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Comprehension of grammatically modified and nonmodified sentences by second language learners

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ABSTRACT

At issue in the present research is whether native speakers' "simplified" or modified utterances, as in foreigner-talk (FT), actually facilitate comprehension for nonnative speakers hearing such utterances. It was hypothesized that (grammatical) Dutch inversion sentences (AdvVSO) that have proven to be problematic in studies on Dutch second language (L2) acquisition – as reflected both in the (ungrammatical) output of L2 learners and in the (ungrammatical) FT input to L2 learners – would not be problematic in terms of comprehension, when compared with modified, ungrammatical AdvSVO and AdvSOV sentences, as long as such sentences do not express an implausible state of affairs. Three subject groups participated in the experiment: 20 English and 22 Turkish L2 learners of Dutch and 30 Dutch native speakers (control group). Subjects heard and interpreted declarative Dutch sentences, in which word order (NVN, VNN, NNV) and animacy configurations (AI [i.e., animate/inanimate], AA, IA) were systematically manipulated. Subjects had to name the noun (first or second) that functions as actor/subject of the sentence. Positive evidence was found for the hypotheses. It is concluded from the present study, as well as from a previous study (Issidorides, 1988), that linguistically more complex input will not necessarily impede comprehension. The fact that nonnative speakers have difficulties in producing a certain grammatical structure (e.g., the AdvVSO structure) does not imply that such a structure is also more difficult to understand in the speech of others.

At issue in the present research is whether native speakers' "simplified" or modified utterances, as in foreigner-talk (FT) (Clyne, 1982; Ferguson, 1975), actually facilitate comprehension for nonnative speakers hearing such utterances, a tacit assumption often made by the producers of such utterances. Modifications in FT include adjustments in articulation, vocabulary, morphology, syntax, and patterns of conversational interaction (Chaudron, 1988; Clyne, 1982; Hatch, 1983, Ch. 9; Long, 1983). Previous research on FT has mostly described its setting, the status of participants, topic, and other variables considered to be responsible for FT. Some studies have shown that ungrammatical FT is used by second language (L2) teach-

ers and student peers when talking to ethnic minority students (De Bot & Janssen-van Dieten, 1984; Kleifgen, 1985; Van Helvert, 1985, Ch. 6). In one Dutch L2 textbook (De Praatkist, 1982) currently used at some Dutch elementary schools, dialogues are presented in three versions, beginning with simplified, often ungrammatical sentence patterns and ending with normal, grammatical sentence patterns.

Little is known about the effects of such linguistic modifications on L2 comprehension or about their role in L2 acquisition. L2 acquisition research has only recently begun explicitly to examine the effects of modified input on L2 comprehension and acquisition (Chaudron, 1983; Kelch, 1985).

In our research, we aimed to investigate the effect of some grammatical modifications resulting in ungrammatical or "broken" utterances: "You Tarzan me Jane." We are primarily concerned with the questions of whether, and to what extent, grammatical modifications resulting in ungrammatical utterances may aid comprehension.

In a previous study (Issidorides, 1988, 1991), we investigated comprehension of the following three types of sentences: (a) nonsimplified sentences, such as "The book is on the shelf" or "There is a book on the shelf," pronounced with normal intonation (Normal condition); (b) the same nonsimplified sentences, pronounced with equal pitch on all syllables (Monotonous condition); and (c) simplified sentences, such as "Book on shelf," arrived at by omitting the semantically redundant function words (*the*, *a*, *is*, and *there*) from the nonsimplified sentences (FT condition). Using a concept-identification task in three successive experiments, we assessed the comprehensibility of these sentence types to individuals who had absolutely no knowledge of the language (Experiments I and II), and to individuals who had a limited knowledge of the language (beginning Dutch L2 learners in Experiment III). We found that, contrary to naive assumptions of native speakers using FT, in all three experiments the Normal sentences did not impede nor slow down the comprehension of their meaning, when compared with FT sentences. However, the comprehension of the Monotonous sentences in Experiments I and II, using subjects who were totally unfamiliar with the input language, was seriously impeded by the absence of suprasegmental cues. We concluded that the presence of semantically redundant function words in utterances with normal suprasegmental cues does not hinder comprehension, and hence that their omission, as in FT, does not necessarily facilitate comprehension.

In the present study, we set out to investigate the effect on comprehension of another type of modification: the rearrangement of word order combined with the omission of verb inflection. This choice originated from observations (Snow, Van Eeden, & Muysken, 1981; Van Helvert, 1985, Ch. 6) that Dutch native speakers, when speaking to nonnative speakers, tend to limit themselves to subject-verb-object (SVO) structures or SOV structures, with the verb left uninflected. Among the utterance types resulting from this procedure are the following (an * indicates that the sentence is ungrammatical):

1. **Jan helpen Piet* 'John help Peter', instead of the grammatical sentence *Jan helpt Piet* 'John helps Peter' – an SVO main clause with uninflected V.
2. **Soms Jan helpen Piet* 'Sometimes John help Peter', instead of the grammatical sentence *Soms helpt Jan Piet* 'Sometimes helps John Peter' – an AdvVSO main clause, often called "inversion" structure, changed into an AdvSVO order, together with an uninflected V.
3. **Hij zeggen Jan helpen Piet* 'He say John help Peter', instead of the grammatical sentence *Hij zegt dat Jan Piet helpt* 'He says that John Peter helps' – a regular SOV subclause order changed into SVO, together with an uninflected V.

The modification in type (1) is limited to the omission of the verb inflection. The modifications in types (2) and (3), however, involve a regularization of word order as well. These regularizations are found not only in FT, but also in nonnative speakers' production (speech and writing). In fact, this regularization is a highly frequent and characteristic feature in the output of Dutch L2 learners, particularly L2 learners with an SVO mother tongue (Appel, 1984, p. 103; Hulstijn, 1982, 1984; Hulstijn & Hulstijn, 1984). In German, which basically has the same word order rules as Dutch, similar problems with the acquisition of word order in main clauses of the inversion type (AdvVSO) and in subclauses (SOV) have been found (Clahsen, Meisel, & Pienemann, 1983).

The OV sequence in Dutch, with the V uninflected, occurs normally not only in main clauses with a preceding inflected auxiliary (*Ik wil een appel eten* 'I want an apple to eat'), but also in two forms of modified (ungrammatical) speech. First, OV occurs in Caretaker Speech. Adults may utter a noun followed by an uninflected verb with the intonation of either a question or a statement. For example, *Melk drinken* 'Milk drink' may have meanings such as "Do you want to drink milk?", "We will now drink our milk", "I am drinking milk", etc. Second, OV occurs in FT, albeit mainly in questions, as in *Jij appel willen?* 'You apple want?', i.e., "Do you want an apple?"

