MAZE

Issue 3: Editorial Letter

Our third issue is short and we did not pick a consistent theme, however, we hope you will enjoy reading it and we promise that our fourth issue is going to be a lot longer and more exciting! Once again if you would like to contribute or just get involved with our newsletter get in touch!

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REAL LIFE STATS

how much should we trust online ratings*

Akira O'Connor

The internet is rife with tiny images of stars and thumbs. Shopping sites and app-stores use them to tell us how good their products are. Entertainment sites use them to convey how enjoyable their content is. Such is their ubiquity, they've even crawled out of the computer screen and invaded the real world, with pubs and restaurant menus begging to be rated on Tripadvisor. They're clearly very important in building consumer confidence in services and products, but how much should we really trust online ratings?

As this is a Real World Stats column, I'm not interested in fake reviewers or gamed star ratings (where sites falsely inflate their ratings by providing 5*'good', 4* 'horrendous' options, thereby encouraging all but the most disappointed customers to give them a 5* rating). Instead, I'll focus on the statistical uncertainty associated with small sample sizes.

Let's say you want to show your stats class a video which best illustrates a statistical concept through the medium of dance. You've narrowed it down to two videos:
1) Correlation: http://www.youtube.com/watch?v=VFjaBh12C6s 113 likes, 4 dislikes (96.6% +ve)
2) Variance: http://www.youtube.com/watch?v=pGfwj4GrUIA 39 likes, 1 dislike (97.5% +ve)
(all ratings correct as of 28th October, 2013)

Statistics through the medium of dance. Just because.

If you wanted to give yourself the best possible chance of entertaining your class you might choose to show Option 1 which has nearly three times as many likes as Option 2. But, if you wanted to try to account for the number of ratings the video has had, you might choose to show Option 2 as it has the highest percentage of positive ratings. The problem is that neither option takes into account that when you change your sample size, you change the confidence with which you can say your results are representative of the population.

To put this in context, if you found a study with 10 participants which showed that coffee intake significantly aided relaxation, and another study with 400 participants which didn't show this finding, you would probably question the results of the first study. We should apply a similar skepticism to highly positive online ratings drawn from small samples. It's a rule of thumb most us employ heuristically, but there is a formal statistical way of dealing with this problem that considers sample size as it relates to your population estimate. Wilson (1927) published a formula for calculating the confidence interval for binomial ratings as follows:

$$\frac{\hat{p} + \frac{z^2_{\alpha/2}}{2n} \pm z_{a/2}\sqrt{\frac{(\hat{p}[1-\hat{p}] + z^2_{\alpha/2})/4n}{n}}}{1 + \frac{z^2_{\alpha/2}}{n}}$$

p^ is the proportion of positive ratings from the sample.
zα/2 is the quantile of the standard normal distribution. If we care about the 95% confidence interval then we can simply replace this with the constant 1.96.
n is the total number of ratings (positive and negative) from the sample.
The ± sign indicates that we can calculate the upper or lower bounds of the confidence interval by using a + or a - sign respectively.

This formula appears pretty complicated, but it produces a range of values within which you can be 95% certain your population's true proportion of positive ratings will lie.**

If we apply this formula to our dance videos, we get the following 95% confidence intervals
1) Correlation (n = 117): **lower bound .915**; upper bound .987 (range .072).
2) Variance (n = 40): **lower bound .871**; upper bound .996 (range .125).
I highlight the lower bounds because they represent the lower limits of the population ratings that we could reasonably expect to observe. They tell us that we can be more certain of higher ratings for Option 1 than for Option 2 - taking all of this into account, we should show the Correlation video. (Incidentally, if we examine the lower bounds alongside the confidence interval ranges, we can see that the larger your sample size, the less variability there is in your population estimate, something we know is true when we calculate standard errors of the mean.)

The question I posed at the start of this article was, how much should we really trust online ratings? The answer is that it depends on how many people have contributed to those ratings and Wilson's formula allows us to quantify exactly how much sample size affects the confidence we can have in online ratings. If that seems like too much hard work, the following **xkcd cartoon** is the next best thing to remember.

