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Positive Evidence Versus Explicit Rule Presentation and Explicit Negative Feedback: A Computer-Assisted Study

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The facilitative role of explicit information in second language acquisition has been supported by a significant body of research (Alanen, 1995; Carroll & Swain, 1993; de Graaff, 1997; DeKeyser, 1995; Ellis, 1993; Robinson, 1996, 1997), but counterevidence is also available (Rosa & O'Neill, 1999; VanPatten & Oikkenon, 1996). This experimental study investigates the effects of computer-delivered, explicit information on the acquisition of Spanish word order by comparing four groups comprised of [+/−Explanation] and [+/−Explicit Feedback]. Results

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showed that all groups improved significantly and similarly on interpretation and production tests. It is suggested that explicit information may not necessarily facilitate second language acquisition and that exposing learners to task-essential practice is sufficient to promote acquisition.

There is general agreement that exposure to the language (i.e., input) is *necessary* to learn languages, but the jury is still out on whether input is *sufficient* for adult second language (L2) learning. Input may need to be supplemented with some type of form-focused instruction, that is, "events which occur within meaning-based approaches to L2 instruction in which a focus on language is provided in either spontaneous or predetermined ways" (Spada, 1997, p. 73). One manner of focusing on form is to provide the learner with explicit information[1] before or during exposure to input, with grammatical explanation or explicit feedback, respectively. Several empirical studies have found that the provision of explicit information is beneficial to second language acquisition (SLA; Alanen, 1995; Carroll & Swain, 1993; de Graaff, 1997; DeKeyser, 1995; Ellis, 1993; Nagata, 1993; Nagata & Swisher, 1995; Robinson, 1996, 1997; Rosa, 1999). Other studies present evidence that explicit information does not necessarily play a facilitative role for SLA (Rosa & O'Neill, 1999; Van Patten & Oikkenon, 1996). In light of these findings a closer examination of specific issues such as the amount of explicit information provided as well as its timing (preemptive or reactive) is called for, as is research that examines the nature of the input and the tasks used to present it.

Within studies on the role of explicit instruction in L2 acquisition, research on the effects of processing instruction (PI) (VanPatten, 1996, 2003) shows that exposure to a combination of (a) information about both a linguistic form/structure and an input-processing strategy and (b) manipulated input presented through activities that push the learner to process the form/structure can alter specific L2 learners' processing strategies resulting in acquisition (Cadierno, 1995; Farley, 2001; VanPatten

& Cadierno, 1993; VanPatten & Oikkenon, 1996; VanPatten & Sanz, 1995; VanPatten & Wong, 2001). The input is manipulated to make the form more salient and frequent, and the input-focused tasks are crucially designed so that learners attend to the target grammatical form/structure in order to understand the meaning and complete the activity (i.e., task-essentialness).[2] Interestingly, VanPatten and Oikkenon (1996) found that it was not the explicit information provided before exposure to input, but rather the structured input activities, that were responsible for L2 development. Benati (2003), Farley (2003), and Wong (2003) all replicated VanPatten and Oikkenon using different target forms and found that structured input activities played a major role and were the necessary and perhaps sufficient component of PI. Explicit information, on the other hand, played a much lesser role, if any.

The present empirical study examines the isolated effects of explicit rules presented before and during practice on the acquisition of Spanish object pronouns using PI-based input and tasks. The study incorporated computer-assisted instruction (CAI) into the design and hypothesized that the effects of explicit information about how the language works are intrinsically related to the quality of the input and how it is presented and do not depend solely on the explanation and feedback components that accompany it.

Review of Literature

The following sections review the literature on the effects of providing explicit information about the target language to adult L2 learners. First, we review studies that have provided such information before practice in the form of explicit rule presentation. Then, we discuss those that have provided it during practice in the form of explicit negative feedback. Finally, we draw conclusions based on the literature reviewed and provide motivation for the current study.

Explicit Rule Presentation

A substantial body of research has investigated the isolated effects of explicit rule presentation on the acquisition of natural and artificial languages as measured by grammaticality judgment tests (Ellis, 1993; Robinson, 1996, 1997) and controlled production assessments (Alanen, 1995; de Graaff, 1997; DeKeyser, 1995).

Ellis (1993) investigated whether exposure to the "soft" mutation of Welsh was more effective for acquisition with or without rule presentation and examples. He randomly assigned 51 participants to three learning conditions: a Rule group, a Rule & Instances group, and two Random groups. The Rule group received explicit rule presentation. In addition to explicit rules, the Rule & Instances group saw examples of the rules used in sentences. The Random groups received neither explicit rules nor examples. All groups proceeded through "natural learning" phases in which they translated phrases from Welsh to English. Ellis suggested that the results from grammaticality judgment tests demonstrated the following: (a) The Random groups showed some implicit learning, (b) the Rule group developed explicit knowledge and evidenced some transfer to implicit knowledge, and (c) the Rule & Instances group developed explicit and implicit knowledge, both of which were generalizable. Ellis interpreted the results as showing that explicit instruction can facilitate acquisition, but that explicit instruction in combination with instances of the target form is better.

Robinson's (1996) experimental study examined the effects of instruction, which was operationalized as explicit rule presentation, on the ability of 104 adult Japanese learners to acquire simple and complex English grammatical rules. Participants were randomly assigned to four groups and presented with 40 exemplar sentences generated with either a simple or a hard English grammatical rule. Each group's training phase was based on different purposes for reading a text. The implicit group was asked to memorize each sentence. The incidental group was instructed to read the sentences for meaning. The rule-search group attempted to

identify rules. Finally, the instructed group read through the rules prior to exposure and then had the rules available to consult as they read through exemplar sentences. Results indicated that, for the simple rule, learners exposed to rules prior to exposure to the forms were significantly more accurate on grammaticality judgment tests than all other groups. For sentences containing the hard rule, the instructed group was more accurate judging grammatical sentences but not ungrammatical sentences. Robinson concluded that explicit instruction with exposure to examples has advantages over rule search and implicit learning.

Robinson (1997) followed a similar design to that above. Instead of a rule-search group, however, he included an enhanced group that was asked to read exemplar sentences, in which the target form was surrounded by a box, for meaning. The implicit, incidental, and instructed conditions were defined in the same way as in Robinson (1996). Sixty native Japanese speakers were exposed to dative alternation in English and assigned to one of the four conditions. After exposure, participants judged the acceptability of grammatical sentences that they had seen during the exposure as well as novel grammatical sentences and ungrammatical sentences. All groups performed similarly on previously seen grammatical items, but the instructed group significantly outperformed all other groups on novel grammatical and ungrammatical items, showing that they not only remembered instances previously encountered but also were able to generalize the knowledge. Robinson's study presents further evidence that learners benefit from explicit information.

In the studies reviewed above, L2 knowledge was measured by grammaticality judgment tests only. Production tasks, however, are valuable instruments, as they inform us what learners can do with what they have learned. Alanen (1995) included both grammaticality judgments and sentence completion tests in her design. Using a modified form of Finnish, Alanen tested for effects of explicit grammatical explanation and textual enhancement (i.e., target forms made perceptually salient with italics) on the acquisition of Finnish locative suffixes and consonant changes.

She assigned 36 learners to three experimental groups and a control group. All groups read two passages for meaning. The Enhance group received enhanced passages with target forms in italics. The Rule group was provided with explicit grammatical explanation before reading unenhanced passages. Finally, the Rule & Enhance group received both explicit grammatical explanation and the enhanced version of the passages. Alanen's results showed that explicit rule-based instruction had an overall positive effect on acquisition. Both rule-based groups performed significantly better on a sentence completion task than the enhanced-only and control groups. The group that received rules and enhanced forms, however, had lower mean scores on a grammaticality judgment test than the other experimental groups. By analyzing think-aloud data, Alanen was able to attribute low grammaticality judgment test scores of the Rule & Enhance group to participants' overgeneralization of a rule, which appeared to be a result of the provision of examples given in the instruction and passages. Alanen concluded that all treatments caused learners to focus more attention on the forms, but that those groups receiving explicit rule presentation performed better, even considering the overgeneralization that was evidenced.

