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# EMOTION IN TYPOGRAPHIC DESIGN: AN EMPIRICAL EXAMINATION

BETH E. KOCH, PhD, is an Assistant Professor of Design at The University of Minnesota Duluth (USA) where she serves on the graduate faculty and teaches typography, graphic design, interactive design and senior and graduate studio courses. Apart from teaching and academic administration, her extensive experience in practice has garnered numerous prestigious design awards. Early in her career, Koch was trained to set hot and cold type (handset metal and wood type, Linotype, Typositor, Compugraphic Photo Typesetters and eventually on computers). Her love of typography is evident today in her current research in visual literacy that examines human emotional response to typographic design elements.

ABSTRACT

*There are virtually no rules to empirically interpret the meaning inherent in typeface designs—people intuitively decipher typefaces (Van Leeuwen, 2005). Forty-two participants examined six alphabets and responded using an online questionnaire to discover*

- 1 \_\_\_\_\_ whether viewing typefaces produces emotional responses,*
- 2 \_\_\_\_\_ whether people have the same emotion responses to typefaces and*
- 3 \_\_\_\_\_ whether certain emotions are predominantly associated with the formative design features of typefaces—classification, terminal shape, character width and weight.*

*Psychological research about the role of emotion in visual processing was combined with an interactive animated questionnaire methodology (Desmet, 2002), and the resulting data were analyzed in a matched t-Test design ( $\alpha = .05, 95\%$ ). This human-centered empirical approach proved a promising methodology for design research that successfully eliminated problems evidenced in previous object-centered typography studies. Because people reported similar emotion response to the design features, this study suggests that design's underlying features represent a common visual language.*

## **GRAPHIC DESIGN PLAYS AN IMPORTANT ROLE IN**

helping people to decipher meanings, prioritize information, and judge the personal relevance of communications by injecting emotion into visual messages. However most designers don't understand that what they are really selling is emotion (Karajuluoto, 2008). Designers must begin to go beyond form, function and aesthetics, according to Robinson (2004), to integrate aspects of "emotional awareness." Typography is one area of graphic design that telegraphs the tone and attitude—the emotion—of communication. This study provided evidence about the role of emotion in visual perception of the formal graphic elements that make up typographic forms.

While much is known about how the brain processes components of vision (motion and spatial relationships: Merigan & Maunsell, 1993; color: Zeki, 1973, 1974b, 1977; Merigan & Maunsell, 1993; edges: Zeki, Perry, et al., 2003; form (shapes): Gulyas & Roland, 1994; Gulyas, Heywood, et al., 1994; Grill-Spector, Kushnir, et al., 1998; Merigan & Maunsell, 1993; Marcar, Loenneker, et al., 2004; and patterns: Pinker, 1984), virtually nothing is known about how categories of design elements are interpreted through emotion and perception. Or for that matter, whether design elements are processed individually, as basic visual criteria. In order to examine how people interpreted basic elements of design, this study asked people to respond to six different typefaces by indicating the emotion(s) they felt when viewing the typefaces.

This study was a significant departure from the typical methodologies used for design research. For studies inquiring about responses to visual stimuli, Morrison (1986) suggested that the response mechanism should utilize a non-verbal reporting method. A wide variety of methodological approaches and variable descriptions were utilized in previous typography studies, which limited comparison of the studies. For example, most researchers had not accounted for possible interactions between presentation form (word or pictures) and reporting method (reading, writing or interactive selection) resulting in mixed findings. (For a summary of past typographic research see Morrison, 1986; Poffenberger and Franken, 1923; Davis and Smith, 1933; Kastl and Child,

1968; Tannenbaum et al., 1964; Benton, 1979; Wendt, 1968; and Weaver, 1949.)

#### RESEARCH QUESTIONS AND DESIGN

In order to answer the three research questions of

- 1 \_\_\_\_\_ whether viewing specific typefaces produces emotional responses,
- 2 \_\_\_\_\_ whether all people have the same emotion responses to typefaces, and
- 3 \_\_\_\_\_ whether certain emotions are predominantly associated with the formative design features of typefaces,

an interactive questionnaire was selected. PrEmo™ (Desmet, 2002) is a unique scientifically validated, non-verbal, self-report, rich media research tool to measure product emotions and was the protocol chosen to measure emotion in this study. Its form is a grid of buttons containing cartoon characters that are activated by the user's mouse click. Once clicked, a character animates. It acts out the body language, facial expression and makes the sound connected with the emotion portrayed in the button. There are no labels to indicate what emotion is being demonstrated (see FIGURE 1).

There were twelve emotions, both positive and negative. Successful emotion studies in psychology measured both valence polarity and arousal strength. This study followed that precedent. Emotion arousal strength was ranked on a 5-point Likert scale labeled "0" (I do not feel this) to "4" (I feel this strongly) for each typestyle.

This study used stimuli in the form of visual alphabet samples to convey the typeface design features. The purpose of this design was to avoid an interaction between visual typeface design features and the verbal/semantic meaning of a passage of text. Asking participants to read would have defeated the purpose, which was to learn about visual literacy and how people derive emotion from viewing different design styles. Participants were asked to make emotion

## Experiment Questions—6 of 6

How much do your feelings about the alphabet design pictured here correspond with the feelings expressed by each cartoon? Click on the cartoons one at a time and rate your feelings for each one. Once you have clicked on each cartoon and made your choice, you will be able to move on to the next page.

Next >>

**ABCDEFGHIJKL**  
**MNOPQRSTUUV**  
**XYZabcdefghijklmnopqrstuvwxyz&O**  
**123456789ÆÁÄ**

Number Six

I do feel this strongly — 4  
 I do feel this — 3  
 I feel this somewhat — 2  
 I feel this a little — 1  
 I do not feel this — 0

judgments about six different typefaces by pressing each of twelve emotion character buttons and selecting a number (0 to 4) representing the strength of their feeling toward the type design.

The most well-known typeface design in the world is a typeface called Helvetica. This typeface was chosen for the study because it has relatively non-descript design features, that is, without ornament or features to indicate what situations in which the typeface might be appropriately used. This typeface is well represented in international visual culture; used in a variety of contexts and applications. Its style is seen as universal and as such, the meaning or emotion of the typestyle may be difficult to decipher.

