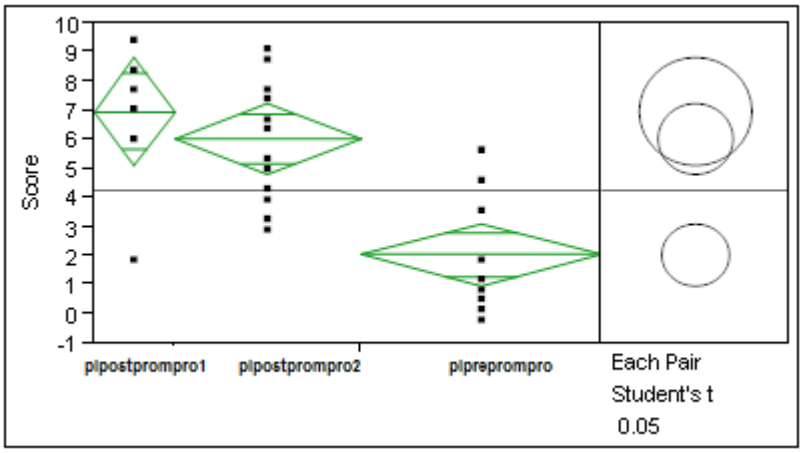
Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



Normality of groups

piprepprompro vs. pipostprompro1 vs, pipostprompro2



Oneway analysis of production between pre and post-tests within PI group

Oneway Anova
Summary of Fit

Rsquare	0.496514
Adj Rsquare	0.467743
Root Mean Square Error	2.248366
Mean of Response	4.282632
Observations (or Sum Wgts)	38

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Variable_PI	2	174.48014	87.2401	17.2577	<.0001*
Error	35	176.93020	5.0551		
C. Total	37	351.41034			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
pipostprompro1	6	6.95500	0.91789	5.0916	8.8184
pipostprompro2	14	6.01000	0.60090	4.7901	7.2299
piprepprompro	18	2.04833	0.52994	0.9725	3.1242

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.03011	0.05

Abs(Dif)-LSD	pipostprompro1	pipostprompro2	piprepprompro
pipostprompro1	-2.63527	-1.28221	2.754976
pipostprompro2	-1.28221	-1.72519	2.335141
piprepprompro	2.754976	2.335141	-1.52148

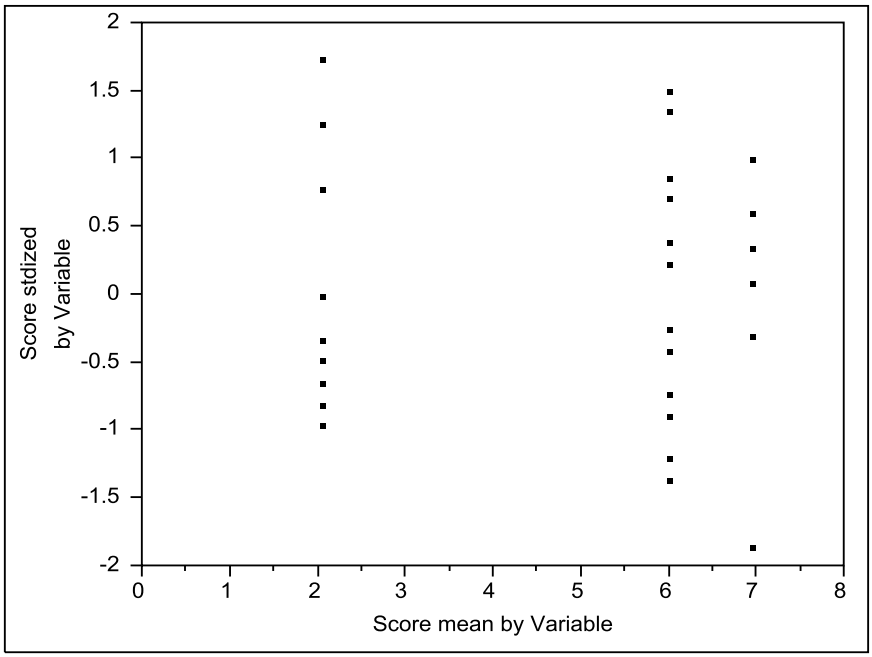
Positive values show pairs of means that are significantly different.

Level		Mean
pipostprompro1	A	6.9550000
pipostprompro2	A	6.0100000
piprepprompro	B	2.0483333

Levels not connected by same letter are significantly different.

Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



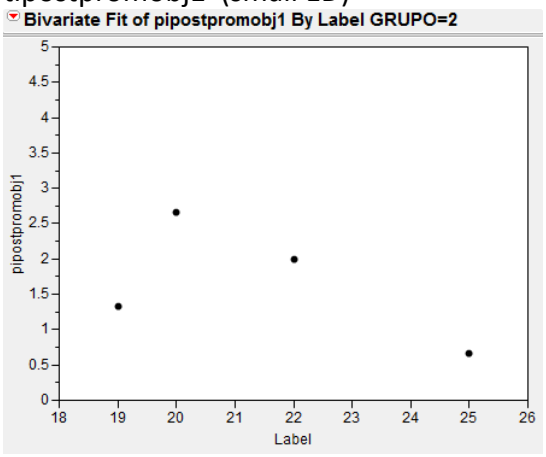
Normality of groups

APPENDIX M TI Group Descriptive statistics

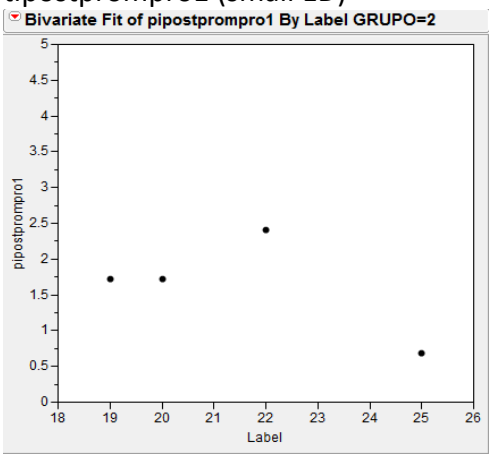
Tets	Variable	n	Mean	ED	Min	50%	Max
pre	20 tiprepromsub	7	4.21	1.99	1.43	4.29	7.14
pre	21 tiprepromobj	7	2.66	1.33	0.67	3.33	4.0
pre	22 tiprepromcop	7	5.35	1.24	3.75	5.63	6.88
pre	23 tiprepromin	7	6.46	1.47	3.91	6.96	8.7
pre	24 tiprepprompro	7	2.26	2.02	0.34	1.72	5.52
pre	25 tipreprom	7	4.12	1.37	1.92	4.04	6.15
post	26 tipostpromsub1	4	4.64	1.62	2.38	5	6.19
post	27 tipostpromobj1	4	1.66	0.86	0.67	1.66	2.67
post	28 tipostpromcop1	4	3.59	2.41	0	4.69	5
post	29 tipostpromin1	4	5.76	0.89	4.78	5.87	6.52
post	30 tipostprompro1	4	1.63	0.71	0.69	1.72	2.41
post	31 tipostprom1	4	3.46	0.75	2.50	3.56	4.23
post	32 tipostpromsub2	6	5.15	1.58	3.33	5.0	7.62
post	33 tipostpromobj2	6	2.44	2.17	0	1.66	6
post	34 tipostpromcop2	6	5.00	1.36	3.13	4.69	6.88
post	35 tipostpromin2	6	6.81	1.39	5.22	6.74	9.13
post	36 tipostprompro2	6	2.35	1.59	0.0	2.41	4.14
post	37 tipostprom2	6	4.32	1.95	2.88	4.04	6.35

Scatter plots of variables with a high ED

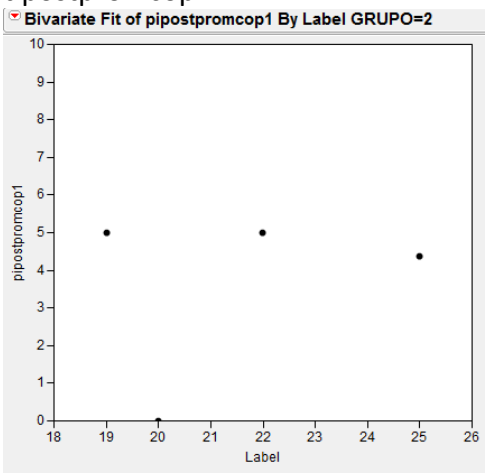
tipostpromobj1 (small ED)



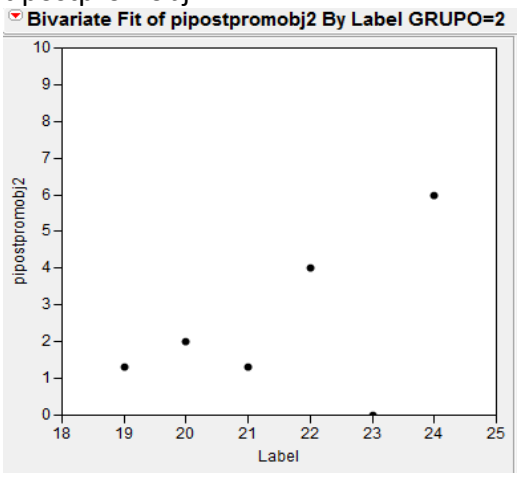
tipostprompro1 (small ED)



tipostpromcop1

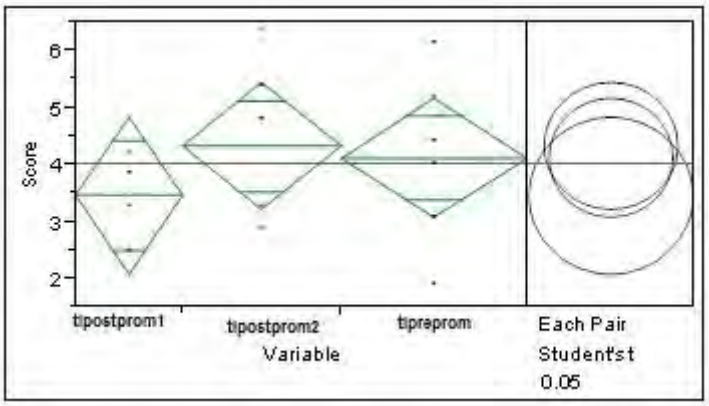


tipostpromobj2



Oneway ANOVA within TI group

tipreprom vs. tipostprom1 vs. tipostprom2



Oneway analysis of general scores between pre and post-tests within TI group

Oneway Anova
Summary of Fit

Rsquare	0.076006
Adj Rsquare	-0.05599
Root Mean Square Error	1.274918
Mean of Response	4.038235
Observations (or Sum Wgts)	17

