A Feature-Based Approach to Assessing Advertisement Similarity

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Abstract

This research explores the degree to which similarity perceptions between two advertisements can be decomposed and explained by a "weighted-and-summed" distance measure computed on the advertisements' executional elements, after controlling for familiarity and viewers' responses to the advertisement.

Our empirical findings are twofold. First, they reveal that a significant portion of the variation in similarity ratings can be explained by the advertisement features; a finding of potential importance for advertisement construction, as well as for applications in the legal domain. Second, we explore the degree to which executional elements that have been shown to drive recall and persuasion are effective at driving perceptions of similarity. This is of practical importance as managers want their advertisements not only to be liked and remembered, but also possibly perceived as similar (or dissimilar) to those for other products, such as competitors, for strategic purposes. In this regard, our findings indicate that while some features drive both similarity and effectiveness measures, others only affect a single construct; understanding which items drive which constructs can contribute to a more effective and precise overall marketing strategy.

Keywords: Bayesian parametric model, Feature Matching, Similarity

I. Introduction

The development of similar advertisements is often part of the overall marketing strategy utilized by many firms in their positioning. For example, in developing a series of advertisements for the same product, such as Mastercard's recent "Priceless campaign," several executional elements are intentionally carried across advertisements so that each individual advertisement within the campaign is perceived as similar to the others. Moreover, such a strategy is not unique to advertisements within a given company, as one successful campaign developed for one company can spur a number of copycats from different companies that are meant to be compared to the original. Consider the highly successful "Got Milk?" campaign which spawned numerous copycat advertisements ranging from Disney's use of the tagline "Got coconut milk?" for its movie "George of the Jungle," to HBO's advertising for "The Larry Sander's Show" with the phrase "Got Milk of Magnesia?" These advertisements clearly piggybacked off the success of the original campaign and were designed with the intent of being similar (Lukas 2003). In addition, advertisement comparisons can also occur when consumers are considering aspects of advertisements that make them dissimilar from one another, as firms try to uniquely position themselves in the minds of consumers (Sujan and Dekleva 1987). In summary, similarity or dissimilarity among advertisements matters.

Assessing perceptions of similarity among advertisements is also not limited to the field of marketing and can become a legal issue. In a recent controversy, two artists claimed that a popular Honda advertisement in the United Kingdom (touted by critics as "one of the most impressive television adverts ever made" (Cozens 2003)) copied elements of their award-winning short film. A similar argument arose surrounding

sportswear company Nike and video game company Sega (Cozens 2002, Day 2002). The dispute centered around Nike's "Frozen Moment" advertisement that aired between 1996 and 1997 which depicted a basketball game where the fast pace of the action shifted to slow motion as the audience, unaware of other occurring events, watched Michael Jordan execute a slam dunk. Sega's advertisement for the Dreamcast game "NBA 2K2," which began airing in January 2002, showed "a computer-animated basketball sequence that Nike says 'virtually re-enacts Nike's Frozen Moment with only subtle differences'" (Day 2002). While Sega appears to have been striving to capitalize on the success of Nike's advertisement, Nike representatives alleged that the Sega advertisement copied the theme, tone, characters, mood, pace, music and setting of the original advertisement to an extent that "the viewing public could not mistake the similarity of expression between the two advertisements." In a sense, this quote describes one main focus of the present research: to what extent can perceived advertisement similarity be described by their executional elements?

Understanding similarity judgments is also important in psychology, as well as in marketing, where similarity is considered to be among "the most central theoretical constructs in psychology" (Medin, Goldstone and Gentner 1993) and is often linked to other cognitive processes, such as preference formation. Consistent with this perspective, we examine in this research not only similarity judgments of advertisements, but also whether the same advertisement executional elements shown to affect advertisement effectiveness are used in making similarity judgments between advertisements. Our intent here is to take a systematic and quantitative approach to understanding how the executional elements of advertisements can explain perceived similarity, and determine if

the elements that drive similarity perceptions are the same as those that drive advertisement effectiveness. If this is the case, positioning the advertisement to be similar or dissimilar from another advertisement cannot be done without impacting the effectiveness of the advertisement.

Our approach to model obtained similarity data is via a hierarchical Bayesian model. To do this, we build upon an existing similarity framework of Hutchinson and Mungale (1997), using the features of the advertisements as descriptors of pairwise (dis)similarity ratings, but add heterogeneity, allowing for differential feature-matching weights across individuals. To the best of our knowledge, this is the first time Bayesian techniques have been applied to the research question of advertisement similarity and, hence, our research contribution is not limited to substantive findings, but is also methodological in nature.

The remainder of this paper is laid out as follows. In Section II, we consider previous related research that has acted as our principal guide in selecting the executional elements of advertisements to include in our study, as well as viewer responses to the advertisements that were obtained. In Section III, we describe our model and the computational approach. Section IV describes the data used for the analysis and Section V details our empirical findings, including a comparison between the drivers of similarity and the drivers of persuasion and recall found in previous research. Section VI provides some conclusions, limitations, and areas for future research.

II. Previous Literature

Similarity has been recognized as one of the most central theoretical constructs in psychology (Medin, Goldstone and Gentner 1993). Comparative processes are believed

to be a fundamental psychological process that pervades, and is central to, much of cognition. Consumers often compare objects in order to make judgments of similarity that are basic to other psychological processes, such as the formation of evaluations and preferences (e.g., Dhar, Sherman and Nowlis 1999; Medin, Goldstone and Markman 1995). For example, research has shown that preferences among alternatives can depend on whether or not the alternatives share or do not share features—in other words, how similar or dissimilar the alternatives are perceived to be (Dhar, Sherman and Nowlis 1999). The nature of initial similarity judgments has also been shown to have a systematic effect on evaluations and judgments (Brenner et al 1999).

