

FOCUS IDENTIFICATION IN ENGLISH, GREEK AND SWEDISH

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ABSTRACT

Three experiments of focus identification are reported one each for American English, Greek and Swedish. In the first experiment, listeners were presented with isolated sentences as well as sentences extracted from question-answer contexts and were asked to identify focus distribution. In the second experiment, questions were paired with prosodically variable answers and listeners were asked to identify the matching pairs. In the third experiment, lexical words were extracted from their sentence context and listeners were asked to identify focalised words. The results indicate the following: (1) isolated sentences have variable focus identifications but no final-focus bias; (2) focus is best identified at non-final position; (3) focus is identified in the question-answer contexts of the corresponding prosodic pairs; (4) lexical words out of immediate sentence context have variable focus identifications.

1. INTRODUCTION

The present study is a follow up investigation of focus perception from a crosslinguistic perspective. According to our earlier results, focus in Greek and Swedish was identified well over 90% in isolated utterances. Furthermore, tonal manipulations with resynthesised stimuli had partly similar and partly different effects in Greek and Swedish. In summary: First, tonal range manipulations had no major effect on either language. Second, tonal structure manipulations had a major effect on both languages, mostly on Greek where the perceptual effect was categorical. Third, tonal shift manipulations had a categorical effect on Greek but not on Swedish. Forth, tonal neutralisations had also a categorical effect on Greek but not on Swedish [1].

In addition to Greek and Swedish, American English is also included in this study. Accumulated research on the three languages under investigation has indicated that focus production has multiple effects associated with tonal (i.e. F0), temporal (i.e. duration), and dynamic (i.e. intensity) variations at both local and global levels of application [2], [3], [4] and [5]. At the local level of syllable/stress group, the tonal range is maximally expanded with reference to the individual speaker's tonal range; duration and intensity may also interact, although less invariably in Greek [6]. The effects of focus are extended to non-focus material as well, which undergoes variable degrees of tonal compression, especially after focus where tonal flattening at a low level is much regular in English and Greek while in Swedish the variability is much larger. The global effects of focus include also intensity range compression, especially after focus, while duration is less invariably at the global level.

In summary, focus production is associated with prominent syllables at the local level causing at the same time a prosodic reorganisation of variable prosodic units at the global level. Thus the prosodic category [+focus] may have F0, duration and intensity interactions at both local and global levels whereas the prosodic category [+stress] has rather local interactions of duration and

intensity and, less invariably with F0. Focus has also a basic intrasentence function, i.e. to highlight the most important information of its application domain, as well as intersentence and discourse function, i.e. to manipulate the common ground and enlarge the repertoire of information of the parties involved in a linguistic communication. In contrast, the function of stress is limited at the morphological level with lexical distinctions in the first place.

With reference to the distinct realisations and functions of [+stress] vs. [+focus] three basic questions are addressed at the present study: First, what is the identification reliability of [+focus] productions in isolated utterances with no contextual information? Second, given a question with distinct focus elicitation with reference to the answer, to which extend is the corresponding prosodic answer identified? Third, to which extend are lexical words marked with [+stress] vs. [+focus] in their original production identified accordingly when extracted from their linguistic context and presented in isolation?

Aspects of the first and second questions have been addressed in English, Greek and Swedish (e.g. [1] & [7]) whereas the third question has not been explicitly addressed.

2. EXPERIMENTAL METHODOLOGY

2.1. Speakers and Speech Material

Native speakers in pairs produced three dialogue sets in American English, Greek and Swedish. Each set was introduced by a statement with no particular focus by the first speaker and, with reference to the statement, the second speaker was asking different questions in order to elicit different focus distribution by the first speaker. Table 1 shows the English material whereas the Greek and Swedish materials are the corresponding translations. The recordings took place in quite environments in Athens, Greece, Columbus, Ohio and Skovde, Sweden. The speech material was recorded directly into a PC computer.

