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Hulstijn, J.H.; Hulstijn, W.

DOI

[10.1111/j.1467-1770.1984.tb00994.x](https://doi.org/10.1111/j.1467-1770.1984.tb00994.x)

Publication date

1984

Published in

Language Learning

[Link to publication](#)

Citation for published version (APA):

Hulstijn, J. H., & Hulstijn, W. (1984). Grammatical errors as a function of processing constraints and explicit knowledge. *Language Learning*, 34(1), 23-43.
<https://doi.org/10.1111/j.1467-1770.1984.tb00994.x>

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GRAMMATICAL ERRORS AS A FUNCTION OF PROCESSING CONSTRAINTS AND EXPLICIT KNOWLEDGE

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The first question of this study deals with the influence of the factors Time Pressure (present or absent) and Focus of Attention (on information or on grammar) on the correct use of two Dutch word-order rules in the speech of 32 adult learners of that language. In an experimental repeated measures design using a story retelling task, Attention had a significant effect, but Time did not. The second question deals with the relation between explicitness of rule knowledge, assessed in an interview, and rule application, elicited in the experiment. Although the learners without explicit knowledge of the two word-order rules made more errors in the story retelling task than learners with explicit knowledge, they were influenced by Time and Attention to the same extent as the learners with explicit knowledge.

The results of this study are discussed in terms of Krashen's Monitor Theory and in terms of an information-processing approach that distinguishes executive control from metacognitive knowledge.

This study deals with some factors that may play a significant role when intermediate second language learners plan and monitor their speech.¹ In this introduction, we shall briefly consider the notions of planning and monitoring, as they occur in the psycholinguistic literature on speech production, and then present our research questions in an information-processing framework which distinguishes an executive-control dimension as well as a metalinguistic-knowledge dimension.

According to psycholinguists (e.g., Clark and Clark 1977), the speech production process consists of the conceptualization of a message, the planning of an utterance, and the articulation of the planned utterance. These three processes take place in an incremental and interactive way (Kempen 1977; Kempen and Hoenkamp 1982; see also Hatch 1983, ch. 6). Planning involves the activation and retrieval of knowledge about

¹This article is based on the unpublished doctoral dissertation of the first author (Hulstijn 1982). The authors wish to thank Professor Krashen (University of Southern California), as well as the anonymous reviewers, for their comments on an earlier version of this paper.

linguistic forms and their meanings, stored in the speaker's memory. It has been suggested that there are several stages in the planning and execution phases of speech production, during which speakers review their utterance plan and may or may not decide to change it. These reviewing processes are commonly called "monitoring" (e.g., Laver 1973, 1980; Levelt 1983). Not much is known about monitoring processes; "monitoring" is generally used as a cover term indicating review processes that can lead to a variety of covert as well as overt editing or self-correction phenomena. Automatic error correction frequently occurs in the domains of syntax, morphology, and pronunciation: In their memory, skilled speakers have available ready-made subroutines for the construction of these structures as well as for the detection (monitoring) and correction of errors in them. Nonskilled speakers—such as second language learners at a beginning or intermediate proficiency level—have not yet fully routinized many of these structural rules of the second language (L2). For such speakers, utilizing these structural rules can be characterized as a controlled process. Most controlled processes are continuously monitored, attended to, and governed by the subject (Shiffrin and Dumais 1981). Moreover, controlled processes require more time than automatic processes.

It is important to note that humans have limited capacities for information processing. In the case of second language learners who do not yet use some L2 structural rules automatically, this limitation in processing capacity may have the following consequence. For correct performance, they need to pay extra attention to these rules. This takes time and consequently we may expect the whole planning and execution process to slow down. However, if such learners while speaking are to pay attention to other phenomena, e.g., to informational aspects of their message, and/or if they are given only little time to convey their message, they may run out of capacity to simultaneously control the structural features. Under such circumstances we may expect their performance to exhibit many structural errors.

Thus, in this information-processing approach to the development of second language speaking skills, we distinguish first of all a dimension of executive control. This dimension, ranging from controlled to automatic processes, deals with the effective and efficient selection and coordination of particular kinds of information. An example of this is, in the case of oral production, the construction, monitoring, and execution of utterance plans in accordance with the task demands.

In addition to this executive-control dimension, we distinguish a dimension of metacognitive knowledge (knowledge of cognition). In the case of the second language learner, this dimension pertains to the learner's linguistic awareness, ranging from a highly implicit to a highly explicit knowledge of the language rules. In the implicit case, the learner knows the rule intuitively, but in the highly explicit case, the learner is able to verbalize the rule in sophisticated metalinguistic terms.