In view of these linguistic output and input phenomena in the L2 setting, we decided to compare in our investigation the comprehensibility of the grammatical AdvVSO inversion structure (4) with the ungrammatical AdvSVO structure (5), and also with the ungrammatical AdvSOV structure, as in (6):

4. *Soms helpt Jan Piet* 'Sometimes helps John Peter';
5. **Soms Jan helpen Piet* 'Sometimes John help Piet';
6. **Soms Jan Piet helpen* 'Sometimes John Peter help'.

Two important points motivated our investigation. First, the fact that nonnative speakers have difficulties in producing a certain form may not

imply that such forms are also more difficult to understand in the speech of others. Second, the "simplifications" that native speakers might make when talking to nonnatives need not be experienced as facilitating by the nonnatives. Hence, our research question:

Are (grammatical) inversion sentences (AdvVSO) that have proven to be problematic in studies on Dutch L2 acquisition – as reflected both in the (ungrammatical) output of L2 learners and in the (ungrammatical) FT input to L2 learners – problematic in terms of comprehension as well, when compared with modified, ungrammatical AdvSVO and AdvSOV sentences?

Our approach to the study of this question was to adopt the method used by Bates and MacWhinney (1982, 1987, 1989) in their sentence comprehension studies within the framework of their Competition Model. We applied that method to the comprehension of Dutch AdvVSO, AdvSVO, and AdvSOV sentences by English learners of Dutch and Turkish learners of Dutch (two groups of Dutch L2 learners) and native Dutch speakers (a comparison group). In the following two sections, we will first give a brief presentation of the Competition Model and then explain our motivation for our choice of subject groups, while stating our hypotheses.

THE COMPETITION MODEL

The Competition Model of sentence comprehension, as initially developed by Bates and MacWhinney (1982, 1987, 1989) and enriched by McDonald (1986, 1987a, 1987b, 1989), offers a promising approach to the issues sketched above. The model derives from the notion that language is a system of mappings between form and function, and that the relations between such mappings are the central structure controlling language processing (MacWhinney, Bates, & Kliegl, 1984, p. 128). Language users have a limited number of forms, or linguistic *cues*, at their disposal in order to determine the relationships among language elements. In natural languages, there are four surface cues available for determining the function of elements in a sentence (semantic case roles, given/new information, etc.), consisting of: (a) lexical items, (b) morphological markings on lexemes, (c) word order, and (d) prosody (suprasegmental information). However, because form-to-function mappings are not one-to-one, are not always reliable, and are sometimes in conflict, the task of the language learner is to identify the formal linguistic devices and the range of form-function mappings in the input language (Bates & MacWhinney, 1982).

Cross-linguistic research has shown that significant differences exist across languages in the mapping between form and function and in the relative strengths of such mappings (Bates & MacWhinney, 1982, 1987, 1989; Bates, McNew, MacWhinney, Devescovi, & Smith, 1982; De Bot & Van Montfort, 1988; Gass, 1987; Kilborn & Cooreman, 1987; Kilborn & Ito, 1989; MacWhinney, Bates, & Kliegl, 1984; McDonald, 1986, 1987a, 1987b; Slobin, 1982; Slobin & Bever, 1982; Van Montfort, 1986). Such differences can be traced to differences in cue validity across languages, due, in turn, to differences in grammar and the frequency with which

various types of cues occur. For instance, while word order is a highly valid cue in English, agreement has more validity in German and Italian (MacWhinney, Bates, & Kliegl, 1984). Thus, in a sentence such as *The flowers sees the girl*, Germans and Italians would choose *the girl* as subject, with the validity of the sum of the noun-verb agreement and animacy cues weighing more than the word order cue, whereas English native speakers would choose *the flowers* as subject, with the validity of the word order cue weighing more than the sum of the agreement and animacy cues.

The Competition Model offers a framework to explore the issues we raised concerning the comprehensibility of FT modifications. We chose to focus on the relative contributions of a syntactic cue (word order) and a semantic cue (animate vs. inanimate property of concrete nouns) to the comprehension of Dutch inversion sentences.

HYPOTHESES

We chose to investigate the research question with two groups of nonnative subjects (English and Turkish L2 learners of Dutch) and a group of native Dutch subjects (a comparison group). In this section, we will first specify some facts about the Dutch language and state our assumptions as to the performance of the Dutch comparison group. We will then specify some facts about English and Turkish and formulate our hypotheses concerning the performance of the English and Turkish subject groups.

Dutch

In the Dutch language, all three possible word order patterns are common: noun-verb-noun (NVN), verb-noun-noun (VNN), and noun-noun-verb (NNV). Moreover, like in Turkish and unlike in English, in Dutch there is flexibility as to the way word order in declarative main clauses can be interpreted. Accordingly, although the basic, default, or unmarked interpretation for simple, active, declarative NVN sentences is subject-verb-object (SVO) in Dutch, such NVN patterns may also be interpreted as OVS, albeit explicitly marked by other cues such as inflectional noun-verb agreement, as in (7b), and suprasegmental cues, as in (8b) (Appel, 1984; Jansen, Lalleman, & Muysken, 1981; Jordens, 1988; Kilborn & Cooreman, 1987; Kilborn & Ito, 1989; Koster, 1975; McDonald, 1986, 1987b).

- 7a. *Ik ken dat boek* 'I know that book'
- 7b. *Dat boek ken ik* 'That book know I', i.e., "I know that book"
- 8a. *Jan helpt Piet* 'John helps Peter'
- 8b. *JAN helpt Piet, niet FRED* 'JOHN helps Peter, not FRED', i.e., "It is John, not Fred, who is being helped by Peter"

If the first constituent is an adverbial phrase, then the subject-verb order is reversed, giving rise to AdvVNN sentence patterns.

(4) *Soms helpt Jan Piet* 'Sometimes John helps Peter'

The only possible interpretation, moreover, for such declarative main clauses beginning with an adverbial phrase is AdvVSO. An AdvVOS interpretation is simply not possible. Thus, in (9) there can be little doubt as to who is doing the washing.

