Organic versus Sponsored links:

Users' selection- and evaluation behavior towards search results

University of Twente

Master Psychology

November 2006

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Organische versus Gesponsorde links:
Klik- & evaluatiegedrag ten opzichte van zoekresultaten

Zoekmachines presenteren meestal twee soorten zoekresultaten. Enerzijds zijn dit organische, of natuurlijke, zoekresultaten, die de zoekmachine bepaalt door middel van haar natuurlijke algorithme. Anderzijds zijn dit gesponsorde zoekresultaten waarvoor betaald wordt door adverteerders, ofwel advertenties.
Deze studie onderzocht klikgedrag & evaluatiegedrag ten opzichte van organische- en gesponsorde zoekresultaten en was specifiek geïnteresseerd of kennis van dit onderscheid in resultaten beide gedragingen beïnvloedt. De resultaten van een online vragenlijst (*N*=647) toonden een grote voorkeur voor organische resultaten aan en dat deze voorkeur bovendien het sterkst is onder internetgebruikers die het onderscheid tussen zoekresultaten weten. Er werden meer geldige redenen gevonden voor het klikken op organische resultaten dan op gesponsorde resultaten. Voornamelijk kwalitatieve factoren (bijv. betrouwbaarheid, relevantie) en vooroordelen over gesponsorde resultaten waren de beste redenen voor het klikken op organische resultaten. Opvallendheid en het herkennen van bedrijven/organisaties waren redenen voor het klikken op gesponsorde resultaten. De in deze studie gevonden redenen, zoekresultaat-kenmerken en de invloed van kennis van het onderscheid in zoekresultaten vormen een aanvulling op eerder gevonden factoren van invloed op relevantie-beoordelingen, online zoekgedrag en interactie met zoekresultaten. Mate van Google-gebruik en positie bovenin een resultatenpagina waren de voornaamste voorspellers voor het klikken op respectievelijk organische- en gesponsorde resultaten.
De bevindingen van dit onderzoek kunnen richtlijnen bieden voor het optimaliseren van zoekresultaten en bijdragen aan de ontwikkeling van de campagnes voor gesponsorde advertenties. Tot slot werden er in deze studie aanwijzingen gevonden dat klikgedrag mogelijk voorspeld en verklaard kan worden vanuit een sociaal cognitief perspectief. Aansluitende studies werden voorgesteld om factoren, die klikgedrag kunnen voorspellen en verklaren, verder te onderzoeken.

Organic versus Sponsored Links:
Users' selection- and evaluation behavior towards search results

Search engines usually present two main categories of search results on the search engine results page (SERP). One set is composed of *organic* results which the search engine determines using its native matching algorithm. The other set is composed of *sponsored* results, or advertisements, which are paid for by advertisers.

The current study investigated users' selection- and evaluation behavior towards organic- and sponsored search results and was espcially interested in whether awareness of the search result distinction influences both behaviors. Findings from an online survey (*N*=647) showed that organic search results outperformed sponsored search results and are specifically preffered by users who are aware of the search result distinction, which were generally more frequent users of search engines. More valid reasons are found for selecting organic search results than for selecting sponsored search results. Especially quality factors (e.g. reliability, relevance) and a bias against sponsored results were the most important reasons for selecting organic results. Remarkability and recognition of familiar suppliers/organizations were reasons for selecting sponsored results. Reasons, features and the influence of awareness identified in this study extend and update the previously found factors of influence on relevance judgments, web search behaviour and users' interaction with search engine results. Level of Google use and search result position were the main predictors for selecting respectively organic- and sponsored search results.

From the findings of this study, guidelines can be extracted for further optimising the presentation of search results on a SERP and for the development of sponsored result presentation and "paid search" campaigns. Furthermore, the findings of this study indicated that users' selection behavior may be predicted and explained from a social cognitive perspective and proposes additional investigations to further explore factors of influence.

Abstract

This study investigated users' selection- and evaluation behavior towards organic- and sponsored search results and whether these behaviors are influenced by users' awareness of this search result distinction. Results of an online survey (*N* = 647) showed an overall preference for organic results. Selection behavior was influenced by users' awareness of the search result distinction. Reasons like reliability, relevance and good experience were most applicable to organic results, while remarkability and recognition of familiar suppliers/organizations were reasons for selecting sponsored search results.

Google use and search result position were the main predictors for selecting organic- and sponsored results respectively. Indicators are suggested for further investigations on selection behavior from a social cognitive perspective and the influence of search results' rank order on selection behavior.

Organic versus Sponsored Links:
Users' selection- & evaluation behavior towards search results

Although email is still the top Internet activity, the use of search engines is edging up on email as a primary Internet activity on any given day (Rainie & Shermak, 2005). The role of search engines within online buying processes is substantially growing. The majority of the internet users searches online for information about products and services and 50% of the active Internet users buy products online (Thuiswinkel marktmonitor, 2005; Thuiswinkel marktmonitor, 2006) of which almost 64% would use a search engine for their search (Hotchkiss, 2004).

These data indicate the importance of search engines in the online buying process of consumers. Searching and retrieving information on the Internet using search engines, especially during a commercial search task, involve two main categories of search results (or links) on the search engine results page (SERP). One set is composed of *organic* results, which the search engine determines using its native matching algorithm. The other set is composed of *sponsored* results that appear because a company, organization or individual purchased the keyword(s) that the searcher used in the search task. Sponsored links are usually situated at the top of a SERP (top-sponsored results) and on the right side of a SERP (side-sponsored). How users interact with search engine results and, more specifically, whether they select organic- or sponsored search results is of special interest for companies and organizations investing in the so-called "paid search". Which factors determine users' selection behavior might be the key to this understanding. On the other hand, since the shift of search engine usage from informational goals to commercial goals (Spink & Jansen, 2004), insight in user's interaction with search results will also extend and update the knowledge on relevant research areas. These research areas include information retrieval, relevance judgments, general human information behavior, web search behavior and consumer behavior including online buying processes.

