# Visual Quotes: Does Aesthetic Appeal Influence How Perceived Motivating Text Messages Impact Short-Term Exercise Motivation?

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## ABSTRACT

Visual Quotes, or the communication of motivational text messages in a visual format, are increasingly used across social media and online communities. While physical activity trackers could leverage visual quotes, empirical studies of activity tracking in HCI research have paid little attention to this phenomenon and their potential effects on motivation. In this work, we

conducted an online experiment (129 participants) to evaluate the impact of aesthetic appeal in motivational text messages as it relates to extrinsic identified behavior regulation. This is the type of motivation linked to the initial adoption of exercise behavior. The results of our study demonstrate that a perceived motivating text message presented with different levels of aesthetic appeal — ugly, neutral, beautiful — has the same impact on the motivation linked to short-term exercise (extrinsic identified behavior regulation). In other words, the perceived aesthetic appeal did not influence the motivating capability of textual messages for encouraging physical activity.

## KEYWORDS

Visual Quotes; Motivational Text Messages; Aesthetic Appeal; Physical Exercise Motivation

## INTRODUCTION

In recent years, activity trackers following their increasing popularity among buyers [8] have been an object of study as a tool of behavior change in HCI [6, 10]. One of the limitations pointed out by research is the motivating power of presenting numerical feedback [5]. For example, a study found that numerical feedback can have a detrimental effect on intrinsic motivation [5], the type of motivation associated with long-term exercise [14]. An alternative to showing directly numerical data can be transforming the data into motivational text messages. Physical activity text messaging can increase physical activity levels in the short-term (up to 15 weeks) [2], which is likely due to their capacity to activate the motivation linked to short-term exercise adoption [16]. However, HCI researchers have paid little attention to the current phenomenon in which many people are sharing and accessing motivational text messages on image-sharing social media platforms [3, 4]. On these platforms these messages are typically embedded in a visual presentation (Figure 1). This study explores how perceived aesthetic appeal impacts the motivating power of text messages for encouraging physical activity. Specifically, we conducted an experiment in which perceived motivating messages were presented in perceived ugly, neutral, and beautiful presentations. Our goal was to determine how extrinsic identified behavior regulation (linked to short-term exercise [5]) scores differed based on aesthetic appeal levels.

## BACKGROUND

Self-Determination Theory has been applied extensively to predict and understand health related-behaviors among adults, including exercise adoption and exercise adherence [5]. The extrinsic identified behavior regulation—linked to short-term exercise [5]—is a relatively self-determined type of behavior regulation and refers to behaviors that derive from the conscious valuing of an activity (the outcome of the behavior is highly valued) [13]. Motivational text messages seem to instigate this type of extrinsic behavior regulation. A recent early-stage work suggests text messages can instigate autonomous motivation to perform physical exercise [16]. This study [16], which lasted a month and a half, found that motivational text messages can



**Figure 1: Examples of Visual Quotes (motivational text messages embedded in a visual presentation).**

instigate identified behavior regulation. In other words, motivational text messages can help to promote a conscious valuing of physical exercise. Since this type of extrinsic motivation is linked to the initial short-term adoption, it seemed to us that it would be important to understand whether aesthetic appeal can help to strengthen how perceived motivating text messages impact short-term exercise motivation.

**Visual Aesthetics**

Visual aesthetics, in HCI, is viewed as the beauty or pleasing appearance of things [17], a non-instrumental quality that plays a significant role in a product's overall impression [15]. Beauty is often perceived before any other quality aspects of the product (e.g., usability) [7] and aesthetic judgments are similar before and after individuals interact with a system [15].

How beauty impacts the general impression of products and user experience is not yet completely clear, but "as long as beauty contributes to value and the overall liking of the product, this general 'positivity' is likely to spill over to other attributes" [7].

Following Hassenzahl [7] there are three typical approaches that researchers in HCI use to study beauty: the *Normative* (attempt to provide a "recipe" for how to design something beautiful), the *Judgmental* (concerned with what users judge to be beautiful or not; mainly interested in the consistency of beauty), and the *Experiential* (focus on all-embracing holistic experiences characterized by an individual's altered perception of their surroundings).

This study follows the Experiential approach. It is not particularly interested in rules about how to create beauty, but instead how the experience of beauty (aesthetic pleasure) impacts human assessments. Since the aesthetic appeal impacts the overall likeability of artifacts, in this work we explored how the perception of aesthetic pleasure influences the motivating capability of the textual content of a visual quote. In specific, our goal was to determine whether or not aesthetic appeal can help to strengthen the motivating capacity of the textual content on the type of motivation linked to short-term exercise.

**METHODS**

We conducted an experiment where each participant was exposed to a visual quote (example Figure 1) (procedure explained below). The textual content used in visual quotes were generic messages collected from the Instagram page of the commercial activity tracker Runkeeper. Examples of messages are "*Embrace the road in front of you*" and "*No matter what your goals are, the first step is to start.*" The visual presentations were created by author 1 (examples Figure 1). Motivational text messages are typically embedded in a range of different styles of visual presentations in social media platforms (e.g., illustration, photography, typographic). Runkeeper for example, shares this type of messages on Instagram in typographic-only visual presentations, as well as in visual presentations where the text message is placed over an image (photography). This study focuses on typographic presentations. To choose the final presentations to be used in

**Table 1: The 129 participants distributed per perceived aesthetic appealing levels.**

| Perceived aesthetic appealing levels | | |
| --- | --- | --- |
| Ugly | Neutral | Beautiful |
| 44 | 21 | 64 |

this study, several small pilot studies (between six to eight participants) were performed where several different types of typographic visual presentations were tested to provide the researchers with information about which of the created visual presentations were more consensually classified regarding how beautiful they are. The final pool of visual presentations to use in this study was selected after this study.

