BIDDING ON THE BUYING FUNNEL FOR SPONSORED SEARCH AND KEYWORD ADVERTISING

Bernard J. Jansen
College of Information Sciences and Technology
The Pennsylvania State University
jjansen@acm.org

Simone Schuster
Department of Marketing, Smeal College of Business
The Pennsylvania State University
sls529psu@gmail.com

ABSTRACT

In this research, we evaluate the effectiveness of the buying funnel as a model for understanding consumer interaction with keyword advertising campaigns on web search engines. We analyze data of nearly 7 million records from a 33 month, $56 million (US) search engine marketing campaign of a major US retailer. We classify key phrases used in this campaign into stages of the buying funnel (i.e., *Awareness*, *Research*, *Decision*, and *Purchase*) and then compare the consumer behaviors associated with each stage of the buying funnel using the critical keyword advertising metrics of impressions, clicks, cost-per-click, sales revenue, orders, and items sold. Findings from our analysis show that the stages from the buying funnel are effective for classifying types of queries, with statistically different consumer behaviors for all attributes among all stages. However, results also indicate that the buying funnel model does not represent the actual process that consumer engage in when contemplating a potential purchase, as the stages do not seem to be associated with expected consumer actions as predicted by the model. Results show that *Awareness* key phrases cost less and generate more sales revenue than *Purchase* queries, indicating that these broader phases can be a lucrative advertising segment for sponsored search campaigns. The results reported in this paper are important to researchers interested in understanding online consumers interaction with search engines and beneficial to search engine marketers striving to design successful advertising campaigns. Insights from this research could produce keyword advertising efforts being more effectively targeted to consumers in order to achieve campaign goals.

Keywords: keyword advertising, pay-per-click, PPC, paid search advertising, search engine marketing

1. Introduction

Search engine marketing (a.k.a., keyword advertising, pay-per-click, and search engine advertising) is a form of web advertising that companies use to promote their products and services on search engine results pages (SERPs). Search engine marketing (SEM) is focused on the effective use of search engine advertisements (a.k.a., sponsored results, sponsored links) that appear on the SERP.

This form of online advertising emerged in 1998 [Fain and Pedersen 2006], rapidly has become the central business model of the major search engines [Jansen and Mullen 2008], and is one of the most rapidly growing segments of the online marketing area [SEMPO Research 2009]. Keyword advertising revenue generates billions of dollars for the major search engines [Google 2008]. As such, keyword advertising has helped shaped the nature of the Web today and is, therefore, an area of critical research importance.

Grounded in marketing research, the buying funnel is one well known paradigm used in SEM campaigns for conceptually understanding customer behavior. The buying funnel is a staged process for describing the way consumers make their buying decisions, from becoming aware of the existence of a need all the way to the final purchase of a product or service that addresses this need. Although there are several minor variations depending on the source, the buying funnel model is typically depicted with a four stages, with each stage relates to the cognitive phase that the consumer is what contemplating on whether or not to make a purchase. The first stage is *Awareness*, when a customer realizes that there is a product that can solve his/her problem or need. After a consumer realizes that a product can address a problem, the customer finds a specific product line and become more knowledgeable

about this type of product or service. This stage is called *Research*. The third stage is *Decision*, when a consumer is deciding between different brands of a specific product by forming choice set. The final stage of the buying funnel is *Purchase*. This stage is when a consumer knows what specific product and brand that they intend to purchase, and they are typically doing a price, convenience to order, or similar comparison before executing the purchase.

Given the wide spread acceptance of the buying funnel in SEM efforts, it is critical to evaluate whether or not the buying funnel correctly or adequately explains consumer behavior in these keyword advertising campaigns. Leveraging data from search engines and other organizations with advertising platforms could provide extensive feedback to individual advertisers on customer behavior within a SEM campaign concerning the usefulness of the buying funnel in evaluating the successes or failures of a SEM campaign. However, companies generally have not published their data and statistics. Consequently, neither researchers nor practitioners have insight into how searchers on Web search engines, as potential consumers, interact with sponsored ads, an important segment of search engine results. Such insights can provide important theoretical implications for understanding and enhancing models of online consumer behavior as they interact with search engine results. There are also practical implications for keyword advertising professionals in areas of keyword selection and bidding on search engine key phrases.

Therefore, there are several open questions. Do customers really shop according to the buying funnel or is the buying funnel just a paradigm for advertisers? If it does exist, can one apply the buying funnel to a real SEM campaign? What percentage of user queries occurs in the different stages of the buying funnel? Are there different levels of performance for SEM campaigns in the different stages of the buying funnel? Should a SEM campaign target each stage of the buying funnel or is it best to target the Purchase stage queries? These are some of the questions that motivate our research.

In the next section, we begin with a literature review, outlining the buying funnel and its relationship to keyword advertising campaigns. We then present our research questions and associated hypotheses, with justifications. We present a brief overview of keyword advertising and a description of our data and methods of analysis. We then discuss results and implications for advertisers, online advertising platforms, and consumers. We end with directions for future research.

2. Literature Review
2.1. Buying Funnel

What is the buying funneling? A common view of the buying funnel is of a staged process that a consumer takes in order to purchase a product or service [Ramos and Cota 2008, Seda 2004]. The buying funnel is also known as the buying cycle or sales funnel [Caspari 2004, Webb and Gorman 2006] and is academically grounded in the marketing funnel [Howard and Sheth 1969, Meyerson and Scarborough 2007, Young, et al. 2006], AIDA model (Attention +Interest +Desire +Action model) [Lancaster and Withey 2006], and the hierarchy of effects model [Lavidge and Steiner 1961].

Foundationally, from the consumer's point of view, the buying funnel rests on information processing theory, which is at the core of most consumer behavior models [Bettman, et al. 1998]. Information processing theory postulates that the consumer decision making involves a five stage process: (1) problem recognition, (2) information search, (3) alternative evaluation and selection, (4) outlet selection and purchase, and (5) post-purchase processes [Hawkins, et al. 1995, Sirakaya and Woodside 2005]. The buying funnel is the consumer parallel to the organization's sales funnel, which frames the customer buying process from the producer's point of view with the aim of funneling the potential customers to a successful transaction [Dubberly and Evenson 2008]. Although there are various labels for each stage, one common labeling system is *Awareness*, *Research*, *Decision*, and *Purchase* (see Figure 1), which is the labeling scheme that we use in this research.

The gist of the buying funnel is that it models how advertisers can reach consumers. This model states that consumers pass through the different cognitive stages (i.e., from *Awareness* to *Research* to *Decision* in order to get to the *Purchase* stage) as they decide whether and what product or service to purchase. The buying funnel fits nicely with concepts of decision making [Simon 1977]. Awareness aligns well with intelligence. Research and Decision line up well with Design, and Purchase aligns well with choice. So, there is psychological foundational support for the buying funnel.

