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Adaptive Networks as a Model for Human Speech Development-Cluster Plots

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Purdue University

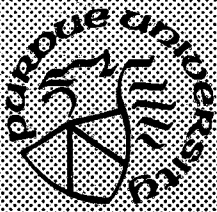
M. D. Tom
Purdue University

R. G. Schwartz
Purdue University

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R. G. Schwartz

TR-EE 90-12
February, 1990

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Purdue University
West Lafayette, Indiana 47907

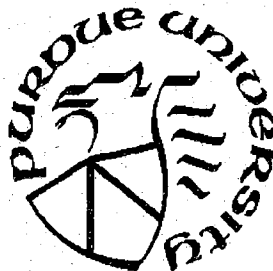
Adaptive Networks as a Model for Human Speech Development— Cluster Plots

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M. Daniel Tom
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Department of Audiology and Speech Sciences

TR-EE 90-12
February 1990



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West Lafayette, IN 47907

This Technical Report contains all the cluster plots generated for the cluster analyses described in §9.7 of [1]. The Lance and William General Algorithm with complete linkages for hierarchical clustering analysis [2] is used. A brief description of the algorithm may be found in §9.7.1 of [1].

In the cluster plots the symbol \rightarrow designates a letter-to-phoneme mapping. For example, $c \rightarrow k$ means the letter in the center of the window is "c" and is being mapped by the network into the phoneme /k/. Definitions of the phoneme symbols may be found on pp. 22-23 of [1].

A horizontal line designates a cluster. The length of a horizontal line has no significance. A vertical line designates the distance between the two clusters joining the top and bottom ends of the vertical line. The distance scale may be found at the beginning and the end of each plot. All plots have the same relative distance scale.

Cluster analyses are performed after the 5th, 10th, 15th, 20th, and 25th passes through the English training database, and after the 2nd, 4th, 6th, 8th, and 10th passes through the Spanish training database. Cluster analyses for the second language trainings are performed similarly. Observations may be found in §9.7.2-§9.7.7 of [1].

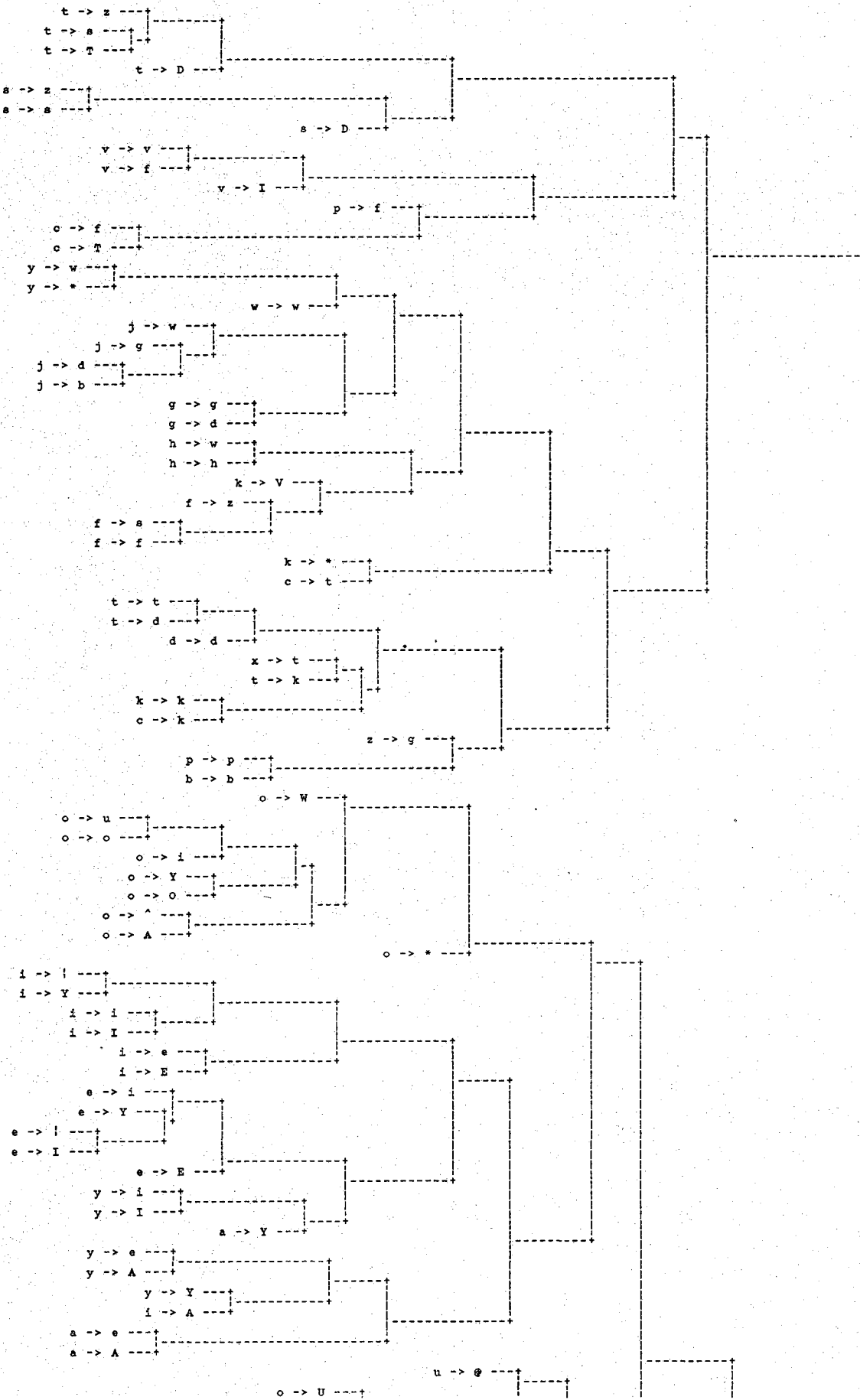
[1] Tenorio, M. F., M. D. Tom, and R. G. Schwartz, "Adaptive Networks as a Model for Human Speech Development," Purdue University TR-EE 89-54, August 1989.

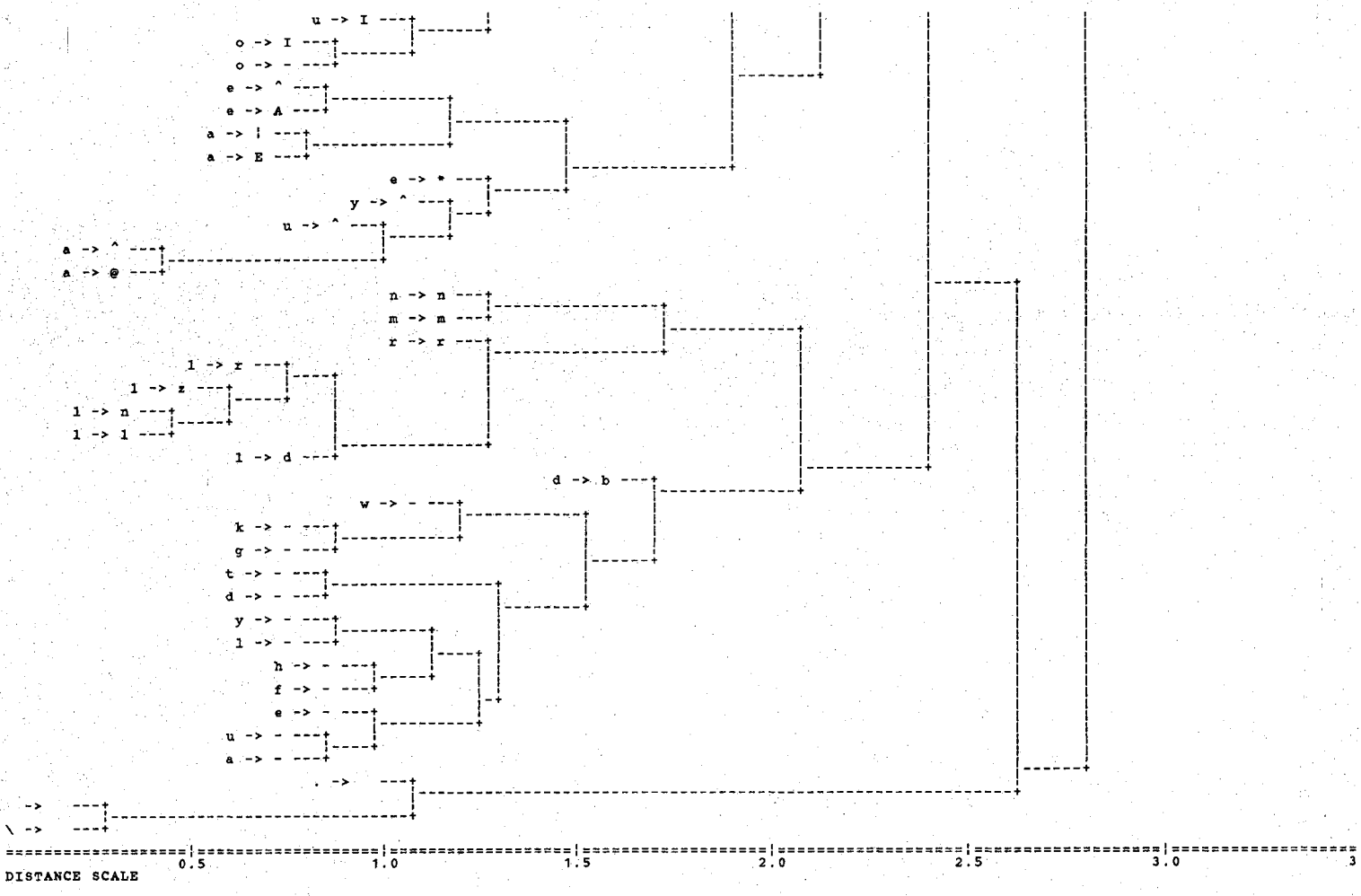
[2] Diday, E. and J. C. Simon, "Clustering Analysis," in *Digital Pattern Recognition*, ed. K. S. Fu, Springer-Verlag, Berlin, 1980.