Previous studies on users' interactions with search results showed that users prefer organic results over sponsored results (e.g., Marable, 2003; Wehr, 2005; Hotchkiss, 2004; iProspect, 2006; Harvestdigital, 2006). However, it appeared that the majority of users is not aware of this distinction between search results (e.g., WebAdvantage.net, 2003; Rainie & Shermak, 2005). This (non-) awareness is expected to be an important condition when we want to acquire insight in the determining factors of users' interaction behavior towards organic- and sponsored search results. Therefore, this study brings in a new topic into the research area of search engine usage by investigating whether this awareness is an influencing factor on user's selection behavior. Moreover, the current study includes an investigation of selection behavior towards organic- and sponsored search results, reasons

for selection behavior and search result features of influence on selection behavior during a commercial search task using a search engine.

Literature review

Human information behavior originally concerned the fields of information- and library sciences. Since the user, rather than the system, became more and more the focus of interest, consumer behavior research, marketing, psychology and a number of other disciplines could be added (Wilson, 2000). Information searching behavior is defined as a subset of information behavior, particularly concerned with the interactions between users and computer-based information systems. One of the most common information searching situations in which computer users nowadays are involved, is that which entails the use of an Internet search engine (Jansen, Spink, & Saravecic, 2000).

Studies on web search are usually framed from the perspective of information retrieval (IR), which concerns the techniques and processes of searching, retrieving and interpreting information. The current available literature on information seeking and retrieval (IS & R), including web search, mostly addresses factors of influence on search behavior in general. These factors include at least five categories that influence information searching: the work task, the search task, the searcher, the search process and the social/organizational environment (Pharo & Järvelin, 2004). Although these categories might be a promising way to understand and explain web search, the current study is more concerned with the interaction of users with an online information retrieval system, including a specific subset of web search. A web search engine may be defined as an IR system which aims to provide users with information that helps them to fulfill the information need they expressed to the system, mostly in the form of a query. Users are then typically involved in the process of evaluating the relevance or utility of the information that the IR system retrieves.

The concept of relevance is found to be the key concept in IR (e.g., Saravecic, 1997; Greisdorf, 2000) and includes two main approaches; topic-appropriateness and user-utility. Topic-appropriateness, or topicality, is concerned with whether or not information has some topical bearing on the information need expressed by the user in the query. User-utility deals with the ultimate usefulness of the information to the user who submitted the query (Schamber, 1994). Several studies have attempted to investigate criteria employed by searchers when judging the utility or topicality of retrieved information, providing a wide range of factors affecting human judgments of relevance. These criteria include factors like information content factors (document features), background/experience factors, information source factors, affective factors, situational factors, quality factors

and so on (e.g., Barry, 1994; Barry, 1998; Cool, Belkin, Kantor and Frieder, 1993; Maglaughlin & Sonnenwald, 2002; Schamber, 1991; Tang & Solomon, 1998).

Saravecic (1997) expanded the traditional IR model by introducing a model more specified to user's interaction with an information system and proposed four levels of interaction in order to better model users' search behaviors: the cognitive level, the affective level, the situational level and the query level. Variables at these four levels of interaction are defined as the context variables of influence when interpreting the appropriateness and utility of information returned by a system. The factors that affect human judgments of relevance found in previous studies and the variables addressing the four interaction levels of Saravecic (1997) provided a first indication of factors influencing users' interaction with search results.

Only recently the interaction of users with search engines and the determining factors of their actions are found to be essential to the understanding of the overall process of web search and to enable to create appropriate models (Lorigo et al., 2006). O'Brien, Keane and Smyth (2006) investigated whether two cognitive strategies were predictively useful when applied to first-click behavior. The 'threshold' model, which assumed a result is selected if it is above an established threshold, provided a reasonable approximation to human behavior. Another recent attempt by Lorigo et al. (2006) to investigate users' evaluations of search results found gender and search task are both factors of influence. Hotchkiss, Alston and Edwards (2005) used eye tracking to investigate users' result viewing patterns and found that users' eye activity included a pattern referred to as the "Golden triangle". This pattern included top sponsored links, top organic links and Google's alternative results, including shopping, news or local suggestions. Although these studies all had important findings on users' interaction with search results, they were not aimed at both selection- and evaluation behavior and, more important, did not integrate these behaviors with the distinction between organic- and sponsored search results.

The study by Jansen and Resnick (2005) was one of the few studies that investigated the relation between selections and evaluations towards both result categories and was aimed at the bias against sponsored results found in previous studies (e.g., Hotchkiss, 2004; Marable, 2003; Fallows, 2004). URL (internet address), rank, a result being organic/sponsored, location and principally the summary and title of a search result were all factors of influence on the bias for sponsored search results and the preference for organic results. However, the study by Jansen and Resnick assumed that users were aware of the distinction between organic- and sponsored search results, while this may be an invalid premise. The study by Rainie and Shermak (2005), for example, revealed that 38% of the searchers were aware of a distinction between sponsored- and organic search results

and only half of these aware searchers could always tell which search results are sponsored and which are not. Another earlier study revealed that half of the searchers is not sure when a search result is sponsored or organic (WebAdvantage.net, 2003). Nevertheless, several studies showed that users prefer organic results over sponsored results (e.g., Wehr, 2005; Hotchkiss, 2004; Bruemmer, 2005) and even that users have a bias against sponsored results. This bias was illustrated by, for example, Marable (2003) who investigated users' reactions to learning the truth about how search engines work. Marable found that users, when informed about the nature of sponsored results, showed negative reactions.