From this distinction between executive control and metalinguistic knowledge we may hypothesize that, while controlling a structural feature, not all learners necessarily take recourse to an explicit linguistic rule in memory (the knowledge base). It may well be that some learners control a structural L2 feature with knowledge of an implicit, intuitive kind. We conceive of this distinction between executive control and metacognitive knowledge as being tentative but useful for hypothesis generation. In fact, the literature in cognitive psychology offers a wide variety of theoretical positions in these and in related issues. A full review, however, is beyond the scope of the present study (see Anderson 1981; Bialystok and Bouchard-Ryan, *in press*; Brown 1981; Cavanaugh and Perlmutter 1982; McLaughlin, Rossman, and McLeod 1983).

Applying this information-processing framework to the case of L2 learners who have not yet mastered certain L2 rules to the point of automaticity, we may now state the following research hypotheses: First, if execution of control for learners with low skills requires time, we may expect them to make more errors when they have to speak as fast as they can than when they can take as much time as they want. Second, if execution of control for learners with low skills requires special attention, which consumes a large amount of processing capacity, we may expect them to make more errors when they have to pay extra attention to the contents of their message than when they have to focus on its grammaticality. Third, if metalinguistic knowledge is independent of executive control, then control-influencing variables such as time pressure and focus of attention should have an equal impact on learners, regardless of whether they do or do not have an explicit knowledge of L2 structural rules.

In order to examine these questions, we conducted an experiment, with 32 adult learners of Dutch as a second language. All subjects, who were tested individually, had to perform a story retelling task under four conditions. Two variables were manipulated, time pressure (present or

absent) and attention (focussed on information or on grammar). In the responses the percentage of correct realizations of two Dutch word-order rules in obligatory context were scored: (1) *inversion* of subject and finite verb in main clauses (INV) and (2) the placement of the finite verb in *final* position in subordinate clauses (VF), giving two dependent variables.

In the second part of our study, we interviewed the subjects, immediately after the experiment, and assessed the degree to which they knew the INV rule and the VF rule explicitly. In order to find out to what extent explicit linguistic knowledge interacts with the influences of time and attention (executive-control variables), we investigated whether learners with explicit rule knowledge (1) had a better overall performance across the four experimental conditions and (2) had gained more from the absence of time pressure and/or from a focus on grammaticality than had learners with a nonexplicit knowledge of these rules.

In summary, the main research questions of our study concerned the influence of two executive-control variables, time pressure and focus of attention, on the correct realization of two word-order rules and their impact for learners with and learners without an explicit knowledge of these rules (i.e., the interaction with a metacognitive-knowledge variable).²

THE INFLUENCE OF TIME AND ATTENTION: THE EXPERIMENT

Method

Subject selection. Thirty-two subjects (Ss) were selected from a sample of 157 adult learners of Dutch living in Holland. All of these learners had completed at least secondary school in their home countries, and all had taken Dutch lessons, although some more than others. The selection was made on the basis of a sentence correction test that measured (at least implicit) knowledge of INV and VF. In this test the learners had to look for errors in the stimulus sentences and then correct these errors. We do not assume that such a task, in which the learner is required to give

²For details concerning INV and VF, the two Dutch word-order rules that served as dependent variables, and for matters such as subject selection, testing materials, instructions, scoring procedures, and many more details, we refer the reader to Hulstijn (1982). In Hulstijn (forthcoming) the results of this study are related to the literature on acquisition order of INV and VF in Dutch and German and the literature on L1 interference.

grammaticality judgments, can only be accomplished by means of explicit metalinguistic knowledge. Errors can also be assessed and corrected on the basis of an unarticulated, implicit knowledge of the rules. The test consisted of 40 Dutch sentences, each one printed on a separate page, with 20 sentences (10 correct and 10 incorrect) serving as distractors. The remaining 20 sentences, containing 10 INV errors and 10 VF errors, were scored. The learners were told that most sentences contained an error in grammar, and that they had to correct these errors with a pencil. Half a minute was allowed for the correction of each sentence.

In designing this study, we assumed that differences in L1, along with differences in educational system and teaching/learning styles in the home country, might affect the extent to which L2 learners monitor their L2 speech. In this light we decided that in selecting 32 Ss for our experiment we would take care that 16 of them had the same mother tongue.

In order to exclude from our experiment learners who could be expected to perform without error under all circumstances as well as learners who could be expected never to perform correctly, it was decided that, in order to be selected as a subject in the experiment, a learner would have to have an INV score as well as a VF score of more than 10% correct and less than 90% correct. Of the 157 learners who took the test, there were 40 learners who met both requirements, and of them, 16 who had English as their L1. The mean age of the 16 English Ss (4 male, 12 female) was 32 years; their mean length of residence in Holland was 2.8 years. The 16 non-English Ss that were selected had the following mother tongues: French (2), Spanish (2), Italian (1), Portuguese (1), Greek (1), Turkish (5), Hebrew (1), Indonesian (2), and Japanese (1). (The Romance languages, Greek, and Indonesian are, like English, SVO languages; Japanese and Turkish are SOV; Hebrew is originally VSO, but modern colloquial Hebrew is almost SVO.) The mean age of the 16 non-English Ss (8 male and 8 female) was 24 years; their mean length of residence was 1.3 years.