The typestyles selected for this study consisted of six different typeface designs: Helvetica Ultra Light, Helvetica

figure 1. above  
*PrEmo™ interactive  
 animated characters*  
[http://www.premoonline.com/en/  
 how-does-it-work/](http://www.premoonline.com/en/how-does-it-work/)

Bold, Helvetica Condensed Bold, Helvetica Bold Extended, Helvetica Rounded and Glypha Medium (the only serif typeface used for comparison). In conducting studies of visual designs, there is general difficulty in isolating the multiple overlapping variables that are simultaneously present in a design, for example color, line and shape. Conducting studies that attempt to assign cause or attribute meaning to specific design features has been impossible, since too many variables confound study results (Stemler, 1997) constraining the usefulness of findings. For this reason, the typestyles were carefully chosen for their homogeneity.

The simplicity of the Helvetica typeface family made it an optimal choice as the basis for stimuli selection since its attributes could be carefully controlled through specific matched pairing. The study adopted an alpha level of  $\alpha=.05$  in the Paired t-Tests. Corresponding confidence level was set to 95%.

The Institutional Review Board at the University of Minnesota cleared the study design. Then invitations to participate in the study were emailed to international typography organizations, national graphic design organizations and announced on the University of Minnesota graduate student listserv. A convenience sample of one hundred adult volunteers responded.

Forty-two participants fully completed the questionnaire, providing the data for this study. Participants did not know that the typeface designs had been selected and paired according to shared and differing design features.

#### ANALYSIS

The data were analyzed first to determine the range and mean of the scores across all participants as a whole for each typeface. Then participant scores were used in a paired comparison to examine whether there were differences in emotion ratings arising from differences of design features between the typefaces. For example, the single design difference between Helvetica Bold and Helvetica Ultra Light was the variable of weight. These typographic design dimension pairs were as

follows: Variations in weight: the typestyle being either bold or light; variations in character width: typestyle design was condensed or extended; and variation in classification: the typestyle was either serif or sans serif, and variation in terminal style: square or rounded (see TABLE 1).

While it would have been possible to conduct this study and gather purely qualitative response, the research questions were better answered through quantifying qualitative data. Thereby, qualitative variables such as emotion responses, which we think of as highly individual could be measured and typefaces compared rather than simply describing emotions.

While physiological responses such as heart rate and perspiration, or skin conductive response are the measures most frequently employed in emotion studies, these measures don't provide sufficient information to explain behavior. Previous studies had suggested that consumer behavior (gauged by purchase decisions) is affected by the congruency of association between a typeface and a brand (Doyle & Bottomley, 2004, 2006). This study described the association between emotions and elements of typographic design construction, helping researchers more fully understand the mechanisms underlying findings in previous studies.

#### LIMITATIONS

This study assumes that human beings have emotions and their behavior is driven by emotions. Humans have survived and evolved in part as a result of emotion. The study acknowledges that different people have varying capabilities of emotion: some are considered emotionally advanced; some are considered emotionally handicapped; some are considered devoid of emotion due to injury or illness; and emotional dimensions change as people get older (Doost, Moradi, Taghavi, Yule & Dalglish, 1999). This study assumes emotional competence but does not discuss emotional intelligence.

The study of emotion responses can be difficult. Asking participants how they feel can produce mixed results for a variety of reasons. In order to limit some of these problems, this

TYPEFACE	TYPOGRAPHIC ATTRIBUTES							
	CLASSIFICATION		WEIGHT		CHARACTER WIDTH		TERMINALS	
	<i>serif</i>	<i>sans serif</i>	<i>light</i>	<i>bold</i>	<i>cond.</i>	<i>extd.</i>	<i>square</i>	<i>round</i>
<i>Glypha Medium</i>	•			•			•	
<i>Helvetica Bold</i>		•		•			•	
<i>Helvetica Condensed Bold</i>		•		•	•		•	
<i>Helvetica Bold Extended</i>		•		•		•	•	
<i>Helvetica Ultra Light</i>		•	•				•	
<i>Helvetica Rounded Medium</i>		•		•				•

table 1.

Typographic design  
attributes of typeface  
stimuli

study used animated cartoon characters to demonstrate the emotions visually and collected data through the use of a visual response mechanism. Using this methodology, participants could register conflicting feelings, or co-occurring feelings, and even report not feeling any emotion. Responses were registered on an emotion intensity scale 0-4 that was attached to each animated emotion cartoon.

Access to the online study was limited to the first 100 visitors. Once the study was launched, it was visited as follows: 42 respondents finished the survey, 46 respondents clicked on the survey but did not participate at all, 11 respondents started but did not finish the survey, and 2 respondents were asked to test the functionality of the survey before it was launched to the public. Of the 42 participants, 76% indicated prior training in some form of design (n=32) and 24% (n=10) had no previous design experience. As a result, the majority of respondents were typographically sophisticated; a study with ordinary type users may yield significantly different results. It is also likely that other online studies may experience a similar high incompleteness rate as a result of the online presentation mode, where users are inclined to act hastily. Further, the



interface design of PrEmo™ should be simplified: participants were required to click once to animate the character and pop-up the intensity scale alongside, then click again to select the strength of that emotion (0-4). With twelve emotions and six typestyles, a total of 144 clicks were required to complete the main questions in the study. It is suggested that the animation and the intensity scale should be presented at once in future interface designs in order to limit the amount of clicks required for responses.

Typestyle stimuli employed in this study are limited and therefore do not fully encompass the vast scope and range of the typeface designs available today.

An important acknowledgement of the limitations of this study is that even if one chose to develop a design and emotion guideline for designers to follow, there is no guarantee that people would respond in the intended way. Myriad influences can affect individual responses to designed communications. Stylistic fashions come and go, as do preferences for typefaces. Culture, visual trends and even age may have been factors in this study. Longitudinal studies of typography are indicated.

#### PAIRED T-TESTS

In this study, descriptive statistics were used to analyze the responses and observe patterns in the data (mean and range of scores). Selection of the paired t-Test statistic allowed for direct comparisons of participants' mean scores for each typeface. Paired t-Tests are designed to use one set of data and compare a second set of data to it.