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Variable	2	1.871839	0.93592	0.5758	0.5750
Error	14	22.755808	1.62541		
C. Total	16	24.627647			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
tipostprom1	4	3.46250	0.63746	2.0953	4.8297
tipostprom2	6	4.32667	0.52048	3.2103	5.4430
tipreprom	7	4.12000	0.48187	3.0865	5.1535

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.14479	0.05

Abs(Dif)-LSD	tipostprom2	tipreprom	tipostprom1
tipostprom2	-1.57872	-1.31463	-0.9009
tipreprom	-1.31463	-1.46161	-1.05639
tipostprom1	-0.9009	-1.05639	-1.93353

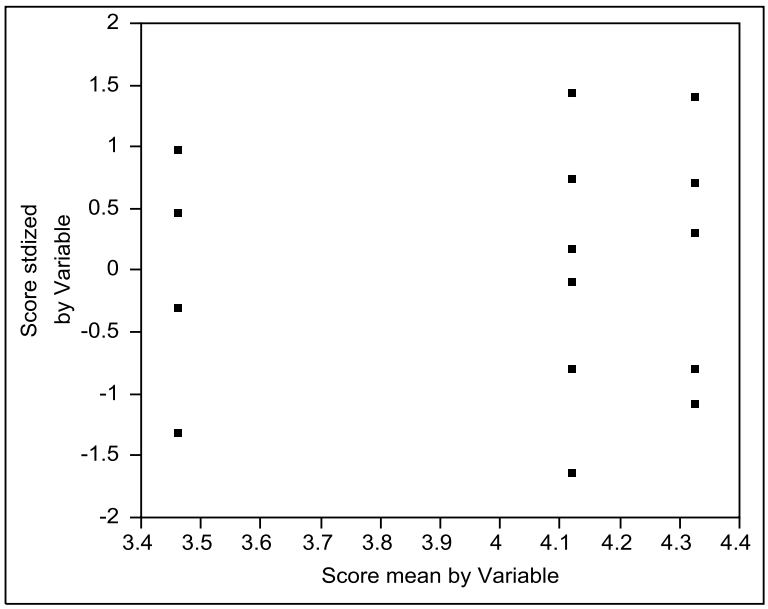
Positive values show pairs of means that are significantly different.

Level		Mean
tipostprom2	A	4.3266667
tipreprom	A	4.1200000
tipostprom1	A	3.4625000

Levels not connected by same letter are significantly different.

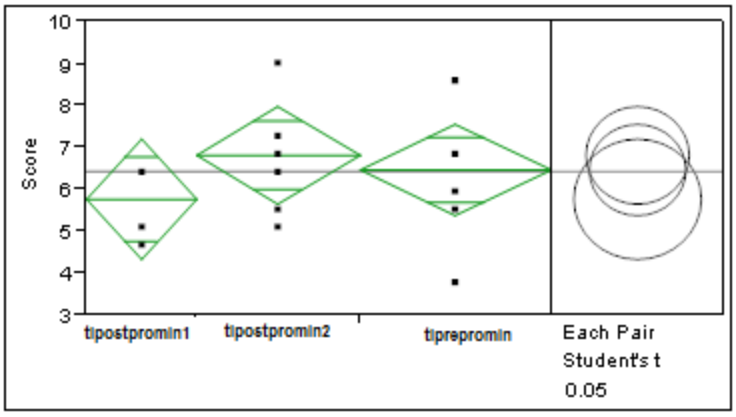
Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



Normality in each group

tiprepromin vs. tipostpromin1 vs. tipostpromin2



Oneway analysis of interpretation between pre and post-tests within TI group

Oneway Anova
Summary of Fit

Rsquare	0.096064
Adj Rsquare	-0.03307
Root Mean Square Error	1.340825
Mean of Response	6.42
Observations (or Sum Wgts)	17

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Variable	2	2.674831	1.33742	0.7439	0.4931
Error	14	25.169369	1.79781		
C. Total	16	27.844200			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
tipostpromin1	4	5.76000	0.67041	4.3221	7.1979
tipostpromin2	6	6.81167	0.54739	5.6376	7.9857
tiprepromin	7	6.46143	0.50678	5.3745	7.5484

