



Provided by the author(s) and University of Galway in accordance with publisher policies. Please cite the published version when available.

Title	A study of first click behaviour and user interaction on the Google SERP
Author(s)	Barry, Chris; Lardner, Mark
Publication Date	2010
Publication Information	Barry, C., Lardner, M. (2010). A study of first click behaviour and user interaction on the Google SERP. In 19th International Conference on Information Systems Development (ISD 2010). Prague, Czech Republic, August 25 - 27, 2010.
Link to publisher's version	<a href="http://dx.doi.org/10.13025/S8159X">http://dx.doi.org/10.13025/S8159X</a>
Item record	<a href="http://hdl.handle.net/10379/5502">http://hdl.handle.net/10379/5502</a>
DOI	<a href="http://dx.doi.org/10.13025/S8159X">http://dx.doi.org/10.13025/S8159X</a>

Downloaded 2024-03-03T20:22:18Z

Some rights reserved. For more information, please see the item record link above.



# **A Study of First Click Behaviour and User Interaction on the Google SERP**

Chris Barry<sup>1</sup> and Mark Lardner<sup>2</sup>

**Abstract** Firms use Search Engine Marketing (SEM) to drive users to their Website. Some are prepared to pay for placement; others use Search Engine Optimization (SEO) hoping their result percolates up the organic SERP. Despite extensive SEM efforts, firms can only speculate over the first critical interaction between the first SERP and a user's first click. This study sheds some light on users' first click behaviour on Google and the early interaction thereafter. The research reveals that users evaluate the SERP from the top downwards, deciding instantly whether to click into each link, while first clicks are predominantly at the top of the SERP, especially towards organic links. For certain queries top sponsored links received almost as many clicks as organic links despite what users profess. Recommendations to firms include advice that strategies should be primarily SEO focused and that paid search campaigns should maintain a position in the top sponsored links section of the Google SERP.

## **1 Introduction**

Firms use search engine marketing (SEM) to drive users to their Website. There are two main strategies: paid search and search engine optimization (SEO). The two strategies are not mutually exclusive and various arguments can be made for pursuing each strategy (Barry and Charleton, 2008). Whichever SEM strategy is chosen, competition for a high search engine results page (SERP) ranking is intense. Firms can make critical decisions about SEM strategy if they have insight s

---

<sup>1</sup> Chris Barry  
National University of Ireland Galway, [chris.barry@nuigalway.ie](mailto:chris.barry@nuigalway.ie)

<sup>2</sup> Mark Lardner  
National University of Ireland Galway, [m.lardner1@nuigalway.ie](mailto:m.lardner1@nuigalway.ie)

into early user interaction. This study seeks to provide such insights on the SERP of the predominant search engine (Lewandowski, 2008), Google.

## **2 The Nature of Search Online**

Searching online refers to the input of a query (a list of one or more keywords) into the text box of a search engine followed by a list of results returned on the SERP (O'Brien & Keane, 2006). The abundance of content online makes firms ever more reliant on the search engine optimally indexing and ranking their Web pages so they are found in the earliest part of a user's interaction. Search engines determine these ranks through their own typically undisclosed ranking algorithms (Bar-Ilan, 2007). Failing to find what they want after only the first click could create negative perceptions of the search engine and the chosen Website and possible reputational damage. Furthermore, search engine algorithms are increasingly more impressed when users actually click on a link for any given query (Ciaramita, Murdock and Plachouras, 2008). It is also becoming clearer how little time users spend making judgments on the relevancy of links and how easily distracted or impatient they can be (Browne, Pitts and Wetherbe, 2007; Szetela, 2008).

A SERP consists of two main areas: the visible area and the scrolling area (Hochstotter and Lewandowski, 2009). Information that is immediately seen on a screen is the visible area of the SERP while the scrolling area must be scrolled to. In Hochstotter and Lewandowski's study the SERP links that occur 'below the fold' (i.e. links only visible when the user scrolls) are very rarely clicked upon. This increases the pressure on firms to ensure their site appears above the fold. An important characteristic of user behaviour is that very few users actually move on to the second SERP after performing a search query (Bar-Ilan, Levene, Mat-Hassan, 2006; Richardson, Dominowska and Ragno, 2007). Furthermore, a recent report found that 68% of all users concentrate their clicks on the first SERP (iProspect, 2008). This makes competition for a high ranking very intense and vulnerable to ranking fluctuation at all times.