The primary findings from the results of the paired t-Tests indicate that

- 1 \_\_\_\_\_ people responded to type designs with emotion rather than indifference,
- 2 \_\_\_\_\_ people agreed about the emotions associated with specific typefaces,
- 3 \_\_\_\_\_ certain emotions were associated with the formative design features of typefaces,

- 4 \_\_\_\_\_ of the positively valenced emotions, no significance was found for the emotions pride or hope, and
- 5 \_\_\_\_\_ of the negatively valenced emotions, no significance was found for the emotion shame.

#### STUDY FINDINGS

Findings from this study are as follows: Desire, satisfaction and fascination were significantly different for a typeface with 'light' weight than a 'heavy' weight. A typeface with 'heavy' weight showed significant difference for dissatisfaction and fear than the 'light' typeface. There were no significant differences reported in the terminal shape comparison, neither for typefaces with 'round' nor 'square' terminals. Desire, satisfaction, joy and fascination were reported as significantly different for a typeface that had a 'condensed' character width. Dissatisfaction, fear, sadness and boredom were significantly different for the character width category of 'extended' versus 'condensed.' Satisfaction was reported as significantly different for a typeface with a 'serif' classification versus 'sans serif' (see TABLE 2).

Several of the findings in this study agree with Scherer's set of utilitarian emotions (anger, fear, joy, disgust, sadness, shame and guilt) that have a very high impact on behavior (2005). Participants significantly associated Helvetica Ultra Light (light weight) with desire; Helvetica Bold (heavy weight) with fear; Helvetica Condensed Bold (narrow/condensed character width) with joy; and Helvetica Bold Extended (wide/extended character width) with fear and sadness. One finding in this study agreed with Scherer's (2005) aesthetic emotions (awe, wonder, admiration, bliss, fascination, harmony, rapture, ecstasy and solemnity). Participants associated the typeface Helvetica Bold Condensed (narrow/condensed character width) with fascination.

The findings from this study clearly indicate that subjects responded to typefaces with statistically significant levels of emotion, therefore I rejected the Null H1 hypothesis, "Viewing typeface designs produces no emotional response in participants."

The preponderance of subjects reported the same

SUMMARY OF SIGNIFICANT FINDINGS $\alpha = 0.05$ (95% confidence)		
CATEGORY: WEIGHT ANALYSIS	LIGHT	HEAVY
	<i>Desire [Paired t(df 41) = 3.3]</i> <i>Satisfaction [Paired-t(df 41) = 2.6]</i> <i>Fascination [Paired t(df 41) = 4.0]</i>	<i>Dissatisfaction [Paired t(df 41) = 2.3]</i> <i>Fear [Paired t(df 41) = 2.5]</i>
CATEGORY: CLASSIFICATION	SERIF	SANS SERIF
	<i>Satisfaction [Paired-t(df 41) = 2.1]</i>	<i>No Significance</i>
CATEGORY: TERMINAL SHAPE	ROUNDED	SQUARED
	<i>No Significance</i>	<i>No Significance</i>
CATEGORY: CHARACTER WIDTH	CONDENSED (NARROW)	EXTENDED (WIDE)
	<i>Desire [Paired-t(df 41) = 3.3]</i> <i>Satisfaction [Paired-t(df 41) = 2.6]</i> <i>Joy [Paired-t(df 41) = 2.8]</i> <i>Fascination [Paired-t(df 41) = 2.18]</i>	<i>Dissatisfaction [Paired t(df 41) = 2.05]</i> <i>Fear [Paired t(df 41) = 2.38]</i> <i>Sadness [Paired t(df 41) = 3.3]</i> <i>Boredom [Paired t(df 41) = 2.05]</i>

emotions when viewing the typestyle designs. This was seen in the charts, where responses cluster together, rather than distribute randomly. Therefore based upon observation of the charts, I rejected the Null H2 hypothesis: “Subjects do not feel the same emotions when viewing different typestyle designs” (see FIGURES 2-9).

table 2.

Summary of significant findings

Understanding how humans respond emotionally to visual media, and knowing how the brain processes visual information has significant implications for design practitioners, design theory, design research and theory, for the field of graphic design, indeed, for individual visual consumers and society as a whole.

CONCLUSION

1 \_\_\_\_\_ Technological advances in word processing have provided simple tools for working with type. “Non-expert typographers are becoming increasingly important shapers of our graphic language” (Walker, 2001). It is therefore increasingly important for people who use technology to understand design’s visual language.

figure 2.