Also for reasons of limited space, we cannot report here the third part of the original study, concerning Krashen's distinction between overusers and underusers of the Monitor. All subjects in our study were administered a cognitive style test, Kagan's Matching Familiar Figures Test. No meaningful relation was found to exist between Ss' scores on this test and their performance in the experiment, or with their explicit or nonexplicit knowledge of the grammar rules.

After the original study (Hulstijn 1982) was finished, we conducted a number of additional analyses on the experimental data. We looked at differences in speech rate, self-repeats, and self-corrections among the four experimental conditions, and we analyzed a number of self-correction types into more detail. The report on this additional study is in progress.

Experimental task and materials. Ss had to perform what was essentially the same task (story retelling) under four different conditions. In the IF condition (Information/Fast) they had to pay attention to the information that they had to reproduce, and at the same time, speak as fast as they could. In the IS condition (Information/Slow) they could take as much time as they wished. In the GF and GS conditions (Grammar/Fast and Grammar/Slow) they had to pay as much attention as possible to grammatical correctness.

The elicitation procedure—for each subject individually—was as follows. The subjects listened to passages of L2 speech, ranging in length from 25 to 36 words, through a head set. The stimulus texts contained simple vocabulary and dealt with topics from everyday life. They were then required to retell the content of the texts, also in L2. In front of them was a screen, onto which a so-called response frame was projected by means of a slide projector. This response frame consisted of a few words that forced them to produce a sentence structure of the required type. For example, in order to force the Ss to produce a subclause in their reproduction of a stimulus text, a written response frame was offered consisting of a phrase such as *This man says that...* or *This lady believes that...* The Ss were instructed to start their response by reading aloud the response frame that had been presented to them after they had listened to the stimulus text. To elicit inversion structures, the response frame consisted of an adverbial phrase taken from the stimulus text, preferably from the first sentence of the stimulus text, so that the Ss were not forced to reproduce the information segments of the stimulus text in a different order. In this way we were able to elicit with each response at least one linguistic context obligatory to INV, or one linguistic context obligatory to VF. After the response frame, the subjects chose their own words for the remainder of the response; they were thus free to supply INV and VF as often as they wished.

Altogether, every S had to retell 68 stimulus texts. In each of the four conditions there were 4 practice items followed by 12 experimental items (6 with an INV response frame and 6 with a VF response frame). The first condition to be administered was preceded by 4 items that served to make the Ss familiar with the task. Hence, of the 68 responses, only 48 (12 in each condition) were scored for analysis.

To be able to score the responses for the amount of information correctly reproduced, we designed stimulus texts, each containing four pieces of information. (The stimuli for INV actually consisted of five pieces, but one of these served as the response frame, leaving four for retelling.) Below are

two examples, translated into English. The response frame of the first example elicits an obligatory INV context, the second elicits an obligatory VF context.

Stimulus text 19: I was in hospital last month. The reason was that I'd broken my leg. I had to stay in hospital for five days. But the people there were all very kind to me.

Frame: Last month...

Information units: (1) in hospital, (2) broken leg, (3) five days, (4) kind people

Stimulus text 8: Recently we had a radio stolen from our flat. It was while we were on holiday. It's very easy for them to just open a window or something. But the whole thing still cost us a good 800 guilders.

Frame: This lady says that...

Information units: (1) radio stolen, (2) while on holiday, (3) it's easy to get in, (4) damages: 800 guilders

For the first text, a response containing a correct realization of the subject-verb inversion rule might begin as follows: "Vorige maand *was ik* in het ziekenhuis" (literal: Last month *was I* in hospital). For the second text, a response containing a correct realization of the verb-final-in-subclause rule, might begin with: "Deze dame zegt dat er een inbraak *was*" (literal: This lady says that there a burglary *was*).

Instructions and feedback. Each experimental treatment consisted of 4 practice items followed by 12 test items, which were recorded for later scoring. All instructions were in Dutch.

In the two fast conditions (the IF and GF treatments), the experimenter (E) told the subject (S) to respond as quickly as possible. E used a stop watch and, in the practice stage, told S after each response how many seconds that response had lasted.

No stop watch was used in the two slow conditions (IS and GS). During the practice stage of these treatments, E advised S to take as much time as he or she wished.

In the two information conditions (IF and IS), S was requested to pay attention to the contents of the stimulus texts. S was told that the responses would be scored for information errors only, and not for grammatical errors. During the practice stage of these two treatments, E pointed out not more than two information errors that S might have committed in any response. For instance, E might say, "You said it was a loss of 80 guilders, but the lady said it was 800 guilders. And you didn't say that this happened when the lady was on holiday" (cf. the stimulus text quoted above).