DeKeyser (1995), who also incorporated production tests into his experimental design, examined the effects of explicit rule presentation prior to exposure by comparing two treatment groups, one explicit and one implicit. He hypothesized that explicit-deductive learning would be more effective for learning simple categorical rules (i.e., number, case, or gender markings on nouns or verbs), whereas implicit-inductive learning would be better for learning linguistic prototypes (i.e., number, case, or gender markings that are subject to allomorphy). During the treatment, all participants took part in 20 sessions during which they viewed pictures and sentences describing them. In addition, participants in the explicit group received grammatical explanation during the second, third, and eleventh sessions. Results from analyses of production data show that on simple categorical rules, participants in the explicit condition signifi-

cantly outperformed those in the implicit condition. Statistical analysis was not available for performance on prototypical rules. In conclusion, DeKeyser states that explicit language learning is superior to having students induce rules for themselves.

Alanen (1995), DeKeyser (1995), Ellis (1993), and Robinson (1996, 1997) examined the effects of conditions in which participants received explicit rule presentation in addition to *exposure* to the target forms. This research showed that the provision of explicit rule presentation prior to exposure had positive effects on the acquisition of specific language forms. In these studies, the type of exposure was receptive, in that participants were instructed to read sentences for a variety of purposes (meaning, memorization, and rule search), but participants did not *practice* manipulating the form. In contrast, de Graaff (1997) implemented CAI in his design to look at the effects of explicit rule presentation in combination with practice of—rather than simple exposure to—target forms. De Graaff provided two groups of 27 university students with an explicit or an implicit instructional packet including both simple and complex morphological and syntactic forms of the artificial language eXperanto. Both groups read dialog translations, completed vocabulary activities, and practiced interpreting and producing the forms in exercises. Immediate feedback was also provided to both groups. Participants were told whether their response was correct and (if not) provided with the correct answer. The groups differed in that the explicit group was exposed to explicit rule presentation on grammatical structures and received grammatical explanation during feedback, whereas the implicit group merely rehearsed example sentences. After approximately 150 hr of computer-based lessons, participants in the explicit-instruction group performed better on all test sessions, including delayed posttests, and on all task types (grammaticality judgment with and without time pressure, fill-in-the-gaps, and correction) than learners in the implicit group. Analyses showed no differential effects of explicit instruction on simple versus complex morphological structures but identified an advantage for the explicit group on

complex syntactic structures. Overall, these results suggest that explicit instruction is beneficial when combined with practice decoding and producing the target form. Although incorporating practice, which entails feedback, in experimental designs allows for tasks that are more like what goes on inside and outside the classroom, it also results in designs in which explicit rule presentation and explicit negative feedback are easily confounded.

Although the studies reviewed above offer support for the beneficial effects of explicit rule explanation, they also present evidence that there are limitations to these effects. First, benefits found in DeKeyser (1995) were restricted to categorical rules describing simple patterns of covariance. Secondly, Robinson (1996) noted that instruction could lead learners to overgeneralize rules. Overgeneralization was also present in Alanen's (1995) Rule & Enhance group. Finally, Ellis (1993) noted that instruction was more beneficial if it was combined with exposure to exemplars. A limitation to the studies themselves is that, with the exception of those in de Graaff (1997), learners were exposed only to input; that is, participants were asked to read and memorize (in the case of short strings) or to read and comprehend or translate (in the case of a text in a natural language). Participants did not practice with the language (i.e., engage in interpretation or production of the target form) and hence did not benefit from feedback. It is probable that the interaction of explicit rule presentation with practice and/or explicit negative feedback might influence what is learned under any given condition. Since de Graaff did not isolate the effects of explicit rule presentation and explicit negative feedback, we cannot attribute the positive effect to one of the variables—feedback, explanation, or practice—alone.

Indeed, results of some studies indicate that explicit information is not necessary. Rosa and O'Neill (1999) investigated intake of Spanish contrary-to-fact sentences by randomly assigning 67 participants to four experimental groups and a control group. All groups were exposed to the target form through a puzzle task in which they had to match two clauses in order to

form a complete sentence. The clauses were provided on pieces of a puzzle, and participants knew if they had a correct match when the pieces fit together. The experimental groups, [+FI, +RS], [+FI, −RS], [−FI, +RS], and [−FI, −RS], varied in regard to whether participants received explicit formal instruction (FI) and/or directions to search for rules (RS). The control group was not given any specific directions on how to approach the task. Note that like those in de Graaff (1997), but unlike those in Alanen (1995), DeKeyser (1995), Ellis (1993), and Robinson (1996, 1997), participants received more than exposure to the target form: They also benefited from a form of practice, which inherently included implicit feedback. Rosa and O'Neill reported that all groups, including the control group, significantly improved from the pretest to the posttest. There were few differences between treatments. The only significant difference was that the two treatments that included explicit rule presentation ([+FI, +RS] and [+FI, −RS]) outperformed the most implicit treatment ([−FI, −RS]), which did not include explicit rule presentation or directions to search for rules. Interestingly, the analysis did not identify significant differences between the control group and any other group. These findings contrast with those reviewed above in at least two ways: (a) The instructed groups did not outperform the control group, and (b) the instructed groups did not outperform the rule-search group. Rosa and O'Neill point out that the "immediate feedback provided by the puzzle activity itself gave the learners enough information about the properties of the target structure so as to produce a similar effect than if they had been exposed to rule-based formal instruction" (p. 538) and conclude that "task demands may have an influence on how L2 input is processed" (p. 546). In other words, provision of positive evidence and implicit feedback by means of tasks that fulfill specific requirements, such as task essentialness, was sufficient to allow learners to take in the target form. In sum, it seems that with certain tasks, the task itself and not the explicit condition under which the task is carried out may lead to acquisition.

VanPatten and Oikkenon (1996) would seem to support this conclusion. They isolated effects of explicit information and practice on learners' first-noun strategy used to assign argument function of noun phrases (NPs) at the sentence level. The dependent variables were interpretation and production of Spanish preverbal direct-object pronouns. Fifty-nine participants were divided into three experimental groups: (a) A group that received full PI (i.e., both explicit rule presentation and structured input), (b) a group that received explicit information (EI) only, and (c) a group that received only structured input (SI). Structured input was presented through practice, for which it was essential that learners attend to the target form in order to understand the meaning, thus leading learners to make form-meaning connections. Groups receiving structured input (PI and SI) were given feedback as to whether their responses were correct or incorrect during practice. The results showed that on the interpretation task, both the full PI and the SI groups significantly outperformed the EI group. All groups improved on the production task, but the PI and SI groups improved more than the EI group. Based on these findings, VanPatten and Oikkenon suggested that it was the structured input activities and not the rules that were responsible for the benefits found for PI. Given the fact that the PI and SI groups received feedback but the EI group did not, VanPatten and Oikkenon mention that an area for further research is determining whether learners develop some kind of conscious knowledge because of the interaction of structured input and feedback.

A series of studies have replicated Van Patten and Oikkenon (1996). Benati (2003) examined the roles PI components play in the acquisition of the Italian future tense. Benati compared a regular PI group, an SI group, and an EI group. Both the PI and the SI group performed significantly better than the EI group for both interpretation and production tasks. Farley (2003) compared the linguistic development of a PI group to an SI group. His target structure was the Spanish subjunctive. Both groups improved significantly on both interpretation and production

tasks, leading Farley to conclude that structured input is a necessary and perhaps sufficient component of PI. Farley also found that the PI group outperformed the SI group on both assessments. He attributed this to the fact that the form-meaning relationship of the Spanish subjunctive is not readily transparent to learners. Finally, Wong (2003) compared a PI group, an SI group, an EI group, and a control group. The target structure was the change in article used with the French verb *avoir*, meaning 'to have'. On an interpretation test, Wong found that the PI and SI groups both significantly outperformed the EI and control groups. On a production test, the PI and SI groups both significantly outperformed the control group, and the PI group significantly outperformed the EI groups. These results suggest, as do those of VanPatten and Oikkenon, that the structured input activities are primarily responsible for the benefits of PI, whereas explicit information plays a minor role at most.

To summarize this section, explicit rule presentation does have beneficial effects on acquisition when learners are simply asked to memorize or comprehend the input to which they are exposed. These effects have been identified in performance on grammaticality judgment tasks (Ellis, 1993; Robinson, 1996, 1997) and production tasks (Alanen, 1995; DeKeyser, 1995). Other studies, however, suggest that when input is presented by means of practice, which essentially engages learners in making form-meaning connections, explicit rule presentation does not add to what has been processed, as shown for intake (Rosa & O'Neill, 1999), and interpretation and production measures (Benati, 2003; Farley, 2003; VanPatten & Oikkenon, 1996; Wong, 2003). De Graaff's (1997) results may seem contrary to this, but we cannot know whether the practice included in his study was "essential."