First Grade Speech Training Set Pass 5

DISTANCE SCALE

0,5 1,0 1,5 2,0 2,5 3,0



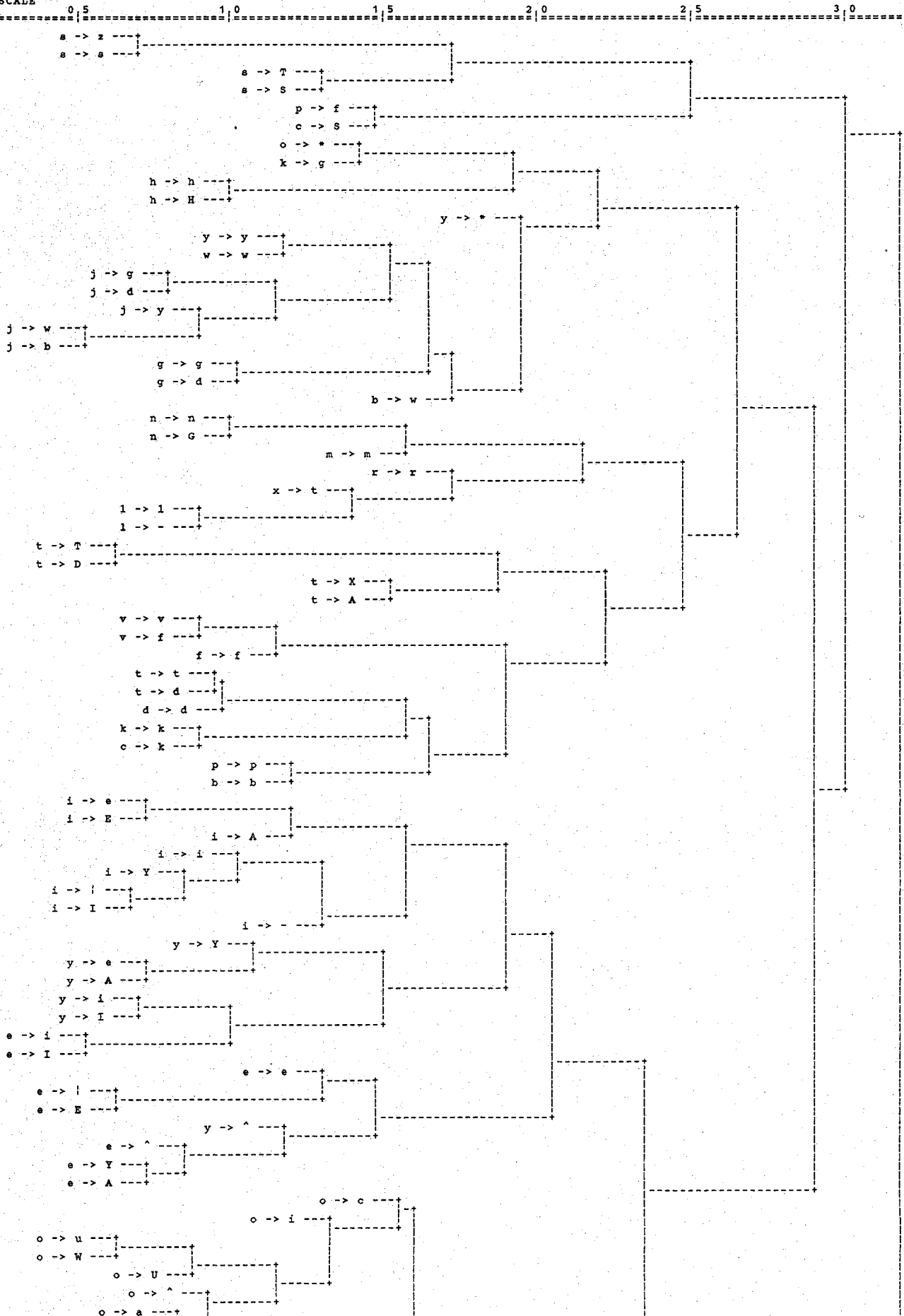


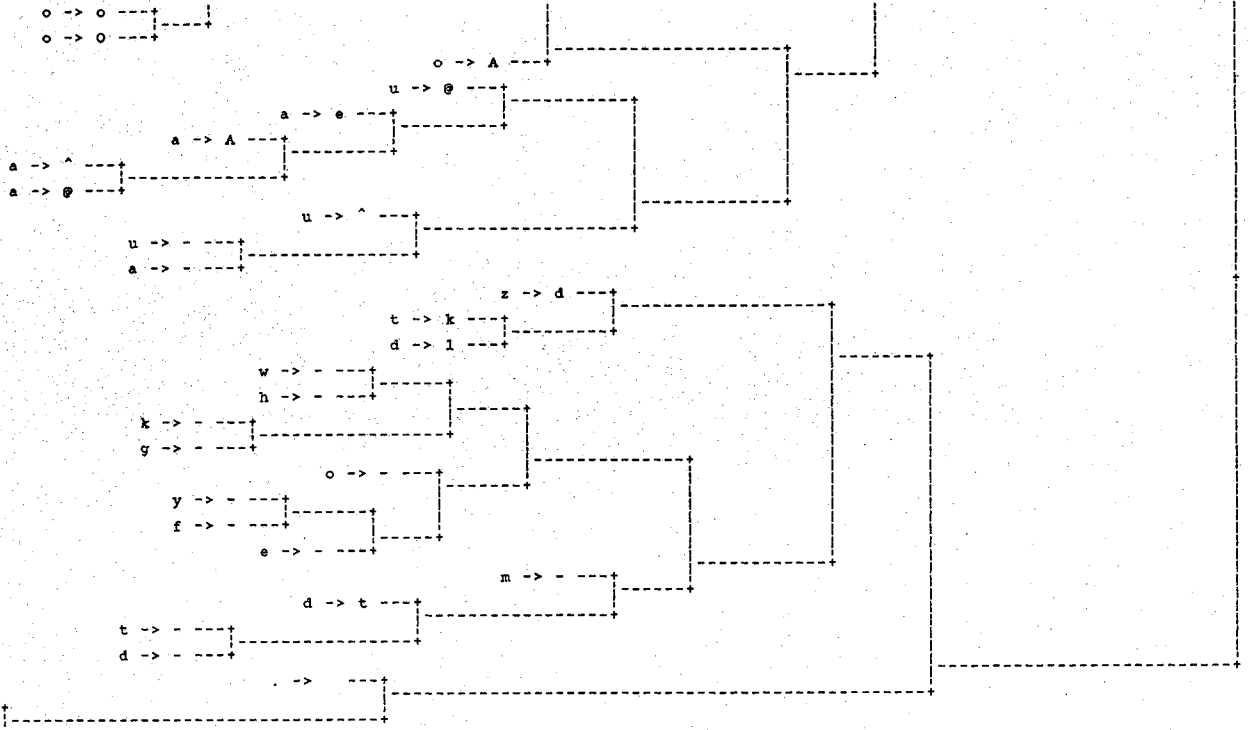
DISTANCE SCALE

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First Grade Speech Training Set Pass 10

