



Rise of the Undead: The science of zombies

What is it about zombies that fascinate people? The latest zombie movie, [“World War Z” \(WWZ\)](#), opened to nearly USD 112 million in total ticket sales worldwide. WWZ is another addition to the long list of zombie movies that includes the first zombie movie in 1919.



Why are zombies becoming increasingly popular? And can zombies possibly exist? (photo from Yuya Shino/Reuters)

What is a common feature in perhaps all zombie movies is zombie infection is not limited to just a few people. Instead, the infection spreads quickly, soon overwhelming an entire city, nation, and even the whole world. Zombies have an inherent predisposition to spread their infection, and they do this by going on a nationwide spree of mass killings. Always attacking in numbers. Never resting unless after exhausting all supplies of fresh meat in the immediate vicinity.



The opening success of World War Z the movie starring Brad Pitt highlights the growing interest of zombies in popular culture

In the beginning, zombies moved painfully slow and clumsily. We could run circles around these lumbering idiots. Zombies were deadly only in packs or when they sneaked up behind you (because they creep up slowly and thus quietly). But zombies soon evolved by getting a major adrenaline boost ever since the movie ["28 Days Later"](#), where zombies now ran at you like a runaway train. Today, zombies not only moved fast but also have a killing tenacity and ferocity of herds of amok wildebeests on steroids. Bullets and bombs could decimate these zombies but only to be replaced by seemingly endless supply of more zombies. Armies and police are soon overrun by hordes of zombies, as so well depicted in WWZ.



The protagonist, Jim (played by Alex Palmer), wanders in bewilderment the empty streets of London, oblivious that the city has been decimated by zombies in the 2002 movie "28 Days Later". Since this movie, zombies are shown to move very quickly, heightening the scare and shock.

Zombies are not limited just in movies. They appear in books, comics, and computer games (heard of “Plants vs. Zombies”?). There is even now a successful TV series on zombies, [“The Walking Dead”](#).

There is now talk by sociologists about the rise of the zombie culture. For instance, in some cities like Tokyo, Paris, Prague, Berlin, Sydney, and Tel Aviv, people perform the [“Zombie Walk”](#) where they make up and dress up like zombies and walk en masse along the streets, much to the surprise and amusement of the normal, non-zombie people.



Zombie Walk in Tokyo
(photo from Yuya Shino/Reuters)



Zombie Walk in Prague (photo from David W. Cherny/Reuters)



Zombie Walk in Sydney (photo from Getty Images)



Zombie Walk in Berlin (photo from Sean Gallup)



Zombie Walk in Paris (photo from pariszombie.com)

But why is the zombie culture gaining popularity? [Asst. Prof. Sarah Lauro](#) from Clemson University, South Carolina suggests that people who like zombies are those who are dissatisfied over the government and life in general. Lauro exerts that in times of economic crises when the vast population is feeling

disempowered, people either play dead themselves or watch a show like “Walking Dead” which provide an outlet for people. Zombies could be a form an escapism for some people, but zombies could also denote larger problems in a society.

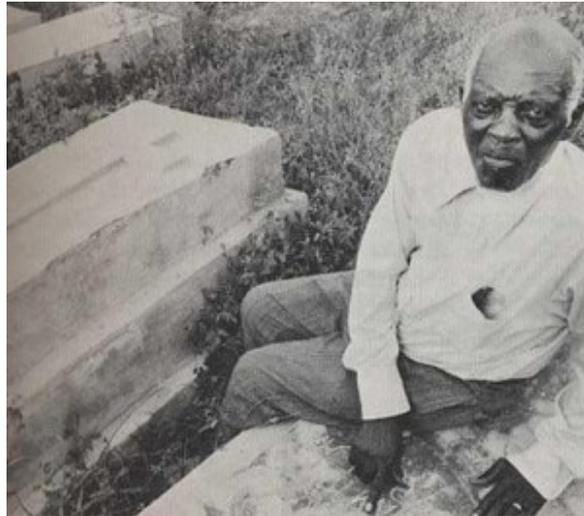
It is in Haiti where stories about the walking undead originate. [Voodoo](#) is widely practised in Haiti, and the voodoo practice for zombification (the process of turning someone into a zombie) is sometimes practised as a way to keep a “problematic” person in order. Zombification can be regarded as a revenge or punishment method against your enemies, so instead of killing your enemies, you turn them into zombies.



Haiti is a country from where voodoo and zombies originate (photo from nationalgeographic.com)

But can the dead really rise? Is there any scientific basis on zombies? In what is the most well documented evidence of zombies is the case about a Haitian man named [Clairvius Narcisse](#).