In the two grammar conditions (GF and GS), S was requested to focus attention on the grammatical correctness of his or her responses. S was told that the responses would be scored for errors in grammar but not for errors in information. During the practice stage of these two treatments, E pointed out grammatical errors (but no more than two per response). Preference was given to correcting INV and VF errors over other syntactic errors. In correcting, E did not mention the rule as such, but corrected only in the following way: "You said.... But that is not correct. You must say...."

When the four practice items in any treatment had been completed, E did not provide any more feedback. Each of the 12 test items that followed was announced with only a short instruction, referring to the two critical features of the treatment, e.g., "information and fast," "information and slow," "grammar and fast," and "grammar and slow." To summarize, instruction and feedback were aimed at shaping the response behavior, and this was done not only in an abstract, verbal way but, more importantly, by having Ss practise according to the instructions before the actual experimental items were presented.

Design. Each S performed in the story retelling task under all four conditions (repeated measures). The order of the 68 stimulus texts was the same for all Ss, but the order in which the treatments were administered was counterbalanced, such that half of the Ss had the two slow treatments first and the two fast treatments last. Within a block of two slow or fast treatments, half of the Ss had the information treatment first and the grammar treatment last. This resulted in four different administration orders. Ss were randomly assigned to these orders, such that each order was administered to four non-English and to four English subjects.

Scoring. The data consist of 1536 responses; each of the 32 Ss reproduced 12 stories in four treatments. In each response, at least one obligatory context was elicited by the frame, either for INV or for VF. This context is called an In-frame context. Any other contexts for INV and VF constructions found in the remainder of the subject's response are labelled Elsewhere contexts. Apart from the 1536 contexts elicited in frames (768 for INV and 768 for VF), the data also contain 1746 Elsewhere contexts (1015 for INV and 731 for VF).

Analysis. A number of analyses of variance (ANOVAs) were carried out with repeated measures on the within-subject factors. Unless otherwise stated, all analyses of variance comprised the following factors: (1) mother tongue groups (non-English subjects versus English subjects), (2) focus of

attention (on information in the IF and the IS conditions, on grammatical correctness in the GF and the GS conditions), (3) time pressure (present in the two fast conditions IF and GF, and absent in the two slow conditions IS and GS), and (4) locus of obligatory context (In-frame or Elsewhere). Thus each of these four factors contains two levels. For convenience we will label these factors *Group*, *Attention*, *Time*, and *Context*, respectively. The Group factor is the between-subject factor. The remaining three factors are the within-subject factors, i.e., the factors with repeated measures.

The analyses were carried out on the INV scores and the VF scores separately (the two dependent variables). Analyses of variance were also done on two control variables, *Response Length* and *Information* correctly reproduced.

Results

The effect of Time and Attention on the two control variables. Our principal research question concerns the effect of Time Pressure and Focus of Attention upon the grammatical correctness of sentences in L2 performance. In the experiment both variables were manipulated, Time Pressure being present or absent and Attention being focussed on information or on grammar, giving four experimental conditions. Our first task was to check whether or not these experimental manipulations had been effective. We used response length as a check on the Time Pressure manipulation and information scores as a check on Focus of Attention.

The length of all responses was clocked by hand and rounded off to whole seconds, including the time that elapsed from the tone that followed each stimulus text until speech onset. Table 1 gives the mean response length in the four experimental conditions across all subjects. The table contains three F values, the top one for the presence versus absence of Time Pressure, the middle one for focus on Information versus Grammar (mean), and the bottom one for the interaction of Time and Attention (interaction).

As expected, the presence of Time Pressure resulted in much shorter responses. However, putting the Focus of Attention on grammar also resulted in longer responses, which is an unintended side effect. Moreover, Time Pressure had more effect when the attention was on grammar than on information.

As a second check we determined the extent to which Ss had correctly reproduced the information contained by the stimulus texts, in each

Table 1
Mean response length in seconds in the four conditions across all subjects

	Focus of Attention on		Mean	F(1,30)
	Information	Grammar		
TIME PRESSURE				
Present	21.2	25.4	23.3	66.28***
Absent	30.9	42.2	36.5	
MEAN	26.0	33.8		37.27***
INTERACTION				19.33***

* $p < .05$

** $p < .01$

*** $p < .001$

condition. Two judges, who were not familiar with the research questions, scored the transcripts of all responses in order to assess the extent to which the four pieces of information contained in the stimulus texts had been correctly reproduced by the subjects in their responses. The maximum score per response was 8, i.e., two points for each piece of information. Both judges scored all 48 responses of all 32 subjects. The scores of the judges correlate .98. Table 2 shows the information scores (means from both judges) according to Time and Attention.