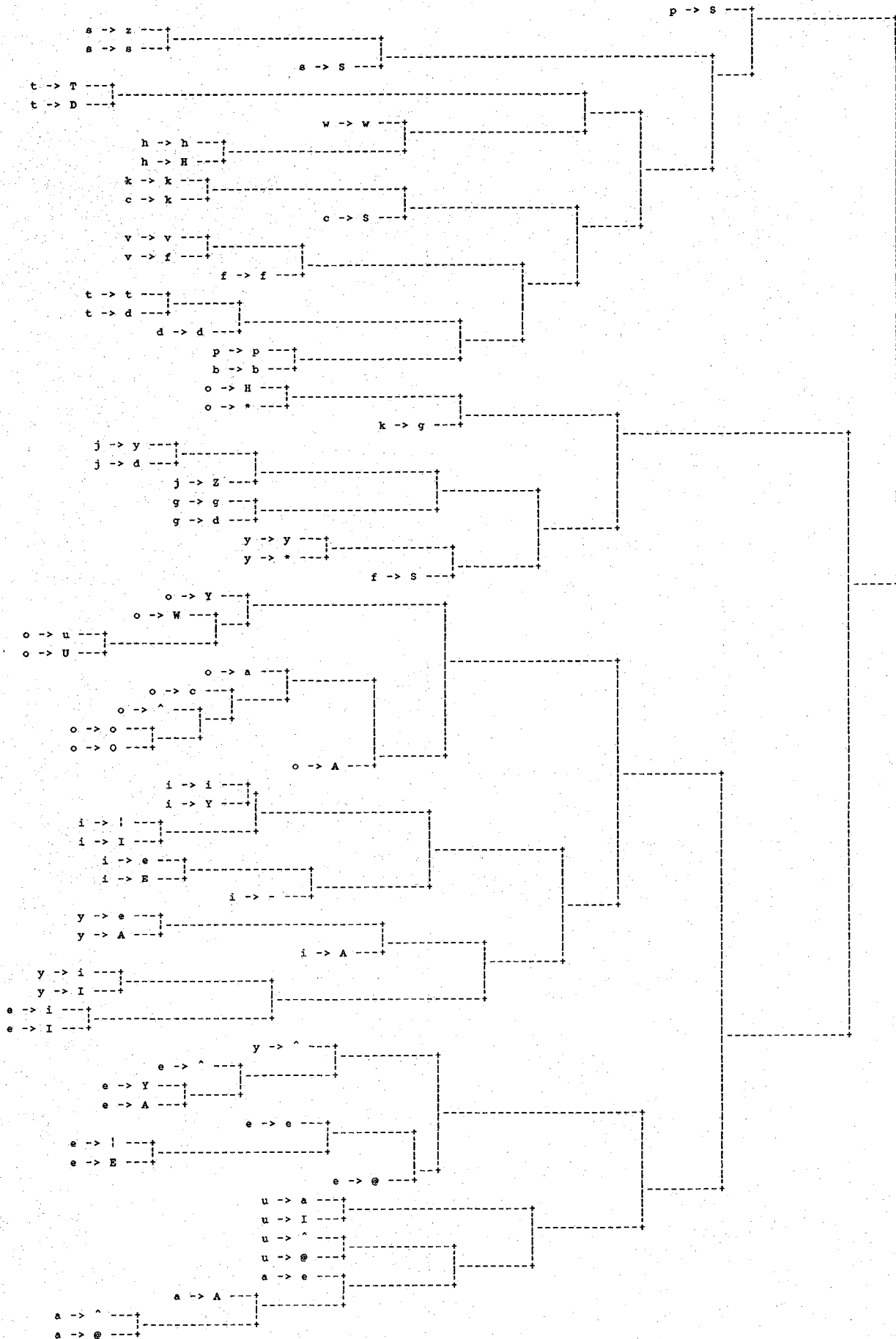
DISTANCE SCALE

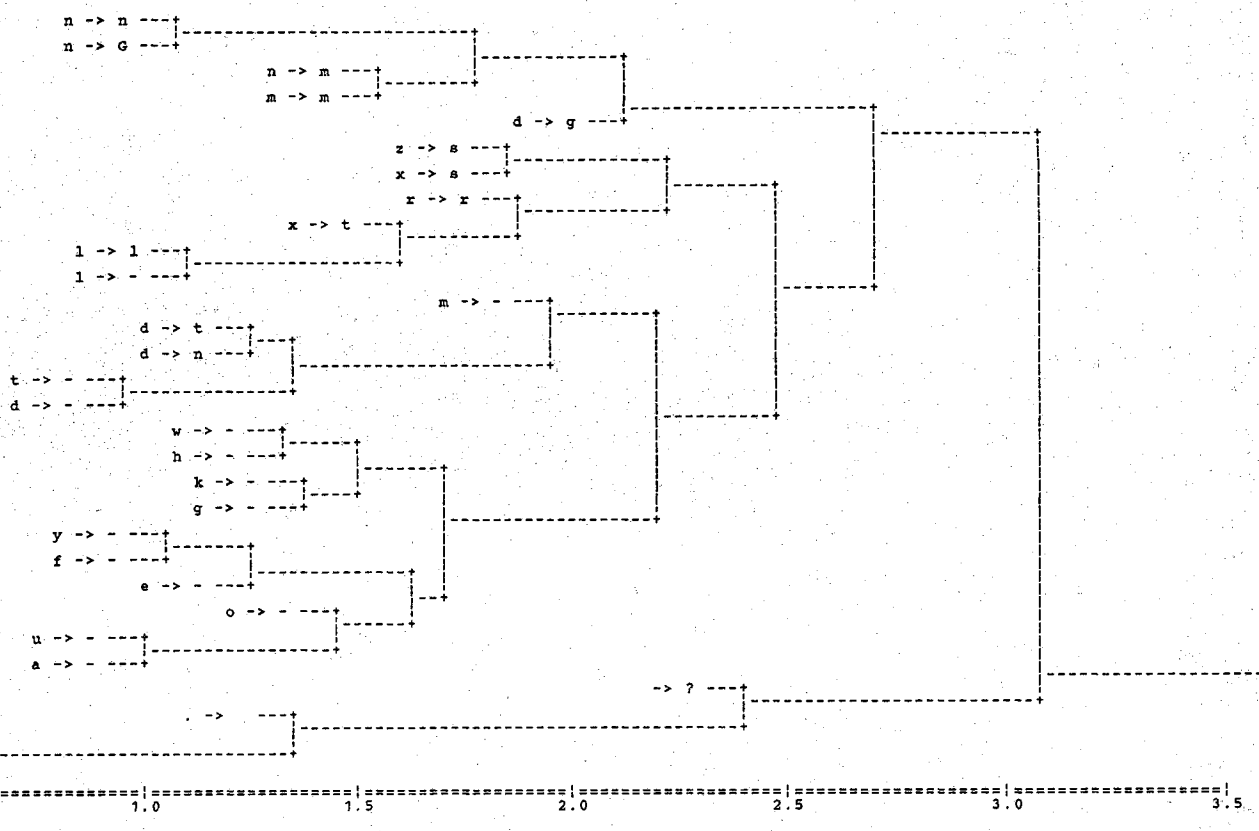




DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5

DISTANCE SCALE 0,5 1,0 1,5 2,0 2,5 3,0 3,5



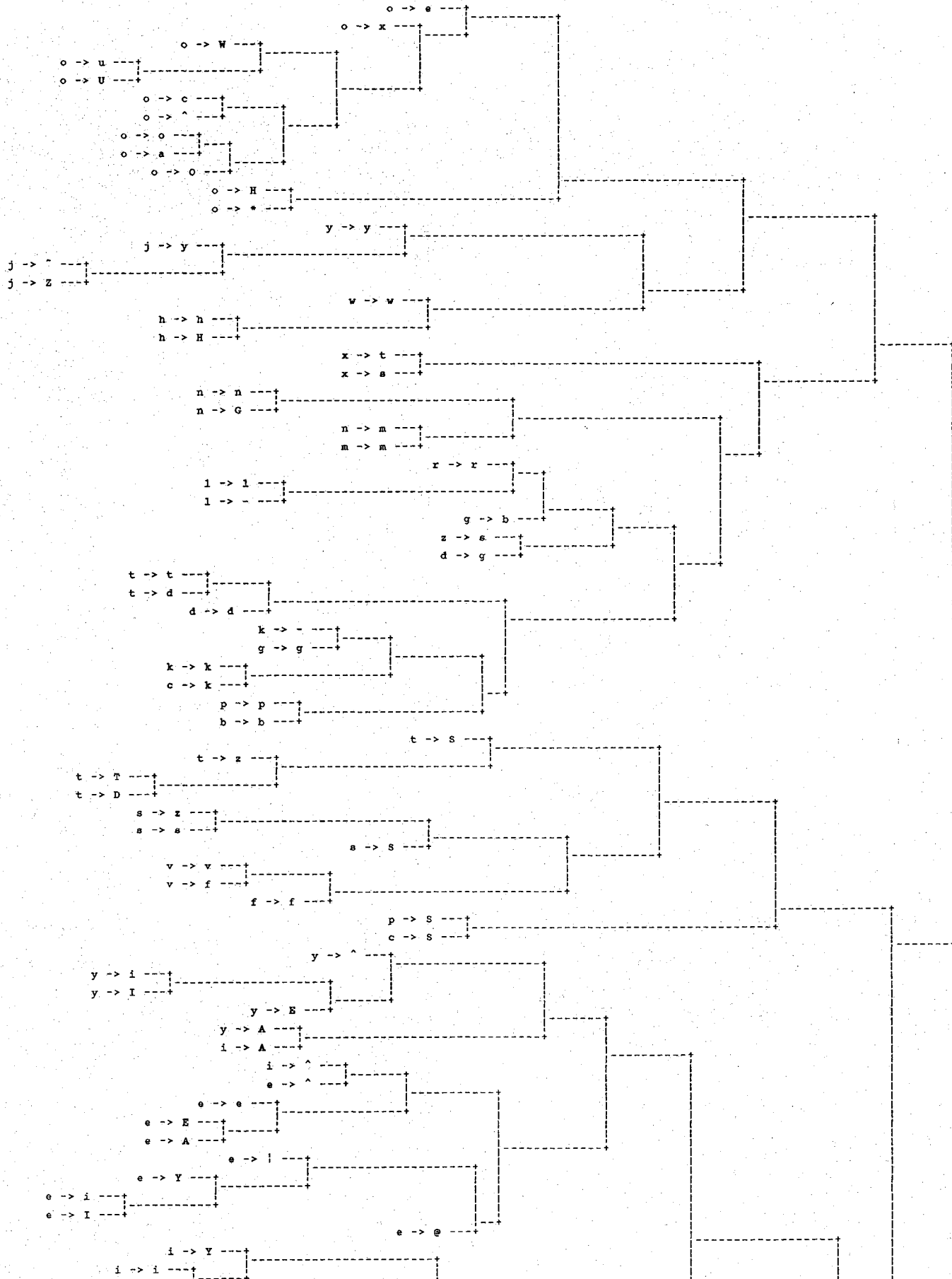


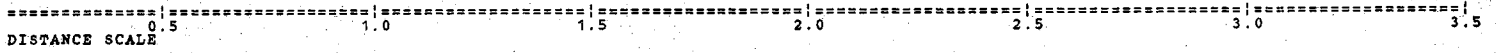
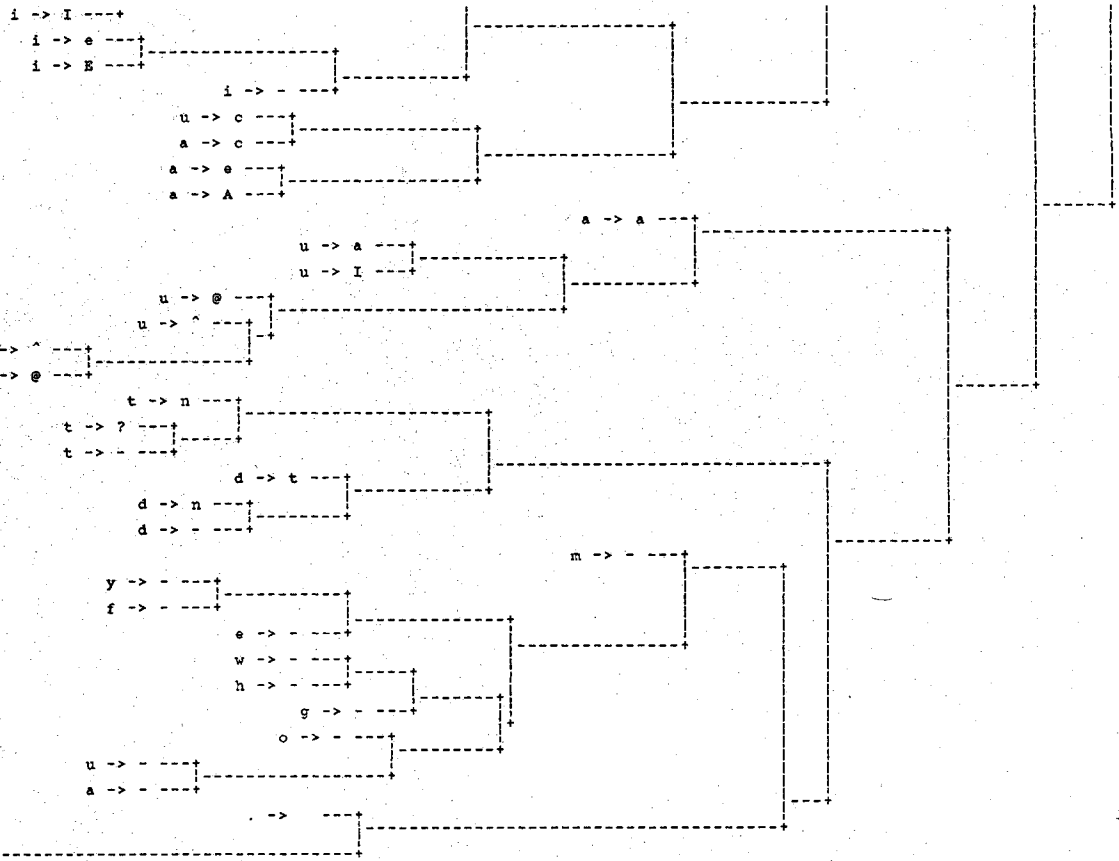
First Grade Speech Training Set Pass 20

DISTANCE SCALE

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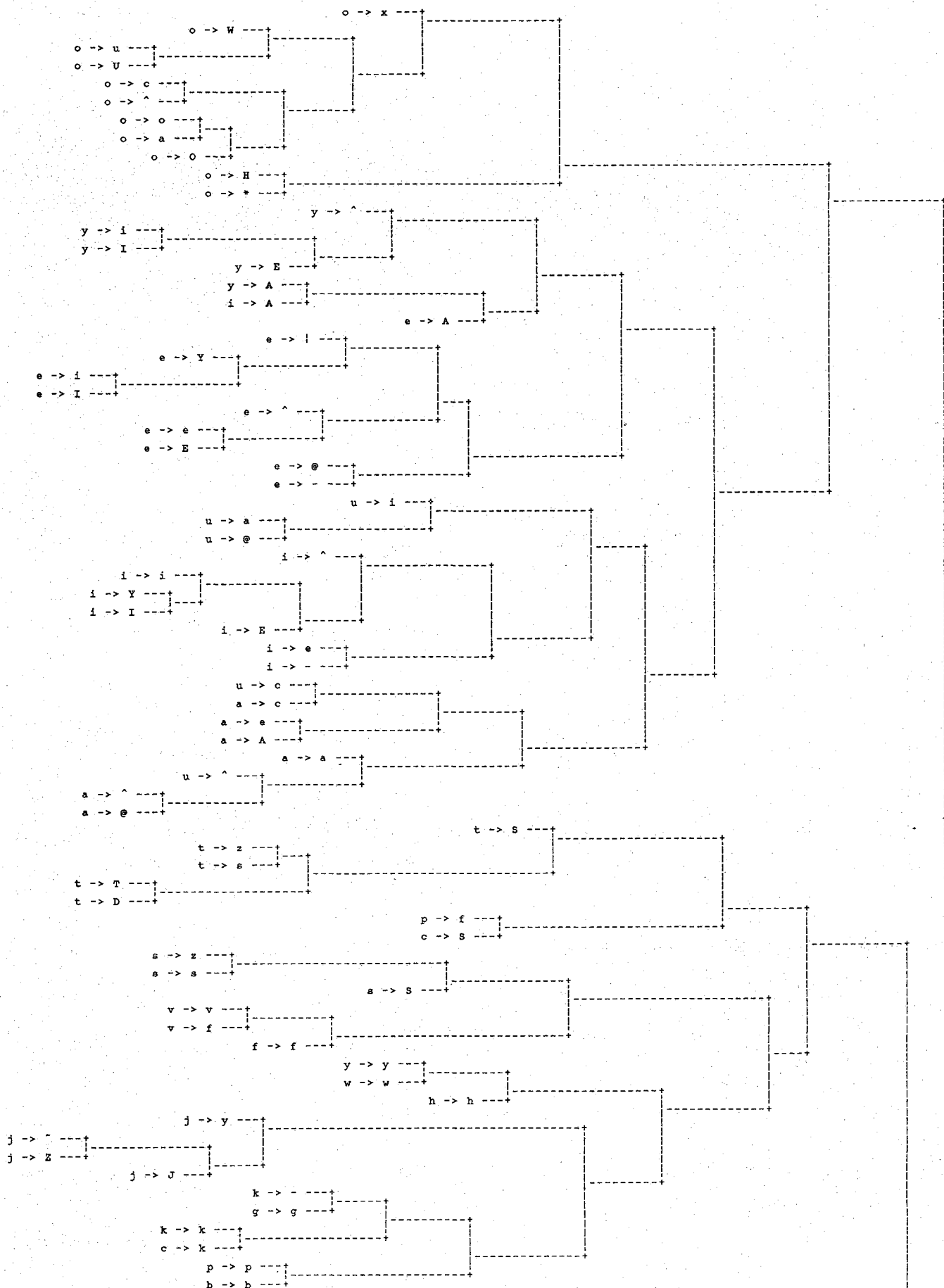
-> ?