In addition, much research suggests that the processes underlying the construction of both similarity and preference judgments are very similar and can be captured by feature matching models (Medin, Goldstone and Markman 1995; Dhar, Sherman and Nowlis 1999; Tversky 1977). The formation of preferences and evaluations is often thought to rely upon the evaluation of utility associated with individual features (e.g., Fader and Hardie 1996; Wind and Green 1974). In the spirit of feature-matching models, we examine the degree to which executional elements drive perceptions of the (dis)similarity of advertisements.

In many respects, previous literature has helped us define this problem. In particular, our use of previous literature for this research centers around three major areas: (1) existing models of similarity, (2) advertising executional elements, and (3) viewer responses to advertisements. The latter (hereafter denoted "control variables") are included and hence their impact controlled for, as we desire to understand the variation in

similarity explainable by the executional elements of the advertisements that is uniquely attributable to them.

First, we review previous models of similarity in psychology and marketing as we position our model within existing frameworks (e.g., Tversky 1977; Tverksy and Gati 1982; Tversky and Hutchinson 1986; Hutchinson and Mungale 1997). Second, to understand the executional elements that potentially drive perceptions of similarity, we turn to Stewart and Furse (1986) who provide a comprehensive list of executional elements. Third, we turn to the considerable literature that exists on general perceptions and affective measures that impact perceptions of advertisements, and which may impact how consumers evaluate aspects of similarity among advertisements.

II.1 Related Models

Much work in feature-based similarity has stemmed from Tversky's (1977) contrast model, where the similarity between objects A and B, S(A,B), is a function of both the shared features of A and B, $A \cap B$, as well as the features present in only one of the pair, A-B and B-A. The real-valued function S is defined on the set of features, and is often assumed to be additive (Goldstone 1999); so, similarity is a linear combination of features that two items share and features that are distinct between the two.

Hutchinson and Mungale (1997) propose an extension of this model for pairwise similarity judgments. In their model, called pairwise partitioning,

$$(1) \qquad s_{ij} = \theta\left(\sum_x w_x m_{ix} m_{jx}\right) - \alpha\left(\sum_x w_x \left[m_{ix}\left(1 - m_{jx}\right) + \left(1 - m_{ix}\right) m_{jx}\right]\right) + c + \varepsilon_{ij}$$

where s_{ij} is the reported similarity between items i and j, $m_{ix} = 1$ if feature x is contained in item i and 0 otherwise, c is a constant and ε_{ij} is an error term. Here, each feature x receives its own coefficient w_x. In addition, shared features are weighted by a common

factor of θ, while distinct features are weighted by a common factor of α. The constant, c, allows for individuals to respond with a baseline level when reporting similarity, regardless of features. Restrictions on θ and α allow this model to nest other feature-based models of similarity. This model serves as the basis for our work, which we extend as described in Section III to incorporate heterogeneity, as well the potential moderating effect of familiarity, in a Bayesian manner (Rossi and Allenby 1993).

II.2 The Advertisement Features

Stewart and Furse (1986, 2000) conducted extensive studies on more than 1000 commercials, looking at the use of executional elements and their effectiveness in advertisements. In their review, they identified an exhaustive set of more than 150 items, based on prior literature as well as input from advertisers and agencies. Examples of the features include specific informational items, auditory and visual devices, and promises and appeals among other structural and creative elements of the advertisement. We present these elements in Appendix I. Stewart and Furse (1986) then examined the impact of these executional elements on advertisement effectiveness. Whether these executional elements also relate to similarity is the second main focus of the present research.

In their analysis, Stewart and Furse use factor analysis to identify underlying factors and reduce redundancies and the number of dimensions in the features. Related to this, Goldstone (1999) noted a shortcoming of feature-based models of similarity, as well as geometric methods, such as multidimensional scaling, in domains such as the one on which we are focused: such models may not be well suited for assessing the similarity of items that are highly dimensional, e.g. the large number of individual features identified

by Stewart and Furse (1986, 2000). According to Goldstone, shared features "are aligned to the extent that they play similar roles within their entities" (1999). We therefore perform a factor analysis on the features identified by Stewart and Furse that occur in at least 10% of the advertisements in our sample (consistent with Stewart and Furse 1986, 2000). The factors, and the features with loadings of at least .5 in magnitude, are presented in Table 1, and are utilized in our models described in Section III. We note, as is consistent with much research and practice and described next in equations (2) and (3), that we do not use the factor loaded constructs, but rather 0/1 coded constructs (summed scores) based on a cutoff of 0.5. Our findings were not sensitive to the exact value of the cutoff used and factor names were ascribed based on the executional elements that load on to the factors.

[Insert Table 1]

II.3 Individual-level Control Measures

To understand the "unique" role of executional elements in similarity judgments, we must consider additional aspects of advertisement processing that may influence perceptions of the advertisement. Recent research has looked at the effect of executional elements on advertisement effectiveness and recall (e.g., MacInnis, Rao and Weiss 2002). This research, for example, found that affectively-inspiring executional elements were likely to cause an increase in media weight-related sales. Importantly, they also found that viewer responses to advertisements, such as attitudes and affective responses, were linked to media weight-related sales.

This suggests that viewer responses to advertisements, as well as underlying executional elements, may drive evaluations of similarity. Thus a respondent may

experience warm feelings in response to two different advertisements and judge those advertisements to be similar. We, however, do not focus on those overall impressions or responses to the advertisements; rather, we focus on the executional elements of the advertisements, for example the presence of multiple characters, which may lead to stronger warm feelings on the part of viewers (Vanden Abeele and MacLachlan 1994) in modeling similarity. Nonetheless, we feel that it is important to control for these and other similar individual responses to the advertisements, and do so in our models. Specifically, we control for attitudes toward the advertisement and brand (AAd and ABrand), in addition to the individual-level control measures that are detailed in Section IV and listed in Table 2.[1]

[Table 2]

Previous research has also demonstrated that prior experience with a product or service depicted could cause differential weighting to be placed on the attributes of an advertisement or preference for the advertisement when making comparisons (Alba and Hutchinson 1987; Bettman and Park 1980). In the area of discrimination learning, it is posited that individuals "can learn to attend to relevant dimensions and to ignore irrelevant or uninformative dimensions" (Medin, Goldstone and Gentner 1993). For example, familiarity with both brands may cause advertisement features pertaining to brand identification to not be processed and not contribute to perceived similarity. In reference to new products, Dhar, Nowlis and Sherman (1999) claim that consumers are likely to make similarity judgments in reference to what they already own. It may be the case that familiarity will operate differently if it is familiarity with the products from *both*

[1] Regressions of the control variables on the factors comprised of executional elements were performed and are available upon request.

advertisements, or from just one. We consequently consider a possible moderating role for familiarity across pairs of advertisements, while also controlling for any main effects that such differences in familiarity may cause.