Alex gave an album to Alice.	
<i>Who gave an album to Alice?</i>	<i>Alex gave an album to Alice.</i>
<i>What did Alex give to Alice?</i>	<i>Alex gave an Album to Alice.</i>
<i>Who did Alex give an album to?</i>	<i>Alex gave an album to Alice.</i>
Alan has gone to the Alps with Anna.	
<i>Who has gone to the Alps with Anna?</i>	<i>Alan has gone to the Alps with Anna.</i>
<i>Where has Alan gone with Anna?</i>	<i>Alan has gone to the Alps with Anna.</i>
<i>Who has Alan gone to the Alps with?</i>	<i>Alan has gone to the Alps with Anna.</i>
Martin has met Maggie in Malta.	
<i>Who has met Maggie in Malta?</i>	<i>Martin has met Maggie in Malta.</i>
<i>Who has Martin met in Malta?</i>	<i>Martin has met Maggie in Malta.</i>
<i>Where has Martin met Maggie?</i>	<i>Martin has met Maggie in Malta.</i>

Table 1. Question-answer sets introduced by statement (see text).

2.2. Listeners and Experimental Set-up.

Three listening groups of ten, four and four native speakers of American English, Greek and Swedish participated in the respective experiment which consisted of three tasks. In the first task, labeled “Answer Identification Context” (AIC), listeners were presented with one of the sentences and given four response options, one non-focus as well as three focus alternatives extracted from their original question-answer context, and were asked to press the corresponding response-button in accordance with their identification. The response-buttons had the labels “none”, “Alex”, “album”, “Alice”, etc., for the non-focus and the alternative focus distributions respectively. The AIC task consisted of 12 statements x 10 (randomised) repetitions = 120 statement-sentence stimuli.

In the second task, labeled “Question Identification Context” (QIC), listeners were presented with question-answer pairs. The question was constant, extracted from the question-answer original context, whereas the answer had four variable options, i.e. one non-focus and three focus alternatives, the ones used in the AIC task. Listeners were asked to press one of the four response-buttons, labeled “A”, “B”, “C” and “D”, which were lighting up during each question-answer presentation. The QIC task consisted of 9 questions x 4 focus options x 10 (randomised) repetitions = 360 question-answer stimuli.

In the third task, labeled “No Context Identification” (NCI), listeners were presented with isolated words, extracted from the original question-answer context, which were used in the AIC task. Listeners were asked to press either “yes” or “no” response-buttons, which corresponded to focus and non-focus binary identification respectively. The NCI task consisted of 12 answer-statements x 3 lexical words x 10 repetitions = 360 stimuli.

The listeners were taking part in the experiments on an individual basis with the option of using headphones or computer loudspeakers. They had an unlimited repetition option but could not go back and change previous identification responses. Each task lasted for about ten minutes and listeners could take either one, or two, or three tasks on one run and conclude the remaining on another occasion.

The stimuli-responses were computed and presented to tables with basic statistics automatically, in accordance with the experimental requirements and the functional specifications of the software programme.

3. RESULTS

Tables 2, 3, and 4 show the responses of the speakers for the American English, Greek and Swedish respectively.

3.1. American English

The American English data, based on four listeners, indicates the following: In the AIC task (1) non-focus productions have not the corresponding identifications, neither is any regular structure or a strong bias observed. Although two out of three cases show a final-focus preference (Alice & Malta) the scores are not particularly high (60 & 52% respectively). (2) non-final focus productions have high identification scores (up or close to 100%) but for the final-focus ones the scores drop substantially in two out of three cases (Anna & Malta, 52 & 62 % respectively).

