ABSTRACT
Communication involving the expression of emotion is often more challenging online than in face-to-face interactions. Kinetic typography offers the possibility of more effectively encoding expressions of affect in social online interaction. The Emotive Type project explores the development of a framework for the mapping of affective states to kinetic letterforms for the explicit expression by a user in online social interaction. This project seeks to identify forms of kinetic text that effectively encode the expression of affect.


Keywords: design, computer mediated communication, kinetic typography

1 INTRODUCTION
The historical shift in use of text in e-mail communication for military correspondence to a medium for social communication has re-appropriated digital typefaces for the communication of social affect. These typefaces may function effectively to represent content in business environments, such as word processing and spreadsheet programs, but they may serve a less useful function in the socially charged environments of online Chat and email systems.

In order to visually distinguish text in online communication, current widely used IM Chat and email clients allow users to impart a narrow set of graphical transformations on text, such as bolding and italicizing, or selecting Arial or Times New Roman. The user is typically provided with a default font and font size in which to write, both of which have been chosen for objectivity and readability.

Kinetic typography has the potential to improve the communication of universal emotive cues that are not currently available through static type design by harnessing movable expression. Emotive Type explores the expression of using 15 discrete emotions corresponding to universal facial expressions [1]. The designs were deployed in a series of experimental tasks that seek to determine correlations between the textual manipulations and the emotion they attempt to express.

The Emotive Type project investigates 14 moving type designs effectiveness in evoking distinct emotions.

1.1 Research Problem
Online textual communication provides users with limited visual cues. People often use emoticons and other affective textual misspellings to cope with these limitations, but the emotional cues they provide are typically limited in scope and culturally biased [2].

Emotive Type explores the design and development of moving typographic forms to facilitate the communication of a group of universally salient human emotions (Ekman 1999). The design strategy for design is to observe typographical principles in the development of text transformations.

1.1.1 Problem Justification
Affect is acquired through interaction with a user, but the text to which affect can be mapped is limited: only a small number of possible combinations of text can be anthropomorphized or used to represent the human facial expressions, such as emoticons. The problem of limited range and quality of emotive cues given off in online communication has been raised in a variety of contexts. In a relatively early study of electronic mail, Sarbaugh, Thompson and Feldman (1998) suggest online communication has been limited by the lack of nonverbal cues in CMC, noting that “sarcasm, for example, is not well expressed on electronic mail.” [3]

Interestingly, the emoticon is the most common means of expressing affect in textual online social interactions but also fails to capture nuanced emotional feedback provided by face-to-face interactions. Emoticons often break in dialogues where interactions trigger complex or layered emotions. Yet their wide appeal and evocative potential suggests they afford a use other than for communication: rather than helping the message receiver understand the message, emoticons may help the sender to “express, check, and if need be to edit, that which may be unclear during initial message production.” [4]. The emoticon is used to generate feedback rather than facilitate direct conversation.

The lack of visual cues available for online emotive expression does not necessarily influence the quality of other affective states that depend on those cues. One recent study by Hancock, J. (2004) suggests textual computer mediated communication may not reduce the breadth of intentional states that rely on emotional common ground for those involved in the conversation, such as the use of humor or sarcasm. [5] In the case of sarcasm, the recipient must understand the content of the originator’s utterance through decoding the humor or irony in the message. Such cases represent plausible areas for application of a successfully expressive textual system for affect.

1.2 Previous Work
Previous work exploring the design of kinetic typography has addressed this problem, but with insufficient attention to the nuances of typographic form and movement [6]. This previous research has either focused on the physical interface with which to measure affect or on the design of an independent functioning system for the display of kinetic typographic content [7]. Little or
only peripheral attention has been paid to the process of creating the letterforms themselves. [8]

Cheiro, a text-based chat system, uses gesture input to generate animate text. An animated word is composed of individual kinetic letterforms, derived from movies of physical manipulations of two-dimension letterforms in three-space. The process of determining human gestures, such as dropping (for shy and depressed) and swinging left and right is not novel, but does suggest successful mappings from expressed emotional states and animated text through the use of gestural metaphor. An unfortunate lack of thorough evaluation of the system leaves many open questions as to the function of such an applied methodology.

Other designs have exercised the potential for the expression of emotion, but little has been done to fully embolden those possibilities. One recent study explored the implementation of a mutable avatar and text environment within a Chat client.i The system used implicit feedback from the user to automate changes in text contrast by altering the background color. The user’s typing speed served as the representative input for the communication of affect. The study did not address the effectiveness of the kinetic text to convey affect or meaning.