In May 1962, Clairvius was declared dead by doctors in an American hospital in Haiti. Clairvius had arrived at the hospital, complaining about severe fever, body aches, and vomiting. Upon hearing his death, Clairvius’s sister collected his body and had him buried. But in 1981, a man approached this sister and introduced himself as the woman’s brother, Clairvius, using a name that only she and a few of her family members knew. The man said he had been made into a zombie and forced to work in a plantation until his zombie master died. Extensive psychiatric tests later confirmed that this man was indeed the woman’s brother, Clairvius Narcisse. Perhaps something Clairvius had contracted made him appear to be dead. What could it be?



In Haiti, Clairvius Narcisse was declared dead but awoke as a zombie slave (photo from kreyolicious.com)

In 1982, Canadian anthropologist, [Wade Davis](#), travelled to Haiti to learn more about the zombification process. There he learned that zombification involved several steps. One of which is subtly feeding someone, through the skin, a very powerful potion made up of several toxins such as that extracted from puffer fish, *Bufo marinus* (a toad species), and *Albizia lebeck* (a plant species). This so-called zombie potion is given to the intended victim to induce hallucinations and ultimately, enter into a pseudo-death state.

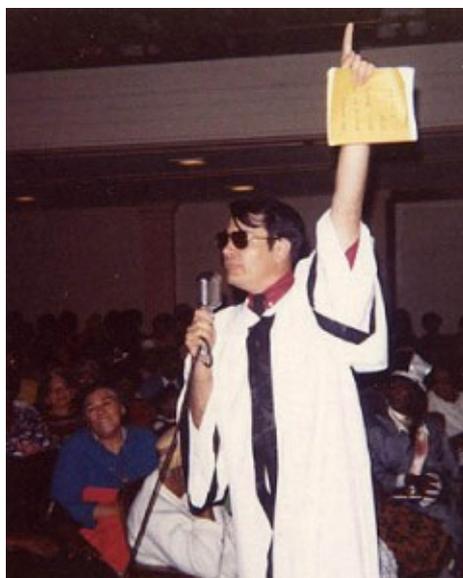


Deadly toxin from the puffer fish is one ingredient in the zombie potion (photo from nationalgeographic.com)

But pseudo-death by poisoning is only one step of the zombification process. The

buried victim would have to be dug up and psychologically and physically tortured into submission. Some believe intense hypnosis is used as one way to convert a person into mindless submission of a docile zombie. But the power of hypnosis is limited. Using hypnosis to order someone who is law-abiding (or strongly religious) to commit murder, for instance, would fail because murder would be in strong opposition to the person's beliefs or moral principles. In other words, the pre-requisite of turning someone into a zombie is the victims must themselves first believe that zombies can be created. Thus, in Haiti, where there already exists an environment of voodoo and supernatural belief, including the belief of zombies, it is easier to use hypnosis as a body and mind control method for convincing a victim that he-or-she is now a zombie.

Mind control is not as far fetched as some might think. Charismatic leaders in politics and religious cults, such as [Adolf Hitler](#) and [Reverend Jim Jones](#), are well known to be able to exert their influence over hundreds of people and even over the entire country. Rev. Jim Jones, for instance, had such powerful control over his followers that upon his demand, over 900 of his followers committed mass suicide in Guyana in 1978.



Charismatic cult leader, Rev. Jim Jones, wields powerful mind control over his followers (photo from [news365today.com](#))



Over 900 followers of Rev Jim Jones committed suicide upon his demand. Do not underestimate the power of mind control by charismatic people (photo from Associated Press)

The dead do not just rise in Haiti. In Columbia, a woman who had been declared dead (due to a heart attack) suddenly awoke during her funeral service. Lazarus syndrome is a condition given to describe patients who have been declared dead but, for some unknown reason even until today, awake. Since 1982, at least 25 incidences have been reported on Lazarus syndrome. One possible explanation given is the delay in adrenaline administered by medical staff reaching the heart.

The zombie outbreak we typically witness in mass media is actually a metaphor of anthropogenic global disasters. The zombies represent our fears, our worst-case scenario that our cities, way of life, and civilization could collapse so abruptly and colossally.

Our world has already experienced mass disease epidemics. In the 14th century, [Black Death \(or the Bubonic Plague\)](#) wiped out 30% of Europe's population, and the [Spanish Flu](#) in 1918 decimated over 50 million people worldwide in just a year.

