DOI: 10.1177/00222429241263012

JOURNAL of Marketing

Positive Emotions During Search Engine Use: How You Feel Impacts What You Search For and Click On

Journal:	*Journal of Marketing*
Manuscript ID	JM-21-0807.R5
Manuscript Type:	Revised Submission
Research Topics:	Advertising, Consumer Emotion
Methods:	Lab Experiments, Archival analysis

Positive Emotions During Search Engine Use: How You Feel Impacts What You Search For and Click On

Sarah C. Whitley
Assistant Professor of Marketing
Terry College of Business
University of Georgia, Athens GA
Email. sarah.whitleyc@uga.edu

Anindita Chakravarty*
Professor of Marketing Effective August 1st, 2024
Terry Dean's Advisory Council Distinguished Professor
Terry College of Business
University of Georgia, Athens GA
Email. achakra@uga.edu

Pengyuan Wang
Associate Professor of Marketing
Terry College of Business
University of Georgia, Athens GA
Email. pengyuan@uga.edu

* is the corresponding author. The names of authors appear in their rank order of contribution to the manuscript. We acknowledge and appreciate the valuable support provided by Lan Anh Ton in the early stages of this manuscript. Lan Anh Ton is currently an Assistant Professor in Marketing at the Texas Christian University (email: L.A.TON@tcu.edu).

Positive Emotions During Search Engine Use: How You Feel Impacts What You Search For and Click On

Abstract

The authors examine how positive incidental emotion influences online search and ad click-through rates. They predict and find that while positive incidental emotion is irrelevant to the search task, it has the effect of priming emotionally congruent thoughts, which increases the likelihood that consumers will use positive emotion words as keywords in their search queries. This use of positive emotion keywords, in turn, increases the likelihood of clicking on paid search ads. Results from six studies support this prediction and the role of lower persuasion knowledge as a mechanism. Specifically, the use of positive emotion keywords in search queries reduces the likelihood that consumers will use persuasion knowledge towards sponsored content in the form of paid search ads—making them more likely to click on the ads. This examination of the role of positive incidental emotion and the use and consequence of positive emotion keywords in search queries has important implications for advertisers' search engine keyword targeting strategies.

Keywords: positive incidental emotion, search engine, search query keywords, paid search ads, click-through rates

In 2023, advertisers spent approximately $110 billion in the U.S. on paid search ads within search engines (Wood 2023). Given the substantive importance of paid search ads, advertisers are interested in identifying keywords in search queries that when matched to paid search ads can improve ad effectiveness. Accordingly, research has proposed various advantageous keywords such as deal-related words, brand names, retailer names, product category names, and location information (Agarwal and Mukhopadhyay 2016; Ghose and Yang 2009; Jerath, Ma, and Park 2014; Joo, Wilbur, and Zhu 2016; Lu and Zhao 2014; Rutz, Trusov, and Bucklin 2011). When consumers search online with these keywords, advertisers can provide ads that match as a way to improve ad clicks (e.g., Du et al. 2017). However, despite extensive research on keyword identification and ad clicks, advertisers continue to lament that ad click rates do not justify spending on paid search ads (Brenner 2023; Fou 2021; Hsu 2023).

One challenge is that we lack an understanding of consumer mindsets in the online search process (e.g., Hamilton and Price 2019; Humphreys, Isaac, and Wang 2021). Specifically, advertisers would likely benefit from understanding "why" consumers choose product descriptors (which advertisers call keywords) in search queries and "why" they click on paid search ads (Liu-Thompkins 2019), answering calls from scholars acknowledging a greater understanding of the processes behind online advertising effectiveness is needed (Shankar et al. 2022). One opportunity is to investigate how consumers' incidental emotions (that are unrelated to the search task) might influence what they search for and why they click on paid search ads.

We focus on positive incidental emotion because studies on consumer emotions show that positive incidental emotion significantly influences the type of information consumers consider during consumption-related actions (Cohen and Andrade 2004; Kahn and Isen 1993; Meloy 2000; Rucker and Petty 2004). In our context, when using a search engine, if a consumer

feels positive emotion (regardless of the source, i.e., incidental positive emotion), we predict that this emotion can influence the subsequent product search process. The product search process within a search engine requires an initial articulation of a search query, which is typically a description of the product. Any positive incidental emotion felt during the generation of a search query might impact the choice of keywords used to describe the product in a search query. In this research, we propose that positive incidental emotion primes consumers' use of positive emotion keywords (e.g., "happy," "joyful," "inspiring") to characterize their desired product in search queries. We further propose that the use of positive emotion keywords in a search query makes consumers less likely to use persuasion knowledge—thoughts about marketers' ulterior motives to persuade or manipulate consumers (Friestad and Wright 1994)—in their evaluation of paid search ads. This lower use of persuasion knowledge towards paid search ads makes consumers more likely to click on the ads.

Across a series of six studies (plus another three studies in the Web Appendix; five preregistered; 6,803 total participants), we examine this multistage process starting from positive incidental emotion to its influence on the use of positive emotion keywords in search queries and the subsequent effect on paid search ad clicks. In doing so, we make three important contributions.

First, we extend work on keyword targeting strategies for paid search ads. While prior findings indicate that consumers are more likely to click on certain links depending on their position and characterization on the search results page (Berman and Katona 2013; Jansen and Resnick 2006; Jerath, Ma, and Park 2014), our work relates to the psychology underlying search engine use. That is, positive incidental emotion impacts how consumers describe products in search queries that subsequently influences paid search ad click behavior.

Second, our process driven psychological examination behind why consumers click on paid search ads expands upon the keyword specificity explanation referred to in prior work (Jansen and Schuster 2011; Ramlall et al. 2011). Previous research identifying advantageous keywords to target in paid search advertising has postulated that certain keywords are associated with higher ad click rates because they more specifically describe the consumers' desired product, which appeals to consumers who are close to the point of purchase prompting higher ad clicks. However, rather than assessing the underlying consumer psychology associated with the use of specific keywords, prior work infers this "point of purchase" perspective from an examination of ad click data (i.e., click-through-rates from archival data). With our experimental approach, not only do we propose a new type of keyword (i.e., positive emotion keywords) that advertisers might consider in their keyword targeting strategies, but we also provide psychological explanations based on affect priming and persuasion knowledge for why these keywords influence paid search ad clicks.

Third, we add to the literature on the effects of positive emotion on consumer decisions by exploring the impact of positive incidental emotion in online search. Whereas prior work has primarily examined the effect of incidental emotion on product judgments or choices (Han, Lerner, and Keltner 2007; Kahn and Isen 1993; Raghunathan and Pham 1999; Rucker and Petty 2004), we show how positive emotion influences search query generation, which has downstream consequences on consumers' search behaviors for products. Finally, by examining not only how search queries are initiated but also how consumers respond to ads obtained from these search queries, our work adds to a growing literature on the role of human emotions on digital behavior (e.g., Morningstar et al. 2021; Schweidel and Moe 2014).

Next, we provide a conceptual framework for how positive incidental emotion influences consumers' search query keyword selection and subsequently how those search queries impact paid search ad clicks. We then provide support for our proposed conceptual framework using archival search engine data and experiments.

Conceptual Development

Using a search engine involves a sequential set of decisions. Upon deciding to engage in online search via a search engine, consumers select keywords to implement their search query and then evaluate whether or not to click on ads generated among their search results (Agarwal and Mukhopadhyay 2016). We focus on how positive incidental emotion influences these two steps of engaging in online search via a search engine: (1) keyword selection (i.e., the words a consumer chooses to describe the product they have in mind that will be typed into the search query) and (2) ad clicks.

Positive Incidental Emotion and its Impact on Search Query Keyword Selection

Research shows that consumers' emotional state can play a role in determining the products consumers seek to purchase (Cohen and Andrade 2004; Kahn and Isen 1993; Rucker and Petty 2004). Emotion felt at a particular moment, both relevant (i.e., integral emotion; Loewenstein and Lerner 2003) and irrelevant (i.e., incidental emotion; Han, Lerner, and Keltner 2007) to a given task, can inform people's search and procurement processes (e.g., Meloy 2000). With regard to incidental emotion, despite the emotion being irrelevant to the purchase decision, consequences of the felt emotion can impact how consumers think about products and what types of information they focus on. For instance, while negative incidental emotion has been shown to

impact subsequent product decisions because of its goal-directed motivating nature to alleviate the feeling of negative emotion (Chen and Pham 2019; Han, Lerner, and Keltner 2007; Wyer et al. 2019), positive incidental emotion tends to impact what one thinks about and how they process information, which can affect subsequent purchase decisions. Specifically, positive incidental emotion tends to make congruent positive emotion-related thoughts and words more available in one's memory (Bower 1981; Forgas 1995). In other words, positive incidental emotion makes one more apt to recall and think about positive content in the process of making product judgments. Further, positive incidental emotion impacts how consumers process information during a decision, promoting information that is top of mind (Bless and Fiedler 2006) and resulting in more simple, shallow processing (Bless et al. 1996; Tiedens and Linton 2001). For instance, consumers are equally persuaded by strong and weak persuasion appeals when positive emotion is primed, whereas under other emotional states only strong appeals lead to persuasion (Schwarz, Bless, and Bohner 1991).

Building on this research, we suggest that consumers who feel positive incidental emotion when initiating a search think about certain types of information when selecting the keywords for their search query and deciding which results to click on. As positive incidental emotion makes positively-valenced associations more salient and available in one's memory (Bower 1981; Forgas 1995), we suggest that consumers will also be more likely to describe their desired product with positive emotion words (e.g. "happy," "joyful," "inspiring"). We hypothesize:

H1: Positive incidental emotion, felt at the initiation of search, will lead to an increased use of positive emotion keywords to describe a product in one's search query.

The Impact of Positive Emotion Keywords on Paid Search Ad Clicks

In H1, we propose that positive incidental emotion impacts the use of positive emotion keywords in consumers' search queries. Next, we describe how this use of positive emotion keywords subsequently influences which search results consumers click on. To understand this relationship, it is important to think about how paid search ads are displayed on a search engine results page. These ads are explicitly disclosed as sponsored content with the label "Sponsored" or "Ad"[1] (see Figure 1 for an illustration).

Figure 1. Illustrative Paid Search Ad on Google for T-shirts

Multiple studies have shown that disclosing the sponsored nature of content can prime consumers to use persuasion knowledge when assessing the content (Boerman, Willemsen, and Van Der Aa 2017; Eisend and Tarrahi 2022). Persuasion knowledge refers to thoughts about marketers' ulterior motives to persuade consumers via psychological effects and various marketing tactics and strategies (Friestad and Wright 1994). The use of persuasion knowledge is typically associated with consumers' skepticism or distrust of persuasion attempts (Darke and Richie 2007; Xu and Wyer 2010). As a result, after generating a search query, when consumers

[1] Bing uses "Ad" to denote sponsored search content while Google used "Ad" up until 2022 and then changed to "Sponsored."

see paid search ads with the label "Sponsored" or "Ad," they are likely to use persuasion knowledge when assessing the ad, which can result in skepticism of the content along with perceptions of manipulative intent[2], which should make them less likely to click on paid search ads.

We build on this idea by suggesting that the use of positive emotion keywords in a consumer's search query will decrease the likelihood the consumer will use persuasion knowledge, leading to an increased likelihood to click on the ads. As indicated above, we suggest that positive incidental emotion leads to the use of positive emotion keywords in one's search query (H1). We base our hypothesis on findings that positive incidental emotion makes congruent positive emotion-related thoughts and words more available in one's memory (Bower 1981; Forgas 1995) and promotes top-of-mind processing (Bless et al., 1990; Bless and Fiedler 2006; Mackie, Asuncion, and Rosselli 1992; Schwarz, Bless, and Bohner 1991; Tiedens and Linton 2001). Further, viewing positive emotion words has been shown to prime congruent thinking and shallow, top-of-mind processing (for a review, see Fazio 2001; Klauer and Musch 2003). Thus, we anticipate that employing positive emotion keywords in one's search query prolongs shallow, top-of-mind processing throughout the online search engine process. As using persuasion knowledge requires inferences of ulterior motives underlying a persuasion attempt (Campbell and Karmani 2000), and these inferences are obtained from elaborating on the presented information (Ahluwalia and Burnkrant 2004; Friestad and Wright 1994,), when consumers engage in shallow processing, they should be less likely to use persuasion knowledge. Prior work provides support for this in that positive emotion, relative to neutral emotion, has

[2] In a manipulation check for Study 5 (Web Appendix G) we empirically validate that consumers do perceive higher manipulative intent on behalf of paid search ads (disclosed sponsored or paid content) compared to organic links (no disclosure due to unpaid content).

been shown to increase the gullibility of individuals, making them less skeptical of presented information (Forgas 2019). Accordingly, we propose that when using positive emotion keywords in a search query, consumers are more likely to click on a paid search ad compared to consumers using nonemotion keywords because they are less likely to use persuasion knowledge when evaluating the ad.

H2: The use of a positive emotion versus nonemotion keyword in a search query will be associated with an increased likelihood to click on paid search ads.

H3: Consumers are more likely to click on paid search ads when using a positive emotion keyword because they are less likely to use persuasion knowledge when evaluating the ad.

Overview of Studies

Using archival search query data from a prominent search engine (Pilot Study), we first demonstrate that the use of positive emotion keywords in search queries is an important context for exploration, as they are used in consumers' search queries and result in consequential effects for marketers (i.e., ad clicks). We then experimentally examine how positive incidental emotion impacts this search engine process by showing how it (1) impacts the keywords consumers use in their search queries (Studies 1-3) and (2) the subsequent effect on consumer ad click behavior (Studies 4-5).

In Study 1, using a design that resembles the organic derivation of consumer search queries, we show that positive incidental emotion increases consumers' likelihood to employ positive emotion keywords in their search query for various products. Using a controlled design testing the effect within a specific product category, we find that the effect of positive incidental

emotion on positive emotion keyword use in search queries replicates across products for which positive emotion words as descriptors may be more or less common (Studies 2-3). In Study 4, we conduct a causal mediation analysis to show the full search process that positive incidental emotion increases consumers' use of positive emotion keywords in their search queries and that this use of positive emotion keywords in search queries increases paid search ad clicks. In study 5, we provide support for our theory that this effect on ad clicks occurs because consumers use less persuasion knowledge to assess paid search ads when searching for a product described with a positive emotion keyword. Lastly, we summarize various replication studies that demonstrate the robustness of the effect of positive emotion keywords on ad clicks.

Pilot Study

To validate this exploration of positive incidental emotion on the search engine search process, we first demonstrate the existence and impact of positive emotion keywords in search queries on a metric of concern for marketers in the search engine space: CTRs for paid search advertising. Accordingly, we examine archival search queries from a search engine platform and the accompanying CTRs associated with those queries.

Method

We extracted a random sample of product search queries generated on a search engine platform between February and March 2019, which equated to 50,335,229 search queries[3]. We then employed matching algorithms using an emotion word dictionary (see Web Appendix A) to

[3] The non-disclosure agreement with the archival dataset provider prohibits the publication of the data used in the pilot study.

identify queries with positive emotion keywords, which resulted in the identification of 36,224 unique queries that contained positive emotion keywords. To validate whether the positive emotion keywords extracted by this method indeed represented descriptors of products, we randomly selected a subsample of 13,035 unique queries containing positive emotion keywords and hired two linguistic experts from a freelancing website to independently assess each search query to confirm whether (1) it contained a positive emotion keyword (not merely a brand name) and (2) the positive emotion keyword was used as a descriptor (i.e., adjective or adverb) of a product/service (intercoder agreement: 80.38%). This subsample was generated for feasibility of human assessment and cost; we designed the selection procedure (using a random number drawing) to maximize the various types of positive emotion keyword search query combinations employed in the data (for a detailed description, see Web Appendix A). With this human validation process, the two linguistic experts unanimously confirmed that 2,420 of the 13,035 queries mentioned a product with a positive emotion keyword as a product descriptor. To assess how the presence of a positive emotion keyword in the search query influences paid search ad clicks, we compared the CTRs of this set of 2,420 queries containing positive emotion keywords with an accompanying set of search queries for analogous products/services with nonemotion keywords.

For each search query with a positive emotion keyword, we manually crafted a "counterpart query" for the same product or service but replaced the positive emotion keyword with a nonemotion keyword. For example, for the query "pleasant Hawaiian holidays," we crafted a comparable query of "long Hawaiian holidays." We did this by requesting the same linguistic experts to articulate a nonemotion descriptive keyword for each query that (1) did not convey any emotion and (2) meaningfully described the product (see Table 1 for a subset of the

data showcasing this process). This process provided us with the unique text of 4,840 search queries (i.e., 2,420 queries with a positive emotion keyword paired with 2,420 queries for the same product/service with a nonemotion keyword). Next, for each search query (i.e., the text of the query) as generated above, we searched our archival dataset for a match, and then obtained the aggregated CTR[4] of paid search ads appearing under all queries in our archival data that matched the search query text. Restrictions imposed by the data provider meant that the CTR for specific ads (i.e., specific retailers) could not be identified, thus the aggregated CTR represents consumers' responses to all paid search ads in the first rank position for the stated query.

Results and Discussion

We compared the CTR of paid search ads between the queries with positive emotion keywords and their paired counterpart query with a nonemotion keyword using a paired *t*-test. Our results indicated that search queries containing positive emotion keywords led to significantly higher CTRs than queries for the same product/service containing a nonemotion keyword (CTR_{PosEmo} = .09 vs. CTR_{NonEmo} = .07; t = 7.80, p < .001). We also conducted another version of this analysis in which we compared the CTR of paid search ads between the queries with positive emotion keywords and a paired counterpart query with no descriptive keyword (e.g., "pleasant Hawaiian holidays" vs. "Hawaiian holidays"). That paired t-test showed a similar result: search queries containing positive emotion keywords led to significantly higher CTRs

[4] CTR is the number of clicks that an ad receives divided by ad impressions (the number of times the ad is shown). In paid search, different queries might trigger different numbers of ads, and the ads may have divergent ad relevance and advertiser quality as signaled by ranking. Thus, we restricted the data set to only include the ad in the first position on the search result web page in response to each search. We then calculated the aggregate CTR for each query across the study period (i.e., if between February and March 2019 a query was searched 100 times and the corresponding first-position ads yielded five clicks, the aggregate CTR of ads displayed upon the search query would be 5%). We restricted the data set to include only the ad in the first rank position to avoid the confounding effect of ad quality as signaled by ranking. We acknowledge that the reported CTRs of queries are restricted to first-ranked ads, which may be higher than the overall CTRs of search ads in all rank positions.

than queries with no descriptive keywords (CTR_{PosEmo} = .09 vs. $CTR_{NoKeyword}$ = .06; t = 8.96, p < .001).