The results that are returned by a search engine with any given query are divided into two sections; organic listings and sponsored listings (Jansen & Resnick, 2005; Jansen & Molina, 2006). Organic links are links that the search engine's algorithm deems most relevant to the query, whilst sponsored links are links that appear as a result of a party purchasing the right to be displayed on the SERP for a particular keyword (Jansen & Resnick, 2005).

Barry and Charleton (2008) report that SEM strategies are the predominant methods firms use to promote their visibility and that the primary objective of an SEM strategy is to ensure that one's site is displayed at or near the top of the first SERP. Paid search allows firms or organisations to place bids on certain keywords and hence have their advertisements displayed along side or above the organic listings as sponsored listings (Bar Ilan, 2007). The higher ranked sponsored listings

typically cost more. Payment may also be made for a click through to a Website. SEO involves altering a Web page so that it appears to be more relevant to the search engines. SEO aims to exploit search engine algorithms to attract users to specific Websites presented as organic results (Barry and Charleton, 2008). SEO is carried out by altering the aspects of the Website (such as relevant keywords in the metadata of a page) that a search engine's 'spider' is thought to explore in judging relevancy (Jones, 2008). In a recent study of Irish small to medium enterprises (SMEs), it was found that the majority of SMEs show a preference for SEO over paid search (Barry and Charleton, 2008).

One of the chief methods that Google uses to evaluate the full extent of the relevancy of a page is through a metric called 'PageRank' which helps measure the popularity of a page (Cho & Roy, 2004). The page popularity is determined by how many other Web pages link to a specific page on the Internet. A simplified example - Google will present a hyperlink at the top of its SERP if that hyperlink contains the relevant keywords in its metadata and also if that hyperlink is linked to by more external sites than other hyperlinks with similar keywords (Cho & Roy, 2004). Google uses complex algorithms to rank the results organically on the SERP. The highly optimised pages (via SEO) are those more likely to appear on the first SERP (Jones, 2008).

### **3 Evaluation of the SERP**

SERPs are presented in some form of text based summaries and based on the information contained within these summaries users make relevance judgments based on what links best suit their information needs (Jansen & Resnick, 2005; O'Brien and Keane, 2006). The question of how users evaluate the relevance of the SERP can be answered through the investigation of users' first click behaviour. First click behaviour describes "the process of when a user (a) poses a query to a search engine to fulfill some information need. (b) evaluates the results list returned to that query and (c) then chooses one of these results as a link to follow" (O'Brien, Keane and Smyth, 2006, pp1).

Klockner, Wirschum and Jameson contend users either adopt a depth-first or a breadth-first approach (2004). A depth-first approach refers to when users evaluate each entry in the list in turn, starting from the top, and deciding systematically whether to choose that link or to move onto the next consecutive link. A breadth-first approach is where a user looks ahead at a number of list entries and then revisits the most promising ones in order to open them. In an eye tracking study conducted by Klockner et al (2004), 65% of participants utilised the depth-first approach with the remaining participants adopting a fully or sometimes partially breadth-first approach.

Keane, O'Brien and Smyth (2008) showed that users do have a tendency to choose results at the top rather than results down the bottom of a list, but this ten-

dency will not be as prevalent when the relevancy of the top result is weakened. Joachims, Granka, Pan, Hembrooke and Gay (2005) contend that users' trust in the search engine mean links ranked first received many more clicks than the following link and also that the top two links received more attention than the rest of the SERP. Opinions are divided as to whether a click on a link is representative as a vote of relevance. Joachims et al (2005) believe that a click on a hyperlink from a user on the SERP is representative of an endorsement of that page. On the other hand, Ciaramita et al (2008) believe that clicks on particular links are not an indication of absolute relevance, but only indicates that the clicked item is perceived to be more relevant than other links that were ranked elsewhere but not actually clicked.

While users have been shown to examine both organic and sponsored listings, organic links are ultimately perceived as being more relevant (Jansen, Brown and Resnick, 2007), even if sponsored links are reported to be just as relevant as organic links (Jansen and Resnick, 2006). Laffey also shows that with Google specifically, users are more likely to click on organic links, rather than sponsored links (2007). Users have also expressed negative emotional reactions to sponsored search listings (Marable, 2003). Most search engines including Google have a vested interest in hoping that sponsored search has a future since their business model depends significantly on it. Previous research also emphasises the importance of appearing high in the rankings for sponsored listings (Richardson et al, 2007).