Although not without dissent [Rimm-Kaufman 2006], this model is widely cited and referred to in the practitioner press [c.f., Ash 2008, Fou 2009, Ryan 2009] and in marketing literature [c.f., Howard and Sheth 1969, Meyerson and Scarborough 2007, Young, et al. 2006]. For example, Nimitz [2007] states that the buying funnel is crucial to better understand the customer, giving the advertiser better chances of selling a product or service. Laycock [2007] stresses that the Internet makes it so easy for a consumer to research a product before actually

making a purchase that the buying funnel is critical in understanding why some keywords perform well and others do not.
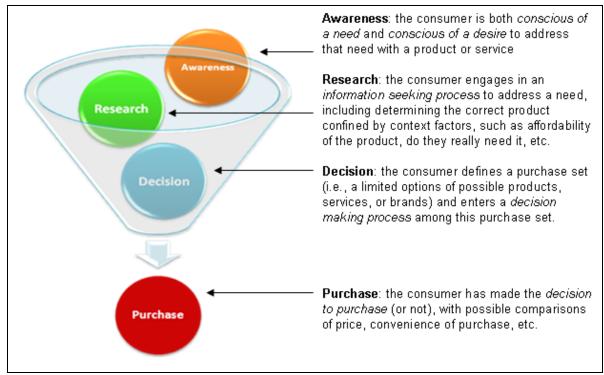

Figure 1: The four stage buying funnel (Awareness, Research, Decision, and Purchase) with explanations

The concept of the buying funnel appears in a wide range of commerce contexts, including both products and services. From the perspective of tourism, the buying model is understood as a sequential process during which potential tourists attempt to reduce the number of destination alternatives from a choice set. In this funneling process, the final destination selection is the result of a sequential process of reducing the set of destination alternatives, from a large number in the early stages to one the final stage [Jang, et al. 2007]. From the consumer decision making literature, there is again a view of consumers following a funnel-like procedure of narrowing down choices among alternate destinations as the consumer moves through a series of well-defined stages [Sirakaya and Woodside 2005]. Research has suggested that firms leverage this funneling process to guide consumers to make optimal purchasing decisions [Yu and Cai 2007]. In the area of ecommerce and search engine marketing, there is a wealth of articles and opinion pieces concerning the merits of the buying funnel [c.f., Kelt 2005, Laycock 2007, Nimetz 2007, Ryan 2009, Yahoo! Research 2007].

However, despite the prior publications concerning the buying funnel, does it really exist for consumer shopping on the web? Interestingly, there is a critical lack of published empirical research concerning the buying funnel within the SEM literature. One the few published reports examining the buying funnel within the SEM domain is from Hotchkiss [2004]. From a survey of 400 participants, Hotchkiss reports that searchers are much more likely to use a search engine during the Research stage of the buying funnel. Hotchkiss further states that usage of search engines drops off as the searcher draws closer to the Purchase stage. In the same report, using a focus group, 68% of participants indicated using a search engine for research, and a smaller 41% indicated that they would purchase online. One would caveat these numbers with the note that this study was conduct in 2003, and commercial use of the Web has dramatically increased since that time [SEMPO Research 2009].

Despite the many antidotal references to the metrics buying funnel, other than this one study, we could locate no other published articles or reports that empirically investigated the buying funnel phenomenon on the Web. Moreover, although the buying funnel as a paradigm is well documented, there has been dissent concerning its effectiveness. For example, Vakratsas and Ambler [1999] called into question the validity of many of the hierarchical advertising models, like the buying funnel, within academic research. Some practitioners have also questioned aspects of the buying funnel directly [Rimm-Kaufman 2006]. Additionally, research framed via the

hierarchy of effect model [Ducoffe 1996] has conjectured that the Web may be compressing the traditional buying funnel [McMillan 2007] by moving the awareness of a commerce need closer to the purchase point. This convergence of need awareness and purchase point has serious implications in that previous validations of the buying funnel may not hold on the web. Researchers have also conjectured that the web may have complicated the traditional buying funnel [Court, et al. 2009, Haven 2007], with multiple possible touch points for the consumer rather than just one.

Therefore, empirical research of this prevalent marketing model is a worthwhile pursuit for both academic and practitioners. In the academic field, research into aspects of the buying funnel can provide insights on the validity of the buying funnel model on the web. For the practitioner area, findings of buying funnel research can provide greater clarity on successful marketing and advertising strategies by a clearer understanding of actual consumer behavior online. Therefore, research in this area has both theoretical and practical implications.

2.2. Keyword Advertising

Prior to introducing our research question, we first describe the keyword advertising process and key metrics, as many may not be familiar with SEM practices. In keyword advertising campaigns on the major search engines, advertisers typically bid key phrases that relate to some product or service they are providing. These key phrases link ads from the advertiser to queries submitted by potential customers, who are the searchers on the Web search engines. Reports indicate that about 15% of search engine clicks are on these keyword advertisements [Jansen and Spink 2009].

When a searcher enters a query that matches a key phase, a set of ads is displayed on the SERP. The amount that an advertiser *must* bid to get an ad to display depends on the overall demand for that key phrase. The amount that an advertiser is *willing* to bid depends on the perceived value of the visitor and the cost of the acquisition.

Ads on the SERP are typically shown above the organic results listing (i.e., the north position), to the right of the organic results listing (i.e., the east position), or below the organic results listing (i.e., the south position) depending on the search engine. The rank of the ad depends on the bid price and a quality score (i.e., determined by several factors including click through history and landing page relationship to the ad).

These advertisements typically consist of a short, headline, two short lines of text describing the product or service, and a hyperlink that points to the advertiser's landing page (i.e., an advertiser designated Webpage). In the pay-per-click (PPC) arrangement, an advertiser only pays the search engine if a searcher actually clicks on the displayed ad hyperlink.

There are several important keyword advertising terms that are commonly used in the industry, which one must have a working knowledge of in order to follow the research presented here. When an ad displays in response to a query that matches a certain key phrase, this is called an impression. If the searcher clicks on the ad's hyperlink that points to an advertiser's landing page, this is a click. The search engine will bill the advertiser for this click, an amount known as the cost-per-click (CPC). At the landing page, if the consumer makes a purchase, this act is known as a conversion. The sales revenue generated from this convert defines the value of that customer.

This is a brief overview of a very complex procedure. For further information on the keyword advertising process, see [Fain and Pedersen 2006, Jansen and Mullen 2008], which is part of a small but growing body of literature on keyword word advertising. Jansen and Resnick [2006] report that searchers have a bias against sponsored results, but introducing searchers to relevant sponsored links overcome this bias. In a series of articles, Ghose and Yang [Ghose and Yang 2007, Ghose and Yang 2008a, Ghose and Yang 2008b, Ghose and Yang 2008c, Ghose and Yang 2009] use an aggregate data log of a keyword advertising campaign from the first 13 weeks of 2007 containing weekly statistics for 1,799 keywords with a total of 5,147 records. They report that the use of brand terms, retail terms, and ad rank have an effect on campaign performance. Brooks [2004a, 2004b] also shows how the ad rank affects clicks and conversions, following a curve linear function of the ad's rank. Sen, Bandyopadhyay, Hess, and Jaisingh [2008] present situations for optimal ad pricing for the search engine. Brooks [2006] show that searchers repeat visits to search engines and click on similar ads during these visits, although Bruner and Kumar [2000] state that more experienced searchers become desensitized to ad stimuli. Fulgoni and Mörn [2008] show that multiple sponsored ads exposure has a positive impact on consumer intent to purchase.

However, none of these prior works address the fundamental concept of the buying funnel, which we do in this research.

3. Research Questions

With this background and motivations, our research question is: *Do the searching and purchase interactions with keyword advertisements of online consumers conform to stages of the buying funnel?*

Our research question inherently assumes that, if the buying funnel does exist, then one should be able to classify search queries via attributes that distinguish queries in each stage of the buying funnel. Typically, when people in the keyword advertising area refer to the buying funnel, they are referring to a stream of multiple queries preceding a possible sale by a given customer. In our research, we take a difference perspective. We aim to investigate if one can tell based on a query what stage of the buying funnel a given customer is in when that customer submits the query. Classifying the buying stage when a consumer submits a query can help companies target advertisements and allocate bids for key phrases more effectively. If the buying funnel represents reality, then over the aggregate set of queries, one should see the prescribed funnel. Therefore, the research question has both theoretical and practical importance.