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.14479	0.05

Abs(Dif)-LSD	tipostpromin2	tiprepromin	tipostpromin1
tipostpromin2	-1.66033	-1.2497	-0.80464
tiprepromin	-1.2497	-1.53717	-1.10106
tipostpromin1	-0.80464	-1.10106	-2.03349

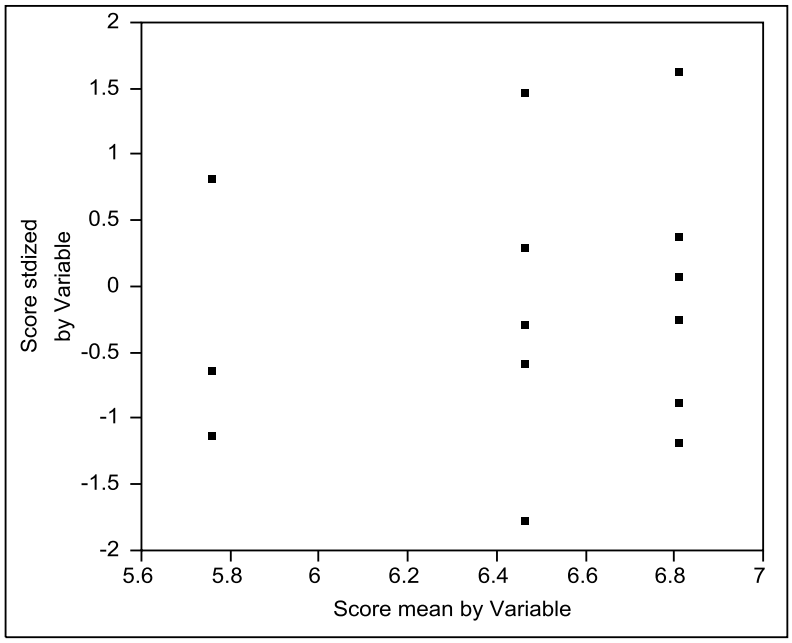
Positive values show pairs of means that are significantly different.

Level		Mean
tipostpromin2	A	6.8116667
tiprepromin	A	6.4614286
tipostpromin1	A	5.7600000

Levels not connected by same letter are significantly different.

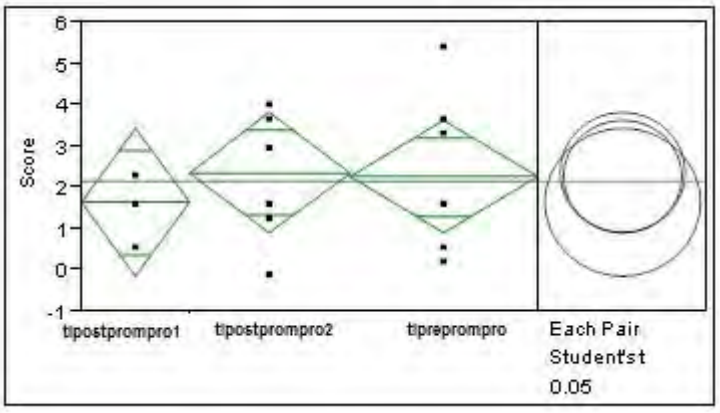
Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



Normality in each group

tipreprompro vs. tipostprompro1 vs. tipostprompro2



Oneway analysis of production between pre and post-tests within TI group

Oneway Anova
Summary of Fit

Rsquare	0.035
Adj Rsquare	-0.10286
Root Mean Square Error	1.663091
Mean of Response	2.148235
Observations (or Sum Wgts)	17

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Variable	2	1.404426	0.70221	0.2539	0.7793
Error	14	38.722221	2.76587		
C. Total	16	40.126647			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
tpostprompro1	4	1.63500	0.83155	-0.1485	3.4185
tipostprompro2	6	2.35500	0.67895	0.8988	3.8112
tipreprompro	7	2.26429	0.62859	0.9161	3.6125

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.14479	0.05

Abs(Dif)-LSD	tipostprompro2	tipreprompro	tipostprompro1
tipostprompro2	-2.05939	-1.89377	-1.58247
tipreprompro	-1.89377	-1.90663	-1.60643
tipostprompro1	-1.58247	-1.60643	-2.52223

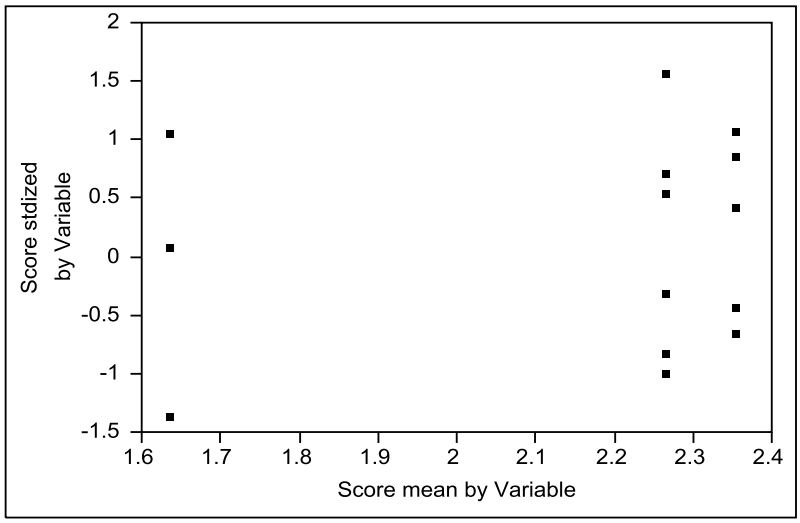
Positive values show pairs of means that are significantly different.