9. *Soms wast de bal de kameel* 'Sometimes washes the ball the camel', i.e., "Sometimes the ball washes the camel"

Word order in Dutch subordinate clauses differs from that in main clauses, with all verbs generally occurring at the end of the sentences, including tensed verbs as well as infinitival complements and participles (Appel, 1984; Jansen, Lalleman, & Muysken, 1981; Jordens, 1988). The interpretation of such NNV subordinate clauses is SOV.

10. . . . *omdat Jan Piet helpt* 'because John Peter helps', i.e., "because John helps Peter"

As a matter of fact, it has been argued that Dutch fits the formal category of an SOV language better than that of SVO (Koster, 1975): an SOV word order is very frequent even in main clauses, owing to the fact that when an auxiliary is present, the main verb, in the form of the infinitive, as in (11), or a participle, as in (12), is placed at the end of the sentence.

11. *Jan wil Piet helpen* 'John wants Peter help', i.e., "John wants to help Peter"
 12. *Jan heeft Piet geholpen* 'John has Peter helped', i.e., "John has helped Peter"

Furthermore, in main clauses such as (11) and (12), an O(Aux)SV interpretation is also possible if other cues – such as contrastive stress, as in (11a), intonation, or noun-verb agreement (or a combination of these cues) – mark the sentence:

- 11a. *JAN wil Piet helpen, niet Fred* 'Peter wants to help John, not Fred'.

In summary, the Dutch language allows not only for a variety of word order combinations (NVN, VNN, NNV), but also for a certain flexibility in interpretation within main-clause word orders. In declarative NVN and NNV (i.e., N[Aux]NV) main clauses, a subject-before-object (SO) interpretation is the unmarked, basic interpretation for Dutch native speakers (SVO and SOV, respectively). An alternative OS interpretation of these two word orders (OVS and OSV, respectively) is possible only if marked as such by other cues (contrastive stress, intonation, agreement). In declarative VNN main clauses beginning with an adverbial phrase, however – the AdvVNN

Table 1. *Summary of marked and unmarked (in italics) sentence patterns in Dutch, English, and Turkish declarative main clauses*

	Dutch	English	Turkish
NVN	SVO <i>OVS</i> ^a	SVO	SVO <i>OVS</i> ^a
NNV	S(Aux) OV <i>O(Aux)SV</i> ^a	<i>OSV</i> ^a	SOV <i>OSV</i> ^a
VNN	VSO	<i>VOS</i> ^a	VSO <i>VOS</i> ^a

^aLess frequent, marked orders, occurring only if marked by particular cues (such as contrastive stress, intonation, agreement <Dutch>, literary or colloquial style <English>, or affixation <Turkish>).

sentences central in our investigation – an SO reading is a compulsory interpretation (AdvVSO). An AdvVOS mapping of such sentences is simply not allowed by Dutch grammar (also refer to Table 1).

These facts have led to the prediction that Dutch subjects interpreting their own language will predominantly apply the default SO strategy to all word orders in the present experiment, since neither noun-verb agreement nor contrastive stress cues give pretext to perceive the sentences as contradicting the conventional SO word order rule. When the animacy factor is taken into consideration, however, instances in which an inanimate noun precedes an animate noun (IA) will offer conflicting information to the SO cue, in contrast both to neutral AA instances and converging AI instances. Such IA configurations, although creating conditions of cue competition in all three word orders, should affect the interpretation of the AdvVNN configurations, as in (9), the least, since the word order cue alone of such inversion sentences in Dutch is sufficient to constrain interpretation. In contrast, NVN and NNV configurations do make allowances for an alternative OS interpretation in the language, rendering them more ambiguity-prone – particularly so whenever semantic cues (IA: ball/camel) contain an inherent OS bias.

English

The vast majority of sentences in the English language use the NVN order as basic, mapped with high probability to SVO interpretations. Alternative, “nonbasic” word orders such as VNN and NNV sequences are very infrequent in English and are restricted to informal, colloquial settings or literary writings: “The red one I want”; “Likes apple pie, John”. Despite these differences, these three word orders (two nouns linked by a transitive verb) have two cues in common: the preverbal noun is interpreted as subject, and the immediately postverbal noun as object.

A comparison between English and Dutch shows that these languages differ basically in the headedness of their underlying VP structures, English being a VO language and Dutch being an OV language. Nonetheless, they

share a feature in surface structure: the SO feature is found both in the most frequent structure (NVN) together with its SVO interpretation in English and in the most frequent interpretation of a sequence of two nouns in Dutch (also refer to Table 1).

As has been said, however, Dutch grammar, although generally favoring the SO interpretation, dictates that the immediately postverbal noun in inversion sentences (AdvVSO) must be assigned the subject role. This is in agreement with the shared SO convention, but in conflict with the English "immediately postverbal N is object" cue. Thus, it is to be expected that Dutch AdvVNN inversion sentences, such as (4), sound somewhat odd to English learners of Dutch, especially during the beginning and intermediate phases of Dutch L2 acquisition.

4. *Soms helpt Jan Piet* 'Sometimes helps John Peter', i.e., "Sometimes John helps Peter"

However, this oddness does not have to lead to a misinterpretation of sentences, such as (13) or (14).

13. *Soms wast de zebra de bal* 'Sometimes washes the zebra the ball', i.e., "Sometimes the zebra washes the ball"
14. *Soms wast de zebra de kameel* 'Sometimes washes the zebra the camel', i.e., "Sometimes the zebra washes the camel"

However, English listeners may very well be much more confused than native Dutch speakers by sentences, such as (9).

9. *Soms wast de bal de kameel* 'Sometimes washes the ball the camel', i.e., "Sometimes the ball washes the camel"

Although Dutch native speakers will find the sentence semantically inconceivable, the competition offered by the animacy cue is quite weak, since Dutch word order rules (VNN = VSO) leave no other reading than that the ball did the washing. Thus, conflicting animacy information will probably be less detrimental to performance on AdvVNN sentences for Dutch native speakers. However, for English speakers beginning to learn Dutch, the validity of the word order cue may be much lower. Thus, the competing animacy cue (assign the subject role to the animate camel rather than to the inanimate ball) may stand a good chance of prevailing over the word order cue SO. This contention is supported by Gass's work (1987, 1989), in which she argued that animacy cues may have a certain universal prepotency in L2 learning.

