*Refereed paper – 5th International Academy of Wine Business Research Conference, 8-10 Feb. 2010 Auckland (NZ)*

# Consumer metacognitions: The ease, speed, and accuracy of inferring meaning from wine packages

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**Abstract**

Consumers often make initial judgments about a wine based solely on package design. The ease, speed, and accuracy of forming these first impressions (i.e., their fluency) are important for marketers to understand as fluency influences liking and ultimately consumer behavior. This paper examines how three factors generic to design influence the three dimensions of design fluency. In three studies we show that (1) the ease and speed of judgments come at the expense of accuracy for wine packages exhibiting different combinations of low versus high prototypicality, harmony, and information content, (2) those generic design factors relate to differences in consensual accuracy (the variance of judgments across consumers), and (3) the factors further differ in spatial accuracy (the variance of judgments across space) hereby differentially relating to within-subject changes in judgments when packages are viewed from a distance versus close. Implications focus on managing wine package design to convey intended meaning easily, speedily, and accurately for more favorable consumer responses.

***Keywords:*** *brand personality, package design, processing fluency, quality*

## 1. Introduction

Consumer processing of design can be characterized by several parameters that are not content-related, such as the ease, speed, and accuracy (Reber, Wurtz, & Zimmermann 2004). These parameters are commonly referred to as visual fluency (Novemsky, et al. 2007).

Research on metacognitive experiences indicates that the visual fluency of stimuli influences important marketing outcomes such as judgments (Reber, Schwarz, & Winkielman 2004), liking (Reber, Winkielman, & Schwarz 1998), attitudes (Lee & Labroo 2004), and choice (Novemsky et al. 2007). Research on wine package design suggests the meaning consumers infer from design can be traced back to variations in three generic factors, namely prototypicality, harmony, and information content (Orth & Malkewitz 2008).

Although guidelines exist for how to create wine packages to achieve desired judgments (Orth & Malkewitz 2008), possible differences in how easily, speedily, and accurately those designs convey meaning across individuals and space remain unknown. Generating insights into the underlying relations is important as it facilitates the identification of wine package designs relating to higher fluency and thus to more desirable marketing outcomes.

## 2. Conceptual Framework

We focus on consumer judgments of a wine brand's *quality and personality* as the bases for capturing the ease, speed, and accuracy of design-evoked meaning. Wine package design functions as a prime medium in shaping consumer judgments with downstream effects eventually extending to choice (Orth & Malkewitz 2008; Reid 2002; Rocchi & Stefani 2006). Wine quality and brand personality both are prominent package design-based judgments that capture important facets of brand meaning (Aqueveque 2008; Boudreaux & Palmer 2007; Charters, Lockshin & Unwin 1999; Orth & Malkewitz 2008) and relate to fluency through mental operations concerned with evaluating packages within their knowledge structures.

Seminal research corroborates the contention central to our research that judgments originate from *generic factors of design* (Veryzer 1999; Kimchi 1994). Three generic design factors (prototypicality, harmony, and information content) account for a significant portion of design-evoked judgments (Henderson & Cote 1998; Henderson et al. 2004; Henderson et al. 2003; Orth & Malkewitz 2008). Prototypicality combines lower-level characteristics such as representative and organic; it reflects the degree to which a design overlaps with others commonly encountered in the category (Barsalou 1985). For example, a Bordeaux-style wine bottle, bearing a traditional label with a classical Chateau pictured in muted colors, and a red closure on top would be more prototypical than a cresting moon-shaped vessel in metallic blue with a minimalistic edged label and a bright yellow closure.

Harmony is a combination of symmetry and balance with contrast and asymmetry representing the opposing end of the continuum. Analogous to "unity" (Veryzer & Hutchinson 1998), harmony refers to a congruity among design elements such that they look as though they belong together or as though there is a visual connection. For example, a wine package that uses muted colors and elements symmetric around horizontal and vertical axes would be more "harmonious" than one that does not (Orth & Malkewitz 2008).