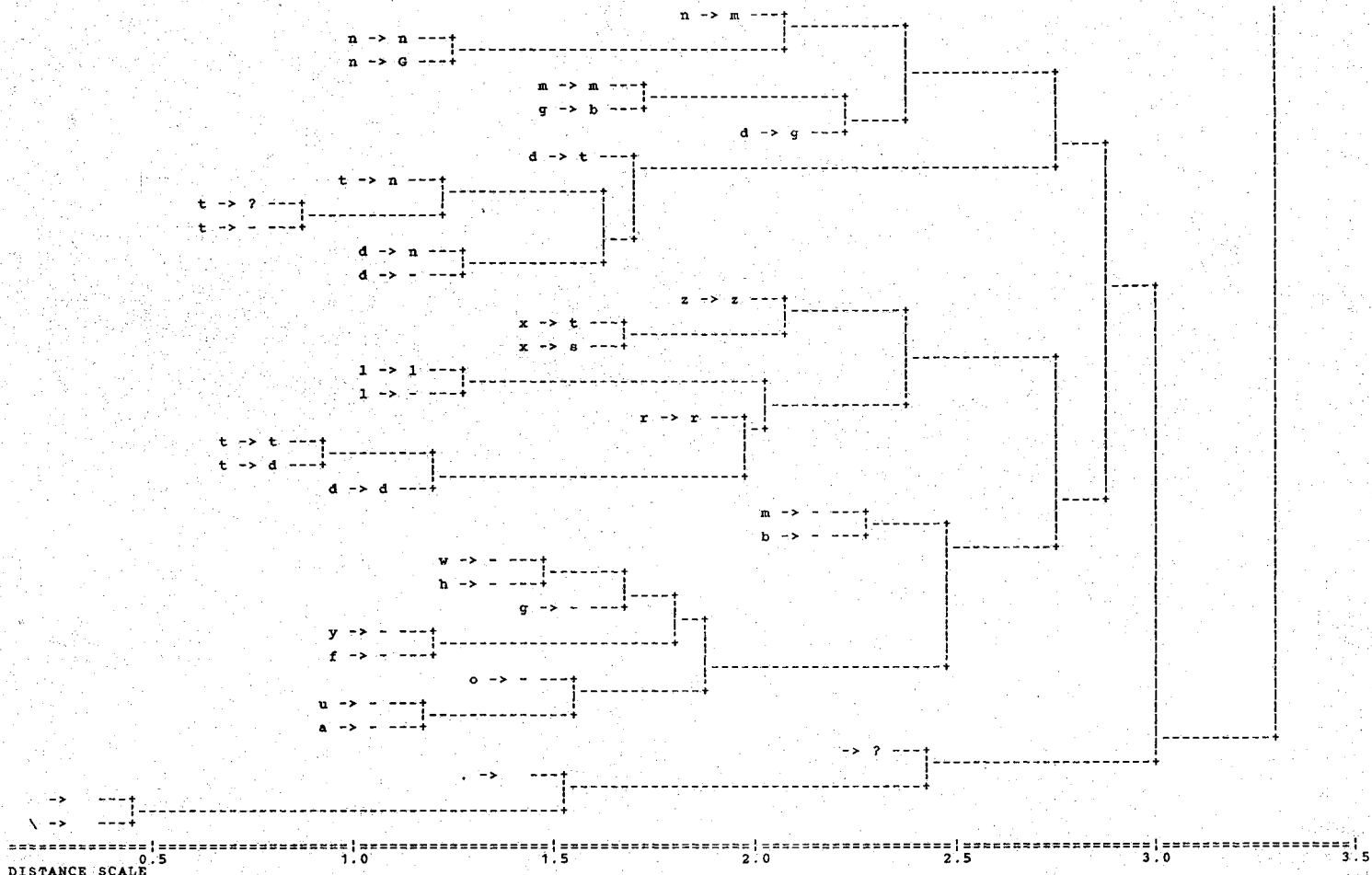




DISTANCE SCALE

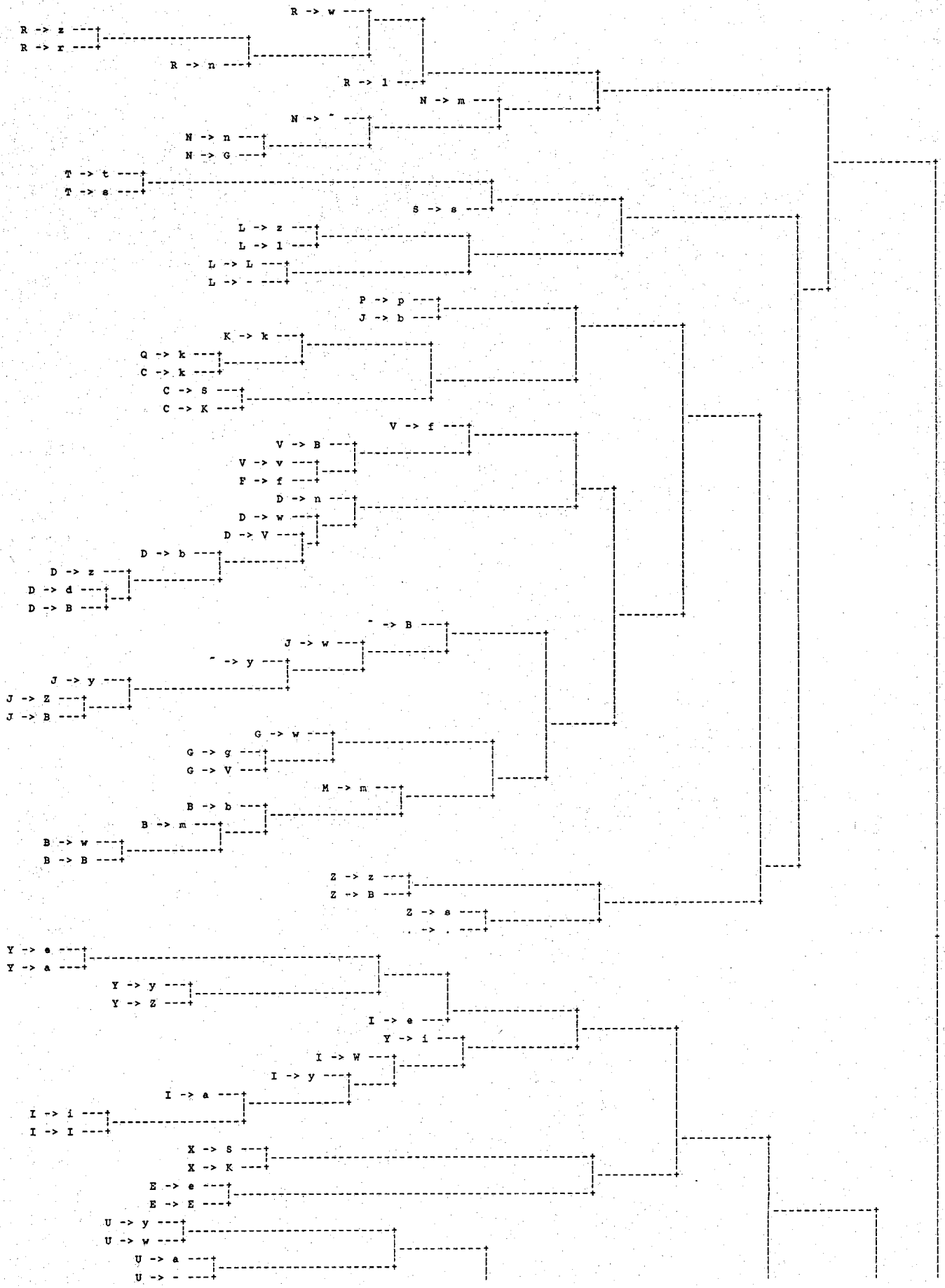
0.5 1.0 1.5 2.0 2.5 3.0 3.5

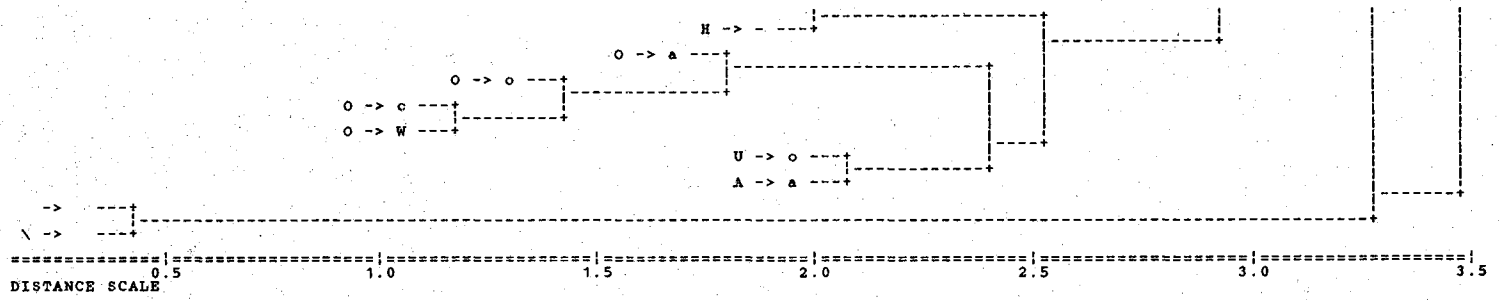




English-Spanish Training Set Pass 2

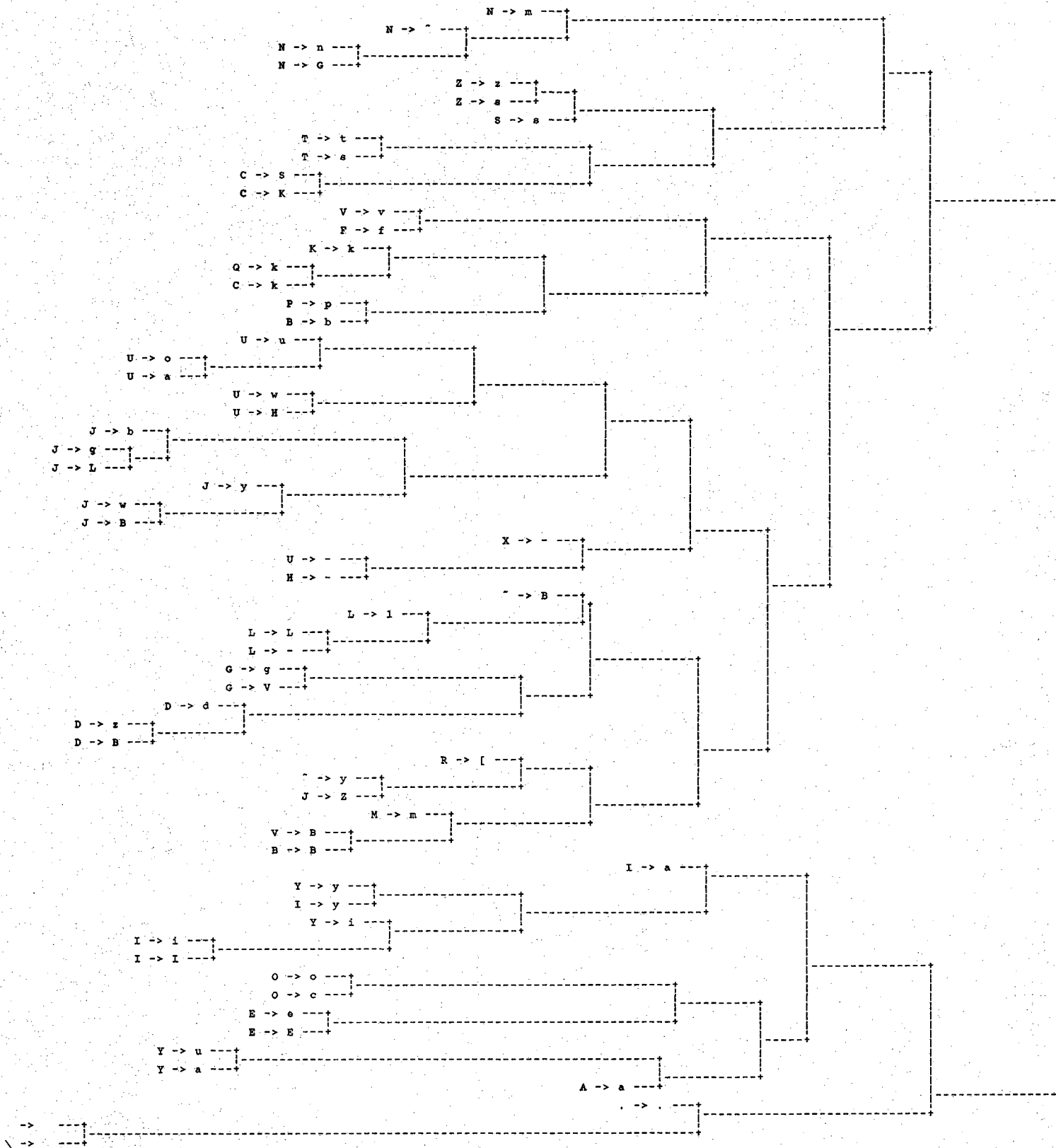
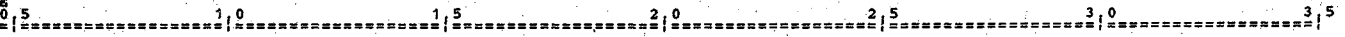
DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5



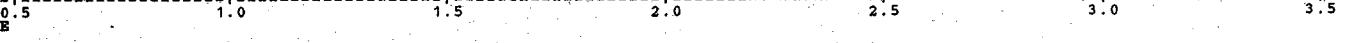


English-Spanish Training Set Pass 4

DISTANCE SCALE

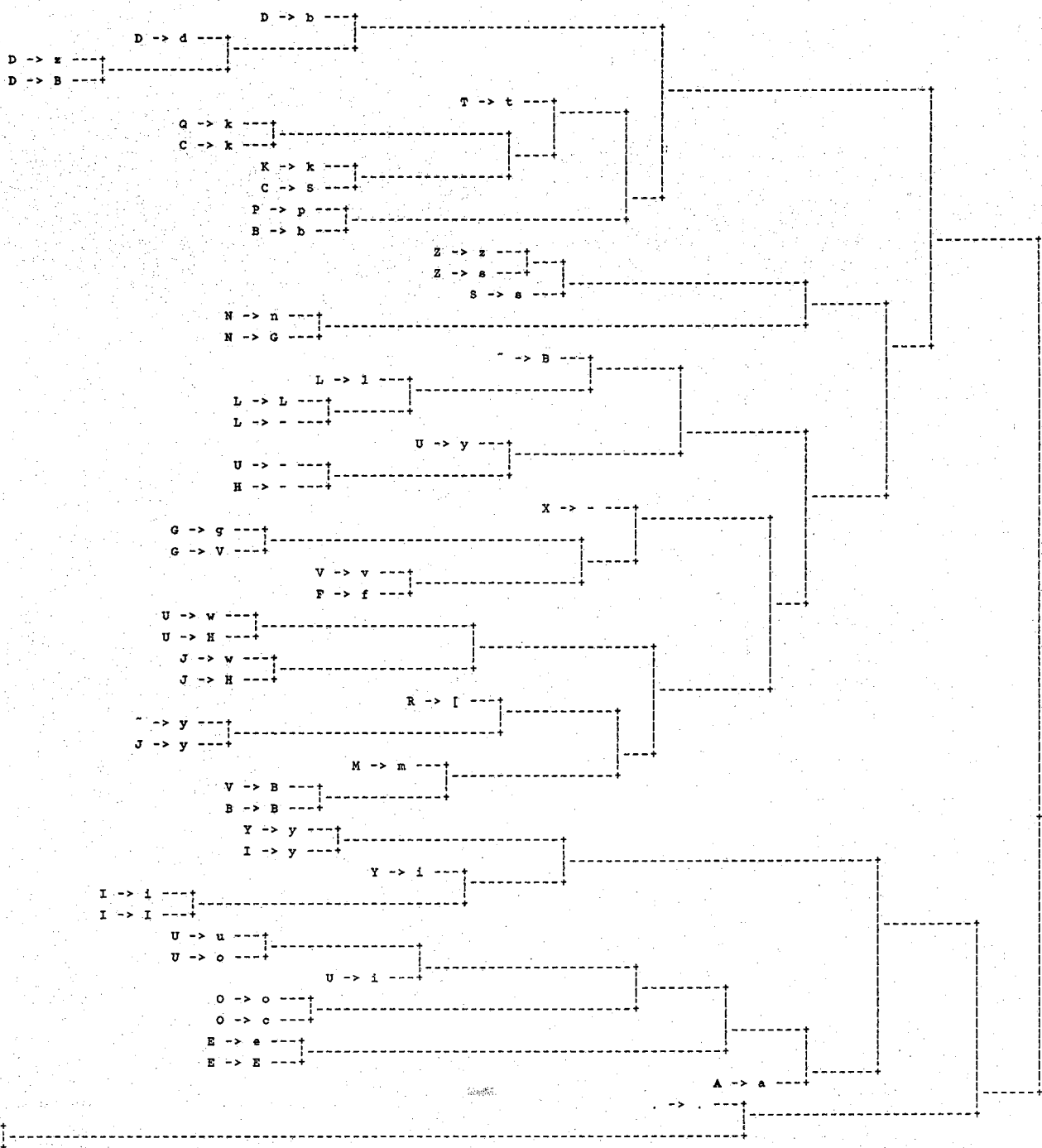


DISTANCE SCALE



English-Spanish Training Set Pass 6

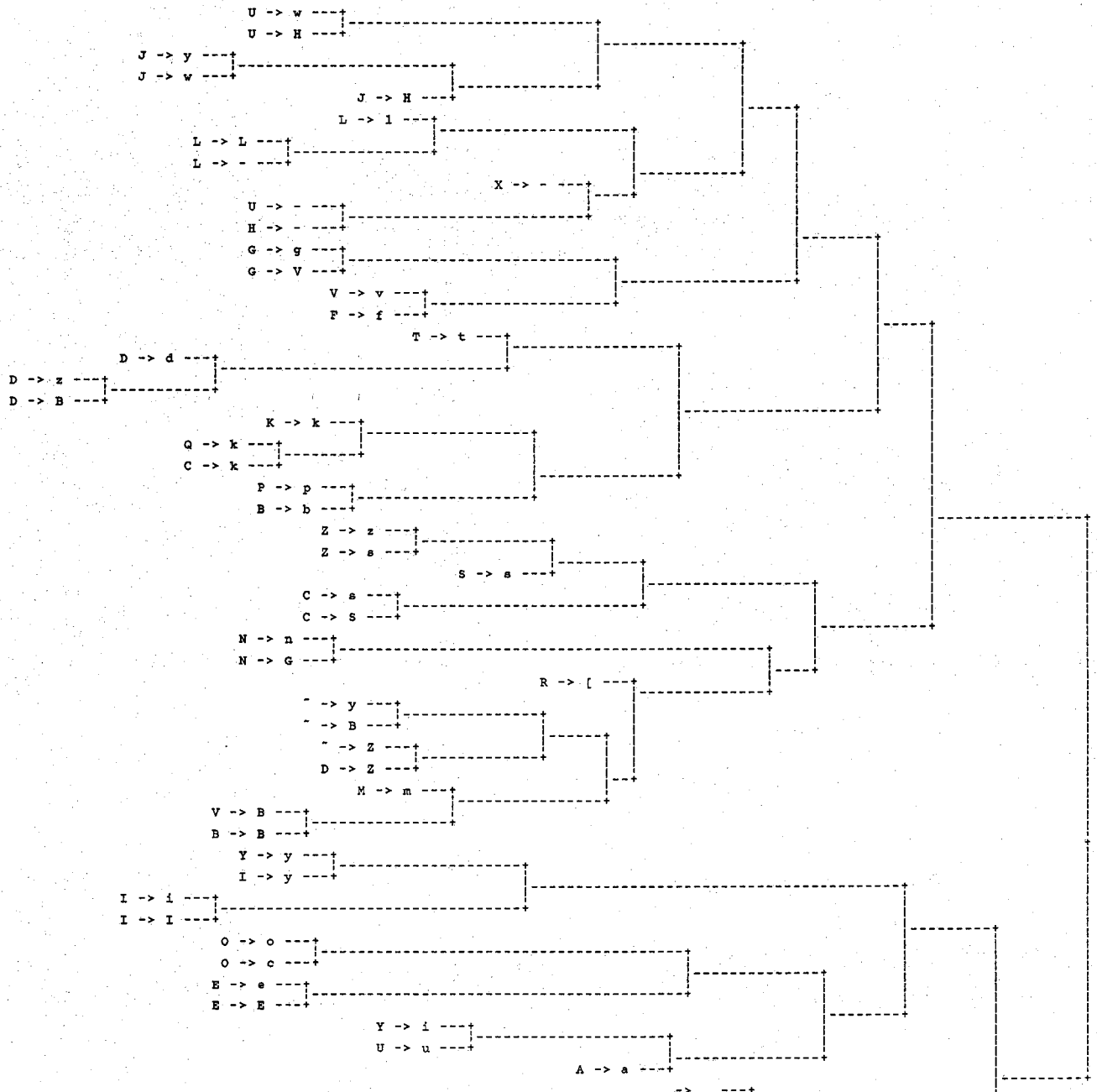
DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5



DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5

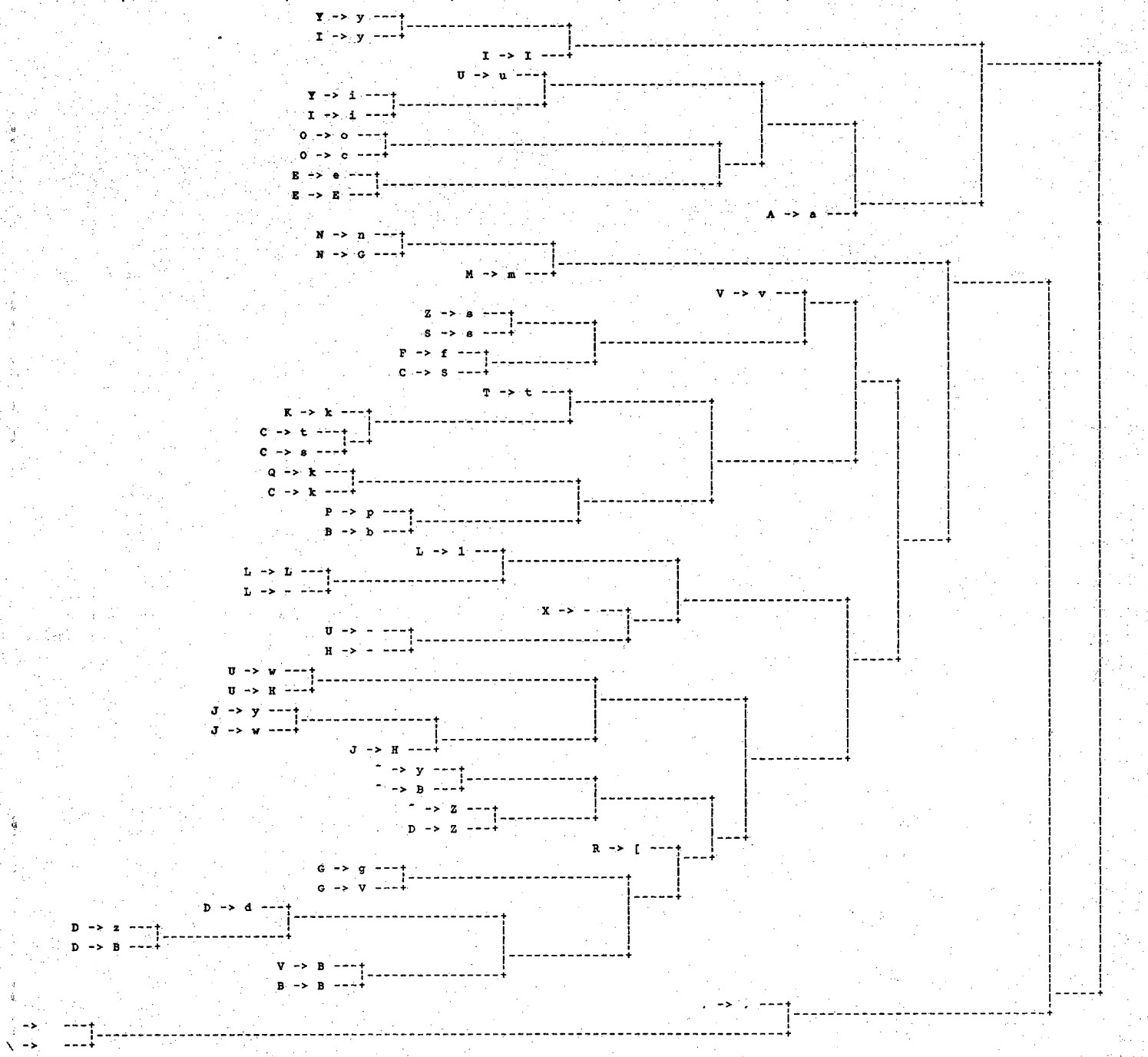
English-Spanish Training Set Pass 8

DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5



DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5

DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5

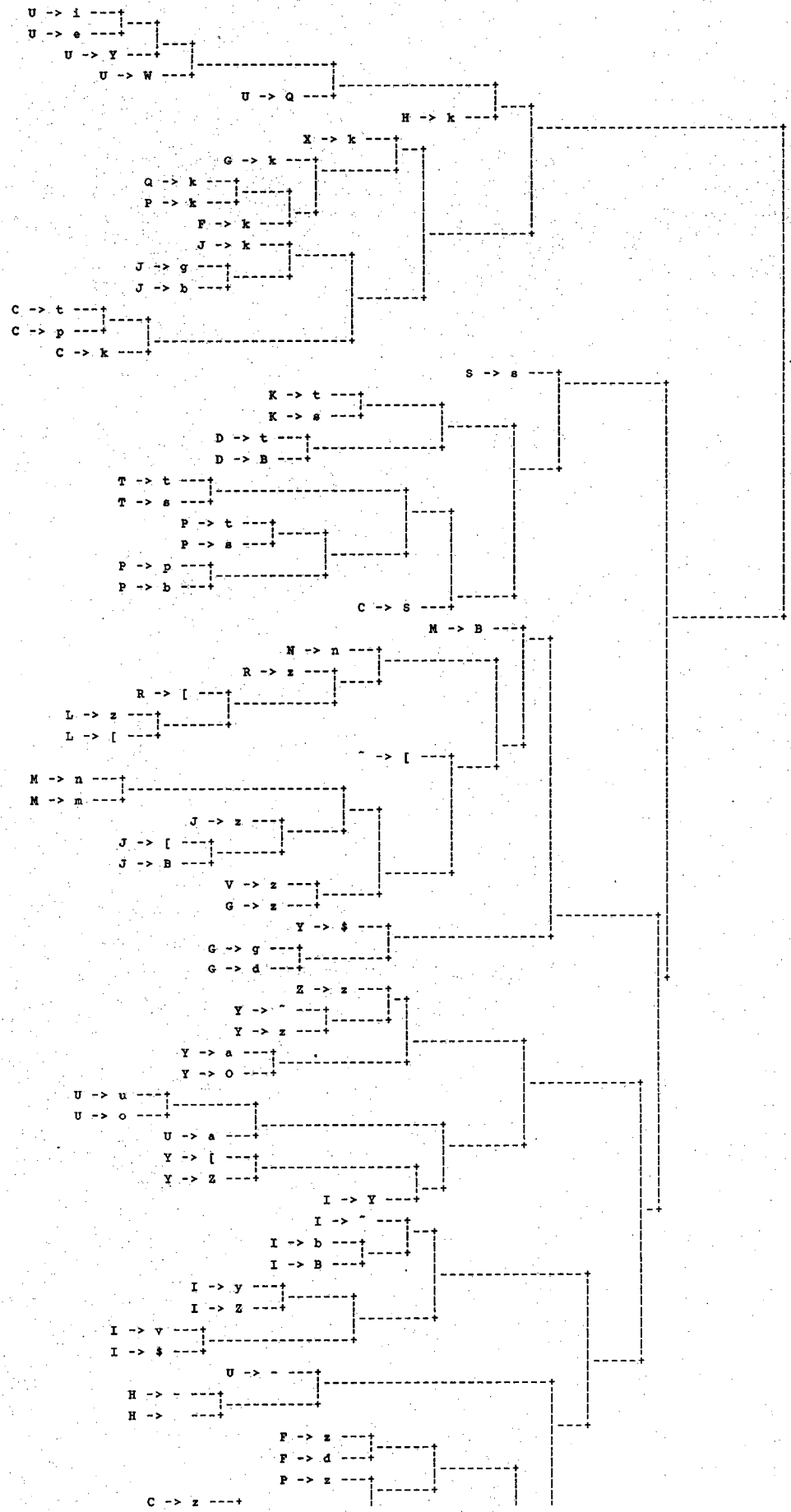


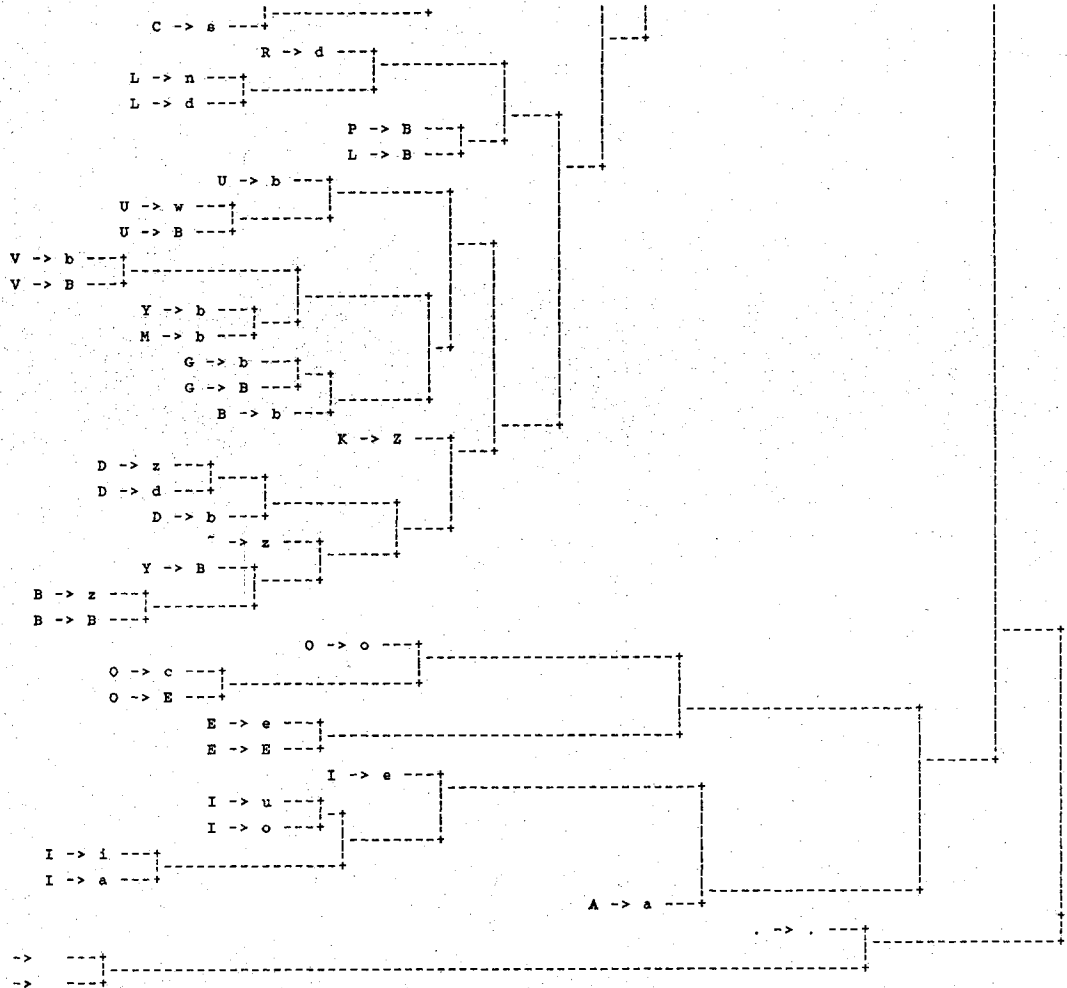
DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5

Spanish Training Set Pass 2

DISTANCE SCALE

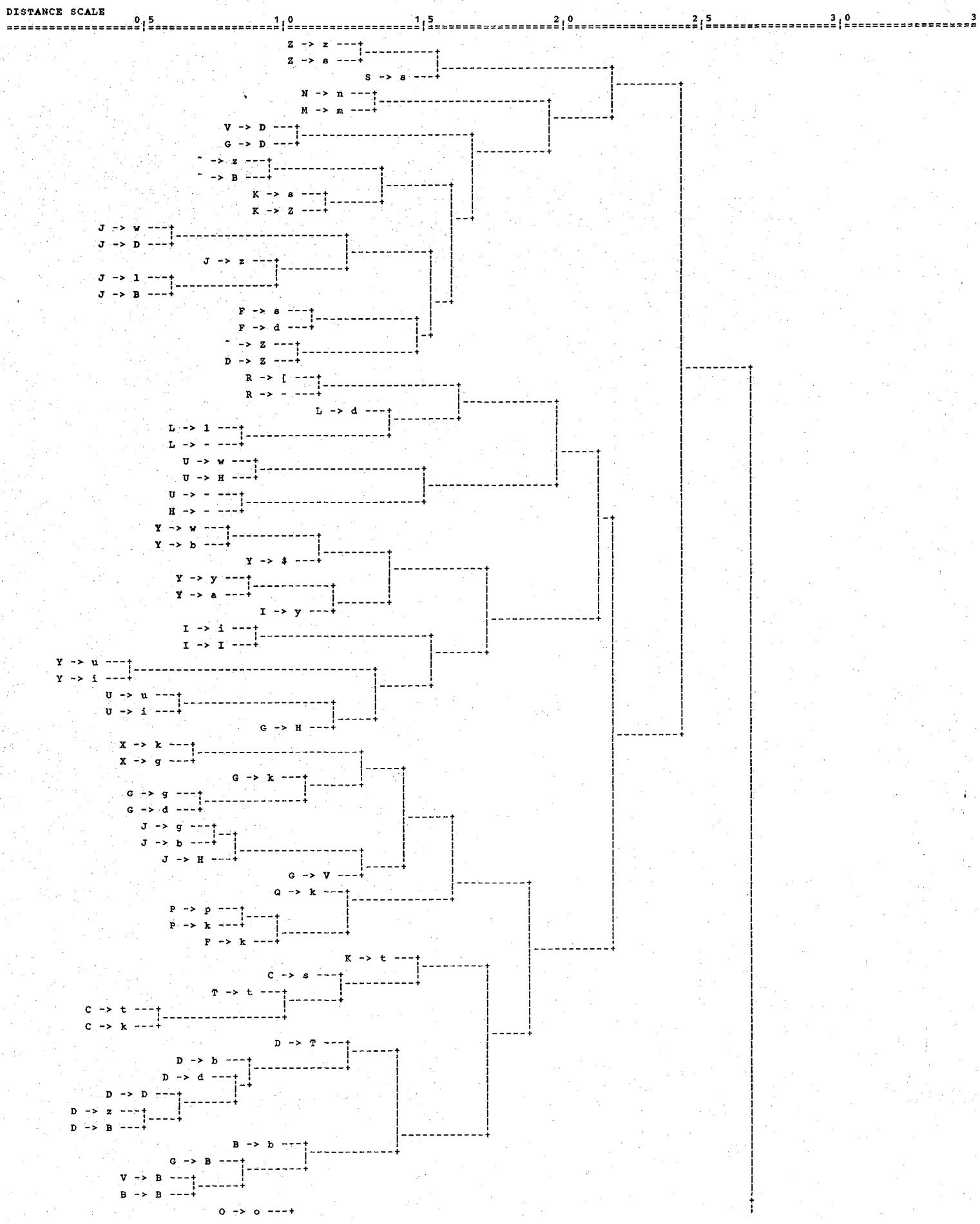
0.5 1.0 1.5 2.0 2.5 3.0

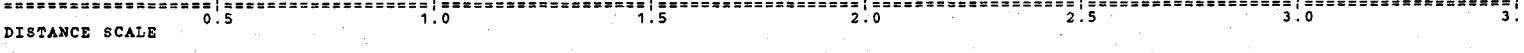
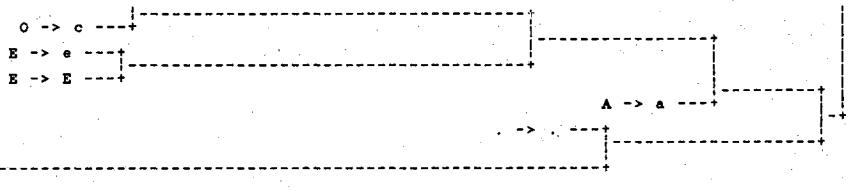