On the basis of this reasoning, we formulated the following hypothesis about the responses of our English subjects:

HYPOTHESIS 1. Although not of the SVO type, Dutch AdvVSO inversion sentences ("Sometimes washes the N the N") are not more difficult to com-

prehend by English subjects than their SVO modified, FT counterparts ("Sometimes the N wash the N"), provided that the animacy cues are not in conflict with the word order cue SO. Thus, it is predicted that in cases of animate/inanimate (AI) configurations ("Sometimes washes the camel the ball") and animate/animate (AA) configurations ("Sometimes washes the camel the zebra"), English subjects will have no difficulty assigning the subject role to the first noun. However, inversion sentences with conflicting animacy cues, namely, with inanimate/animate (IA) configurations ("Sometimes washes the ball the camel"), are predicted to be indeed more difficult to comprehend than their FT counterparts.

The alternative to Hypothesis 1, a view we do not endorse, would hold that the relative comprehensibility of the various sentence types is affected by a straightforward application of L1 interpretation strategies. On the basis of this alternative hypothesis, one could predict that AdvSVO sentences would be less difficult to comprehend than either AdvVSO or AdvSOV sentences.

Turkish

In Turkish, the unmarked or neutral word order is NNV, which is given the unmarked SOV interpretation (Lewis, 1967).

15. *Ahmet kitap okuyor* 'Ahmet a book is reading', i.e., "Ahmet is reading a book"

The next most frequent order in the language is NVN, and the least frequent is VNN (Slobin, 1982; Slobin & Bever, 1982). All five deviations from the conventional SOV pattern can occur in Turkish (also refer to Table 1). They are seldom ambiguous, however, due to a rich system of case inflections (grammatical suffixes), which mark the relationships among the words. In other words, the grammatical relations and their underlying functions are encoded by inflectional morphemes, not by word order. For instance, whenever an OSV reading is intended in an NNV utterance in Turkish, the first noun is marked by an object suffix. Although an unmarked object can appear in SOV word order, it is always marked if OSV is implied. Hence, uncertainty as to which of two nouns functions as subject or object hardly ever arises in Turkish sentences. In view of the fact that Turkish and Dutch share the default SO interpretation, we arrived at the following hypothesis, which is essentially the same as that for English subjects:

HYPOTHESIS 2. Although not of the SOV type, Dutch AdvVSO inversion sentences ("Sometimes washes the N the N") are not more difficult to comprehend by Turkish subjects than their SOV modified, FT counterparts ("Sometimes the N the N wash"), provided that the animacy cues are not in conflict with the word order cue SO.

The alternative to Hypothesis 2 would hold that the relative comprehensibility of the various sentence types is affected by a straightforward ap-

plication of L1 interpretation strategies. On the basis of this alternative hypothesis, one could predict that AdvSOV sentences were less difficult to comprehend than both AdvVSO and AdvSVO sentences.

RESEARCH STRATEGY

The comprehension of grammatical Dutch inversion sentences (AdvVSO) was investigated in comparison to the comprehension of two ungrammatical, modified sentence types (AdvSVO and AdvSOV, both with the V left uninflected) by having English, Turkish, and Dutch subjects interpret declarative Dutch sentences, beginning with an adverb, followed by any possible combination of a transitive verb with two nouns (NVN, VNN, NNV) – the nouns having any of three different animacy configurations (AI, AA, IA). The effects of these word orders and animacy configurations on comprehension were examined by two distinct measures of performance:

1. Choice of sentence actor/subject: subjects had to name the noun (first noun or second noun) that functions as actor/subject to the sentence. The percentage of first noun choices was used as data in the statistical analyses.
2. Reaction time: the time taken to make a response (i.e., choose the actor/subject of the sentence).

Thus, not only do we gain insight as to how different sentences are interpreted as such, but, and as important, the speed (ease) with which decisions are made as well.

DESIGN AND METHOD

Subjects

There were 72 adult subjects who participated in the experiments: 30 native speakers of Dutch, mostly students at the Free University of Amsterdam, constituted our L1 group; 20 native speakers of English and 22 native speakers of Turkish constituted our two L2 learner groups. The English and Turkish speakers were all enrolled in various Dutch language courses for foreigners.

Selection. We administered a Sentence Imitation Test (De Jager & Samplonius, 1986) to make sure that all of the L2 speakers selected for the experiment would be familiar with Dutch morphology and syntax only to a limited extent. The Sentence Imitation Test was comprised of 48 tape-recorded Dutch sentences that increased in grammatical complexity and in length from 4 to 13 words. The vocabulary of the test sentences, however, comprised only high-frequency words. After hearing each sentence, the listener was required to repeat the sentence out loud, and the elicited sentence imitation was recorded. One point was given for every word correctly imitated and uttered in the correct order in the sentence.

Of a maximum possible score of 410 on the Sentence Imitation Test, the English subjects had a mean score of 296 ($SD = 59.72$), and the Turkish subjects had a mean score of 323 ($SD = 31.25$). Moreover, there were no ceiling effects (not one subject had a perfect score). Results from a two-tailed t test indicated that there were no significant differences in Dutch sentence imitation performance between the English and Turkish subjects ($p > .05$).

Thus, as indicated by the Sentence Imitation Test, all our nonnative subjects were definitely above the "absolute beginner" level, yet not so far advanced in their command of Dutch morphology and syntax as to attain perfect scores. More important, there are no serious grounds for suspecting significant differences within our nonnative subject population, as far as morphological and syntactic proficiency level in Dutch is concerned.

Design

A $3 \times 3 \times 3$ factorial design with repeated measures was used. The three factors (each with three levels) manipulated as independent variables were: (a) native language group (LG) of the subjects (Dutch, English, Turkish), (b) word order (WO) (noun-verb-noun, NVN; verb-noun-noun, VNN; and noun-noun-verb, NNV), and (c) animacy contrasts (animate first noun with animate second noun, AA; animate first noun with inanimate second noun, AI; and inanimate first noun with animate second noun, IA). The dependent variables were: (a) percent choice of the first noun as subject and (b) reaction times (latency scores).