Queries are often divided into transactional, informational and navigational queries. Informational queries are queries seeking images, songs, videos or documents while transactional ones are queries with a commercial motive (purchasing a specific product or service) and navigational-based queries are entered to take users to a specific URL (Jansen, Booth and Spink, 2008). Previous studies have shown that the majority of users use search engines to find out specific pieces of information or to ask questions (Rose and Levinson, 2004; Zhang, Jansen and Spink, 2009). Jansen et al provided some useful insights into user perception of sponsored and organic links for transactional queries (2007): sponsored links are likely to be more relevant than organic links for e-commerce queries; top listed sponsored links are more relevant than side sponsored; and the rank of side-sponsored links are not correlated with the relevance of sponsored links. A recent study showed that 80% of Web search queries are predominantly informational with the remaining 20% of queries split between navigational based and transactional-based queries (Jansen et al, 2008).

## **4 Research Objectives and Methodology**

Despite extensive SEM efforts, firms can only speculate about the first critical interaction between the return of the first SERP and a user's first click. Thus the

main objective of the study is an investigation of how Web searchers perceive and interact with the Google SERP for informational and transactional queries from a first click behavioural perspective. Secondary objectives are: to explore the nature of user's link assessment strategy for both informational and transactional queries; to reveal how favourably users view organic versus sponsored links; and to identify where, within the Google SERP, are first clicks most concentrated.

In order to reveal a rich picture, both quantitative and qualitative research methods were used. Three research techniques were used: verbal protocols, interviews and Web based questionnaires. Verbal or 'think aloud' protocols refer to the practice of collecting data by getting participants to think aloud as they partake in a set of specific tasks (Crutcher, 1994). Verbal protocols were used to examine how users perceived and interacted with the Google SERP from a first click behaviour perspective, interviews to examine in more detail the issues and concerns arising from the verbal protocol sessions, and Web based questionnaires were administered in order to capture necessary participant demographics. Each participant, under controlled laboratory conditions, was asked to respond to the most common types of Google searches - one using an informational query and another using a transactional query (Jansen et al, 2008). These types of queries were used since research shows that they are the two most common types of queries (Zhang, Jansen and Spink, 2009). Both tasks were very specific, achievable and easy to explain to a novice user. All verbalisations and on screen behaviour (e.g., clicks, scrolling, mouse movements) were recorded by an open source computer programme called 'CamStudio'. The combination of verbal protocols with a simultaneous recording of on-screen activities has shown to be a valuable observational method, previously used by Van Waes (1998). For the study, a convenience sample of twenty participants was used.

## **5 Research Findings**

### ***5.1 Link Assessment Strategy Analysis***

A variant of the depth and breadth-first approaches of Klockner et al (2004) to analyse first click behaviour was used. This more sophisticated analysis identifies usage patterns that characterise each approach and combines verbalised thoughts to more fully understand user behaviour. These patterns are identified in Table 1 below and represented in Figure 1.

In the informational query sessions, the variant depth-first approach was significantly more evident with 17 out of the 20 participants characteristically using it, without any scrolling action before the first click. Each first click was on the first

organic link and verbalisations made in tandem with the first clicks included: “...guess I should go for the first one” and “First up is Wikipedia which I usually use. I’m going to try that one first”. There was little hesitation and behaviour was hurried. The action appeared a somewhat automated response, entrusting the first result on the SERP with a confident assertion of relevancy. Depth-first was also more common for the transactional session with 13 participants utilising the approach. Depth-first approaches came in a mix of sequential and non-sequential click-through patterns on the SERP. Some participants evaluated the list sequentially, e.g. “...I’m going to go down to the next ones...there’s Amazon (scroll), Play (scroll), there’s a Dublin one so I’m going to go for that one”. Other depth-first instances were more instantaneous “...Amazon is the first one I’m going to”. While search sessions did take longer for participants to complete than for the informational query, the hurried depth-first approach was still more regular.

