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MIXED-CASE FORMAT AND LEXICAL DECISION PERFORMANCE: Initial Uppercase is Special



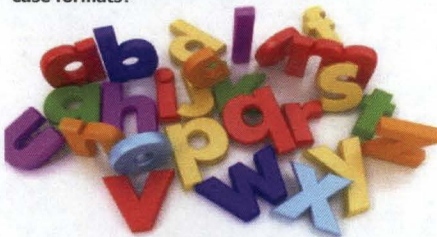
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Some models of visual word identification propose that identification is mediated exclusively by letter identification. However, some studies have shown that there are phenomena that require a route to word identification by means other than through letters.

One such phenomenon is the effect on lexical decision performance of within-item case transitions. In a lexical decision task, an experimental participant is to determine if a string of letters is a word or not. The simplest version of a model that asserts that word perception is mediated exclusively by letter perception would predict that response times should not depend on whether there is a case transition in the letter string. However, such case transitions have a substantial effect on performance: responses are slower to such items as TRaVEL and traVEL than to such items as travel and TRaVEL.

Case mixing does not always impair performance. Jacobs et al. (2008) found that identification of German nouns, which are typically capitalized, was facilitated when they were presented in initial uppercase format (compared to when they were in all uppercase or all lowercase letters). For non-nouns, performance with initial uppercase format did not differ from that with lowercase, and performance with these formats was superior to that with all uppercase.

In this experiment, we investigated the effect on lexical decision performance of different mixed-case formats. Of special interest were the effects of type and location of the case transition. We compared performance with 8 different formats (i.e., travel, TRaVEL, Travel, tRaVEL, travel, TRaVEL, traVEL, TRaVEL) to answer the following questions: Is the initial uppercase (Travel) format special among mixed-case formats? Is performance with items in initial uppercase format more like responses to items in homogeneous-case formats (all lowercase and all UPPERCASE) than like performance with other mixed-case formats? Are there meaningful differences in performance among the other mixed-case formats?



METHOD

Participants

Twenty-four Cleveland State University students participated.

Stimuli

A master list of stimuli consisted of 768 six-letter items selected from the English Lexicon Project database: 192 high frequency words, 192 low frequency words, 192 "high frequency" nonwords, and 192 "low frequency" nonwords. Each set of nonwords had the same mean bigram frequency as its corresponding set of words.

Design

Experimental conditions were yielded by crossing two levels of lexicality (word; nonword) with two levels of frequency (high; low) with the eight formats shown below.

1	2	3	4	5	6	7	8
travel	TRaVEL	Travel	tRaVEL	travel	TRaVEL	traVEL	TRaVEL

For each participant, the 768 stimulus items were assigned to 12 blocks of 64 items; each block consisted of 16 items from each of the four lexicality-by-frequency classes, with two items from each class presented in each of the 8 formats. Formats were balanced over items so that over the 24 participants, each item occurred 3 times in each of the eight formats.

Procedure

Each participant was instructed to make lexical decisions about presented items as rapidly as possible without sacrificing accuracy. Prior to data collection, each participant completed at least one practice block of trials that was structured like an actual experiment block. Each participant had to respond correctly to at least 56 of 64 practice trials before beginning actual data collection. Most participants required 1 practice block; no participant required more than 3 practice blocks.

On each trial, the participant was shown a warning cross for 300 milliseconds, followed by a blank of 300 milliseconds before the letter string was presented. The letter string remained on the screen until the participant responded. No feedback was given to the participant after he or she responded. The participant was encouraged to rest between blocks of trials; experimenter intervention was required for the participant to move from the sixth to the seventh trial block.

Response time was the time interval between the participant being shown the letter string and a response.

RESULTS AND DISCUSSION

For this poster, we present analyses of response times for words, examining effects of format averaged across the two levels of frequency.

The figure shows, for correct responses to words, mean response times in milliseconds for each of the eight stimulus formats.

Consistent with previous research, responses to homogeneous-case words (e.g., travel, TRaVEL) were faster than those to mixed-case words, $F(1,23)=31.4$, $P<.001$. We found no significant differences in mean response times among UPPERCASE (e.g., TRaVEL), lowercase (e.g., travel), and Initial Uppercase (e.g., Travel) words, all $F(1,23)s < 3.84$, all $Ps > .05$. Mean response times to Initial Uppercase words were faster than the average response time to other mixed-case formats, $F(1,23)=21.3$, $p<.001$. These results indicate that there is indeed something special about Initial Uppercase. The most notable difference among the other MIXed caSE formats (e.g., tRaVEL, travel, TRaVEL, traVEL, and TRaVEL) was between initial lowercase (e.g., tRaVEL) and last letter lowercase (e.g., TRaVEL). For reasons we do not understand, response times for words formatted like TRaVEL were faster than those formatted like tRaVEL.

Responses to Initial Uppercase words were more like those to words in homogeneous case formats than like those to words in the other mixed-case formats. Initial Uppercase is a format that conforms to rules of English orthography and is commonly encountered. These results are consistent with the notion that word identification may involve a route other than through letters.