Materials

When the three levels of word order (NVN, VNN, NNV) are crossed with the three levels of animacy contrast (AA, AI, IA), 9 different sentence types emerge. Subjects heard a total of 90 Dutch sentences (10 sentences in each of the 9 sentence types), recorded on tape by an adult Dutch native speaker. The sentences contained an adverb, two singular nouns with a definite article, and a transitive verb. The 90 sentences were constructed by random selection out of a pool of 9 verbs describing concrete transitive activities, 18 animal names, 9 inanimate object names, and 5 adverbs (Table 2). The only restriction to this randomization procedure was that a certain noun-verb-noun combination could occur only once within each sentence-type cell ($n = 10$ for each cell). Ten tapes of different random orders of the 90 test sentences were constructed in order to counterbalance learning effects. English cognate lexical items were specifically chosen for the present experiments to rule out the possibility that experimental effects were due to vocabulary difficulties rather than to our experimental manipulations, namely, word order and animacy considerations. This "cognate" qualification did not apply to our Turkish native speakers. In the "Procedure" section, an extra vocabulary training task is described, which the Turkish

Table 2. *List of Dutch nouns, verbs, and adverbs used in sentence construction (with English translations), and sample sentences of the 9 Word Order × Animacy configurations*

Animate nouns				Inanimate nouns		Verbs		Adverbs	
Dutch	English translation	Dutch	English translation	Dutch	English translation	Dutch	English translation	Dutch	English translation
zebra	zebra	lam	lamb	bal	ball	horen	hear	altijd	always
giraffe	giraffe	hond	dog	pen	pen	kussen	kiss	soms	sometimes
kangoeroe	kangaroo	kat	cat	boek	book	zoeken	seek	hier	here
pinguin	penguin	wolf	wolf	steen	stone	wassen	wash	daar	there
tijger	tiger	kalf	calf	sok	sock	helpen	help	's morgens	in the morning
olifant	elephant	hen	hen	bel	bell	vinden	find		
kameel	camel	beer	bear	glas	glass	eten	eat		
krokodil	crocodile	aap	ape	pan	pan	likken	lick		
zwaan	swan	muis	mouse	vork	fork	bijten	bite		

Sample sentences

AdvVNN (grammatical inversion sentences)

- AA: 's Morgens kust de tijger de wolf.
(In the morning kisses the tiger the wolf)
- AI: Daar likt de kat de vork.
(There licks the cat the fork)
- IA: Hier eet de bal de olifant.
(Here eats the ball the elephant)

AdvNVN (ungrammatical, SVO modified sentences with uninflected V)

- AA: Altijd de zwaan likken de kangoeroe.
(Always the swan lick the kangaroo)
- AI: Soms de wolf zoeken de bel.
(Sometimes the wolf seek the bell)
- IA: Hier de steen eten de kameel.
(Here the stone eat the camel)

AdvNNV (ungrammatical, SOV modified sentences with uninflected V)

- AA: Altijd de giraffe de hen zoeken.
(Always the giraffe the hen seek)
- AI: 's Morgens de kameel de sok likken.
(In the morning the camel the sock lick)
- IA: Soms de bal de krokodil zoeken.
(Sometimes the ball the crocodile seek)

subjects had to successfully master before being administered the experiment proper. Table 2 lists the words used for sentence construction and gives sample sentences of each of the 9 sentence types.

The factor of stress was neither manipulated, nor left ambiguous in any way. On the contrary, the recorded sentences were uttered with a default or unmarked way of uttering Dutch declarative sentences. That is, prosodic information gave no pretext for interpreting the message in a way other than that appropriate for Dutch, unmarked, declarative sentences, namely, SO.

The specific aspects of sentence construction in the present series of experiments result in somewhat different stimulus material from that used by the Competition Model research, making direct comparisons with previous research possible only to a limited extent. Moreover, although the factors studied and the manner in which they were crossed were retained (three different word orders crossed with three different animacy considerations), the premises differ: the subjects in our study heard sentences that were more than just a collection of two nouns plus a verb, ordered and stressed in alternative ways (as was often the case with the verbal material used by the Competition Model researchers). Due to the additional adverb and the way they were marked intonationally, the sentences in the present study were intended as declarative, unmarked sentences (SO).

Apparatus

A four-track TEAC 144 cassette recorder was interfaced to an Apple II+ microcomputer equipped with a voice key, enabling stimulus presentation, reaction-time measurement, and reaction-time registration, respectively. Intersentence interval was 5,000 msec. On a separate track of the TEAC, a cue tone signaled the end of each of the 90 stimulus sentences. This cue tone activated a real-time clock in the microcomputer, which registered the time elapsed between cue tone (end of stimulus sentence) and offset of the voice key (the beginning of the subject's verbal response). This registration had an accuracy of 1 msec. Thus, for each test sentence, the computer automatically registered response reaction time.

A sound-proof cabin (Philips, Ampliphon), equipped with an intercom system and a headphone with microphone (Koss, K36), housed the subjects during experimentation.

Procedure

A pretest vocabulary training was carried out for Turkish subjects. The words chosen for the stimulus sentences, as mentioned previously, were cognates for the English subjects. This, however, did not apply to the Turkish subjects, for whom a special procedure was designed. About a week in advance of their appointments for the experiment proper, they were sent a list of the Dutch lexical items that were to be heard in the experiment, together with their Turkish equivalents. It was pointed out to

them that it was important for them to be absolutely familiar with all the words listed, and that they should make certain that they learned all unfamiliar words before coming to the experiment. They were tested on their knowledge of the vocabulary and, if necessary, trained on the items with which they had difficulties, until all words could be identified effortlessly. On the whole, Turkish subjects had very little difficulty with the vocabulary items employed.

With the English subjects, the experimenter went through the Dutch vocabulary list, making sure that they could effortlessly provide the English equivalents to all words used in the stimulus sentences. All English subjects were perfectly familiar with the vocabulary items.

Subjects were tested individually. The instructions were read aloud in Dutch to the Dutch subjects and in English to the English subjects. A written, Turkish translation was given to the Turkish subjects.

Instructions explained that the purpose of the experiment was to examine the factors that impede or facilitate the comprehension of Dutch sentences by nonnative learners. The task proper was then explained to them. They were told that they would hear a series of very simple Dutch sentences, and that after each sentence, they would have to interpret it; that is, call out loud which one of the two nouns heard in the sentence was "the subject of the sentence, that is, the one who does the action." Half the subjects were given these instructions with "subject" first and "one who does the action" second; half received the same instructions in the opposite order. By essentially asking for both, we avoided biasing subjects toward a syntactic versus a semantic strategy. The entire session lasted about 70 minutes, on average.

RESULTS AND DISCUSSION

Two major analyses of variance were performed: one on the percentage choice of first noun (N1) as subject and one on the reaction times (RTs). Tables 3 and 4 show the mean N1 choice percentages and RTs, respectively, for all 9 Word Order $\times$ Animacy configurations, in each language group. Tables 5 and 6 summarize the results of the N1 choice ANOVA and the RT ANOVA, respectively.

