

TABLE OF CONTENTS

0.	Preface	v
0.1.	Field of Discourse	v
0.2.	Hierarchy in general	v
0.3.	Hierarchies among F's	vi
0.4.	Conclusions	vi
1.	Distinctive Features, some basic considerations	1
1.0	Introduction	1
1.1.1.	F definitions	2
1.1.2.	F-ordering and economy	3
1.2	Necessity of F-hierarchy	5
1.3	Binarity of F's	6
1.4	Levels of pertinence in F-hierarchies	7
1.5	Perceptual relevance of F's	7
1.6	Phonological and phonetic F's; inadequacies	7
1.7	Absence of perceptual F's	8
2.	Hierarchies and rank orders	10
2.0	Introduction	10
2.1.1.	Basic characteristics of hierarchies	10
2.1.2.	Hierarchy vs. rank order	12
2.2.1.	Implications of plus and minus specifications	13
2.2.2.	Matrix-derived F-hierarchies	14
2.3.1.	Some examples of matrix-derived F-hierarchies	14
2.3.2.	Definition-derived hierarchies	16
2.3.3.	Priority of articulation F's over acoustic F's	16
2.3.4.	Significance of minus specifications	17
2.3.5.	F-inventory based on SPE	18
2.3.6.	Rules stating articulatory restrictions	19
2.3.7.	Difficulties in arriving at assessment of articulatory constraints	23
2.3.8.	Number of articulatory predictions per F	25
2.3.9.	Hierarchy in F-value predictions	25
2.3.10.	Examples of F-value predictions	27
2.4.	Matrix-derived F-hierarchies	30
2.4.1.	F-matrices	30
2.4.2.	Maximally redundant matrix for English	32
2.4.3.	Procedure to arrive at a matrix-derived F-hierarchy	33
2.4.4.	Results	34
2.4.5.	Discussion	34
2.4.6.	Matrix-derived F-hierarchy for Dutch	37

2.5.1.	Motivation for F-introduction	41
2.5.2.	Survey of proposed F's	42
2.5.3.	Necessity of reduction of F-inventory	42
2.6.	Rule-derived rank orders	42
2.6.1.	F-counting in rules	42
2.6.2.	Stress rules	45
2.6.3.	Some restrictions	46
2.6.4.	Sound-symbol to F conversion	46
2.6.5.	Results	47
2.6.6.	Rule-derived F-frequencies in Dutch	48
2.7.	Consonant distribution in clusters and its implications for F rank orders	50
2.7.1.	Types of clusters	50
2.7.2.	Characteristics of cluter formation	50
2.7.3.	F counting as an appropriate measure of differences between consonants	51
2.7.4.	F counting as an inappropriate measure of differences between consonants	52
2.7.5.	Unequal F weights in clusters	53
2.7.6.	Expectations	54
2.7.7.	Lexical frequency of occurrence of F's in Dutch; procedure	54
2.7.8.	F-differences in actually occurring Dutch clusters	55
2.7.9.	F differences in all theoretically possible Dutch clusters	55
2.7.10.	F differences in bigram-derived Dutch clusters	57
2.7.11.	Specific contribution per F in Dutch cluster formation	58
2.7.12.	Discussion	59
2.7.13.	Distribution of F-differences over actual and bigram-derived Dutch clusters per F	60
2.7.14.	Conclusion	60
2.7.15.	Lexical frequency of occurrence of F's in English; procedure	61
2.7.16.	F-differences in actually occurring English clusters	62
2.7.17.	F-differences in all theoretically possible English clusters	62
2.7.18.	Saporta's hypothesis disproved	64
2.7.19.	Specific contribution per F in English cluster formation	64
2.7.20.	Discussion	66
2.8.	Frequency of occurrence and utilization of F's	68
2.8.0.	Justification	68
2.8.1.	Material	68
2.8.2.	Procedure	69
2.8.3.	Results	69
2.8.4.	Nonredundant F-frequency of occurrence, Dutch ,	70
2.8.5.1.	Procedure, Dutch	71
2.8.5.2.	Results	72
2.8.5.3.	Discussion	72
2.8.6.	Material, English	72
2.8.7.1.	Procedure, English	73
2.8.7.2.	Results	73
2.8.8.	Nonredundant F-frequency of occurrence, English	73
2.8.9.	Discussion	74
2.9.0.	F rank orders in sound acquisition	74
2.9.1.	Speech sound order in sound acquisition	75
2.9.2.	F acquisition	75
2.9.3.	Language specific influences	76
2.9.4.	Various proposals for speech sound acquisition	76
2.9.5.	F acquisition vs. sound acquisition	77