Paired comparison chart for positive emotions responses for weight

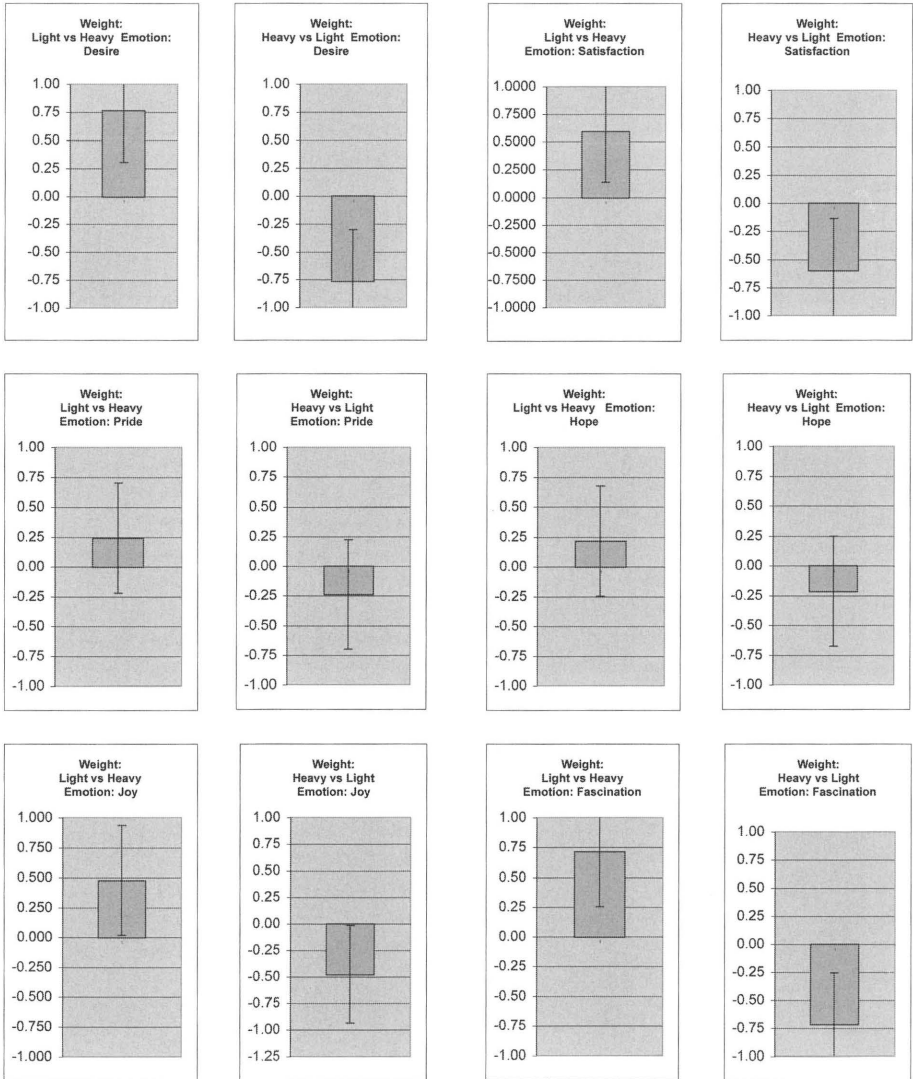


figure 3.

Paired comparison chart  
for negative emotions  
responses for weight

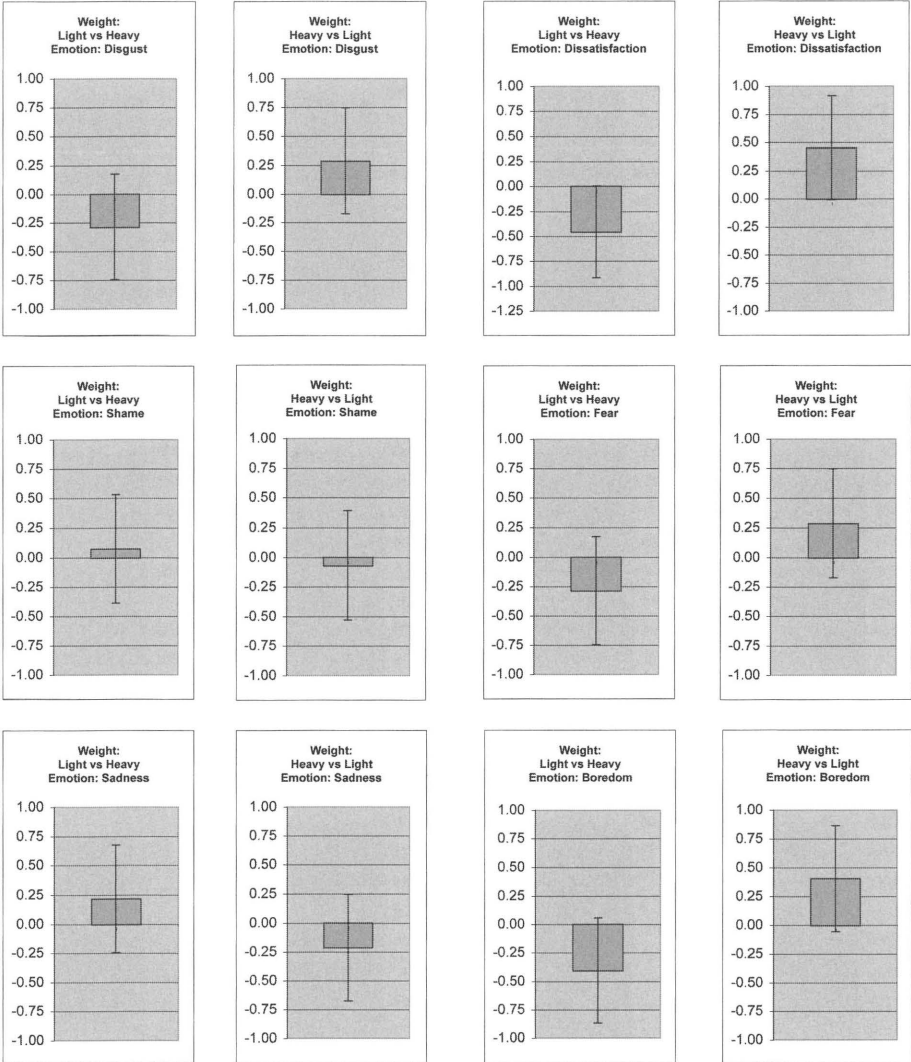


figure 4.