Awareness of the search result distinction can be considered as the foreknowledge or level of expertise of an Internet user. Foreknowledge refers to specific knowledge elements concerning a specific application and is likely to have an effect on performance (e.g., Freudenthal, 2001; Sohn & Carlson, 2000). Pejtersen and Fidel (1998) regarded level of expertise as a user characteristic of influence on relevance judgments and web search strategies. Therefore, it was assumed that awareness of the distinction between search results might influence users' interaction with search results, specifically eliciting different selection- and evaluation behaviors towards organic- and sponsored search results. The current study included a first investigation of this awareness by considering how it influences selection behavior and the reasons aware users have for selecting organic- or sponsored search results.

From previous studies on relevance judgments and users' interaction with search results, a wide range of factors of expected influence on selection behavior could be extracted. Most of the factors of expected influence in the current study were categorized into reasons for selecting organic- and sponsored search results and search result features of importance on selection behavior. These reasons and features were, first of all, aimed at the presentation of search results like the content, the perceived quality, the source and the position within the SERP. Furthermore, they were also aimed at previous experience, habits and attitudes towards search results. In essence, an attitude can be considered as an individual disposition (either favorable or unfavorable) toward an object or event (Klobas & Clyde, 2000), which in this case are organic- and sponsored search results. The range of factors that might influence selection behavior was made complete by adding personal factors like demographics and users' awareness of the search result distinction. Through these factors this study attempted to predict and explain users' selection behavior towards organic- and sponsored search results. This study addressed the following research questions:

RQ 1. Are there differences in selection behavior towards organic- and sponsored search results between aware and non-aware users?

RQ 2. Are there differences between reasons for selecting organic search results and selecting sponsored search results? If so,
  2.1 What reasons do aware users have for selecting organic search results?
  2.2 What reasons do aware users have for selecting sponsored search results?

RQ 3. Which search result features are important for the selection behavior of non-aware users?

RQ 4. Can differences in reasons or search result features predict selection behavior towards organic- and sponsored search results? If so, how?

Method

Sample and procedure

Subscribers of a national panel, representative for the Dutch population administrated by a market research institute, were invited via email to participate in an online survey. The 1154 Internet users who responded to the invitation were divided using a stratified random sampling method, considering awareness of the distinction between search results and preference for organic- or sponsored search results as strata. The stratified random sampling method led to three groups (N = 647).

From the 647 participants, 49% were men and 51% were women. The participants were aged from 14 to 75 years old, with a majority (over 50%) between 30 and 45 years old. Internet was mainly used between 1.5 and 4 hours a day and over 80% of the participants used Google once or more times a day. Of the 1154 internet users who responded to the invitation, 807 users (70%) were not aware and 347 users (30%) were aware of the distinction between organic- and sponsored search results.

Measures

A preliminary qualitative study was conducted in order to investigate selection behavior during a commercial search task and to explore factors of influence on search result selections. From the findings of the preliminary study, a questionnaire could be designed which measured selection behavior, reasons for selecting organic- or sponsored search results, important search result features and whether participants were aware of the distinction between search results or not.

The final questionnaire started with general items including demographics, the use of Internet and search engines in general and the use of search engines for online purchases in specific.

The second part of the questionnaire measured selection behavior towards organic- and sponsored search results. Selection behavior was tested with a pre-determined search task

in combination with an image of a pre-determined SERP. The SERP was extracted from search engine Google since that is the search engine most used (91%) in the Netherlands (*Checkit*, 2006). The search task instructed the participants to purchase a new microwave online using a search engine. Presenting a pre-determined SERP, which consisted of five organic- and seven sponsored search results, the participants were asked to choose the search result they found most relevant to their search task. Although this study was aimed at selection behavior towards organic- and sponsored search results, additional selection behaviors could be measured. Both result categories consisted of familiar suppliers, non-familiar suppliers, familiar brand and price comparison results. Therefore, selection behavior could also be measured for type of search result. Furthermore, sponsored search results could be further divided into top-sponsored links and side-sponsored links.

Before the factors of influence on selection behavior could be tested, part three of the questionnaire divided the participants into users who were aware and users who were not aware of the search result distinction. The participants were asked if they had ever noticed advertisements within a SERP and if they had ever noticed sponsored links within a SERP. When they had noticed advertisements or sponsored links before, an image of a SERP was presented and the participants were asked to select the search result sections which consisted of sponsored links. The participants who selected the correct search result sections were assigned to group one; the aware users (N = 347). The participants who had never noticed advertisements or sponsored search results before, and the participants who did not select the correct search result sections, were assigned to group two; the non-aware users (N = 300). The aware users were further divided into subgroups by asking to which degree they selected sponsored search results when they wanted to purchase a product online. The participants who always selected sponsored search results or often selected sponsored search results were assigned to group one A (N = 300) and the participants who never selected sponsored search results were assigned to group one B (N = 300). The participants who sometimes selected sponsored search results were assigned to both subgroups.