Other studies have attempted to assess effects of kinetic typography on other aspects, such its effect on readability. The study was unable to draw empirical conclusions due to problems in experimental methodology producing inconclusive results. [9]

2 TYPOGRAPHY AND DESIGN

Typography requires distinct design metrics with which to evaluate and understand its aesthetic and semantic effect. Kinetic typography may be defined as the selection of typefaces and the arrangement of type in a non-static composition. The letterforms within kinetic typography are constantly in motion. The inherent visibility and ubiquity of typography within a social and historical context provides the designer with a mutable medium by which one can communicate content. As such, the attributes of each letterform can be discretely mapped to various meanings that they represent.

In contrast to traditional letterpress printing, online textual communication uses a small set of default visual transformations: bolding, italicizing and underlining. Other visual attributes that can be manipulated include the text size, alignment, justification, letterspacing and, of course, the selection of the typeface itself. However, the manipulation of these factors more often conveys an emotion to a animation directly designed for that emotion set in sans-serif fonts. Ideally, a letterform can be discretely mapped to various meanings that they one can communicate content. As such, the attributes of each letterform can be discretely mapped to various meanings that they represent.

In the design of an experiment to assess the effectiveness of animation to communicate discrete emotions, the author controlled for five typographic properties: stylistic features, such as italic, roman, small caps; the weight of the text; the color of the text and background; the size of the text; and, lastly, the position of the text: its leading, tracking, and alignment. Three independent variables were used: typeface, emotion, and animation.

Setting up the design of an experiment to test the first hypothesis, font is used an independent variable in the kinetic design. Half of the animated text was set in a sans-serif font, and half set in a serif font. The Arial and Times New Roman typefaces were chosen due to their extensive online use.

3 METHODOLOGY

Although potentially effective typographic solutions for communication of affect have been previously explored, their implementation and effect on communication has not been rigorously analyzed. In the design of Emotive Type, the author explored two hypotheses for analysis: First, kinetic text set in serif or sans-serif fonts will have no effect on the correlations users report between animated text and the feeling that it; second, a word represented by kinetic text will rarely evoke both an emotion and it’s opposite. To decrease users’ fatigue, testing was limited to 36 sub-tasks in the first experiment and 26 sub-tasks in the third experiment (since users spent on average more time per sub-task on the third experiment). In each test, an animation designed for a particular emotion was applied to both that emotion (i.e. a positive emotion) and an animation it differed from (i.e. a negative emotion). The following emotion pairs were presented using the same two animations (one animation designed for each emotion): pleasure and disgust; satisfaction and anger; fear and relief; pride and shame; pride and embarrassment; pride and guilt; distress and contentment; amusement and contempt; excitement and boredom; (boredom was added to the list of emotions in order to present an emotion opposite to excitement). All animations were presented in random order to each user.

Although non-linguistic cues can be culturally biased, Paul Ekman [1] has defined “Basic emotions” that correspond to universal facial expressions: pleasure, disgust, satisfaction, anger, fear, relief, amusement, contempt, pride, shame, embarrassment, guilt, excitement, distress, and contentment. These emotions were used to design three experimental tasks that attempt to address whether affective states can be communicated consistently through animation.

In experiments one and two, animations were chose at random from four emotion-animation mappings: a mapping from an emotion to a animation directly designed for that emotion set in serif font, a mapping from an emotion to a animation directly designed for the closest antonym for that emotion set in serif font, as well as both mappings set in sans-serif fonts. Ideally, a mapping between every emotion and every animation should be generated and tested, but the mappings were constrained due to the small number of participants.

3.1 Experiment

The author conducted 27 user observations across three different experiments. For each experiment type, half of the subjects were male and half were female (with the exception of Task 3 in which 4 males and 3 females participated as subjects.)

For the first experiment, users viewed a series of 30 kinetic text animations, each spelling the name of an emotion. Users were asked to report whether they felt the emotion evoked by the animation was similar to or different from the name of the emotion represented. The second experiment asked users to complete the same task as the first experiment, but evaluate their rating of similarity using a Likert scale from 1 to 6 (1 being highly similar and 6 being highly different). [10]

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For the final experiment, users were asked to view a series of approximately 32 varying animations of the non-emotive word “information.” They were asked to select the emotion they felt was most similar to the same emotions evaluated in the previous two experiments. Of these animations, half the animations were set in the sans-serif font, and half were set in the serif font. The order of animations was randomly generated.