Explicit Negative Feedback

Classroom studies suggest that provision of feedback seems to have some observable effects on individuals (DeKeyser, 1993)

and on classrooms (Lightbown & Spada, 1990). All feedback, however, may not be equal. Therefore, we must consider research that attempts to distinguish between effects of different types of feedback, specifically, explicit and implicit feedback.

This was precisely the goal of Carroll and Swain's (1993) study. They assigned 100 adult learners of English as a second language to four experimental groups and a control group. Participants received training on the English dative alternation under one of four conditions. The experimental groups differed in the type of feedback they received when they made an error. Groups were (a) given metalinguistic information, (b) told their response was wrong, (c) given a model of the response along with implicit negative evidence (as in recasts), or (d) asked if they were sure about their response. The control group was given no feedback. Analysis of an initial session and two recall sessions showed that a learning effect due to feedback was present. All groups receiving feedback performed significantly better than the control group. Moreover, the group whose feedback was comprised of metalinguistic information outperformed all other groups. For this group both new and old items were affected by feedback, and these effects held for over a week. Carroll and Swain concluded from the significant improvements made by all experimental groups that both direct and indirect forms of feedback could aid in the learning of abstract linguistic generalizations, but that metalinguistic explanation was better than the other types studied.

Nagata (1993) and Nagata and Swisher (1995) examined whether traditional or intelligent feedback was more effective at "consciousness-raising" in a computer-assisted learning instruction (CALI) study. This research is particularly relevant for the current study as its design is computer-generated. Thirty-two university students, enrolled in 2nd-year Japanese, were randomly assigned to two computer-based groups: (a) a traditional-feedback group (T-CALI), which received feedback indicating what was wrong with their answer, and (b) an intelligent-feedback group (I-CALI), which received feedback

including the above plus metalinguistic explanations. During four computerized treatment sessions, students first read through a grammatical explanation and then proceeded to complete production exercises of Japanese passive sentences. Results from a final achievement test showed no differences between the two groups on word-level errors (e.g., vocabulary and conjugation errors). For complex sentence-level errors (e.g., particle errors), however, the I-CALI group outperformed the T-CALI group. Nagata concluded from the study that "when a grammatical system is nontrivially complex, metalinguistic feedback by means of computer-aided instruction involving natural language processing is more effective than traditional CALI feedback" (Nagata & Swisher, 1995, pp. 345–355). Two limitations are worth noting. First, the type of practice was not fully described, so it cannot be determined if task-essentialness characterized the practice. Second, since both groups received explicit grammatical explanation, the effects of feedback alone were not isolated. It is important for future research to examine the independent roles of both grammatical explanation and feedback.

Overall, the few studies examining explicit feedback find evidence for its effectiveness. Unanswered and more specific questions remain, however, such as: What is the effect of feedback during on-line sentence processing? Does the effect depend on the nature of the input to be processed and the task implemented to present the input? Like the studies reviewed above, Rosa's unpublished dissertation (1999) looks at how external conditions affect learners' processing of language and, in particular, the role that specific conditions may have in manipulating attention and developing awareness. We will review it in detail, as it shares several points with our own study.

Rosa (1999) parallels the current study by examining the role of explicit information provided through rule explanation and feedback in combination with "task-essential" practice. Specifically, Rosa examined whether exposure to L2 input through problem-solving comprehension tasks combined with varying

degrees of explicitness had a differential effect on acquisition of Spanish past-tense, contrary-to-fact conditional sentences. Her experimental task (E) was presented as 28 computer-based puzzles using contrary-to-fact sentences, 10 in the present tense and 18 in the past. For each puzzle, a simple sentence in the present or past was given to provide context. One hundred participants were randomly assigned to a control group or one of five treatments: (a) explicit rule presentation, explicit negative feedback, plus the experimental task (EPEFE); (b) explicit rule presentation, implicit feedback, plus the experimental task (EPIFE); (c) explicit feedback and the experimental task (EFE); (d) explicit rule presentation (EP); and (e) implicit feedback, plus the experimental task (IFE). Finally, the control group was exposed to the same sentences as the experimental groups but was only asked to read the sentences for meaning. In order to establish that attention was paid to the target form, all participants wrote down the correct sentence fragments from the practice exercises on an answer sheet. A recognition test was used to measure intake of new and old items (i.e., those that were repeated from the treatment and those that were novel). A fill-in-the-blank test was used to measure production of the target form. Attention to the target form was measured with on-line think-alouds and off-line questionnaires.

Some of Rosa's results indicated that groups provided with explicit information performed better on assessment tasks. All experimental groups outperformed the control group on all tests administered, with the exception of the IFE group on production of new items. Rosa also found that the experimental groups EPEFE, EPIFE, and EFE outperformed the IFE group on recognition of new and production of old items. Likewise, the EPEFE and EPIFE groups outperformed the IFE group on production of new items. Based on these results, Rosa concluded that explicit information leads to more intake and production and enables learners to generalize knowledge to new items. There are, however, indications that explicit information is not necessarily beneficial. First, members of the IFE group, which did not

receive any type of explicit information, significantly improved between tests (pre–post), maintained their gains (pre–delayed), and outperformed the control group on all tests except one. Second, the group exposed to explicit rule presentation (EP) did not outperform the IFE group on any measure of intake or production. Rosa suggests that the provision of explicit information as a pretask was not effective without some form of concurrent feedback. Thus, Rosa's results are somewhat mixed.

In light of these mixed results, limitations of Rosa's (1999) study need to be considered. First, both the learning and assessment tasks were highly controlled, thereby enabling learners to monitor their responses. It would have been interesting to see how participants performed on more communicative tasks. Second, learning under the implicit condition may have been difficult because exposure was limited to 28 items, only 18 of which contained the target form. Ellis (1993) claims that implicit L2 learning is slow and that exposure to many instances of the L2 form are necessary for such learning to take place. Third, one might also consider whether the puzzles in Rosa's study really provided the same level of task-essentialness for all groups. It is possible that the IFE group did not receive enough information to be able to interpret the meaning of the exemplars of the target forms, making it less likely that they made form-meaning connections through the task. Finally, the combined effect of measures of attention (i.e., thinking aloud, recording responses on an answer sheet, and completing a postexposure questionnaire) could have augmented explicit processing, which might have worked in favor of the more explicit groups.

Drawing conclusions based on the literature reviewed is no easy task: Some might find clear evidence of the positive effects of explicit rule presentation on acquisition of at least simple rules and in combination with simple exposure. Similarly, some might conclude that explicit negative feedback has a role in SLA, albeit in a small number of studies. Others might see in Rosa and O'Neill (1999), VanPatten and Oikkenon (1996), Benati (2003), Farley (2003), and Wong (2003) evidence of the

powerful effects of input-driven acquisition, provided the input is manipulated and presented by means of a task that engages learners in making form-meaning connections, as shown by improvements in intake, interpretation, and controlled production. It is important then to proceed with further research that investigates the possible interaction between explicit information about how a particular language works provided before and during exposure and positive evidence provided by means of a task that makes the learner an active participant in making form-meaning connections. It is also important to assess the effects of that interaction in different ways, as most studies in the explicit/implicit paradigm have relied on grammaticality judgments and few have incorporated production, including more content-rich written production.

The Study

Our study investigates both the individual and combined effects of information provided prior to a task (i.e., explicit rule presentation) and information provided while participants are performing a task (i.e., explicit negative feedback). Previously, only Rosa (1999) has examined explicit rule presentation and explicit negative feedback. Comparable to that of VanPatten and Oikkenon (1996) and Rosa (1999) but different from that of other studies (Alanen, 1995; DeKeyser, 1995; Ellis, 1993; Robinson, 1996, 1997), our treatment has the attributes of task-essentialness; that is, it requires students to attend to the target form in order to successfully complete the task. The target form, Spanish word order, is morphosyntactic in nature. The design incorporates three measures of the effects of explanation and explicit negative feedback on learners' ability to correctly assign semantic functions to the NPs in a sentence: one interpretation and two production measures, which differ in the amount of information learners produce (i.e., information about one event or about seven sequential events).

Based on the research reviewed above, we pose the following general null hypothesis: Providing L2 learners of Spanish with explicit information on sentences with object pronouns in preverbal position (i.e., O-cliticV sentences) and how to process them either before or during exposure to input-based practice or both will not affect learners' ability to interpret and produce O-cliticV sentences.