In the last part of the questionnaire, group one A was surveyed on reasons for selecting sponsored search results and group one B on reasons for selecting organic search results. Reasons for selecting organic- and sponsored results were measured on a Likert-type scale that ranged from 1 (*totally disagree*) to 5 (*totally agree*). Group two was surveyed on search result features of importance on selection behavior, which were measured on a Likert-type scale that ranged from 1 (*very unimportant*) to 5 (*very important*).

In summary, the applied stratified random sampling led to the following three groups:

Group 1A: Aware users who valued reasons for selecting *organic* search results

Group 1B: Aware users who valued reasons for selecting *sponsored* search results

Group 2: Non-aware users who valued search result features of importance on selection behavior

Data-analysis

Frequency analyses were run to determine which search results aware users and non-aware users selected. Mann-Whitney tests and a Kruskall-Wallis test were run to measure whether there were differences in selection behaviors between both groups. Additional chi^2 analyses were applied to further explore the differences found (RQ 1).

Means of reasons for selecting both result categories were calculated in order to determine which reasons were actual reasons for selecting a search result and which reasons were not. Additionally, paired sample T-tests were applied to measure differences between reasons applicable for selecting organic search results and sponsored search results as well (RQ 2). Means of search result features were calculated in order to determine which features were important for selection behavior and which were not (RQ 3). For the analyses mentioned above, results were controlled for demographics.

Binary regression analyses were applied to provide information whether differences in reasons for selecting organic results, reasons for selecting sponsored results, and differences in search result features could predict selection behavior towards organic- and sponsored search results (RQ 4). Additional binary regression was applied to provide supplementary information whether differences in evaluation of reasons for selecting sponsored search results could predict selection behavior towards top-sponsored - and side-sponsored search results. To control for demographics, the variables of Gender, Age, Internet use and Google use were included in the regressions in order to expand the possible predictors.

Results

Selection behavior of aware and non-aware users

Aware users significantly selected more organic results (χ^2 (1) = 86.251, p < .001) than sponsored results and, within the sponsored results, they significantly selected more top-sponsored results than side-sponsored results (χ^2 (1) = 9.667, p < .01). Non-aware users also significantly (χ^2 (1) = 15.923, p < .001) selected more organic results than sponsored results and more top-sponsored results than side-sponsored results (χ^2 (1) = 8.357, p < .01). Although price comparison results were the results most selected by both groups, for non-aware users these results significantly outperformed the other result types (χ^2 (1) = 6.158, p < .05). The results mentioned above are presented in appendix A.

Differences in selection behaviors between both groups, indicated by χ^2, are presented in table 1.

Table 1

Differences in selection behavior between aware users and non-aware users

	Aware users	**Non-aware users**
Selection behavior		
Organic - Sponsored		
Organic	260 (74.9%)	184 (61.5%) ***
Sponsored	87 (25.1%)	115 (38.5%) *
Total	347 (100%)	299 (100%)
Top-sponsored vs. Side-sponsored		
Top-sponsored	58 (16.7%)	73 (24.4%)
Side-sponsored	29 (8.4%)	42 (14%)
Total sponsored	87 (25.1%)	115 (38.5%)
Result Type		
Price comparison result	159 (45.8%)	157 (52.3%)
Familiar supplier	39 (11.2%)	23 (7.7%) *
Non-familiar supplier	145 (41.8%)	116 (38.7%)
Familiar brand	4 (1.2%)	3 (1.0%)
Total	347 (100%)	299 (100%)

*p < 0.05; **p < 0.01; ***p < .001; N = 647

Results of a Mann-Whitney test indicated that selection behavior towards organic- and sponsored search results significantly differed between both groups (U = 44930.5, p <. 001). Additional chi^2 analyses showed that significantly more non-aware users selected sponsored results than aware users did (χ^2 (1) = 3.881, p < .05). Vice versa, significantly more aware users than non-aware users selected organic results (χ^2 (1) = 13.009, p < .001). Although a Kruskall-Wallis test did not show significant differences between both groups and selection behavior towards result type (χ^2 (3) = 3.956, p = .266), additional chi^2

analyses showed that aware users significantly selected more familiar suppliers than non-aware users did (χ^2 (1) = 4.129, p < .05).

Reasons for selecting organic search results or sponsored search results

Mean scores of reasons (table 2) indicated that there are more reasons for selecting organic search results than for selecting sponsored search results (M > 3.0). *Reliability, relevance, habit* and *good experience* were all reasons for selecting organic search results. *Sponsored results do not match, sponsored results are intrusive* and *sponsored results are paid for* were all reasons for not selecting sponsored search results. Sponsored search results were selected because of their *remarkability* and because of *recognition of familiar suppliers/organizations*. Additional bar charts, including only values 4 (agree with) and 5 (totally agree with) of the Likert scale, controlled for dispersion and confirmed the reasons found.

Paired sample t-tests for reasons applicable to organic- and sponsored search results as well showed that r*eliability, relevance, habit, knowing from others that sponsored/organic results are the best results* and *good experience* were all reasons valued higher for selecting organic search results (p < .001). *Remarkability* and *recognition familiar suppliers/organizations* were both reasons valued higher for selecting sponsored search results (p < .001). Results of the paired sample t-tests are presented in table 2.