Level		Mean
tipostprompro2	A	2.3550000
tipreprompro	A	2.2642857
tipostprompro1	A	1.6350000

Levels not connected by same letter are significantly different.

Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



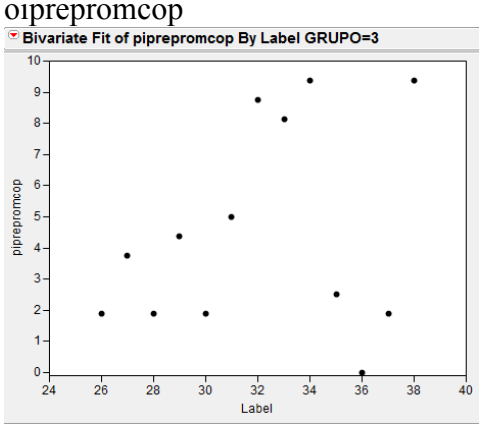
Normality in each group

APPENDIX N OI Group Descriptive statistics

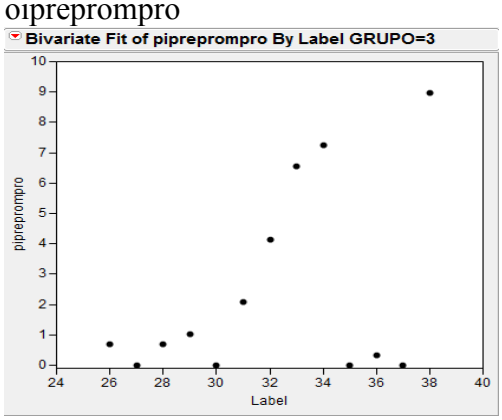
Test	Variable	n	Mean	ED	Min	50%	Max
pre	20 oiprepromsub	13	4.06	2.56	1.43	2.86	8.57
pre	21 oiprepromobj	13	2.61	2.75	0.0	1.33	10
pre	22 oiprepromcop	13	4.52	3.31	0.0	3.75	9.38
pre	23 oiprepromin	13	5.48	2.11	2.61	4.78	9.57
pre	24 oiprepprompro	13	2.44	3.18	0.0	0.69	8.97
pre	25 oipreprom	13	3.78	2.51	1.54	3.08	9.23
post	26 oipostpromsub1	13	8.16	2.43	1.9	9.05	10.0
post	27 oipostpromobj1	12	5.00	3.54	0.0	4.66	10
post	28 oipostpromcop1	9	6.94	3.37	0.0	6.88	10.0
post	29 oipostpromin1	9	7.00	2.24	2.17	7.39	9.57
post	30 oipostprompro1	9	5.90	1.78	3.1	5.86	7.93
post	31 oipostprom1	9	6.39	1.94	2.69	6.35	8.65
post	32 oipostpromsub2	10	5.91	2.78	1.9	5.95	9.52
post	33 oipostpromobj2	10	4.86	2.82	0.67	4.33	10.0
post	34 oipostpromcop2	10	7.25	2.57	3.13	8.44	10.0
post	35 oipostpromin2	10	7.08	1.39	5.65	6.52	9.57
post	36 oipostprompro2	10	5.17	3.32	0.34	5.69	9.66
post	37 oipostprom2	10	6.02	2.36	3.08	5.96	9.62