These analyses of archival search engine data provide descriptive evidence of the importance of positive emotion keywords in search queries, as their use is correlated with consumers' paid search ad click behavior. Next, we embark on a series of studies examining when and why positive emotion keywords appear in consumer search queries and why their use increases paid search ad clicks.

Table 1. List of Queries with Positive Emotion, Nonemotion, and No Descriptive Keywords

Queries with Positive Emotion Keywords	Queries with Nonemotion Keywords	Queries with No Descriptive Keywords
romantic[1] hotels	international hotels	hotels
sexy[1] sundresses	pink sundresses	sundresses
lovely[2] flowers	red flowers	flowers
calming[3] foods	international foods	foods
energetic[4] art	animated art	art
delightful[5] fruit	juicy fruit	fruit
playful[5] kitten	newborn kitten	kitten
sentimental[2] jewelry	customized jewelry	jewelry
exciting[4] comics	colorful comics	comics
love[2] poems	short poems	poems
upbeat[6] jazz songs	contemporary jazz songs	jazz songs

Notes: Emotion descriptors correspond to Richins's (1997) positive emotion categories: romantic love[1], love[2], peacefulness[3], excitement[4], joy[5], and optimism[6].

Study 1

As an initial test of how positive incidental emotion influences the use of positive emotion keywords in search queries, we conducted a study in which participants organically generated a search query for a product they were interested in after being induced with positive or neutral emotion, incidental to the search task. A text analysis was performed on their generated search queries to evaluate the presence of positive emotion keywords. This study was

preregistered on OSF and all details about the sampling procedures can be found in Web Appendix B.

Method

Five hundred and eighty-seven undergraduate student participants (M_{age} = 20.5 years; 61.5% female, 36.8% male, 1.7% other) from a large public university subject pool voluntarily participated in the survey for course credit. We randomly assigned participants to one of two conditions (emotion: positive vs. neutral) in a single factorial between-subjects design in which they were primed with emotion, unrelated to the search task, before asking them to indicate the words they would use to execute a search query for a product they were interested in purchasing.

We manipulated emotion by having participants view a series of 14 images corresponding to their assigned condition (positive emotion: babies, flowers, sunshine, etc.; neutral emotion: household items like a book, chair, spoon, etc.). This type of image-based emotion induction manipulation has been used in prior work (Pyone and Isen 2011); a manipulation check regarding the effectiveness of this emotion priming task can be found in Web Appendix C. We informed student participants that we were interested in learning about the types of products and goods that students are interested in purchasing. We then elicited participants' search queries (in free response form) by asking participants to think about a product they are interested in purchasing and to "type the words you would use to execute a search query for this product. In other words, what would you type in the search bar to find this product?" Lastly, participants completed demographic questions of age and gender.

Results and Discussion

We analyzed search query text free responses for the presence of any emotion descriptive keywords contained in our emotion word dictionary of 173 positive emotion keywords used in the Pilot Study. We only observed the use of positive emotion keywords in the data, as would be expected per prior work on the priming of congruent emotion-related associations (Bower 1981; Forgas 1995). Consequently, our dependent variable indicates whether participants employed a positive emotion keyword (0 = No, 1 = Yes) in the search query they generated. Our results support H1: participants primed with positive incidental emotion were more likely to use a positive emotion keyword to describe the product in their search queries (7.9%) than those in the neutral emotion condition (0.0%; $\chi^2(1) = 33.07$, $p < .001$; see Figure 2). Further, the positive emotion keywords employed in the search queries were variations of "happy," "joyful," and "joy," which are all congruent with the positive emotion-inducing images of the emotion manipulation.

Overall, this study provides initial evidence supporting our hypothesis (H1) that positive incidental emotion increases one's likelihood to employ positive emotion keywords to describe products in search queries. Next, we use a more controlled design to validate the effect of positive incidental emotion on the use of positive emotion keywords in consumers' search queries.

Study 2

In this more controlled design, we confined search to a specific product (a water bottle) and provided participants with a list of descriptors (both positive emotion and nonemotion keywords) to choose from to articulate a search query for their desired product. This study was

preregistered on OSF and all details about the sampling procedures can be found in Web Appendix B.

Method

Three hundred and ninety-seven undergraduate student participants (M_{age} = 20.4 years; 58.4% female, 41.1% male, .5% other) from a large public university subject pool voluntarily participated in the survey for course credit. We randomly assigned participants to one of two conditions (emotion: positive vs. neutral) in a single factorial between-subjects design in which they were primed with emotion, unrelated to the search task, before engaging in a product search keyword choice task.

We asked participants to imagine they were looking to purchase a 20 oz. water bottle that they could take with them everywhere (i.e., to meetings, to workout sessions, to events), and then primed them with emotion, unrelated to the search task, using the same manipulation as Study 1. Subsequently, we asked participants to imagine they went online to search for this water bottle using a search engine and to indicate how they would describe the water bottle they were looking for by choosing a word from a provided list to complete their product search query text.

For this keyword choice task, we provided participants with a set of 8 product descriptor keywords. Half the keywords were nonemotion words, depicting specific and physical attributes of the product (clear, plain, metal, and lightweight), as specific and physical attribute descriptive keywords have been commonly explored in the paid search ad literature (Agarwal, Hosanagar, and Smith 2011; Ramlall et al. 2011). We developed these from searching popular water bottle retailer websites and forums. The four positive emotion keywords (joyful[(5)], cheerful[(5)], playful[(5)], and inspiring[(6)]; superscripts refer to emotions listed in note of Table 1) were obtained

from the emotion word list we developed from Richins's (1997) 20 consumption emotions (see Web Appendix A). We chose positive emotion keywords that aligned with emotions (e.g., joy, optimism) one might experience while using a water bottle (working out, staying focused, etc.). See Web Appendix D for details on the development of this set of keywords. Our dependent variable was whether participants selected a positive emotion keyword (1 = Yes, 0 = No) to employ in their product search query. Finally, participants completed demographic questions.

Results and Discussion

A logistic regression revealed a significant effect of a positive incidental emotion on the use of positive emotion keywords in participants' search queries ($\chi^2(1) = 9.31$, $p = .002$). Supporting H1, participants in the positive incidental emotion condition (9.6%) were more likely to use positive emotion keywords in their search query to describe their desired product than those in the neutral emotion condition (2.5%; see Figure 2). Overall, these results indicate that even with a more tightly controlled design that is narrowed down to a specific product category, we observe our hypothesized effect. One potential critique is that this effect of positive incidental emotion on the use of positive emotion keywords in search queries may be more likely in product domains where emotion descriptive words are not common, as the positive emotion might have a larger impact on priming what descriptive words come to mind. However, what if some products (e.g., books) are naturally described with emotion words, would the effect of positive incidental emotion be redundant in terms of influencing the choice of descriptive keywords? In the next study, we test if our effect also holds for a product category, such as books, for which using emotion words to describe products is common.

Study 3

In Study 3, we replicate the design of Study 2 using a book context, a product category for which positive emotion descriptive keywords are highly relevant, as people seek emotions in books and regularly describe books with emotion words. Details about the sampling procedures for this study can be found in Web Appendix B.

Method

Four hundred U.S.-based participants (M_{age} = 40.4 years; 51.0% female, 48.5% male, .5% other) from CloudResearch's Connect platform took part in this study for payment. Analogous to Study 2, we randomly assigned participants to one of two conditions (emotion: positive vs. neutral) in a single factorial between-subjects design in which they were primed with emotion, unrelated to the search task, before engaging in a product search keyword choice task.

We asked participants to imagine that they were looking to purchase a book that they could read for any occasion (e.g., before bed, on vacation, when having a moment to themselves), and then primed them with either positive or neutral emotion using the same manipulation as prior studies. Subsequently, we asked participants to imagine they went online to search for this book using a search engine and to indicate how they would describe the book by choosing a word from a provided list to complete their product search query.

For this keyword choice task, we provided participants with a set of 8 product descriptor keywords. Half the keywords were nonemotion words, depicting specific and physical attributes of the product (audio, contemporary, paperback, and secondhand) like Study 2. We developed these from searching a popular book retailer website (e.g., Barnes & Noble). The four positive

emotion keywords (joyful[5], inspiring[6], relaxing[3], and uplifting[6]; superscripts refer to emotions listed in the note of Table 1) were developed from the same word list employed in the Pilot Study, analogous to the process of Study 2. We chose positive emotion keywords that aligned with popular book categories (e.g., romance, self-help, fiction, nonfiction). See Web Appendix D for more details on the development of these keywords. Our dependent variable was whether participants selected a positive emotion keyword (1 = Yes, 0 = No) to employ in their product search query. Finally, participants completed demographic questions.

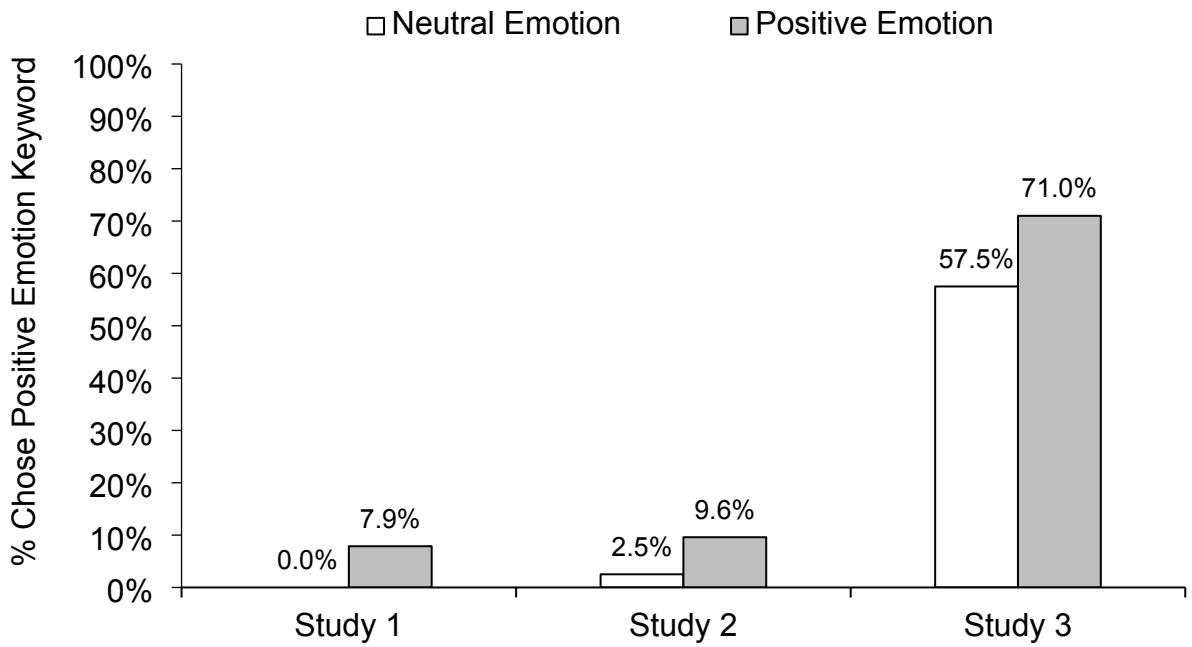
Results and Discussion

A logistic regression revealed a significant effect of positive incidental emotion on the use of positive emotion keywords in participants' search queries ($\chi^2(1) = 7.97$, $p = .005$). Supporting H1, participants primed with positive incidental emotion (71.0%) were more likely to use positive emotion keywords than those in the neutral emotion condition (57.5%; see Figure 2). Overall, we find additional support for our first hypothesis that positive incidental emotion increases the likelihood to employ positive emotion keywords in the text of search queries, even when emotion words are highly salient and commonly used in the category. Thus, regardless of whether emotion keywords are commonly employed in a specific product category, positive incidental emotion makes one more likely to employ positive emotion keywords to articulate their desired product in the text of an online search query.

With a greater understanding of how positive emotion keywords enter one's search query, in Study 4 we focus on the downstream consequences of their employment on paid search ad click behavior. In particular, we test whether the observed correlation between positive

emotion keyword use in search queries and higher paid search ad clicks documented in our Pilot Study is causal in nature.

Figure 2. Use of Positive Emotion Keywords in Search Query by Incidental Emotion State (Studies 1-3)



Study 4

In Studies 1–3, we observe that positive incidental emotion makes consumers more likely to employ positive emotion keywords in their search queries (H1). In this study, we explore downstream consequences of this behavior on paid search ad clicks (H2). After completing a search query composition task, similar to the prior studies, we provided participants with a search result page containing an ad and recorded their tendency to click on the ad. In doing so, in this study both the use of positive emotion keywords in search queries and paid search ad clicks

are dependent variables, measured in succession, allowing for a test of the full causal pathway in this two-step process.

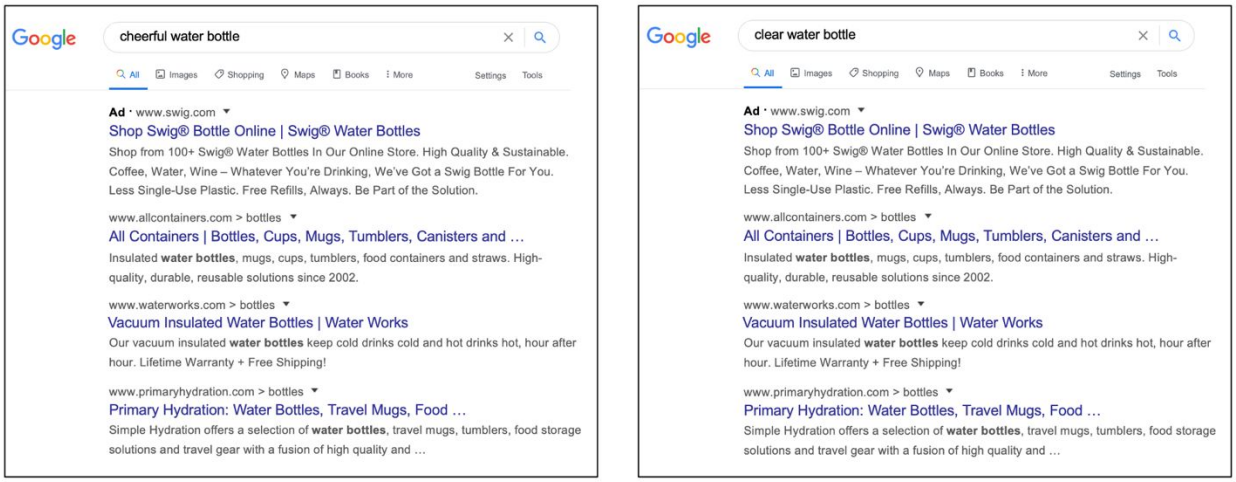
Method

Six hundred and four U.S.-based participants (M_{age} = 38.2 years; 58.1% female, 40.6% male, 1.3% other) from Prolific took part in the study for payment. Using the same design as Study 2, participants were randomly assigned to one of two conditions (emotion: positive vs. neutral) in a single factorial between-subjects design, in which they completed a search query composition task and subsequently indicated which of the links they would click on among an accompanying page of search results. Positive and neutral emotion were primed using the same manipulation as Studies 1-3. All participants were told they were looking to purchase a new water bottle and would be searching for it online. Analogous to the query composition task of Study 2, participants were given a choice between eight keywords (4 nonemotion keywords and 4 position emotion keywords; the same as Study 2) to complete their product search query. Our first dependent variable was whether participants chose to employ a positive emotion keyword in their search query (1 = Yes, 0 = No).

After selecting a keyword for their search query, participants saw a corresponding search results page (see Figure 3) containing four links, one of which was a paid search ad. The ad, which appeared at the top of the list of results (a prominent place for paid search ads; Lu and Du 2020; Narayanan and Kalyanam 2015), was denoted by the general moniker "Ad" as observed on prominent search engines. All participants saw the same set of search results; we varied only the text depicted on the search bar across participants to ensure it matched the search query keyword they had previously chosen. Participants were then asked to indicate all of the links they

would click on. Whether participants clicked on the paid search ad (1 = Yes, 0 = No) served as our second dependent variable. We carefully constructed the search result link stimuli to exclude any potential confounds that might influence the effect of positive emotion keyword use in search queries on ad clicks. Specifically, none of the product descriptors employed in the initial query composition task were present in any text on the search result page, eliminating concerns about fluency or content matching (details on stimuli development can be found in Web Appendix E). Finally, participants completed a recall-based attention check that asked whether they recalled seeing a paid search ad (e.g., denoted by the word "Ad" in front of the link) in the search results page (1 = yes, 2 = no, 3 = not sure) followed by demographic questions of age and gender.

Figure 3. Search Results Page Stimuli (Study 4)



Results and Discussion

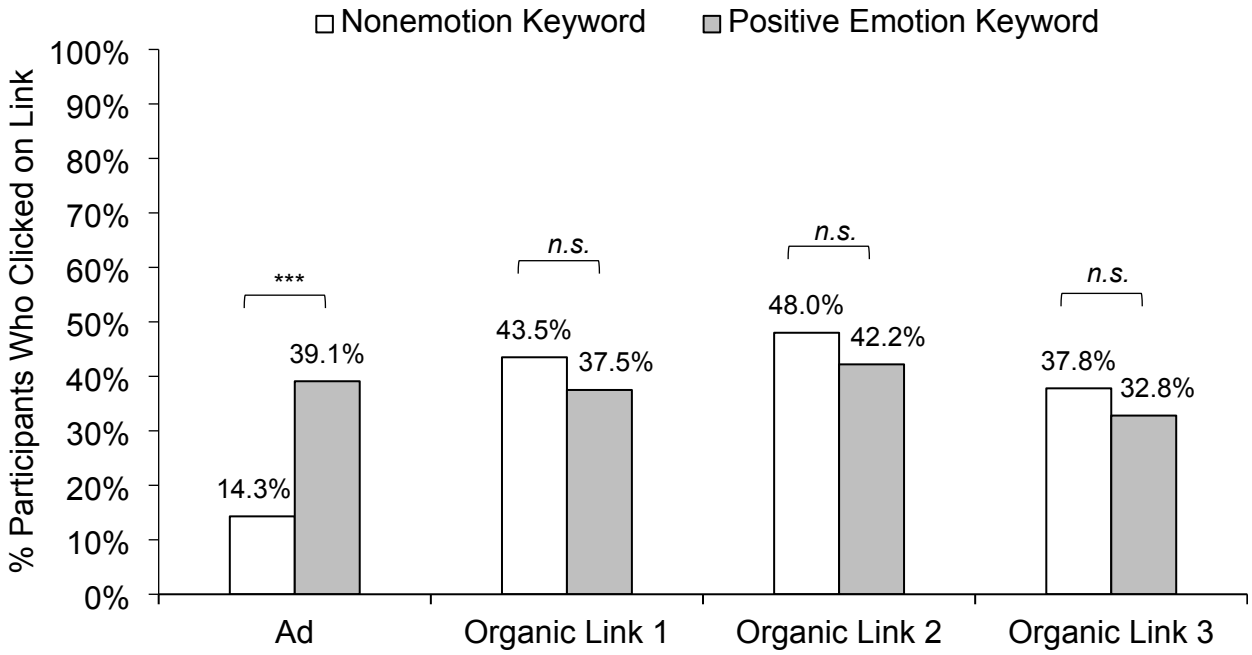
Replicating the results of Study 2 in support of H1, a logistic regression revealed that positive incidental emotion significantly increased participants' use of positive emotion

keywords to describe products in their search query (17.4%) compared to those in the neutral emotion condition (3.9%; $\chi^2(1) = 31.12$, $p < .001$). In support of H2, a second logistic regression revealed that participants who employed a positive emotion keyword in their search query were more likely to click on the paid search ad (39.1%) than participants employing a nonemotion keyword (14.3%; $\chi^2(1) = 20.50$, $p < .001$). Furthermore, the ad click results did not change when we excluded participants who failed to recall seeing the ad in the stimuli or when this recall measure was included as a covariate (see details in Web Appendix E). Additionally, while participants were able to click on any of the links on the search result page, the effect of using positive emotion keywords on increased clicks only occurred for the paid search ad and not any of the organic links in the stimuli (see Figure 4 and Web Appendix E for a detailed analysis).