	None	ALEX	ALBUM	ALICE
ACI Totals				
None	7 (17.5%)	7 (17.5%)	2 (5.0%)	24 (60.0%)
ALEX	0 (0.0%)	40 (100.0%)	0 (0.0%)	0 (0.0%)
ALBUM	0 (0.0%)	1 (2.5%)	39 (97.5%)	0 (0.0%)
ALICE	4 (10.0%)	1 (2.5%)	1 (2.5%)	34 (85.0%)
QCI Totals				
ALEX	0 (0.0%)	40 (100.0%)	0 (0.0%)	0 (0.0%)
ALBUM	0 (0.0%)	0 (0.0%)	39 (97.5%)	1 (2.5%)
ALICE	12 (30.0%)	0 (0.0%)	1 (2.5%)	27 (67.5%)
NCI Totals				
ALEX		29 (72.5%)		
ALBUM			34 (85.0%)	
ALICE				33 (82.5%)
	None	ALAN	ALPS	ANNA
ACI Totals				
None	14 (35.0%)	16 (40.0%)	0 (0.0%)	10 (25.0%)
ALAN	0 (0.0%)	40 (100.0%)	0 (0.0%)	0 (0.0%)
ALPS	0 (0.0%)	0 (0.0%)	40 (100.0%)	0 (0.0%)
ANNA	13 (32.5%)	6 (15.0%)	0 (0.0%)	21 (52.5%)
QCI Totals				
ALAN	2 (5.0%)	38 (95.0%)	0 (0.0%)	0 (0.0%)
ALPS	0 (0.0%)	0 (0.0%)	40 (100.0%)	0 (0.0%)
ANNA	3 (7.5%)	1 (2.5%)	1 (2.5%)	35 (87.5%)
NCI Totals				
ALAN		28 (70.0%)		
ALPS			22 (55.0%)	
ANNA				31 (77.5%)
	None	MARTIN	MAGGIE	MALTA
ACI Totals				
None	9 (22.5%)	10 (25.0%)	0 (0.0%)	21 (52.5%)
MARTIN	0 (0.0%)	40 (100.0%)	0 (0.0%)	0 (0.0%)
MAGGIE	0 (0.0%)	0 (0.0%)	40 (100.0%)	0 (0.0%)
MALTA	13 (32.5%)	1 (2.5%)	1 (2.5%)	25 (62.5%)
QCI Totals				
MARTIN	0 (0.0%)	40 (100.0%)	0 (0.0%)	0 (0.0%)
MAGGIE	0 (0.0%)	0 (0.0%)	40 (100.0%)	0 (0.0%)
MALTA	5 (12.5%)	0 (0.0%)	1 (2.5%)	34 (85.0%)
NCI Totals				
MARTIN		24 (60.0%)		
MAGGIE			14 (35.0%)	
MALTA				25 (62.5%)

Table 2. English focus identification results (see text).

In the QCI task (1) focus-match has high identification scores (up or close to 100%) although the final focus-match shows a regular drop, especially in one case (i.e. Alice, 67.5%).

In the NCI task, the first (Alex, etc.) and partly the second set (Alan, etc.) have fairly high identification scores (i.e. over 70%) but in one case (Alps, 55%) whereas the third set (Martin, etc.) shows a substantial drop (i.e. under 62%).

In general, the American English listeners responded adequately and with higher accuracy to intended focus productions

in isolated utterances as well as question-answer focus-matching than lexical focus extractions.

	None	ALEX	ALBUM	ALICE
ACI Totals				
None	82 (82.0%)	4 (4.0%)	2 (2.0%)	12 (12.0%)
ALEX	1 (1.0%)	99 (99.0%)	0 (0.0%)	0 (0.0%)
ALBUM	0 (0.0%)	0 (0.0%)	100 (100.0%)	0 (0.0%)
ALICE	5 (5.0%)	0 (0.0%)	0 (0.0%)	95 (95.0%)
QCI Totals				
ALEX	0 (0.0%)	99 (99.0%)	1 (1.0%)	0 (0.0%)
ALBUM	0 (0.0%)	0 (0.0%)	99 (99.0%)	1 (1.0%)
ALICE	1 (1.0%)	0 (0.0%)	1 (1.0%)	98 (98.0%)
NCI Totals				
ALEX		89 (89.0%)		
ALBUM			84 (84.0%)	
ALICE				86 (86.0%)
	None	ALAN	ALPS	ANNA
ACI Totals				
None	22 (22.0%)	1 (1.0%)	1 (1.0%)	76 (76.0%)
ALAN	0 (0.0%)	100 (100.0%)	0 (0.0%)	0 (0.0%)
ALPS	2 (2.0%)	0 (0.0%)	98 (98.0%)	0 (0.0%)
ANNA	11 (11.0%)	0 (0.0%)	0 (0.0%)	89 (89.0%)
QCI Totals				
ALAN	1 (1.0%)	99 (99.0%)	0 (0.0%)	0 (0.0%)
ALPS	0 (0.0%)	1 (1.0%)	99 (99.0%)	0 (0.0%)
ANNA	5 (5.0%)	1 (1.0%)	0 (0.0%)	94 (94.0%)
NCI Totals				
ALAN		89 (89.0%)		
ALPS			90 (90.0%)	
ANNA				72 (72%)
	None	MARTIN	MAGGIE	MALTA
ACI Totals				
None	60 (60.0%)	0 (0.0%)	38 (38.0%)	2 (2.0%)
MARTIN	0 (0.0%)	100 (100.0%)	0 (0.0%)	0 (0.0%)
MAGGIE	0 (0.0%)	0 (0.0%)	100 (100.0%)	0 (0.0%)
MALTA	28 (28.0%)	0 (0.0%)	0 (0.0%)	72 (72.0%)
QCI Totals				
MARTIN	0 (0.0%)	97 (97.0%)	2 (2.0%)	1 (1.0%)
MAGGIE	1 (1.0%)	0 (0.0%)	98 (98.0%)	1 (1.0%)
MALTA	3 (3.0%)	0 (0.0%)	3 (3.0%)	94 (94.0%)
NCI Totals				
MARTIN		88 (88.0%)		
MAGGIE			65 (65.0%)	
MALTA				74 (74.0%)