Paired comparison chart for positive emotions responses for classification

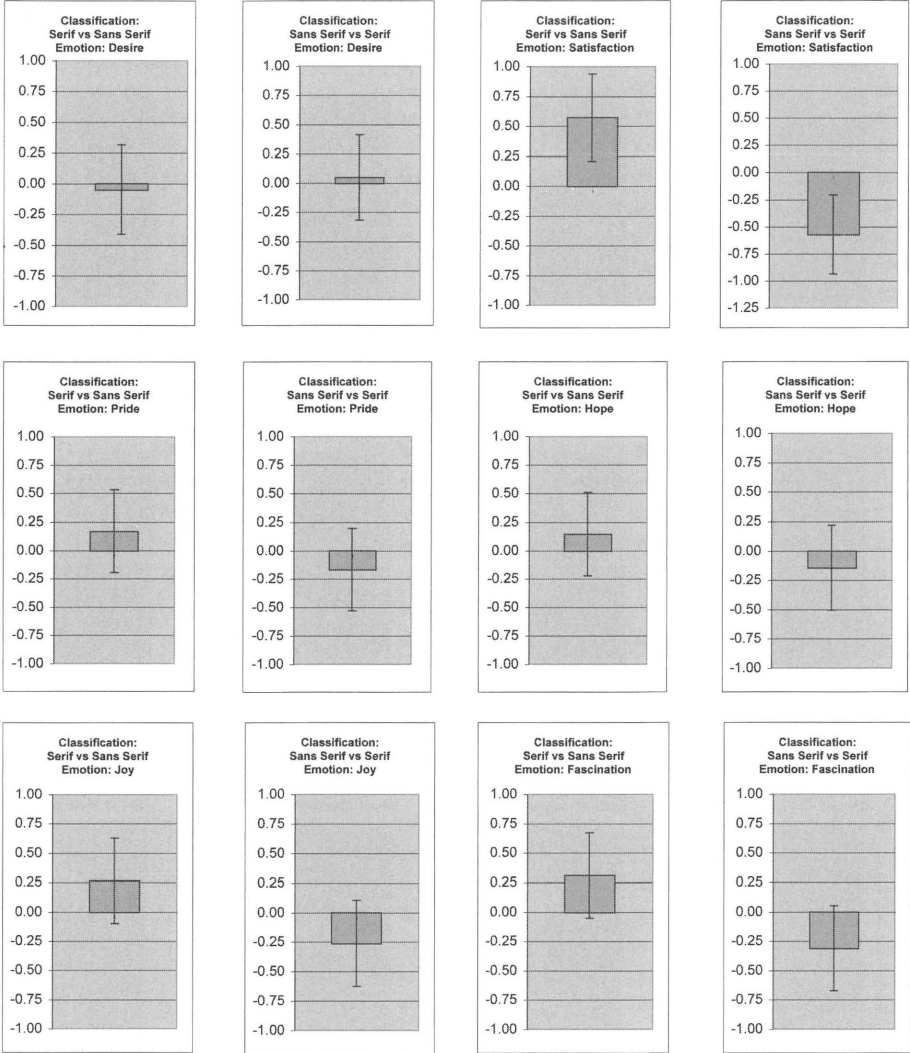


figure 5.

Paired comparison for negative emotions responses for classification

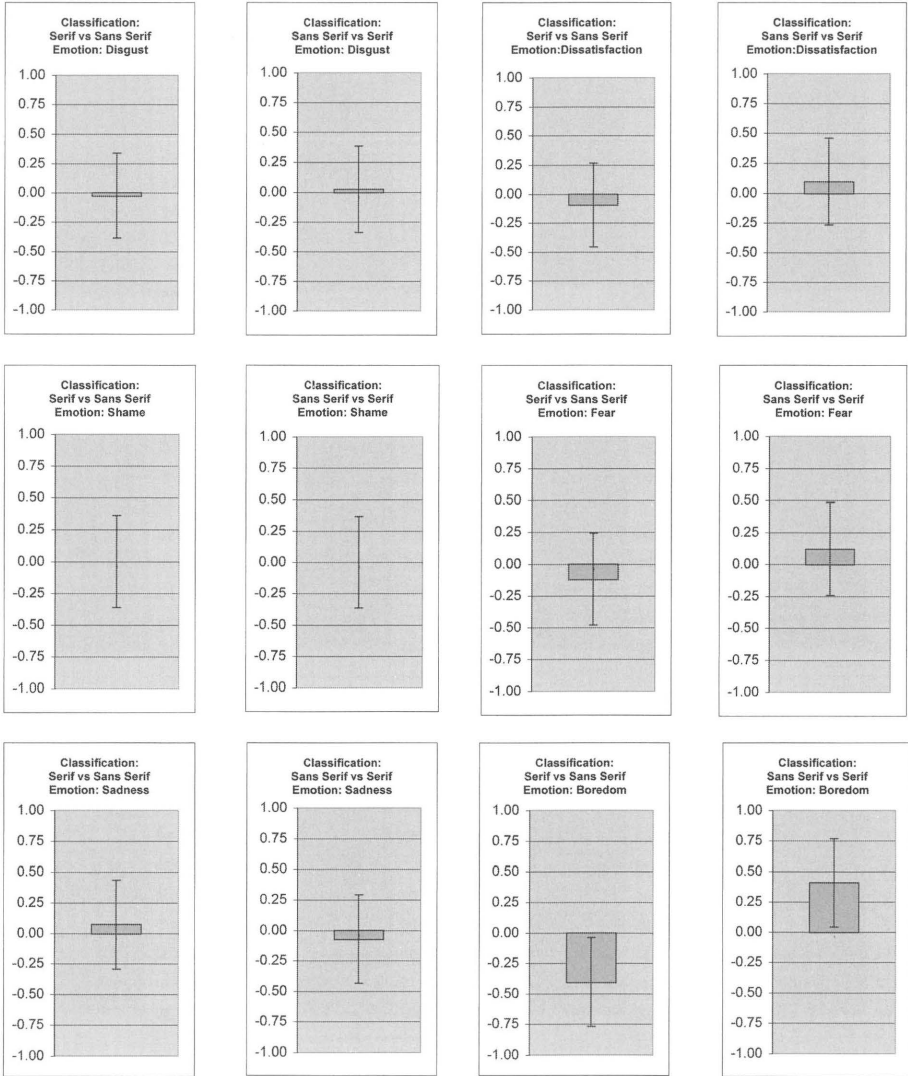


figure 6.