Table 2
Mean information scores in the four conditions across all subjects

	Focus of Attention on		Mean	F(1,30)
	Information	Grammar		
TIME PRESSURE				
Present	6.14	5.29	5.72	0.44
Absent	6.22	5.32	5.77	
MEAN	6.18	5.31		46.48***
INTERACTION				0.08

* $p < .05$

** $p < .01$

*** $p < .001$

Attention on information did indeed result in higher information scores than attention on grammar, although the differences were small. One might expect that long responses would contain more information than short responses, but this was not borne out. Subjects who reproduced little

information needed more time than subjects who retold a lot of the information. Perhaps the general proficiency of the first group was lower, which might explain why extending their reflection time did not yield better results: The mean response length over 12 trials per subject correlated negatively with the mean information score over 12 trials per subject, the mean r over four conditions being $-.30$, which just reaches significance at the .05 level.

We conclude from the measurement of these two control variables, Response Length and Information correctly reproduced, that instructions and feedback had been effective since, as expected, our subjects generally exhibited a different response behavior in the four treatments, irrespective of their performance on INV and VF.

The effect of Time and Attention on the monitoring of Inversion and Verb Final. The first research question that we attempted to answer with this experiment concerns the effect of Time Pressure and Focus of Attention on the correct realization of the two second language grammar rules under investigation, Inversion in main clauses and Verb Final in subordinate clauses. Table 3 shows the mean correct percentages across all subjects, and for both In-frame and Elsewhere contexts, in the four experimental conditions.

Table 3
Mean correct use of INV and VF (as %) in the four conditions

Focus of Attention				
	Information	Grammar	Mean	F(1,30)
RULE: INV				
TIME PRESSURE				
Present	81.0	85.7	83.4	0.10
Absent	77.6	87.9	82.7	
MEAN	79.3	86.8		5.40*
INTERACTION				2.33
RULE: VF				
TIME PRESSURE				
Present	36.1	55.7	45.9	0.46
Absent	37.6	59.1	48.4	
MEAN	36.8	57.4		32.13***
INTERACTION				0.09

* $p < .05$

** $p < .01$

*** $p < .001$

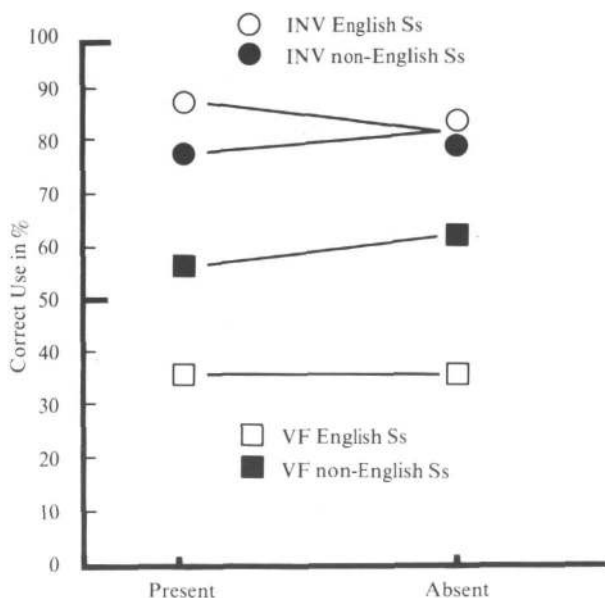


Figure 1. Effect of the Time Pressure factor on INV and VF performance (In-frame + Elsewhere contexts).

The INV scores are high (the mean is 83%) and so their variance between conditions is small. The VF performance, however, showed considerable variance between conditions (the mean is as low as 47%). Focus of Attention on grammar improved both INV performance and VF performance, but the presence of Time Pressure had no effect at all. We can conclude that Focus of Attention on grammar resulted in better performance, which is indicative of increased monitoring, irrespective of the Time Pressure. The greatest difference was found, as expected, between the IF condition (Information Fast) and the GS condition (Grammar/Slow).

The effect of the factors Time and Attention is also shown in Figures 1 and 2, but here the effect is shown for non-English and English subjects separately. The English Ss did slightly better than the non-English Ss on INV but they did substantially worse on VF ($F(1,30) = 11.12, p < .01$). In the sentence correction test that was used to select the 32 Ss, too, the 16 English Ss scored significantly lower on VF than the 16 non-English Ss, although both subgroups met the selection requirements.