Table 3. Greek focus identification results (see text).

3.2. Greek

The Greek data indicates the following: In the ACI task (1) non-focus productions have the corresponding identification in one of the three sets (i.e. Alex-set, 82%) whereas the other two sets do not show a regular structure. The second set shows a final-focus bias (i.e. Anna, 76%) whereas the third set splits the identification responses into non-focus (60%) and medial-focus ones (Maggie,

38%). (2) non-final focus productions have high identification scores (up or close to 100%) but a final-focus drop is observed, especially in the second set (Malta, 72%).

In the QCI task (1) focus match has high identification scores (up or close to 100%) with hardly any substantial drop of final focus-match.

	None	ALEX	ALBUM	ALICE
ACI Totals				
None	4 (10.0%)	13 (32.5%)	23 (57.5%)	0 (0.0%)
ALEX	3 (7.5%)	36 (90.0%)	1 (2.5%)	0 (0.0%)
ALBUM	7 (17.5%)	0 (0.0%)	33 (82.5%)	0 (0.0%)
ALICE	11 (27.5%)	0 (0.0%)	0 (0.0%)	29 (72.5%)
QCI Totals				
ALEX	1 (2.5%)	39 (97.5%)	0 (0.0%)	0 (0.0%)
ALBUM	13 (32.5%)	0 (0.0%)	26 (65.0%)	1 (2.5%)
ALICE	0 (0.0%)	0 (0.0%)	0 (0.0%)	40 (100.0%)
NCI Totals				
ALEX		30 (75.0%)		
ALBUM			15 (37.5%)	
ALICE				32 (80.0%)
	None	ALAN	ALPS	ANNA
ACI Totals				
None	3 (7.5%)	26 (65.0%)	0 (0.0%)	11 (27.5%)
ALAN	1 (2.5%)	39 (97.5%)	0 (0.0%)	0 (0.0%)
ALPS	1 (2.5%)	1 (2.5%)	36 (90.0%)	2 (5.0%)
ANNA	5 (12.5%)	2 (5.0%)	0 (0.0%)	33 (82.5%)
QCI Totals				
ALAN	0 (0.0%)	40 (100.0%)	0 (0.0%)	0 (0.0%)
ALPS	0 (0.0%)	1 (2.5%)	39 (97.5%)	0 (0.0%)
ANNA	1 (2.5%)	0 (0.0%)	0 (0.0%)	39 (97.5%)
NCI Totals				
ALAN		34 (85.0%)		
ALPS			36 (90.0%)	
ANNA				35 (87.5%)
	None	MARTIN	MAGGIE	MALTA
ACI Totals				
None	1 (2.5%)	0 (0.0%)	38 (95.0%)	1 (2.5%)
MARTIN	0 (0.0%)	39 (97.5%)	1 (2.5%)	0 (0.0%)
MAGGIE	0 (0.0%)	0 (0.0%)	40 (100.0%)	0 (0.0%)
MALTA	14 (35.0%)	0 (0.0%)	0 (0.0%)	26 (65.0%)
QCI Totals				
MARTIN	0 (0.0%)	40 (100.0%)	0 (0.0%)	0 (0.0%)
MAGGIE	20 (50.0%)	2 (5.0%)	18 (45.0%)	0 (0.0%)
MALTA	0 (0.0%)	0 (0.0%)	1 (2.5%)	39 (97.5%)
NCI Totals				
MARTIN		37 (92.5%)		
MAGGIE			18 (45.0%)	
MALTA				25 (62.5%)

Table 4. Swedish focus identification results (see text).