Once we code each query into one of the four buying funnel stages, we can then evaluate each stage of the funnel based on industry standard keyword advertising metrics. Our central assumption is that, if the buying funnel reflects behaviors in the real world, one would expect different behaviors in each stage. If these distinct behaviors do not exist, then it would lead one to the conclusion that, perhaps, the buying funnel does not reflect real world behaviors, but it is a metaphor for advertisers. The findings might also indicate some other online purchasing process that describes actual consumer behaviors.

Based on our research question, our hypotheses are:

Hypothesis 01: *There will be a significant difference among queries in each stage of the buying funnel based on average number of impressions.*

A key metric in any keyword advertising campaign is impressions (i.e., the number of times that a given advertisement appears on a SERP in response to a query submitted by a potential consumer). The concept of the buying funnel would indicate that Awareness queries would generate the most impressions, followed by Research, Decision, and then Purchase. The idea behind the buying funnel, as articulated in the AIDA model [Lancaster and Withey 2006] and the hierarchy of effects model [Lavidge and Steiner 1961] is that one makes potential consumers aware of a brand both before and during a desire to purchase. Therefore, it would be reasonable to assume that advertisers would be engaged in branding advertising, generating a large number of impressions.

Hypothesis 02: *There will be a significant difference among queries in each stage of the buying funnel based on average number of clicks.*

The goal of most keyword advertising campaigns is to get potential consumers to click on a given advertisement. Using the buying funnel model stages, it would seem reasonable that Awareness queries would generate the most clicks, followed by Research, Decision, and then Purchase. The entire concept of the buying funnel is that Purchases are made at the end of this cognitive process that the consumer progresses through a buying behavior [Howard and Sheth 1969]. As there are more consumers considering a brand than actually purchasing a brand, it is this consumer behavior that should produce the funnel effect.

Hypothesis 03: *There will be a significant difference among queries in each stage of the buying funnel based on average cost per click.*

Advertisers must bid different amounts for different key phrases depending on the value that they place on those key phrases and the competition from other advertisers. One would expect that key phrases associated with later stages of the buying funnel would be more expensive than key phrases keywords associated with the earlier stages of the buying funnel (i.e., awareness keywords would be less expensive than research which would be less expensive than decision, which would be less expensive than purchase), based on a rational actor [Simon 1957, Simon 1977] perception of the advertiser. However, this is not always the case in practice, as the pool of advertisers bidding on the generic key phrases commonly associated with Awareness and Research stages is larger than the pool of advertisers bidding on more focused key phrases in the Decision and Purchase stages. So, there are multiple factors at play in determining cost per click.

Hypothesis 04: *There will be a significant difference among queries in each stage of the buying funnel based on average sales revenue per query.*

Most online advertisements have the aim of generating a sale or lead (i.e., identifying a potential customer). Given the stages of the buying funnel as explained by the hierarchy of effects [Lavidge and Steiner 1961], one would expect queries in the Purchase stage to generate the most sales. Also, as potential consumers get closer to the Purchase stage, one would expect the potential for a sale would increase (i.e., Decision queries result in more sales

than Research queries which result in more sales than Awareness queries). Again, the gist of the buying funnel is that Purchases are made at the end of this cognitive process by the consumer as a buyer [Howard and Sheth 1969].

Hypothesis 05: *There will be a significant difference among queries in each stage of the buying funnel based on average number of orders.*

Related to sales revenue, companies track the number of orders placed for a given set of keywords. It is reasonable to assume that Purchase queries would generate more orders than Decision queries, which would generate more than Research queries, which would generate more than Awareness queries based on expectation of buying funnel [Dubberly and Evenson 2008]. If Purchase queries generate more sale revenue, it could be due to the consumer adhering to the buying funnel for more expensive items and not as much for less expensive items. Therefore, an analysis of the number of orders in the various stages will help us determine if this conjecture actually holds.

Hypothesis 06: *There will be a significant difference among queries in each stage of the buying funnel based on average number of items ordered.*

The number of items purchased per order is a key metric of online sales. Cross-selling (i.e., the process of getting consumers who come to an online store for potentially only one product to purchase related products) [Berry and Linoff 2004] is a common retail practice. Additionally, consumers that purchase multiple items may be more valuable than consumers who purchase only a single item. One might expect that queries in the Purchase stage would result in more items sold than Decision queries. Decision queries would have more items sold than Research queries, which would have more items sold than Awareness queries, as advertisers attempt to cross-sale related items. Similar to the analysis number of orders, if Purchase queries correlate with more items ordered relative to queries in other stages of the buying funnel, it would indicate that the buying funnel model holds in these contexts. An analysis of the number of items ordered will help us determine if this assumption is supported by empirical analysis [Dubberly and Evenson 2008].

4. Methods
4.1. Data

Our data log contains daily information on keyword advertising from a large nationwide retail chain, with both brick and mortar and online sales presence. The data is of keyword advertisements by the company during a 33-month period, spanning 4 calendar years, from 30 September 2005 to 09 June 2008. The dataset is quite rich in that we have the key phrase that trigger the ad and consumer responses and sales information.

The data set contains just fewer than 7 million records from nearly 40,000 key phrases. There is a record for every day in which one of the key phrases triggered an ad. Each key phrase for a given day is a unique record. Each record in our data log has a variety of information by key phrase for a given day. The record includes the key phrase that triggered the ad, number of impressions, number of clicks, the average CPC, the number of conversions (or orders), the total sales revenues, and the total number of items ordered. A query may lead to an impression but no click. If there is a click there may not be a conversion (i.e., purchase or order). If there is an order, the order may be for one to several items.

Applicable fields used for the research reported here are shown in Table 1.

Table 1: Fields and descriptors from search engine marketing data log

Field	Description
Ad Number	Unique identifier for the advertisement
Key Phrase	The key phrase that triggered the advertisement
Day	Date of data collection
Impressions	The total number of impression for that day for the given advertisement with the given key phrase
Clicks	The number of clicks on the advertisement for that day for a given key phrase
Cost	The total cost for the day for a given key phrase for a given advertisement
Sales	The revenue generated from that advertisement on that day for a given key phrase
Orders	The number of orders from the advertisement for that day for a given key phrase
Items	Number of items purchased from that advertisement on that day for a given key phrase from all orders. One order could have one or more items.

We believe our dataset to be a rich source in which to investigate our research question and hypotheses. There have been limited empirical studies of SEM campaigns, and there are no studies from a dataset this large, that covers such an extension temporal span, or that contains such a rich range of keyword attributes.

4.2. Buying Funnel Classification

Prior to any analysis, we had to classify approximately 40,000 key phrases into one of the stages in the Buying Funnel. Although the buying funnel is much discussed, we could locate no specific criteria for query classification. Therefore, drawing on the prior work presented in the literature review section and especially [Hotchkiss 2004], one of the researchers independently classified each unique key phrase using the following criteria:

Awareness:
- Does not contain a brand name
- Could contains partial product name/type
- Could contain problem to be solved
- Could contain, gift certificate amount, generic company special, or generic company code

Awareness is the knowledge that the product exists, and there is a need for it. In the **Awareness** stage, a user is searching for general knowledge, which could possibly lead to a purchase. An **Awareness** queries would be the broadest of all queries in the buying funnel. An example of an **Awareness** query would be a search for "computer." In our classification, **Awareness** queries contain neither brand name nor a specific product name. They can contain an action or a problem that needs to be solved (i.e. 'sanitize kitchen'). Awareness can also be a very general product (i.e. 'massagers') that has many different specific types.

