

# Analyzing Search Engine Manipulation Campaigns

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## Extended Abstract

Understanding online crime from an economic and operational standpoint has become a key to trying to turn the tide. I will describe two measurement studies that we have conducted to that effect over the past year and a half, and that evidence that miscreants are increasingly focusing their efforts on search-engine manipulation.

I will first describe an investigation of how web search results are manipulated to promote the unauthorized sale of prescription drugs. I will focus on a particular attack where high-ranking websites are compromised to dynamically redirect users to different pharmacies depending on the particular search terms used. Based on our collection of nine months worth of results returned daily by over 200 different queries, I will offer several insights into the nature and dynamics of this form of search engine manipulation, and into the online trade of prescription drugs in general. In particular, I will show that search engine manipulation appears considerably much more efficient for attackers than traditional advertising vectors (e.g., spam).

Second, I will present a study of the abuse of "trending" search terms, in which miscreants place links to malware-distributing or ad-filled web sites in web search and Twitter results. I will show how we build an economic model informed by our measurements and conclude that ad-filled sites and malware distribution may be economic substitutes. Finally, because our measurement interval spans February 2011, when Google announced changes to its ranking algorithm to root out low-quality sites, I will show how we can assess the impact of search-engine intervention on the profits miscreants can achieve.