Table 2

Means of reasons for selecting organic search results or sponsored search results

Reasons organic search results	**M**	**SD**	**Reasons sponsored search results**	**M**	**SD**
I find organic search results:			*I find sponsored search results:*		
1. Most reliable	3.41 ***	1.06	1. Most reliable	2.37	1.06
2. Most relevant	3.43 ***	1.08	2. Most relevant	2.61	1.06
3. Most remarkable	2.76	0.95	3. Most remarkable	3.45 ***	1.16
I select organic results because:			*I select sponsored results because:*		
4. I recognize familiar suppliers/organizations	2.91	1.04	4. I recognize familiar suppliers/organizations	3.00 ***	1.12
5. Of a habit	3.27 ***	1.22	5. Of a habit	1.99	1.28
6. Of good experience	3.64 ***	1.15	6. Of good experience	2.55	1.08
7. Other people told these are the best results	2.72 ***	1.24	7. Other people told these are the best results	1.99	1.16
8. Sponsored search results do not match	3.01	1.19	8. Organic search results do not match	2.27	1.28
9. Sponsored results are intrusive	3.54	1.34	9. Sponsored results are paid for	2.60	1.17
10. Sponsored results are paid for	3.54	1.35	10. I always select the 1st search result	2.06	1.43

*$p < 0.05$; **$p < 0.01$; ***$p < .001$; $N = 347$

Results of binary regression analysis for selection behavior towards organic- and sponsored search results, including demographics, Internet use, Google use and reasons for selecting organic search results as predictors, are provided in table 3.

Table 3

Binary regression analysis of selection behavior using demographics, Internet use, Google use and reasons for selecting organic search results as predictors.

Predictors	**Selection behavior: Sponsored (0), Organic (1)** *N* = 248 Bèta
Block1: Demographics	
Age	.998
Gender	.651
Nagelkerke R^2 (%)	43.7%
Block 2: Use	
Internet use – hours a day	.976
Google use	1.087
R^2 Change (%)	1.1%
Nagelkerke R^2 (%)	44.8%
Block 3: Reasons	
I find organic search results:	
1. Most reliable	1.400
2. Most relevant	.992
3. Most remarkable	1.446
I select organic search results because:	
4. I recognize familiar suppliers/organizations	.923
5. Of a habit	.896
6. Of good experience	1.251
7. Other people told these are the best results	1.002
I do NOT select sponsored search results because:	
8. Sponsored results do not match	.802
9. Sponsored results are intrusive	1.003
10. Sponsored results are paid for	1.065
R^2 Change(%)	4.8%
Final Nagelkerke R^2 (%)	43.7%

*p < 0.05; **p < 0.01; ***p < .001

The total variance explained for selection behavior towards organic- and sponsored search results was 43.7%. Hosmer and Lemeshow's goodness-of-fit Test (χ^2 (8) = 5.207, p = .735) indicated that the logistic model had a good fit (p > .05). The model was able to correctly classify 100% of the selections of organic results and 2.1% of the selections of sponsored results, with an overall success rate of 81.5%. No significant predictors for selecting organic- or sponsored search results were found.

Selection behaviors towards organic- and sponsored search results (A) and towards top-sponsored and side-sponsored search results (B) were regressed, including demographics, Internet use, Google use and reasons for selecting sponsored search results as predictors. Results of the binary regression analyses are provided in table 4.

Table 4

Binary regression analysis of selection behaviors using demographics, Internet use and Google use and reasons for selecting sponsored search results as predictors.

Predictors	A: Selection behavior Sponsored (0), Organic (1) *N* = 254	B: Selection behavior Top-sponsored (0), Side-sponsored (1) *N* = 84
	Bèta	Bèta
Block1: Demographics		
Age	1.017	.987
Gender	.923	.864
Nagelkerke R^2 (%)	24%	12.4%
Block 2: Use		
Internet use – hours a day	.960	1.067
Google use	1.576 **	3.239 *
R^2 Change (%)	1.3%	0.6%
Nagelkerke R^2 (%)	25.3%	13%
Block 3: Reasons		
1. Most reliable	1.066	.954
2. Most relevant	.944	.754
3. Most remarkable	1.005	.406 *
I select sponsored results because:		
4. I know these results are paid for	.793	1.446
5. I recognize familiar	.748	.687
6. I Always click on the 1st search result	.847	.597
7. Organic results do not match	.939	1.124
8. Of a habit	1.191	1.599
9. Of good experience	1.142	1.222
10. Other people told these are the best	.893	.358 *
R^2 Change(%)	6.4%	32.3%
Final Nagelkerke R^2 (%)	31.7%	45.3%

*p < 0.05; **p < 0.01; ***p < .001

The total variance explained for selection behavior towards organic- and sponsored search results (A) was 31.7% and for selection behavior towards top-sponsored and side-sponsored results (B) 45.3%. Hosmer and Lemeshow's goodness-of-fit Tests (A: χ^2 (8) = 13.509, p = .095, B: χ^2 (8) = 6.452, p = .597) indicated that the logistic models had a good fit (p > .05). Model A was able to correctly classify 95.1% of the selections of organic results and 10% of the selections of sponsored results, with an overall success rate of 71.7%. Model B was able to correctly classify 87% of the selections of top-sponsored results and 37.5% of the selections of side-sponsored results, with an overall success rate of 70%.

Google use was the only significant predictor for both selection behaviors. The more Google is used, the more a person is likely to select organic results (Exp(*B*)= 1.576, p < .01) and the even more a person is likely to select side-sponsored results (Exp(*B*)= 3.239, p < .05). Internet- and Google use accounted for 1.3% (A) and 0.6% (B) respectively of the variance.

The reasons model for selecting top-sponsored results and side-sponsored results explained 32.3% of the variance. *Remarkability* was a second predictor (Exp(*B*)= .406, p < .05). Inverting the odds ratio indicated that, for each one point increase on the five-point Likert scale, a person is 2.46 times more likely to not select side-sponsored results. The third significant predictor was *knowing from other people that sponsored results are the best results* (Exp(*B*)= .358, p < .05). Inverting the odds ratio indicates that, for each one point increase on the five-point Likert scale, a person is 2.79 times more likely to not select side-sponsored results.