Research
- Does not contain brand name
- Contains specific product

The next stage in the buying funnel is **Research**, when a consumer has decided on the type of product they want, but not a brand or store to purchase from. Queries in the **Research** stage contain keywords suggesting that the user most likely has commercial intent. Research queries are typically still broad, but they are more focused than **Awareness** queries. A **Research** search on the topic computers might be "light weight laptop computer." In order to be classified in the **Research** stage of the buying funnel, the query needs to contain the full product type that is being searched. Although the **Research** query can contain product specifics, it can not contain a brand name.

Decision
- Contains specific product and partial brand name
- Does not contain full brand/company

The **Decision** stage is when the user is comparison shopping to consider alternatives, so brand names and technical specifications are often included. An example of a **decision** search would be "Dell Inspiron laptop computer." In this stage, the consumer has chosen a product and brand but not the exact model number or version of that product. **Decision** queries contain a product and a partial company or brand name (i.e. 'aquos flat panel lcd television'). **Decision** queries are more focused than **Awareness** and **Research** queries.

Purchase
- Contains specific product and full brand name/company

The final stage in the buying funnel is **Purchase**. In the **Purchase** stage, the user knows what and/or where to purchase the product or service. Search with intent to purchase a product would include the full product and brand name and model type, such as "Dell Inspiron T4200 15" Notebook" In order to be classified in the **Purchase** stage, these queries need to be a product and nearly full brand name in the query. This implies that the consumer has done research on the product and knows what brand that he or she intends to purchase [Hotchkiss 2004]. **Purchase** queries are the most focused of any stage in the buying funnel.

After the first coder had manually classified each query, a second coder classified a thousand queries again into the stages of the buying funnel using the criteria listed to verify our categorization. The two classifications were compared for inter-rater reliability. Cronbach's alpha was 0.89, which is quite high. This high inter-rater agreement suggests that the criteria used are granular and specific enough for effective classification of queries into stage of the buying funnel.

The percentage breakdown of key phrase produce a fairly nice funnel shape (see Figure 2), with the majority of queries in **Awareness** and **Research**, although one might expect more **Awareness** key phrases (38%) relative to **Research** (35%). However, given that search is typically motivated by a need, a portion of the awareness phase may occur off line.
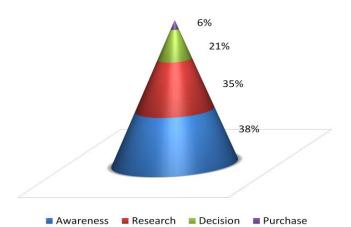
Figure 2: Percentage of nearly 40,000 key phrase classified into the four stages of the buying funnel

4.3. Data Analysis

Once we had classified each unique query, we used this set of queries to automatically categorize the key phrases in the nearly 7 million records. With this done, we could then link each key phrase, now classified into one stage of the buying funnel, to the associated behavioral and sales data. We could then examine each key phrase occurrence based on our research question and hypotheses. A snippet of records showing applicable fields from the data log is shown in Table 2.

Table 2: Snippet from data log showing applicable fields

Buying Funnel Stage	Impressions	Clicks	CPC	Sales Revenue	Orders	Items Ordered
Awareness	4	1	0.20	19.95	1	1
Research	36	2	0.39	29.95	1	1
Decision	9	3	0.21	7.95	1	1
Purchase	1	1	0.10	65.01	1	4

5. Results

We first present overall statistics for the data set of 6,871,461 records from the time span 2005-09-30 to 2008-06-09, as shown in Table 3.

Table 3: Aggregate statistics from the dataset

	Total	Average (by day)	Standard Deviation
Impressions	423,211,204	61.59	809.61
Clicks	13,286,944	1.93	43.95
Advertising Cost	$8,484,855	$1.24	$19.68
Sales	$56,232,819	$8.18	$377.02
Orders	372,445	0.05	2.61
Items	691,023	0.10	5.17

From Table 3, we see that this was a substantial keyword advertising effort generating more than $56 million in sales and moving nearly seven hundred thousand items. Table 3 also presents the average figure per day and the standard deviations. The standard deviations are high due to the nature of retailing, when there are substantial sales during the holiday buying season, typically October through early January.

5.1. Buying Funnel Stage

With each key phrase now labeled with a stage of the buying funnel, we present of the classification in Table 4. From Table 4, we see that the stages do not following our expected buying funnel paradigm. More than half (51.5%) of the key phrase occurrences were Research. This may indicate the normal use of search engines by online consumers for information research and not as a serendipitous source of product awareness.

Table 4: Buying funnel classification of search engine marketing key phrase occurrences

Stage of the Buying Funnel	Occurrences	%
Awareness	1,892,620	28%
Research	3,537,930	51%
Decision	1,174,251	17%
Purchase	266,660	4%
	6,871,461	100%

The high use of Web search engines in the Research stage is in line with that reported by Hotchkiss [2004], who details that about sixty percent of online consumers used search engines for product or service research, as well as others [Nelson 1974]. The low percentage (3.9%) of Purchase queries was somewhat surprising with the increase in the use online media for ecommerce. This would indicate that, perhaps consumers are using search engines for the research and making their purchase off-line [Yahoo! Research 2007]. However, these are occurrences are by day in the dataset, so these percentages did not capture the multiple uses of terms within a given day, which we address when we test the hypotheses.

It is interesting to compare these percentages of actual key phrase occurrences (Table 4) to the percentages of bidding key phrases (see Figure 2), with the difference in the Research stage greater than 47%. There were also substantially less Awareness and Purchase key phrase occurrences (see Table 5).

Table 5: Comparison of key phrases to occurrence in the dataset

Stage of the Buying Funnel	Key phrases	Occurrences in Dataset	Difference
Awareness	38%	28%	10%
Research	35%	51%	-16%
Decision	21%	17%	4%
Purchase	6%	4%	2%
	100%	100%	

5.2. Hypothesis Testing

We now evaluate our six hypotheses. We used a one-way ANOVA statistical analysis to compare means and variance between the groups. The one-way ANOVA tests whether two or more groups are significantly different. For all ANOVA tests presented, the critical value of $F = 3.78$. We ran a Tamhane's T2 Test comparing means to identify specific differences among groups. Tamhane's T2 Test does not assume equal variances among the groups.

Hypothesis 01: *There will be a significant difference among queries in each stage of the buying funnel based on average number of impressions.*

The results indicate that there is a significant difference among the stages ($F(3) = 440.97$, $p < 0.01$). The Tamhane's T2 Test indicated a significant difference among all four buying funnel categories. Therefore, hypothesis 01 is fully supported.

Table 6: Impressions by buying funnel stage

Stage of the Buying Funnel	Mean	St Dev
Awareness	74.68	645.29
Research	62.28	914.96
Decision	40.67	295.10
Purchase	51.58	1,562.89
All Stages	61.59	809.62

From Table 6, we see that the mean number of impressions follows the general expectation that one would anticipate with the buying funnel model, with Awareness queries generating the most impressions, Research queries the next, and followed by Decision queries. However, we have an increase in mean number of impressions with Purchase queries, perhaps indicating that an increased use of search engines for this stage of the buying funnel relative to Decision queries. This may indicate an increase acceptance of online purchases since the Hotchkiss study [2004].

Hypothesis 02: *There will be a significant difference among queries in each stage of the buying funnel based on average number of clicks.*

The results indicate that there is a significant difference among the groups (F(3) = 887.64, p< *0.01*). The Tamhane's T2 Test indicated a significant difference among all four buying funnel stages. Therefore, hypothesis 02 is fully supported.

Table 7: Click by buying funnel stage

Stage of the Buying Funnel	Mean	St Dev
Awareness	3.30	78.22
Research	1.51	18.92
Decision	1.04	8.37
Purchase	1.82	35.58
All Stages	1.93	43.95

From Table 7, we see that the mean number of clicks is somewhat unexpected. Awareness queries had nearly twice the number of clicks as the other categories, with a noticeable drop in clicks with Research and Decision queries. There was an uptick in the mean number of clicks with Purchase queries, which would be expected with a buying funnel scenario.