Scatter plots of variables with a high ED

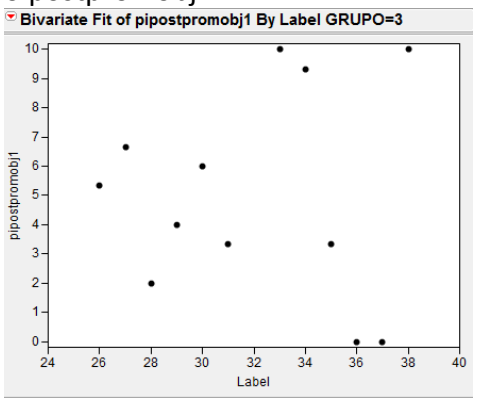
oiprepromcop



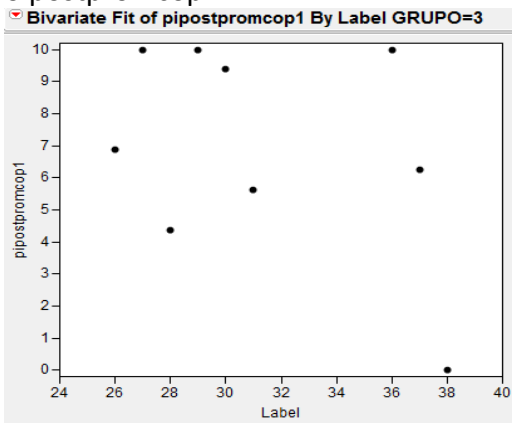
oipreprompro



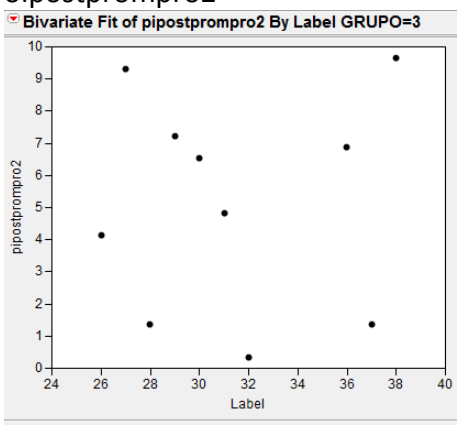
oipostpromobj1



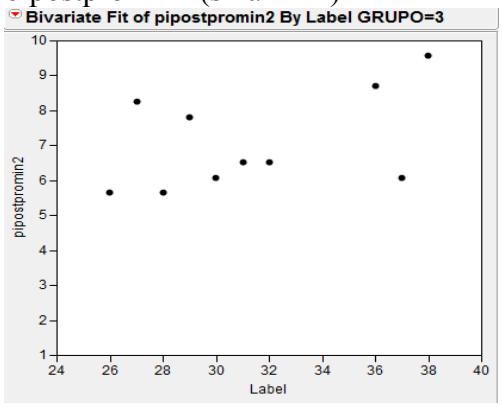
oipostpromcop1



oipostprompro2

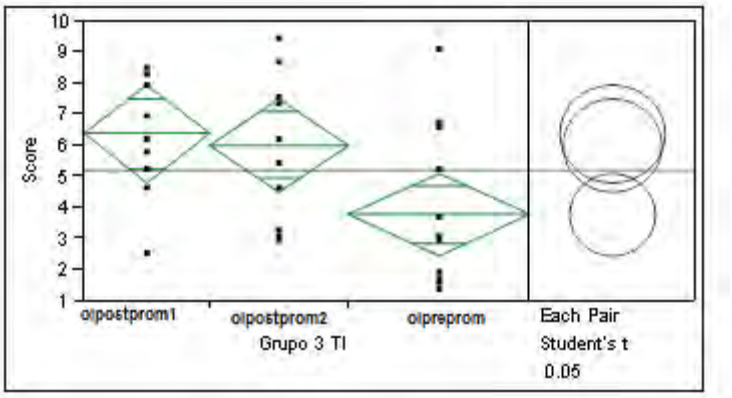


oipostpromin2 (small ED)



Oneway ANOVA within OI group

oipreprom vs. oipostprom1 vs. oipostprom2



Oneway analysis of general scores between pre and post-tests within OI group

Oneway Anova
Summary of Fit

Rsquare	0.225387
Adj Rsquare	0.171965
Root Mean Square Error	2.319841
Mean of Response	5.216875
Observations (or Sum Wgts)	32

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo 3 OI	2	45.41063	22.7053	4.2190	0.0246*
Error	29	156.06826	5.3817		
C. Total	31	201.47889			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
oipostprom1	9	6.38889	0.77328	4.8074	7.9704
oipostprom2	10	6.02100	0.73360	4.5206	7.5214
oipreprom	13	3.78692	0.64341	2.4710	5.1028

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.04523	0.05

Abs(Dif)-LSD	oipostprom1	oipostprom2	oipreprom
oipostprom1	-2.23663	-1.81211	0.544566
oipostprom2	-1.81211	-2.12185	0.238389
oipreprom	0.544566	0.238389	-1.86099

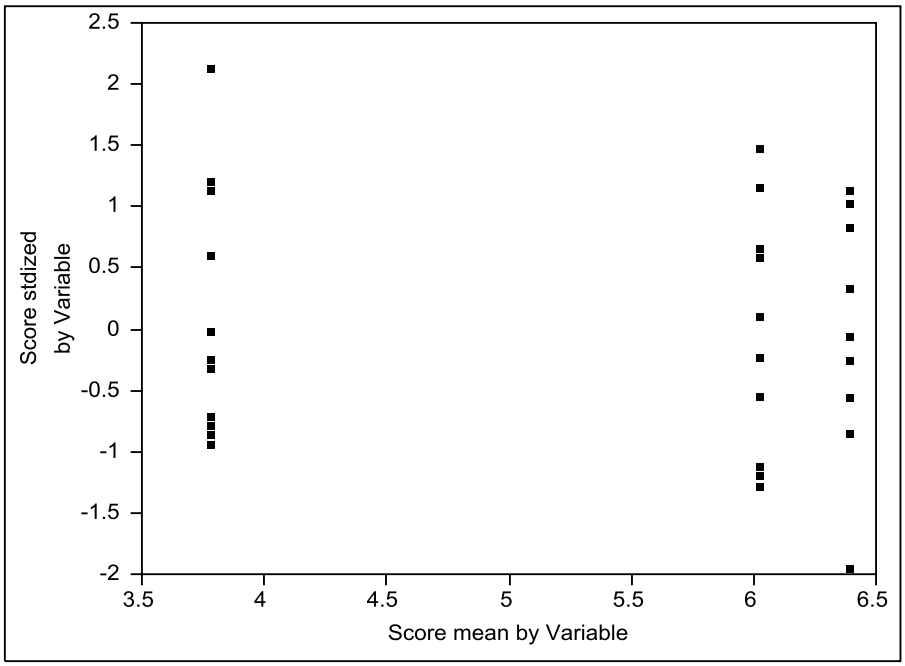
Positive values show pairs of means that are significantly different.