To test for the causal and sequential nature of these steps in the online search process, we conducted a mediation analysis and considered that both our proposed mediator (positive emotion keyword use) and outcome variable (ad clicks) were categorical in nature. The widely used product method of Baron and Kenny (1986) and Hayes's (2018) PROCESS macros are applicable to linear models with continuous outcomes and mediators. Thus, the Baron and Kenny and Hayes PROCESS approaches cannot be applied when both categorical outcomes and mediators are considered. This is because instead of two linear regressions, we need to estimate two logistic regressions, and the latter being markedly different than the former in their specifications and assumptions makes interpretability in terms of a traditional mediation a challenge (Iacobucci 2012; VanderWeele and Vansteelandt 2014). This limitation can be addressed by evaluating mediation analysis within a counterfactual framework also called a "causal mediation analysis" (Emsley 2012; Liu et al. 2016; VanderWeele and Vansteelandt 2014). The result decomposes into the sum of controlled and natural effects in which the natural

indirect effect tests mediation. As we are interested in only mediation to assess the causal path between these two steps, we report the natural indirect effect, which is the component of the total effect that is explained by the mediator (i.e., use of positive emotion keywords) alone. We find that the natural indirect effect of positive incidental emotion at the initiation of product search on paid search ad click likelihood via the use of a positive emotion keyword in one's search query is statistically significant (b = 1.35, *bootstrapped SE* = .10, 95% CI [1.101, 1.677]; note that for an effect to be significant in this type of analysis, the CI should not include 1). As a robustness test, we referred to Iacobucci (2012), who suggests testing for a Z-mediation effect that can be interpreted with respect to a standard normal distribution. Using that technique, we find that the Z-mediation effect is 3.35, which is statistically significant at the 95% CI. Overall, these results provide support for a causal mediation model, indicating that positive incidental emotion indirectly increases paid search ad clicks through its effect on prompting the use of positive emotion keywords in search queries. Next, we employ moderation to examine the persuasion knowledge process we theorize underlies this effect on paid search ad clicks.

Figure 4. Percent Clicks on Paid Search Ad and Organic Links by Keyword Type



Notes: *$p < .05$; **$p < .01$; ***$p < .001$

Study 5

Study 4 finds that positive incidental emotion has consequential effects on positive emotion keyword use and ad clicks, which we suggest is because it impacts how consumers process information. With respect to ad clicks, we suggest that when consumers use positive emotion keywords in their search queries to describe their desired product (a consequence of positive emotion), they are less likely to use persuasion knowledge directed towards paid search ads and will be more likely to click on the ads. We test this proposed process using a moderation approach that focuses on this second half of the search process: the link between the use of positive emotion keywords on paid search ad clicks. If searching for a product with a positive emotion keyword leads one to use less persuasion knowledge, then priming persuasion

knowledge (i.e., priming knowledge of ulterior motives and manipulative intent of advertisers) should negate the effect of positive emotion keyword use on ad clicks.

Method

Sixteen hundred and eight U.S.-based participants (M_{age} = 40.4 years; 53.2% female, 45.6% male, 1.2% other) from CloudResearch's Connect platform took part in the study for payment. We randomly assigned participants to one of four conditions in a 2 (keyword: nonemotion vs. positive emotion) X 2 (prime: no vs. persuasion knowledge) between-subjects design in which they engaged in subsequent tasks of search query keyword selection and ad click behavior for a water bottle. This study was preregistered on OSF and all details about the sampling procedures can be found in Web Appendix B.

All participants were asked to imagine that they were searching for a water bottle online using a search engine (e.g., Google, Bing). Participants in the nonemotion keyword condition were told they were looking to find a "metal water bottle" while those in the positive emotion keyword condition were told they were looking to find a "happy water bottle." For participants in the no prime condition, after learning about their product search task, they proceeded to view a page of search results for their water bottle. Before proceeding to the search research page stimuli, participants in the persuasion knowledge prime condition read a short article discussing how advertisers try to get consumers to click on their paid search ads by imitating organic search results (See Appendix for full article). This manipulation was designed to be similar to that employed by Kirmani and Zhu (2007) but specific to the online search domain.

All participants were then presented with a search results page corresponding to the product they were searching for. All participants saw the same page of search results, analogous

to that used in Study 4 (see Web Appendix F for details). Participants then indicated all of the displayed links they would click on, and our dependent variable was whether participants clicked on the paid search ad (1 = Yes, 0 = No). Finally, participants completed a recall-based attention check that asked whether they recalled seeing a paid search ad (e.g., denoted by the word "Ad" in front of the link) in the search results page (1 = yes, 2 = no, 3 = not sure) followed by demographic questions of age and gender.

Results and Discussion

Manipulation check

We conducted a separate manipulation check to validate the effectiveness of the persuasion knowledge manipulation. Four hundred and one U.S.-based participants (M_{age} = 39.9 years; 49.1% female, 49.9% male, 1.0% other) from CloudResearch's Connect platform were randomly assigned to one of two conditions (prime: no vs. persuasion knowledge) in a single factorial between-subjects design in which they were told they were looking for a water bottle. Participants in the persuasion knowledge prime condition read the article used in Study 5, while those in the no prime condition did not, before being shown a page of search results matching that used in Study 5. All participants then indicated their perceptions regarding the manipulative intent (1= Not at All, 7 = Extremely) to attract clicks behind (1) sponsored advertisements as well as (2) organic links (item wording for both measures adapted from Kirmani and Zhu (2007)). Results confirmed that the persuasion knowledge prime successfully increased perceptions of manipulative intent for the paid search ad (M_{No} = 3.64, SD = 1.90 vs. M_{PK} = 4.06, SD = 1.68; $F(1, 399) = 5.61$, $p = .018$) but did not impact the organic link perceptions (M_{No} =

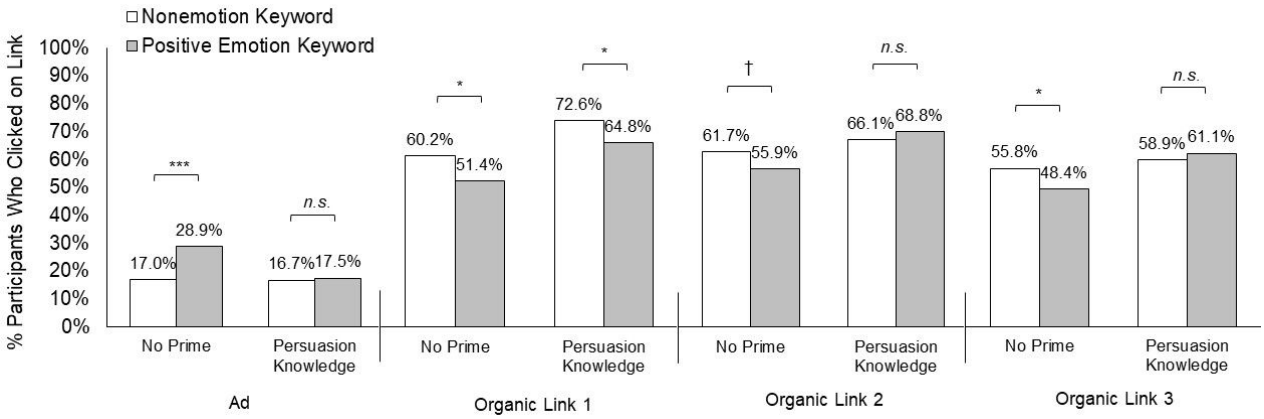
2.60, SD = 1.64 vs. M_{PK} = 2.86, SD = 1.58; $F(1, 399) = 2.53$, $p = .113$). More details on the design and analysis of this manipulation check are in Web Appendix G.

Ad clicks

A binary logistic regression revealed a main effect of keyword type (1 = positive emotion, 0 = nonemotion) on likelihood to click on the ad (P_{PosEmo} = 23.2% vs. P_{NonEmo} = 16.9%; $b = .68$, $Wald = 15.81$, $p < .001$). While there was no main effect of the persuasion knowledge prime (P_{No} = 23.0% vs. P_{PK} = 17.1%; $b = -.02$, $Wald = .02$, $p = .901$), most importantly, there was a significant interaction between keyword type and persuasion knowledge prime on ad clicks ($b = -.63$, $Wald = 6.15$, $p = .013$; see Figure 5). Specifically, replicating the findings of Study 4 in support of H2, within the no prime condition, participants using a positive emotion keyword in their search query (28.9%) were more likely to click on the ad than participants using a nonemotion keyword (17.0%; $\chi^2(1) = 16.25$, $p < .001$). However, when persuasion knowledge was primed, there was no difference in ad clicks between participants employing a positive emotion (17.5%) or nonemotion keyword (16.7%) in their search query ($\chi^2(1) = .08$, $p = .778$). Importantly, this attenuation of the effect occurred because ad clicks decreased significantly when persuasion knowledge was primed among those using a positive emotion keyword in their search query ($\chi^2(1) = 14.93$, $p < .001$). However, priming persuasion knowledge did not influence ad clicks among those employing a nonemotion keyword in their search query ($\chi^2(1) = .02$, $p = .901$), suggesting a high level of persuasion knowledge already underlies the lower amount of ad clicks observed when employing a nonemotion keyword. Additionally, results did not change when we excluded participants who failed to recall seeing the ad (details on this analysis can be found in Web Appendix F). Further, while participants were able to click on any

of the links on the search result page, the effect of using positive emotion keywords on increased clicks only occurred for the paid search ad and not any of the organic links (see Figure 5 and Web Appendix F for a detailed analysis). This pattern further gives support to our theorizing that the effect of positive emotion keyword use on ad clicks is due to the use of persuasion knowledge, which is directed toward sponsored persuasive content (i.e., paid search ads) and not all types of content. Overall, the findings of Study 5 support our hypothesis that searching for a product with a positive emotion keyword in one's search query leads to a decreased use of persuasion knowledge toward ads, resulting in higher ad clicks (H3).

Figure 5. Percent Clicks on Paid Search Ad and Organic Links by Keyword Type and Persuasion Knowledge Prime



Notes: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$

Robustness Checks on Ad Clicks

While the prior two studies showcase our effects and provide support for our hypotheses, we also conducted multiple replication studies to serve as robustness checks for our observed experimental effects. First, we conducted a study that examined the main effect of keyword type

(positive emotion vs. nonemotion) on ad clicks for a different product. Web Appendix H illustrates that we replicate the main effect of keyword type on ad clicks observed in Studies 4 and 5 on the product of t-shirts. Further, as with Study 5, we again find that the effect of positive emotion keywords on click behavior only holds for paid search ads and not organic search links, which further supports our theory regarding lower persuasion knowledge. In addition to validating that the effect holds for a different product, utilizing a different product also involved the creation of completely new search result stimuli. Thus, this study provided robustness checks not only with regard to the product considered but also the ad text and search result stimuli.

Second, we also considered whether the design of the search results page, specifically the location of the paid search ad appearing first (as observed on search engines), or the specific text of the ad might be unintended drivers of our observed effect. We ran two supplemental studies, using a similar design as Web Appendix H, to address these concerns. In Web Appendix I, we included an additional factor to randomize the order of the paid search ad between the first and second position on the page to test whether ad location played a role. In that study, location of the ad in the first or second position did not influence the effect. We also considered that perhaps if the ad is much lower on the page of search results, it might impact the effect. In Web Appendix J, we randomized the order of the ad between the first and last position on the search result page. While we still observe the directional pattern when the ad is lower on the page, it is weaker than when the ad is located at the top of the search results, which is more typical in practice. Thus, the difference in ad clicks between search queries containing positive emotion keywords versus nonemotion keywords appears to be most pronounced when the ad is located in a higher position (e.g., 1st or 2nd).

Lastly, in Web Appendix J, we also randomized the text of the ad employed in the study, confirming that we observe our effect of positive emotion keyword use on increased ad clicks for the ad employed in Studies 4 and 5, regardless of the text employed in the ad. That is, it is the ad itself that consumers click on, and not a confounding element of the text employed in the ad that leads to higher clicks.

General Discussion

Given the prevalence of using online search engines to conduct product search, a greater understanding of consumer usage of search engines is necessary. Relying on consumer psychology, we examine how consumers navigate the use of search engines when searching online, with a specific focus on how positive incidental emotion at the initiation of search influences the keywords one uses in their search queries and the consequent downstream effects on paid search ad click behavior.

Theoretical Contributions

Our work contributes to marketing literature in several ways. First, prior research has primarily focused on the marketing outcomes of search engine use (i.e., clicks on search results, e.g., Agarwal and Mukhopadhyay 2016; Jerath, Ma, and Park 2014; Klapdor et al. 2014), with the general explanation that keywords that explicitly indicate higher purchase intentions (e.g., "best deals," "affordability," or specific store/brand names) explain click behavior on search engine results. Related to that is the notion that longer and more specific keywords suggest consumers are more ready and willing to click on paid search ads (Agarwal and Mukhopadhyay 2016; Ramlall et al. 2011). We contribute to this literature theoretically because unlike prior

studies, we show the psychological underpinnings behind the use of certain keywords and demonstrate that these psychological underpinnings help explain subsequent ad click behavior. By doing so, we find that searching for products with positive emotion keywords in one's search query is associated with decreased use of persuasion knowledge, leading to higher ad clicks. Further, this effect is specific to persuasion knowledge of advertisers' disclosed persuasion attempts (i.e., paid search ads with the explicit label of "sponsored" or "ad") and not on clicking on organic links that do not carry such labels. In additional analyses conducted for Studies 4 and 5 (see Web Appendices E and F), we find that the pattern observed for paid search ads from using positive emotion versus nonemotion keywords does not apply to any of the other organic links on the search result page. That is, the use of positive emotion keywords in search queries only increases clicks on paid search ads and not on any of the other organic links on the search result page.

Second, by showing that positive incidental emotion, through the greater use of positive emotion keywords in search queries, can result in a higher likelihood to click on paid search ads, we theoretically extend the current understanding of the role of human emotions in the digital domain. The literature on the role of human emotions on digital behavior primarily considers (1) how emotions toward a product, brand, or topic are expressed as social media sentiments toward the product, brand, or topic and their effects on firm performance (e.g., Schweidel and Moe 2014); (2) how firm-created digital content influences consumers' emotions (e.g., Mazaheri et al. 2014); and (3) how emotions expressed in online settings might differ from those expressed offline (e.g., Morningstar et al. 2021). While most of that work relates to emotions as elicited by a product, brand, or digital content, we add to this literature by understanding the psychological

process by which felt emotions that are purely incidental can have significant effects on how consumers conduct product search using online search engines.

Though there is literature indicating that how a consumer feels while searching for a product (i.e., the felt emotional state) can influence their evaluation of product options and tendency to purchase (Cohen and Andrade 2004; Kahn and Isen 1993; Meloy 2000; Rucker and Petty 2004), the same findings may not hold in the search engine domain. This is because between the felt emotional state and the evaluation of product options, an interruption occurs with the articulation of a search query for the search engine and corresponding evaluation of search results. Thus, product evaluation is delayed, which differs from the literature that considers how the simultaneous occurrence of emotional states (commonly integral emotions) and product options influences consumer attitudes and behavior toward product evaluation (Chen and Pham 2019; Pham 1998; Wood and Moreau 2006). Thus, our research findings are unique to the context of online search that by nature involves a two-step behavioral process. Ultimately, our examination of the steps in the search process helps shed greater light on the multiple stages in consumers' online search behavior, adding to the growing literature focused on the consumer's path to online purchase (Grewal and Roggeveen 2020; Lemon and Verhoef 2016).

Practical Implications

Our work has substantive implications as well. First, across all our studies examining ad click behavior, we consistently find that ad CTRs generated from product search queries with positive emotion keywords are significantly greater than ad CTRs from nonemotion keywords. Such use of positive emotion keywords represents a novel suggestion for advertisers that, to our knowledge (e.g., from keyword descriptions in ad blogs and the Google AdWords platform), are

not focusing on positive emotion keywords in their paid search ad targeting strategies. To further validate that advertisers are not currently targeting positive emotion keywords, we collected anecdotal evidence by comparing the number of ads appearing in search results between 13 queries with positive emotion keywords and 13 queries without any descriptive keywords (e.g., "cheerful water bottle" vs. "water bottle"). In this comparison, we found that search results for queries with positive emotion keywords contained fewer ads than search results for queries without any descriptive keywords (Bing: $M_{Pos\text{EmoKeyword}} = 1.69$, $SD = 2.36$ vs. $M_{\text{NoKeyword}} = 5.15$, $SD = 2.30$; $F(1,24) = 14.33$, $p < .001$; Google: $M_{Pos\text{EmoKeyword}} = 0$, $SD =$ not applicable vs. $M_{\text{NoEmotion}} = .15$, $SD = .55$; $F(1,24) = 1.00$, $p = .327$; see Web Appendix K for more details), roughly indicating that positive emotion keywords are not commonly targeted by advertisers, and represent a novel targeting strategy.