Hypothesis 03: *There will be a significant difference among queries in each stage of the buying funnel based on average cost per click.*

The results indicate that there is a significant difference among the stages (F(3) = 10,504.65, p< *0.01*). The Tamhane's T2 Test indicated a significant difference among all four buying funnel stages. Therefore, hypothesis 03 is fully supported.

Table 8: CPC by buying funnel stage

Stage of the Buying Funnel	Mean ($)	St Dev
Awareness	0.47	66.94
Research	0.68	88.96
Decision	0.75	89.47
Purchase	0.96	87.49
All Stages	0.65	85.03

From Table 8, we see that the mean CPC adheres to an expected upward trend in cost. As the consumer nears the point of purchase, these consumers are considered more valuable. Therefore, advertisers have the incentive to bid higher on the key phrases to attract these consumers. This pattern is borne out in our analysis of the data and provides support for our buying funnel classification methodology in the minds of the advertisers.

Hypothesis 04: *There will be a significant difference among queries in each stage of the buying funnel based on average sales revenue per query.*

The results indicate that there is a significant difference among the stages (F(3) = 994.07, p< *0.01*). The Tamhane's T2 Test indicated a significant difference among all four buying funnel stages. Therefore, hypothesis 04 is fully supported.

From Table 9, we see that Awareness and Purchase generated far more sales revenue than either Research or Decision queries. For Purchase stages queries, this might be expected. The Awareness queries was somewhat

unexpected, if one adheres to the buying funnel model. However, it appears that searchers are issuing these broad queries and then following through with a purchase.

Table 9: Sales revenue by buying funnel stage

Stage of the Buying Funnel	Mean ($)	St Dev ($)
Awareness	19.96	705.06
Research	2.85	68.47
Decision	2.93	52.24
Purchase	18.47	242.63
All Stages	8.18	377.02

Hypothesis 05: *There will be a significant difference among queries in each stage of the buying funnel based on average number of orders.*

The results indicate that there is a significant difference among the stages ($F(3) = 967.45$, $p < 0.01$). The Tamhane's T2 Test indicated a significant difference among all four buying funnel stages. Therefore, hypothesis 05 is fully supported.

Table 10: Orders by buying funnel stage

Stage of the Buying Funnel	Mean	St Dev
Awareness	0.14	4.96
Research	0.02	0.30
Decision	0.01	0.19
Purchase	0.07	0.74
All Stages	0.05	2.62

From Table 10, Awareness generated significantly more orders than queries in the other stages of the buying funnel, followed by Purchase queries. Again, the high number of orders in the Awareness stage might be somewhat surprising based on the buying funnel paradigm. However, this would follow from the results with the sales revenue.

Hypothesis 06: *There will be a significant difference among queries in each stage of the buying funnel based on average number of items orders.*

The results indicate that there is a significant difference among the stages ($F(3) = 918.04$, $p < 0.01$). The Tamhane's T2 Test indicated a significant difference among all four buying funnel stages. Therefore, hypothesis 06 is fully supported.

Table 11: Items sold by buying funnel stage

Stage of the Buying Funnel	Mean	St Dev
Awareness	0.27	9.81
Research	0.03	0.57
Decision	0.03	0.44
Purchase	0.13	1.50
All Stages	0.10	5.18

From Table 11, we see Awareness generate more items sold than queries in the other stages of the buying funnel, followed by Purchase queries. This is somewhat unanticipated, but it may be that cross-selling is more difficult at the Purchase stage, when users are more focused on a specific product or service. Cross-selling may be easier in the Awareness stage. Also, it might imply that consumers are more willing to buy lower cost items in the Awareness stage while progressing through the stages of the buying funnel for higher priced items, as indicated by Purchase queries having the second highest sales revenue with drastically fewer items sold than Awareness queries.

6. Discussion and Implications

6.1. Discussion of Results

There are several key implications from this research. First, it is clear that the buying funnel is representative of actual online consumer behavior at least at the individual query level. There were statistically significant differences among all critical keyword advertising attributes for all stages of the buying funnel. Our classification approach produced the percentage results for both queries and the bidding pattern of advertiser confirming expectations, so it would seem that our classification was at least reasonable. Based on our analysis, this indicates that the buying funnel is a workable model for real-world online marketing, advertising, and consumer purchases actions in terms of classifying individual search queries.

However, it appears that a 'funnel' may not be the best shape for describing this search process as it is employed by the aggregate set of online consumers. There are also some interesting temporal issues occurring. More than half of the daily query occurrences were in the Research stage, with an extremely small percentage in the Purchase stage (approximately 4%). This would indicate that consumers, at least for now, consumers use Web search engines as ecommerce information gathering tools for much of the time. However, examining impressions, we see a more funnel like occurrence, but with Purchase queries generating even more impressions than Decision queries. The implication for online advertisers is to have some method to monetize the effect of these keyword advertisements by tracking those consumers who may have performed their product information searching online but purchased off-line, navigate away from search engines to continue shopping, drop out of the buying process, purchase at some other merchant online, or delay their online purchase.

Therefore, findings indicate that the buying funnel is a workable model for classifying the focus (i.e., broad to narrow) of online ecommerce queries (given that there were statistical differences in queries among each of the stages), but it may not be a good model for describing the online purchasing process (i.e., a movement by online consumers from one stage to the next, moving from broad to narrow queries).

Pulling literature from outside the marketing domain, specifically from the general Web searching field, there is of evidence that would indicate that Web searchers do not conduct online searches in the way suggested by the buying funnel, just by correlating the number of queries it would take to progress through the buying funnel. In analysis at the session level (i.e., series of queries by individual searchers) in general Web searching, research shows that most searchers submit generally two or so queries in a session [c.f., Jansen and Spink 2005, Jansen, et al. 2000, Park, et al. 2005, Silverstein, et al. 1999]. Therefore, it would be unusual to expect to see the behavior as predicted by the buying funnel, if online shopping is viewed as a search process. They may be that searchers proceed through the buying funnel across multiple sessions; however, it this is so, the behavior should be evident in the aggregate analysis of all sessions, which it is not.

Although, we do not have the session level information with the dataset used in this research, from the aggregate analysis, it appears that the precise broad to focused process is not occurring on Web search engines. From the classification of queries, 79% were broad or general queries (i.e., Awareness or Research), with the remaining 21% of the queries being narrow or focused (i.e., Decision or Purchase). This 80-20 rule split of broad and focused is in line with the Web search research reported above. This 80-20 rule may be a more workable tenet, in that 80% of the key phrases will be broad, non-branded, and 20% will be narrow, branded.

However, this is not to say that all online consumers do not following the buying funnel for all products. Given the high occurrences of purchases at the Awareness question it, may be that certain products lend themselves to lower levels of engagement by consumers. Other products may require more detail searching, such as that prescribed by the traditional buying funnel. The sales revenue to items ordered comparison between Awareness and Purchase queries seems to support this viewpoint. The experience of the consumer may also be a factor. In fact, prior work has shown that consumers who are more knowledgeable [Puccinelli, et al. 2009], feeling lucky [Jiang, et al. 2009], or involved [O'Cass 2000] concerning a particular product or service perceive less risk in making a purchase . Therefore, these consumers may spend less effort in information searching.

Concerning our ANOVA testing, there were statistical significant differences for all attributes tested (impressions, clicks, CPC, sales revenue, orders, and items ordered), even with large standard deviations. This would support the position that our attribute selection actually distinguished queries in different stages and points to differences in user behavior based on underlying needs or goals as reflected by the stages of the buying funnel across the aggregate population of potential online consumers.