III. The Model

In developing a model for the perceived similarity between advertisements, we designed/required a model that would account for: (i) the specific nature of our data collection process (a dissimilarity rating score collected for pairs of advertisements), (ii) the executional elements of the advertisements, with an associated distance metric, that act as the fundamental "matching" kernel in our approach, (iii) viewer responses to the advertisements (the previously identified control variables), (iv) the varying levels of familiarity with the advertisements across respondents, and (v) heterogeneity in parameters reflecting underlying individual differences. To accomplish this task, we build on models from existing literature, and merge them into a cohesive model of advertisement similarity perceptions. We introduce each model piece, in parts, providing notation and the appropriate existing literature reference along the way (ignoring heterogeneity momentarily for purposes of explicating the model). This is followed by the full model (incorporating heterogeneity), including an intuitive description of its properties and details of computation under the model.

III.1 The Model Components

As described in Section II, and fully explicated in Section IV, the fundamental kernel of our model is that each advertisement j and j' in a given pair has a vector of executional elements given by $f_j = (f_{j1},\ldots, f_{jP})$. These executional elements load onto factors 1,…, Z=26 as shown in Table 1. To turn the factors, comprised of executional

elements for each advertisement, into components that will be used to model the i^{th} dissimilarity score between advertisements j and j', denoted $Y_{ijj'}$, we use work by Hutchinson and Mungale (1997) that describes a feature-based approach.[2]

More specifically, the feature-based component of our model considers two functions $D(f_{jz},f_{j'z})$, and $M(f_{jz},f_{j'z})$, given by:

$$D(f_{jz}, f_{j'z}) = \left(\sum_{p \in z} m_{jp}(1 - m_{j'p}) + (1 - m_{jp}) m_{j'p} \right) \tag{2}$$

$$M(f_{jz}, f_{j'z}) = \sum_{p \in z} m_{jp} m_{j'p} \tag{3}$$

where $m_{jp} = 1$ if feature p which is nested in factor z is present in advertisement j, and 0 otherwise. D and M count the number of non-matching and matching features, respectively, between advertisements j and j' on factor z. This model is identified as we omit from the model, and it acts as a baseline, the number of components $N(f_{jz},f_{j'z})$ that are neither contained in advertisement j or j' in factor z.[3] As a simple example, consider the objects X, comprised of features {1, 2, 3, 4}, and Y, with features {3, 4, 5, 6}, where the complete set of features is {1,2,3,4,5,6,7,8}. Then, M(X,Y) = 2, as both objects share 3 and 4, and D(X,Y) = 2, as both objects have two unique features. N(X,Y)=2, as the features {7,8} are not present in either X or Y.

There are two other "components" we consider in our dissimilarity model: $F_{ijj'}$, the familiarity of respondent s(i) with advertisement pair [j,j'] (operationally described in Section IV) and the vector X_{ij} of control variables. $F_{ijj'}$ is brought in as both a main effect on dissimilarity perceptions, as well as a potential moderating variable (Baron and Kenny

[2] We considered a hybrid model (Carroll 1980) by incorporating a perceptual mapping component based on work by DeSarbo and Wu (2001). However, we did not find support for the geometric component of the model and therefore present the results obtained by only using a feature-based approach.

[3] This is consistent with Hutchinson and Mungale (1997) in which they do not count it as a match when both objects are lacking feature p.

1986). That is, the effects of $D(f_{jp},f_{j'p})$, and $M(f_{jp},f_{j'p})$ on dissimilarity perceptions may differ when an individual is or is not familiar with the advertisements. We bring the k^{th} individual-level control measure, X_{ijk}, from Table 2 into the model by adding the term:

$$U\left(X_{ijk}, X_{ij'k}\right) = \sqrt{\left(X_{ijk} - X_{ij'k}\right)^2} \tag{4}$$

the Euclidean distance on individual-level measure k between advertisements j and j' for the i^{th} observation.

III.2 The Integrated Model

Our complete model specification for the dissimilarity measure of respondent s(i) on the i^{th} trial, when presented advertisements j and j', $Y_{ijj'}$, incorporating each of the pieces described in Section III.1 and allowing for heterogeneity across respondents is given by:

$$\begin{aligned} Y_{ijj'} &= c + \alpha F_{ijj'} + \sum_{k=1}^{K} \kappa_k U(X_{ijk}, X_{ij'k}) - \sum_{z=1}^{Z} \theta_{z1s(i)} M(f_{jz}, f_{j'z}) - F_{ijj'} \sum_{z=1}^{Z} \theta_{z2s(i)} M(f_{jz}, f_{j'z}) \\ &+ \sum_{z=1}^{Z} \theta_{z3s(i)} D(f_{jz}, f_{j'z}) + F_{ijj'} \sum_{z=1}^{Z} \theta_{z4s(i)} D(f_{jz}, f_{j'z}) + \varepsilon_{ijj'} \end{aligned} \tag{5}$$

The first and second terms on the right hand side account for an overall mean, which may differ from 0, and the main effect of familiarity, $F_{ijj'}$. The third term accounts for differences in the individual-level measures with associated slopes κ_k. The fourth and fifth terms correspond to a main effect of matching features of advertisements j and j', $M(f_{jz},f_{j'z})$, and their interaction with familiarity.[4] The sixth and seventh terms correspond to main effect of distinct features, $D(f_{jz},f_{j'z})$, and their interaction with familiarity. The final term corresponds to a residual error, $\varepsilon_{ijj'} \sim N(0,\sigma^2)$.