Methodology

Participants

Participants were selected from a population of 142 students enrolled in first- or second-year Spanish language courses at Georgetown University who had volunteered to participate in the study in exchange for free movie tickets. Participants were monolingual native speakers of English who scored at or below 60% on the interpretation pretest and who had completed all treatment and testing sessions. They were randomly assigned to one of four treatment groups that resulted from combining [+/−Explanation] ([+/−E]) and [+/− Feedback] ([+/−F]), with each group interacting with a different computer lesson. At the end of the experiment only 69 participants had fulfilled the requirements for being part of the final sample.[3]

Target Form

The current study's target form was the Spanish preverbal direct-object pronoun.[4] Like children learning Spanish as a first language, adult L2 learners of Spanish interpret a sentence like *Lo besa la chica* 'Him kisses the girl' (The girl kisses him) as 'He kisses the girl' (LoCoco, 1987; VanPatten, 1984). That is, they decide that the NP before the verb is the subject of the verb. This results from applying a processing strategy known as the first-noun or NVN = SVO strategy, in which word order is used

to assign functions to NPs at the sentence level (Slobin and Bever, 1982). Following this strategy, learners assign agent status to the preverbal noun and object status to the noun in postverbal position. Spanish relies both on morphology (such as clitic and verbal morphology and the personal *a*, which precedes direct objects) and syntax for function assignment, which allows it to have a more flexible word order: OVS, SOV, and OV sentences are common in all standard varieties of Spanish. Therefore, application of the NVN = SVO strategy can lead learners to make incorrect interpretations. A series of empirical studies (Sanz, 1994, VanPatten & Cadierno, 1993, VanPatten & Oikkenon, 1996) have tested the effectiveness of PI in teaching students to process O-clitic V sentences, as exemplified in the following:

La	*besa*	*el niño*
Her-OBJ	kisses	the boy-SUBJ

"The boy kisses her."

Materials

Treatment. To remind the reader, the present study implements PI as a means to investigate the individual effects of exposure to modified input through task-essential practice (positive evidence), explicit rule presentation, and explicit negative feedback. PI is a particular approach to instruction in grammatical form whose goal is to alter L2 learners' processing strategies, that is, to change the way L2 learners process input. PI is made up of two basic components: metalinguistic information and exposure to structured input. Metalinguistic information is based on psycholinguistic principles rather than linguistic structural description and focuses both on the form and on the strategy used to process it. Structured input consists of input which has been manipulated to increase the frequency and saliency of the key form and in which form-meaning connections are privileged. Likewise, PI tasks are carefully designed to push learners to interact with the input, to respond to it in a way that requires them to make form-meaning connections (see VanPatten, 2002,

for a detailed discussion on this issue). For the purpose of the present study we have kept exposure to structured input (Practice) constant and have manipulated presence or absence of metalinguistic information given prior to the task (Explanation) or during task completion (Feedback).

The treatment materials of the present study are based on an adaptation of the paper-and-pencil treatment in VanPatten and Cadierno (1993) to computer-assisted language learning (CALL) format and later converted from the original HyperCard language to a LIBRA-based program format. A computer-delivered treatment has the advantage of creating highly controlled but natural (similar to any computer lesson students complete in language labs) experimental studies (Sanz, 2000). This enables us to examine carefully the effects of (a) amount of explicit instruction and (b) timing of explicit instruction (before or during practice, i.e., explicit rule presentation and explicit negative feedback).[5]

Practice. Rather than exposing participants to the form by having them read or memorize sentences or search for rules, each item required participants to react to the input. The type and amount of practice—a total of 56 practice items—provided for processing O-cliticV clauses was equivalent for all treatments. Some activities presented participants with a written or oral sentence for which they identified the correct visual cue (still frames) by clicking on it with the mouse, as in Figure 1. In other activities (see Figure 2), participants practiced decoding written input at the text level. Learners read a title that summarized a short article that followed. The title *¿Cómo nos afecta el medio ambiente?* 'How us affect-third-person-sing. the environment' translates as "How does the environment affect us?" Learners who apply the NVN = SVO strategy (i.e., those who rely on word order) assign agent role to the first NP, *nos*, which they interpret as *we*. Those learners who choose the most reliable and available cue (i.e., verbal morphology) choose the correct answer of the two provided by the task. Nothing in the picture or the sentence (e.g., animacy, knowledge of the world) other than word

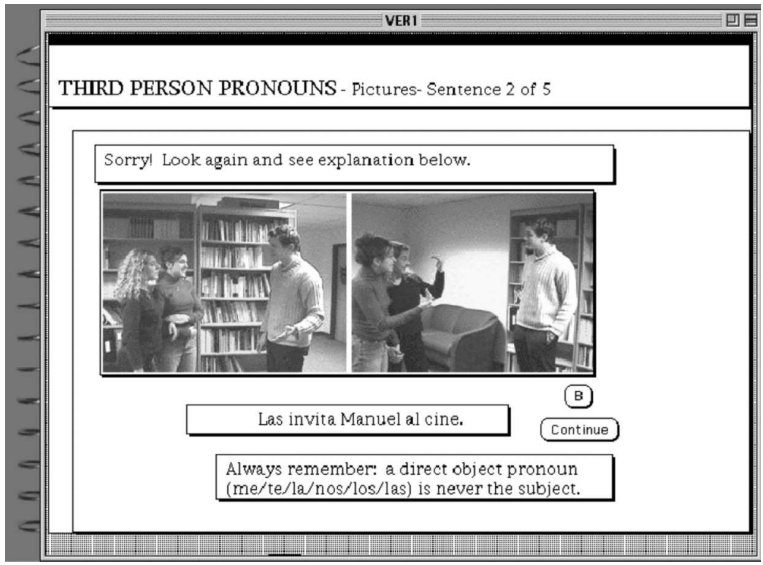


Figure 1. Example of practice at the sentential level with explicit feedback.

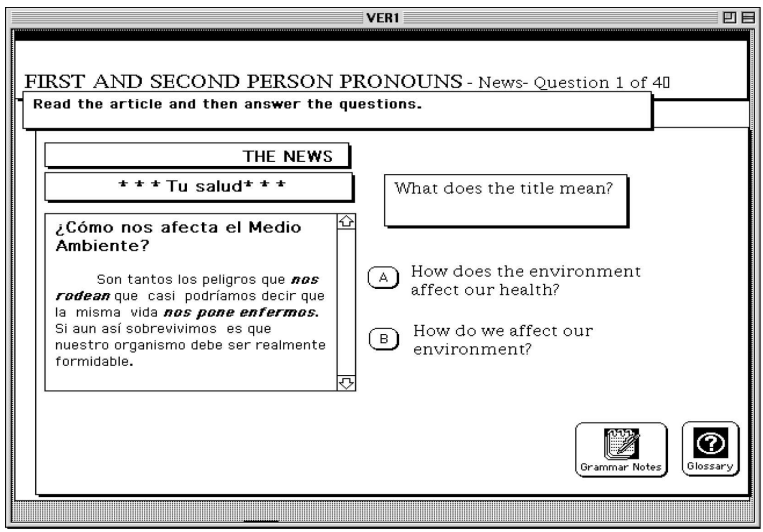


Figure 2. Example of practice in processing clitics at the suprasentential level.

order or word endings provided the necessary information to complete the task (Loschky & Bley-Vroman's task-essentialness). As is stipulated by PI, only one form of the direct-object pronouns (first, second, third person) was presented and practiced at a time (see Lee & VanPatten, 1995, for guidelines for creating PI activities). Each lesson presented 56 instances of the target form in both referential and affective activities[6] and combined oral and written input at the text and sentence levels.

Explanation. Explanation also followed PI guidelines in that it included (a) explicit grammar instruction on the structure and (b) information both on the correct strategy to apply and on the result of applying the wrong strategy. The explanation section was, like the lesson, divided into two parts, one devoted to first- and second-person pronouns (eight frames), and a second section devoted to third-person pronouns (six frames). This part of the computer lesson was also interactive. It periodically asked students to test their understanding of the explanation by choosing an interpretation for a sentence, phrase, or word by clicking on the appropriate response with their mouse. The explanation section was immediately followed by the practice section for the [+E, −F] and [+E, +F] groups. Figure 3 provides an example of the explanation section of the treatment.