The mean number of impressions generally follows the expected funnel shape, although there was an uptick with Purchase queries. The Research queries were also slightly over represented compared with expectations. With clicks, we see a very high mean number of clicks on Awareness queries, with a notable drop-off for Research and Decision

queries, followed again by an uptick with Purchase queries. This would indicate that Awareness and Purchase queries result in the most interaction with ads and landing pages by potential consumers.

In examining CPC, the bowl shaped relationship that we see with impressions and clicks does not hold. Instead, there is a nearly linear relationship, with steadily increasing mean CPC from Awareness to Research to Decision to Purchase. This would be a relationship that one would reasonably expect. As queries get more precise, one would expect that advertisers would be more willing to increase their bids to lure potentially higher value consumers closer to the buying point. Also, other advertisers would be competing for these consumers, which would also work to push up the bid for these key phrases. This is not to say that this pattern holds all the time for all domains. There are many Awareness key phrases that are quite expensive as advertisers attempt to snatch potential customers early in the information searching process.

Interestingly, we did not see this same linear trend when examining sales per query type. Awareness and Purchase queries generated far more sales revenue than Research and Decision queries. Therefore, it would seem that these types of queries have the most potential for sales. In other words, it is best to either pinch potential consumer right away or at the point of purchase. In fact, Awareness queries (although the least expensive CPC) actually generated more average revenue than Purchase queries (the most expensive CPC). This is really unusual because Awareness queries are the most generic, and Purchase queries are the most focused. Yet, each stage was a high revenue generator. In fact, the broadest queries (Awareness and Research) and the focused queries (Decision and Purchase) were almost exactly equal in mean sales revenue ($22.81 versus $21.40).

We see this similar trend in number of orders placed (with Awareness queries having twice the number of orders of Purchase queries). Given that Awareness queries generate similar sales revenue and twice the number of orders, it would indicate that the Awareness orders were for less expensive items relative to Purchase queries. This seems to hold when examining the number of items ordered. Awareness queries generated sales of more than twice the number of items compared to Purchase queries. This may indicate that searchers in the Awareness stage are more open to cross-selling or impulse buying than searchers in the Purchase stage. With the similar average sales revenue, it would point to Awareness query converts being for the inexpensive items, relative to the converts from Purchase queries, where searcher may do a more deliberate information searching process.

6.2. Theoretical Implications

What could account for this rather unexpected behavior? The marketing literature would indicate that, as a potential consumer progresses through the buying funnel, the probability of that consumer making a purchase would increase. Instead, we found that a high percentage of the activity (impressions, clicks, sales, orders, and items) is at the Awareness stage. Although further research is needed, one possible explanation is the Principal of Least Effort [Zipf 1949], which fits nicely with information processing theory [Hawkins, et al. 1995, Sirakaya and Woodside 2005].

Built on information processing theory, the buying funnel is a rational process that assumes potential consumers act rationally and expend the resources to find the optimal solution. This is theoretical grounded in the rational actor paradigm [Slovic, et al. 2002]. However, the Principal of Least Effort takes a slightly different approach. Specifically, when presented with a problem or decision, people will take the route that requires the expending of the least amount of energy for arriving at a satisfactory answer, even if it is not the most optimal. In other words, people (including potential consumers) will satisfice [Simon 1957]. So, consumers may rationally begin a process akin to the buying funnel, but if they encounter a solution that fits their general expectations of the satisfactory solution, they will stop. We see this behavioral searching construct in information foraging theory also [Pirolli 2007].

So, imagine a potential customer mentally considering a product, say a portable music player, with an expected price that he/she is willing to pay. Let's say this consumer goes to a search engine, enters 'portable music player' in the search box, scans the SERP ads, and sees an ad from a trusted source with sales price below what the potential customer was willing to spend? It would seem reasonable by both the ration actor theory and principle of least effort, that the customer might just convert at this point, rather than progressing through any additional information searching process.

Our empirical data seems to support this satisficing behavior. The broad, non-focused Awareness queries generated more impressions, nearly twice as many clicks, twice the orders, and more than twice the number of items ordered than Purchase queries. However, the mean sales revenue for Awareness queries was just 8% higher than Purchase queries. This would indicate that for the inexpensive goods or services, consumers are not willing to expend the additional energy to conduct extensive research. As the price of the good increases, they expend more resources by conducting more in-depth and focused research, as reflected in the higher mean sales revenue of Purchase queries that is out of proportion to their other associated metrics, such as impressions, clicks, orders, and number of items. This action conforms to what one would expect from least effort behavior.

In terms of the buying funnel, the consumer may begin with a general Awareness query, maybe expecting to research multiple options before arriving at a decision and making a purchase. However, if this consumer encounters a possible solution that generally fits the parameters of what they are seeking, they will take the path of least effort and just make the purchase. As the cost increases, the more effort they are willing to expend in researching the item. This lack of focus is also represented by the higher number of items purchased. With their searching need not well articulated, these searchers might, it appears, be more open to impulse buying.

Therefore, based on our analysis, for many products and services, the buying funnel is not an appropriate model for the online purchase process. Although one can use the buying funnel stages to classify individual queries, the natural progression from Awareness to Research to Decision and finally to Purchase just does not appear to occur, at least in the search process on Web search engines. Although it may be an appropriate process for some products and services, each stage of the buying funnel may lead directly to a convert, based on individual factors of the consumer and product or service (see Figure 3).
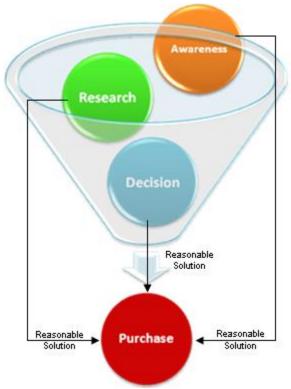

Figure 3: The Buying Funnel Process.

6.3. Practical Implications

Although our hypotheses were statistically significant, one must ask if these differences are of practical significance. From a review the data presented in Tables 1 through 11, it would seem that the findings do have important practical impacts. As a framework for categorizing key phrases, the buying funnel is an appropriate metaphor. So, advertisers can use the model for organizing separate campaigns targeted toward various consumer touch points.

Also, Awareness queries generated an average of 45% more impressions, 81% more clicks, 8% more sales revenue, 100% more orders, and 108% more items sold, all while costing 51% less per click compared to Purchase queries. This disparity signifies that the statistical differences if key phrase among stages of the buying funnel are important in practice for those companies and organizations engaged in keyword advertising.

The implication for advertisers is clear. – do not ignore Awareness key phrases in a keyword advertising campaign! Though often general and broad in nature, it appears that these queries can be high performers in an overall search marketing strategy. Although there is a higher cost associated with Purchase queries relative to Awareness queries, the Awareness queries actually generated higher mean sales revenue. Therefore, companies that plan on using keyword advertising campaigns should include relatively generic key phrases common in Awareness

queries, along with more long-tail key phrases common in Purchase queries. Used effectively, this approach of focusing on broader queries could save a company costs while generating higher revenue. Of course, as with any general rule, there are unique individual product characteristics where the general rule might not hold. However, this approach seems like a good starting point.

The imperative descriptor here is effectiveness. Note that although Awareness queries had 81% higher mean click through, they resulted in only 8% more sales revenue. This would indicate that Purchase queries are the more effective (i.e., more of the users who clicked on purchase queries converted). This premise also holds true if we examine the sum of both cost and revenue in our dataset. Awareness queries generated 67% of the sales revenue, followed by 18% for Research queries, compared to 9% for Purchase queries. However, Awareness queries also generated 25% of the cost compared to 6% for Purchase queries. Research queries (with only 18% of revenue) generate 57% of the cost. Therefore, there is a potentially higher cost associated with the less focused Awareness and especially Research queries.