*I*nformation content, the third factor, combines complexity, activity, and depth. This factor captures the concept of richness and the ability of the design to capture a visual representation's essence. For example, a wine package bearing elaborate sketched images, highly structured surfaces, flourish typeface, large amounts of small-font text, and numerous colors contains more "information" than one that does not.

Our first set of hypotheses posits that the prototypicality, harmony, and information content of wine packages differentially relate to the ease, speed, and accuracy of judgments. Stimuli which are prototypical, archetypical, or representative for the product-category are processed more easily than non-prototypical ones (e.g., Winkielman et al. 2006; Reber, Schwarz, & Winkielman 2004). Prototypical stimuli also lead to more accurate higher-level categorization than less prototypical stimuli (Rousselet, Fabre-Thorpe, & Thorpe 2002). This implies that exposure to more rather than less prototypical designs results in more accurate judgments.

The speed of recognition is further higher for stimuli high rather than low in figure-ground contrast (Unkelbach 2006). Whittlesea et al. (1990) found the visual clarity of a stimulus can bias consumer interpretations of meaning hereby leading to greater variance in associations. Also, as difficult-to-read stimuli (i.e. blurred fonts) make consumers reconsider choices (Novemsky et al. 2007) designs low on the harmony factor may convey meaning less accurately.

The idea that the amount of information is an important determinant of fluency has a long history in psychology, especially in the Gestalt tradition (Wertheimer 1925). Stimuli with less information are usually easier to process, leading to higher fluency (Reber, Schwarz, & Winkielman 2004). Yet, designs containing less information (i.e., plain, non-descript, or symmetrical stimuli) may be more prone to misinterpretation than high-information designs as they invite more speculation on their meaning, hence decreasing accuracy (Reber, Schwarz, & Winkielman 2004).

Our *second set of hypotheses* posits that design factors will relate to differences in consensual accuracy. Prototypical stimuli present "goodness-of-example" and tend to correlate substantially with convergent meaning and familiarity (Loken & Ward 1990). Familiarity, in turn, relates positively to the accuracy of judgments as associations between familiar stimuli and stimulus meaning are stronger and more entrenched with greater consensus among perceivers (Metcalfe & Finn 2008). All this implies that prototypicality relates to higher consensual accuracy.

Very similar to the related concept of "unity", harmony refers to a congruity among design elements such that they look as though they belong together or as though there is a visual connection (Veryzer & Hutchinson 1998). Consensus on judgments of meaning should increase as more perceivers agree on the visual link or uniting connection.

Information content is an established driver of fluency (Garner 1974), and stimuli containing less information are usually more fluent due to their greater ease of processing (Reber, Schwarz, & Winkielman 2004). Yet, designs containing less information (i.e., plain, non-descript, or symmetrical packages) may be more prone to misinterpretation than elaborate designs as they invite more speculation on their meaning, hence decreasing consensus (Reber, Schwarz, & Winkielman 2004). We expect high information content designs are lower in consensual accuracy because the greater amount of information contained increases the potential for divergent evaluative judgments.

Our *third set of hypotheses* predicts that key factors of design will differentially relate to spatial accuracy. Generally, we expect spatial accuracy to decrease as more design details become available to consumers, that is, when design perception moves from holistic types of design to design factors to more atomistic design elements (Orth & Malkewitz 2008).

As prototypical designs achieve differentiation through their archetypicality and representativeness, these characteristics should facilitate meaning from a greater distance. Because prototypical designs set the design standard within a category, consumer evaluative judgments should change little upon approaching stimuli, thus relating prototypicality to greater spatial accuracy.