In both analyses of variance, the three-way interaction (LG $\times$ WO $\times$ AN) reached only borderline significance. Notwithstanding, we think that a detailed examination of this three-way effect should in no way be ignored.¹ Separate post-hoc multiple pairwise comparisons (Newman-Keuls) were made in each language group among the 9 experimental conditions (sentences types). In the following section, we present and simultaneously discuss the results of these analyses for each language group separately. All post-hoc analyses are significant at the .05 level, unless otherwise specified. We will limit our presentation and discussion to the results that are pertinent to our research question. (For an elaborate presentation and discussion of the results, including the issues of L1 influence and the competition between word order cues and animacy cues, see Issidorides, 1991.)

Table 3. *Percentage first noun choices for all 9 Word Order $\times$ Animacy combinations, in each language group*

	Dutch	English	Turkish
AdvVNN (grammatical)			
AA	.98	.72	.95
AI	1.00	.71	.95
IA	.84	.53	.87
AdvNVN (SVO modified)			
AA	.97	.81	.96
AI	1.00	.79	.95
IA	.79	.66	.90
AdvNNV (SOV modified)			
AA	.95	.63	.94
AI	1.00	.77	.96
IA	.82	.50	.84

Table 4. *Reaction time scores for all 9 Word Order $\times$ Animacy combinations, in each language group^a*

	Dutch	English	Turkish
AdvVNN (grammatical)			
AA	-.12	.16	.00
AI	-.06	-.15	-.14
IA	.31	.17	.27
AdvNVN (SVO modified)			
AA	-.25	-.30	-.23
AI	-.06	-.18	-.22
IA	.04	.06	.20
AdvNNV (SOV modified)			
AA	.08	.14	-.05
AI	-.07	.04	-.05
IA	.15	.06	.26

^aReaction time = *z*-score transformations against each individual's mean reaction time; positive values = slow responses; negative values = fast responses.

Dutch Subjects

First-noun choices. For the Dutch subjects, the percentage of N1 choices as subject did not differ among VNN, NVN, and NNV sentences containing either AA (97%, 98%, 95%) or AI (100%, 100%, 100%) noun configurations. However, in sentences containing IA configurations, the first noun was chosen as subject significantly less often in NVN/IA sentences (79%)

Table 5. *Summary from the ANOVA on percent choice of N1 as subject for all three language groups*

Effect	<i>df</i>	<i>F</i> ratio	<i>p</i>
Language group (LG)	2	33.197	.0000 ^a
Word order (WO)	2	7.547	.0008 ^b
Animacy (AN)	2	19.418	.0000 ^c
LG × WO	4	5.615	.0003 ^d
LG × AN	4	.874	.4811
WO × AN	4	3.109	.0159
LG × WO × AN	8	1.938	.0545

Results of post-hoc Newman-Keuls analyses:

^aDutch and Turkish Ss chose the N1 significantly more often than English Ss ($p < .01$).

^bN1 choices on (simplified) AdvNVN sentences, (grammatical) AdvVNN sentences, and (simplified) AdvNNV sentences were 87%, 84%, and 82%, respectively. The difference between 87% and 84% was not significant; the differences between 87% and 82% and between 84% and 82% were significant at the .01 and .05 levels, respectively.

^cThe N1 was selected significantly more often in AI sentences (90%) and in AA sentences (88%) than in IA sentences (75%; $p < .01$).

^dPerformance of Dutch and Turkish Ss did not vary as a function of word order, but English Ss chose the N1 significantly more often in NVN sentences than in VNN and NNV sentences ($p < .01$).

than in either VNN/IA (84%) or NNV/IA (82%) sentences; performance on the latter two did not differ significantly.

Reaction times. There were no significant differences in the time taken to resolve NVN/AI (−.06), VNN/AI (−.06), and NNV/AI (−.07) sentences. In sentences with neutral AA animacy cues, although the trend was that NVN/AA was resolved faster (−.25) than VNN/AA (−.12), which, in turn, was resolved faster than NNV/AA (.08), only the NVN/AA versus NNV/AA comparison revealed significant differences in reaction time ($p < .01$). Finally, RTs to VNN/IA sentences (.31) were significantly slower than in either NVN/IA sentences (.04; $p < .01$) or NNV/IA sentences (.15; $p < .05$).

As mentioned earlier, we assumed that Dutch subjects would apply the default SO strategy to all configurations (IA, AA, and AI) in unambiguous, grammatical AdvVNN sentences, and also to the ungrammatical AdvNVN and AdvNNV sentences with converging AI and AA configurations, but less so to ungrammatical sentences with conflicting IA configurations. These expectations were almost entirely borne out. The only exception was

Table 6. *Summary from the ANOVA on reaction time scores for all three language groups*

Effect	<i>df</i>	<i>F</i> ratio	<i>p</i>
Language group (LG)	2	1.457	.2358
Word order (WO)	2	8.515	.0003 ^a
Animacy (AN)	2	29.725	.0000 ^b
LG × WO	4	.203	.9366
LG × AN	4	2.328	.0592
WO × AN	4	4.888	.0008
LG × WO × AN	8	1.900	.0600

Results of post-hoc Newman-Keuls analyses:

^aThe mean reaction time *z* score (where negative scores indicate more rapid reaction times) was $-.11$ for NVN, which was significantly faster than the reaction times to both VNN (.05) and NNV (.06; $p < .01$).

^bReaction times were significantly slower to sentences with an IA noun ordering (.17) than to sentences with either an AI noun ordering ($-.10$) or a reversible, AA noun ordering ($-.06$; $p < .01$).

that the difference between VNN/IA (84% N1 choice) and NNV/IA (82%), although in the expected direction, was not significant.

Two additional findings in the performance of the Dutch comparison group are worth mentioning. First, Dutch Ss did indeed choose the N1 in semantically anomalous VNN/IA sentences ("Sometimes washes the ball the camel"), since grammar gave them no other option. However, making this semantically anomalous decision (this was the only case of *non-free* competition between word order and animacy cues in this study) took longer than decisions in any other condition, illustrating that non-free competition results in unequivocal, but relatively slow, responses.

Second, the fact that Dutch subjects chose the N1 even in the ungrammatical, modified sentences is in accordance with observed FT behavior: when producing a simplified sentence such as "Sometimes the N kiss the N" while addressing a nonnative speaker, Dutch native speakers mean the first N to be the actor and the second N to be the recipient of the kissing.

