

# Emotionality in Text as Predictor of Behavior

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## Abstract

The present study demonstrates how the emotional content of search terms and their eventual results affects the breadth of a users' search for information. We observed the quantity of results selected by users. In a random sample of queries from the *Microsoft LiveSearch* search engine, 7,021 queries were evaluated using a dictionary with valence and arousal ratings. The number of search results selected was regressed on the valence and arousal of the search terms. We additionally observed users' selection of results based on the position in the search results. Using the same sample, result placement was regressed on the valence and arousal level of the search terms. Results from quantity of search results selected shows that negative search terms result in an overall larger number of selections made than positive search terms. For position-based selections, we found that the selection of the first result is affected by an interaction of valence and arousal. Specifically, users were unaffected by the arousal level of negative search terms, but appeared to be more likely to search deeper on the page when they searched for less arousing positive information. These results suggest that the emotional content associated with a search query may lead users to be more or less discriminating in their acceptance of information and may influence the impact of placement on result selection.

## Introduction

People search for a variety of kinds of information, all containing emotional content. While it is not possible to infer a user's psychological state based on their queries, evaluating words by their emotional content can be a valuable tool for classifying data. The present study demonstrates how the emotional content of search terms affects the breadth of users' search for information.

Psychological research has documented many instances of information processing biases toward negative information. Generally, negative events and information

lead people to narrow and focus their attention, and increase the quantity of processing (Taylor, 1991).

For example, Fiske (1980) presented subjects with positive, negative, and neutral information about a person upon whom they would form an impression. Subjects spent longer viewing the negative information compared to the positive and neutral, suggesting that people paid more attention to negative than positive information when forming impressions.

Furthermore, people seek to understand events that happen to them, and some research suggests that negative events cause people to engage in a greater search for meaning than they would engage in following positive events (Baumeister, 2001).

Overall, people process negative and positive information differently. Positive information is often accepted as true with little examination or scrutiny, whereas negative information is more carefully evaluated. Consequently, we expected that users would examine and select a wider amount of information when they engaged in searches for negative than positive information.

## Method

### Participants and Procedure

By randomly sampling *Microsoft LiveSearch* single-word queries collected on 5/1/2006, we analyzed 7,021 queries that included words appearing in Bradley and Lang's (1999) *ANEW* dictionary.

We were able to identify the relative valence (good-bad) and arousal level (high-low) of each search term, the number of result selections each user made before ending their search session, and the result position of the first result selected. The sample encompassed search sessions where at least one result was selected. Number of selections is defined as the total number of results that the user selected in the search session. Position of result is the ordinal position of the first result selected in the search session.

Individual regressions compared result selections and result position to the valence, arousal, and valence-arousal interaction ratings for each query.

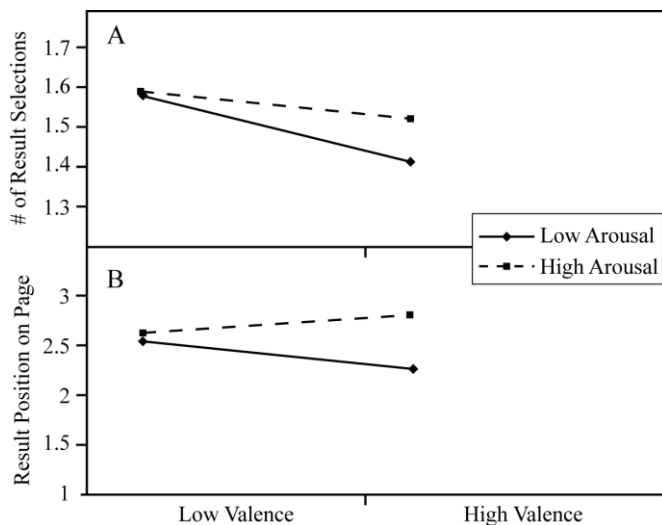


Figure 1

## Results

### Number of Selections

We regressed the number of result selections on the valence and arousal of search terms, which revealed a significant linear fit,  $F(3, 7017) = 5.77, p = .001$ .

A main effect of valence was found, such that negative search terms resulted in a larger number of selections than did positive search terms,  $\beta = -.06, t = 4.02, p < .001$ . Perhaps more important, valence of search terms interact with the degree to which search terms were arousing,  $\beta = .04, t = 2.19, p = .03$ . When search terms were less arousing, users searching for negative content (e.g., “ear infection”) chose a greater number of results than users searching for positive content (e.g., “gentle dental, 06810”). When search terms were highly arousing, however, users searching for negative (e.g., “dandelion killer”) and positive (e.g., “ecstasy”) content selected results at a similar frequency (see Figure 1A). There was no main effect of arousal,  $t < 1$ .

### Position of Results

A regression of the first selected result’s position on the valence and arousal of search terms showed a significant linear fit,  $F(3, 7017) = 12.44, p < .001$ .

A significant interaction was found, such that the valence of the search terms interacted with the degree to which search terms were arousing,  $\beta = .07, t = 4.25, p < .001$ . Users were unaffected by the arousal level of negative search terms, but were more likely to search deeper while searching for highly arousing positive content (e.g., “ecstasy”). Users who searched for positive content that was low in arousal (e.g., “gentle dental, 06810”) selected results placed higher on the page (see Figure 1B). There was no main effect of arousal,  $t < 1$ , and no main effect of valence,  $t < 1$ .

selected results placed higher on the page (see Figure 1B). There was no main effect of arousal,  $t < 1$ , and no main effect of valence,  $t < 1$ .

These results suggest that the emotional content of or associated with a search query may lead users to be more or less discriminating in their acceptance of information and may influence the impact of results placement on result selection. Users who searched using negative queries tend to select more results than users searching with positive queries. When users’ searches were less arousing, those searching for negative content chose a greater number of results than users searching for positive content. In addition, users were likely to search deeper while searching for highly arousing positive content. Users who searched for positive content that was low in arousal selected results placed higher on the page.

## Discussion

If the emotional content of words predicts how many results a user will select, and how far down a list of results they will go, it may mean that a user does not engage in the same browsing behavior for every search session. Indeed, these preliminary results suggest that the way a user perceives search results is contingent upon the emotionality of the words involved in the original query. Search providers can account for the emotionality of words and use this analysis to reorder information to discount for immediate bias. In addition, social media websites can potentially classify users according to individual behavioral differences in reacting to the emotionality of text.

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