**Table 1** Usage Patterns of Link Assessment Approaches

<b>Link Assessment Approach</b>	
<b>Variant Depth-First</b>	<b>Variant Breadth-First</b>
<p><b>Characterised by:</b></p> <p>An immediate first click without any partial/full scroll</p> <p>Sequential/non-sequential click-through pattern starting from top to bottom of SERP</p> <p>Verbalisations (e.g. “First thing I’ll do is click the top one”)</p> <p>Behaviour appears more impatient and rushed</p>	<p><b>Characterised by:</b></p> <p>First click being preceded by partial or full scroll through SERP (Then a retreat up the SERP)</p> <p>Participant placing cursor over one or more links momentarily before retreating up the SERP for first click</p> <p>Verbalisations (e.g. “I’ll just look through the list first to see what else there is...”)</p> <p>Behaviour appears more thorough and aware</p>

Overall, instances of breadth-first search were far fewer for both the informational and transactional sessions. Only three participants exhibited the breadth-first approach for the informational search. One participant performed a partial scroll of the SERP before returning to the top link, stating: “...Wikipedia is your best bet”. The lack of a breadth-first strategy when informational searching online could be indicative of impatience, consistent with suggestions of Browne et al (2007) and Szetela (2008) above. There were notably more breadth-first usage for the transactional query. Breadth-first search is exhibited through the following illustrative verbalisations: (a) “I’m scrolling down to see if there is any link that immediately catches my eye...”; (b) “I’m going to scroll down to see if there is anything else that looks good before I click into that. There’s lots of reviews and stuff, not looking for that. I’m going to go for Amazon.com”; and (c) “OK, any of

these I recognise? Don't know if they're good...hmmm... (Scrolls to bottom). See do I recognise any first before I move on...". Another participant displayed signs of breadth-first search by musing "E-bay, Amazon (third top sponsored and first organic links respectively) kind of stick out to me anyway...sure I'll look at the first one...".

**Fig. 1** First Click Behaviour: Incidence of Depth-First and Breadth-First Link Assessment Strategies

☹ = One Participant	Informational (Query)	Transactional (Query)
<b>Depth-First</b> (Link Assessment)	☹☹☹☹☹☹ ☹☹☹☹☹☹ ☹☹☹☹☹	☹☹☹☹☹☹ ☹☹☹☹☹☹ ☹
<b>Partial/Full Breadth-First</b> (Link Assessment)	☹☹☹	☹☹☹☹☹☹ ☹

These combined results show that most participants (75%) are not prepared to pour over the entire SERP in detail, instead preferring to adopt a more hurried depth-first approach whereby the user makes more spontaneous and rushed judgments when deciding where to click first. This finding also correlates with the study by Klockner et al (2004) who found that the depth-first approach was used 65% of the time, with the remaining users adopting a breadth-first search.

## 5.2 User Perceptions of Organic and Sponsored Links

The click data collected from the verbal protocol sessions produced some interesting results. As mentioned above all participants chose the top organic link as their first click for the informational query. In the absence of sponsored links, participants tend to gravitate towards the first organic link, irrespective of the link assessment strategy. Of all the first clicks carried out on the transactional session 11 (55%) of the first clicks were on organic links, confirming a disposition towards the use of organic links (Laffey, 2007). In this case, the first organic link received the most clicks.

Anomalously, despite nine participants (45%) choosing a sponsored link as a first click, verbalisations and post-test feedback indicated that sponsored links are not deemed relevant. One participant suggested that the sponsored links are automatically ignored: "...your train of thought is to automatically go to the first link up here below the sponsored links". Other verbalisations also show an explicit disregard for sponsored links: "...they're sponsored links. I never go for them, so I'm

*going to go down to the next ones*". Sponsored links were also being viewed as having "...catches in them." and not being "...your best bet for getting a deal", almost a hindrance. This view concurs with the finding of Jansen et al (2007) that stated that there were no strong relevance correlations with sponsored links. Conceivably, the anomaly might be explained by some confusing the organic and sponsored areas. A number of participants did not seem to distinguish the top sponsored links section as being separate to the organic links with one participant referring to the first organic link as the "...fourth one on the list". Another participant expressed difficulty differentiating between organic and sponsored links.

In contrast, organic links are viewed far more favourably, described by one as the "...normal area...", another commenting "*I'd prefer to use the non sponsored links because they're more impartial...*". Consistent with other studies participants appeared to find organic links more relevant than sponsored links (Hotchkiss et al, 2004; Jansen and Resnick, 2005; Jansen and Molina, 2006; Jansen et al, 2007).

The actual search engine behaviour of users and the comments in the post-test interview, that somewhat contradict their previous action, could be explained by the concepts of espoused theory and theory-in-use (Argyris, 1980). It may be the case that users overtly subscribe to some notion of the purity of organic search (espoused theory), but in the hurried world of online search, they are often prepared to compromise by utilising all available links (theory-in-use).