[4] We code these with a negative sign so that an increase in M corresponds to positive value of θ and a decrease in dissimilarity.

Since we nest our model in a Bayesian framework, this requires a choice of specification of the relationships among the individual level parameters $\theta_{zus(i)}$ for z=1,…,Z=26 and u=1,…,4 from (5) to form the prior distributions. Since a fully parameterized model was infeasible due to the lack of parsimony, we developed a reduced structure set of priors that captures a rich correlation structure.

In particular, we first recognize the possible correlation for parameters ($\theta_{zus(i)}$, $\theta_{z'u's(i)}$) for a given individual by including in (6) below δ_u. We next allow for variance in the coefficients attributable to the factor z by incorporating λ_z in (6). Finally, we recognize the correlation within an individual s(i) by incorporating $\varphi_{s(i)}$. This leads to the following reduced-form variance-components model specification:

(6) $$\theta_{zus(i)} = \bar{\theta} + \delta_u + \varphi_{s(i)} + \lambda_z \text{ for z=1,…,Z and u=1, 2, 3, 4}$$

where $\varphi_{s(i)} \sim N(0, \sigma_\varphi^2)$, $\lambda_z \sim N(0, \sigma_z^2)$ and $\delta_u \sim N(0, \sigma_\delta^2)$. This leads to a block-diagonal covariance structure (Hedeker and Gibbons 1996) that has been shown to be quite flexible, yet parsimonious.

III.3 Computation

The model given in equations (5) and (6), utilizing slightly informative inverse-gamma hyperpriors for the variance components and slightly informative normal priors for all other coefficients, was fit using the freely available Bayesian software WinBUGS (http://www.mrc-bsu.cam.ac.uk/bugs/) which obtains samples from the marginal posterior distributions of interest by doing Monte Carlo sampling from a Markov Chain (Gelfand and Smith 1990). Inferences presented for all models are based on the combined draws of three independent chains run for 20,000 iterations each, after discarding the first 10,000 as burn-in, from overdispersed starting values. Convergence

of the Markov chains (the burn-in length) was determined using the F-test of Gelman and Rubin (1992a, b). The WinBUGS code used is available from the authors and is a strength of this research as it can be easily adapted by other authors for practice and use.

IV. Data

To provide a demonstration of our method and to provide insights into the decomposability of similarity, we conducted the following empirical study. Our primary data collection consisted of two parts. In part I, the executional elements of the advertisements as given by Stewart and Furse (1986) and listed in Appendix I, f_{jp} as described in Section III, were coded by two independent raters who watched each of the advertisements. The raters were provided copies of the coding guide used by Stewart and Furse (1986) to aid them, which lists the items that obtained sufficient reliability in their original study. As an example, for the element "music," raters were asked, "Is music present in the commercial in any form?" They indicated whether or not this was the case. Similarly, for the element "auditory sign-off," they were asked, "Is the brand name repeated within the last 3 seconds of the commercial?" to which they responded "yes" or "no." For more details, we refer readers to the original work of Stewart and Furse (1986). Raters, at the first round, agreed on 86% of the items. Differences were reconciled through discussion and review of the advertisements in question. This yielded the necessary information to compute M and D as given in Section III.

In the second wave of data collection, 115 MBA students from a large northeastern university were recruited to complete an on-line questionnaire that served as partial credit for course fulfillment. Students were instructed that they would be watching a sequence of 10 advertisements and that they would be asked to evaluate the

advertisements along various dimensions. The instructions asked them to carefully watch the advertisements, and emphasized that there were no right or wrong answers, instead they were to provide their honest opinions. The ten advertisements were randomly drawn from a sample of fifty television commercials chosen from a large variety of product categories ranging from liquor to automobiles to health products. The advertisements used, and the number of times that they were viewed, appear in Appendix II. The order in which the advertisements were shown (among the ten selected) was randomized.

In the first part of the task, each participant viewed a series of 10 web-pages with each page containing a link to an advertisement. When clicked, the link brought up a browser in which the advertisement was played. We recorded the time spent on each web page to ensure that sufficient time had elapsed for respondents to view the advertisement (30 seconds). Though rare, responses that did not allow for sufficient time were removed (2% of the responses).

Beneath each advertisement link was a series of items consisting of four binary measures of familiarity with the advertisement (category, brand, previous purchase and prior exposure), as well as the previously mentioned Likert preference scales to measure attitude toward the advertisement (AAd), attitude toward the brand (ABrand) and purchase intentions (PI). In assessing AAd and ABrand, respondents were asked to rate the advertisement (brand) on the following dimensions: Negative/Positive, Bad/Good and Unfavorable/Favorable (Burke and Edell 1986); which were then combined to form single measures for AAd ($\alpha = .96$) and ABrand ($\alpha = .97$).

After these items, a battery of questions assessed perceptions of the advertisements on a wide variety of individual-level constructs, serving as control

variables for our research. All items utilized seven-point Likert response scales. The items used were identical to those by MacInnis, Rao and Weiss (2002), as described in Section II. In addition, a series of scales were also used to measure upbeat, warm and negative emotional respones (Edell and Burke 1987). We also measured respondents' interest in, empathy for, and comprehension of the advertisements as well as the degree to which they perceived each advertisement to be relevant to them (MacInnis, Rao and Weiss 2002), using a set of three questions for each. Responses to each set of three questions were combined to create a single index to measure each construct (all α>.69).[5] Finally, we measured the extent to which the advertisement was perceived to have an informational or transformational focus (Puto and Wells 1984). Table 2 lists these constructs, the items used to assess them, and their respective Cronbach's alpha. This provided the data for X_{jk} as given in Section III.