English subjects

First-noun choices. For the English group of subjects, there was a significant overall effect of word order, indicating a significant decrease in the percentage of N1 choices in VNN sentences (65%) and NNV sentences (64%), compared to NVN sentences (75.5%). However, the decrease in N1 choices in VNN and NNV word orders (as compared to NVN) found in the English performance data was not manifested in sentences with AI

configurations: N1 choices on NVN/AI sentences (79%), VNN/AI sentences (71%), and NNV/AI sentences (77%) were not found to differ significantly from each other. In this respect, English performance data do not differ from the Dutch control group (nor the Turkish group).

On sentences with AA configurations, there were significantly fewer N1 as subject interpretations given to NNV/AA sentences (63%) than to NVN/AA sentences (81%), with VNN/AA sentences in the middle (72%), although not significantly different from either NVN/AA or NNV/AA sentences.

On sentence IA configurations, the percentage of N1 as subject interpretations was significantly lower on both VNN/IA (53%) and NNV/IA (50%) sentences than on NVN/IA sentences (66%).

Reaction times. No significant differences were found in the time needed to interpret NVN, VNN, and NNV sentences in the case of either AI configurations or IA configurations. In sentences with AA configurations, however, reaction times differed as a function of word order. Reaction times to VNN/AA sentences (.16) and NNV/AA sentences (.14) were significantly ($p < .01$) slower than to NVN/AA sentences ($-.30$).

Our main research question pertains to the alleged difficulty of Dutch AdvVSO inversion sentences for nonnative learners of Dutch. As mentioned earlier, we predicted that inversion sentences with conflicting IA configurations would present interpretation difficulties to English Ss in comparison to their AdvSVO counterparts, but that inversion sentences with nonconflicting AI and AA configurations would not. The results support this hypothesis.

Although the English subjects chose the N1 in VNN sentences less often than in NVN sentences, irrespective of animacy configuration, higher order interactions show that the number of N1 choices in VNN/IA versus NVN/IA sentences *did* – and in VNN/AI versus NVN/AI sentences, as well as in VNN/AA versus NVN/AA, *did not* – differ significantly, supporting our hypothesis. The number of N1 choices on inversion sentences was significantly lower only if animacy cues conflicted with Dutch word order cues (i.e., in cases of VNN/IA). As long as animacy cues were neutral (AA) or converged with Dutch word order cues (IA), inversion sentences *did not* create more comprehension problems than NVN or NNV sentences. Thus, grammatical inversion sentences (AdvVNN) that have proven to be problematic in studies on Dutch L2 acquisition were not more problematic than FT-type AdvNVN sentences, as long as animacy cues converged with Dutch word order cues.

Reaction times for IA configurations were slower than for AI configurations, reflecting the overall greater competition of the IA configurations with word order cues, but, and more importantly, there were no significant differences in RT between VNN/AI and NVN/AI sentences, nor between VNN/IA and NVN/IA sentences. Thus, grammatical VNN/AI inversion sentences were not more problematic than FT-type NVN/AI sentences, neither in choice, nor in time needed to make the choice. In contrast, subjects were extremely uncertain about the interpretation of grammatical,

but implausible, VNN/IA sentences, as evidenced both by a very low N1 choice (53% – only 3 percentage points above the chance level) and by comparatively long reaction times (.17).

No evidence was found for the alternative to Hypothesis 1 that the relative comprehensibility of the various sentence types is affected by a straightforward application of L1 interpretation strategies. This alternative hypothesis predicts that N1 choices on AdvSVO sentences should be higher, or at least not lower, and in any case less time-consuming, than on AdvVSO sentences. Although the lower order comparisons (word order main effect) seem to corroborate this hypothesis, it is not supported by higher order comparisons. Namely, as long as animacy cues converge with Dutch word order cues, English native speakers have no more difficulty in responding to inversion sentences than to sentences that comply with the canonical SVO word order of their native language. (We will return to the issue of L1 transfer at the end of the article.)

The second ungrammatical, modified sentence type, with which we contrasted the grammatical inversion sentences, was the AdvNNV order. This sentence type was introduced first of all in view of the contrast with Turkish, but an additional aim was to explore whether (S)OV, as the most typical word order of the Dutch language in terms of underlying structure, would be easier for nonnative speakers to process than both the grammatical inversion order (AdvVSO) and the FT order (AdvSVO). The results, however, show that the English subjects did not opt more often for the N1 on NNV sentences, nor did they respond faster to NNV sentences as compared to VNN or NVN sentences.

Turkish subjects

First-noun choices. The first striking result is a predominant N1 strategy being used by Turkish subjects in processing Dutch sentences (93%), much more so than the English subjects (68%). The second finding is that, in contrast to both the Dutch control group and the English group, there was no significant interaction between word order and animacy in the Turkish group. The lack of a significant interaction effect between word order and animacy in the Turkish group of subjects means that the results from the language group by word order interaction (Table 5^d) and animacy main effects (Table 5^e) are a true description of their performance: there is no difference in the percentage of N1 choices among the three word orders, and sentences with IA configurations bring about fewer N1 choices than sentences with AI or AA configurations.

Reaction times. In the reaction time data of the Turkish subjects there was no significant interaction between the factors of word order and animacy. Thus, differences in reaction times occurred only as a result of an animacy main effect. Reaction times were slower only on all sentences with IA configurations, irrespective of word order.

At first sight, the high percentages of N1 choices in all 9 conditions may

raise some concern as to the validity and reliability of the Turkish responses. This concern, however, is not warranted. Recall that the Turkish subjects performed as poorly as the English subjects on the sentence imitation test used for subject selection. Thus, the Turkish Ss were in no way fully competent in Dutch. Furthermore, they did understand the task they were asked to perform just as fully as did the English and the Dutch subjects. This is evidenced by the systematic variation in their response pattern: the animacy factor affected both their choice responses and their reaction times. Furthermore, the RT data do help in showing that subjects paid attention to word order differences. Thus, one cannot argue that the Turkish Ss were responding with N1 choices to all stimuli without paying attention to the structure of the sentence and the meaning of the nouns and the verb. We conclude that the Turkish data reflect the experimental conditions as genuinely as do the Dutch and English data.

This high overall preference for the N1 as subject in the Turkish data (93%), as in the Dutch data (93%) and in contrast to the English data (68%), is probably attributable to the fact that Turkish and Dutch, unlike English, are both flexible word order languages that adhere to a basic SO noun ordering. As illustrated in Table 1, there are more similarities between Turkish and Dutch vis-à-vis flexibility in word order (all three permutations are quite frequent in the respective languages) and in the permissible form-to-function mappings *within* word orders (both unmarked SO and marked OS readings are permissible in NVN and NNV).

