Support for an operational definition of distinctiveness

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The question in this experiment is whether the manipulations that have strong effects on memory can also affect subjective judgments of the distinctiveness of fonts. In this experiment, words were presented in uncommon fonts, but the number of words on the list that were studied in any particular uncommon font was varied. In addition to trying to replicate the finding that memory is better for words studied in fonts seen with fewer words, we investigated whether the amount of exposure to unusual fonts affected their perceived distinctiveness. It is important to note that fonts were randomly assigned to be seen with many words (high fan) or few words (low fan) and that this was done for each participant. Thus, any influence of the font conditions on judged distinctiveness must result from experimental exposure to a font being relatively rare or common.

Method

Participants.   Twenty-three Carnegie Mellon undergraduate students participated as partial fulfillment of a research experience requirement.

Design and Materials.   The study consisted of a single within-subject factor: how many words were presented in a particular font at study (one or twelve). The stimuli for this experiment were 340 words, rated as medium to high normative frequency according to the norms of Kucera and Francis (1967) and 60 unique fonts. The fonts were collected from various internet sources, and were selected to be as unique as possible. Fonts were randomly assigned to words and fan conditions for each participant so that any effects due to inherent properties of the materials would be controlled.

Procedure.   Participants were presented with a list of 140 words to study. They were instructed to rate the appropriateness of the font in which a word was presented for the meaning

of that word, in order to ensure that participants would pay attention to both the word and the font. For example, if one were to see the word *windy* in a font that appeared to be bent over towards one side as wind might do to an object, one might judge that correspondence to be somewhat appropriate or very appropriate. On the other hand, if one were shown the word *straight* in a font that looked curvy, one might judge that font to be very inappropriate for that item. Among study items, 20 words were presented in a font that was shown once during the study list (the *low fan* condition), while the remaining 120 words were presented in one of ten fonts, such that each of the ten fonts was presented twelve times during the study list with twelve different words (the *high fan* condition).

After completing the study phase, participants were asked to rate the distinctiveness of fonts that were encountered in the study phase of the experiment, as well as a set of fonts not presented at study. In this task, they were shown 60 words not encountered in the study phase of the experiment, and each word was presented using one of the fonts selected for use in this experiment. Half of the words were presented in fonts that had been used in the study phase and half were presented in fonts that had not been encountered during the study phase (*novel* fonts). Among the 30 fonts that had been encountered at study, ten of them were high fan fonts and twenty of the fonts were low fan fonts. For each word, participants were asked to rate the distinctiveness of each font on a 7-point scale where 1 represented "very normal" and 7 represented "very distinctive."

Following the rating task, participants were given a recognition test for 280 words, consisting of the words seen during the first study phase and new words not seen during either phase that served as foils. The purpose of this memory test was to confirm that the intervening rating task did not affect the standard finding that font fan affected memory accuracy. All words

were presented in one of the fonts presented during the study phase of the experiment. Studied words were presented in the same font used to display them during study, while foils were presented in one of the fonts utilized to present study items.

Results

An alpha level of .05 was used for all statistical tests in the present studies. Replicating the primary result from Reder et al. (2002), recognition memory was better for words presented in fonts that had been seen with only one word (.88) than for words presented in fonts studied with twelve words (.81), $t(22) = 3.27$. This occurred despite the fact that there was an intervening exposure to unrelated words in the same fonts.

Of particular interest was whether manipulations of exposure to the fonts would affect participants' ratings of distinctiveness. The results of these font distinctiveness ratings are shown in Figure 2. The number of study presentations of fonts affected the distinctiveness ratings, $F(2,44) = 8.08$, $MSE = .21$. The difference in rated distinctiveness between the fonts seen once at study and novel fonts was marginally significant, $t(22) = 1.84$, $p < .08$. Novel fonts were judged as more distinctive than fonts seen with many words at study, $t(22) = 3.88$. Importantly, once-presented (low fan) fonts were rated as more distinctive than many times presented (high fan) fonts, $t(22) = 2.24$.

The judgments of distinctiveness could not be due to any inherent stimulus properties since assignment of fonts to the high versus low fan condition was randomly determined for each participant. Furthermore, participants' judgments of font distinctiveness were made on words that had not been encountered during the study phase of the experiment. Therefore it seems clear that the judgment of font distinctiveness was due to its degree of previous exposure to the fonts but not to the words.

Discussion

The goal of this study was to test the idea that the same manipulation of font fan that has been shown to influence recognition memory also affects the perceived distinctiveness of fonts. The data support the view that the fonts seen less often are judged as more distinctive than fonts viewed more often. While SAC does not necessarily make an explicit claim regarding how participants arrive at judgments of font distinctiveness, one plausible explanation is that participants assess the number of associations emanating from the font's representation, and use the results of that retrieval process as a way of estimating the font's distinctiveness. Thus, fonts that were associated with more words in the study episode will be regarded as less distinctive than fonts that were associated with a single word in the same study episode. Importantly, such a process converges with SAC's explanation of the influence of font fan on recognition memory by postulating that the number of associations emanating from the font's representation is a critical determinant of performance. Perhaps more important for present purposes is that this experiment demonstrates a manipulation that affects memory also affects people's subjective impressions of distinctiveness.