After providing responses for the ten advertisements, respondents received a second set of instructions in which they were told that they would be shown the advertisements they had just seen, but this time in pairs, and that we were interested in their perceptions regarding similarity among pairs of advertisements. Respondents were also told to watch the advertisements for as long as they needed to re-familiarize themselves with the advertisements.[6] They were then asked to assess the degree to which they perceived the pair of advertisements shown to be similar, again on a seven-point scale.[7] These pairings were randomized, without replacement, from the original set of ten that had been seen by each respondent so that each respondent provided similarity ratings

[5] Like MacInnis, Rao and Weiss (2002), we measure credibility. However, the items did not load reliably onto a single index of credibility (α=.5633) and was therefore dropped from the analysis.
[6] Only 13% of responses allowed enough time to watch both advertisements in their entirety during this part of the data collection, minimizing our concern of the effects of multiple exposures.
[7] These were converted to dissimilarity scores by taking 8-(reported score).

to five pairs of advertisements. Finally, respondents completed a series of questions on demographics and viewing habits.

Of final note, for each advertisement pair, the four measures of familiarity (category, brand, previous purchase and prior exposure) were combined to create a single [j,j'] familiarity score, 0,1,2,…, 8. Then, all pairs [j,j'] for which the familiarity score was five or greater (i.e. familiarity with both advertisements on at least one dimension) was coded as $F_{ijj'} = 1$ (as indicated in Section III) otherwise $F_{ijj'}=0$. This completed the second part of the data acquisition.[8]

V. Results

V.1 Dissimilarity Model Results

We began our analysis by fitting a series of models to the dissimilarity data to determine if each model piece, given in (5), contributed significantly to the fit. The primary purpose of this was to determine the model for which we would provide detailed inferences. A summary of the fit of these models is given by the mean absolute error (MAE) in-sample fit for $Y_{ijj'}$ and global fit criterion DIC (Spiegelhalter et al 2002). We first fit the full model with all terms (DIC=2277.1, MAE=1.30). Inferences from the full model revealed that only distinct features, $D(f_{jz},f_{j'z})$, were significantly affecting dissimilarity. We next ran a model where we omitted the matching features, $M(f_{jz},f_{j'z})$ (DIC=2288.6, MAE=1.36, percent increase in MAE from the full model = 5%). In doing so, this reduced model was therefore equivalent to counting the features that were present in both advertisements or absent in both as a "match," compared to separate pieces for $M(f_{jz},f_{j'z})$ and $N(f_{jz},f_{j'z})$. Subsequently, we fit a model where we omitted the terms that

[8] An earlier identical study on these 50 advertisements and the same familiarity measures indicated that splitting familiarity scores at 5 led to little loss in predictive validity and hence is used here as opposed to a set of four binary items which would not be parsimonious.

contain the interaction of familiarity with distinct features, using only the individual-level measures, including the main effect of familiarity, and distinct features (DIC=2270.0, MAE=1.39, percent increase in MAE from the full model = 7%). Lastly, we ran a model in which we omitted the individual-level measures, looking only at the main effect of distinct features (DIC=2297.6, MAE=1.46, percent increase in MAE from the full model = 12%). Based on the DIC, we provide detailed inferences for the model that includes the main effect of distinct features and controls for individual-level measures ($\theta_{\cdot 1 \cdot}=0$, $\theta_{\cdot 2 \cdot}=0$, $\theta_{\cdot 4 \cdot}=0$); however inferences from the full model are similar and available upon request.

We first consider the effects of an individual's responses on the control variables, toward the advertisements, on dissimilarity perceptions. These enter our model via the individual-level measures, detailed in Table 2, reported preferences (AAd and ABrand), together comprising X_{ijk}, and the respondents' familiarity with the advertisements, $F_{ijj'}$. While we treat the individual-level measures and familiarity as control variables, they do warrant discussion. We find that a difference in the reported interest ($\kappa=.17$, $p<.05$) and comprehension ($\kappa=.14$, $p<.05$) of an advertisement increase the perceived dissimilarity between advertisements. That is, advertisements that are entertaining and interesting are seen as dissimilar from those that are boring, and advertisements that are easily understood are seen as dissimilar from those that are seen as more abstract. All other factors are not significant at $\alpha=0.05$. Summarizing, after including the executional elements, differences in individual-level control variables still contain drivers of reported dissimilarity in an interesting yet not wholly unexpected way.

Table 1 presents the effects of distinct features, θ_{z3}, given in equation (5), as nested into the factors we constructed on dissimilarity, f_{jz}. For each factor of executional elements, we present the average posterior mean coefficient, as well as the average standard deviation across all individuals. However, since this can mask heterogeneity (Hutchinson et al 2000), we also present the number of individuals (out of our sample of 115) that have significant effects (Bayesian p-values) at the 5% and 10% levels. Notice that the mean effects for the factors where at least one respondent had a significant p-value are all positive, which provides a face validity check, indicating that an increased proportion of distinct features in each group increases perceived dissimiliarity.

The coefficients for the distinct features are interpreted as the change in dissimilarity for each additional non-matching attribute in a given factor. The factor with the highest effect (Factor 10, θ=.21, 88/115 respondents significant at the .05 level) is "a minority as a principal character." An advertisement with a minority principal character will be seen as dissimilar from an advertisement lacking a minority principal character.

Another factor that significantly affects perceived dissimilarity is the "surreal" factor (Factor 7). Each distinct feature contributes .17 towards the perceived dissimilarity and the effect holds for 107 respondents at α=0.05; 113 at α=0.10. An advertisement employing surreal visuals and depicting fantasy elements (the two elements of that factor) will be perceived as dissimilar from an advertisement lacking these features, set more firmly in reality. Another factor relating to the mood of the advertisement that significantly affects dissimilarity is the "typical humor" factor (Factor 1, θ=.17, 115/115 respondents significant at the .05 level). This factor includes elements relating to humor, but also to everyday life, including an indoor setting and a principal character as an

ordinary person. Such a finding indicates that differences in the mood between two advertisements can lead to perceived differences; however, drilling down to the specific elements, it is features relating to both humor and fantasy that are driving this effect.