In the NCI task, all three sets have fairly adequate identification scores which vary from 84% to 89%, 72% to 89%, and 65% to 88% for the first, second and third set respectively.

In general, the Greek data shows a rather high accuracy to the intended focus productions in isolated utterances as well as to the

question-answer-focus matching much the same way as the American English data in the respective tasks. The lexical focus extractions have however a much higher identification score than the corresponding American English ones.

3.3. Swedish

The Swedish data indicates the following: In the ACI task (1) non-focus productions do not have the corresponding identification in any set. No regular bias is observed, especially no final-focus one which is not even at the same rate as the other alternative focus options. (2) non-final focus productions have high identification scores (up or close to 100%) but a final-focus drop is observed, especially in the second set (Malta, 72%).

In the QCI task (1) focus-match has high identification scores (up or close to 100%) except for the medial-focus of the first (Alex) and the third (Martin) sets which drop substantially (i.e. album, 65% and Maggie, 45%). No substantial drop of final focus-match is however observed.

In the NCI task, the second set (Alan) has the highest scores, i.e. from 85% to 90%, whereas the biggest drop is observed at the first and third sets (Alex and Martin), medial-focus, i.e. 37.5% and 45% respectively.

In general, the Swedish data corresponds rather well to the intended focus productions in isolated utterances as well as to the question-answer focus-matching and partly to lexical focus extractions.

4. DISCUSSION AND CONCLUSIONS

The three investigated languages, American English, Greek and Swedish have shown the following tendencies of focus identification. First, non-focus productions were not identified reliably as such in any language, which is a clear indication that a focus application is more or less expected much like in other, less controlled, types of spoken communication. There was no regular final-focus bias, even for Swedish, where the unmarked distribution of focus is described as a final one and, furthermore, with a focus tonal gesture which is distinct from and in temporal coordination with the last lexical accent of the focalised speech unit [4].

Second, focus productions are identified in isolated sentences by phonetic means in all three languages, despite the phonetic as well as syntactic and other linguistic variability associated with focus applications. On the other hand, there is a substantial drop of final-focus identification productions, most in English and Swedish, although final-focus dominance is traditionally described for both languages. Apart from phonetic descriptions, right prosodic dominance has prevailed in descriptive phonology in the international literature, especially the Anglo-American (cf. [8], [9] and [10]). No such evidence is provided in the present study.

Third, even in the most optimal conditions with the contextual question included, which elicits focus distribution, there is no ideal identification of focus. This is an implication that vocal means may be the decisive but far from the exclusive factor in spoken communication and other non-linguistic conditions may be involved including guessing, somatic means, background knowledge, contextual information, etc.

Forth, focalised lexical units extracted from their immediate sentence context show reduced identification, which is in

accordance with relevant proposals that focus realisation has both local and global acoustic correlates [2]. This reduction should be the least expected in Swedish which in theory, as mentioned above, has a distinct tonal gesture of focus, in addition to the local magnitude as well as the global structure of the acoustic correlates. However, the Swedish and Greek results do not have any noticeable differences which might be attributed to the different tonal structure of those two languages.

Focus is probably the most widely-studied linguistic concept. However, most studies are concentrated to distribution, phonetic and functional aspects of focus and relatively less research is being carried out with reference to perceptual dimensions as well as identification processes which are the ultimate goal of spoken communication. Given the typological and prosodic variability among different languages, focus identification may have basic crosslinguistic characteristics and, at the same time, a large variability in relation to the linguistic structure of each individual language.

The present study, rather than providing answers, raises further questions: what are the effects of different linguistic structures, be that prosody, syntax, or semantics, on focus identification? How is focus defined crosslinguistically and what are its communicative effects in different languages? What is the communicative load of focus and to what extent can other components of the grammar compensate for a hypothetical non-applicability? These are some central questions, that should be addressed in further research.

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