Second, advertisers want to minimize their cost of click and therefore search actively for keywords that have a higher hit rate (Ludden 2018). In this regard, advertisers considering a range of keywords might benefit by selecting positive emotion rather than nonemotion[5] keywords. It is true though that some types of nonemotion keywords such as deal-based or branded keywords are commonly used in search queries, and their popularity makes them attractive for advertisers (Jerath, Ma, and Park 2014). However, recent studies have demonstrated competitive poaching of popular keywords that results in stolen traffic from focal brands' paid search strategies (Bhattacharya, Gong, and Wattal 2022; Simonov and Hill 2021). Therefore, it might help to revisit keyword strategies for advertisers to focus on positive emotion keywords that are not only less popular but have strategic value for paid search ad effectiveness. To complement our suggestion, we used our archival data to compare the CTR of queries with

[5] Our usage of nonemotion keywords in this research does not include popular, high purchase intent keywords, such as "affordability" and "deals."

positive emotion keywords with some of the most popular and competed-for nonemotion keywords, including "best," "popular," and "affordable." Specifically, we replaced the positive emotion keywords with "best," "popular," or "affordable," and obtained their CTR. Not surprisingly, all three keywords have higher CTRs than positive emotion keywords ("best" has a CTR of .12, "popular" a CTR of .12, and "affordable" a CTR .14; all higher than positive emotion keywords' CTR of .09 with statistical significance using t-tests). However, noting that queries with nonemotion keywords that do not include the most popular keywords have a CTR of .07, and those queries with no descriptive keywords have a CTR of only .05, using positive emotion keywords might be a good way to improve ad clicks without the intense competition associated with popular nonemotion keywords.

To quantify the value of the ad CTRs reported above, consider an advertiser is already targeting search queries with no descriptors, and the advertiser gets 1,000 impressions per day. Instead, if the advertiser uses the budget to target search queries with positive emotion descriptors, then these 1,000 ad impressions would generate around (.09 – .05)*1,000 = 40 additional clicks. We note that to be able to receive these additional clicks by targeting queries with positive emotion keywords rather than no descriptors, the advertiser should target the days or weeks when the incidence of queries with positive emotion descriptors is likely high (thus, impressions of ads targeted to these queries is likely to be high). In our archival data of approximately 50 million queries, we find that some days of the week, as well as some weeks of the year, show a higher frequency of product search queries that include positive emotion keywords than others. For example, within our six-week archival dataset, comparing weekends (Friday, Saturday, and Sunday) with the rest of the weekdays (Monday–Thursday) reveals that the proportion of searches with positive emotion keywords on the weekend (1.24%) is higher

than that on weekdays (1.10%; $p < .001$). Similarly, the holiday weeks of Thanksgiving and Christmas of 2019 (obtained from an additional data pull) also show a larger proportion of searches with positive emotion keywords (1.48%) than the six weeks from February to March (1.16%; $p < .001$). Web Appendix A provides more details on these frequency calculations[6] and the comparison of weekends with weekdays and holidays with nonholidays. Given that Google, the largest search engine, processes roughly three billion searches globally each day[7], this suggests that around 4.2 million more searches occur with positive emotion keywords on each day during the weekend than on other days and around 9.6 million more searches occur with positive emotion keywords on each day during a major holiday week. As a result, advertisers may want to consider a day or holiday-based scheme for bidding on positive emotion keywords, as these occasions may provide more strategic value during times when the incidence of positive emotion keywords in search queries is higher.

Fourth, it might help advertisers to understand whether the strategy of using positive emotion keywords will payoff better in some product categories versus others. To gain some insight into product categories, we conducted an exercise in two parallel steps and then a final step as follows. We note that we had identified 2,420 unique search queries from our archival data that included positive emotion keywords accurately used as product descriptors (see Web Appendix A1.2 and A1.3). These 2,420 unique search queries proved useful in the following two parallel steps. As the first parallel step, we obtained the total number of searches in the archival dataset that were based on the 2,420 unique search queries. This led to a set of 85,597 searches.

[6] These calculations assume that the estimated proportion of searches with positive emotion keywords holds for global traffic with various cultures and languages, which cannot be verified with our data. Thus, this analysis should not be taken as an exact estimation, but it provides suggestive evidence on the scale of the effect.

[7] There are around 90 billion searches per month on Google (https://www.statista.com/study/15884/search-engine-usage-statista-dossier/) and, thus, around 3 billion per day.

Thus, this set represents the total number of searches made using all 2,420 unique search queries with positive emotion keywords accurately used as product descriptors. As the other parallel step, we had two research assistants code the product categories mentioned in each of the 2,420 unique search queries. The research assistants identified and coded 43 different product categories (69% agreement) that consumers seem to be searching for using positive emotion keywords.

As the final step, we obtained the percentage of our set of 85,597 searches in which the product represents each of the 43 product categories identified. Most of these categories (36 out of 43 categories) comprised less than 5% of our set of searches. The other seven categories comprised a significantly higher proportion of searches; we list these seven and their corresponding proportion of the total number of searches with positive emotion keywords accurately used as product descriptors in Table 2.

Table 2: Product Categories that Comprise More than 5% of Searches with Positive Emotion Keywords as Product Descriptors in the Archival Dataset

Product Category	Proportion
clothes	9.52%
movies/tv series/videos/shows	9.45%
restaurant/dining/food/drink/catering	9.11%
personal care/skin care/makeup	8.95%
song/music	8.31%
plants/animals/pets	6.93%
furniture/home improvement/appliances	5.42%

Notes: The second column of the table provides the proportion of the corresponding product category among searches with positive emotion keywords as product descriptors.

Not surprisingly, the seven product categories are mostly hedonic. This model-free description of our archival data seems to suggest that the strategy of using positive emotion

keywords might be more effective for advertisers of hedonic product categories, some of which are identified in Table 2.

Fifth, we find a contingency such that the effect of positive emotion keyword use on ad clicks is most prominent when the ads are located in higher positions on the search result page (see Web Appendices I and J). As a result, the strategy of targeting positive emotion keywords may only help advertisers if they are able to place their ads toward the top of the search results page. The position of the ad is partially under the control of the advertiser based on several metrics specified by the search engine platform. For example, Google considers bidding amounts and relevance to search query based on matching criteria[8]. Thus, to the extent advertisers can meet the search engine's criteria for higher positions, they should be able to take advantage of positive emotion keywords in search queries.

Limitations and Future Research Directions

While this work makes an initial effort at examining the psychological process behind consumers' use of an online search engine for product search, its limitations provide many opportunities for future research. First, while the focus of this work is on the impact of positive emotion keywords on paid search ads clicks, we acknowledge that organic links also appear on a search results page (as indicated by our experimental stimuli) for which the use of positive emotion keywords may influence CTR. However, the manner in which these different items appear on a search results page (i.e., the search engine's algorithm for organic links and advertiser bidding for paid search ads) as well as consumers' perceptions of these items may differ, yet both are components that could differentially influence click behavior. While prior

[8] https://support.google.com/google-ads/answer/1722087?hl=en

work in marketing examining paid search ad click behavior has primarily focused on ad clicks rather than organic links (e.g., Li et al. 2016; Rutz, Bucklin, and Sonnier 2012), despite both appearing on a search page, the field has yet to develop a deep understanding of consumers' perceptions of paid search ads versus organic search results. One possible direction for research that seeks to understand the differences between paid search ads and organic search results is the explicit disclosure of sponsored content in the former with labels such as "sponsored" or "ad." Organic search results do not carry such labels as they are not paid for by advertisers. Perhaps the lack of disclosure labels limits the use of persuasion knowledge with regard to organic links, leading to consistently higher clicks on organic search results versus paid search ads as we observe in our experiments regardless of emotion condition (e.g., see Web Appendices F, H, I, and J). Examining this distinction between paid search ads and organic link click behavior is fertile ground for future extensions.

Additionally, our manipulations and theory on the impact of positive incidental emotion on the search process via an online search engine has mostly focused on the positive or valenced element of emotion rather than a specific emotion. Prior work has documented the distinct differences that specific emotions (Han, Lerner, and Keltner 2007; Wyer et al. 2019) can have on how people process and evaluate information, which can have downstream consequences on subsequent decisions. Additionally, there are other aspects of emotion besides its valence (i.e., emotionality and extremity; Rocklage and Fazio 2015) that could also differentially impact the search process. Future research might consider the possibility that different specific emotions and different levels of emotionality or extremity of emotion might impact the types of positive emotion keywords consumers employ in their search queries and the downstream effect it may have on paid search ad click behavior.

Lastly, there is also a possible concern for whether our findings regarding positive incidental emotion and consumer search engine usage behavior might generalize to other product search and digital advertising domains. For example, e-commerce platforms are used for product searches using query formats. In addition, search results include not just sponsored displays but sponsored products as well. It is a meaningful area of future research especially because the extrapolation of our findings to e-commerce platforms is not obvious. These platforms have user ratings, reviews, and detailed comments that serve as metrics of credibility, trustworthiness, skepticism and persuasive intent of sponsored content. As such, any effect of positive incidental emotion on clicks on sponsored content should consider the availability of multiple metrics.

References

Agarwal, Ashish, Kartik Hosanagar, and Michael D. Smith (2011), "Location, Location, Location: An Analysis of Profitability of Position in Online Advertising Markets," *Journal of Marketing Research*, 48 (6), 1057-73.

Agarwal, Ashish and Tridas Mukhopadhyay (2016), "The Impact of Competing Ads on Click Performance in Sponsored Search," *Information Systems Research*, 27 (3), 538-57.

Ahluwalia, Rohini and Robert E. Burnkrant (2004), "Answering Questions About Questions: A Persuasion Knowledge Perspective for Understanding the Effects of Rhetorical Questions," *Journal of Consumer Research*, 31 (1), 26-42.

Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51 (6), 1173-82.

Berman, Ron and Zsolt Katona (2013), "The Role of Search Engine Optimization in Search Marketing," *Marketing Science*, 32 (4), 644-51.

Bhattacharya, Siddharth, Jing Gong, and Sunil Wattal (2022), "Competitive Poaching in Search Advertising: Two Randomized Field Experiments," *Information Systems Research*, 33 (2), 599-619.

Bless, Herbert, Gerd Bohner, Norbert Schwarz, and Fritz Strack (1990), "Mood and Persuasion: A Cognitive Response Analysis," *Personality and Social Psychology Bulletin*, 16 (2), 331-45.

Bless, Herbert, Gerald L. Clore, Norbert Schwarz, Verena Golisano, Christina Rabe, and Marcus Wölk (1996), "Mood and the Use of Scripts: Does a Happy Mood Really Lead to Mindlessness?," *Journal of Personality and Social Psychology,* 71 (4), 665-79.

Bless, Herbert, and Klaus Fiedler (2006), "Mood and the Regulation of Information Processing and Behavior," in *Hearts and Minds: Affective Influences on Social Cognition and Behaviour*, J.P. Forgas, ed. Psychology Press, 65–84.

Boerman, Sophie C., Lotte M. Willemsen, and Eva P. Van Der Aa (2017), "'This Post is Sponsored' Effects of Sponsorship Disclosure on Persuasion Knowledge and Electronic Word of Mouth in the Context of Facebook," *Journal of Interactive Marketing*, 38 (1), 82-92.

Bower, Gordon H. (1981), "Mood and Memory," *American Psychologist*, 36 (2), 129-48.

Brenner, Michael (2023), "Digital Ads Don't Work And Everyone Knows It," (published January 16, 2023), https://marketinginsidergroup.com/marketing-strategy/digital-ads-dont-work-and-everyone-knows-it/#1.

Campbell, Margaret C. and Amna Kirmani (2000), "Consumers' Use of Persuasion Knowledge: The Effects of Accessibility and Cognitive Capacity on Perceptions of an Influence Agent," *Journal of Consumer Research,* 27 (1), 69-83.

Chen, Charlene Y. and Michel Tuan Pham (2019), "Affect Regulation and Consumer Behavior," *Consumer Psychology Review*, 2 (1), 114-44.

Cohen, Joel B. and Eduardo B. Andrade (2004), "Affective Intuition and Task-Contingent Affect Regulation," *Journal of Consumer Research*, 31 (2), 358-67.

Darke, Peter R. and Robin J.B. Ritchie (2007), "The Defensive Consumer: Advertising Deception, Defensive Processing, and Distrust," *Journal of Marketing Research*, 44 (1), 114-27.

Du, Xiaomeng, Meng Su, Xiaoquan Zhang, and Xiaona Zheng (2017), "Bidding for Multiple Keywords in Sponsored Search Advertising: Keyword Categories and Match Types," *Information Systems Research*, 28 (4), 711-22.

Eisend, Martin and Farid Tarrahi (2022), "Persuasion Knowledge in the Marketplace: A Meta-Analysis," *Journal of Consumer Psychology*, 32 (1), 3-22.

Emsley, Richard (2012), "Process Evaluation and Causal Mediation Analysis Using Mplus," presented at Third UK Mplus Users Meeting, London School of Hygiene and Tropical Medicine, London (May 24).

Fazio, Russell H. (2001), "On the Automatic Activation of Associated Evaluations: An Overview," *Cognition & Emotion*, 15 (2), 115-41.

Forgas, Joseph P. (1995), "Mood and Judgment: The Affect Infusion Model (AIM)," *Psychological Bulletin*, 117 (1), 39-66.

Forgas, Joseph P. (2019), "Happy Believers and Sad Skeptics? Affective Influences on Gullibility," *Current Directions in Psychological Science*, 28 (3), 306-13.

Fou, Augustine (2021), "When Big Brands Stopped Spending on Digital Ads, Nothing Happened. Why?," (published January 2, 2021), https://www.forbes.com/sites/augustinefou/2021/01/02/when-big-brands-stopped-spending-on-digital-ads-nothing-happened-why/?sh=74e786441166.

Friestad, Marian and Peter Wright (1994), "The Persuasion Knowledge Model: How People Cope with Persuasion Attempts," *Journal of Consumer Research*, 21 (1), 1-31.

Ghose, Anindya and Sha Yang (2009), "An Empirical Analysis of Search Engine Advertising: Sponsored Search in Electronic Markets," *Management Science*, 55 (10), 1605-22.

Grewal, Dhruv and Anne L. Roggeveen (2020), "Understanding Retail Experiences and Customer Journey Management," *Journal of Retailing*, 96 (1), 3-8.

Hamilton, Rebecca W. and Linda L. Price (2019), "Consumer Journeys: Developing Consumer-Based Strategy," *Journal of the Academy of Marketing Science*, 47 (2), 187–91.

Han, Seunghee, Jennifer S. Lerner, and Dacher Keltner (2007), "Feelings and Consumer Decision Making: The Appraisal-tendency Framework," *Journal of Consumer Psychology*, 17 (3), 158-68.

Hayes, Andrew F. (2018), *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*. Guilford Press.

Hsu, Tiffany (2023), "Why Are You Seeing So Many Bad Digital Ads Now?", (published February 11, 2023), https://www.nytimes.com/2023/02/11/technology/bad-digital-ads.html?hpgrp=c-abar&smid=url-share.

Humphreys, Ashlee, Mathew S. Isaac, and Rebecca Jen-Hui Wang (2021), "Construal Matching in Online Search: Applying Text Analysis to Illuminate the Consumer Decision Journey," *Journal of Marketing Research*, 58 (6), 1101-19.

Iacobucci, Dawn (2012), "Mediation Analysis and Categorical Variables: The Final Frontier," *Journal of Consumer Psychology*, 22 (4), 582-94.

Jansen, Bernard J. and Marc Resnick (2006), "An Examination of Searcher's Perceptions of Nonsponsored and Sponsored Links during Ecommerce Web Searching," *Journal of the American Society for Information Science and Technology*, 57 (14), 1949-61.

Jansen, Bernard J. and Simone Schuster (2011), "Bidding on the Buying Funnel for Sponsored Search and Keyword Advertising," *Journal of Electronic Commerce Research*, 12 (1), 1-18.

Jerath, Kinshuk, Liye Ma, and Young-Hoon Park (2014), "Consumer Click Behavior at a Search Engine: The Role of Keyword Popularity," *Journal of Marketing Research*, 51 (4), 480-86.

Joo, Mingyu, Kenneth C. Wilbur, and Yi Zhu (2016), "Effects of TV Advertising on Keyword Search," *International Journal of Research in Marketing*, 33 (3), 508-23.

Kahn, Barbara E. and Alice M. Isen (1993), "The Influence of Positive Affect on Variety Seeking Among Safe, Enjoyable Products," *Journal of Consumer Research*, 20 (2), 257-70.

Kirmani, Amna and Rui Zhu (2007), "Vigilant Against Manipulation: The Effect of Regulatory Focus on the Use of Persuasion Knowledge," *Journal of Marketing Research*, 44 (4), 688-701.

Klapdor, Sebastian, Eva M. Anderl, Florian von Wangenheim, and Jan H. Schumann (2014), "Finding the Right Words: The Influence of Keyword Characteristics on Performance of Paid Search Campaigns," *Journal of Interactive Marketing*, 28 (4), 285-301.

Klauer, Karl Christoph and Jochen Musch (2003), "Affective Priming: Findings and Theories," in *The Psychology of Evaluation: Affective Processes in Cognition and Emotion*, Jochen Musch, and Karl Christoph Klauer, eds. Earlbaum, 7-49.

Lemon, Katherine N. and Peter C. Verhoef (2016), "Understanding Customer Experience Throughout the Customer Journey," *Journal of Marketing*, 80 (6), 69-96.

Li, Hongshuang, P. K. Kannan, Siva Viswanathan, and Abhishek Pani (2016), "Attribution Strategies and Return on Keyword Investment in Paid Search Advertising," *Marketing Science*, 35 (6), 831-48.

Liu, Shao-Hsien, Christine M. Ulbricht, Stavroula A. Chrysanthopoulou, and Kate L. Lapane (2016), "Implementation and Reporting of Causal Mediation Analysis in 2015: A Systematic Review in Epidemiological Studies," *BMC Research Notes,* 9 (354), 1-21.

Liu-Thompkins, Yuping (2019), "A Decade of Online Advertising Research: What We Learned and What We Need to Know," *Journal of Advertising*, 48 (1), 1-13.

Loewenstein, George and Jennifer S. Lerner (2003), "The Role of Affect in Decision Making," in *Handbook of Affective Sciences*, Richard J. Davidson, Klaus R. Scherer, and H.H. Goldsmith, eds. Oxford University Press, 619-42.

Lu, Chongyu and Rex Yuxing Du (2020), "Click-Through Behavior Across Devices in Paid Search Advertising: Why Users Favor Top Paid Search Ads and are Sensitive to Ad Position Change," *Journal of Advertising Research*, 60 (4), 394-406.