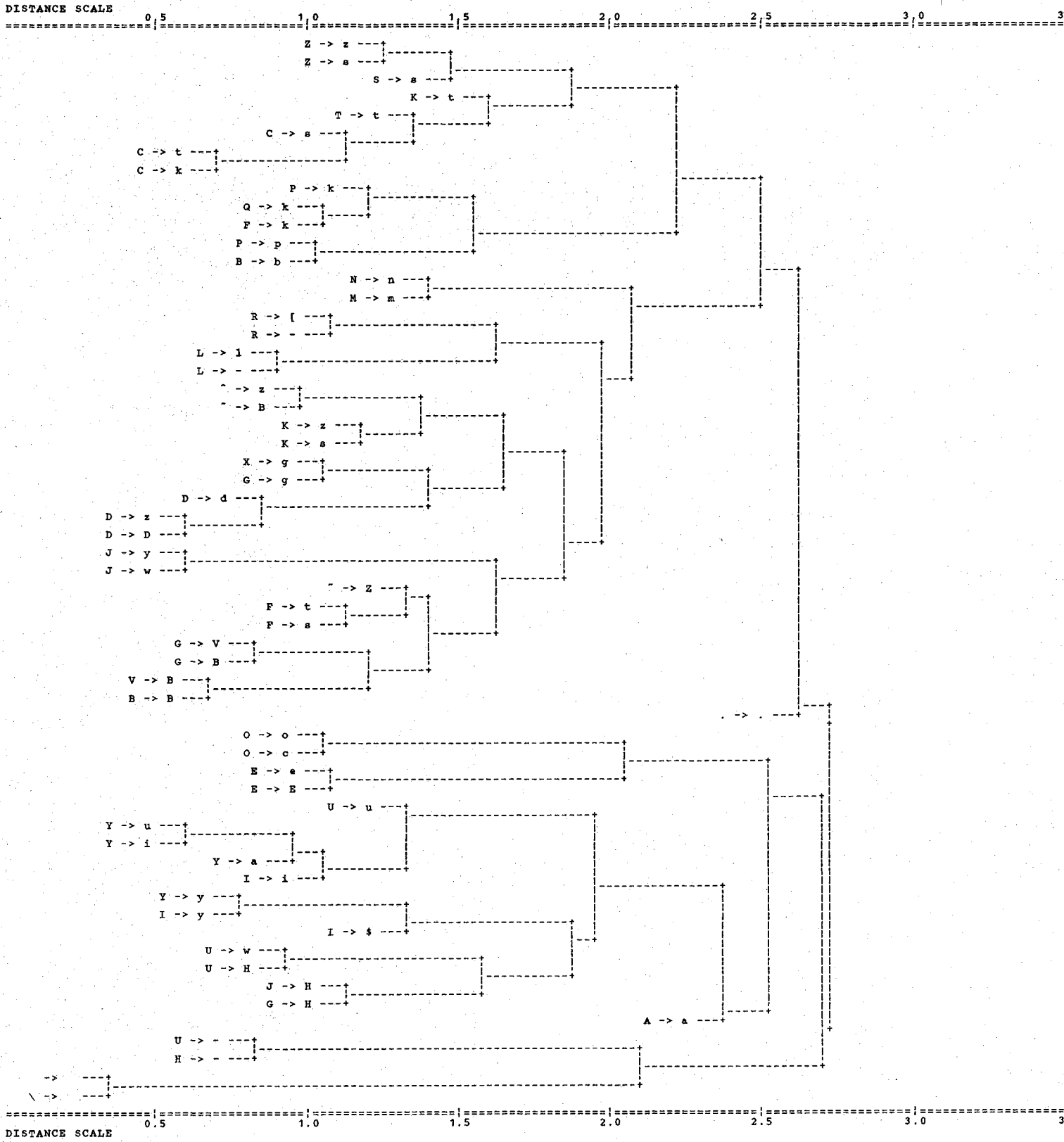
DISTANCE SCALE 0.5 1.0 1.5 2.0 2.5 3.0 3.5