All first clicks were concentrated entirely on top sponsored links rather than right-hand sponsored links. This correlates with research from Jansen et al (2007) that found no real relevance correlation with right-hand sponsored links. This finding is also backed up with a remark from one participant who noticed that one link in the right-hand sponsored section was a dating site as opposed to an e-commerce based site for DVDs. Right-hand sponsored links received far more negative attention than top sponsored links throughout the transactional session. They were described as "...just advertisements that I don't want to be wasting my time checking" and "...untrustworthy...". Another participant remarked dismissively that "...if they were any good they would be in the main search".

### ***5.3 First Click Distribution on the SERP***

For the informational query all participants' first clicks were carried out on the first organic link. This finding is consistent with previous research where it was found that links ranked first in the SERP, received many more clicks than the following link on the SERP (Joachims et al, 2005). The same research also found that users pay most attention to the first and second links on the SERP.

In respect of transactional queries, 95% of all first clicks occurred between the top sponsored link and the third organic link (within the visible area of the SERP), again consistent with Joachims et al (2005). The pattern between these links is that the first top sponsored link received four more first clicks than the next link and the first organic link received five more first clicks than the following organic

link. This emphasises the importance of ensuring that SEO secures a place in the 'visible' area of the screen (Hochstotter and Lewandowski, 2009).

Verbalisations from the interviews also reveal a tendency to gravitate towards the top links on the SERP. *"I usually just go to the one on the top of the page...if it doesn't suit me I just go next one down"*. Some participants display a lack of patience when describing their online search habits: *"If I don't get it, at a push, in the first five links, more often than not I just give up, I just go and type in something else"*, consistent with the notion that it only takes one second for a user to make a relevancy judgment (Szetela, 2008). The apparent urge shown by participants here to act quickly on the SERP and then refine the query if no relevancy is found at the top demonstrates that users are becoming increasingly dissatisfied with the search engine, the longer the time they spend on it (Browne et al, 2007). Participants did seem to possess an explicit trust in the top half of the SERP: *"...even if you're not sure what you're looking for, you assume that the first result will be relevant"*; *"The first one that comes up is usually the most relevant"*; *"generally I will click on the top few"*. Verbalisations like these suggest that SEO strategies must be focused on a high SERP ranking if they are to have any chance of winning the race for that first click. These findings and verbalisations also tie in with previous research on this topic, that conclude that users have a tendency to concentrate mainly on the top part of the SERP whilst paying significantly less attention to the bottom part (O'Brien and Keane, 2006; Ciaramita et al, 2008; Keane et al, 2008).

## 6 Conclusions

In light of the above findings and from an SEM perspective, companies would be advised to make the achievement of a high-ranking position on the Google SERP the primary objective of their SEM strategy. The findings demonstrate that companies are at a distinct disadvantage if their link does not appear in the visible area of the Google SERP. This distribution towards the top is also noted in other studies (Richardson et al, 2007; Keane et al, 2008). If it is accepted that users place more trust in the top two links (Joachims et al 2005), users who utilise a depth-first approach will execute that vital first click on the top part of the SERP. Therefore, SEM strategies should work under the assumption that users assess the SERP using the depth-first approach. SEM strategists should therefore take all steps necessary (on site optimization and paid search campaigns) to ensure that their site appears and stays in a high-ranking position on the Google SERP in order to increase traffic to their site. Exploiting PageRank is key to achieving this strategy. In this regard, Google could assist firms by offering more clarity on the reasons why a link is on top of the SERP.

SEO specialists should also ensure that users who click through to their link on the SERP are greeted with a landing page that meets the needs of the user and cor-

relates sufficiently with the apparent relevancy of the SERP link. This is critical so that users do not feel compelled to navigate back to the SERP and click into a rival site (Todd, 2006; Szetela, 2008). Sites not ranked highly on the Google SERP that are effectively less ‘popular’ need to design their SEO strategy that views the first Google SERP as a highly competitive market where the onus is on the lower ranked sites to justify and demonstrate to Google why their sites should be placed at a higher ranking. This can be achieved if an SEO-focused SEM strategy is designed to encompass as many of the reported factors Google use to determine relevancy with special attention given to the PageRank metric. To achieve this, a company needs skilled individuals to ethically implement continuous SEO throughout the Web site.