Lu, Xianghua and Xia Zhao (2014), "Differential Effects of Keyword Selection in Search Engine Advertising on Direct and Indirect Sales," *Journal of Management Information Systems*, 30 (4), 299-326.

Mackie, Diane M., Arlene G. Asuncion, and Francine Rosselli (1992), "The Impact of Positive Affect on Persuasion Processes," in *Emotion and Social Behavior*, Margaret S. Clark, ed. Sage Publications, 247-70.

Mazaheri, Ebrahim, Marie Odile Richard, Michel Laroche, and Linda C. Ueltschy (2014), "The Influence of Culture, Emotions, Intangibility, and Atmospheric Cues on Online Behavior," *Journal of Business Research,* 67 (3), 253-59.

Meloy, Margaret G. (2000), "Mood-Driven Distortion of Product Information," *Journal of Consumer Research*, 27 (3), 345-59.

Morningstar, Michele, Annie C. Gilbert, Jessica Burdo, Maria Leis, and Melanie A. Dirks, (2021), "Recognition of Vocal Socioemotional Expressions at Varying Levels of Emotional Intensity," *Emotion*, 21 (7), 1570-75.

Narayanan, Sridhar and Kirthi Kalyanam (2015), "Position Effects in Search Advertising and Their Moderators: A Regression Discontinuity Approach," *Marketing Science*, 34 (3), 388-407.

Pham, Michel Tuan (1998), "Representativeness, Relevance, and the Use of Feelings in Decision Making," *Journal of Consumer Research*, 25 (2), 144-59.

Pyone, Jin Seok and Alice M. Isen (2011), "Positive Affect, Intertemporal Choice, and Levels of Thinking: Increasing Consumers' Willingness to Wait," *Journal of Marketing Research*, 48 (3), 532-43.

Raghunathan, Rajagopal and Michel Tuan Pham (1999), "All Negative Moods Are Not Equal: Motivational Influences of Anxiety and Sadness on Decision Making," *Organizational Behavior and Human Decision Processes*, 79 (1), 56-77.

Ramlall, Shalini, David Sanders, Giles Tewkesbury, and David Ndzi (2011), "Can Keyword Length Indicate Web Users' Readiness to Purchase," presented at The 2011 World Congress in Computer Science, Computer Engineering, and Applied Computing, Las Vegas, Nevada.

Richins, Marsha L. (1997), "Measuring Emotions in the Consumption Experience," *Journal of Consumer Research*, 24 (2), 127-46.

Rocklage, Matthew D. and Russell H. Fazio (2015), "The Evaluative Lexicon: Adjective Use as a Means of Assessing and Distinguishing Attitude Valence, Extremity, and Emotionality," *Journal of Experimental Social Psychology*, 56, 214-27.

Rucker, Derek D. and Richard E. Petty (2004), "Emotion Specificity and Consumer Behavior: Anger, Sadness, and Preference for Activity," *Motivation and Emotion*, 28 (1), 3-21.

Rutz, Oliver J., Randolph E. Bucklin, and Garrett P. Sonnier (2012), "A Latent Instrumental Variables Approach to Modeling Keyword Conversion in Paid Search Advertising," *Journal of Marketing Research*, 49 (3), 306-19.

Rutz, Oliver J., Michael Trusov, and Randolph E. Bucklin (2011), "Modeling Indirect Effects of Paid Search Advertising: Which Keywords Lead to More Future Visits?" *Marketing Science*, 30 (4), 646-65.

Schwarz, Norbert, Herbert Bless, and Gerd Bohner (1991), "Mood and Persuasion: Affective States Influence the Processing of Persuasive Communications," *Advances in Experimental Social Psychology*, 24 (1), 161-99.

Schweidel, David A. and Wendy W. Moe (2014), "Listening In on Social Media: A Joint Model of Sentiment and Venue Format Choice," *Journal of Marketing Research*, 51 (4), 387-402.

Simonov, Andrey and Shawndra Hill (2021), "Competitive Advertising on Brand Search: Traffic Stealing and Click Quality," *Marketing Science*, 40 (5), 923-45.

Shankar, Venkatesh, Dhruv Grewal, Sarang Sunder, Beth Fossen, Kay Peters, and Amit Agarwal (2022), "Digital Marketing Communication in Global Marketplaces: A Review of Extant Research, Future Directions, and Potential Approaches," *International Journal of Research in Marketing*, 39 (2), 541-65.

Tiedens, Larissa Z., and Susan Linton (2001), "Judgment Under Emotional Certainty and Uncertainty: The Effects of Specific Emotions on Information Processing," *Journal of Personality and Social Psychology*, 81 (6), 973-88.

Ludden, Matthew (2018), "A Comprehensive List of Pay-Per-Click Stats (PPC Statistics in 2023)", (published August 20, 2018), https://valveandmeter.com/blog/ppc/pay-per-click-statistics/.

VanderWeele, Tyler and Stijn Vansteelandt (2014), "Mediation Analysis with Multiple Mediators," *Epidemiologic Methods*, 2 (1), 95-115.

Wood, Chris (2023), "U.S. Paid Search Spend Forecast to Hit $110 Billion in 2023," (published May 18, 2023), https://searchengineland.com/us-paid-search-spend-forecast-2023-427066.

Wood, Stacy L. and C. Page Moreau (2006), "From Fear to Loathing? How Emotion Influences the Evaluation and Early Use of Innovations," *Journal of Marketing*, 70 (3), 44-57.

Wyer Jr., Robert S., Ping Dong, Xun (Irene) Huang, Zhongqiang (Tak) Huang, and Lisa C. Wan (2019), "The Effect of Incidental Emotions on Judgments and Behavior in Unrelated Situations: A Review," *Journal of the Association for Consumer Research*, 4 (2), 198–207.

Xu, Alison Jing, and Robert S. Wyer Jr. (2010), "Puffery in Advertisements: The Effects of Media Context, Communication Norms, and Consumer Knowledge," *Journal of Consumer Research*, 37 (2), 329-43.

Appendix

Advertisers Imitate Organic Search Results

A recent Consumer Report about digital advertising uncovered some concerning tactics about why advertisers use sponsored search advertising. It found that advertisers employ sponsored ads on search engines not only to get their content in front of consumers, but also anticipate that consumers might confuse the ads with the organic search results of the search engine and end up clicking on them. Since advertisers make money when consumers click on their sponsored search ads, ensuring consumers click on them is a high priority. To entice consumers to click on their ads, advertisers design their sponsored search ads to look very similar to organic search results, with a headline, URL, and description text, analogous to organic search results. Due to legal reasons, the ads have to be labeled, but that labeling is often very subtle, such that they do not appear very different than the organic search results themselves. Ultimately, by mimicking organic search results, consumers often click on sponsored search ads that they thought were organic search results, making money for advertisers.

Web Appendices: Positive Emotions During Search Engine Use: How You Feel Impacts What You Search For and Click On

Sarah C. Whitley, Anindita Chakravarty, and Pengyuan Wang

Data Collection Details

Study	**Date**	**Subject Pool**	**N**
Pilot Study	February-March 2019	Archival search data	2,420 query pairs
Study 1	8/22/2023-9/3/2023	Undergraduate pool	587*
Study 2	9/12/2023-9/20/2023	Undergraduate pool	397*
Study 3	9/11/2023	Connect	400
Study 4	3/21/2022	Prolific	604
Study 5	3/13/2024	Connect	1,608*
Web Appendix H	1/9/2024	Mturk	802*
Web Appendix I	3/14/2022	Prolific	802
Web Appendix J	4/3/2024	Connect	1,603*
Total			**6,803** participants

*Pre-registrations and datasets can be found on OSF at https://osf.io/nq85g/?view_only=af55bddaa1e84bfca7b00631b3e5fca2.
The archival data employed in the Pilot Study (and Web Appendix A) is not located on OSF due to its proprietary nature.

Web Appendix A: Emotion Descriptor Dictionary and Details on Archival Data Analyses

In this web appendix, we include more details of the archival search data analyses. We first describe the process used to identify search queries with emotion descriptors of a product or service and hence obtain the data for the pilot study, and then provide details of the comparison of proportion of queries with emotion words on weekends versus weekdays and holiday versus nonholiday periods.

A1. Emotion Word Dictionary and Data for Pilot Study

The process used to identify search queries with emotion descriptors of a product or service involved three steps:

1) Construct a dictionary of emotion words.

2) Match queries to the emotion word dictionary, and hence obtain a set of queries with emotion words.

3) From the queries with emotion words, hire two linguistic experts to further identify the queries in which the emotion words were indeed emotion descriptors of a product or service, and to construct comparable queries with nonemotion descriptors.

We provide details for each step below.

A1.1. Emotion Word Dictionary

To obtain a dictionary of emotion words, we adopted the procedure described in Wang, Chakravarty, and Yang (2021). We started with all the emotion words described in Richins (1997), which covers a very comprehensive set of emotions, encompassing the frequently studied emotions in the consumer behavior literature (for a meta-analysis, see Kranzbühler et al. 2020). We manually expanded the emotion word list using synonyms (e.g., “joyful” expanding to

"cheerful") and grammatical variations (e.g., "inspired" expanding to "inspiring") to obtain a basic dictionary for emotion words.

To obtain more emotion words from real search queries, we further applied a word embedding technique to embed the emotion words into a vector space and find their neighbors in the embedding space to expand the word collection. This approach employs distributed language models (Mikolov et al. 2013; Turian, Ratinov, and Bengio 2010), has demonstrated success in various tasks such as sentiment classification (Kim 2014) and text topic modeling (Li et al. 2017), and was also used in marketing literature (Wang, Xiong, and Yang 2019). Specifically, it learns word representation in a continuous vector space (i.e., it represents each word with a vector of numbers). In the embedding vector space, words that are semantically similar will have vectors close to each other (Mikolov et al. 2013). In this application, we followed the Skip-gram model in Mikolov et al. (2013) to obtain word embedding. The Skip-gram model is trained on a set of sequences of words, where a sequence of words is usually defined by a sentence or a document. It aims to represent each word with a vector of real numbers, so that in the word sequence, one can use the word representation to predict its surrounding words. Formally, given a sequence of words $w_1, w_2, w_3, \ldots, w_T$, with each word w represented by a vector v, the basic Skip-gram model maximizes the following log probability:

$$\frac{1}{T}\sum_{t=-1}^{T}\sum_{-c\le j\le c, j\neq 0}\log p(w_{t+j}|w_t) \qquad \text{(B1.1)},$$

where c defines the 'surrounding' window and $p(w_j|w_i)$ is defined as

$$p(w_j|w_i) = \frac{\exp(v'_{w_j} v_{w_i})}{\sum_{h=1}^{H}\exp(v'_{w_h} v_{w_i})} \qquad \text{(B1.2)},$$

with H being the number of unique words in the data set. By maximizing the objective function, we obtained an embedding vector for each word.

To train word embedding in the context of online search, we obtained a proprietary search data set that organizes users' search queries into sessions. A session is an uninterrupted sequence of search activities, with a maximum of 30 minutes.[1] Concatenating the search queries within a session, the session forms a sequence of words. The training data set of the embedding vector contains around 130 million search queries. The above-mentioned model was applied to the search session data set and produced an embedding for each word. Using search sessions to obtain the embedding vector allows us to embed the words in the context of online searches. Embedding using search sessions has also been used in marketing research (Wang, Xiong, and Yang 2019).

After obtaining the embedding vectors of the emotion words in the manually-crafted basic dictionary, we looked for the nearest neighbors of the words in the embedding vector space and added them to the dictionary. Three of the co-authors assessed each emotion word in the dictionary and deliberated as to whether the word indeed represented an emotion. After reviewing the instances in search queries, we find that emotion categories of "love," "joy," "relief," "surprise," "romantic love," "excitement," "pride," "peacefulness," "optimism," "eagerness," and "contentment" express positive emotion in the search context. Through this deliberation process, we arrived at a final positive emotion word list dictionary of 173 words. We obtained 111 positive emotion words from the synonyms/grammar approach and obtained another 62 with the nearest neighbor approach. In Table W1, we provide an illustrative list of the positive emotion words.

[1] Defining 30 minutes of activities as a session is a popular choice in industry practice (Grbovic et al. 2016; Mitra 2015). It is also the fixed choice of the collaborating company, and thus we were not able to try other time window.

Table W1. Illustrative List of Positive Emotion Words in Dictionary

Example Positive Emotion Words
romantic, beloved, nostalgic, peaceful, satisfied, optimistic, delightful, pleasant, excited, proudly

A1.2. Obtaining Queries with Positive Emotion Keywords

Next, we matched each unique query in our data set to the dictionary of positive emotion words. Specifically, for each unique query, we went through the entire emotion word dictionary, and checked whether the query included any word in the dictionary; if yes, the query was labeled as "with positive emotion keyword." For example, for the query "romantic hotels," in going through the emotion word dictionary we would find that it contains the positive emotion keyword "romantic," and hence this query "romantic hotels" would be labeled as "with positive emotion keyword." Through this step, we obtained 36,224 unique queries with 173 distinct positive emotion keywords. In order to reduce the size of the sample to make it feasible for human validation and the associated costs ($) (a process described in A1.3), we generated a subsample of queries. This procedure involved randomizing (with a random number generator) the order of queries for each of the 173 positive emotion keywords identified in the query data set and taking the first 100 queries for that positive emotion keyword. If that positive emotion keyword did not contain at least 100 queries, we included in the subsample all the queries associated with that positive emotion word in the data set. This procedure sought to maximize the observed use of positive emotion keywords in the search query data set while also producing a manageable number of observations for human validation. It resulted in 13,035 unique queries containing positive emotion keywords.

A1.3. Assessment of Positive Emotion Keywords in Queries as Descriptors of a Product/Service and Construction of Comparable Queries with Nonemotion Keywords

We then hired two linguistic experts from a freelancing website to independently assess whether the positive emotion keyword in each of the 13,035 queries indeed represented a descriptor of the product or service mentioned rather than serving another linguistic purpose (e.g., brand name). This step narrowed the data to a final set of 2,420 queries with positive emotion keywords.

To compare the CTR of search queries with positive emotion keywords and nonemotion keywords, we also requested the hired linguistic experts to go over each of the 2,420 queries with positive emotion keywords and replace the positive emotion keywords with nonemotion keyword, thus constructing a set of queries for the same product or service but with nonemotion keywords. In order to construct these paired nonemotion keyword queries, these linguistic experts were specifically told to use a word (1) that does not convey any emotion and (2) that should meaningfully describe the product.

We also compared the CTR of the search queries with positive emotion keywords to paired queries without any descriptive keywords. In doing so, we constructed comparable queries without keywords by simply removing the positive emotion keyword and compared them with the 2,420 queries with positive emotion keywords, which resulted in similar findings as the analysis comparing nonemotion keywords (see Pilot Study). We provide an illustrative list of queries with positive emotion keywords, nonemotion keywords, and no descriptive keywords in Table 1 in the manuscript.

With the labeled 2,420 queries, we find that 122 out of the 173 positive emotion words are contained in queries where they do perform as descriptors of a product or service. We

provide the top 30 most popular positive emotion keywords employed in search queries in the data set with their corresponding emotion categories, per Richins (1997), in Table W2.

Table W2: Top 30 Popular Positive Emotion Keywords

Emotion Word	Emotion Category (Richins 1997)	Frequency
happy	joy	10.07%
amazing	surprise	8.47%
love	love	8.30%
sexy	romantic love	5.60%
precious	love	4.68%
romantic	romantic love	4.48%
sensual	romantic love	3.30%
pleasant	joy	3.24%
lovely	love	2.64%
healing	relief	2.05%
lively	joy	1.87%
peaceful	peacefulness	1.64%
gracious	love	1.22%
calming	peacefulness	1.00%
upbeat	optimism	0.93%
nostalgic	love	0.87%
beloved	love	0.86%
joyful	joy	0.83%
seductive	romantic love	0.82%
gorgeous	love	0.78%
exciting	excitement	0.78%
graceful	love	0.77%
playful	joy	0.76%
cheerful	joy	0.72%
scrumptious	love	0.67%
relaxing	peacefulness	0.65%
alluring	romantic love	0.61%
delighted	joy	0.61%
excited	excitement	0.58%
optimistic	optimism	0.55%

Note: The third column of the table provides the relative frequency of the corresponding positive emotion keyword among all queries labeled as including a positive emotion keyword.

A2. Comparison of Proportion of Queries with Positive Emotion Keywords on Weekends Versus Weekdays and Holidays Versus Nonholiday Days

As described in section A1, we obtained the 6-week data from February to March of 2019. The proportion of searches with positive emotion keywords among all searches is 1.16%. This was calculated in the following manner. 36,224 unique search queries in the dataset include a positive emotion keyword. These 36,224 unique search queries appear in a total of 582,907 of the searches conducted across the entire dataset, which encompasses 50,335,229 total searches. Thus, the frequency of occurrence for a search query containing a positive emotion keyword is around 582,907/50,335,229 = 1.16%.

To provide practical recommendations to advertisers, we further investigated when positive emotion keywords are used more often in search queries. We conjecture that positive emotion keywords are used more often during weekends compared to weekdays, and during holidays compared to nonholiday days, as consumers are comparatively more likely to experience positive emotion on the weekends and during holidays than during the week and nonholiday periods.

To compare weekends versus weekdays, we obtained the proportion of searches with positive emotion keywords on each day within our 6-week data and compared the proportions between weekends (defined as Friday, Saturday, and Sunday) and weekdays (Monday–Thursday). We find that the proportion of searches with positive emotion keywords is higher on the weekend (1.24%) than on weekdays (1.10%). With a t-test, we find that the difference is statistically significant ($p < .001$). With Google's around 3 billion searches globally each day, it suggests that there are around 4.2 million (i.e., 3 billion × [1.24% – 1.10%]) more searches with positive emotion keywords on each day during the weekend compared to weekdays.

To compare holidays to nonholiday days, we contacted the collaborating company and obtained the daily proportion of searches with positive emotion keywords during Thanksgiving (November 25–December 1, 2019) and Christmas (December 23–December 29, 2019) of the same year. The average proportion of searches with positive emotion keywords within these two weeks was (1.48%), which is higher than the 6 weeks in February to March 2019 (1.16%). With a t-test, we found that the difference is statistically significant ($p < .001$). With Google's around 3 billion searches globally each day, it suggests that there are around 9.6 million (i.e., 3 billion × [1.48% – 1.16%]) more searches with positive emotion keywords on each day during a major holiday week.

We were not able to compare the proportion of searches with positive emotion keywords describing a product or service in the above analysis, because not all queries with positive emotion keywords were labeled to confirm whether the positive emotion keywords performed as a descriptor of the product (among the 36,224 queries with positive emotion keywords, we only labeled a random sample of 13,035 queries).