Table 4 shows the means for the correct use of INV and VF, with In-frame contexts and Elsewhere contexts given separately. Recall that the

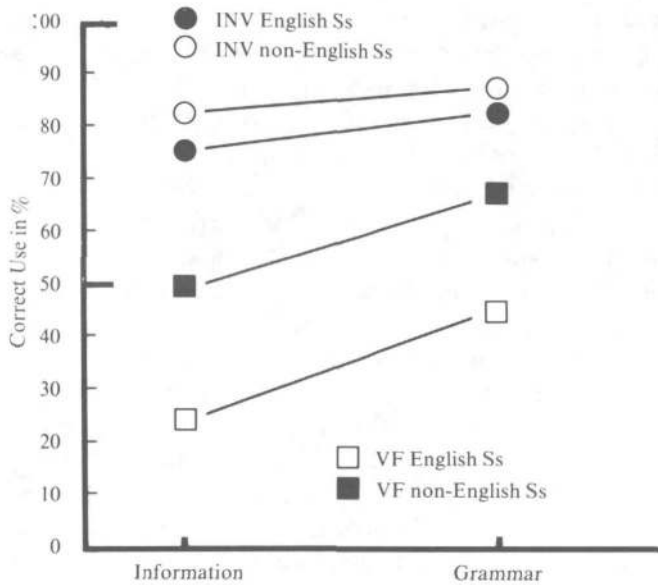


Figure 2. Effect of the Attention factor on INV and VF performance (In-frame + Elsewhere contexts).

Table 4
Mean correct use of INV and VF (as %), by context and group

	Group		Mean	F(1,30)
	Non-English	English		
RULE: INV				
CONTEXT				
In-frame	84.7	84.8	84.8	2.87
Elsewhere	77.1	85.5	81.3	
MEAN	80.9	85.2		0.48
INTERACTION				4.01
				(p = .052)
RULE: VF				
CONTEXT				
In-frame	54.9	23.8	39.3	15.03***
Elsewhere	62.5	47.4	54.9	
MEAN	58.7	35.6		11.12**
INTERACTION				3.97
				(p = .053)

*p < .05

**p < .01

***p < .001

former were forced upon the Ss, whereas the latter arose spontaneously due to the subjects' choice of words and phrases. The table also gives the means for the non-English and English subgroups separately.

In the case of VF there is a marked difference between In-frame and Elsewhere contexts. We believe that this is a consequence of the elicitation procedure that we deliberately adopted: In In-frame contexts Ss were confined to a certain linguistic structure, while Elsewhere in the response they had opportunities to adopt a play-it-safe strategy and avoid syntactic structures about which they felt insecure. Note that the subordinate conjunction in all VF frames was *dat*, "that," whereas in Elsewhere contexts Ss also used other conjunctions, such as *omdat*, "because," and *als*, "if." Thus the Elsewhere contexts differed from the In-frame contexts not so much in quantity (731 Elsewhere contexts against 768 In-frame contexts), but rather in quality. This is especially so in the case of VF. Moreover, as noted, the mean INV scores were high in all conditions, leaving little room for influence on the part of the independent variables. (For both INV and VF, increased monitoring was greater for the weaker context: Elsewhere in case of INV and In-frame in case of VF.)

EXPLICIT KNOWLEDGE: THE INTERVIEW

The second research question of this study asked to what extent explicit or nonexplicit knowledge of an L2 grammar rule is related to the capability to apply that rule effectively in different circumstances. In order to investigate this relation, all Ss were individually interviewed immediately after the experiment and assessed as to their ability to explicitly verbalize the two word-order rules INV and VF. The results were then compared with the results of the experiment. This was done in two ways. First, Explicit Knowledge was compared with the learner's general performance across four conditions. Second, Explicit Knowledge was compared with the differences in correct scores between the Information/Fast condition and the Grammar/Slow condition.

Method

Procedures. Ss were shown their own copy of the booklet containing the 40 sentences of the sentence correction test that had been used for selection purposes. (Generally, there was an interval of a few weeks between the

administration of the sentence correction test and the experiment plus interview.) E asked questions of the following kind (translated into English; the interview was held in Dutch): "Is this sentence right or wrong? Do you know why?"; "Why did you correct this sentence in this way?"; "Have you ever heard of inversion, main clause, subclause?" E persisted with his questioning until he felt that Ss had made explicit everything about INV, VF, and the distinction between main clause and subclause that existed in their minds. Therefore, the most frequent question was "Why?"

Scoring principles. For each rule, we allotted each S one of the following three marks: plus, minus, or zero. A plus was scored when S was able to formulate the rule explicitly (although sometimes in unsophisticated terms) and exhibited a correct understanding of it. A minus was scored when S was unable to state any explicit rule regardless of whether the grammaticality judgments were correct or not. A zero means that, although S stated a rule, it was evident that he or she did not really understand it. For instance, S might give inconsistent explanations of the rule while using grammatical terms such as *inversion*, *conjunction*, *main clause*, and *subclause* without precisely knowing what they meant. A zero was also scored in cases of successful problem solving when S was first unable to state any rule but appeared to "find" the correct rule after some discussion.

