Authors

Gontijo, Possidonia F. D.

Shillcock, Richard

Kelley, M. Louise

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Familiarity assessment in visual word recognition and the transformation hypothesis

Possidonia F. D. Gontijo (possi@cogsci.ed.ac.uk)
Richard Shillcock (rcs@cogsci.ed.ac.uk)
Centre for Cognitive Science; 2, Buccleuch Place
Edinburgh, EH8 9LW UK

M. Louise Kelly (louise@cogsci.ed.ac.uk)
Department of Linguistics; George Square
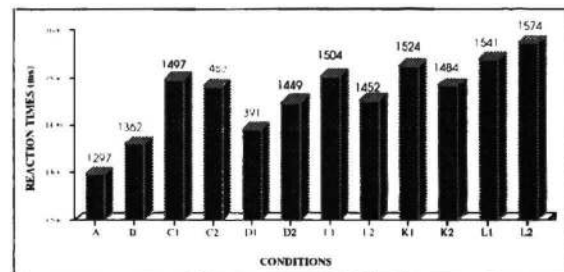Edinburgh, EH8 9LL UK

The use of word-shape as a source of information in visual word recognition is a controversial issue where holists and analytics take different views (Paap et. al., 1984). The majority of experiments on case influence, has resorted to the alternating case paradigm as a method of investigation. Although this is a successful paradigm, the extreme disruption it causes to the string's appearance produces a stimulus not normally found in the environment. Consequently, the strategies used to deal with these strings may not be the same as those used in normal processing.

A same-different maching task was designed in which pairs of strings had their letter cases manipulated in 12 different conditions. Subjects were asked to match each pair of strings according to their spelling and ignore any other difference they might encounter. For each target pair, there was a filler pair in which the two strings spelled differently and response times (RTs) were measured. Table I shows the twelve conditions.

Picture I - Average Reaction times for each of the experimental conditions

Table I - Experimental conditions for the nonword "hean".

code	type	code	type
A	hean hean	B	HEAN HEAN
C1	HEAN - hean	C2	hean HEAN
D1	Hean - hean	D2	hean - Hean
E1	HEAN - Hean	E2	Hean - HEAN
K1	heaN - hean	K2	hean - heaN
L1	HEAN - heaN	L2	HEAN heaN

A one-way repeated-measures ANOVA was used to verify any statistically significant differences between the twelve conditions. The result obtained was $F=12.28$ (11, 286), $p < .001$. A further test, a Pairwise Multiple Comparison Procedure (Student-Newman-Keuls) was performed to isolate the groups that differ from each other. This will be presented in the poster. Picture I shows the average reaction times obtained for each conditions.
Subject's RTs varied according to the familiarity of the patterns being matched. The more familiar a physical pattern was the faster subjects matched them. Consistent-case were matched faster than mixed-case, with condition **A** being the fastest. For mixed-case strings the **D1** condition was the only one found to be significantly faster than the others. There was no significant difference among all the other mixed-case pairs.

An explanation for the results is given terms of our *transformation hypothesis*. It predicts that there is a hierarchical structure concerning the easiness with which strings are recognised by the cognitive system. The easiness with which a string is recognised depends on the level of disturbance of its physical appearance and how far it departed from its more familiar shape. Consistent case pairs would then be the easiest type of strings to be processed and strings that exhibited unfamiliar patterns would take longer to process. This is precisely the pattern found in the experiment. The transformation hypothesis explains the intricate pattern of results above and also those found in alternated case experiments. This will be further developed in the poster.

References

Paap, K.R., Newsome, S.L., & Noel, R.W. (1984). Word shapes in poor shape for the race to the lexicon. Journal of Experimental Psychology: Human Perception and Performance 10, 412-428.