A3. Proportion of Queries with Positive Emotion Keywords Used as Product Descriptors

The 1.16% frequency of occurrence noted in section A2 does not distinguish as to whether the positive emotion keyword was used specifically as a product descriptor in these searches. To develop a better understanding of that specific number, we start with the 2,240 unique search queries identified from the 13,035 convenience sub-sample that were identified as employing the positive emotion keyword as a product descriptor. The total number of searches in the dataset for which these 2,240 search queries (i.e., text) was employed is 85,597 searches. If 85,597 searches are identified from a convenience sample of 13,035 queries, then extrapolating this correlation to the bigger sample of 36,244 queries, we estimate that the total number of

searches based on queries with positive emotion keywords as product descriptors in our archival dataset is (85,597/13035) × 36,224 = 237,873. Hence, the estimated proportion of searches with positive emotion keywords that are definitely used as product descriptors is 237,873 / 50,335,229 = .47%.

Web Appendix B: Details on Pre-registered Sampling Procedures

Link to OSF Pre-registrations:

https://osf.io/nq85g/?view_only=af55bddaa1e84bfca7b00631b3e5fca2

Study 1 - Sampling Procedures

We sought to obtain 300 participants per condition, given the open-ended nature of the dependent variable, and preregistered our study design on OSF prior to collection. However, only 587 subjects chose to participate in the study during the time that it ran on the university's subject pool.

Study 2 - Sampling Procedures

We sought to obtain 200 participants per condition and preregistered our study design on OSF prior to collection. However, only 397 subjects chose to participate in the study during the time that it ran on the university's subject pool.

Study 3 - Sampling Procedures

We sought to obtain 200 participants per condition analogous to Study 2; 400 submissions via the CloudResearch platform were recorded.

Study 4 – Sampling Procedures

We sought to obtain 300 participants per condition, given the binary nature of the first dependent variable (positive emotion descriptor use) and its downstream effect on the second dependent variable (ad clicks).

Study 5 – Sampling Procedures

We sought to obtain 400 participants per condition, given the binary nature of the dependent variable, and preregistered our study design on OSF prior to collection; 1,608 submissions via the CloudResearch Connect platform were recorded.

Web Appendix C: Emotion Manipulation Check

Emotional Image Prime: Manipulation Check

In a separate pilot study, 304 U.S.-based participants from MTurk (M_{age} = 39.3; 56.3% female, 43.8% male) participated in a survey for payment. We sought to obtain 100 participants per condition. Participants were randomly assigned to one of three incidental emotion conditions (positive vs. negative vs. neutral) in which they viewed a continuous series of 14 images meant to induce them into their assigned emotional state, analogous to manipulations used in prior work on emotion induction (Pyone and Isen 2011). Images in the positive (e.g., puppies, bubbles, flowers), negative (e.g., funeral, divorce, war), and neutral (e.g., rug, chair, jar) conditions were displayed on a computer and auto-advanced after a period of 6 seconds. Analogous to Pyone and Isen (2011), after viewing the full series of 14 images, participants were asked to indicate how the images made them feel on eight 7-point bipolar rating scales. Three of the items were intended to assess positive vs. negative emotion ("positive/negative," "pleasant/unpleasant," and "sad/happy"); the first two items were reverse-coded and all three were combined to create a scale of emotion with higher values indicating more felt positive emotion (α = .97).

A one-way ANOVA revealed that emotional state had a significant effect on how participants felt after viewing the images ($F(2, 301) = 688.13$, $p < .001$). Post hoc LSD comparisons revealed that participants in the positive emotion manipulation condition felt significantly more positive emotion (M_{Pos} = 6.44, SD = .85) than participants in the neutral (M_{Neu} = 4.87, SD = 1.04; $p < .001$) and negative emotion manipulation conditions (M_{Neg} = 1.71, SD = .87; $p < .001$) emotion manipulation conditions. In addition, those in the negative emotion condition felt significantly less positive (i.e., more negative) emotion following the manipulation than participants in the neutral emotion condition ($p < .001$).

Web Appendix D: Additional Details for Studies 2 and 3

Study 2 – Development of Descriptors

Half the product descriptive keywords were nonemotion keywords, depicting specific and physical attributes of the product (clear, plain, metal, lightweight), as specific and physical attribute keywords have been commonly explored in the paid search ad literature (Agarwal, Hosanagar, and Smith 2011; Ramlall et al. 2011). We developed this specific set of nonemotion keywords by looking at common descriptors used for water bottles sold from online retailers (e.g., Amazon.com) as well as online lists devoted to selecting water bottles ("The 8 Best Water Bottles," www.nytimes.com). The set of positive emotion keywords (joyful[(5)], cheerful[(5)], playful[(5)], and inspiring[(6)]; superscripts refer to emotions listed in note of Table 1 in manuscript) included four positive emotion words from the emotion keyword list we developed from Richins's (1997) 20 consumption emotions (see Web Appendix A). We chose positive emotion keywords that aligned with positive emotions (e.g., joy, optimism) one might experience while using a water bottle (working out, staying focused, etc.). We also performed pilot search engine queries for each potential keyword combination for the water bottle and obtained relevant results depicting water bottles containing various images and text depicting joy and optimism, justifying the validity and relevance of our chosen descriptors.

Study 3 – Development of Descriptors

Half the product descriptive keywords were nonemotion keywords, depicting specific and physical attributes of the product (audio, contemporary, paperback, and secondhand), as specific and physical attribute keywords have been commonly explored in the paid search ad literature (Agarwal, Hosanagar, and Smith 2011; Ramlall et al. 2011). We developed this specific set of

nonemotion keywords by searching popular book retailers (e.g., Barnes & Noble) and expanding to consider other descriptors of books as well as how a buyer might procure them. The set of positive emotion keywords (joyful[5], inspiring[6], relaxing[3], and uplifting[6]; superscripts refer to emotions listed in note of Table 1 in manuscript) included four positive emotion words from the emotion keyword list we developed from Richins's (1997) 20 consumption emotions (see Web Appendix A). We chose positive emotion keywords that aligned with popular book categories (e.g., romance, self-help, fiction, nonfiction) as well as those that are commonly depicted in book reading lists online (i.e., "25 of the Most Inspiring Books Everyone Should Read," www.inc.com).

Web Appendix E: Supplemental Analyses for Study 4

Development of Search Results Stimuli

The search result link stimuli were carefully constructed to exclude any potential confounds that might influence the effect. We created a search results page that reflected the actual set of results participants would see when searching for a product on a search engine, such as Google. We did this by conducting Google searches for the respective products and copying aspects of the returned results of those queries. Due to concern over familiarity with popular water bottle brands and retailers, we employed fictitious retailers in this stimulus, but still adapted the link description language from that used by actual brands who appeared in our sampling of search results. We reduced any fluency effects by ensuring product keywords considered in the query composition task were not present in the text of any search results. We also ensured no search results contained any emotional or deal-related words. In addition, while the three organic links were fictitious brands, the paid search ad was a real brand. The ad for this brand appeared in our sample Google search, and given it was not a highly popular water bottle brand at the time (e.g., Swell, HydroFlask, Nalgene), we employed is as the ad in our stimuli. The description for the ad in our stimuli was the same as employed in the actual ad, accounting for the removal of study-specific product descriptors, emotional content, and deal-related words. We used this real ad to ensure that there was nothing we were missing in the design of the search results stimuli that could cause low ad clicks.

Ad Recall Failures

The effect of positive emotion keyword use on ad clicks also held (P_{PosEmo} = 37.0% vs. P_{NonEmo} = 14.6%; ($\chi^2(1) = 14.40$, $p < .001$) when excluding $N = 64$ participants who failed to recall seeing the paid search ad in the stimuli. Further, mediation still held, with a calculated Z-mediation score of 2.88, which is greater than 1.96, suggesting that the mediation was statistically significant. In a second analysis, when including all participants and accounting for ad recall as a covariate (ad recall success = 1; $b = .08$; $Wald = .05$, $p = .830$), we still observed the effect of positive emotion keyword use on ad clicks ($b = 1.35$; $Wald = 22.55$, $p < .001$) as well as a significant mediation effect (Z-mediation score of 3.35).

We also ran a logistic regression with ad recall (1 = success, 0 = failure) as the dependent variable and keyword type and primed emotion as independent variables to address the concern that positive incidental emotion and the choice of a positive emotion keyword may increase attention towards the ad, which could impact ad clicks. However, there was no effect of positive incidental emotion (P_{Pos} = 89.3% vs. P_{Neu} = 89.5%; $b = .05$; $Wald = .04$, $p = .843$) nor keyword type (P_{Pemo} = 84.4% vs. $P_{Non\text{-}Emo}$ = 90.0%; $b = -.53$; $Wald = 1.89$, $p = .169$) on ad recall, suggesting that our effects were not driven by attention.

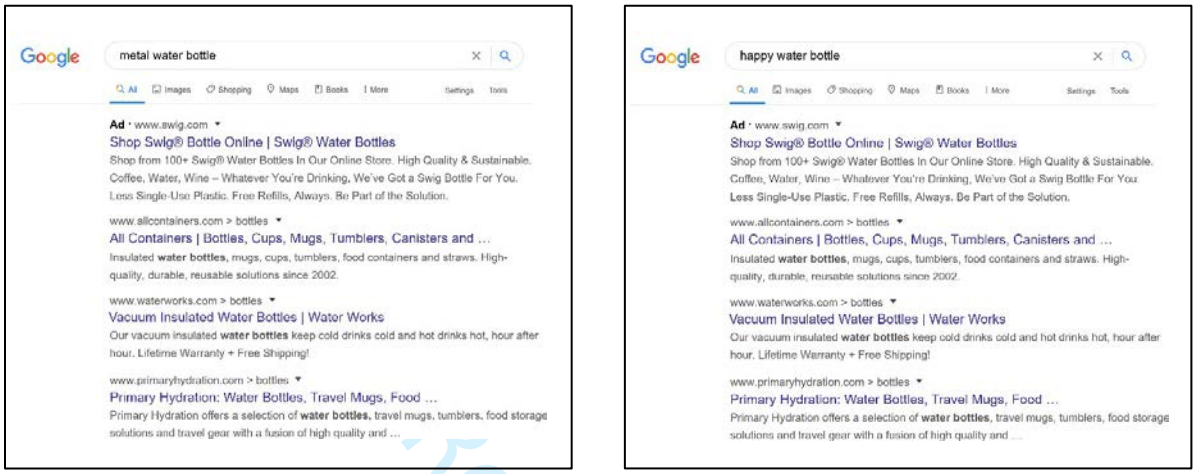
Organic Link Click Behavior

The pattern of click behavior observed for the paid search ad was distinct from that observed among the three organic search results. As hypothesized, there was a significant effect of positive emotion keyword use on paid search ad clicks (P_{PosEmo} = 39.1% vs. P_{NonEmo} = 14.3%; $\chi^2(1) = 20.50$, $p < .001$). For the first organic link, there was not a significant effect of positive emotion keyword use on link clicks (P_{PosEmo} = 37.5% vs. P_{NonEmo} = 43.5%; $\chi^2(1) = .86$, $p = .355$). For the second organic link, there was also not a significant effect of positive emotion keyword

use on link clicks (P_{PosEmo} = 42.2% vs. P_{NonEmo} = 48.0%; $\chi^2(1) = .77$, $p = .380$). For the third organic link, there was not a significant effect of positive emotion keyword use on link clicks (P_{PosEmo} = 32.8% vs. P_{NonEmo} = 37.8%; $\chi^2(1) = .61$, $p = .434$). See Figure 4 in manuscript. These results suggest that the effect of positive emotion keyword use in search queries is specific to paid search ad clicks and not just click behavior on links in general.

Web Appendix F: Supplemental Analyses for Study 5

Figure W1: Study 5 Search Results Stimuli



Ad Recall Failures

Results did not change when excluding N = 139 participants who failed to recall seeing the paid search ad in the stimuli (e.g., "No" + "Maybe" responses to attention check). A binary logistic regression revealed a main effect of keyword type (1 = positive emotion, 0 = nonemotion) on likelihood to click on the ad (P_{PosEmo} = 28.5% vs. P_{NonEmo} = 16.1%; b = .73, $Wald$ = 15.40, p < .001). While there was no main effect of the persuasion knowledge prime (P_{No} = 22.2% vs. P_{PK} = 15.7%; b = -.10, $Wald$ = .26, p = .613), most importantly, there was a significant interaction between keyword type and persuasion knowledge prime on ad clicks (b = -.59, $Wald$ = 4.59, p = .032). In addition, when including all participants in the analysis and accounting for ad recall as a covariate (ad recall success = 1; b = -.60; $Wald$ = 10.19, p = .001), we still observed the significant interaction of keyword type and persuasion knowledge prime on ad clicks (b = -.63; $Wald$ = 6.09, p = .014).

Organic Link Click Behavior

The pattern of click behavior observed for the paid search ad was distinct from that observed among the three organic search results. For the first organic link, while there was a main effect of keyword type on link clicks (P_{PosEmo} = 58.1% vs. P_{NonEmo} = 66.4%; b = -.36, $Wald$ = 6.42, p = .011), it was in the opposite direction of what was observed for paid search ads. Additionally, while there was a main effect of persuasion knowledge prime (P_{No} = 55.8% vs. P_{PK} = 68.7%; b = .56, $Wald$ = 13.59, p < .001), there was no interaction of keyword type and persuasion knowledge prime on link clicks (b < .001, $Wald$ < .001, p = 1.000). For the second organic link, while there was a marginal main effect of keyword type on link clicks (P_{PosEmo} = 62.3% vs. P_{NonEmo} = 63.9%; b = -.24, $Wald$ = 2.86, p = .091), it was in the opposite direction of what was observed for paid search ads. There was no main effect of the persuasion knowledge prime (P_{No} = 58.8% vs. P_{PK} = 67.5%; b = .19, $Wald$ = 1.66, p = .198), and there was a marginal interaction (b = .37, $Wald$ = 3.12, p = .077), however the pattern is the opposite of what was observed for the paid search ad. For the third organic link, while there was a main effect of keyword type on link clicks (P_{PosEmo} = 54.7% vs. P_{NonEmo} = 57.3%; b = -.30, $Wald$ = 4.44, p = .035), it was in the opposite direction of what was observed for paid search ads. There was no main effect of the persuasion knowledge prime (P_{No} = 52.1% vs. P_{PK} = 60.0%; b = .13, $Wald$ = .77, p = .381), and there was a marginal interaction (b = .39, $Wald$ = 3.76, p = .053), however the pattern is the opposite of what was observed for the paid search ad. See Figure 5 in the manuscript.

Given the experimental design nature of this study, we can also compare the click percentages between conditions and observed that CTRs for the organic search results were higher than that for the ad, suggesting that the greater ad clicks observed in the positive emotion keyword condition were not a result of more attention devoted to the ad.

Web Appendix G: Persuasion Knowledge Manipulation Check

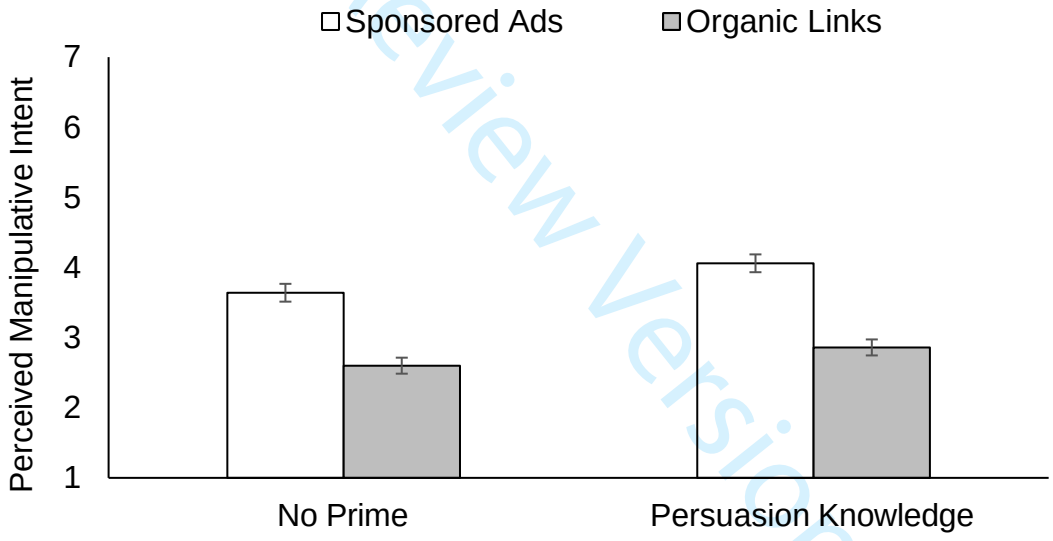
In a separate manipulation check study, four hundred and one U.S.-based participants (M_{age} = 39.9 years; 49.1% female, 49.9% male, 1.0% other) from CloudResearch's Connect platform completed the study for payment. We sought to obtain 200 participants per condition and preregistered our study design on OSF prior to collection; 401 submissions via the CloudResearch platform were recorded. Participants were randomly assigned to one of two conditions (prime: no vs. persuasion knowledge) in a single factorial between-subjects design in which they were told they were looking for a water bottle.

All participants were asked to imagine that they were searching for a water bottle online using a search engine (e.g., Google, Bing). Participants in the persuasion knowledge prime condition read the article used in Study 5, while those in the no prime condition did not. All participants were then shown a page of search results, matching that used in Study 5. All participants then answered two items about the perceived manipulative intent of the various types of links found on a search result page. Specifically, participants indicated to what extent they believed that sponsored advertisements are attracting clicks by inappropriate, unfair, or manipulative means (1 = Not at All, 7 = Extremely). They answered the same question for organic search results. The wording of the two items was adapted from Kirmani and Zhu (2007) and the order of the items was randomized. Lastly, participants indicated their age and gender.

A one-way ANOVA revealed that the persuasion knowledge prime significantly increased participants' perception of manipulative intent on behalf of sponsored advertisements (M_{No} = 3.64, SD = 1.90 vs. M_{PK} = 4.06, SD = 1.68; $F(1, 399) = 5.61$, $p = .018$). However, the persuasion knowledge manipulation did not significantly increase perceptions of manipulative

intent among the organic search results (M_{No} = 2.60, SD = 1.64 vs. M_{PK} = 2.86, SD = 1.58; F(1, 399) = 2.53, p = .113), further positing how persuasion knowledge is targeted toward sponsored content. Additionally, pairwise comparisons within each condition confirmed that participants held higher perceptions of manipulative intent for sponsored advertisements than organic search results, both in the no prime condition (repeated measures post-hoc LSD; $p < .001$) and when persuasion knowledge was primed (repeated measures post-hoc LSD; $p < .001$; see Figure W2).