All experiments recorded the results for each emotion-animation mapping as well as the time it took to complete each mapping.

3.1.2 Results: Quantitative
The first experiment consisted of ten test subjects, 5 male and 5 female. The results showed that an average rating per animation-emotion mapping for all users was twice as high for reports of positive correlations (reports that the animation fit the emotion) than for negative correlations (reports that the animation did not fit the emotion). (75% or higher rating for positive correlation was reported for 20 out of 61 animations tested, compared with 75% or higher rating for negative correlation was reported for 8 out of 61 animations.) Each user tested 32 animations randomly selected from the 62 possible animation-emotion mappings.

The third experiment consisted of 7 test subjects, 4 male and 3 female. Of the seven users, the highest correlation between text and animation was for excitement, which was tied to three animations by at least 3 users.

Among 14 animations, six emotion-animation pairs received an average score of over 75% correlation: distress, anger, guilt, contentment, pleasure, contentment, pleasure, excitement and pride. Thus, six out of the seven positive emotion-animation pairs (animations designed for the animations they presented) were reported as highly correlated; whereas, only three of nine negative emotion-animation pairs were reported as highly correlated.

3.1.3 Results: Qualitative
During the first experiment, several users reported difficulty using a binary decision-making process. Before any introduction to the greater context of the experiment, several users reported an interest in using the typographic figures for talking to friends.

The emotional state of the test subjects appeared to influence the scoring of the animation to emotion correlations. One woman reported being pressed by an impending school assignment and subsequently selected a majority of negative emotions mapped to the “information” animations in the third experiment. Another woman participating in the third experiment declared that all the animations appeared positive in nature; she continued, “I don’t know how you could animate text and make it negative.” In addition to reflecting emotional conditions of each user, the animations appeared to elicit correlations of emotion to animation on a continuum. One young woman selected “anger” to correlate with an animation of “information”, but upon receiving the next animation declared: “Oh, that’s more angry!” In general, the results from the last experiment elicited the most vocal reactions and appeared to require more concentration and longer decision-making.

4 FIGURES AND TABLES

Figure 1. Two manipulations of the word “information” set in Times New Roman and Arial typefaces.

Figure 2. Second experiment screenshot.

Figure 3. The average score reported by all users of an animation-emotion mapping high (6) to low (1) for each positive emotion designed for that animation.
Animations Designed for and Presenting Negative Emotions

1.5 2 2.5 3 3.5 4 4.5 5 5.5 6

anger fear contempt distress disgust boredom shame embarrassment guilt

Figure 4. The average score reported by all users of an animation-emotion mapping from high (6) to low (1) correlation for each negative emotion designed for that animation.

Figure 5. The average score reported by all users of an animation-emotion mapping for four animations from highly correlated (1) to not correlated (0).

5 CONCLUSIONS

Based on the results of both the second and third experiments, positive animations were more than twice as likely to be reported by users as highly correlated. Although users reported correlations of varying consistency among animation-emotion pairs, animations that presented positive emotion names and those that involved less graphic complexity ranked higher than those that did not. Interestingly, the emotion-animation pairs that ranked highest in their user’s reported correlation value also made more explicit use of metaphor than those that did not. For example, the relief emotion-animation received a high correlation score and presented a simple metaphor: a ghost-like mirror of the “relief” text emerges from behind the letterform and is whisked off to the upper-left of the screen as if moved by wind. On the other hand, satisfaction did not make use of any metaphorical material and was also the only positive emotion-animation pair that did not receive a correlation rating of over 75% (of the animations designed for the animations they presented). The animation of the word satisfaction was more complex than the others, manipulating hue, contrast and size of the letterform yet using no direct metaphorical references. Future work should investigate the effectiveness of using metaphor in the animation of text to convey discrete emotions.

If a reliable design model for the expression of emotions explored in the study evolves, other interesting research questions may be worth addressing. For example, it would be interesting to test the divide between the ability to establish emotional common ground with an unfamiliar partner in face-to-face interactions verses in online interactions (particularly textual computer mediated communication). This difference may be due to the lack of the universally understood emotions and emotional cues in cmc. Face-to-face encounters provide cues that traverse cultures and allow people to gain emotional understanding without prior knowledge. In this sense, the interaction is not dependent on familiarity, but on the ability to read universal cues. Emotive Type could be used to address such questions in future work.

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REFERENCES