So, Awareness and other more generic key phrases such as those in the Research stage cannot be included wholesale to be profitable for an advertiser. Instead, Awareness queries that generate both clicks and converts will be among the highest pay-off key phrases, since they are both low cost and generate high sales. Awareness and Research queries that generate impressions and clicks but few converts, should be candidates for removal, as they generate a lot of overall cost but with little revenue generation. Table 12 shows the percentage of each buying funnel stage for each keyword advertising attribute.

Table 11: Items sold by buying funnel stage

Buying Funnel Stage	Total Impressions	Total Clicks	Total Cost	Total Sales	Total Number of Orders	Total Number of Items Orders
Awareness	34%	47%	25%	67%	71%	73%
Research	52%	40%	57%	18%	19%	18%
Decision	11%	9%	12%	6%	5%	4%
Purchase	3%	4%	6%	9%	5%	5%
	100%	100%	100%	100%	100%	100%

6.4. Limitations and Strengths

As with any research, there are limitations to this study. First, the data set came from one company in the retail sector. Although the dataset used is quite large both in terms of number of records and temporal span, further research with other companies and in other industry sectors is need to ensure that the results are generalizeable. However, we believe that the research reported here is an important step in understanding keyword advertising campaigns and will assist in determining avenues for future research.

Also, the data for this research does not contain the customer behaviors at the landing page Website or the offline customer behaviors. Customers may be using Web search engines for some stages of the buying funnel and using other information sources for other stages. For example, a searcher may submit a Research query to a search engine, click on a displayed link, and then conduct the Decision stage searching on the landing page. Alternately, they may be conducting research in actual brick and mortar stores. Prior work refers to this as the "research shopper" phenomenon, which is the tendency of some consumers to research the product in one channel (e.g., the Web), and then purchase it through another channel (e.g., a store) [Verhoef, et al. 2007]. However, the data from this study clearly shows that, within the confines of keyword advertising campaign, consumers do not always follow behaviors indicated by the buying funnel.

The research also has several strengths, including the large data set, the lengthy period of data collection, the analysis of major keyword advertising attributes, and the application of the buying funnel, a widely used customer behavior model. We believe that the research presented here is a valuable contribution to the growing area of study in the sponsored search and keyword advertising area. Given the considerable impact that this technology and business process has had on the development of the Web and online commerce, it is an area that deserve substantial investigation. Therefore, this research provides valuable insight into consumer behavior in the real world, ecommerce domain.

7. Conclusion

A company that uses search engine advertisements has a great deal of information and metrics at their disposal for evaluating campaign performance. Knowing everything from what key phrases were searched for, what ads were

clicked on, and what resulted in a sale can help companies spend their advertising dollars more effectively. The results of this research conclude that advertisements linked to Purchase searches do not generate more sales but cost more for the advertiser relative to Awareness searches. Retail advertisers should target some of their resources at these relatively low cost – high pay-off Awareness queries.

There are several avenues for future research. The foremost option is to see if these results hold for a variety of companies and business outside of general retail. One could hypothesize of niche companies and products where the results of research from this dataset might not hold. For example, businesses where the product is well know, and there is little brand differentiation. One could speculate that searchers in these markets would focus more directly on Purchase queries in an attempt to locate the best price or convenience. This would also be true of products where there are high rates of repeat customers. Again, this speculation and would need to be empirically investigated.

As sponsored search goes forward as a key component of ecommerce and online advertising, continued research into this critical area is a must if we are to understand its effects on consumer behavior. From its beginnings as primarily an advertising medium, sponsored search has become a credible media for a variety of business – consumer interactions. Research findings, such those presented here, are now shedding light on the inner workings of this complex and importance process.

ACKNOWLEDGMENTS

REFERENCES

Ash, T., "Landing Pages and the Decision-Making Process," Retrieved from http://searchenginewatch.com/3631328, August 2009

Berry, M.J.A. and G.S. Linoff, "Data Mining Techniques: For Marketing, Sales, and Customer Relationship Management," Wiley, New York, 2004.

Bettman, J. R., M. F. Luce, and J.W, Payne, "Constructive Consumer Choice Processes," *Journal of Consumer Research*, Vol. *25*, No. 3: 187-217, 1998.

Brooks, N., "The Atlas Rank Report I: How Search Engine Rank Impacts Traffic", Retrieved from http://www.atlasdmt.com/media/pdfs/insights/RankReport.pdf, August 2004.

Brooks, N., "The Atlas Rank Report II: How Search Engine Rank Impacts Conversions". Retrieved from http://www.atlasonepoint.com/pdf/AtlasRankReportPart2.pdf , January 2005.

Brooks, N., "Repeat Search Behavior: Implications for Advertisers." *Bulletin of the American Society for Information Science and Technology*, Vol. *32*, No. 2: 16-17, 2006.

Bruner, G.C. and A. Kumar, "Web commercials and advertising hierarchy-of-effects," *Journal of Advertising Research*, Vol. 40, No. 1: 35 - 42, 2000.

Caspari, P. *Management dynamics*. Wiley, New York, 2004.

Court, D., D. Elzinga, S. Mulder, and O.J. Vetvik., "The consumer decision journey," Retrieved from http://www.mckinseyquarterly.com/Strategy/Strategic_Thinking/The_consumer_decision_journey_2373, 2009

Dubberly, H. and S. Evenson, "The Experience Cycle," *interactions*, Vol. *June*. 11-15, 2008.

Ducoffe, R.H., "Advertising Value and Advertising on the Web," *Journal of Advertising Research*, Vol. *36*, No. September/October. 21-32, 1996.

Fain, D.C. and J.O. Pedersen, "Sponsored Search: A Brief History," *Bulletin of the American Society for Information Science and Technology*, Vol. *32*, No. 2: 12-13, 2006.

Fou, A., "How to Use Search to Calculate the ROI of Awareness Advertising," Retrieved from http://www.clickz.com/3633054, August 2009.

Fulgoni, G.M. and M.P. Mörn, "How Online Advertising Works: Whither the Click?" *Empirical Generalizations in Advertising Conference for Industry and Academia*, (Philadelphia, PA, 2008), SEI Center for Advanced Studies in Management Future of Advertising Project The Ehrenberg-Bass Institute for Marketing Science, pp. 1-16, 2008.

Ghose, A. and S. Yang, "An Empirical Analysis of Paid Placement in Online Advertising," *9th International Conference on Electronic Commerce (ICEC'07)*, Minneapolis, Minnesota, USA, pp. 95, 2007.

Ghose, A. and S. Yang, "Analyzing search engine advertising: firm behavior and cross-selling in electronic markets," *17th World Wide Web Conference*, Beijing, China, pp. 219-225, 2008a.

Ghose, A. and S. Yang, "Comparing Performance Metrics in Organic Search with Sponsored Search Advertising," *2nd Annual International Workshop on Data Mining and Audience Intelligence for Advertising (ADKDD 08)*, Las Vegas, Nevada, USA, pp. 18-26, 2008.

Ghose, A. and S. Yang, "An Empirical Analysis of Sponsored Search Performance in Search Engine Advertising," *First ACM International Conference on Web Search and Data Mining (WSDM 2008)*, (Palo Alto, California), pp. 241-250, 2008.

Ghose, A. and S. Yang, "An Empirical Analysis of Search Engine Advertising: Sponsored Search in Electronic Markets," *Management Science*, Vol. *55*, No. 10: 1605-1622, 2009.

Google. (2008, 12 November 2008). Financial Tables. Retrieved from http://investor.google.com/fin_data2007.html, February 2009.