Figure W2: Perception of Manipulative Intent



Web Appendix H: Robustness Check - Ad Click Replication with T-Shirts

After completing a search query composition task for a t-shirt, similar to the prior studies, we provided participants with a search result page containing an ad and recorded their tendency to click on the ad.

Method

Eight hundred and two U.S.-based participants (M_{age} = 43.0 years; 46.3% female, 53.5% male, .2% other) from Mturk via CloudResearch took part in this study for payment. We sought to obtain 400 participants per condition analogous to Study 5 and preregistered our study design on OSF prior to collection; 802 submissions via the CloudResearch platform were recorded. We randomly assigned participants to one of two conditions (keyword: nonemotion vs. positive emotion) in a single factorial between-subjects design in which they engaged in subsequent tasks of search query keyword selection and ad click behavior for a t-shirt.

Analogous to the designs of Studies 2 and 3, participants were told to imagine they were looking to purchase a t-shirt and intended to search online for it using a search engine. Participants were asked to indicate how they would describe the t-shirt they were looking for by choosing a keyword from a provided list to complete their product search query. Unlike Studies 2 and 3 in which participants chose between a set of nonemotion and positive emotion keywords, in this design, keyword type was a randomized factor. Depending upon assigned condition, participants were provided with a list of either four nonemotion keywords (plain, fitted, versatile, and v-neck) or four positive emotion keywords (joyful, cheerful, playful, and inspiring) to choose from to complete their search query. The nonemotion keywords were chosen by looking at physical attributes for t-shirts commonly depicted on websites featuring t-shirt sales, while the

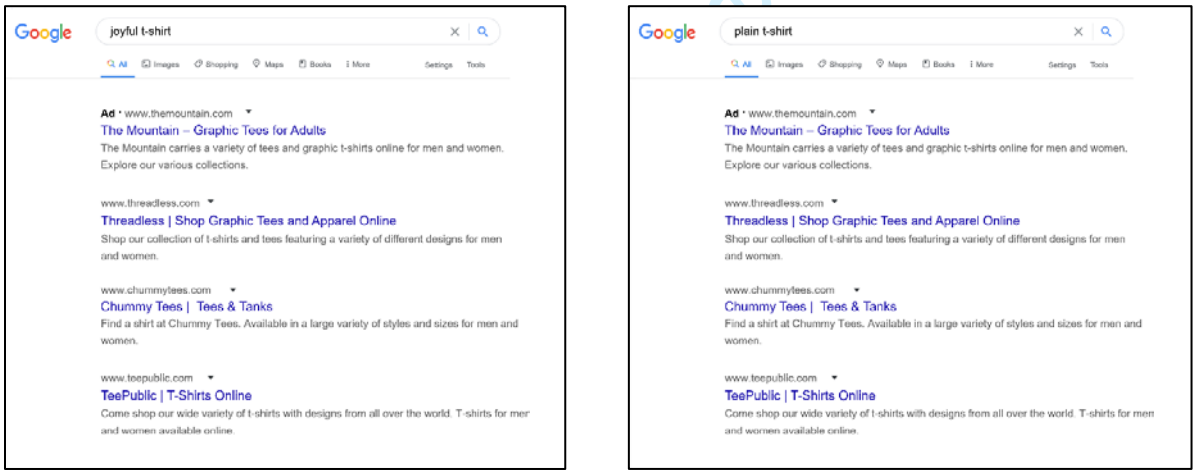
positive emotion keywords were the same as those employed in Study 2. Similar to Studies 2 and 3, the four nonemotion keywords (plain, fitted, versatile, and v-neck) depicted specific and physical attributes of the product; we developed them by looking at physical attributes for t-shirts commonly depicted on websites featuring t-shirt sales. For the four positive emotion keywords, we employed the same keywords used in Study 2 (joyful, cheerful, playful, and inspiring) as they depict emotions that consumers might want to represent themselves with in fashion.

After selecting a keyword for their search query, participants saw a corresponding search results page (see Figure W3) containing four links, one of which was a paid search ad. The ad, which appeared at the top of the list of results (a prominent place for paid search ads; Lu and Du 2020; Narayanan and Kalyanam 2015), was denoted by the general moniker “Ad” as observed on prominent search engines. All participants saw the same set of search results; we varied only the text depicted on the search bar across participants to ensure it matched the search query keyword they had previously chosen. The search result link stimuli were carefully constructed to ensure the generalizability of the effect of positive emotion keyword use on one’s click behavior and to exclude any potential confounds that might influence the effect. Specifically, we created a search results page that reflected the actual set of results participants would see when searching for a product on a search engine, such as Google. We did this by conducting Google searches for the respective products and copying aspects of the returned results of those queries. All the links used employ actual retailers of t-shirts that were obtained from this search. Specifically, we chose smaller retailers whose names are specific to t-shirts and were not associated with big-box stores or other well-known retailers (e.g., Amazon, Walmart, Etsy). We adapted the language from these links to remove any wording that could create an advantageous fluency effect. For example, we made sure that no keywords one selected in the search query composition task were

present in the text of any search results, as well as ensured no search result contained any emotional content. We also removed any deal or sale-related words that could influence click behavior. As a result, we sought to obtain 4 different links with neutral descriptions that focused on the same aspects. The link chosen as the ad was randomly selected. Given the question type and survey platform employed to run the study, we could not randomly assign the ad designation to randomize across links (as the DV employed a static image of the search results page rather than a random set of links).

Participants were then asked to indicate all of the links they would click on. Whether participants clicked on the paid search ad (1 = Yes, 0 = No) served as our dependent variable. Finally, participants completed a recall-based attention check that asked whether they recalled seeing a paid search ad (e.g., denoted by the word "Ad" in front of the link) in the search results page (1 = yes, 2 = no, 3 = not sure) followed by demographic questions of age and gender.

Figure W3. Search Results Page Stimuli



Results and Discussion

Ad clicks

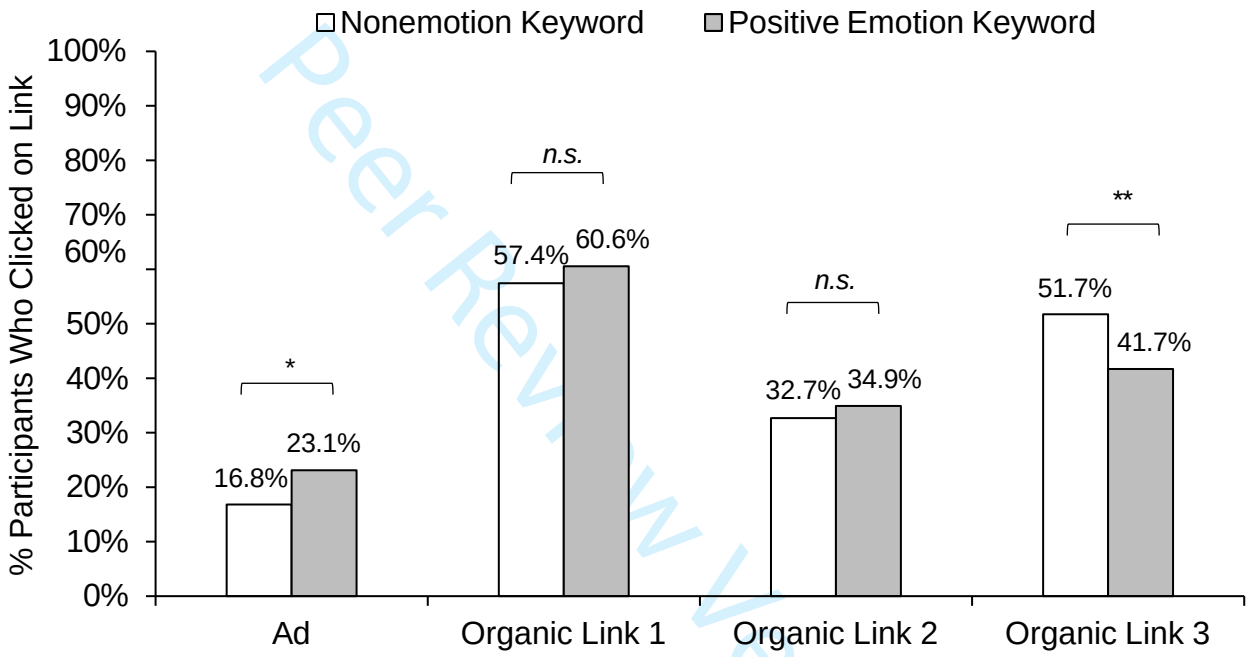
A binary logistic regression revealed a main effect of keyword type (1 = positive emotion, 0 = nonemotion) on likelihood to click on the ad ($\chi^2(1) = 4.97$, $p = .026$). Supporting H2, participants who employed a positive emotion keyword (23.1%) in their search query were more likely to click on the ad than participants who employed a nonemotion keyword (16.8%). The effect of positive emotion keyword use on ad clicks also held (P_{PosEmo} = 22.3% vs. P_{NonEmo} = 15.7%; ($\chi^2(1) = 5.11$, $p = .024$) when excluding $N = 69$ participants who failed to recall seeing the paid search ad in the stimuli. In addition, when including all participants in the analysis and accounting for ad recall as a covariate (ad recall success = 1; $b = -.63$; $Wald = 5.12$, $p = .024$), we still observed the effect of positive emotion keyword use on ad clicks ($b = .40$; $Wald = 4.98$, $p = .026$).

Organic link clicks

We also examined the effect of positive emotion keyword use on click behavior for the three organic results provided on the search results page stimuli. A logistic regression revealed no effect of positive emotion keyword use on clicks on the first (P_{PosEmo} = 60.6% vs. P_{NonEmo} = 57.4%; $\chi^2(1) = .81$, $p = .368$) or second organic links (P_{PosEmo} = 34.9% vs. P_{NonEmo} = 32.7%; $\chi^2(1) = .45$, $p = .500$). And, while there was a significant difference in clicks on the third organic link between keyword type conditions, the pattern was in the opposite direction of that observed with the ad (P_{PosEmo} = 41.7% vs. P_{NonEmo} = 51.7%; $\chi^2(1) = 8.11$, $p = .004$; see Figure W4). Further, participants were more likely to click on the organic links in general than the paid search ad, aligning with prior findings on the general avoidance of paid search ads (Berman and Katona 2013; Jansen and Resnick 2006; Jerath, Ma, and Park 2014). Lastly, while the paid search ad appeared first in the search results page (as observed on search engines; Google Ads 2022),

CTRs for the organic links were higher than that for the paid search ad, dispelling the alternative explanation that our hypothesized effect on ad clicks is due to attention to the first link on the search results page.

Figure W4: Percent Clicks on Paid Search Ad and Organic Links by Keyword Type



Notes: *$p < .05$; **$p < .01$; ***$p < .001$

Web Appendix I: **Robustness Check - Effect of Positive Emotion Keyword on Ad Clicks with Counterbalanced Ad Location (1st vs. 2nd)**

In Studies 4, 5, and Web Appendix H, we positioned the paid search ad at the top of the list of search results as it is a prominent place for paid search ads (Lu and Du 2020; Narayanan and Kalyanam 2015) and also where the most prominent search engine, Google, places their ads. To test whether attentional focus to the first link on the page drives our observed effect, we manipulated whether the paid search ad was placed at the first position or at the second position on the search results page. We elected the second position because it is a common position where an ad is placed relative to the middle or the end of the search results page.

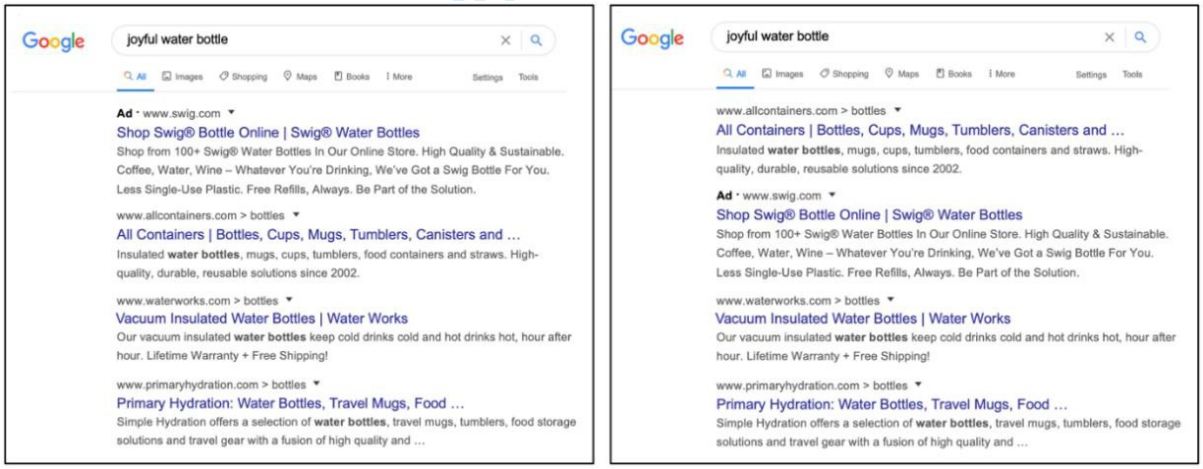
Method

Eight hundred and two U.S.-based participants (M_{age} = 37.82, 62.6% female, 36.3% male, 1.1% other) from Prolific participated in this study for payment. We sought to obtain 200 participants per condition; 803 completed the survey on the Prolific platform. Participants were then randomly assigned to one of four conditions in a 2 (keyword: nonemotion vs. positive emotion) × 2 (ad position: first vs. second) between-subjects design. All participants were presented with a purchase scenario in which they were looking to purchase a new 20oz water bottle which they could use for multiple purposes, analogous to Studies 4 and 5. In this study, all participants were also induced with a positive emotion, unrelated to the search task, using the same image manipulation as previous studies. Participants then completed a search query text selection task analogous to Web Appendix H in which they were provided a list of either four nonemotion keywords (i.e., clear, plain, metal, lightweight) or four positive emotion keywords (i.e., joyful, cheerful, playful, inspiring) to complete their product search query text for a water

bottle. These were the same nonemotion and positive emotion descriptive keywords employed in Study 2.

Subsequently, we presented participants with a search results page that included one paid search ad and three organic links; the same stimuli employed in Study 4. The position of the ad and first organic link were randomized per condition (see Figure W5). Participants indicated which of the search result links they would click on; whether participants clicked on the paid search ad (1=Yes, 0=No) served as our dependent variable. Lastly, participants completed the same recall-based attention check as Studies 4 and 5.

Figure W5: Search Results Page Stimuli



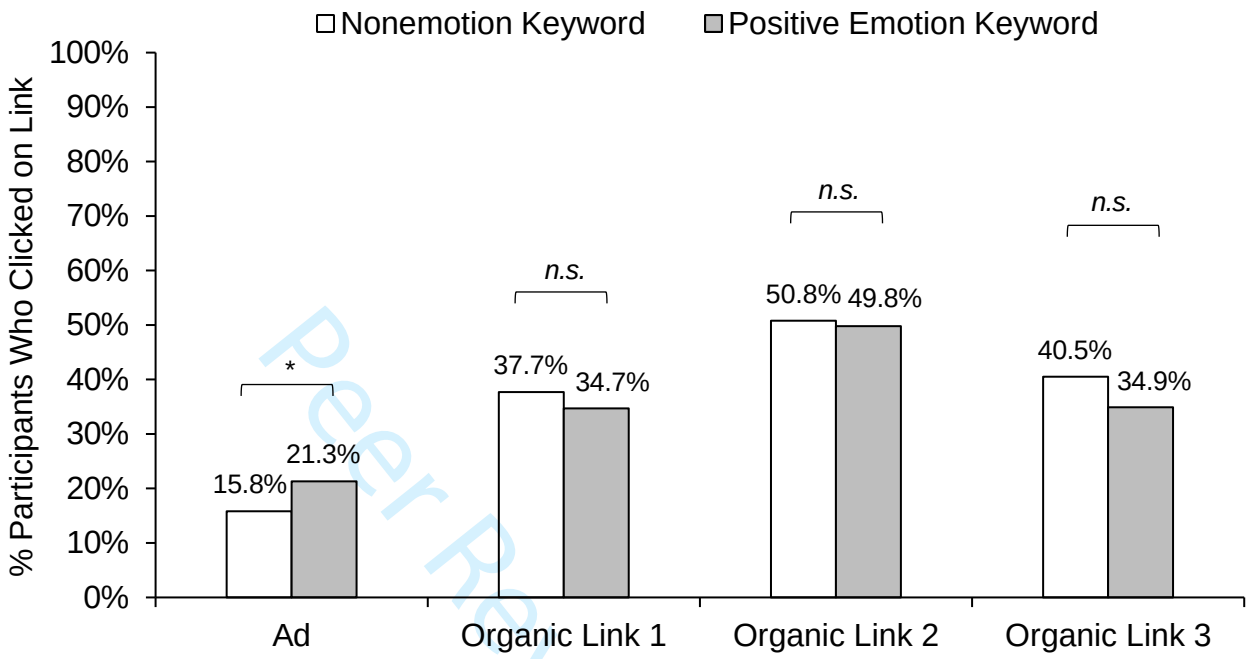
Results and Discussion

A logistic regression revealed an effect of positive emotion keyword use on ad clicks ($\chi^2(1) = 3.96$, $p = .047$) in that, consistent with other studies, participants using a positive emotion keyword (21.3%) were more likely to click on the ad than those using a nonemotion keyword (15.8%). There was also a marginal effect of ad position ($\chi^2(1) = 2.93$, $p = .087$) with the proportion of ad clicks marginally higher when the ad was placed first (20.9%) than when it

was placed second (16.3%), as would be expected. Yet, importantly, there was no interaction between keyword type and ad position ($\chi^2(1) = 1.28$, $p = .259$), indicating that the effect of positive emotion keywords on ad clicks was not dependent upon the ad's location being at the very top of the page.