**Table 2** Behavioural Observations from Query Sessions and Verbalisations

	<b>Informational (Query)</b>	<b>Transactional (Query)</b>
<b>Organic (Links)</b>	<ul style="list-style-type: none"> <li>• Heavily distributed on the top of the organic SERP</li> <li>• Deliberate depth-first approach recurrent</li> <li>• SERP was quickly processed</li> <li>• Participants more relaxed</li> </ul>	<ul style="list-style-type: none"> <li>• Heavily distributed on the 1<sup>st</sup> and 2<sup>nd</sup> link</li> <li>• A less deliberate depth-first strategy recurrent</li> <li>• SERP processing was much slower</li> <li>• Greater awareness evident</li> </ul>
<b>Sponsored (Links)</b>	N/A	<ul style="list-style-type: none"> <li>• Heavily distributed on the 1<sup>st</sup> and 2<sup>nd</sup> link</li> <li>• Participant cynicism was evident</li> <li>• Greater anger/frustration exhibited</li> <li>• Less confidence shown in sponsored links</li> </ul>

Table 2 summarises the general behavioural observations that were exhibited throughout the query sessions in respect of: link assessment strategy; user perceptions of organic and sponsored links; and the distribution of first click behaviour. It shows that participants utilised a depth-first approach for each query, however the depth-first approach appeared less deliberate for the transactional query than the informational query as users exhibited heightened awareness when perusing the SERP and processed it more slowly. Sponsored links elicited a far more cynical and negative reaction from participants overall.

Again, from an SEM perspective, companies should be aware of the implications emerging from this research. This study found some preference for clicking on organic over sponsored links. Furthermore, from verbalisations, participants expressed less faith, at times outright distrust, in sponsored links. In considering a

paid search campaign, this study has shown that first click behaviour is carried out wholly on the top sponsored links. Choosing right-hand side sponsored links would appear a near-redundant investment. The anomaly between verbalisations about sponsored links and actual usage patterns is of concern. Some participants appeared confused or uncertain regarding the actual authenticity and purpose of the top sponsored links. While the findings put forward a possible benign explanation about how people theorise they will behave in an espoused theory may differ from how they behave in practice, their theory-in-use, the issue is primarily one for Google to resolve by making more explicit the distinction for users.

## References

- Argyris, C. (1980). *Inner Contradictions of Rigorous Research*. Academic Press, New York, NY.
- Bar-Ilan, J., M. Levene & M. Mat-Hassan. (2006). Methods for Evaluating Dynamic Changes in Search Engine Rankings: a Case Study. *Journal of Documentation*, 62(6), 708-729.
- Bar-Ilan, J. (2007). Manipulating Search Engine Algorithms: the case of Google. *Journal of Information, Communication and Ethics in Society*, 5(2/3), 155-166.
- Barry, C. & D. Charleton. (2008). Researching Search – A Study into Search Engine Marketing Practices in Ireland. In *Proceedings of the International Conference on e-Business*, Porto, Portugal. 26-29 July 2008, (CD-ROM).
- Browne, G. J., M. G. Pitts & J. C. Wetherbe. (2007). Cognitive Stopping Rules for Terminating Information Search in Online Tasks. *MIS Quarterly*, (31), 89-104.
- Cho, J. & S. Roy. (2004). Impact of Search Engines on Page Popularity. In *Proceedings of the 13<sup>th</sup> International World Wide Web Conference*, New York, USA, May 17-20, 2004. ACM Press, 20-29.
- Ciaramita, M., V. Murdock & V. Plachouras. (2008). Online Learning from Click Data for Sponsored Search. In *Proceedings of World Wide Web Conference*. Beijing, China, 2008, 17-22 May, New York, USA, 227-236.
- Crutcher, R. (1994). Telling What We Know: The Use of Verbal Report Methodologies in Psychological Research. *Psychological Science*, 5(5), 241-244.
- Hochstotter, N. & D. Lewandowski. (2009). What Users see – Structures in Search Engine Results Pages. *Information Sciences*, 179(12), 1796-1812.
- Hotchkiss, G., M. Garrison, & S. Jensen. (2004). Search Engine Usage in North America. [Internet] Accessed: 1<sup>st</sup> December 2008 on the World Wide Web at <http://www.enquiro.com/research.asp>
- iProspect (2008). “Search Engine Marketing Research: iProspect Blended Search Results Study” [Internet] Accessed: 1<sup>st</sup> June 2009 at [http://www.iprospect.com/about/researchstudy\\_2008\\_blendedsearchresults.htm](http://www.iprospect.com/about/researchstudy_2008_blendedsearchresults.htm).
- Jansen, B.J. & M. Resnick. (2005). Examining Searcher Perceptions of and Interactions with Sponsored Results. In *the Workshop on Sponsored Search Auctions at ACM Conference on Electronic Commerce (EC'05)*, 5-8 June, Vancouver, BC, Canada, 1-8.