Paired comparison for positive emotions responses for terminal shape

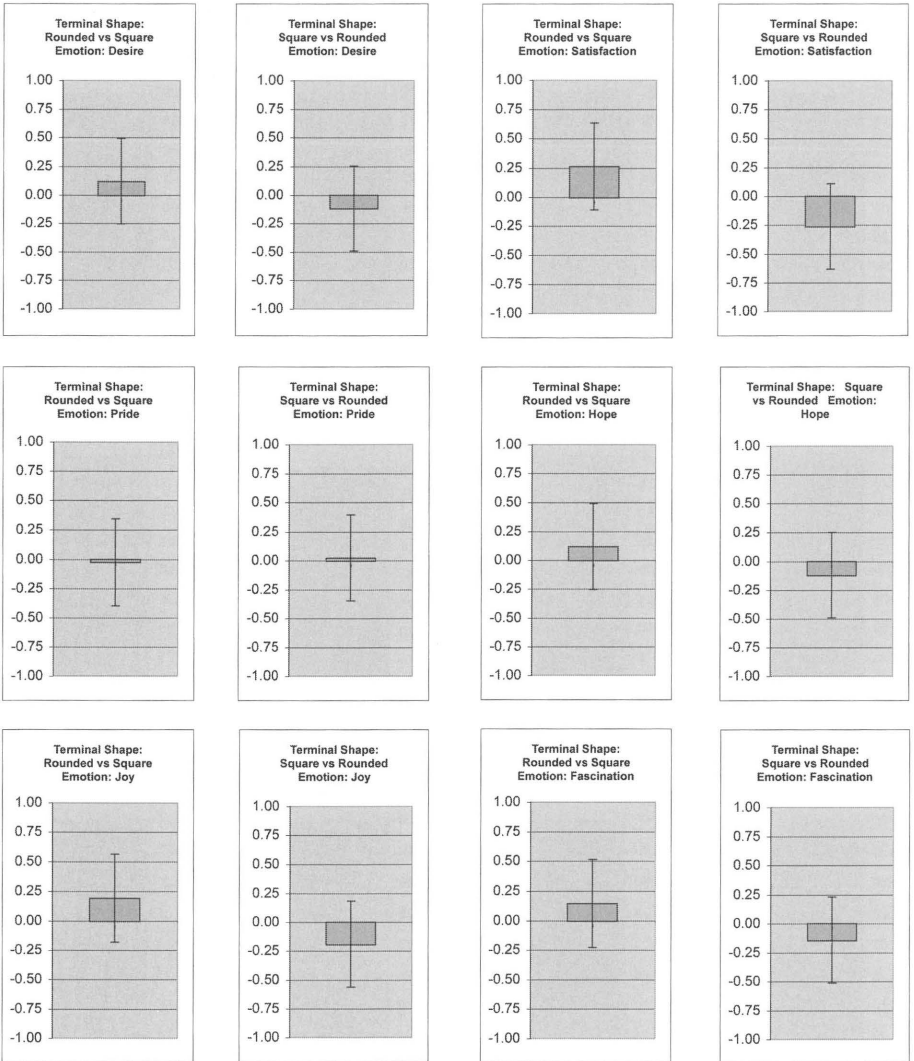




figure 7.

Paired comparison for negative emotions responses for terminal shape

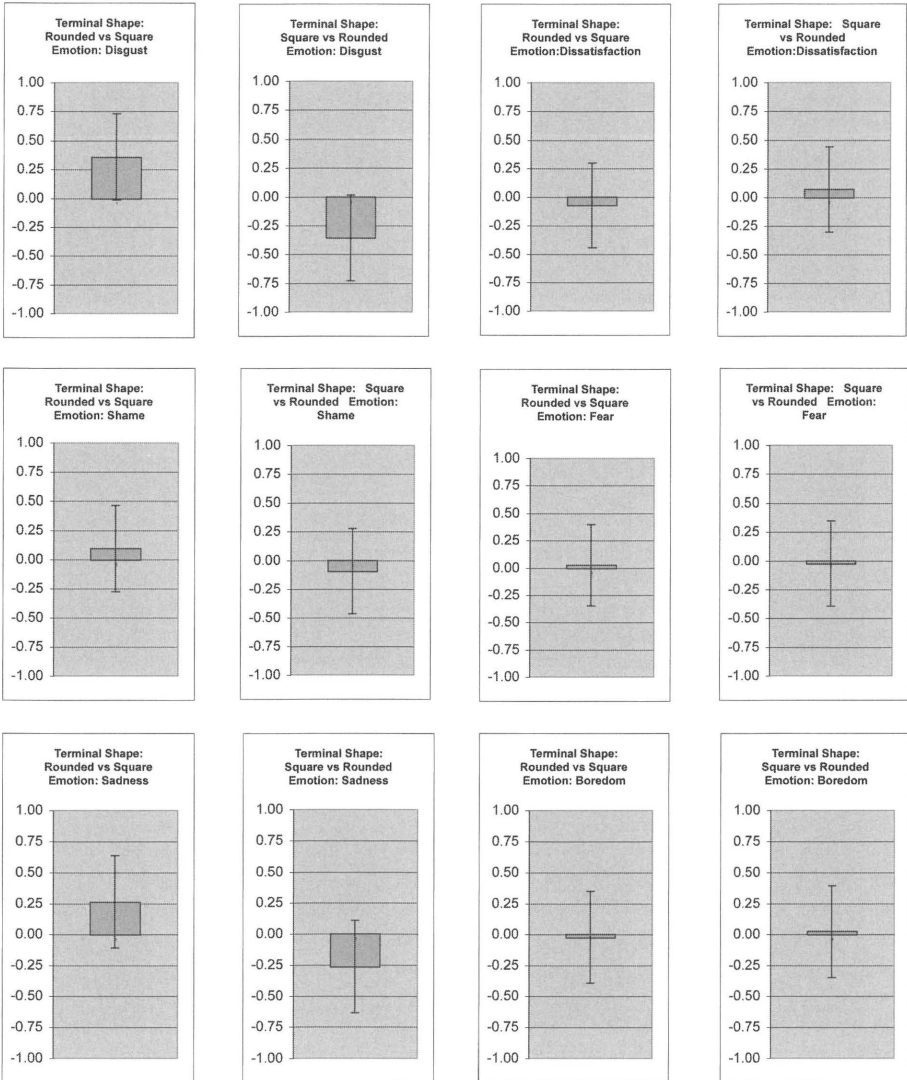


figure 8.