Haven, B. "Marketing's New Key Metric: Engagement", Forrester, Cambridge, MA, 2007.

Hawkins, D.I., R.J. Best, and K.A. Coney, "Consumer behaviour: Implications for marketing strategy,*"* Irwin Publishing, Homewood, IL, 1995.

Hotchkiss, G. (2004), "Inside the Mind of the Searcher," Retrieved from http://www.enquiro.com/research.asp, March 2005.

Howard, J.A. and J.N. Sheth, "The theory of buyer behavior," Wiley, New York, 1969.

Jang, H., S. Lee, S.-W. Lee, and S.-k. Hong, "Expanding the individual choice-sets model to couples' honeymoon destination selection process," *Tourism Management*, Vol. *28*, No. 5: 1299-1314, 2007.

Jansen, B.J. and T. Mullen, "Sponsored search: An overview of the concept, history, and technology". *International Journal of Electronic Business*, Vol. *6*, No. 2: 114 – 131, 2008.

Jansen, B.J. and M. Resnick, "An examination of searchers' perceptions of non-sponsored and sponsored links during ecommerce Web searching," *Journal of the American Society for Information Science and Technology*, Vol. *57*, No. 14: 1949-1961, 2006.

Jansen, B.J. and A. Spink, "How are we searching the World Wide Web? A comparison of nine search engine transaction logs," *Information Processing & Management*, Vol. *42*, No: 1. 248-263, 2005.

Jansen, B.J. and A. Spink, "Investigating customer click through behaviour with integrated sponsored and nonsponsored results," *International Journal of Internet Marketing and Advertising*, Vol. *5*, No. 1/2: 74–94, 2009.

Jansen, B.J., A. Spink, and T. Saracevic, "Real Life, Real Users, and Real Needs: A Study and Analysis of User Queries on the Web," *Information Processing & Management*, Vol. *36*, No. 2: 207-227, 2000.

Jiang, Y., A. Cho, and R. Adaval, "The unique consequences of feeling lucky: Implications for consumer behavior," *Journal of Consumer Psychology*, Vol. *19*, No. 2: 171-184, 2009.

Kelt, J. "Search Before the Purchase: Understanding Buyer Search Activity as it Builds to Online Purchase," DoubleClick, 6, 2005.

Lancaster, G. and F. Withey, *CIM Coursebook 06/07 Marketing Fundamentals*. Butterworth-Heinemann, Oxford, 2006.

Lavidge, R. and G. Steiner, "A model for predictive measurements of advertising effectiveness," *The Journal of Marketing*, Vol. *25*, No. 1: 59-62, 1961.

Laycock, J. (2007, 5 March). "Understanding the Search Buying Cycle." Retrieved from http://www.searchengineguide.com/jennifer-laycock/understanding-t.php, August 2009.

McMillan, S.J. "Internet Advertising: One Face or Many? in Schumann, D.W. and Thorson, E. eds," *Internet Advertising: Theory and Research*, Lawrence Erlbaum, Mahwah, NJ, 2007.

Meyerson, M. and M.E. Scarborough, *Mastering Online Marketing: 12 Keys to Transform Your Website into a Sales Powerhouse*. Entrepreneur Press, Newburgh, NY, 2007.

Nelson, P. "Advertising as Information," *The Journal of Political Economy*, Vol. *82*, No. 4: 729-754, 1974.

Nimetz, J. (2007, 27 March). B2B Marketing in 2007: The Buying Funnel vs. Selling Process. Retrieved from http://www.searchengineguide.com/jody-nimetz/b2b-marketing-i-1.php, August 2009.

O'Cass, A. "An assessment of consumers product, purchase decision, advertising and consumption involvement in fashion clothing," *Journal of Economic Psychology* Vol. *21*, No. 5: 545-576, 2000.

Park, S., H. Bae, and J. Lee, "End User Searching: A Web Log Analysis of NAVER, a Korean Web Search Engine," *Library & Information Science Research*, Vol. *27*, No. 2: 203-221, 2005.

Pirolli, P. "Information Foraging Theory: Adaptive Interaction with Information," Oxford University Press, Oxford, 2007.

Puccinelli, N.M., R.C. Goodstein, D. Grewal, R. Price, P. Raghubir, and D. Stewart, "Customer Experience Management in Retailing: Understanding the Buying Process," *Journal of Retailing 85 (1,)* Vol. *85*, No. 1: 15-30, 2009.

Ramos, A. and Cota, S. *Search Engine Marketing*. McGraw-Hill, New York, 2008.

Rimm-Kaufman, A. (2006, 27 February). "Click Streams, Complexity, and Contribution: Modeling Searcher Behavior Using Markov Models," Retrieved from http://www.rimmkaufman.com/content/rkg-ses-ny-feb06-search-behavior.pdf, August 2009.

Ryan, K. "What's on your Mind?" Retrieved from http://searchenginewatch.com/3630177, August 2009.

Seda, C. "Search Engine Advertising: Buying your Way to the Top to Increase Sales," New Riders, Boston, 2004.

SEMPO Research. The State of Search Engine Marketing 2008 *Survey of Advertisers and Agencies Search Engine Marketing Professional Organization (SEMPO) February, 2009*, Search Engine Marketing Professional Organization, 2009.

Sen, R., S. Bandyopadhyay, J.D. Hess, and J. Jaisingh, "Pricing Paid Placements on Search Engines," *Journal of Electronic Commerce Research*, Vol. *9*, No. 1: 33-50, 2008.

Silverstein, C., M. Henzinger, H. Marais, and M. Moricz, "Analysis of a Very Large Web Search Engine Query Log," *SIGIR Forum*, Vol. 33, No. 1: 6-12, 1999.

Simon, H.A. *Models of man: social and rational*. John Wiley and Sons, New York, 1957.

Simon, H.A. *The New Science of Management Decision*. Prentice-Hall, Englewood Cliffs, NJ, 1977.

Sirakaya, E. and A.G. Woodside, "Building and testing theories of decision making by travellers," *Tourism Management*, Vol. 26, No. 6: 815-832, 2005.

Slovic, P., M. Finucane, E. Peters, and D.G. MacGregor, "Rational actors or rational fools: implications of the affect heuristic for behavioral economics," *Journal of Socio-Economics*, Vol. *31*, No. 4: 329-342, 2002.

Vakratsas, D. and T. Ambler, "How Advertising Works: What Do We Really Know?" *Journal of Marketing*, Vol. *63*, No. 1: 26-43, 1999.

Verhoef, P.C., S.A. Neslin, and B. Vroomen, "Multichannel customer management: Understanding the research-shopper phenomenon," *International Journal of Research in Marketing*, Vol. *24*, No. 1: 129–148, 2007.

Webb, M. and Gorman, T. *Sales and Marketing the Six Sigma Way*. Kaplan Business, Chicago, 2006.

Yahoo! Research. (2007). Research Online, Buy Offline: The Impact of Online Pre-Shopping on Consumer Shopping Behavior. Retrieved 7 August, 2009, from http://us.i1.yimg.com/us.yimg.com/i/us/ayc/pdf/aa_insights_robo.pdf

Young, R.A., A.M. Weiss, and D.W. Stewart, "Marketing Champions: Practical Strategies for Improving Marketing's Power, Influence, and Business Impact," Wiley, New York, 2006.

Yu, Y.-P. and S.Q. Cai, "A new approach to customer targeting under conditions of information shortage," *Marketing Intelligence & Planning*, Vol. *25*, No. 4: 343 - 359, 2007.

Zipf, G.K. "Human Behavior and the principle of least effort," Addison-Wesley Press, Cambridge, MA, 1949.