Search result features

Mean scores of search results features showed that many features were found important when selecting a search result. However, the most important features (*M* = > 4.0) were: *relevant information within the search result* (*M* = 4.16, *SD* = .699), *relevant information within the summary* (*M* = 4.19, *SD* = .691), *reliable/objective information within the search result* (M = 4.16, *SD* = .666) and *an unambiguous Internet address/URL* (*M* = 4.05, *SD* = .787). The most unimportant search result feature was *terms like: order now!* (*M* = 2.17, *SD* = .893). Mean scores of all search result features are presented in appendix B. Additional bar charts, including only values 4 (agree with) and 5 (totally agree with) of the Likert scale, controlled for dispersion and confirmed the most important search result features found.

Results of binary regression analysis for selection behavior towards organic- and sponsored search results, including demographics, Internet use, Google use and search result features as predictors, are provided in table 5.

Table 5

Binary regression analysis of selection behavior using demographics, Internet use, Google use and search result features as predictors

Predictors	Selection behavior Sponsored (0), Organic (1) *N* = 299 Bèta
Block1: Demographics	
Age	1.013
Gender	.933
Nagelkerke R^2 (%)	7.7%
Block 2: Use	
Internet use – hours a day	.955
Google use	1.028
R^2 Change (%)	0.1%
Nagelkerke R^2 (%)	7.8%
Block 3: Search result features	
1. Position at the top of the SERP	.732 *
2. Position on the right on the SERP	.902
3. Repetition of query within the search result	1.038
4. Bolded words in the title	1.165
5. Relevant information within the summary	1.160
6. Recognition familiar suppliers/organizations	.847
7. Terms like: “Order now!”	.955
8. Reliable information within the search result	1.243
9. Relevant information within the search result	.994
10. Running well sentences within the summary	1.075
11. Experience with website	1.090
12. Unambiguous internet adress/URL	.853
R^2 Change(%)	5.1%
Final Nagelkerke R^2 (%)	12.9%

*p < 0.05; **p < 0.01; ***p <.001; N = 299

The total variance explained for selection behavior towards organic- and sponsored search results was 12.9%. Hosmer and Lemeshow's goodness-of-fit Test (χ^2 (8) = 4.892, p = .769) (χ^2 (8) = 4.548, p = .805) indicated that the logistic model had a good fit (p > .05).

The model was able to correctly classify 17.4% of the selections of sponsored results and 88.6% of the selections of organic results, with an overall success rate of 61.2%.

The features block accounted for 5.1% of the variance. *Position at the top of the SERP* was the only significant predictor (Exp(*B*)= .732, p < .05). Inverting the odds ratios for *position at the top of a SERP* indicates that, for every one-point increase on the five-point Likert scale, a person is 1.37 times more likely to not select organic results.

Demographics

The control measures for demographics produced a couple of relevant findings on whether users were aware or not aware of the distinction between search results. Chi^2 analyses showed that there were more aware users than non-aware users among men (χ^2 (1) = 7.291, p < .01) and that least aware users were found within the age category of 46 years and older (χ^2 (2) = 45.412, p < .001). The association test Cramer's V showed a significant positive relation between using Google and awareness of the distinction between search results (V = .259, p < .001). The findings of the control measures are presented in Appendix C.

Discussion

This study investigated users' selection- and evaluation behavior towards organic- and sponsored search results. Whether awareness of this distinction between search results elicited different selection behaviors and how aware users evaluated both result categories was of specific interest.

Selection behavior

Findings of this study indicate an overall preference for organic search results over sponsored search results and that top-sponsored links outperform side-sponsored links when performing a search task aimed at purchasing. These results are in line with previous findings by, for example, Hotchkiss et al. (2004). Half of the users choose a price comparison result, indicating that comparing products and prices fulfill consumer's information need best when they want to purchase a product online.

Results of this study showed that the majority of the participants was not aware of the distinction between organic results and sponsored search results, confirming previous findings on this distinction (e.g., Fallows, 2005).

Differences in selection behavior are found, including that aware users select organic results more often and sponsored results less often than non-aware users (RQ 1). These findings implicate that aware users have a stronger preference for organic search results than non-aware users, which corresponds to a previous finding by Marable (2003). Marable found that, when users are informed by the nature of sponsored search results, these search results might become less preferable and organic results even more preferable. However, awareness of the distinction between search results indeed turns out to be a factor of influence on users' selection behavior. Therefore, this awareness expends the factors of influence on users' interaction with search results and, considering awareness as foreknowledge or level of expertise, it also introduces a new factor which affects human judgments of relevance of retrieved documents.

Evaluation behavior

Reasons for selecting organic search results are reliability, relevance, habit and good experience. Additionally, reasons for not selecting sponsored search results are that sponsored results do not match, sponsored results are considered intrusive and the knowledge that sponsored results are paid for. These reasons show a bias towards sponsored search results as found in previous studies (e.g. Marable, 2003; Jansen & Resnick, 2005). Reasons for selecting sponsored search results are remarkability and recognition of familiar suppliers/organizations (RQ 2).

Considering the factors of influence on relevance judgments found in previous studies, factors of perceived quality, experience and habitual behavior are especially applicable to organic search results. Factors aimed at the presentation and the source of a search result are specifically applicable to sponsored results.