Spanish Training Set Pass 4





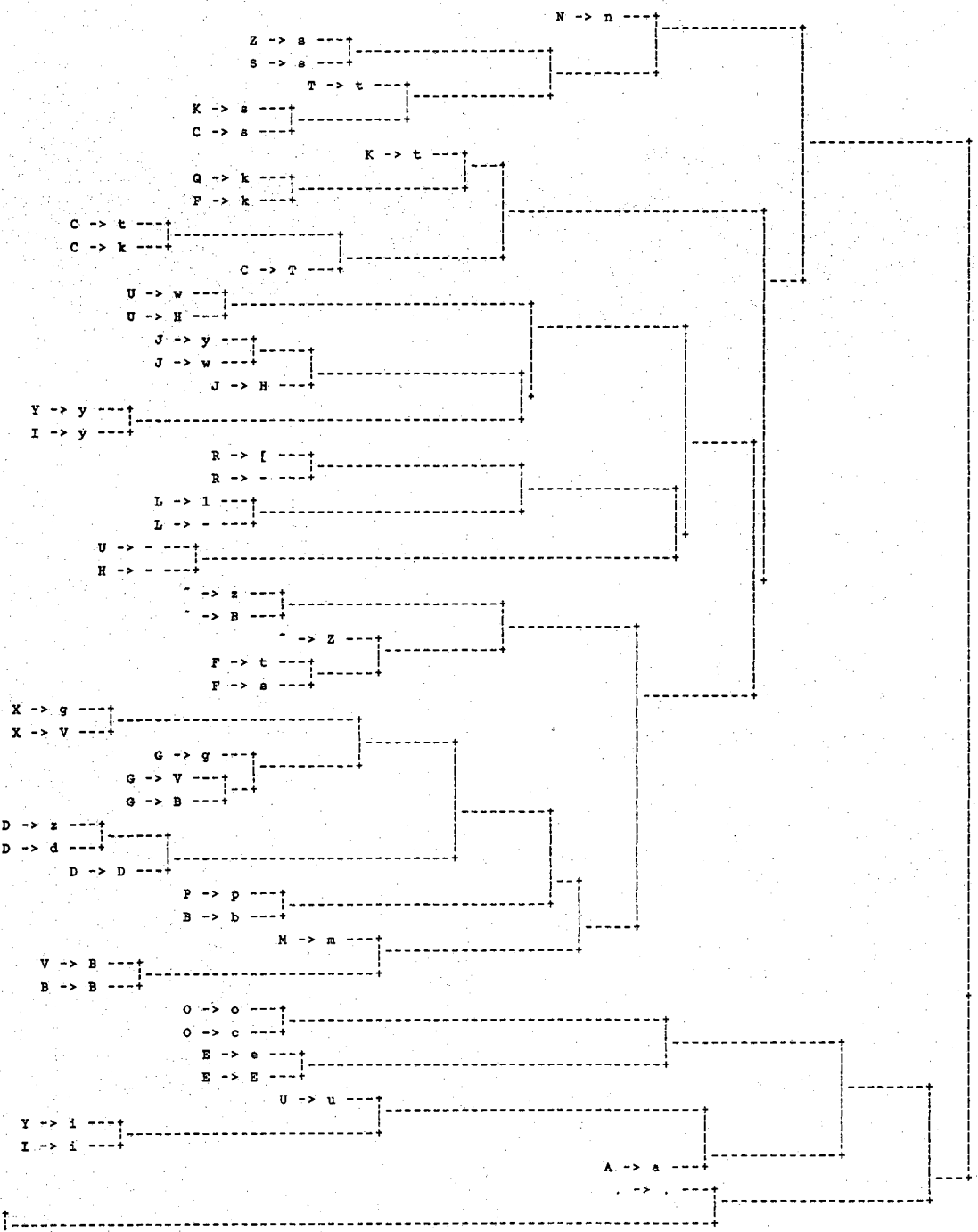
Spanish Training Set Pass 6



Spanish Training Set Pass 8

DISTANCE SCALE

0.5 1.0 1.5 2.0 2.5 3.0 3.5



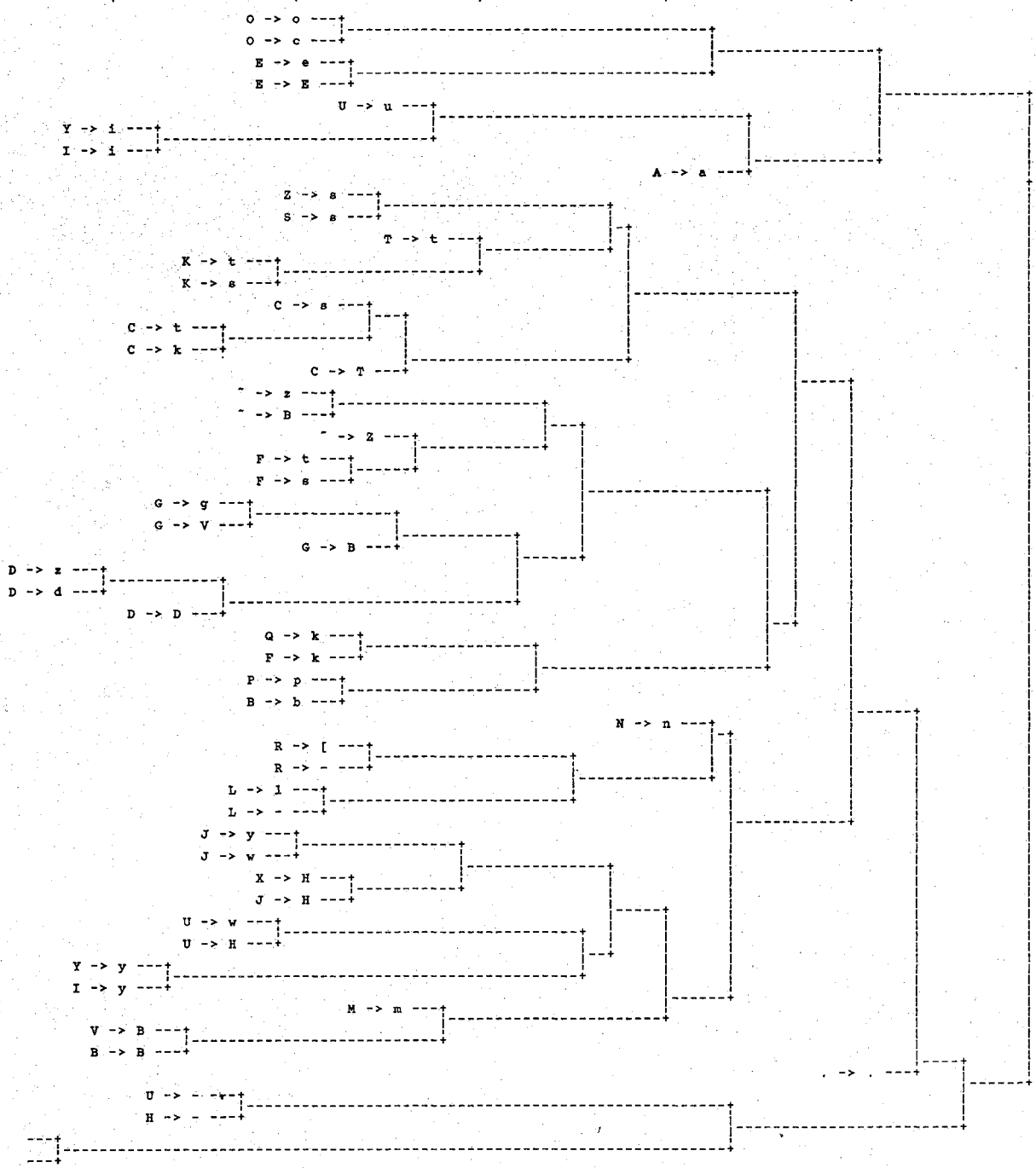
DISTANCE SCALE

0.5 1.0 1.5 2.0 2.5 3.0 3.5

Spanish Training Set Pass 10

DISTANCE SCALE

0.5 1.0 1.5 2.0 2.5 3.0

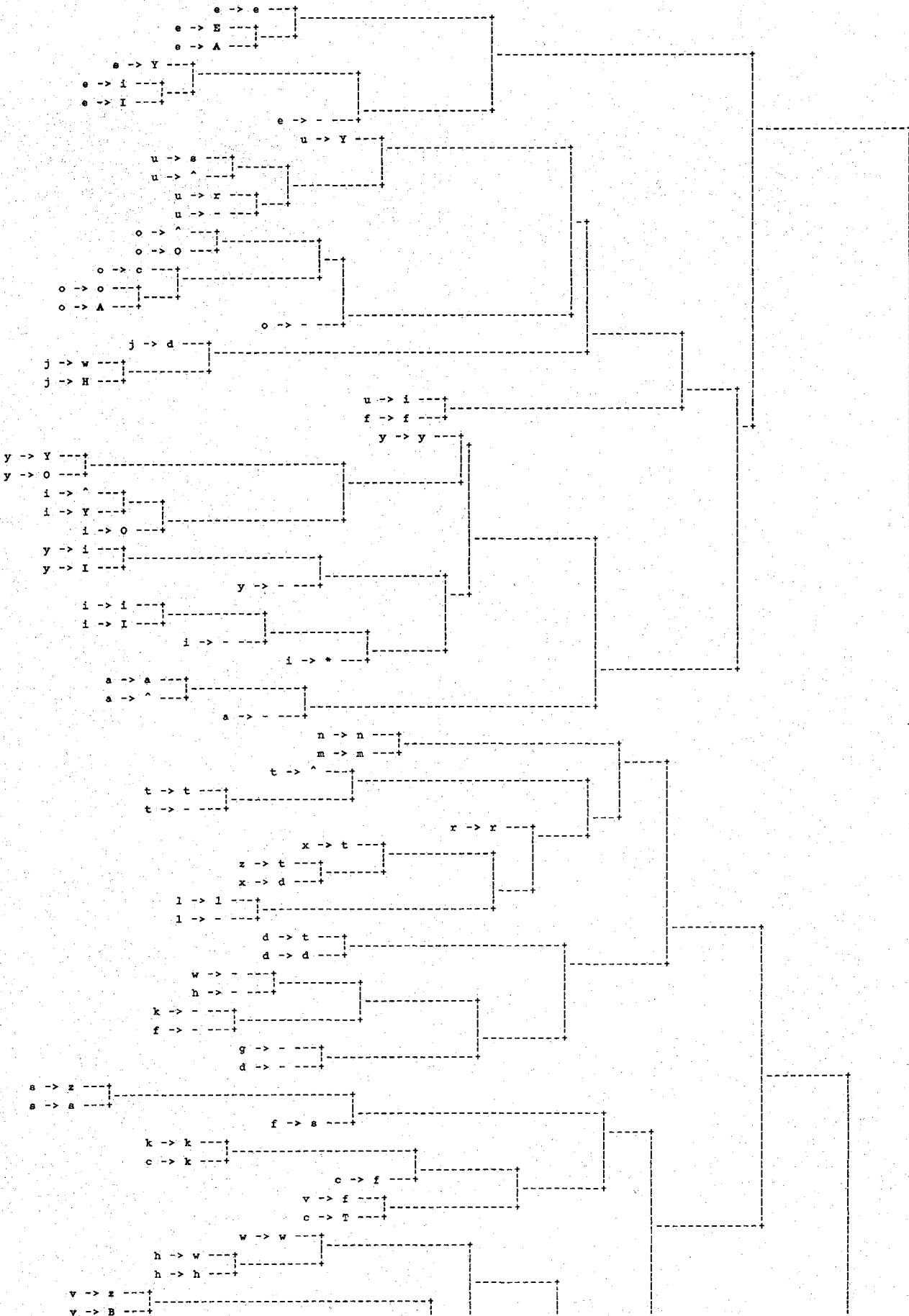


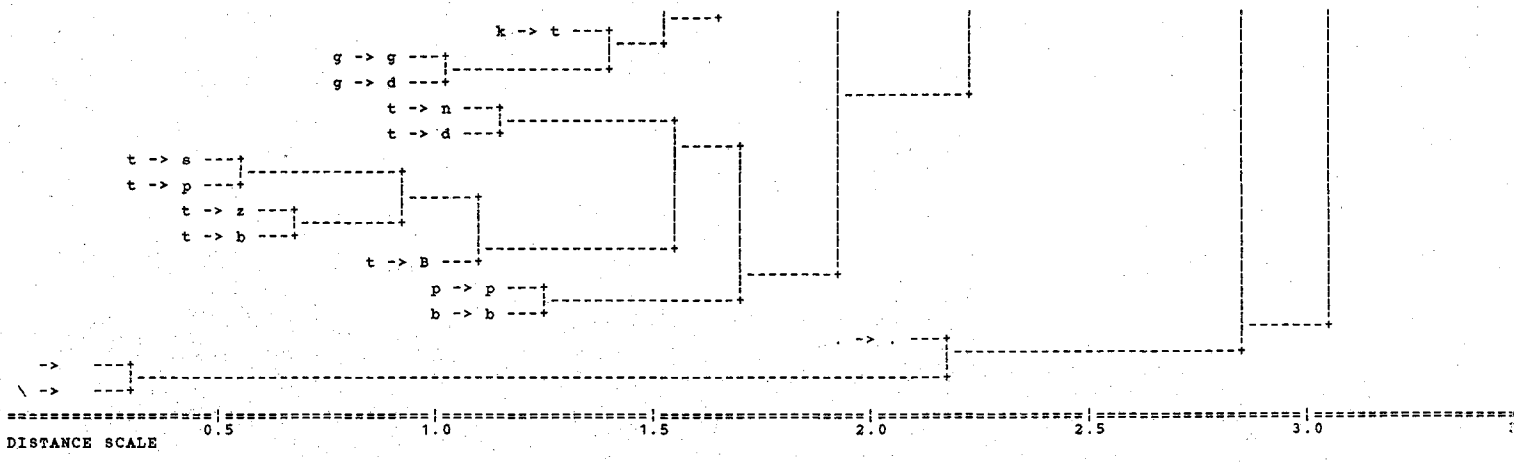
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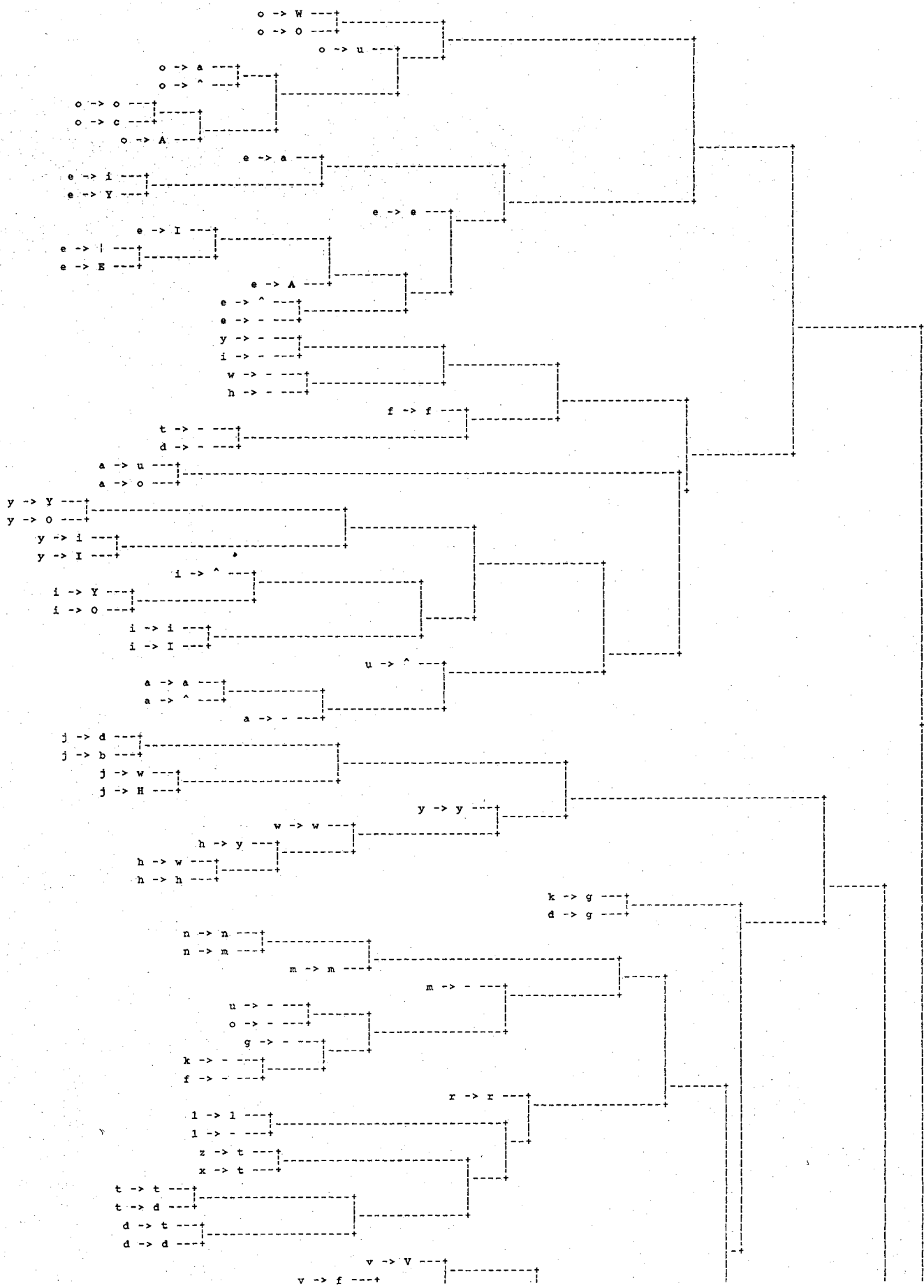
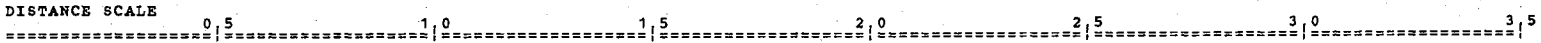
0.5 1.0 1.5 2.0 2.5 3.0