* This article was inspired by Anna Powell-Smith's blog: http://anna.ps/blog/statistics-find-nicest-food-at-waitrose She conducts a far more interesting analysis of Waitrose product ratings (and finds that the new 3-grain-recipe Special K is indeed disgusting).
** You can download an Excel spreadsheet with this formula applied to the examples in this article from: http://goo.gl/EU3op1 .

It is a well-established fact that a large portion of university students like dressing up in costume- be it for Halloween or just your "normal" night out, but what is the actual effect and significance of dressing in a costume? There are a few aspects that come to mind- the idea that you can do anything, that you are anyone and the idea that tomorrow you can step away from it all.

Indeed, a study done on children in a costume suggests that costume-wearing behavior can create a sense of deindividuation and increase the likelihood of lowered restraints in children's behavior, with more children in costume taking forbidden candy (Miller and Rowold, 1979). It seems fairly intuitive that by putting on a costume you loose some of the responsibilities that are attached to your persona at other times. Furthermore, research on college students over a 5 year period suggests that there are significant associations between wearing costume, drinking alcohol and other drug abuse related activity (Miller et al. ,1993). The parallel has been drawn between costume-wearing induced identity loss and the same sort of de-individuation that can take hold of football fans, enabling them to riot. There is another side to the story, the amount of effort and thought that goes into choosing a costume indicates that there is an aspect of internal self-expression involved. It is an escape created through our hopes and dreams that makes the costume, however why I was dressed as a cocker spaniel this Halloween, I do not know.

So what about costume effects perceived by the wearer? It turns out women and men have different approaches, with women being less likely to disguise their identity or believe that they could play different roles, specifically for Halloween. This beautifully links to the abundance of spider man, iron man whatever-I-am-so-awesome-man costumes that the male population embraces. However, costume wearing is not just the domain of Halloween and university students, it is also a lifestyle choice. The first scenario is a fan convention, where it is not just about wearing costume to express different aspects of your personality, it is also about belonging to a community. Costume is not only fun and play though. Many psychological techniques in opening personality and helping people deal with their fears involves dressing up in costumes and assuming new personalities and powers. In fact, an experiment conducted by Pollaczak & Homefield(1954) found that children with speech impediments stuttered less when wearing a mask. So maybe Halloween is really just a creative exercise in expressing one's identity and blowing off steam by being able to bail on personal identity, just for a little while.

MASKS

by Natalia Fedorova

PHOBIAS

by Kirsten Napier

Phobias affect an estimated 10 million people in the UK. This makes phobias the most common type of anxiety disorder. According to the Royal College of Psychiatrists, they affect about one in 10 of us at some time in our lives. In psychological terms, a phobia is an extreme fear of an object or situation which the sufferer will attempt to avoid, or will endure with great distress, often resulting in a panic attack. Diagnostically, phobias fall into five distinct groups: animal, environment, blood-injection-injury, situational and other. Usually developing between childhood and early adulthood, most occur following a traumatic event, but they can also be learned from others or even begin for apparently no reason. Like many people, I can pinpoint the exact time mine started.

Early in 2005 I saw the return of a much loved, long-running British TV series which had ceased regular production 16 years previously. Yes, Doctor Who was back and my eleven year old self was hooked. Then one Saturday evening, a couple of months into the series, I sat down for the most terrifying 45 minutes of television I have seen to this day, and came away of a fully fledged phobia. Of gas masks. I can't even describe this episode, so for those of you who have not been subjected to it, I apologise for the rubbish explanation.

I will be the first to acknowledge that this fear is both irrational and excessive (as well as downright weird), but that doesn't make it any less paralysing. I watch films and the news slightly on edge, screening for any scenario that could conceivably feature a gas mask. Learning about the second world war at school, my classmates all learned of my phobia when we were watching a presentation about the blitz, naturally complete with photos of people donning masks during an air raid, I began shaking, my heart rate accelerated and I nearly passed out. My teacher then kindly pointed out that taking Standard Grade history might be out of the question. Fortunately, however, the object of my phobia is something I have to deal with a couple of times a month at most. For some, the thing they fear most is so commonplace, their phobia leads to depression or even an inability to leave the safety of their home.