Relevant and reliable information within the search result and an unambiguous Internet address are the most important search result features (RQ 3), addressing quality factors that can be principally assigned to organic search results. "Terms like: order now!" is the most unimportant search result feature, which might negatively influence selection- and evaluation behavior in general.

Predictors for selection behavior

Predictors are found for the selection behavior towards organic- and sponsored search results (RQ 4). Google use is the only predictor for selecting organic search results, which implicates that experience with Google might influence selection behaviour and specifically elicits a preference for organic search results. This implication can be confirmed by the plausible positive relation between Google use and awareness of the

search result distinction, which also elicits a stronger preference for organic results. The perceived importance of a search result being situated at the top of a SERP is a plausible predictor for selecting sponsored search results. This finding may implicate that the rank order, or position, of search results is a determining factor for selection behavior.

Selection behavior towards top-sponsored links and side-sponsored links is predicted by reasons for selecting sponsored search results. The perceived remarkability of sponsored search results and knowing from other people sponsored results are the best results were both reasons that predict the selection of top-sponsored links. The remarkability of top-sponsored search results may be related to findings from previous eye-tracking studies in which top-sponsored results were found to automatically receive users' attention and to receive much higher visibility than side-sponsored results (Hotchkiss et al., 2004; Hotchkiss, Alston, & Edwards, 2005). The predictor "knowing from other people sponsored results are the best results" implicates that selection behavior may be influenced by others, the so-called social influence. Previous studies also identified influence of others as an intervening variable in the information seeking-process. This variable was derived from the social cognitive theory by Bandura, which provides a framework for understanding, predicting and changing human behavior (e.g. Wilson & Walsh, 1996). However, the reasons block for selecting sponsored search results only explained 6.4% of the total variance. This small percentage implicates that other factors, like the visibility of top-sponsored results, may be better predictors for selection behavior towards top-sponsored links and side-sponsored links than the reasons evaluated in this study.

Limitations and future research

Although this study revealed new and interesting findings on users' selection- and evaluation behavior towards search results, a few limitations have to be taken into account.

The selection behavior of the participants was based on a commercial query and a pre-determined SERP extracted from search engine Google. Since type of search task influences information searching (e.g. Pharo & Järvelin, 2004) and people use different relevance criteria at different points in search (e.g. Vakkari, 2000; Pharo & Järvelin, 2004), findings in the current study can only be interpreted in the context of online purchasing. Although the use of search engines shifts more and more to commercial goals (Spink & Jansen, 2004), additional investigations on other situational contexts may be needed to acquire an overall understanding on users' selection- and evaluation behavior towards search results. Furthermore, findings on selection behavior in the current study should be interpreted with care since only search engine Google was used to measure

selection behavior. The use of other search engines to measure selection behavior may produce different findings.

The search task and the SERP used to measure selection behavior were both simulated and therefore did not simulate a natural information need and selection process. A fully 'natural' context of a user's search experience can only be created if the search problem is a real information need for the individual, not imposed by the researcher (Anderson, 1998). The search results returned by a search engine vary among queries and moments of executing a query. Therefore, the selection behaviors found in the current study have to be considered in this simulated context. Most accurate results on users' selection- and evaluation behavior towards search results may be provided by conducting studies in a natural context in order to determine real search processes with real information needs.

The current study found indicators for the influence of search results' rank order on selection behavior, which influence is also identified in previous studies (e.g. Hotchkiss et al., 2005; O'Brien, Keane & Smith, 2006). O'Brien et al. (2006), for example, showed that people tend to choose less-relevant results at the top of a SERP over highly relevant results lower down the SERP. These findings on influence of rank order implicate that the selection behavior found in the current study may not be specifically related to the investigated reasons and search result features. Since rank order is assumed to influence selection behavior, especially findings of factors that predict the selection of top-sponsored search results should be interpreted very carefully. Future studies are needed to investigate this influence of rank order on selection behavior and how rank order may be related to the reasons, search result features and predictors found in the current study.

The current study found several factors that can predict or motivate selection behavior, under which personal factors like attitudes towards organic- or sponsored search results and the external factor "influence of other people". These factors correspond to the social cognitive perspective on human behaviour, which is identified as a triadic, dynamic and reciprocal interaction of personal/cognitive factors, environmental factors and behavior (e.g., Bandura, 1977). Therefore, these findings suggest that selection behavior towards search results may be approached from a social cognitive perspective. Two theories are suggested for further investigation on users' selection behaviour and the determining factors of their selections.

Theory of Reasoned Action (TRA) & Theory of Planned Behavior (TPB)

Relevant theories that may predict factors of influence on users' selection behavior from a social cognitive perspective may be the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and it's extended Theory of Planned Behavior (Ajzen, 1991). The TRA and the TPB have been extensively used to predict and explain behavioral intentions and behavior.

According to these theories, the most important determinant of a person's behavior is behavior intent. It is believed that the stronger a person's intention to perform a particular behavior, the more successful they are expected to be. Conform the TRA, behavioral intention is influenced by two predictors or motivations; a person's attitudes to the outcome of a behavior and a person's subjective norm regarding a behavior. Attitude refers to the degree to which the person has a favorable or unfavorable evaluation of the behavior in question. Subjective norm is the influence of social pressure that is perceived by the individual to (not) perform a certain behavior. The TRA assumes that behaviors are under a person's volitional control. Although a person might be highly motivated by attitudes and subjective norms, the person may not actually perform the behavior due to intervening environmental conditions. Therefore, the TPB was constructed which added a third predictor; perceived behavioral control. Perceived behavioral control refers to a person's belief concerning how easy or difficult it is to perform a certain behavior.