2.9.6.	Children's performance in perceptual tasks	78
2.9.7.	Discussion	78
2.9.8.	Analysis of a set of speech deviations in children	82
2.9.9.	F-rank order in deviations	83
2.9.10	Conclusion	83
3.	DF's in perception, especially of consonants	85
3.0.	Why perception?	85
3.1.	Types of perceptual F-studies	85
3.2.	Discussion	94
3.3.	Conclusions	95
4.	Nonacoustic perceptual rank orders of F's	97
4.0.	The experiments	97
4.1.1.	Basic considerations on inner speech	97
4.1.2.	Inner speech as an experimental stimulus	97
4.1.3.	Perceptual vs. distinctive F's	98
4.1.4.	Some expectations	98
4.1.5.1.	Stimulus material	99
4.1.5.2.	Subjects	99
4.1.5.3.	Procedure	100
4.1.5.4.	Analysis of the data	100
4.1.6.	Stress values for random vs. actual stimuli	101
4.1.7.	Discussion	102
4.1.8.	Dimensionality	102
4.1.9.	Effect of dimensionality reduction	103
4.1.10.	Five-dimensional analysis	104
4.1.11.	The meaning of optimal dimensions	105
4.1.12.	Graphic representation of the dimensions	105
4.1.13.	Proximity and hierarchy of the dimensions	106
4.1.14.	Hierarchical cluster analysis of the data	106
4.1.15.	Interpretation of the data	107
4.1.15.1.	Stability of the branching diagrams	108
4.1.15.2.	Phonetically naive vs. nonnaive subjects	108
4.1.15.3.	Interpretation of the dimensions in relation to Kruskal analysis	109
4.1.16.	Conclusions	110
4.1.17.	Inherent objections	111
4.2.0.	Experiment no. 2	111
4.2.1.	Procedure	112
4.2.2.	Instructions	113
4.2.3.	Subjects	113
4.2.4.0.	Expectations	113
4.2.4.1.	Rank orders	114
4.2.5.	Results	114
4.2.5.1.	MINISSA analysis	114
4.2.5.2.	Johnson analysis	115
4.2.6.	Discussion	115
4.2.6.0.	Dimensionality	115
4.2.6.1.	Interpretation of dimensions, pooled data	116
4.2.6.2.	Interpretation of branching diagrams, pooled data	117
4.2.6.3.	Interpretation of individual results	117
4.2.6.3.1.	PeterL.	118
4.2.6.3.2.	MarcelvdB.	118
4.2.6.3.3.	PetravH.	118
4.2.6.3.4.	MFeelen	118

4.2.6.3.5.	GertG.	118
4.2.6.3.6.	AnkvdB.	119
4.2.6.3.7.	AnnejL.	119
4.2.6.3.8.	ITT4.	119
4.2.7.	Conclusions	119
5.	Correlations among the various hierarchies and rank orders established	121
5.1.	Procedure	121
5.2.	Restrictive considerations	124
5.3.	Discussion	124
5.4.	Conclusion	126
6.	Conclusions and prospects	128
6.0.	Modes of listening and F's	128
6.1.	Sources of F hierarchies excluded from this study.	128
6.2.	Prosodic F's	129
6.3.	F-combinations in perception	130
6.4.	Shortcomings of a segmental F model	130
6.5.	The syllable as a F	131
6.6.	Intonation F's	131
6.7.	Some suggestions for a general F model	131
6.8.	Phonology and hierarchical F evidence in phonetics	132
6.9.	Conclusions	133
Appendix 1	. . . . .	136
“ 2	. . . . .	137
“ 3	. . . . .	138
“ 4	. . . . .	148
“ 5	. . . . .	149
“ 6	. . . . .	150
References	. . . . .	174