The most common phobias include agoraphoria (the fear of situations where escape is difficult or embarrassing) and phobias of dogs, snakes, heights and spiders. Last year, researchers at Ohio State University conducted a study which found that people with arachnophobia tend to perceive spiders as larger, strengthening fear and making the phobia more difficult to overcome. Participants with highest self-reported feelings of fear while observing a tarantula generally estimated it to be two to three times bigger than it actually was.

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Three of the more unusual phobias include phobiaphobia (fear of fear); hexakosioihexekontahexaphobia (fear of the number 666); and, cruelly, hippopotomonstrosesquipedaliophobia (fear of long words). This seems even more cruel when you discover the other accepted name for the fear of long words is 17 letters shorter. Sadly in my research for this article, I found out anatidaeophobia, the famed fear that somewhere, somehow, a duck is watching you, is not recognised as a disorder. It actually first appeared in a cartoon, and is now commonly referred to in pop culture. However, some people assert that they do suffer from it and there is currently a petition to rectify its exclusion from lists of clinically recognised phobias.

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School of Psychology and Neuroscience
Student Newsletter

WANTS YOU!

Don't be shy! Get involved!
No special writing skills required!
Email Sarune (ss218)

>>> REVIEW <<<

by Polina Arbuzova

Frankenstein is a play by Nick Dear based on the classical novel by Mary Shelley. Oscar-winning director Danny Boyle (Trainspotting, Slumdog Millionaire, London 2012 opening ceremony) staged it in 2011 in National Theatre. The sell-out production was also broadcasted live in cinemas. Following a huge success and audience request this autumn NT runs encore screening as part of its 50th anniversary celebration.

The lead parts were played by two modern Sherlocks: Benedict Cumberbatch (BBC's Sherlock) and Jonny Lee Miller (CBS's Elementary). They faced unusual creative task: alternating Victor Frankenstein and The Creature parts every show. The latter is particularly demanding of great physicality and transformation abilities. Actors met the challenge and their outstanding performance was marked by Olivier Award for Best Actor.

It is completely different to the stereotypic Frankenstein from low-budget horror movies. The play gives voice to The Creature. Vulnerable and totally lonely, he desperately seeks friendship, but all he finds is just disgust and violence. Desperate and full of hunger for revenge he wants to find his Creator.

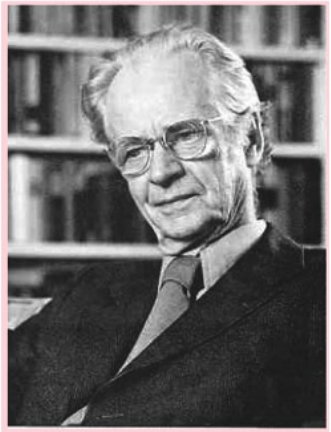
This is rather a food-for-thought piece. The play raises many issues, such as ethics of science, responsibility 'for those who tamed', humanism, fine line between genius and madness… But given stunning directing, acting and set design it is not lecturing.

DID YOU CRACK THE CODE?

The hidden message in the code is:
'Pigpen cipher is a geometric substitution cipher goes back to eighteenth century and was frequently used by Freemansons fraternity'

Can you tell us how this message was coded?

GREAT MINDS OF PSYCHOLOGY



Burrhus Frederic (B.F.) Skinner

1904 - 1990

American psychologist and author, best known for his work on operant conditioning. Skinner believed that free will is an illusion and human actions are just a result of conditioning. Skinner published 21 books and over 180 articles. Skinner worked in Harvard and was influenced by Darwin and Pavlov's ideas.

Skinner's Pigeons

Recommended books by B.F. Skinner:
Science and Human Behavior (1965), About Behaviorism (1976), Beyond Freedom & Dignity (1971), Particulars of My Life (1976), Reflections on Behaviorism and Society (1978)