Although these theories were not expected to be suitable for activities in which a person can choose among alternatives, like the selection of search results, Sheppard, Hartwick and Warshaw (1988) concluded that the theories performed extremely well in predicting goals and activities involving explicit choice among alternatives. Therefore it is assumed that application of the TRA or TPB can guide future investigations on selection- and evaluation behavior from a social cognitive perspective. Investigations from these theories may provide relevant findings on factors that can predict and explain users' behavioral intentions for selecting search results and their actual selection behavior.

Conclusion

The current study was aimed at determining and explaining users' selection behavior towards organic- and sponsored search results. Findings from the study showed that organic search results still outperform sponsored search results and are specifically preffered by users who are aware of the search result distinction, which are generally more frequent users of Google. More valid reasons are identified for selecting organic search results than selecting sponsored search results. Quality factors and a bias against sponsored results are the most important reasons for selecting organic results. The presentation and the source of a search result are reasons for selecting sponsored results. Reasons, search result features and the influence of awareness identified in this study extend and update the previously found factors of influence on relevance judgments, web search behavior and users' interaction with search results. Level of Google use and search result position at the top of a SERP are predictors for selecting organic- and sponsored search results respectively. From the findings of this study, guidelines can be extracted for

further optimising the presentation of search results on a SERP. Since users' selection and evaluation behavior showed a bias against sponsored results, the findings may also provide guidance for the development of sponsored result presentation and "paid search" campaigns. For example, factors like relevance, reliability and unambiguouty are important factors of influence on selection behavior which can be optimised.

Although this study introduced several interesting findings on search result selection, predictors for these selections and how search results are evaluated, a few limitations are discussed which should be taken into account for future studies. Furthermore, the findings of this study suggest that users' selection behavior may be predicted and explained from a social cognitive perspective. Additional investigations are proposed to further explore factors that may predict and explain selection behaviour towards search results.

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Appendix A Differences in selection behavior of aware users and non-aware users

	Aware users		Non-aware users
Selection behavior		***Selection behavior***	
Organic - Sponsored		*Organic - Sponsored*	
Organic	260 (74.9%) ***	Organic	184 (61.5%) ***
Sponsored	87 (25.1%)	Sponsored	115 (38.5%)
Total	347 (100%)	Total	299 (100%)
Top-sponsored vs. Side-sponsored		*Top-sponsored vs. Side-sponsored*	
Top-sponsored	58 (16.7%) **	Top-sponsored	73 (24.4%) **
Side-sponsored	29 (8.4%)	Side-sponsored	42 (14%)
Total sponsored	87 (25.1%)	Total sponsored	115 (38.5%)
Result Type		*Result Type*	
Price comparison result	159 (45.8%)	Price comparison result	157 (52.3%) *
Familiar supplier	39 (11.2%)	Familiar supplier	23 (7.7%)
Non-familiar supplier	145 (41.8%)	Non-familiar supplier	116 (38.7%)
Familiar brand	4 (1.2%)	Familiar brand	3 (1.0%)
Total	347 (100%)	Total	299 (100%)
*$p < 0.05$; **$p < 0.01$; ***$p < .001$; $N = 347$		*$p < 0.05$; **$p < 0.01$; ***$p < .001$; $N = 299$	

Appendix B Means of search result features

	Mean	SD
Search result features		
1. Position at the top of the SERP	3.62	.966
2. Position on the right on the SERP	2.80	.864
3. Repetition of query within the search result	3.51	.948
4. Bolded words in the title	3.66	.898
5. Relevant information within the summary	**4.16**	.696
6. Recognition familiar suppliers/organizations	3.44	.858
7. Terms like: "Order now!"	2.17	.893
8. Reliable information within the search result	**4.15**	.691
9. Relevant information within the search result	**4.19**	.666
10. Running well sentences within the summary	3.72	.844
11. Experience with website	3.72	.870
12. Unambiguous internet adress/URL	**4.05**	.787

Appendix C Control measures for demographics

Results of a Mann-Whitney test showed a significant difference between gender and awareness of the distinction between search results (U = 48247, p < .05). Additional Chi^2 analyses showed that there were more aware users than non-aware users among men (χ^2 (1) = 7.291, p < .01), which is presented in table 1.

Table 1. Differences between gender and awareness of the search result distinction

	Aware users	Non-aware users
Gender		
Men	182	134 **
Women	165	166

*p < 0.05; **p < 0.01; ***p < .001; N = 647

Results of a Kruskall-Wallis test showed a significant difference between age and awareness of the distinction between search results (χ^2 (2) = 59.986, p < .001). Additional Chi^2 analyses showed that least aware users were found within the age category of 46 years and older (χ^2 (1) = 45.412, p < .001), which is presented in table 2.

Table 2. Differences between age and awareness of the search result distinction

Age	**15-30 years**	**31-45 years**	**46-80 years**
Aware users	133	156	58 ***
Non-aware users	62	107	131

*p < 0.05; **p < 0.01; ***p < .001; N = 647

Results of a Cramers' V association test showed a significant positive relation between Google use and awareness or non-awareness of the distinction between search results (V = .259, p < .001). Frequencies are presented in table 3.

Table 3. Frequency analyses of Google use and awareness of the search result distinction

Google use	**Aware users**	**Non-aware users**	***Total***
1 or 2 times monthly	16	6	22
1 or 2 times weekly	67	24	41
Once a day	41	42	83
Several times a day	176	275	451
Total	300	347	647