Differences in the presentation of information between two advertisements can also contribute to the perceived dissimilarity. Distinct features in the "information" factor significantly contribute to the dissimilarity between advertisements (Factor 14, θ=.167, 111/115 respondents significant at the .05 level). An advertisement with an informational nature will consequently be seen as dissimilar from an advertisement lacking such features, including quality information and attributes of the product as the main message.

The last factor that was a significant driver of dissimilarity for a large fraction of respondents (more than ½) was the "flow" factor (θ=.12, 78/115 respondents significant at the .05 level). This factor is comprised of executional elements relating to the format of the advertisement (e.g., vignettes) that affect the continuity of the advertisement. A pair of advertisements with the same structure, either continuous action or multiple vignettes, will be seen as more similar than advertisements in which their flows differ. Thus, the structure of the advertisements appears to impact perceptions of dissimilarity in addition to the content of the advertisements.

While these results, we believe, are interesting in their own right, we next utilize these findings (as described earlier) to address the issue of whether the executional elements that drive similarity, as given in V.1 are the same as those for advertisement effectiveness, as given in previous literature.

V.2 Comparisons to Advertisement Effectiveness Results

We again rely on the work of Stewart and Furse (1986) to serve as a basis for comparison of our findings. Three measures of advertising performance, which they attempt to explain as a function of underlying factors composed of executional elements (as is done here), are recall, comprehension and persuasion. We next review those factors that were found to affect both dissimilarity (the present results) and persuasion (as reported in Stewart and Furse 1986), and one but not the other. These are summarized in Table 3, where the importance of the factors of executional elements identified by Stewart and Furse (1986) are presented in rank order within each of the three columns, with those factors that significantly predict similarity from our analysis in bold.

[Insert Table 3]

We found (Section V.1) that elements relating to humor (Factor 1 in Table 1) significantly impacted perceptions of dissimilarity. Stewart and Furse (1986) showed that humor positively affects recall and comprehension. Attribute and component information, which was shown in their research to adversely affect recall, is also a significant factor found here (Factor 14) in perceptions of similarity. Continuity of action, which relates strongly to the flow of the advertisement, was shown to positively affect persuasion in their work, and we find that it is also a driver of similarity perceptions among advertisements (Factor 17). These factors, and the executional elements which load onto them, affect perceptions of both similarity and advertisement effectiveness. Therefore, one can infer that along these dimensions, it is not possible to position an advertisement as (dis)similar from another based on these features without potentially altering its effectiveness.

However, not all the drivers of similarity perceptions appear to also be significant predictors of recall, comprehension and persuasion. Fantasy and surreal elements were shown in our model to significantly affect perceptions of similarity. However, this factor did not impact any the three measures of advertising effectiveness that Stewart and Furse (1986) examined. This could serve as a potential area in which advertisers could seek to differentiate their product or service via a dissimilar advertisement, while not sacrificing the effectiveness of the advertisement.

One interesting observation regards the use of a minority principal character. While a significant driver of dissimilarity in our study, this executional element did not load significantly onto the factors examined by Stewart and Furse (1986) in their study. However we only compared whether a minority portrays the principal character while Stewart and Furse (1986) have three measures. The inclusion of minority characters could serve as another area in which advertisers could distinguish themselves from others without impacting the effectiveness of the advertisement, albeit more research here is clearly warranted.

There are other executional elements that affect advertising effectiveness without impacting perceptions of similarity found here, as can easily be seen in Table 3 from the factors not in bold. For example, the elements that relate to the timeliness with which the product and brand can be identified are shown to increase comprehension. Also, brand prominence elements, items that relate to how prominently the item and brand are featured in the advertisement, affect recall. Executional elements relevant to product benefits also impact recall and persuasion. Additionally, a brand-differentiating message affects all three measures of effectiveness. However, these advertisement elements do not

significantly impact perceptions of similarity. It would therefore be expected that advertisers may not be able to differentiate their work on these features, yet can use them effectively for recall, comprehension and persuasion.

VI. Conclusions and Future Research

Arguably the most practical aspect of this work is to determine if executional elements, known to impact advertising effectiveness, play a role in perceptions of similarity. Our study reveals mixed results, as some elements of advertisements affect both similarity and advertisement effectiveness, while others affect only one. An interesting finding is that executional elements that convey brand-specific elements, such as items relating to brand prominence and product benefits, impact measures of effectiveness, but not similarity. In positioning an advertisement to be both effective and (dis)similar from another, therefore, would involve combining brand-specific elements with other creative elements so as to not sacrifice effectiveness at the expense of positioning.

A further contribution, to the best of our knowledge, is that we are the first to apply a Bayesian approach to model the similarity of advertisements, allowing us to incorporate variation across individuals. In modeling the data, we combined multiple streams of literature in order to identify the aspects essential to the model. We drew on previous research on advertisement elements, affective response to advertisements and psychological models of similarity. To this end, we used a series of models to determine which piece(s) of the model were doing the "heavy lifting." Beyond individual-level perceptions of the advertisements (treated as control variables), distinct features are significant drivers of dissimilarity. While we allow for matching features and distinct

features to have different weights, it appears that the common features do not contribute significantly to the model. In comparing advertisements, the features that are different are the ones that drive perceptions of similarity.

Work continues in behavioral research on the link between similarity judgments and preference constructions. Future research on this link in the domain of advertisements would also be fruitful. For example, previous research has found that the features of items presented first influence which aspects of subsequent items are processed, and thus are most likely to drive evaluations of similarity (e.g., Dhar, Sherman and Nowlis 1999; van Osselaer and Alba 2000). This has a variety of implications for how consumers judge advertisements to be similar or dissimilar. In a real-world context, advertisements are rarely shown one at a time. It may be the case that the similarity among advertisements shown as a block (for example, during a commercial break) may influence their effectiveness. Developing a model to consider such an inter-relationship may demonstrate that the effectiveness of advertisements is, to some degree, beyond the control of the advertisements' creators, but rather in the hands of those who schedule when advertisements air.