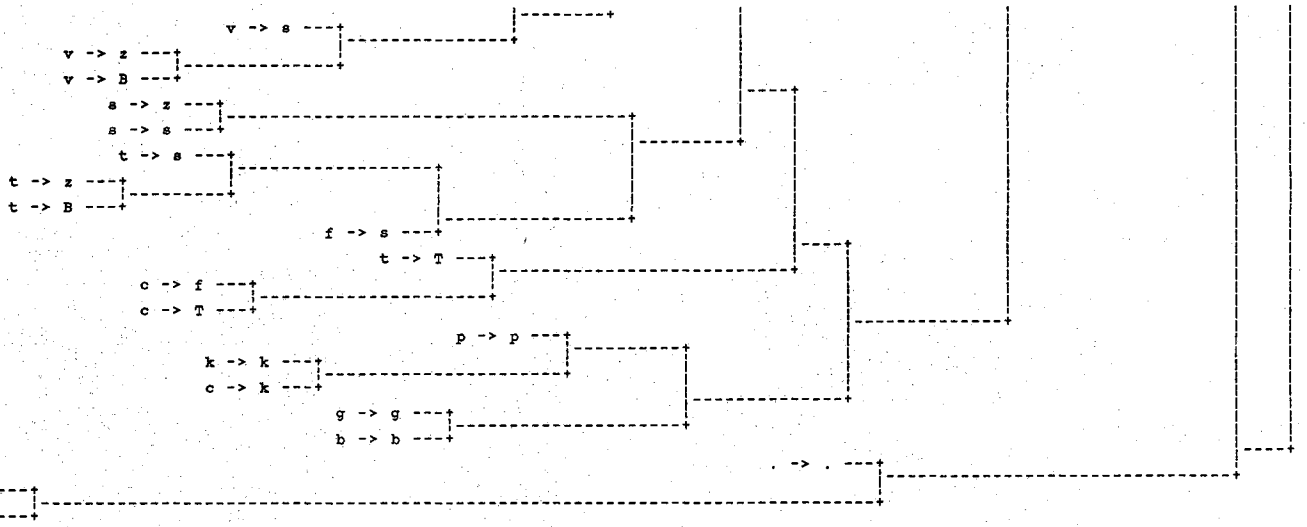
DISTANCE SCALE

0,5 | 1,0 | 1,5 | 2,0 | 2,5 | 3,0 | 3,5

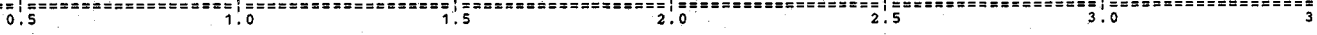






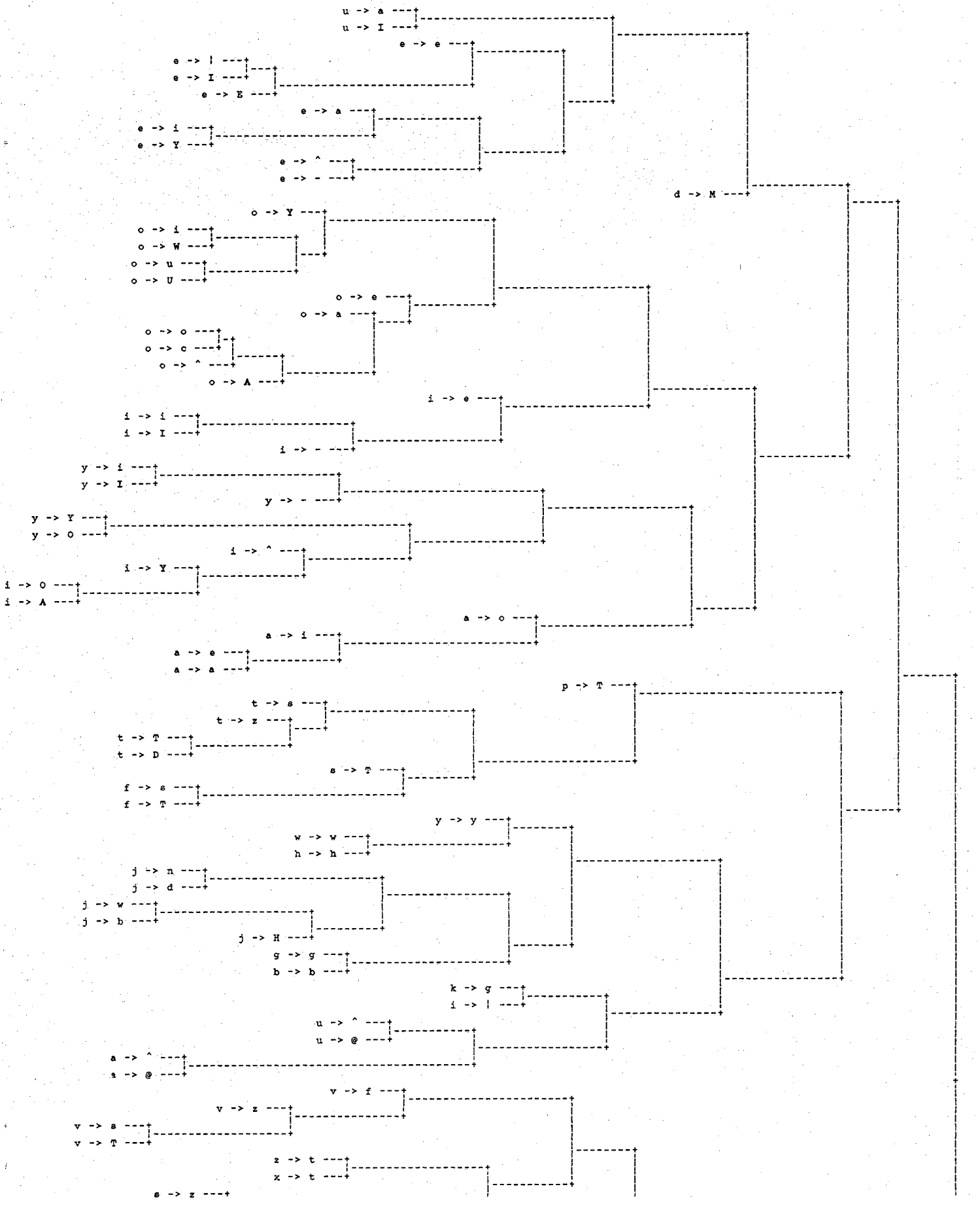


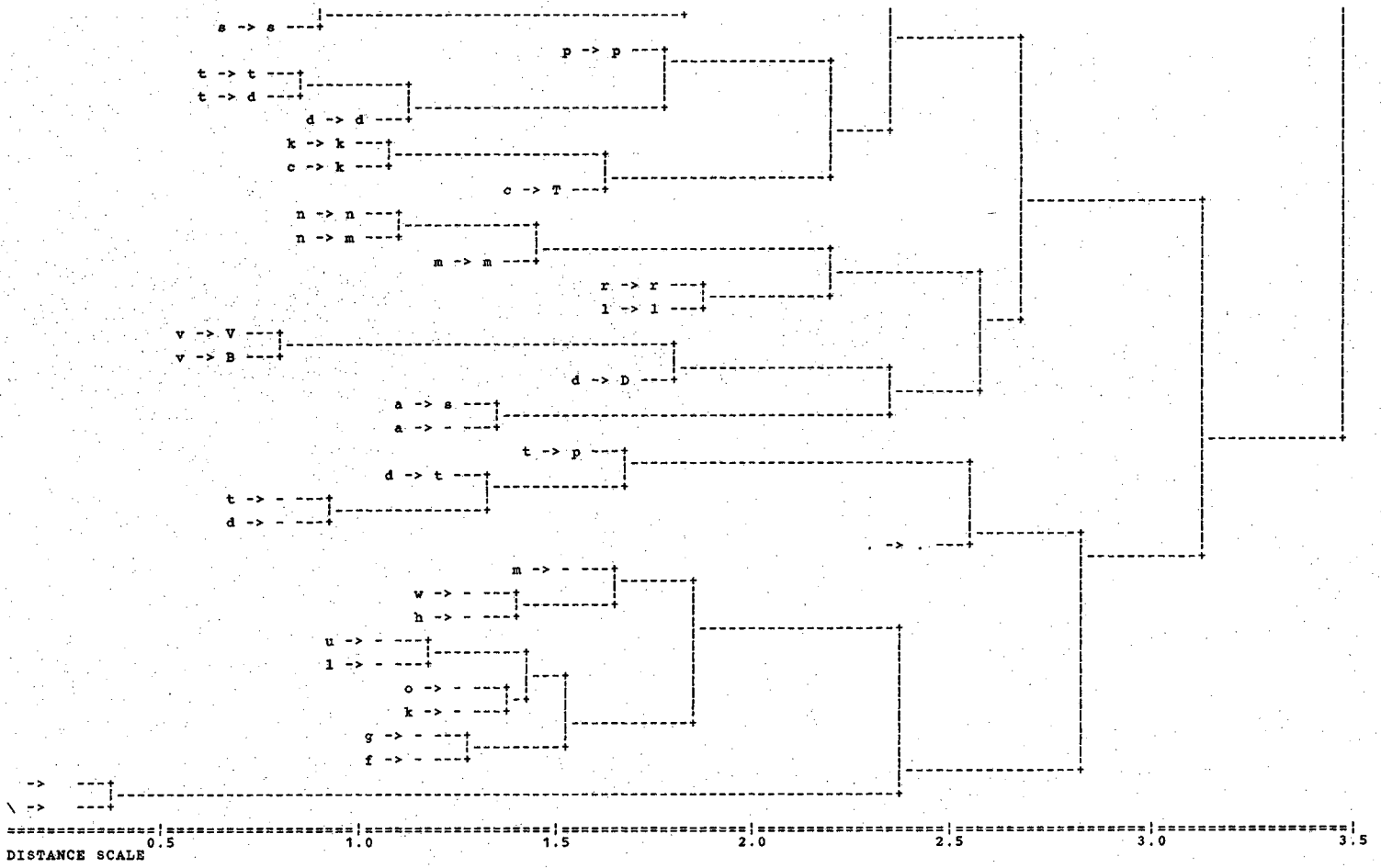
DISTANCE SCALE



Spanish-English Training Set Pass 15

DISTANCE SCALE 0,5 1,0 1,5 2,0 2,5 3,0 3,5

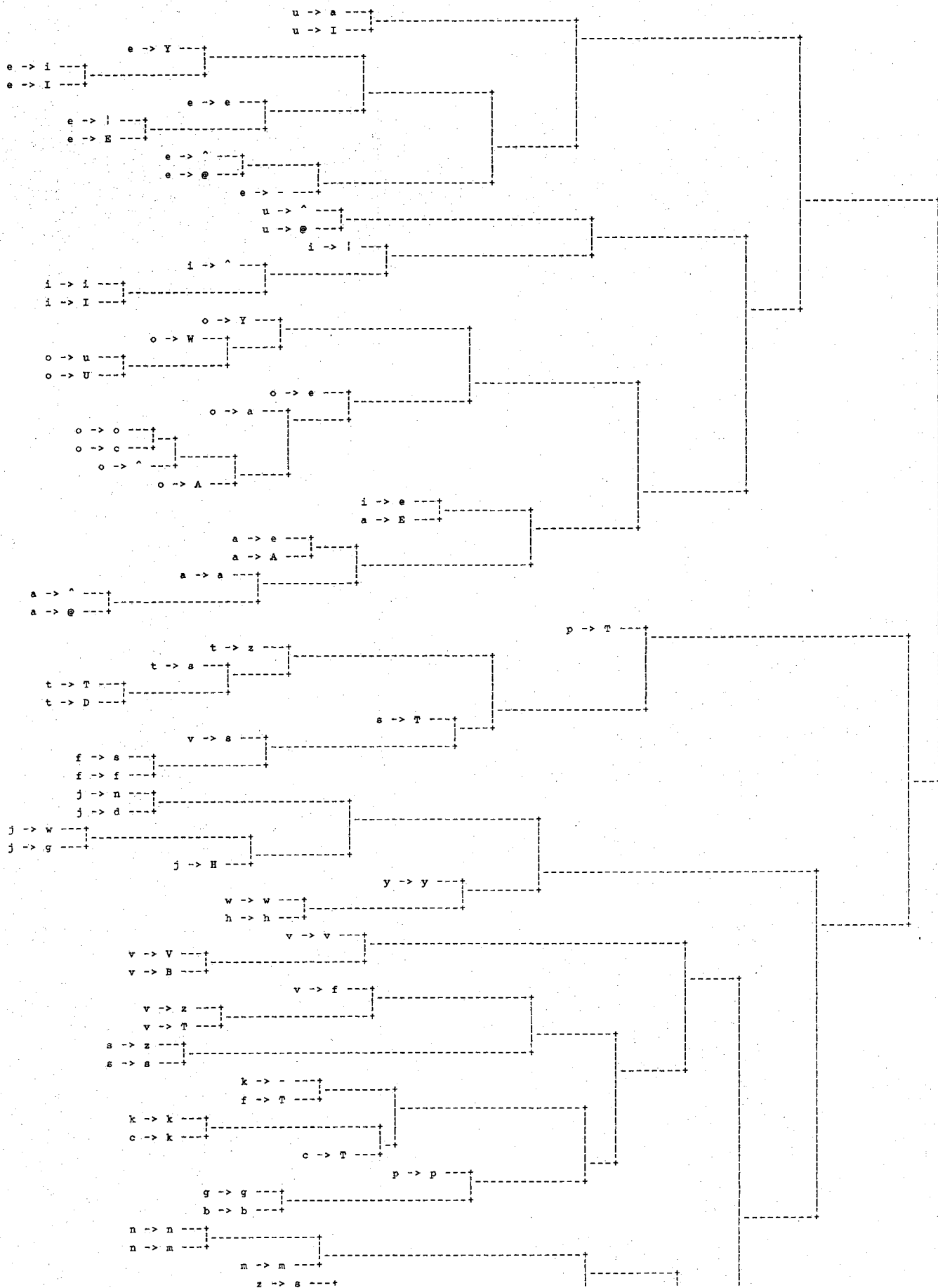


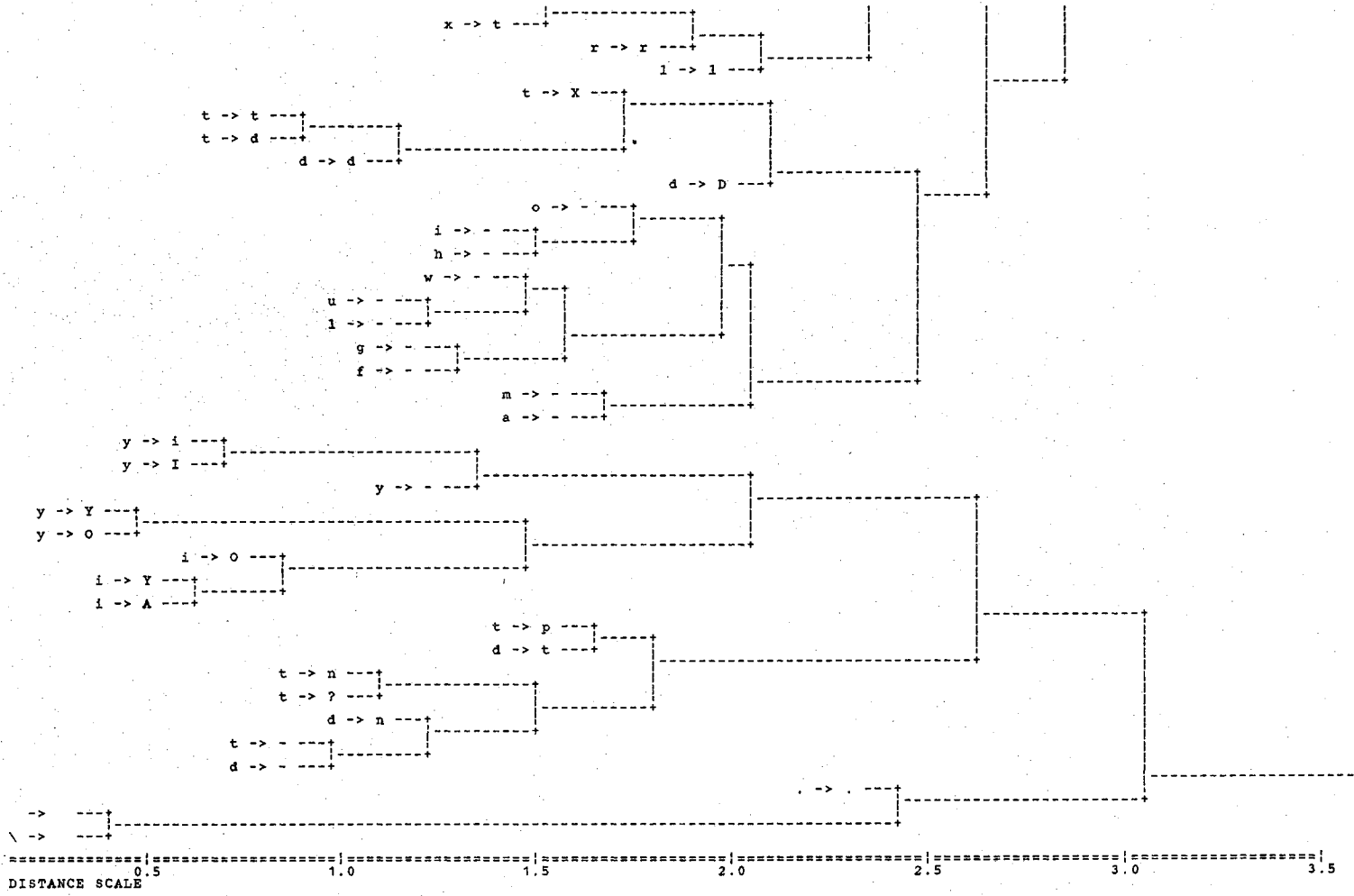


Spanish-English Training Set Pass 20

DISTANCE SCALE

0,5 1,0 1,5 2,0 2,5 3,0 3,5





DISTANCE SCALE

0,5 1,0 1,5 2,0 2,5 3,0 3,5

