

# “How many zombies do you know?” Using indirect survey methods to measure alien attacks and outbreaks of the undead

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## Abstract

The zombie menace has so far been studied only qualitatively or through the use of mathematical models without empirical content. We propose to use a new tool in survey research to allow zombies to be studied indirectly without risk to the interviewers.

## 1 Introduction

Zombification is a serious public-health and public-safety concern (Romero, 1968, 1978) but is difficult to study using traditional survey methods. Zombies are believed to have very low rates of telephone usage and in any case may be reluctant to identify themselves as such to a researcher. Face-to-face surveying involves too much risk to the interviewers, and internet surveys, although they originally were believed to have much promise, have recently had to be abandoned in this area because of the potential for zombie infection via computer virus.

In the absence of hard data, zombie researchers<sup>1</sup> have studied outbreaks and their dynamics using differential equation models (Munz et al., 2009, Lakeland, 2010) and, more recently, agent-based models (Messer, 2010). Figure 1 shows an example of such work.

But mathematical models are not enough. We need data.

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†Not really.

<sup>1</sup>By “zombie researchers,” we are talking about people who research zombies. We are not for a moment suggesting that these researchers are *themselves* zombies. Just to be on the safe side, however, we have conducted all our interactions with these scientists via mail.

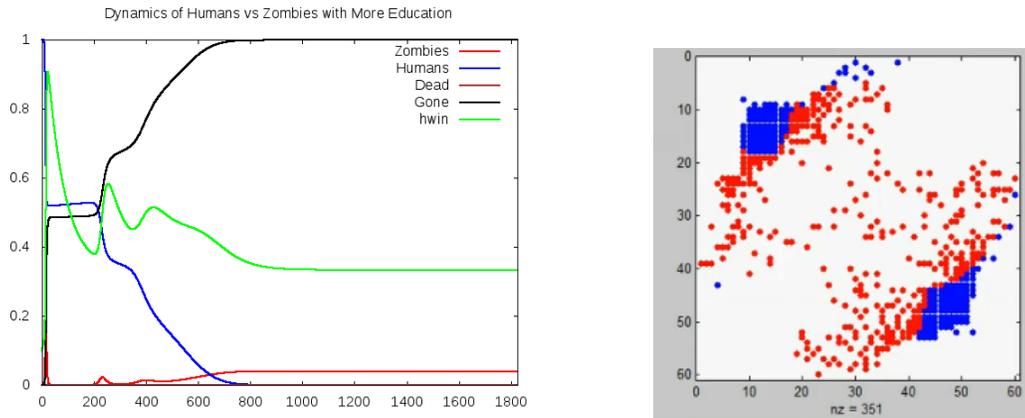


Figure 1: From Lakeland (2010) and Messer (2010). There were other zombie graphs at these sites, but these were the coolest.

## 2 Measuring zombification using network survey data

Zheng, Salganik, and Gelman (2006) discuss how to learn about groups that are not directly sampled in a survey. The basic idea is to ask respondents questions such as, “How many people do you know named Stephen/Margaret/etc.” to learn the sizes of their social networks, questions such as “How many lawyers/teachers/police officers/etc. do you know,” to learn about the properties of these networks, and questions such as “How many prisoners do you know” to learn about groups that are hard to reach in a sample survey. Zheng et al. report that, on average, each respondent knows 750 people; thus, a survey of 1500 Americans can give us indirect information on about a million people.

This methodology should be directly applicable to zombies or, for that matter, ghosts, aliens, angels, and other hard-to-reach entities. In addition to giving us estimates of the populations of these groups, we can also learn, through national surveys, where they are more prevalent (as measured by the residences of the people who know them), and who is more likely to know them.

A natural concern in this research is potential underreporting; for example, what if your wife<sup>2</sup> is actually a zombie or an alien and you are not aware of the fact. This

<sup>2</sup>Here we are choosing a completely arbitrary example with absolutely no implications about our marriages or those of anyone we know.

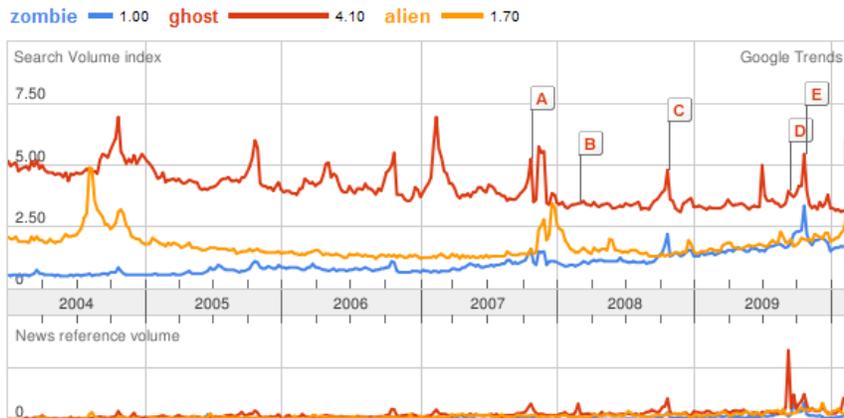


Figure 2: Google Trends report on “zombie,” “ghost,” and “alien.” The patterns show fascinating trends from which, we feel, much could be learned if resources were made available to us in the form of a sizable research grant from the Department of Defense, Department of Homeland Security, or a major film studio. Please make out any checks to the first author or deposit directly to his PayPal account.

bias can be corrected via extrapolation using the estimates of different populations with varying levels of reporting error; Zheng et al. (2006) discuss in the context of questions ranging from names (essentially no reporting error) to medical conditions such as diabetes and HIV that are often hidden.

### 3 Discussion

As Lakeland (2010) puts it, “Clearly, Hollywood plays a vital role in educating the public about the proper response to zombie infestation.” In this article we have discussed how modern survey methods based on social networks can help us estimate the size of the problem.

Other, related, approaches are worth studying too. Social researchers have recently used Google Trends to study hard-to-measure trends using search volume (Askitas and Zimmerman, 2009, Goel, Hofman, et al., 2010); Figure 2 illustrates how this might be done in the zombie context. It would also make sense to take advantage of social networking tools such as Facebook (Goel, Mason, et al., 2010) and more zombie-specific sites such as ZDate. We envision vast unfolding vistas of funding in this area.

## 4 Technical note

We originally wrote this article in Word, but then we converted it to Latex to make it look more like science.

## 5 References

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