Level		Mean
oipostprom1	A	6.3888889
oipostprom2	A	6.0210000
oipreprom	B	3.7869231

Levels not connected by same letter are significantly different.

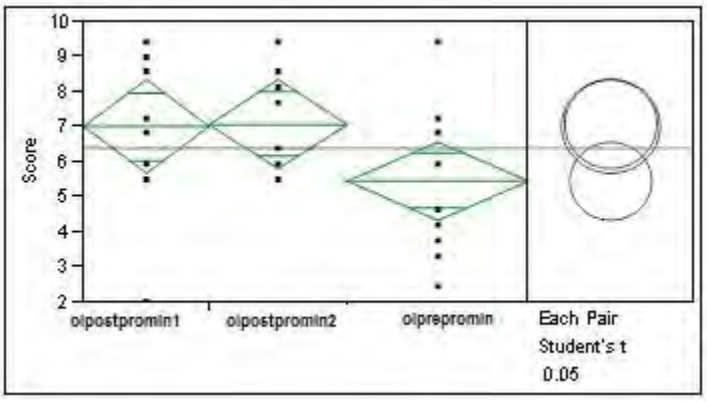
Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



Normaliy in each group

oiprepromin vs. oipostpromin1 vs. oipostpromin2



Oneway analysis of scores in interpretation between pre and post-tests within OI group

Oneway Anova
Summary of Fit

Rsquare	0.145579
Adj Rsquare	0.086653
Root Mean Square Error	1.955901
Mean of Response	6.41375
Observations (or Sum Wgts)	32

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Grupo_3_OI	2	18.90244	9.45122	2.4706	0.1022
Error	29	110.94091	3.82555		
C. Total	31	129.84335			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
oipostpromin1	9	7.00556	0.65197	5.6721	8.3390
oipostpromin2	10	7.08800	0.61851	5.8230	8.3530
oiprepromin	13	5.48538	0.54247	4.3759	6.5949

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.04523	0.05

Abs(Dif)-LSD	oipostpromin2	oipostpromin1	oiprepromin
oipostpromin2	-1.78897	-1.75555	-0.07999
oipostpromin1	-1.75555	-1.88574	-0.21446
oiprepromin	-0.07999	-0.21446	-1.56903

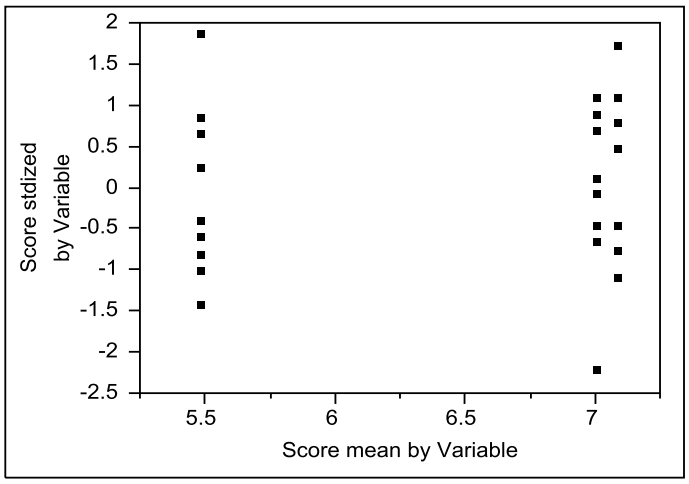
Positive values show pairs of means that are significantly different.

Level		Mean
oipostpromin2	A	7.0880000
oipostpromin1	A	7.0055556
oiprepromin	A	5.4853846

Levels not connected by same letter are significantly different.

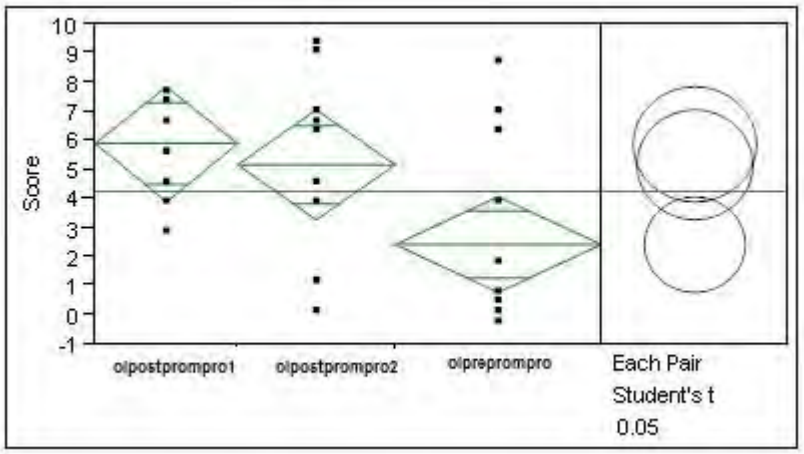
Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