We also examined if there was any effect on organic link click behavior. Regarding likelihood to click on the first organic link (1 = Yes, 0 = No), a logistic regression revealed no effect of keyword type (P_{PosEmo} = 34.7% vs. P_{NonEmo} = 37.7%; $\chi^2(1) = .80$, $p = .371$), ad position (P_{first} = 37.3% vs. P_{second} = 35%; $\chi^2(1) = .46$, $p = .499$), nor an interaction between the two ($\chi^2(1) = .07$, $p = .785$). Regarding likelihood to click on the second organic link (1 = Yes, 0 = No), a logistic regression showed no effect of keyword type (P_{PosEmo} = 49.8% vs. P_{NonEmo} = 50.8%; $\chi^2(1) = .08$, $p = .777$), a marginal effect of ad position (P_{first} = 47.3% vs. P_{second} = 53.3%; $\chi^2(1) = 2.88$, $p = .089$), and no interaction between the two ($\chi^2(1) = 1.32$, $p = .251$). For likelihood to click on the third organic link (1 = Yes, 0 = No), a logistic regression revealed no effect of keyword type (P_{PosEmo} = 34.9% vs. P_{NonEmo} = 40.5%; $\chi^2(1) = 2.63$, $p = .105$), no effect of ad position (P_{first} = 35.6% vs. P_{second} = 39.8%; $\chi^2(1) = 1.53$, $p = .217$), and no interaction between the two ($\chi^2(1) = .09$, $p = .767$). Consistent with the results of prior studies, the effect of positive incidental emotion on increased click behavior only occurred for the paid search ad and not any of the organic links (see Figure W6).

Figure W6: Likelihood to Click on Link by Keyword Type



Notes: *$p < .05$; **$p < .01$; ***$p < .001$

Web Appendix J: Robustness Check - Effect of Positive Emotion Keyword on Ad Clicks with Counterbalanced Ad Location (1st vs. Last) & Counterbalanced Ad Text

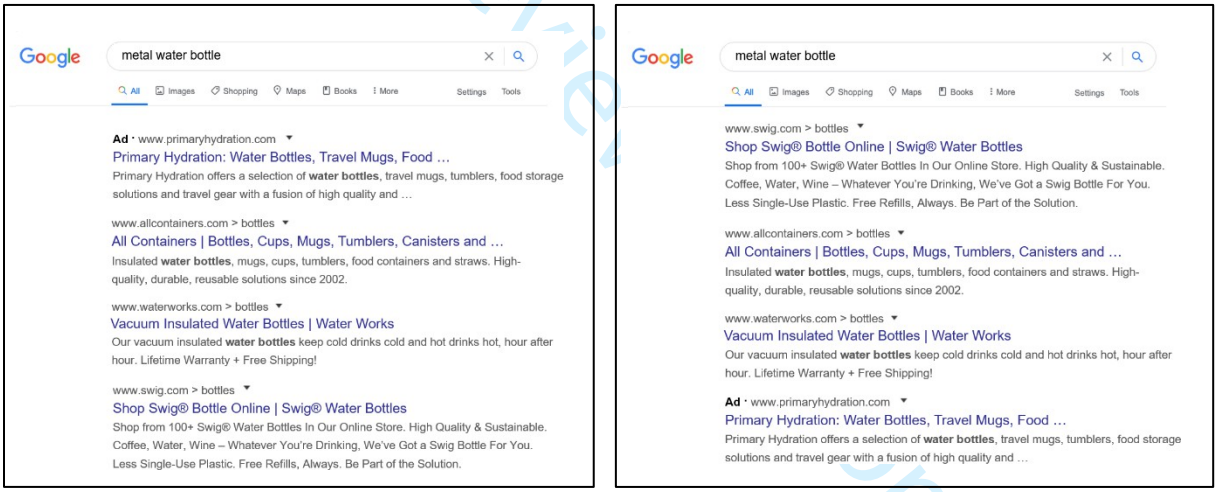
While Web Appendix I finds the effect of positive emotion keyword use in search queries on ad clicks still holds regardless of whether the ad is located in the first or second position on the search result page, in this study we examine if the effect still holds if the ad appears in a lower position on the search results page. In doing so, we manipulated whether the paid search ad was placed at the first position or last position on the search results page. Additionally, we also counterbalanced the text used in the ad, to address concerns that the specific text of the ad might impact our effect.

Method

Sixteen hundred and three U.S.-based participants (M_{age} = 37.82, 62.6% female, 36.3% male, 1.1% other) from CloudResearch's Connect platform took part in the study for payment. We sought to obtain 400 participants per condition, matching the power of Study 5, and preregistered our study design on OSF prior to collection; 1,608 submissions via the CloudResearch Connect platform were recorded. Participants were then randomly assigned to one of four conditions in a 2 (keyword: nonemotion vs. positive emotion) × 2 (ad position: first vs. last) between-subjects design. All participants were asked to imagine that they were searching for a water bottle online using a search engine (e.g., Google, Bing), analogous to Studies 4 and 5. Participants in the nonemotion keyword condition were told they were looking to find a "metal water bottle" while those in the positive emotion keyword condition were told they were looking to find a "happy water bottle." These were the same nonemotion and positive emotion keywords employed in Study 5.

Subsequently, we presented participants with a search results page that included one paid search ad and three organic links; the same stimuli employed in Study 5. The position of the ad was randomized between appearing in the first position or the last position on the search results page (see Figure W7). Additionally, the text of the ad was counterbalanced between that of the first and last link on the page. Participants indicated which of the search result links they would click on; whether participants clicked on the paid search ad (1=Yes, 0=No) served as our dependent variable. Lastly, participants completed the same recall-based attention check as Studies 4 and 5.

Figure W7: Search Results Page Stimuli



Results and Discussion

Ad clicks

A binary logistic regression revealed a main effect of keyword type (1 = positive emotion, 0 = nonemotion) on likelihood to click on the ad (P_{PosEmo} = 20.0% vs. P_{NonEmo} = 16.0%; b = .44, $Wald$ = 6.49, p = .011). There was not a significant main effect of ad position (P_{First} =

21.9% vs. P_{Last} = 14.2%; b = -.32, *Wald* = 2.66, p = .103), nor an interaction between keyword type and ad position on ad clicks (b = -.40, *Wald* = 2.20, p = .138). In looking at the pairwise comparisons, there was a significant difference in ad clicks between the positive emotion (25.6%) and nonemotion keyword (18.1%) conditions when the ad was in the first position on the page ($\chi^2(1) = 6.57$, p = .010). When the ad was in the last position on the page, the difference in ad clicks between the position emotion (14.5%) and nonemotion keyword (13.9%) conditions was weak but still directional ($\chi^2(1) = .05$, p = .817). In comparing across ad position conditions, ad clicks across both the positive emotion (25.6% vs. 14.5%; $\chi^2(1) = 15.76$, $p < .001$) and nonemotion keyword conditions (18.1% vs. 13.9%; $\chi^2(1) = 2.68$, p = .102) decreased when the ad was moved to a much lower position on the page. Taken together with Web Appendix I, while we still observe the directional pattern when the ad is lower on the page, it is weaker than when the ad is located at the top of the search results, which is more typical in practice. Thus, the difference in ad clicks between search queries containing positive emotion keywords versus nonemotion keywords appears to be most pronounced when the ad appears in a higher position (e.g., 1st or 2nd). Further, the text of the ad was counterbalanced in this design, indicating that it is the ad itself that consumers click on, and not a confounding element of the text employed in the ad that leads to higher clicks.

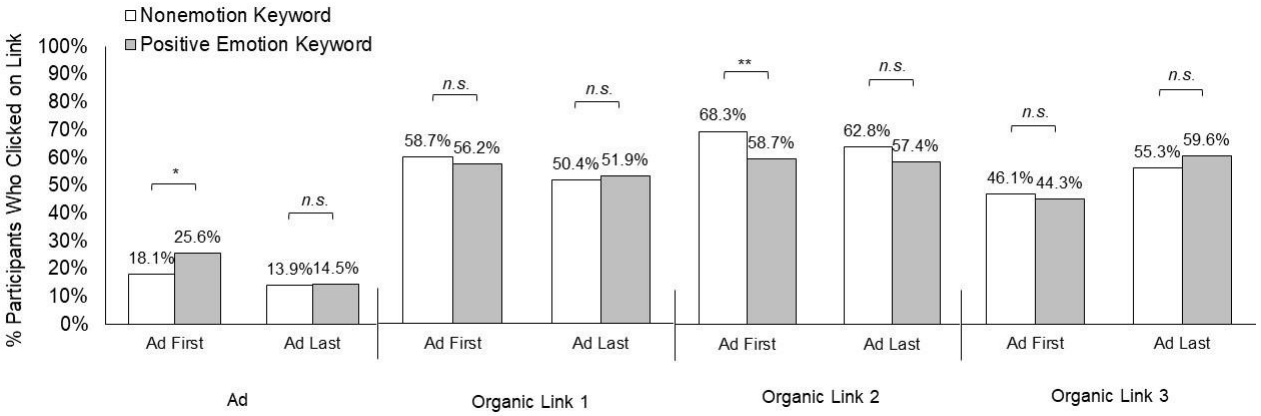
Additionally, results did not change when excluding N = 99 participants who failed to recall seeing the paid search ad in the stimuli (e.g., "No" responses to attention check). A binary logistic regression revealed a main effect of keyword type (1 = positive emotion, 0 = nonemotion) on likelihood to click on the ad (P_{PosEmo} = 19.2% vs. P_{NonEmo} = 15.9%; b = .39, *Wald* = 4.78, p = .029). There was no main effect of ad position (P_{First} = 21.1% vs. P_{Last} = 13.9%;

b = -.30, *Wald* = 2.22, p = .136), nor an interaction between keyword type and ad position on ad clicks (b = -.39, *Wald* = 1.96, p = .161).

Organic link clicks

We also examined if there was any effect on organic link click behavior. Regarding likelihood to click on the first organic link (1 = Yes, 0 = No), there was no main effect of keyword type on link clicks (P_{PosEmo} = 54.0% vs. P_{NonEmo} = 54.5%; b = -.10, *Wald* = .50, p = .480). Additionally, while there was a main effect of ad position (P_{First} = 57.4% vs. P_{Last} = 51.1%; b = -.34, *Wald* = 5.57, p = .018), there was no interaction of keyword type and ad position on link clicks (b = .16, *Wald* = .64, p = .423). For the second organic link, while there was a main effect of keyword type on link clicks (P_{PosEmo} = 58.0% vs. P_{NonEmo} = 65.5%; b = -.41, *Wald* = 7.83, p = .005), it was in the opposite direction of what was observed for paid search ads. There was no main effect of ad position (P_{First} = 63.5% vs. P_{Last} = 60.1%; b = -.24, *Wald* = 2.66, p = .103) nor an interaction of keyword type and ad position on link clicks (b = .19, *Wald* = .83, p = .364). For the third organic link, there was no main effect of keyword type on link clicks (P_{PosEmo} = 51.9% vs. P_{NonEmo} = 50.8%; b = -.07, *Wald* = .27, p = .606). Additionally, while there was a main effect of ad position (P_{First} = 45.2% vs. P_{Last} = 57.5%; b = .37, *Wald* = 6.81, p = .009), there was no interaction of keyword type and ad position on link clicks (b = .25, *Wald* = 1.52, p = .218). See Figure W8.

Figure W8: Percent Clicks on Paid Search Ads and Organic Links by Keyword Type and Ad Position



Notes: *$p < .05$; **$p < .01$; ***$p < .001$

Web Appendix K: Advertiser Current Keyword Targeting Analysis

While our research identifies the benefit of positive emotion keywords in search queries on paid search ad clicks, it is not clear whether advertisers have made use of this potential keyword targeting opportunity. To examine this, we conducted a short pilot test in November 2019 across two different search engines (i.e., Bing and Google) in which we compared the number of paid search ads that appeared on search result pages for 20 product search queries that simply contained the product name itself (e.g., boots, vacation) and 20 analogous search queries containing the same product with an emotion keyword (e.g., amazing boots, thrilling vacations). See Table W3 below for the list of search queries examined. Our goal was to simply see whether advertisers are aware of or currently targeting emotion descriptor keywords with their digital ad campaigns. We preregistered this analysis plan on OSF before conducting the study.

Method

We recruited one research assistant, who was blind to the research's objective, to conduct 40 search queries (explained above) on the Google search engine platform. In this preliminary analysis, we examined both positive and negative emotion keywords for completeness. For each search query, the research assistant entered the search query text in a Google search bar and then took a screenshot of the first page of search results. Another member of the project team replicated this same procedure using the Bing search engine platform. All search queries were completed on the same day. Using the screenshots captured by both individuals, we coded for the number of paid search text ads on the first page of the search results. Text ads are often denoted by the word "Ad" directly before the search result link. This notation was used to determine the

presence of a paid search ad on the search results page. Of note, we preregistered the keyword terms, search result capture procedure, and design analysis on OSF before implementation.

Results and Discussion

Across two search engines, we found that fewer paid search ads appeared in the search results for search queries containing emotion keywords than for search queries containing only product names (i.e., queries without an emotion descriptor; Bing: $M_{\text{EmoKeyword}} = 1.25$, $SD = 2.02$ vs. $M_{\text{NoKeyword}} = 5.50$, $SD = 2.35$; $F(1,38) = 37.56$, $p < .001$; Google: $M_{\text{EmoKeyword}} = 0$, SD = not applicable vs. $M_{\text{NoEmotion}} = .15$, $SD = .49$; $F(1,38) = 1.88$, $p = .178$). Further, in just looking at the 13 positive emotion keyword queries and their accompanying counterpart queries, we saw a similar pattern (Bing: $M_{Pos\text{EmoKeyword}} = 1.69$, $SD = 2.36$ vs. $M_{\text{NoKeyword}} = 5.15$, $SD = 2.30$; $F(1,24) = 14.33$, $p < .001$; Google: $M_{Pos\text{EmoKeyword}} = 0$, SD = not applicable vs. $M_{\text{NoEmotion}} = .15$, $SD = .55$; $F(1,24) = 1.00$, $p = .327$). These results further justify the importance of our findings because it suggests that advertisers are not targeting positive emotion keywords in their paid search advertising strategies.

Table W3. List of Search Queries Conducted

Queries *Without* an Emotion Keyword	Queries *With* an Emotion Keyword
water bottle	cheerful water bottle
couch	sad couch
coffee mug	depressing coffee mug
mousepad	encouraging mousepad
chair	annoying chair
comforter	joyful comforter
t-shirt	happy t-shirt
painting	peaceful painting
book	exciting book
beach towel	embarrassing beach towel
car	fearsome car
costume	frightening costume
blanket	calm blanket
vacation	thrilling vacation
boots	amazing boots
phone case	joyful phone case
backpack	surprising backpack
flowers	hopeful flowers
decorations	grim decorations
cupcake	delightful cupcake

Notes: We included both positive and negative emotion descriptors for completeness.

Web Appendix L: References

Agarwal, Ashish, Kartik Hosanagar, and Michael D. Smith (2011), "Location, Location, Location: An Analysis of Profitability of Position in Online Advertising Markets," *Journal of Marketing Research*, 48 (6), 1057-73.

Berman, Ron and Zsolt Katona (2013), "The Role of Search Engine Optimization in Search Marketing," *Marketing Science*, 32 (4), 644-51.

Grbovic, Mihajlo, Nemanja Djuric, Vladan Radosavljevic, Fabrizio Silvestri, Ricardo Baeza-Yates, Andrew Feng, Erik Ordentlich, Lee Yang, and Gavin Owens (2016), "Scalable Semantic Matching of Queries to Ads in Sponsored Search Advertising," *39th International ACM SIGIR Conference on Research and Development in Information Retrieval Proceedings*, 375–84.

Jansen, Bernard J. and Marc Resnick (2006), "An Examination of Searcher's Perceptions of Nonsponsored and Sponsored Links during Ecommerce Web Searching," *Journal of the American Society for Information Science and Technology*, 57 (14), 1949-61.

Jerath, Kinshuk, Liye Ma, and Young-Hoon Park (2014), "Consumer Click Behavior at a Search Engine: The Role of Keyword Popularity," *Journal of Marketing Research*, 51 (4), 480-86.

Kim, Yoon (2014), "Convolutional Neural Networks for Sentence Classification," *2014 Conference on Empirical Methods in Natural Language Processing (EMNLP) Proceedings*, 1746-51.

Kranzbühler, Anne-Madeleine, Alfred Zerres, Kleijnen, Mirella H. P. Kleijnen, and Peeter W. J. Verlegh (2020), "Beyond Valence: A Meta-Analysis of Discrete Emotions in Firm-Customer Encounters," *Journal of the Academy of Marketing Science*, 48 (3), 478-98.

Li, Chenliang, Yu Duan, Haoran Wang, Zhiqian Zhang, Aixin Sun, Zongyang Ma (2017), "Enhancing Topic Modeling for Short Texts with Auxiliary Word Embeddings," *ACM Transactions on Information Systems*, 36 (2), 1-30.

Lu, Chongyu and Rex Yuxing Du (2020), "Click-Through Behavior Across Devices in Paid Search Advertising: Why Users Favor Top Paid Search Ads and are Sensitive to Ad Position Change," *Journal of Advertising Research*, 60 (4), 394-406.

Mikolov, Tomas, Ilya Sutskever, Kai Chen, Greg S. Corrado, and Jeff Dean (2013), "Distributed Representations of Words and Phrases and their Compositionality," *Advances in Neural Information Processing Systems*, 3111-19.

Mitra, Bhaskar (2015), "Exploring Session Context using Distributed Representations of Queries and Reformulations," *38th International ACM SIGIR Conference on Research and Development in Information Retrieval Proceedings*, 3-12.

Narayanan, Sridhar and Kirthi Kalyanam (2015), "Position Effects in Search Advertising and their Moderators: A Regression Discontinuity Approach," *Marketing Science*, 34 (3), 388-407.

Pyone, Jin Seok and Alice M. Isen (2011), "Positive Affect, Intertemporal Choice, and Levels of Thinking: Increasing Consumers' Willingness to Wait," *Journal of Marketing Research*, 48 (3), 532-43.

Ramlall, Shalini, David Sanders, Giles Tewkesbury, and David Ndzi (2011), "Can Keyword Length Indicate Web Users' Readiness to Purchase," presented at The 2011 World Congress in Computer Science, Computer Engineering, and Applied Computing, Las Vegas, Nevada.

Richins, Marsha L. (1997), "Measuring Emotions in the Consumption Experience," *Journal of Consumer Research*, 24 (2), 127-46.

Turian, Joseph, Lev Ratinov, and Yoshua Bengio (2010), "Word Representations: A Simple and General Method for Semi-Supervised Learning," *48th Annual Meeting of the Association for Computational Linguistics (ACL 2010) Proceedings*, 384–94.

Wang, Pengyuan, Guiyang Xiong, and Jian Yang (2019), "Frontiers: Asymmetric Effects of Recreational Cannabis Legalization," *Marketing Science*, 38 (6), 927-36.

Wang, Pengyuan, Anindita Chakravarty, and Jian Yang (2021). "Can Emotions be Used as Keywords for Text-based Search Engine Advertising?," *Journal of Interactive Advertising*, 21 (3), 159-72.