Participants were recruited through Amazon Mechanical Turk with each participant receiving $0.40 as compensation. A total of 414 individuals participated in the experiment. As an attempt to guarantee the quality of the results, data was filtered using the average time participants took to answer to the questionnaire (median=136 seconds) and the first (97s) and third quartiles (184s).

In other words, data of participants who took less than 97 seconds and more than 184s to answer to the questionnaire were discarded. Thus, a total of 210 participants remained. For the context of this study, we were only interested in participants who assessed message as motivating, since the number of participants split by the levels of aesthetic pleasure [ugly, neutral, beautiful] was too low in the text messages' categories demotivating and neutral (for example, the number of participants who assessed a message as demotivating and the visual presentation as neutral was two; the number of participants who assessed a message as demotivating and the visual presentation as beautiful was three). Therefore, we kept the data of only 131 participants. Data was then filtered by nationality = USA. This resulted in the removal of two participants, thus a total of 129 valid participants remained in the research data. Table 1 shows the distribution of the valid participants (129) by their perception of the aesthetic appeal of the visual quote they evaluated. Since we were interested in measuring the effect of perception, we could not guarantee the number of participants assigned to each group a priori. For example, we could not guarantee how many persons will perceive the visual presentation assigned randomly to them as ugly, neutral or beautiful. Therefore, the number of individuals in each group was not equal.

*Procedure.* First, participants' amotivation and controlled motivation (the external and introjection behavior regulation) were measured using the scale Behavior Regulation in Exercise Questionnaire (BREQ-3) [11, 18]. Next, a visual quote, selected randomly by the system was presented to the participant. The participant was asked to assess the aesthetic pleasure from the visual presentation (measured through the scale Aesthetic Pleasure in Design [1]), and after how motivating or demotivating the present text message was for them (measured through a 7-point Likert scale from extremely demotivating to extremely motivating). Finally, once the user was exposed to the stimulus and had assessed it in terms of aesthetic pleasure and how motivating was the textual content, the extrinsic identified behavior regulation (through BREQ-3 scale) was measured, followed by the participant's characterization questions (age, gender, nationality, exercise habits).

## RESULTS

In this study, we were interested in determining whether identified behavior regulation differed based on the perceived aesthetic appeal of the motivating messages. Our dependent variable

(identified behavior regulation) was not normally distributed for each group of the "independent variable" (perceived aesthetic appealing). Thus, as an alternative of the parametric test one-way ANOVA, the non-parametric test Kruskal-Wallis H test was conducted.

A Kruskal-Wallis H test was conducted to determine if there were differences in identified behavior regulation scores between groups that differed in their level of perceived aesthetic appealing: the "ugly" (n=44), "neutral" (n=21), and "beautiful" (n=64) aesthetic appeal level groups. Distributions of identified behavior regulation scores were similar for all groups, as assessed by visual inspection of a boxplot. Median identified behavior regulation scores decreased from ugly (3.00) to neutral (2.50) and increased from neutral to beautiful (3.00) aesthetic appeal groups. The differences were not statistically significant, $\chi 2(2) = 3.976$, $p = .137$.

*Participants characterization.* All participants reported a nationality of the United States of America. In total, 71 of the participants were male (55%) and 58 female (45%). Most of the participants (69%) are between the age range 20 to 39, followed by 24% between 40 to 59, 6% are 60 or more, and 1% is between 18 to 19. Regarding exercise habits, most of the participants reported doing exercise at least once a week. Twelve participants (9%) reported doing exercise once a week, 19 participants (15%) twice a week, 21 (16%) three times a week, and 43 (33%) more than three times a week. Nine participants (7%) reported never exercising and 25 (19%) just once in a while.

In general, participants showed to have low levels of amotivation (scale from 0 to 4) (mean=0.9, standard deviation = 1.19) and low levels of controlled motivation (M = 1.7, SD = .90).

## MAIN LIMITATION

In a true experiment, participants would be assigned a priori to each condition of aesthetics. However, since in this study we were dealing with the effect of "perception," the experience of aesthetic appeal for each individual can be highly subjective. We were not able to know a priori whether an individual will perceive something as beautiful or not. Therefore, the participants were assigned to the groups (conditions) — "ugly," "neutral", "beautiful" — in the data analysis phase.

## DISCUSSION, OTHER LIMITATIONS, AND CONCLUSION

Studies in HCI related to motivational text messages typically explore message content characteristics—gain versus loss frame [9], tailoring [12], etc.—and its impact on walking behavior [6]. However, nowadays many people seem to see these messages embedded in a visual presentation, and the impact of the visual presentation is unclear as it relates to the motivating capability of motivational text messages. This study, through an experiment, tested whether the perception of aesthetic appeal changes the impact of perceived motivating text messages on identified behavior regulation. The results showed that as opposed to what might be expected, the perception of aesthetic appeal did not change the impact of perceived motivating messages on identified behavior regulation. Nonetheless, we note each participant was exposed to only one visual quote. It can happen that in conditions in which the individuals are exposed to a higher number of visual quotes or over a lengthy exposition to the stimulus, the results may be different.

Additionally, our results do not mean that aesthetic appeal does not add value for motivational text messages. Rather it is possible that it impacts motivational text messages in other ways. For example, it might be that aesthetic appeal contributes to keep persons interested in visual quotes over time. Our results merely indicate that differences in the perception of aesthetic appeal do not seem to influence the motivating capability of a motivational text message.

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