Every 100 years a new disease emerges that could potentially decimate vast numbers of people. SARS outbreak in 2003 killed 15% of the infected - a high mortality rate. It took only a few weeks for SARS to spread from China and Hong Kong to around the world. In the last 30 years, 40 new human pathogens have emerged such as HIV, avian flu, and SARS. And all these human pathogens came from animal pathogens.



In the last 30 years, 40 new human pathogens have emerged (photo from www.excentric-fergie.com)

Consequently, could a zombie virus emerge one day from a mutated rabies virus? Some scientists think it could potentially happen. [Rabies](#) is found in over 150 countries, and it kills about 55,000 people each year. Rabies destroys the brain, rendering human victims into coma and eventually, death. But if there is to be a zombie virus, the rabies virus would have to mutate to dramatically increase its virulence and to spread much more easily, preferably by air. Rabies virus has an incubation period of 1-3 months which is too long. The minimum incubation period for some virus today is only 2-3 days.

At the end, zombies do have an important message to us. They tell us that we humans may have progressed much since modern humans appeared 100,000 years ago, but in many ways, our existence are becoming increasingly tenuous. Half of the world's population currently lives in cities, and this proportion is expected to increase to 70% by 2050. We are increasingly interlinked to one another by air, land, and sea. It takes one highly infectious and deadly disease, mixed with political and social chaos, to demolish our civilization. Anthropogenic climate change, loss of biodiversity and natural resources, and environmental degradation are some ways we humans can become extinct.



At the rate we are causing detrimental climate change and other environmental damage, we do not need zombies to destroy us en masse. We are very much capable of doing it ourselves (photo from sayou.files.wordpress.com)

References

1. [The Science of Zombies. Focus. Science and Technology. Issue: 254. 2013](#)
2. [The Truth on Zombies. National Geographic Channel. 2010](#)



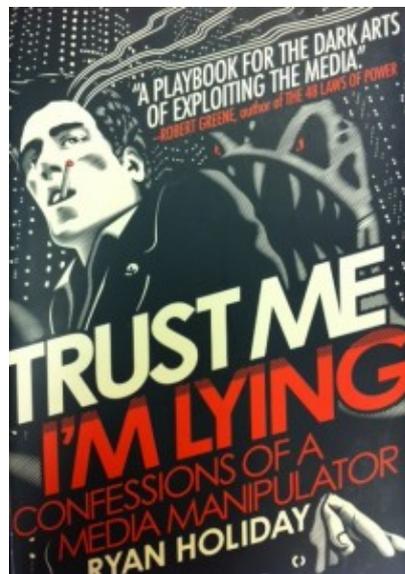
Manipulating the net: How much can we trust what we read on the

net?

[Evgeny Morozov's "The Net Delusions: The Dark Side of Internet Freedom"](#) is one of the most important books I have read. Having read it two years ago, I now often treat web news, in particular those coming from social media (*e.g.*, Facebook and Twitter), with plenty pinches of salt.

Recently, another important book ["Trust Me, I'm Lying: Confessions of a Media Manipulator"](#) by [Ryan Holiday](#) reaffirms my view that the web can be a dark and dangerous place to obtain information.

These two books show that we are naïve. We believe the web is a boon to democracy because it gains us access to more information, more empowerment, and more opportunities for social activism. We believe the web, through its propagation of information, create "shared awareness" such that we not only better understand a situation but also better understand what others are thinking too. Through shared awareness, we believe the web coordinates loose groups of people into collective action to demand change.



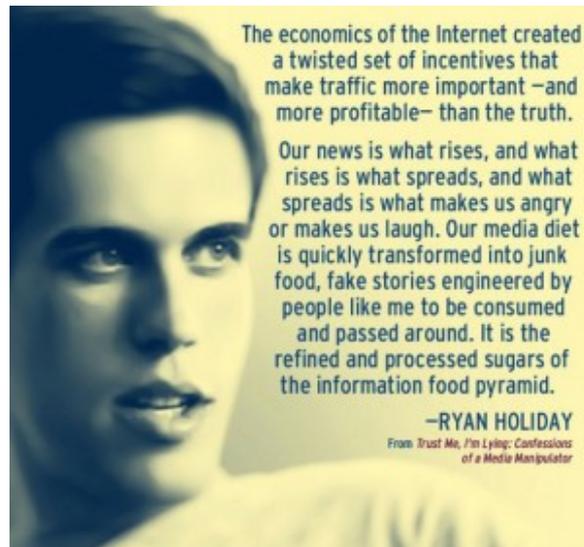
"Trust Me, I'm Lying: Confessions of a Media Manipulator" by Ryan Holiday, Portfolio Hardcover, 2012.