- Jansen, B.J. & A. Spink. (2005). An Analysis of Web Searching by European AlltheWeb.com Users. *Information Processing & Management*, 41, 361-381.
- Jansen, B.J. & P. R. Molina. (2006). The Effectiveness of Web Search Engines for Retrieving Relevant Ecommerce Links. *Information Processing & Management*, 42, 1075-1098.
- Jansen, B. (2007). The Comparative Effectiveness of Sponsored and Non-sponsored Links for Web E-commerce Queries. *ACM Transactions on the Web*, (1)1, 1-25.
- Jansen, B.J., A. Brown & M. Resnick. (2007). Factors relating to the Decision to Click-on a Sponsored Link. *Decision Support Systems*, 44(1), 46-59.
- Jansen, B. J., D.L Booth & A. Spink. (2008). Determining the Informational, Navigational, and Transactional intent of Web Queries. *Information Processing & Management*, 44, 1251-1266.
- Joachims, T., L.Granka, B.Pan, H. Hembrooke, & G. Gay. (2005). Accurately Interpreting Clickthrough Data as Implicit Feedback. In *Proceedings of the 28<sup>th</sup> International Conference on Research and Development in Information Retrieval*, Salvador, Brazil, 15-19 August, SIGIR '05, ACM, New York, NY, 154-161.
- Jones, R. (2008). SEO Site Structure 101. [Internet] Accessed: 22<sup>nd</sup> December 2008 at <http://searchenginewatch.com/3632183>
- Keane, M. T., M. O'Brien & B. Smyth. (2008) Are People Biased in Their Use of Search Engines? *Communications of the ACM*, 51, 49-52.
- Klößner, K., N. Wirschum & A. Jameson. (2004). Depth and Breadth-first Processing of Search Results List. In *CHI '04 Extended Abstracts on Human Factors in Computing Systems*, Vienna, Austria, April 24-29, CHI '04. ACM, NY, 1539-1539.
- Laffey, D. (2007) Paid Search: The Innovation That Changed The Web. *Business Horizons*, 50, 211-218.
- Lewandowski, D. (2008). The Retrieval Effectiveness of Web Search Engines. Considering Results Descriptions. *Journal of Documentation*, 64(6), 915-937.
- Marable, L. (2003). False Oracles: Consumer Reaction to Learning the Truth About How Search Engines Work, Results of an Ethnographic Study, *Consumer WebWatch*, Research Report.
- O'Brien, M., M. T. Keane & B. Smyth. (2006). Predictive Modelling of First-Click Behaviour in Web-Search. In *Proceedings of the 15<sup>th</sup> international Conference on World Wide Web*, Edinburgh, Scotland, May 23-26, ACM, NY, 1031-1032.
- Richardson, M., E. Dominowska, R. Ragno. (2007). Predicting Clicks: Estimating the Click-Through Rate for New Ads. In *Proceedings of the 16<sup>th</sup> Intl Conference on World Wide Web*, Banff, Alberta, Canada, May 08-12, ACM, NY, 521-530.
- Szetela, D. (2008). PPC Landing Pages: PPC Visitors have ADD Accessed: 19<sup>th</sup> December 2008 at <http://searchenginewatch.com/3632150>
- Todd, M. (2006). Getting High Traffic from Search Engines is Wasted on Poor Sites. *New Media Age*, June 29, 15-15.
- Van Waes, L. (1998). Evaluating On-line and Off-line Searching Behavior Using Thinking-Aloud Protocols to Detect Navigation Barriers. In *Proceedings of the 16<sup>th</sup> Annual international Conference on Computer Documentation*, Quebec, September 1998, 180-183.
- Zhang, Y., B. J. Jansen & A. Spink. (2009). Time Series Analysis of a Web Search Engine Transaction Log. *Information Processing and Management*, 45(2), 230-245.