Harmonious designs lack any outstanding or contrasting design characteristics, displaying neither bold elements or asymmetry (Orth & Malkewitz 2008). High congruity among design elements is the key characteristic of harmonious designs (Veryzer & Hutchinson 1998). This visual connection should inhibit spatial accuracy as perceivers may adjust their interpretation of what the visual link is when they approach the design. Similarly, as harmony relies on congruity among larger numbers of design details (Orth & Malkewitz 2008), spatial accuracy should be lower for harmonious designs as people perceive and use more design elements to form judgments when they get closer (Zhao & Meyer 2007).

High-Information content designs are more elaborate than other types; they contain larger numbers of details (Orth & Malkewitz 2008). This would imply that high-information designs may evoke one set of judgments from a distance but potentially different judgments when viewed closely as more details and information become available. As information content correlates with design details, spatial accuracy should be lower for high-information designs as people use additional design elements to form judgments when they get closer (Zhao & Meyer 2007; Deruelle et al. 2006; Kimchi 1994).

**3. Research Method**

The hypothesized relations were tested in three consecutive studies. *Study 1* tests relations between design factors and visual fluency dimensions using a 3 (design factor: prototypicality, harmony, information content) x 2 (level of design factor: low vs. high) full factorial design. We identified and purchased wine packages (N =120) to represent extreme scores on the design prototypicality, harmony, and information content scales. These packages were then pre-tested with design professionals (N = 101) to ascertain their scores on each of the three design factors. Based on the cut points for three equal groups on each design factors (e.g., low, moderate, and high prototypicality), we selected ten packages for each cell (i.e., ten packages low in prototypicality, ten packages high in prototypicality, ten packages low in information content, etc.), resulting in a total of sixty stimuli. Respondents evaluated high-resolution digital images of the packages.

The sample consisted of 276 consumers ranging in age from 20 to 84 years ($M$ = 27.5, $SD$ = 10.7) with 57% females. A customized software application uniformly presented stimuli on a computer screen, and assessed consumer responses. The mean brand familiarity score across all stimuli indicated consumers were not familiar with brands as intended. The speed of inferences (response latency) was measured as the time (in milliseconds) elapsed between the display of a stimulus on the screen and consumers' mouse click indicating their quality judgment. To create a measure of accuracy, we computed the difference between brand managers' target quality score and a consumer's judgment for that stimulus: $accuracy_{i,s} = quality_{q,s} - quality_{i,s}$ , with $i$ = individual consumer, $s$ = stimulus, and $q$ = mean quality score across professionals.

Main effects were significant for prototypicality on ease ($F(1,90) = 9.75$, $p = .01$), speed ($F(1,90) = 5.41$, $p = .02$), and accuracy ($F(1,90) = 74.12$, $p = .01$) with prototypical designs being more fluent than low-prototypicality designs in terms of greater ease, higher speed, and higher accuracy of judgments. Main effects for harmony were significant for ease ($F(1,90) = 21.73$, $p = .01$) and accuracy ($F(1,90) = 67.76$, $p = .01$), but not for speed ($F(1,90) = 2.36$, $p = .13$). Harmonious designs were less fluent than low-harmony designs in terms of lesser ease and lower accuracy. Main effects of information content were significant on ease ($F(1,90) = 10.26$, $p = .01$), speed ($F(1,90) = 5.58$, $p = .02$), and accuracy ($F(1,90) = 66.15$, $p = .01$) with high-information designs being more fluent than low-information designs in terms of consumers inferring meaning with greater ease, higher speed, and higher accuracy.

*Study 2* was designed to determine if design factors relate to differences in consensual accuracy. Study participants (N = 154 ) were randomly selected visitors to a large metropolitan shopping mall (mean age = 32.8 years, SD = 7.42). Images of the packages were displayed on a portable computer screen with each participant evaluating ten randomly assigned stimuli. In all, each package was evaluated by at least 24 consumers; each design factor cell received no less than 242 evaluations. Brand personality judgments were captured through Aaker's (1997) item battery. Package-evoked quality judgments assessed through three items (Teas & Agarwal 2000).