But the truth is the web does not free us from information bias, conflicts, manipulation, and sensationalism. To believe otherwise is not only naïve but also utopian.



We are naïve to think the web reveals the truth. Instead of the truth, we can be subtly manipulated to react in a desired manner (photo from rapgenius.com).

Holiday's "Trust Me, I'm Lying: Confessions of a Media Manipulator" is the first book of its kind. It is an exposé of a self-confessed and (partly) reformed media manipulator. Ryan Holiday's job involves the dark arts of carefully creating, packaging, and feeding false information to the web. He would then sit back as his false information spreads virally to achieve its intended outcome.



Ryan Holiday, self-confessed online media manipulator (photo from bewareofimages.com)

Holiday is the person you would hire to manipulate information on the web for some specific purpose, such as to promote a product brand, to create controversies (when there is initially none), or to target your enemies with fake information or rumor. What is worse is Holiday is not alone. There are many such media manipulators out there and whose identities are unknown even to seasoned Holiday.

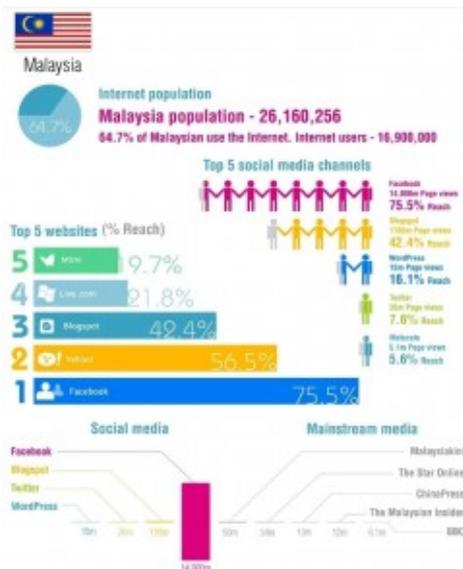
So, yes, we the web users are naïve, and we have been subtly duped and exploited many times over.

In his book, Holiday writes that news on the web is not a critical investigation of issues, but engineered to hook, distract, and cause us to react in certain desired manner. With the advent of the web, standards of what constitutes news, how news are vetted for validity, longevity of news, and the tone news are presented have changed for the worse.

We have been taught to believe that written information have validity, but with the advent of web, this belief has been corrupted by media manipulators. Web news are speculations, impulsive, exaggerated, distorted, and misleading.

The result is what Holiday calls as “unreality”, a situation whereby we cannot distinguish truth from fiction, real outcome from what was staged, relevant from trivial. Furthermore, false information in the web do not stay false; they evolve to become accepted as real.

Unreality occurs because of the so-called link economy and the delegation of trust. This is a case when a news or story is linked by multiple sites, and each site assumes the story has been verified by the source from which this story was taken. In other words, trust has been delegated to other parties. Web sites commonly rely on other sites to provide stories, to borrow stories from one another. A site may perhaps add a few commentaries on a story it linked, but essentially, the story is taken in verbatim, often with no or little verification.



About 16 million or 65% of Malaysia's population are internet users, of which 12 million people use Facebook and nearly half a million use Tweeter. Social media sites are accessed at a rate of about 19.4 million times per hour (photo from humanwebsite.com.my).

Multiple site linkages to a story gives appearance of credibility, akin to multiple citations to a scientific paper. But unlike in science where evidence is verified independently and repeatedly, web articles receive no such cross checks. Instead, in the world wide web, the false can morph into real if the false is disseminated by enough people (or sites). False information are often not taken down quickly and can even persist for years in the web.

Holiday gives several reasons why the web is an easy breeding ground for manipulation. Web sites are driven by traffic and advertisements, which ultimately determines the site's revenue. Consequently, quality of information is less important, as long as the information triggers traffic or better still, goes viral. The value of information is not determined by its accuracy or helpfulness but by its "spreadability". If the information is not shared, the information is regarded as useless. Furthermore, the quick turnover of information on the web places enormous pressure on sites to produce news, which leaves little time for research or verification.

This kind of environment makes it easy for media manipulators to feed false information that have been designed to arouse powerful emotions in people so that the information goes viral. But arousing just any emotion will not do. Holiday cites a research by Berger and Milkman in 2011 who found that of all emotions, *anger* was found to be the most powerful criterion that causes people to share information. In short, anger - not sadness, depression, or mixed emotions - makes information viral. Similarly, the research by Lang in 1996 found that people were provoked more emotionally, paid more attention, and had better memory recall of negative than neutral video footages.