Results

Explicit knowledge of INV and VF was demonstrated by only 12 and 8 Ss, respectively ($N = 32$); 6 Ss could state both rules explicitly. Table 5 shows the average performance over the four experimental conditions according to the type of the subjects' rule knowledge.

From Table 5, it can be seen that the performance of the Ss with explicit knowledge was generally higher than that of the Ss without such knowledge, in particular for VF. Moreover, the 24 Ss without explicit VF knowledge scored much lower in In-frame contexts (31.4%) than Elsewhere (52.7%)—in Table 5 only the mean is indicated (42.0%). This is probably due to the fact that In-frame contexts do not permit play-it-safe strategies. The 8 learners with explicit VF knowledge, however, had an almost equal VF score for In-frame (63.1%) and Elsewhere (61.7%). Thus, the contexts elicited by the researcher and the contexts created by the Ss themselves were experienced as equally difficult. Of the 8 Ss who exhibited explicit VF knowledge, only one was English. Recall that we found that the

Table 5
Mean correct use of INV and VF (as %) across the four experimental conditions, by subjects' knowledge

Rule	Knowledge	N	Performance	F(1,30)
INV	Incorrect rule (0)	11	74.5	1.15
	No rule (-)	9	87.9	
	Total	20	80.5	
	Correct rule (+)	12	87.2	
VF	Incorrect rule (0)	15	43.9	5.58*
	No rule (-)	9	38.9	
	Total	24	42.0	
	Correct rule (+)	8	62.4	

* $p < .05$

English Ss fared less well on VF than the non-English Ss, this being markedly so in In-frame contexts (Table 4).

In the second analysis with the Explicit/Nonexplicit factor, gain scores from the Information/Fast condition to the Grammar/Slow condition were used. Thus, each subject's IF score was subtracted from his or her GS score. Table 6 shows these difference scores in % difference, separately for the learners with and without explicit knowledge.

Table 6
Difference between the IF and the GS conditions (in %), by subjects' knowledge

Rule	Knowledge ^a	N	In-frame	<i>t</i>	Elsewhere	<i>t</i>
INV	Nonexplicit	20	5.0	0.02	8.8	0.01
	Explicit	12	4.9		8.7	
VF	Nonexplicit	24	25.8	0.23	15.6	0.81
	Explicit	8	29.6		30.8	

^aNonexplicit refers to the learners with (0) and (-) scores; explicit refers to the learners with (+) scores.

From Table 6, it can be seen that the improvement in performance was generally *not* greater for learners with explicit knowledge of the rule than for learners without. The one exception to this was the case of VF in the Elsewhere contexts. Here the Ss with explicit knowledge improved their performance from the Information/Fast condition to the Grammar/Slow condition by +30% and those without by +15%, but this difference is not significant.

In addition, biserial correlations were calculated between differential monitoring (again the IF score subtracted from the GS score) and explicit/nonexplicit knowledge (a dichotomous variable). The coefficients are $-.00$ (INV In-frame), $-.00$ (INV Elsewhere), $.06$ (VF In-frame), and $.22$ (VF Elsewhere, $p = .16$).

From this part of our study we conclude that the learners with explicit knowledge had significantly higher correct scores across the four conditions. Thus their general performance was better than the general performance of the learners without explicit knowledge. But there were no significant differences in gain scores between the learners with and without explicit knowledge. Thus the learners lacking explicit knowledge did not profit less than the learners with explicit knowledge from the absence of time pressure and from a focus on grammar.

SUMMARY

We shall now summarize the results from this study, which involved 32 adult learners of Dutch selected on the basis of their intermediate mastery of two Dutch word-order rules, inversion (INV) and verb final (VF).

In the experiment, the first part of the study, the presence of Time Pressure did indeed result in shorter responses (Table 1), and Focus of Attention on information resulted in higher information scores (Table 2). We conclude from these two results that, as expected, the instructions and feedback generally led our subjects to exhibit a different and appropriate response behavior in the four treatments, irrespective of their performance on INV and VF.

The main result from the analyses of the experimental data, the result concerning the first research question of this study, was that Focus of Attention on grammar increased the percentage of correct realizations of INV and VF structures, but Time Pressure had no effect (Figures 1 and 2). Furthermore, these analyses produced the following results: INV performance was much better than VF performance, the VF rule was applied better in subjects' self-generated (Elsewhere) contexts than in the forced (In-frame) contexts, and, finally, the English Ss had particular difficulty with the VF rule.

In the second part of the study, subjects' explicit knowledge of INV and VF was assessed in an interview and compared to their performance in the experiment. These analyses showed that learners with explicit knowledge

generally applied the INV and VF rules better than the learners without such knowledge, when the scores of all four treatments were combined (Table 5). More interestingly, however, the gain scores from the Information/Fast condition to the Grammar/Slow condition of the learners with explicit knowledge did not differ significantly from the gain scores of the learners without explicit knowledge (Table 6). Thus, focus of attention on grammar had the same significant positive impact on INV and VF performance for learners who could correctly verbalize these rules, for learners who could not state any explicit rule at all, and for learners who stated partly correct, or even incorrect, rules.