Normality of each group

oipreprompro vs. oipostprompro1 vs. oipostprompro2



Oneway analysis of scores of production between pre and post-tests within OI group

Oneway Anova
Summary of Fit

Rsquare	0.234442
Adj Rsquare	0.181645
Root Mean Square Error	2.918311
Mean of Response	4.2675
Observations (or Sum Wgts)	32

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Variables	2	75.63430	37.8172	4.4404	0.0208*
Error	29	246.97970	8.5165		
C. Total	31	322.61400			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
oipostprompro1	9	5.90111	0.97277	3.9116	7.8907
oipostprompro2	10	5.17300	0.92285	3.2856	7.0604
oipreprompro	13	2.44000	0.80939	0.7846	4.0954

Std Error uses a pooled estimate of error variance

Means Comparisons
Comparisons for each pair using Student's t

t	Alpha
2.04523	0.05

Abs(Dif)-LSD	oipostprompro1	oipostprompro2	oipreprompro
oipostprompro1	-2.81363	-2.01428	0.872945
oipostprompro2	-2.01428	-2.66925	0.222467
oipreprompro	0.872945	0.222467	-2.34108

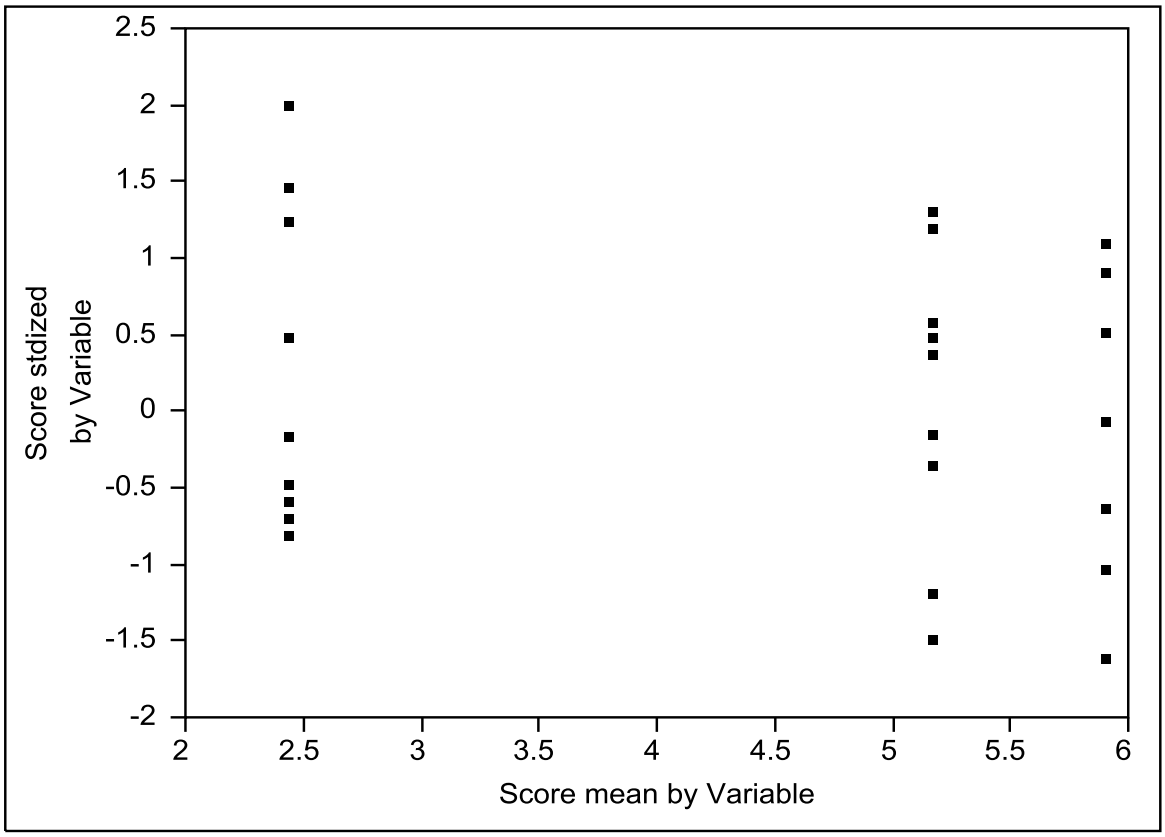
Positive values show pairs of means that are significantly different.

Level		Mean
oipostprompro1	A	5.9011111
oipostprompro2	A	5.1730000
oipreprompro	B	2.4400000

Levels not connected by same letter are significantly different.

Residual vs. predicted values

Bivariate Fit of Score stdized by Variable By Score mean by Variable



Normality in each group