Variances on judgments of quality and brand personality index consensus (Malloy et al. 1997). The unstandardized estimates, and Levene's test of equality based upon those were used to compare the variability of the variances across respondents and dimensions (Kenny 1991). Consensual accuracy was higher (i.e., smaller variance) for designs high rather than low on prototypicality in terms of both overall brand personality and quality (*Levene* = 8.12, $p$ = .01 and *Levene* = 6.36, $p$ = .01, respectively). Similarly, consensual accuracy was higher for designs high rather than low on information content both in terms of brand personality and quality (*Levene* = 7.91, $p$ = .01 and *Levene* = 4.48, $p$ = .03, respectively). However, consensual accuracy for low-harmony design designs was greater only in terms of brand personality and not quality (*Levene* = 7.68, $p$ = .01 and *Levene* = 3.15, $p$ = .08, respectively).

*Study 3* was designed to determine the relations between design factors and the spatial accuracy of judgments. Study 1 and 2 stimuli were re-used but with a different set of consumers ($N$ = 262; mean age of 34.7 years, SD = 7.22) and a within-subject experimental design. In front of a portable computer a customized application guided participants through two phases separated by a filler task. In Phase 1, participants were asked to imagine they just were invited to a friend's house and needed to get a bottle of wine for sharing with others. Subsequent screens then displayed – one by one – a series of randomly selected small wine bottle images along with the information that those wines were available at a local specialty store. Each design was shown on the screen while participants judged the brand in terms of personality and quality. A brief filler task required participants to lift their gaze from the screen and focus on their surroundings. During the following Phase 2, each of the previous designs was shown on the screen again but this time in larger size. Participants then rated the larger design on the same scales as in Phase 1. The appropriate size of "small" and "large" images was determined through a pilot study. The resulting measures correspond to consumers viewing original bottles from distances of ten foot and two foot, respectively.

Mean scores (mean changes in evaluative judgments, i.e., spatial accuracies) were calculated as intra-individual differences between the judgment evoked by a design's large image minus the judgment evoked by the same design's small image for each personality factor and for quality. These intra-individual difference scores were then compared across the two groups within each design factor. Smaller scores thus equal greater spatial accuracy.

ANOVA results indicate no significant effects of prototypicality on spatial accuracy in terms of brand personality judgments and quality ($p$ = .18 and $p$ = .13, respectively). However, spatial accuracy was higher for designs low rather than high on harmony in terms of brand personality ($p$ = .01) but not in terms of quality judgments ($p$ = .59). It was further higher for designs low rather than high on information content in terms of both brand personality and quality judgments ($p$ = .05 and $p$ = .02, respectively).

**4. Discussion**

The present findings suggest that generic factors of wine package design influence the ease, speed, and accuracy of judgments. Previous research assists marketers and designers by showing distinct design factors exist and are systematically related to differential evaluative judgments (Orth & Malkewitz 2008). By determining how these design factors relate to greater or smaller fluency in consumer judgments this research enables wine package designers to additionally incorporate fluency aspects into their decision-making hereby reducing the potential for misinterpretation and unclear positioning of their brands.

Our findings further suggest that consumers agree more or less on the meaning conveyed by packages depending on the design factors employed. Therefore, if designers' objective is to convey meaning more accurately and more precisely (i.e. sharpshooter versus shotgun target marketing approach), wine package designs utilized should exhibit either high prototypicality, low harmony, or high information content to facilitate greater consensus in consumer judgments of the brand's salient characteristics.

Lastly, our findings suggest that designs varying in generic factors convey meaning more and less consistently across space. Specifically, designs low on information content and – as far as quality judgments are concerned – low-harmony (i.e., contrasting) designs exhibit greater spatial accuracy than high-information and high-harmony designs. No differences could be found for designs low and high in prototypicality. Therefore, if stakeholders' objective is to convey brand meaning more accurately across space, they should consider utilizing designs exhibiting low harmony and low information content; they do not need to account for prototypicality, though.

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