Feedback. Feedback, as it was operationalized in the experiment, had the potential to make a change in the participants' linguistic behavior as a result of three characteristics. First, it was immediate and thus provided within an "appropriate cognitive window" (Doughty, 2001, p. 249). Second, it was personalized and provided only when needed. Finally, it consistently focused on the critical form (i.e., O-cliticV clauses) and the source of the error, which was learners' incorrect use of the strategy. This feature was made possible by the fact that there was only one possible source for each error (i.e., clicking on the wrong picture frame or sentence) in the activities and because limiting action to the click of the mouse eliminated possible errors due to typing. An example of explicit feedback can be seen in Figure 1, which shows how the information provided as part

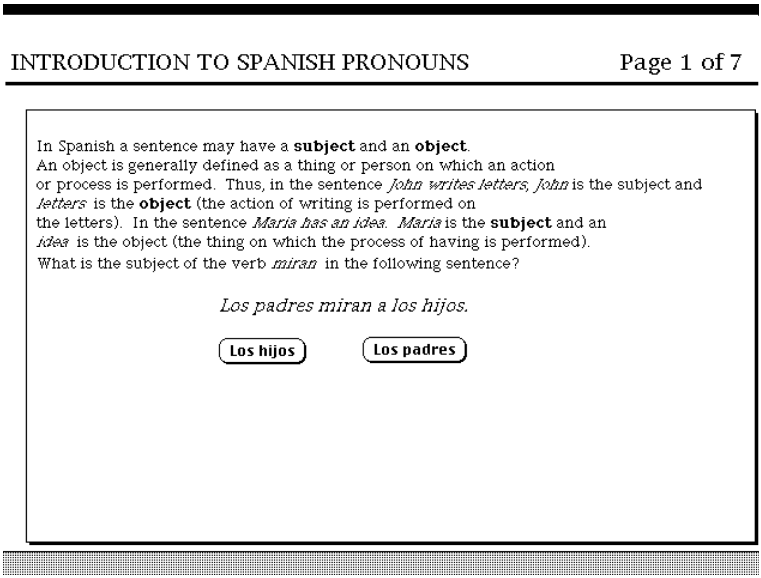


Figure 3. Example of grammatical explanation.

of the feedback results from what we know about the way learners process O-cliticV sentences and the reason for the error. Participants were told to look at pronoun morphology or verb ending or were reminded that the first noun in a sentence is not always the subject. It needs to be clarified that all groups necessarily received feedback about whether their answers were correct or incorrect. All conditions provided a response of "OK" if the user's response was correct and "Sorry, try again" if the participant had chosen an incorrect response. Feedback was provided to participants in all groups to respect the validity of instruction, as it is expected that computer lessons provide feedback of some sort. What was manipulated as an independent variable was the explicit information that accompanied feedback in two of the four conditions.[7]

Assessment measures. Following VanPatten and Cadierno (1993), two types of linguistic behavior were elicited: the ability to interpret and to produce O-cliticV sentences. The interpretation test consisted of 15 sentences. For each item, participants

were shown two pictures and heard a related sentence (see Figure 3). They had to choose which picture the sentence described. There were 10 critical items and 5 distractors. The following is a sample critical item:

Lo	*lame*	*el perro*.
Him-OBJ	licks	the dog-SUBJ
"The dog licks it."		

For this item, participants were shown a picture of a dog licking a cat and a cat licking a dog (see Figure 4). In order to choose the correct response, participants had to identify *el perro* as the subject and *lo*, the direct-object pronoun, as referring to the cat, which means that they had to rely on morphology rather than the NVN = SVO strategy characteristic of L2 learners of Spanish. Scoring procedures followed those in Sanz (1994). For the interpretation test, participants received one point for selecting the correct picture based on the sentence that they heard.

Instructions
Listen carefully to the sentences that will be played on the tape recorder. Your task is to match each sentence with the correct picture, A or B, that will simultaneously be presented on the overhead projector. Please mark your choice of picture on this (answer) sheet.
Sound cue: Lo lame el perro.
Visual cue:

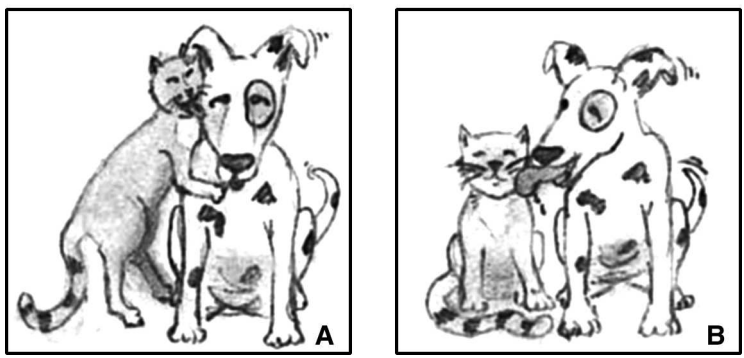
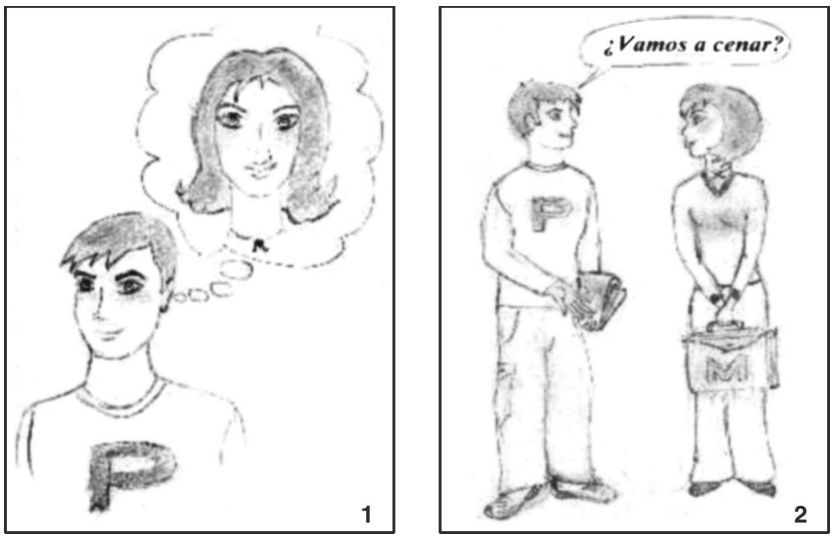


Figure 4. Sample item from sentence interpretation test.

The number of correct items was added and divided by 10 (the number of critical items) to obtain a percentage score.

In order to assess production, two different tasks were used, following VanPatten and Sanz (1995) and Sanz (1997). The first production task was a sentence completion task based on VanPatten and Cadierno (1993). Participants were shown two separate pictures depicting a context that could be best described by two connected sentences. A sentence based on the first picture was given. The participant had to complete the connecting sentence with a direct-object pronoun using the correct word order (OV) to describe the second picture (see Figure 5). The infinitive form of the verb to be used was supplied to the participant. For the following sample item, participants saw a picture that showed Pedro thinking about María and a second picture in

Instructions
Look carefully at each of the pair of pictures. Note that each pair of pictures consists of two successive events. Using the verb provided, your task is to complete the description of the events by finishing each sentence. Write the sentence in the space provided below.



Pedro piensa en María y después _____ (invitar a cenar).

Figure 5. Sample item from sentence completion test.

which he calls her on the telephone to invite her for dinner. They then had to complete the following sentence:

*Pedro piensa en María y después*_____(*invitar a cenar*).
'Pedro thinks about Maria and then_(to invite to dinner).'

The sentence completion tasks consisted of 11 items, out of which 7 were critical. The distractors consisted of sentences with different subjects and objects. On the sentence completion tests, participants could receive two points for each correct response. In order to receive both points, they had to supply the correct form of the object pronoun and place it in the correct position in the sentence. If the participant supplied the correct form of the pronoun but did not place it in its correct position, or vice versa, only one point was awarded. Sentences without clitics and with full NPs as objects, an avoidance strategy used by many learners, as in *Pedro thinks about Maria and then Pedro invites Maria to dinner*, were given zero points.[8]

The second production task was a written video-retelling task that required participants to produce the target form at the suprasentential level. Participants viewed one of two different silent stories, both of which contained seven connected events. The stories involved the repeated use of an item, so that as participants retold the story, obligatory contexts for the use of the direct-object pronoun would present themselves. The stories were viewed twice. During the first viewing, participants were instructed only to watch the story, but during the second viewing they could take notes. Without referring to their notes, participants were then asked to write a description of the story providing as much detail as possible so that students in other classes could pick out the video based on their written description. This task was designed to create a communicative context and to maximize the amount of information elicited. The scoring of the video narration task was designed to allow for participant variation; that is, each participant could produce a different number of OV sentences. Therefore, the number of obligatory contexts for the use of the target form could not be held constant.

In order to have comparable scores, the number of correct uses within obligatory contexts created by each participant was counted. A native speaker read each participant's narration, deciding upon and counting the number of obligatory occasions for the use of preverbal object pronouns. Then the participant was awarded zero, one, or two points in the same manner as in the sentence completion task. For the purposes of direct comparison, scores from both production tasks were calculated as percentages.