Despite the encouraging nature or our findings, there are a significant number of areas for improvement. First, while we used a set fifty advertisements drawn from various industries, depending on the intent of the research, it may be desirable to select advertisements from a specific industry or to include more advertisements to broaden the scope of the model. Second, future work may also consider applying the same model to products or brands. While it is common practice to develop perceptual maps for brand positioning, determining the underlying features (perhaps via factor analysis) in our

setting may allow for a more parsimonious model. Third, while we collected dissimilarity ratings in pairs, other collection tasks may have yielded different findings. Fourth, while our borrowing of features from Stewart and Furse (1986, 2000), developed for a different purpose, made sense here, further refinement may be needed for the domain of similarity perceptions. Finally, as in all work, and especially here as we hope that our work is seen as managerially relevant, some real-world testing of our findings would be the next logical step.

Table 1

Effect of distinct features on dissimilarity, by factor[*+]

1. Typical Humor (0.17, 0.05; 115, 115)	**13. Product Identifiability** (0.03, 0.04; 0, 1)
Indoor Setting Humorous Humorous Closing Comedy or Satire Creation of mood as dominant Principal character as an ordinary person	Auditory sign-off Memorable nonmusical device Times brand name mentioned Time until brand name identified Times brand name/logo appear Type of Commercial
2. Results of Use (0.07, 0.06; 0, 1)	**14. Information (0.16, 0.06; 111, 115)**
Results of use Performance or benefits as main message Product reminder as main message Demonstration of Results	Quality Information Rational/Emotional Appeal Components, contents or ingredients information Attributes or ingredients as main message
3. Beauty (0.02, 0.06; 0, 0)	**15. Real People** (-0.04, 0.07; 0, 0)
Character Beauty Sexual Appeal Glamorous	Principal character(s) are real people Real person in a minor role Recognized continuing character
4. Screen Time (-0.04, 0.06; 0, 0)	**16. Whimsy** (-0.03, 0.07; 0, 0)
Time product is on screen Time package is on screen Blind lead-in	Cute/Adorable Animal is principal Setting unrelated to product use
5. Musical Flow (0.07, 0.06; 0, 1)	**17. Flow (0.12, 0.06; 78, 105)**
Happy/fun-loving Music as major element Dancing Recognized continuing musical theme	Neutral setting Multiple Vignettes Vignettes Continuity of action
6. Creative (0.00, 0.08; 0, 0)	**18. Product Use** (0.06, 0.07; 0, 0)
Type of commercial Principal creation Animated principal	Time until category identified Time until product or package shown Demonstration of use
7. Surreal (0.17, 0.08; 107, 113)	**19. Mood Music** (0.10, 0.07; 1, 20)
Surrealistic Visuals Fantasy, exaggeration or surrealism as dominant	Music as a major element Music creates mood
8. Nature (0.10, 0.08; 0, 1)	**20. Female Achievement** (0.07, 0.09; 0, 0)
Scenic beauty Outdoor setting	Achievement appeal Female principal
9. Casual (0.10, 0.08; 0, 1)	**21. Brand name congruence** (-0.01, 0.10; 0, 0)
Relaxing/comfortable Modern/contemporary	**22. Unrelated, but relevant, setting** (0.06, 0.10; 0, 0) **23. Psychological/subjective benefits** (0.09, 0.10; 0, 0)
10. Minority principal (0.21, 0.11; 88, 112)	**24. Unusual setting or situation** (0.14, 0.10; 0, 21)
11. Double-branded product (0.00, 0.10; 0, 0)	**25. Front-end impact** (0.02, 0.10; 0, 0)
12. Characteristics/image of users (0.16, 0.10; 8, 63)	**26. Child/infant principal** (0.14, 0.11; 0, 6)

[*]Factor names in bold; results are presented as (mean, standard deviation; number significant at the 5% level, number significant at the 10% level)

[+]Single items load onto Factors 10-12 and 21-26

Table 2

Viewer Response Items

Construct	Items	α	κ (SE)
Upbeat Emotions	· Happy · Energetic · Playful	.89	-.03 (.07)
Warmth	· Affectionate · Kind · Warmhearted	.94	.08 (.06)
Negative Emotions	· Disgust · Offense · Irritation	.85	.03 (.06)
Interest	· Interesting · Entertaining · Boring	.87	.17** (.06)
Relevance	· Important · Relevant · Useful	.90	.02 (.07)
Comprehension	· Confusing · Hard to follow · Puzzling	.91	.14** (.06)
Empathy	· Could relate to the characters. · Felt they were right there in the advertisement. · Experiencing the same thoughts and feelings as characters.	.87	.12* (.07)
Informational	· "The commercial did not teach you what to look for when buying this product." · "You can now accurately compare this brand with other competing brands on matters that are important to you." · "This advertisement is uninformative."	.69	-.03 (.09)
Transformational	· "This brand fits your lifestyle well." · "You could really relate to this commercial." · "It's hard to put into words, but this commercial leaves you with a good feeling about using this brand."	.81	.14* (.08)

** p<.05
* p<.10

Table 3

Significant Predictors of Advertisement Effectiveness

Recall	Comprehension	Persuasion
Humor	Brand-differentiating message	Brand-differentiating message
Brand-differentiating message	**Humor**	Product reminder
Auditory memory device	Convenience in use	Convenience in use
On-screen characters	Auditory memory device	Animatics/storyboard
Brand Prominence	Front-end impact	Company identification
Product Attributes/Components	Cast	Cast
Company Identification	Time Until Identification	**Continuity**
Product Benefits		Research
Brand sign-off		Serious/graphics
Front-end Impact		
Convenience in use		

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Appendix I: Features taken from Stewart and Furse (1986)

