Understanding the method that consumers use to sample through alternatives is paramount to correctly estimating their preference and search cost parameters. Identifying consumers’ search method has been the subject of two recent papers (De los Santos et al. 2012; Honka and Chintagunta, 2014). Both of these papers find that the simultaneous search model more accurately describes consumers’ search patterns. Advantages, such as avoiding unnecessary costs of over investment in information, make sequential search dominate simultaneous search. Nevertheless, the sequential search method may be suboptimal when the consumer is time constrained. These tradeoffs suggest that a better search method exists that dominates both simultaneous and sequential search. Morgan and Manning (1985) present exactly such a model of optimal search. Under the optimal search rule, consumers choose both the number of firms to search at each stage and when to stop searching. Simultaneous search is a special case of this model when the consumer chooses how many firms to sample in only one stage, after which she stops searching. Sequential search is also a special case when the consumer only chooses when to stop searching, sampling one alternative at each stage. With data on several stages/ phases in which the consumer searches, it is possible to test whether consumers are using the optimal search rule. In fact, empirical evidence exists that consumers search in phases: Blake, Nosko and Tadelis (2015) look at consumers searching on eBay and find that consumers do not do all their search in one phase, but narrow down their search as they approach a purchase, consistent with the optimal search rule of Morgan and Manning (1985).

In this paper, I use data on consumer online browsing to test whether consumers search according to the model proposed by Morgan and Manning (1985). From preliminary analysis using comScore data on consumers searching for products in the apparel category, I find evidence of consumers searching in phases. In Figure[I] I plot the date and frequency with which consumers make a search within this category. What is immediately evident is that consumers visit a website in this category several times on the same day or on subsequent days. This period is then followed by a gap in their search activity, with larger gaps prevalent after a transaction. Search may then
resume in a number of days or weeks. The observation that gaps in search activity follow intense periods of visits to a website is consistent with consumers searching using the optimal search strategy described by Morgan and Manning (1985).

Figure 1: Number of visits per day for four types of consumers. From left two right: a consumer who makes zero transactions, a consumer who makes two transactions, a consumer who makes three transactions, and a consumer who makes ten transactions.

My first test of whether consumers search using the optimal search rule will focus on the differential dependence of search decisions on the characteristics observed within from across phases. More precisely, under the sequential search model, the number of searches that consumers perform depends on the characteristics of the products sampled previously. In contrast, under the simultaneous search model, the search set size is independent of the number and characteristics of products previously observed (Test 2 in De los Santos et al. 2012). However, under the optimal search rule, the search set size in a given phase depends only on the characteristics of the products sampled in previous phases, not in the current phase. This observation provides the basis for my first test of the optimal search rule.

**Test 1:** Under the optimal search rule, the number of searches performed by a consumer in a certain phase depends only on the characteristics of the products observed in previous phases.
1 References