Procedure

The treatment consisted of four different lessons completed in one session that resulted from combining +/− Explanation and +/−Feedback. The [+E, +F] group ($n = 21$) received two types of explicit information (explicit rule presentation and explicit negative feedback). The [+E, −F] group ($n = 15$) and the [−E, +F] group ($n = 13$) received only one type of explicit information (explicit rule presentation or explicit negative feedback, respectively), and the [−E, −F] group ($n = 20$) received no explicit information. Table 1 summarizes the treatment each of the four groups received. All treatments were identical as to the type and amount of practice provided for processing O-cliticV clauses.

Table 1

Treatment groups

Group	Practice	Explanation	Feedback
[+E, +F] $n = 21$	X	X	X
[−E, −F] $n = 20$	X	—	—
[+E, −F] $n = 15$	X	X	—
[−E, +F] $n = 13$	X	—	X

Three versions of each test were developed. Although difficulty and vocabulary were controlled for, the tests were distributed in a split-block design in order to avoid test effects. All tests included vocabulary familiarization and distracting tasks between the critical tasks. The pretests were administered to whole classes. Participants were then scheduled to come in for the treatment 1 to 3 weeks after having taken the pretest and were randomly assigned to one of the four groups. The treatment and the immediate posttest were all administered individually.

Results

The experimental design of the current study included three independent variables (namely, Explanation, Feedback, and Time) and two dependent variables (the acquisition of Spanish preverbal direct-object clitics as measured by one interpretation and two production tests).

First, power analysis was conducted for the between-groups comparisons and the within-participants comparisons. Assuming a large effect size of $d = 0.40$ (see Cohen, 1988, p. 287) among the four groups, to reach a statistical power of 0.80, a sample size of 18 is required for each group, with $\alpha = 0.05$ and $\alpha = 0.2$. The current design of 69 participants has almost reached a power of 80%. For the within-participants comparison, assuming a medium effect size of $d = 0.50$ (see Cohen, 1988, p. 40), to reach a statistical power of 0.80, a sample size of 64 is needed to detect the mean difference between the pretest and the posttest, with $\alpha = 0.05$ and $\alpha = 0.2$. The current sample size of 69 has enough statistical power to test the repeated-measure hypothesis.

Then, analyses of variance (ANOVAs) were conducted on the pretest scores to determine whether there were any differences between groups prior to the treatment. The analyses showed no statistical differences between groups on the scores from the interpretation test, $F(3, 65) = .04$, $p > .05$, the sentence completion test, $F(3, 64) = .03$, $p > .05$, or the video-retelling test, $F(3, 65) = .03$, $p > .05$, which means that any differences

found on the posttests can be attributed to the treatment. For these and all further statistical analyses, alpha was set at the .05 level.

Subsequent analyses indicated that all groups increased both their ability to interpret and produce O-cliticV sentences, as seen in Table 2 and Figure 6. The average increase for all groups on the interpretation test was 37.73 points. The average gain for all groups on the sentence completion test was 33.07 points. Finally, the average gain on the video-retelling test for all groups was 29.98 points.

A three-way repeated-measures ANOVA (see Table 3) performed on the scores from the interpretation test yielded a significant main effect for Time, $F(1, 64) = 188.42$, $p < .001$. However, no effect was found for Explanation, $F(1, 64) = .00$, $p > .05$, or Feedback, $F(1, 64) = .17$, $p > .05$. The analysis did not yield any significant interaction. Suppliance of Feedback or Explanation did not significantly affect participants' ability to interpret O-cliticV sentences. We may attribute the significant main effect for Time to each group's significant gain as a result of exposure to the structured input activities.

The same analysis was performed on the sentence completion test scores, and similar results were obtained (see Table 4). Although there was a significant main effect for Time, $F(1, 63) = 61.81$, $p < .001$, no main effect was found for Explanation, $F(1, 63) = .01$, $p > .05$, or Feedback, $F(1, 63) = 1.68$, $p > .05$. The analysis did not yield a significant interaction.

Scores from the video retelling pre- and posttests were also analyzed. Again the same statistical test was run and similar results were obtained (see Table 5). A significant main effect was found for Time, $F(1, 64) = 33.53$, $p < .001$, but no effect was found for Explanation, $F(1, 64) = .90$, $p > .05$, or Feedback, $F(1, 64) = .06$, $p > .05$. The analysis did not yield a significant interaction. Results from the production data suggest that, as with the interpretation findings, the structured input activities—the trait shared by all treatments—resulted in a gain in ability to produce the target form. The amount and timing of explanation,

Table 2

Descriptive statistics: All groups and tests

Group	Statistic	Interpretation pretest	Interpretation posttest	Sentence completion pretest	Sentence completion posttest	Video-retelling pretest	Video-retelling posttest
[+E, +F]	Mean	26.67	65.24	41.70	79.05	25.33	57.91
$n = 21$	*SD*	14.94	28.74	30.88	25.51	29.27	37.13
	Min.	10.00	.00	.00	7.00	.00	.00
	Max.	50.00	100.00	93.00	100.00	90.00	100.00
[−E, −F]	Mean	25.00	63.50	39.30	65.30	30.35	61.25
$n = 20$	*SD*	18.21	23.68	35.19	32.72	31.02	31.04
	Min.	.00	20.00	.00	.00	.00	.00
	Max.	60.00	100.00	100.00	100.00	100.00	100.00
[+E, −F]	Mean	26.67	60.00	40.73	69.64	23.33	42.86
$n = 15$	*SD*	18.39	25.63	31.84	32.53	27.85	35.95
	Min.	10.00	10.00	.00	.00	.00	.00
	Max.	60.00	100.00	100.00	100.00	83.00	100.00
[−E, +F]	Mean	26.15	66.67	42.15	83.62	22.69	58.15
$n = 13$	*SD*	15.02	24.98	32.43	17.25	31.94	26.10
	Min.	10.00	30.00	.00	50.00	.00	17.00
	Max.	50.00	100.00	100.00	100.00	100.00	100.00
Total	Mean	26.09	63.82	40.87	73.94	25.86	55.84
$N = 69$	*SD*	16.38	25.51	31.98	28.45	29.49	33.23
	Min.	.00	.00	.00	.00	.00	.00
	Max.	60.00	100.00	100.00	100.00	100.00	100.00

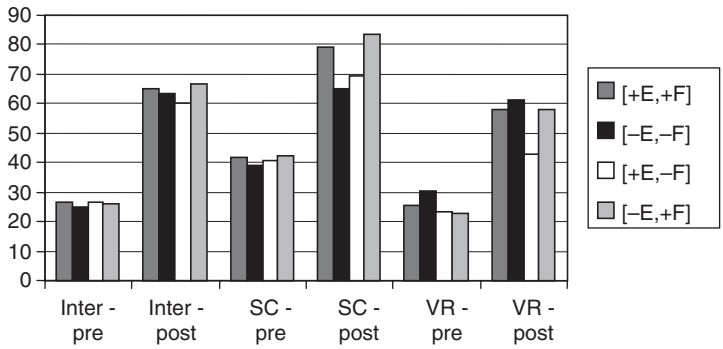


Figure 6. Group means from assessment tests.

however, produced no differential effects. Based on these results, we accept the null hypothesis.

Since the three-way-factorial ANOVA did not yield significant results for main effects and for the interaction term, it would be interesting to examine simple effects. From the findings of previous published studies, we decided to look at possible significant differences between the [+E, +F] group, the [−E, −F] group, and the [+E, −F] and [−E, +F] groups combined (see Table 6 for descriptive statistics). The repeated-measures ANOVA

Table 3

Interpretation: ANOVA for Time and conditions

Source	*df*	SS	MS	*F*	*p*
Time	1	47,209.35	47,209.35	188.42	.00*
Explanation	1	1.17	1.17	.00	.97
Feedback	1	115.76	115.76	.17	.69
Explanation × Feedback	1	17.04	17.04	.02	.88
Time × Explanation	1	167.04	167.04	.67	.42
Time × Feedback	1	172.33	172.33	.69	.41
Time × Explanation × Feedback	1	3.10	3.10	.01	.91
Error	64	16,035.24	690.15		

*$p < .05$.