Paired comparison for positive emotions responses for character width

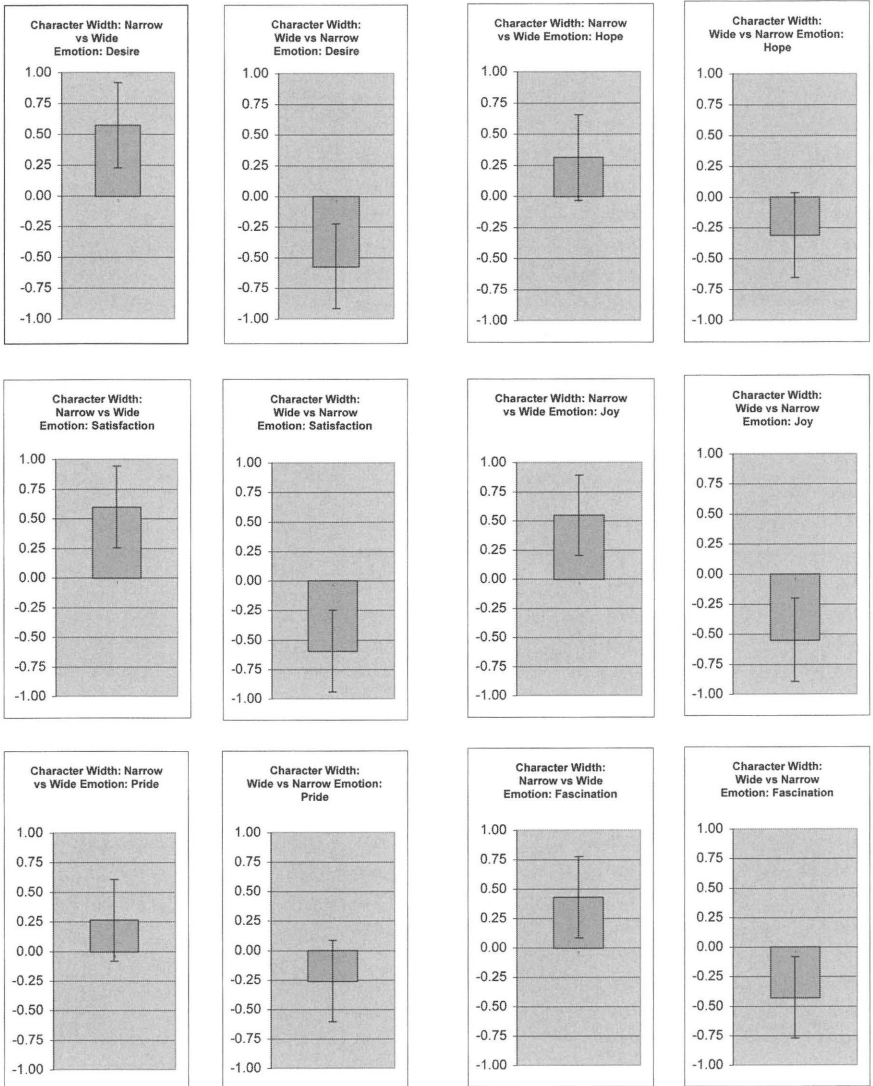
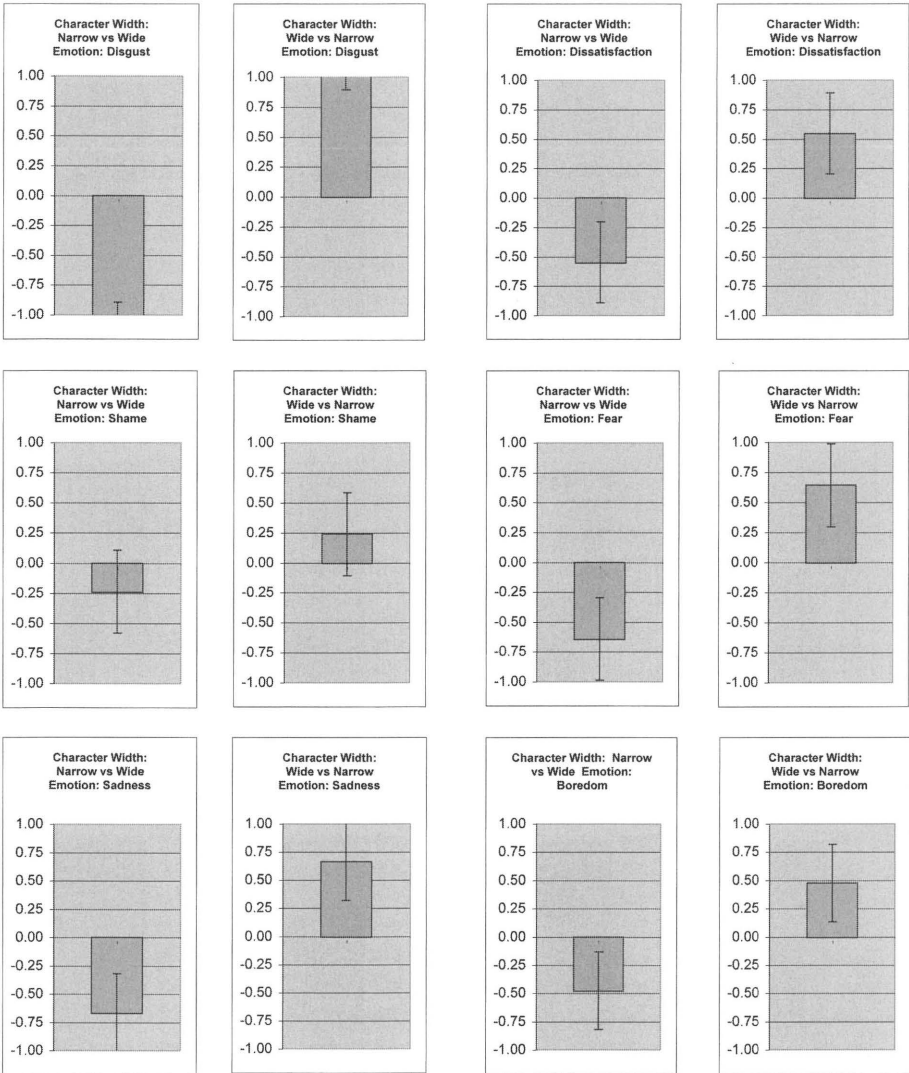


figure 9.