Informational Content (26)	**Visual Devices (8)**
Price Value Quality Economy/savings Dependability/reliability/durability Sensory Information Aesthetic claims Components, contents or ingredients Availability Packaging Guarantees or warranties Safety Nutrition/health Independent research results Company sponsored research results Research from unidentified sources New uses Company image or reputation Results of use User satisfaction/dedication/loyalty Superiority claim Convenience in use Special offer or event User occasion Characteristics or image of users	Scenic beauty Character beauty Character ugliness Graphic displays Surrealistic visuals Substantive supers Visual tagline Use of visual memory
	Auditory Devices (3)
	Memorable nonmusical device Unusual sound effects Spoken tagline
	Promises, Appeals and Propositions (13)
	Attributes or ingredients as main message Performance or benefits as main message Psychological or subjective benefits Product reminder as main message Sexual appeal Comfort appeals Safety appeals Enjoyment appeals Welfare appeals Social approval Self-esteem or self-image Achievement Excitement, sensation, variety
Brand/Product Identification (5)	**Setting (3)**
Number of products Double-branded product Identification of manufacturer or distributor Visual brand sign-off Auditory sign-off	Indoor setting Outdoor setting Neutral setting
Commercial Approach (3)	**Congruence of Commercial Elements (4)**
Rational/emotional appeal Positive/negative appeal Brand-differentiating message	Brand name congruence Setting unrelated to product use Unrelated, but relevant, setting Setting directly related to normal use

Characters (19)	Tone and Atmosphere (17)
Male principal	Cute/adorable
Female principal	Hard sell
Child/infant principal	Warm and caring
Minority principal	Modern/contemporary
Celebrity principal	Wholesome/healthy
Principal as an ordinary person	Technological/futuristic
Principal character(s) are real people	Conservative/traditional
Principal creation	Old fashioned/nostalgic
Animal is a principal	Happy/fun-loving
Animated principal	Cool/laid-back
Character identified with company	Somber/serious
Background cast	Uneasy/tense/irritated
Minority in a minor role	Relaxed/comfortable
Celebrity in a minor role	Glamorous
Animal in a minor role	Humorous
Character/cartoon in a minor role	Suspenseful
Real person in a minor role	Rough/rugged
Recognized continuing character	
Presenter/spokesperson on camera	
Music and Dance (7)	**Structure (7)**
Music	Front-end impact
Music as major element	Surprise or suspense in the middle
Music creates mood	Surprise or suspense at the closing
Dancing	Unusual setting or situation
Music and Dance extravaganza	Humorous closing
Adaptation of well known music	Blind lead-in
Recognized continuing musical theme	Message in the middle
Timing and counting items* (12)	**Format (18)**
Type of Commercial	Vignettes
Times brand name mentioned	Slice of life
Time until category identified	Continuity of action
Time until brand name identified	User testimonial
Time until product or package shown	Celebrity/Authority endorsement
Time product is on screen	Announcement
Time package is on screen	Demonstration of use
Times brand name/logo appear	Demonstration of results
Time brand name/logo on screen	Comedy or satire
Principal message in the first 10 seconds	Animation/cartoon
Number of vignettes	Photographic stills
Number of characters	Creation of mood as dominant
	Serious drama
Production Characteristics and Quality (2)	Fantasy, exaggeration or surrealism as dominant
Number of words	Problem and solution
Visual Pace	Interview
Comparisons (3)	Camera involves the audience
Direct comparison	New wave
Indirect comparison	
Puffery, or unsubstantiated claim	

* Median splits performed on count and time variables

Appendix II: Advertisements Utilized

Product	Category	Views	Product	Category	Views
Entenmann's[2]	Food/Beverage	30	Ipren	Health	20
Heineken[1,5]	Alcohol	17	Etrade	Financial Service	19
Martini1[4,5]	Alcohol	19	Saturn[2,6]	Automotive	22
Alcatel Internet	Network Service	29	BMW[8]	Automotive	21
Lipton Sizzle and Stir[4]	Food/Beverage	14	Fujicolor[4]	Film	22
Budweiser[4,5]	Alcohol	14	Dulcolax	Health	22
Pizza Hut New Yorker[4]	Food/Beverage	21	Thermasilk	Cosmetic	21
Pepsi Twist[4]	Food/Beverage	26	Butterfinger[4]	Food/Beverage	24
Visa	Financial Service	16	Red Devil[7]	Food/Beverage	15
Mountain Dew[7]	Food/Beverage	24	Gap[2,4]	Clothing Retailer	25
Pepsi Twist1[4,5]	Food/Beverage	23	Fiat[4,7]	Automotive	15
FedEx	Delivery Service	14	Lynx Cologne[1,5,6,7]	Cosmetic	22
Lifestyles Condoms[1,4]	Health	15	Mastercard/Eurocard[4]	Financial Service	22
NY Times	Newspaper	20	Deutsche Bank	Financial Service	24
Jeep	Automotive	29	Banca121[1,7]	Financial Service	26
Chevy Blazer[3]	Automotive	31	Motorola[7]	Communications	21
Ikea[4]	Furniture	15	Mastercard[2,4]	Financial Service	30
Heineken[4,5]	Alcohol	25	Virgin Atlantic[4]	Airlines	29
Ft.com	Newspaper	27	Kirin Ichiban Beer[4]	Alcohol	25
Burger King	Food/Beverage	25	Bisto	Food/Beverage	24
Blockbuster Video[4]	Entertainment	19	Toyota[5]	Automotive	31
Durex Condoms[1,4]	Health	20	Mercedes[6]	Automotive	20
Gatorade[7,8]	Food/Beverage	18	Wellowell.nl[5]	Financial Service	26
Peugeot[4,5,7]	Automotive	21	Sony Playstation 2	Electronic	23
Gatorade[7]	Food/Beverage	30	Apple Computers	Electronic	31

[1]Sexual Appeal
[2]Comfort Appeal
[3]Safety Appeal
[4]Enjoyment Appeal
[5]Social Appeal
[6]Self-Esteem Appeal
[7]Achievement Appeal
[8]Excitement Appeal