Table 4

Sentence completion: ANOVA for Time and conditions

Source	*df*	SS	MS	*F*	*p*
Time	1	36,601.18	36,601.18	61.81	.00*
Explanation	1	12.13	12.13	.01	.92
Feedback	1	2,146.85	2,146.85	1.68	.20
Explanation × Feedback	1	188.79	188.79	.15	.70
Time × Explanation	1	1.64	1.64	.67	.99
Time × Feedback	1	861.84	861.84	1.46	.23
Time × Explanation × Feedback	1	210.82	210.82	.36	.55
Error	63	37,308.18	690.15		

*$p < .05$.

(see Table 7) performed on the scores for the interpretation test yielded a significant main effect for Time, $F(1, 65) = 193.87$, $p < .001$. No effect, however, was found for Group, $F(2, 65) = .06$, $p > .05$. The interaction (Group × Time) did not reach significance either. Identical analyses on the sentence completion and the video-retelling scores yielded similar results (see Tables 8 and 9). Performance by all groups improved significantly from the time of the pretest to the time of the posttest. However, the amount of

Table 5

Video retelling: ANOVA for Time and conditions

Source	*df*	SS	MS	*F*	*p*
Time	1	28,409.19	28,409.19	33.53	.00*
Explanation	1	1,054.81	1,054.81	.90	.35
Feedback	1	74.54	74.54	.06	.80
Explanation × Feedback	1	1,544.37	1,544.37	1.32	.26
Time × Explanation	1	427.65	427.65	.51	.48
Time × Feedback	1	647.49	647.49	.76	.39
Time × Explanation × Feedback	1	154.72	154.72	.18	.67
Error	64	75,128.87	1,173.89		

*$p < .05$.

Table 6

Descriptive statistics: All groups combined

Group	Statistics	Interpretation pretest	Interpretation posttest	Sentence completion pretest	Sentence completion posttest	Video-retelling pretest	Video-retelling posttest
[+E, +F]	Mean	26.67	65.24	41.70	79.05	25.33	57.91
$n = 21$	*SD*	14.94	28.74	30.88	25.51	29.26	37.13
[−E, −F]	Mean	25.00	63.50	39.30	65.30	30.35	61.25
$n = 20$	*SD*	18.21	23.68	35.19	32.72	31.02	31.04
[+E, −F] & [−E, +F]	Mean	25.56	62.96	40.30	76.37	23.15	50.22
$n = 27$	*SD*	16.25	25.09	31.57	26.78	29.70	31.96

Table 7

Interpretation: ANOVA for learning condition by Time

Source	*df*	SS	MS	*F*	*p*
Time	1	48,662.50	48,662.50	193.87	.00*
Group	2	83.61	41.80	.06	.94
Time × Group	2	10.41	5.20	.02	.98
Error	65	44,859.78	690.15		

*$p < .05$.

Table 8

Production: Sentence completion. ANOVA for learning condition by Time

Source	*df*	SS	MS	*F*	*p*
Time	1	35,309.65	35,309.65	59.99	.00*
Group	2	1,304.47	652.24	.51	.60
Time × Group	2	725.87	362.94	.62	.54
Error	64	81,432.50	1,272.38		

*$p < .05$.

Table 9

Production: Video retelling. ANOVA for learning condition by Time

Source	*df*	SS	MS	*F*	*p*
Time	1	30,442.32	30,442.32	35.91	.00*
Group	2	1,941.39	970.70	.83	.44
Time × Group	2	192.74	96.37	.11	.89
Error	65	75,829.45	1,166.61		

*$p < .05$.

explicit information (provided twice, before *and* during practice; provided once, before *or* during practice; or not provided at all) had no impact on the groups' ability to interpret and produce O-cliticV sentences.

To summarize, then, no significant effect was found on any assessment of the dependent variables (i.e., interpretation or production) for any independent variable or combination thereof (i.e., explicit rule presentation or explicit negative feedback), except for Time. To the contrary, all treatments significantly affected participants' ability to use non-SVO sentences. This improvement was evidenced in their ability to assign semantic functions correctly to NPs in the sentence during interpretation and production at both the sentence and suprasentential level. Even the least explicit group, the exposure-only group [−E, −F], improved by 31.8% on average on all three tests.[9]

Discussion and Conclusions

The lack of effects for explanation and feedback and the lack of significant differences between conditions leads us to conclude that explicit information about how Spanish works, whether provided before practice, during practice, or at both times, did not enhance acquisition of Spanish preverbal pronouns by participants in our study. This finding is substantially different from the body of evidence suggesting that provision of explicit rule presentation (i.e., information about the grammatical form) *before* practice has beneficial effects (Alanen, 1995; de Graaff, 1997; DeKeyser, 1995; Ellis, 1993; Robinson, 1996, 1997). The explanation for this difference lies in the manner in which the current study and the studies above provide input as well as in the nature of the input they provide. Whereas Alanen (1995), DeKeyser (1995), Ellis (1993), and Robinson (1996, 1997) simply exposed learners to lists of sentences or passages and asked them to read for comprehension, search for rules, or memorize, our study's task required that learners respond to each item presented to them. This response depended entirely on processing the critical form for meaning, as is characteristic of task-essential tasks. Only two studies included any form of practice (de Graaff, 1997; Rosa & O'Neill, 1999). The practice in these studies arguably was not characterized by task-essentialness.

Consequently, there appears to be robust evidence for the beneficial effects of explicit rule presentation when learners receive only exposure to the target form. However, based on our findings, it appears that when learners are asked to complete a task in which they are presented with structured input and task-essential practice items, supplementary information about the language form provided a priori does not enhance their ability to use the form in subsequent interpretation or production measures. Naturally, the nature of the target form in their studies and ours could be in part responsible for the differences in results.

Our results are also contrary to those of relevant feedback studies, specifically Carroll and Swain (1993) and Nagata (1993), which show that more explicit feedback positively affects the production of complex forms. In our study, the [−E, −F] group's performance was not significantly worse than that of the [−E, +F] group. A basic difference between previous research and our study is that, whereas previous studies provided feedback for production tasks, our study provided feedback for an input-processing task. Interestingly, Leeman (2000), a study that investigates the element responsible for the beneficial effects of recasts (a type of feedback), finds results compatible with our own. That is, it is enhanced positive evidence, rather than negative feedback, that affects acquisition. Given that we did not find effects for feedback, our results underscore the effectiveness of practice decoding positive evidence that has been manipulated to be more frequent and salient.

One problem with our results is that they seem to contradict those of Rosa (1999). In her study, as in ours, task-essentialness was an important component of the practice, at least for most groups. Whereas our results showed no significant differences between groups, Rosa's implicit-feedback group (the IFE group) performed significantly worse than the other groups in her study on the production of old items and the recognition and production of new items. A closer examination of the experimental treatments and assessment measures reveals underlying methodological differences that may account for this difference.

First, in Rosa's (1999) treatment, task-essentialness may have been reduced when some form of explicit information was not provided with the puzzle task. For the groups receiving at least one form of explicit information, it was made apparent that the target form was necessary in order to establish whether the hypothetical situation was relevant to the present or to the past. With this information, learners were at one point or another directed to the tense (present or past) of the sentence provided as context for the puzzle sentence. Participants in the IFE group were never directed to distinguish between the present and past tense in the context sentence, and they might not have noticed the corresponding aspectual difference inherent in the target form. Without participants' noticing aspect, making a form-meaning connection would not occur. Thus, whereas in our study the task-essential practice did not vary between groups, in Rosa the IFE group's practice may not have been task-essential, as was the practice for the other groups. In addition, the use of think-alouds, answer sheets, and questionnaires administered before the posttest might have further enhanced effects of the explicit treatments against the control and the IFE group.

A second significant difference between Rosa's treatment and ours is the number of opportunities for exposure to the form provided to learners. In Rosa's study, the practice consisted of 28 sentences, 18 of which contained the target forms. The present study, however, provided learners with 56 practice items, all of which required the use of the target form. Also, our learners were presented with only two possible answers for each item, whereas participants in Rosa's study had to decide among four options. Consequently, they were required to eliminate three incorrect options in order to identify the correct choice. For groups given any amount of explicit information, there were enough opportunities to practice that significant differences did not occur between groups. However, without any explicit information, 18 practice items containing the target form supplied along with three incorrect options simply may not have been enough evidence to be conducive for noticing or understanding the target

form. According to Ellis (1993), implicit L2 learning is slow, and many instances of the L2 form are necessary for such learning to occur. Perhaps if the amount of practice in Rosa's study had been greater, the IFE group would not have performed significantly differently from the other groups.