Paired comparison for negative emotions responses for character width



- 2 \_\_\_\_\_ Designers need to understand how design shapes attention, perception and emotion—and which design features they can utilize to influence behavior.
- 3 \_\_\_\_\_ The societal benefits of this research are the result of applying emotion and brain science to design, which can help solve a host of social problems. Findings from this study could a) effect consumer highway safety by improving comprehension speed, b) improve learning, c) improve communications generally and d) help alleviate the noise of visual information.
- 4 \_\_\_\_\_ Design researchers need to study how design affects people; resolve 70 years of inconsistencies in typographic studies by using consistent language and current typographic classifications; develop a system to quantify qualitative language of typography (how should boldness be measured, etc.); and carefully select stimuli to limit confounding features. Future studies should test a wider range of typefaces and identify and involve other typographic design features. Design researchers should always use emotion terminology that has been validated by psychologists. There is a need for design research to develop new visual methodologies to assess responses to visual stimuli.
- 5 \_\_\_\_\_ Finally, designers should begin to acknowledge and study how their work affects human emotions. Designers should not only function just in the interests of clients and employers, but should perform equally as advocates to protect consumers. In short, designers need to reassess the relationships among themselves and clients and audiences.

Since this study examines four very basic design elements, it also has implications for the entire range of visual design disciplines, from print to products, and experiences to information and safety. Because people reported the

same emotion responses to typographic design features, this study strongly suggests that design's underlying features represent a common visual language.

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#### REFERENCES

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- Benton, C.L. 1979. *The connotative dimensions of selected display typefaces. Paper presented at the annual meeting of the Association for Education in Journalism, Houston, Texas.*
- Davis, R.C. and H.J. Smith. 1933. *Determinants of feeling tone in type faces.* Journal of Applied Psychology, 17, 741-746.
- Desmet, P.M.A. 2002. *Designing Emotions. Self-published Masters thesis, Technical University Delft.*
- Doost, H., A. Moradi, M. Tagahavi, W. Yule, T. Dalglesh. 1999. *The development of a corpus of emotional words produced by children and adolescents.* Personality and Individual difference, 27.3, 433-451.
- Doyle, J.R. and P.A. Bottomley. 2006. *Dressed for the occasion: Font-product congruity in the perception of logotype.* Journal of Consumer Psychology, 16.2, 112-123.
- Doyle, J.R. and P.A. Bottomley. 2004. *Font appropriateness and brand choice.* Journal of Business Research, 57, 873-880.
- Grill-Spector, K., T. Kushnir, T. Hendler, T. Edelman, Y. Itzhak and R. Malach. 1998. *A sequence of object-processing stages revealed by fMRI in the human occipital lobe.* Human Brain Mapping, 6.4, 316-328.
- Gulyás, B. and P.E. Roland. 1994. *Processing and Analysis of Form, Colour and Binocular Disparity in the Human Brain: Functional Anatomy by Positron Emission Tomography.* European Journal of Neuroscience, 6.12, 1811-1828.
- Gulyás, B., C.A. Heywood, D.A. Popplewell, P.E. Roland and A. Cowey. 1994. *Visual form discrimination from color or motion cues: functional anatomy by Positron Emission Tomography.* PNAS Proceedings of the National Academy of Sciences of the United States of America October 11, 1994, 91.21, 9965-9969.
- Karjaluoto, E. 2008. *Loose Lips: Is the true value of design its ability to evoke emotion?* Applied Arts Magazine, 23.1, 10-11.
- Kastl, A.J. and I.L. Child. 1968. *Emotional meaning of four typographical variables.* Journal of Applied Psychology, 52, 440-446.
- Marcar, V.L., T. Loenneker, A. Straessle, S. Jaggy, K. Kucian and E. Martin. 2004. *An fMRI study of the cerebral macro network involved in 'cue invariant' form perception and how it is influenced by stimulus complexity.* NeuroImage, 23.3, 947-955.
- Merigan, W.H. and J.H.R. Maunsell. 1993. *How parallel are the primate visual pathways?* Annual Review of Neuroscience, 16, 369-402.
- Morrison, G.R. 1986. *Communicability of the emotional connotations of type.* Educational Communication and Technology Journal, 34.4, 235-244.
- Pinker, S. 1984. *Visual cognition: An introduction.* Cognition, 18.1-3, 1-63.
- Poffenberger, A.T. and R.B. Franken. 1923. *A study of the appropriateness of type faces.* Journal of Applied Psychology, 7, 312-329.
- Robinson, M. 2004. *The comprehension shift HMI of the future—designers of the future.* In McDonagh, D. and P. Hekkert. 2004. *Design and Emotion: The experience of everyday things.* London: Taylor & Francis.
- Scherer, K.R. 2005. *What are emotions? And how can they be measured?* Social Science Information. Thousand Oaks, CA: Sage Publications, 0539-0184.

- Stemler, L.K. 1997. *Educational characteristics of multimedia: A literature review*. Journal of Educational Multimedia and Hypermedia, 6.3/4, 339-359.
- Tannenbaum, P.H., H.K. Jacobson and E.L. Norris. 1964. *An experimental investigation of typeface connotations*. Journalism Quarterly, 41, 6573.
- Van Leeuwen, T. 2006. *Towards a semiotics of typography*. Information Design Journal & Document Design, 14.2, 139-155.
- Van Leeuwen, T. 2005. *Typographic meaning*. Visual Communication, 4.2, 137-143.
- Walker, S. 2001. *Typography and language in everyday life: Prescriptions and practices*. London: Longman.
- Weaver, W. 1949. *Recent contributions to the mathematical theory of communication*. In Shannon, C.E. and W. Weaver, editors. The Mathematical Theory of Communication. Urbana, IL: The University of Illinois Press, 1-28.
- Wendt, D. 1968. *Semantic differential of typefaces as a method of congeniality research*. Journal of Typographic Research, 2, 3-25.
- Zeki, S., R.J. Perry and A. Bartels. 2003. *The Processing of Kinetic Contours in the Brain*. Cerebral Cortex, 13.2, 189-202.
- Zeki, S.M. 1977. *Colour Coding in the Superior Temporal Sulcus of Rhesus Monkey Visual Cortex*. Proceedings of the Royal Society of London. Series B, Biological Sciences, 197(1127), 195-223.
- Zeki, S.M. 1974. *Cells responding to changing image size and disparity in the cortex of the rhesus monkey*. The Journal of Physiology, 242, 827-841.
- Zeki, S. 1973. *Colour coding in rhesus monkey prestriate cortex*. Brain Research, 53, 422-427.