DISCUSSION

We shall discuss our findings, first in terms of Krashen's Monitor Theory and then in terms of the information-processing framework presented in the introduction.

Krashen's well-known Monitor Theory (1981) hypothesizes that the Monitor (the consciously learned system) can be used only if three conditions are met: (1) The L2 speakers must have enough time, (2) they must focus on grammatical correctness, and (3) they need to know the rule. In the present study this threefold hypothesis could not be tested as such, since Monitor Theory does not offer any means of empirically distinguishing self-correction on the basis of the acquired system from self-correction on the basis of the learned system. These two types of self-correction are additive. Hence, it is not possible to explain our findings directly according to Monitor Theory. The significant Attention effect that we found could have been caused by either or both types of self-correction. However, neither type had benefitted from the absence of time pressure, since no main Time effect was found. Note, however, that focussing on form took time and yielded less information: The responses in the two grammar conditions generally lasted 30% longer (7.8/26.0; see Table 1) and transmitted 14% less information (.87/6.18; see Table 2) than those in the two information conditions.³ Thus, it seems that time in itself is not a necessary condition for successful self-correction but that focus on form generally requires time in order to bring about successful self-correction.

³We owe this observation to Krashen.

Turning now to the second part, we found that learners without explicit rule knowledge gained just as much from focus on form and absence of time pressure as learners with such explicit knowledge. This finding could be accommodated by Monitor Theory: Since the two types of self-correction in Monitor Theory are additive, they may have operated differentially for the learners with and without explicit knowledge. What becomes clear from such a post hoc explanation, is this: As long as Monitor Theory remains unable to empirically isolate the acquired system from the learned system, while continuing to claim that they are totally separate, Monitor Theory may well remain unaffected by some empirical data. Obviously, the value of a theory immune from empirical validation is bound to be limited.

As we have argued in the introduction, a more fruitful approach to the study of L2 learning and L2 use can be found in a cognitive, information-processing framework. On the basis of such a framework we expected that Time Pressure and Attention would influence executive control, and hence performance, under conditions of low skill and limited capacity. For Attention, this was borne out but not for Time Pressure, although generally focus on grammaticalness required more time than focus on information. Moreover, we found that for skills under controlled processing (i.e., the use of VF), focussing of attention on grammar helped much more than for skills largely under automatic processing (i.e., the use of INV), since gain scores were higher for VF than for INV. Another indication that INV was under more automatic control than VF was that the learners who could not verbalize the INV rule employed that rule as well as those who could, whereas the learners who could not verbalize the VF rule employed that rule less well than those who could.

The equal impact of Attention on learners who could and on those who could not verbalize the rules is in accordance with the hypothesis, stated in the introduction, that executive control and metalinguistic knowledge are independent dimensions. Obviously, this finding does not by any means provide conclusive evidence. But we consider it to be the most important and challenging finding of this study, clearly calling for further research.

What is the relevance of the present study for L2 pedagogy? First, it is important to note that even L2 learners with only an implicit knowledge of the rules were able to boost the correctness of their performance significantly when asked to pay attention to form. Furthermore, it is an important finding that, for all learners and for both rules, a substantial

performance variability was found between conditions. This shows that performance can be influenced by task constraints and that it can be manipulated. Apart from supporting theoretical claims concerning the existence of variability in interlanguage (e.g., Tarone 1982), this finding has a practical relevance. It suggests that the language teacher, by varying the materials and the instructions for an oral production task, can help the learners to acquire flexible speaking skills. For instance, a story retelling task can be used in a variety of oral exercises. First of all, type and length of the stimulus texts can be varied in a number of ways. Second, by means of response frames or similar devices, the L2 production can be guided and directed towards particular linguistic features. Furthermore, the learner can be given a variety of instructions. Each time they do (and do again) a particular retelling exercise, the teacher can ask them to pay attention to different features and dimensions: grammatical features, pronunciation, rate of speech and speed of responding, correctness and completeness of information, etc. It is especially the aspect of repetition and rehearsing under different response constraints that may help what Krashen (1981) calls the "overusers" of the Monitor to drop their concern for grammatical correctness in some communicative settings in order to get the information across as quickly and efficiently as possible. And conversely, the "underusers" can be successfully directed to pay attention to the formal properties of language and speech or to the correctness of the message, in at least some communicative situations. Almost all the L2 learners of Dutch to whom we administered our story retelling procedure (in a variety of ways) appreciated this procedure as a valuable and practical exercise in gaining oral proficiency.

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