Not only are the tasks and the opportunities for practice different between Rosa (1999) and the current study, but the linguistic evidence is too (as is the linguistic form). Our study included manipulated input to make the form more salient by increasing its frequency and placing it in sentence-initial position. The form was presented in both the oral and written mode, in sentential and suprasentential contexts, and in a manner contrary to the expected SVO order, thus making it more salient.

Finally, different assessment measures might be responsible for the contradictory results, as is typical in SLA studies. Rosa (1999) assessed intake and controlled production through multiple-choice and fill-in-the-blank tasks, whereas we measured acquisition through interpretation and sentential and paragraph-level production tasks. Moreover, Rosa's production test measured only whether participants had learned the aspect associated with the linguistic form. When their production was assessed, they needed only to show that they were attempting to use the past tense of the form. Whether they produced the form correctly was not considered in the scoring procedure. Our study, however, measured both meaning and form. For a given item to be scored as correct, participants had to provide the forms corresponding to the meaning of a set of pictures, in addition to providing the correct morpheme in its correct position. Considering the four methodological differences, we conclude, contrary to Rosa (1999), that when learners are exposed to positive evidence presented through task-essential practice, the provision of explicit information through explanation or feedback may not produce increases in acquired knowledge.

The focus on form (FonF) literature (Doughty, 2001) claims that attention needs to be directed to form in the process of transforming input into intake for subsequent integration into

the language system. Attention can be redirected from meaning to form implicitly, through exposure to structured input, or explicitly, through provision of information on how the language works. Our study suggests that explicit information may not be necessary to draw attention to form and informs us about two FonF issues: One is *the means*, the other *the timing*. Our study shows that primary linguistic data (i.e., positive evidence), *when presented in a manner in which learners crucially process the form in order to get the meaning*, leads to form-function-meaning mapping and is therefore a successful means of promoting processing for language learning. Our results are in agreement with Leeman (2000), showing that enhanced positive evidence is responsible for effects of recasts, as well as with VanPatten and Oikkenon (1996), Rosa and O'Neill (1999), Benati (2003), Farley (2003), and Wong (2003): In these studies, all groups exposed to input made significant gains that were largely unaffected by metalinguistic explanation. As to when to help the learner shift attention from meaning to form—the timing issue—we conclude, based on our results, that when the attempt to draw the learner's attention to the form is explicit, timing does not make a difference. This specific finding has implications for CAI materials development and its perhaps excessive focus on developing the right feedback to the detriment of quality practice. For our specific operationalization of metalinguistic evidence, sample, and measurement tasks, we are led to conclude that language acquisition is associative in nature and triggered only by exposure to input through task-essential practice, unaffected by metalinguistic information.

Limitations and Further Research

As previously stated, implicit feedback was included as part of the treatment in order to maintain the validity of the present study. Since all groups received practice and at least implicit feedback, we cannot determine whether it was the practice alone, or the practice in combination with implicit feedback,

that equalized the performance of all four groups. Rosa and O'Neill (1999) and Rosa (1999) share the same limitation, since their puzzle task provided both positive and negative implicit feedback, as pieces matched only if the missing half of the conditional sentence in question was correct. In any case, when there are a limited number of possibilities in the input and the number of responses is also limited, locating the source of the problem and rejecting hypotheses is possible even without explicit feedback.

Also, time on task was not controlled for. Specifically, the [+E, +F] group was more likely to take longer to complete the entire treatment. It is important to point out, though, that even with extra time spent on task, none of the explicit groups outperformed the least-explicit group. Finally, another factor limiting our findings is that we cannot make claims about delayed effects of the conditions or address fine-grained attentional distinctions. Although data were gathered to address these two issues, unfortunate decisions during the administration of the experiment made them unusable. In future studies we will incorporate think-alouds to investigate whether providing learners with explicit metalinguistic knowledge means learners develop and use metalinguistic knowledge. Future research should also address these issues, as well as any interactions between treatments and individual differences. Although ANOVAs are useful for drawing conclusions about group behavior, we know from standard deviation that treatment affects members of the same group differently. Introducing working memory as a variable in the design of pedagogical research should yield interesting results, especially in studies like this one that attempt to manipulate learners' attention to focus it on form in an attempt to optimize limited attentional resources.

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Notes

[1]Since Krashen's (1981, 1985) proposals, the term *explicitness* has been simultaneously used to refer to at least three aspects of second language acquisition: (a) the external instruction provided, (b) the internal learning process, and (c) the resultant type of knowledge. In our study, we use *explicitness* to refer to an external condition: provision of information about how the target language works.

[2]Task essentialness is defined by Loschky and Bley-Vroman (1993, p. 132) as "the most extreme demand a task can place on a structure . . . the task cannot be successfully performed unless the structure is used." They also state that "structural accuracy in comprehension and production should be made essential to meaning in the task" (p. 131).

[3]The restrictions established for adding a participant to the sample somewhat reduced sample size. For example, approximately 20% of the initial population of 142 students was not included in the sample, as participants performed above the 60% level on the interpretation task. This criterion was incorporated into the design following VanPatten and Cadierno's study as a solution to the problem of prior exposure to the form being studied. Participants had seen the form before as it is very frequent in the language, and some were exposed to grammatical explanations regarding Spanish direct objects no later than 4 to 6 months prior to the experiment. Unfortunately, however, most participants were lost from the sample because of problems during test administration: Participants either were late and could complete only part of the test or missed the appointment altogether. In order to increase sample size and therefore size effects, we decided to include 16 participants who took identical versions of the pretest and posttest. We considered a period of one to three weeks between tests to be enough to avoid test effects. A delayed posttest session took place at the end of the semester, which increased attrition to the point that we could not include delayed posttest scores in the analysis.

[4]Two reviewers of this article suggested that we include a note discussing the complexity of this form. Here we summarize Sanz (1999), in which it is argued that O-cliticV sentences are complex morphosyntactic forms from the acquisitionist, historical, and variationist perspectives. Although the section on the target form in this article focuses on the learner's internal factors to account for the delay in acquisition, namely, the first-noun strategy, they combine with external factors to make the acquisition of clitics a complex phenomenon. Clitics are a remnant from the old Latin case system, a structure that is still evolving and as such is associated with an important range of variation, including *laismo* and *leismo*, and deletion of the direct-object form in bilingual varieties, as in *¿Le diste el lapiz? sí, le di* ('Did you give him/her the pencil? *Yes, I gave to him'). Clitics' perceptual saliency is low, as they are unstressed and monosyllabic. Many forms that vary in number,

person, gender, and case are used to convey the same meaning. Also, processing clitics places heavy requirements on working memory before a match is made between the clitic and its referent.

[5]One reviewer of this article wondered whether we had identified any drawbacks to computer-delivered treatments. We can think of only one: Developing them is time consuming and requires expertise. But the advantages far outweigh this initial limitation. Sanz's (2000) review of LIBRA details these advantages and quotes participants' reactions. The same reviewer indicated that we needed to provide a rationale for the type and number of items and sessions. The mode of presentation was different but all other variables, including number of practice items, length and structure of grammar lesson, sessions, and test items strictly follow VanPatten and Cadierno (1993) and VanPatten and Sanz (1995).

[6]From VanPatten (2003): "Referential activities are those for which there is a right or wrong answer and for which the learner must rely on the targeted grammatical form to get meaning. Normally, a sequence of structured input activities would begin with two or three referential activities. . . . Following referential activities, learners are engaged in *affective* structured input activities. These are activities in which learners express an opinion, belief, or some other affective response and are engaged in processing information about the real world." An example of an affective activity is the following: "Choose among the following options those that describe how you feel. Mi familia a. me fastidia, b. me quiere mucho, c. me comprende." It is important to point out that the lesson includes a mixture of SVO and OVS/OV sentences.

[7]Unfortunately, LIBRA applications do not allow performance, including frequency and timing of feedback, to be tracked. We are currently working on a new application that combines Flash multimedia capabilities with Java to track frequency and location of errors per individual as well as treatment.

[8]One of the reviewers of this article suggested an analysis based on target-like use as a useful solution for examining overgeneralization errors. In our case, such errors would consist of producing both the clitic and the full NP in a sentence. There are no instances of this type of error in our data.

[9]Finally, a two-within, one-between repeated-measures ANOVA was performed. The additional within variable considered was type of production task. Results indicate that differences between means of the sentence completion task and the video-retelling task are statistically in favor of the sentence completion task, which elicited a higher number of O-cliticV sentences. This finding is similar to that in Sanz (1997) and confirms that different task types elicit differential effects of instruction. However, as seen above, production on both the sentence completion and the video retelling significantly improved on the respective posttests.

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