Our main research question pertains to the alleged difficulty of Dutch AdvVSO inversion sentences for nonnative learners of Dutch. As mentioned earlier, we predicted that inversion sentences with conflicting IA configurations would present interpretation difficulties to Turkish Ss in comparison to their AdvSOV counterparts, but that inversion sentences with nonconflicting AI and AA configurations would not. The results support this hypothesis. The percentage of N1 choices was just as high on the grammatical AdvVSO as in the modified AdvSOV sentences, and sentences with IA configurations were indeed relatively problematic, as evidenced by lower percentages of N1 choices and longer reaction times. No evidence was found that the relative comprehensibility of the various sentence types was affected by a straightforward application of L1 interpretation strategies: AdvSOV sentences, corresponding to the default SOV word order in Turkish, did not elicit significantly higher percentages of N1 choices than either AdvVSO or AdvSVO sentences.

SUMMARY

The responses of the English and Turkish subjects did support both our hypotheses. AdvVSO inversion sentences are no more difficult to comprehend than ungrammatical, modified AdvSVO (for English Ss) or AdvSOV sentences (for Turkish Ss), as long as animacy cues (AI and AA configurations) are compatible with Dutch word order cues (SO); but inversion sentences may indeed offer some comprehension problems when animacy con-

figurations (IA) are incompatible with Dutch word order cues (i.e., in sentences intended to express a semantically implausible state of affairs). Furthermore, simplified SOV sequences, although more typical in Dutch than both VSO and SVO sequences (according to linguistic theory), were not found to be easier to comprehend than the latter two types.

CONCLUSIONS

The aim of our research was to extend previous research on FT, which adopted a purely descriptive approach, with an experimental approach to investigate the effects of FT modifications on L2 comprehension. We limited our research to two types of grammatical modifications resulting in ungrammatical or "broken" utterances. In our previous study (Issidorides, 1988, 1991), we investigated the effect of the omission of semantically redundant function words. The starting point in the present study was inversion sentences (AdvVSO), which have been shown to be problematic in Dutch L2 acquisition. We investigated the effect of rearranging word order and omitting verb inflection. Both the present and the previous studies showed that the normal, grammatical sentence patterns under investigation were no more difficult to comprehend than their "simplified," ungrammatical counterparts, provided that utterances were pronounced with normal suprasegmental cues (previous study) and provided that utterances did not convey extremely implausible messages (present study).

Our conclusion from these two studies is that linguistically more complex input will not necessarily impede comprehension. We emphasize, however, that this contention does not imply that, conversely, linguistically more simple input cannot facilitate comprehension. It seems likely that there will be an important interplay between (a) the type of simplification, (b) the contrast between the learner's native and target languages, and (c) the learner's state of L2 knowledge. To date, however, no evidence exists in the literature as to the facilitative effect of modifications that result in ungrammatical utterances.

To this conclusion we add a note pertaining to the relationship between FT and L2 output. The fact that nonnative speakers have difficulties in producing a certain grammatical structure (e.g., the AdvVSO inversion structure) does not imply that such a structure is also more difficult to understand in the speech of others. Our findings point to the necessity in L2 acquisition research, as Clark and Hecht (1983) argued for L1 acquisition research, of avoiding simplistic input-output models of language acquisition. What is needed is an assessment of the effect of input on comprehension, and not just an assessment of the effect of input on production. It is perhaps precisely the detection of the mismatch between what L2 learners can produce and what they can understand that provides the impetus for their L2 development. (In contrast to the view held by Krashen, 1985, the detection of this mismatch may require the L2 learner to pay conscious attention to formal characteristics of the L2, as suggested by Hulstijn, 1989, 1990.) Viewed from this stand, we can understand and sympathize

with those L2 learners who feel frustrated and insulted when addressed in broken, ungrammatical FT (Meisel, 1980). One of the reasons why they feel frustrated and insulted by such input may precisely be the fact that they "know better," both literally and figuratively speaking.

We add another note pertaining to the issue of L1 transfer. The results provide support for our hypothesis that the L2 performance of English and Turkish native speakers will not be characterized as a straightforward transfer of L1 word order rules or strategy biases. This contention, however, does not mean to say that there is no L1 influence on L2 performance. The results clearly show that L2 word orders, which are very infrequent or have different form-to-function mappings in English (VNN and NNV), are interpreted in a less consistent fashion during L2 processing. The interpretations given to such unfamiliar word order permutations in L2 are much more susceptible to semantic biases when there is a word order/animacy conflict and are less the result of the transfer of L1-specific mappings onto L2. Our results support Gass's studies (1987, 1989) in which she suggested that "a strong influence" in L2 processing "is predicted in the case of a universal predilection for the supremacy of animacy because animacy cues have to do with the ways in which humans view the world as opposed to ways in which particular languages organize elements in a sentence" (Gass, 1989, p. 521).

What are the implications of this study for the use of modified speech to nonnative speakers? We hesitate to make sweeping statements as to the appropriateness of FT practices on the basis of our limited data. We feel justified, however, in advising native speakers, and L2 teachers and text book authors in particular, not to resort to speech modifications resulting in ungrammatical, broken FT. As has been said, to date no evidence exists to support the view that broken FT facilitates L2 comprehension. However, even if there were evidence for facilitation effects of broken FT, it would still be unwise to propagate such input modifications, especially in the language class. Sparing language learners the confrontation with the variability of correct L2 grammatical forms is, as White (1987) pointed out, depriving them of essential information about the language.

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NOTE

1. We suspect that failure to demonstrate a statistically more significant *F* value on this three-way interaction could lie in a canceling-out effect due to the existence of fewer differences among treatments in the Dutch control and Turkish experimental groups than in the English group, rather than on theoretical,

psycholinguistic grounds. Hence, the implications of this three-way interaction will not be dismissed, and, borderline significance notwithstanding, its effect will be further examined through post-hoc analyses. Statistical practices permit multiple comparisons among treatment means, even if the treatment mean square of the analysis of variance is not significant, as long as the comparisons made are meaningful in light of the experimental hypotheses (Edwards, 1968, p. 130; Howell, 1982, p. 279). Howell, moreover, argued that if the nature of the hypotheses is such that fewer differences among treatment means could be expected in one group than in another (in our case, we claim that the between-group factor – native language – will affect the number of differences found among treatments), an insignificant *F* is, in fact, not surprising (Howell, 1982, p. 279). However, he argued, this does not imply that there were no differences among the groups in the manner in which their performance was affected by the treatments, but only that nondifferences in certain groups were, in fact, the case, resulting in a canceling-out effect.

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