Furthermore, fake stories are designed to additionally anticipate for user comments. Media manipulators do not want stories that are too safe, too well written, or complete in information because such stories elicit no comments. Fake stories have to be incomplete, incendiary, and even misleading to provoke people to comment. Media manipulators would not only create fake stories, but also create fake comments to supplement the fake stories. Made-up comments from fake users are given to stage a scene of a heated and polarized debate on the fake story. These media manipulators may also send fake emails to reporters or web publishers to give an impression that some trivial issue has turned "hot".

Errors in news are propagated quickly and widely in the web. But corrections are seldom done and even if done, these corrections are seldom highlighted, noticed, or remembered. Errors remain "sticky" in people's minds. Holiday cites a research where corrections do not fix errors. Instead, corrections were found to fortify and entrench people's misconceptions. That corrections amplify misconceptions is surprising. It is as if people regard corrections as a cover up on deception.

A good example of the futility of correcting errors is Malaysia's opposition street rallies, collectively called as "[Blackout 505](#)", which is so named in response to the perceived blackouts that had occurred in some vote-counting stations. Even though these blackouts were shown later to never have occurred, this misconception still persists, perhaps even amplifying in people's minds that these blackouts were further evidence of election fraud.



Blackout 505: Despite being shown that blackouts had not occurred, anti-government street rallies continue to call themselves as Blackout 505. Corrections to misconceptions have been shown to backfire by making misconceptions stronger and more permanent (photo from [malaysianreview.com](#)).

Another serious problem with news from the web, Holiday adds, is some sites practise "interactive journalism", where, information are published first, then verified later. Such news are updated frequently by relying on others to validate the facts, to send in updates, or to send in additional sources for contact. Interactive journalism does not create finished articles, but create articles that remain work-in-progress, awaiting further input. This kind of journalism encourages misinformation, allegations, rumors, half-truths, shoddy reporting, needless information, and endless projections and predictions. Interactive journalism also encourages sensationalism. If stories are anything but sensational, why would anyone read these so-called interactive news and participate by sending in updates?

The problem with interactive journalism is the information presented at any one time may be inaccurate or even downright wrong. The news may be updated frequently, but people see only a snapshot of the information at a point in time. Even the crowd-sourced and collaborative Wikipedia has been fed with false information by media manipulators, which has led to false information being propagated by other sites as fact. Although the wrong information was later corrected or deleted from Wikipedia, the false information continued to persist in some news sites. If you have not been following the Wikipedia updates or corrections, you may take these false information at face value and accept them as true.

So, at the end, what hope do we as web users have? Holiday offers little hope or resolutions in his book. Far from freeing people with greater access to information, the web polarizes people, exacerbating differences between groups of people by filtering of information and by helping to present information on what people only want to see. The web, Holiday remarks, is hardly the place for revealing the truth; instead, the web is a place for cultural catharsis, made up of online lynch mobs, attack blogs, smear campaigns, cyberbullying, and trial by comments.

Perhaps it is time, Holiday suggests, that we demand quality of information and not quantity. We cannot expect instant news and yet expect it to be done well. No one owns or controls the information flow on the web, not completely anyway. Media manipulators, Holiday admits, are manipulated too on the web. After years of misusing and exploiting the web, Holiday has become frightened of what the web has become.



Drawn over a century ago, this drawing depicts the manipulation of media, often resulting in increasingly larger lies, deceit, and harm that ultimately goes out of control. Ryan Holiday sees himself as “the fool who feeds the monster” (photo from Ricardo Galli via Google+)

Holiday’s book uses several examples of media manipulation in the US, but it is not difficult to find similar examples in Malaysia. Government-hired blogs, the mysterious [Red Bean Army](#), and lone operators have been working anonymously in the background to manipulate the web for devious, ulterior purpose.



The mysterious Red Bean Army,
opposition-sponsored media
manipulators to spread
misinformation and intimidation?
(photo from mole.my).

The web can indeed be a dark and dangerous place to obtain information.

Sources

1. Berger, J. and Milkman, K.L. 2011. What makes content viral? *Journal of Marketing Research*: 49: 192-205.
2. Brendan, N. and Reifler, J. 2010. When corrections fail: the persistence of political misperceptions. *Political Behavior*, 32: 303-330.
3. Lang, A. 1996. Negative video as structure: emotion, attention, capacity and memory. *Journal of Broadcasting & Electronic Arts*, Fall 1996: 460.
4. Shirky, C. 2011. The Political Power of Social Media: Technology, the Public Sphere, and Political Change. *Foreign Affairs*, January/February 2011.