

For better or for worse

The “kiss effect” on television ratings

From Sam and Diane in *Cheers* to Ross and Rachel in *Friends* to Nick and Jess in *New Girl*, TV audiences invest heavily in will-they-won't-they couples. But what happens to ratings after that momentous first kiss? TV producers, **Ashley Mullan** has all the data you need

My day job might be (bio)statistics, but at my core, I'm a sucker for love.

Picture your favourite “will-they-won't-they” TV couple – you know, the one

that you just know is destined to be together for ever. From the first episode, they've got this insane chemistry that just doesn't quit. Their dynamic constantly shifts between almost-romance and friendship, and you're just sitting

there, binge watching, waiting for them to just *kiss already!* For me, that couple is Nick Miller and Jess Day from the show *New Girl*, and that big moment (the one we've all been waiting for) comes in Season 2, Episode 15.





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For Nick and Jess, and other couples like them, the first kiss is a pivotal moment in their character arcs, and it defines the trajectory of the plot. If you're like me, you're hooked. You feel the magic and are excited to see the drama coming up next, so you grab the popcorn and don't leave the couch for at least another half season. Other people might be susceptible to the Zeigarnik effect (more on that later). These folks see that kiss as the completion of the story arc. They'll then get bored and either immediately abandon the show or slowly fizzle out when they lose interest.

This dichotomy of behaviour poses an interesting question to those data-minded Netflix fans. We can certainly track and quantify our own behaviour to uncover our true feelings about love, or at least how we feel when we see it on the screen. Unfortunately, assessing our own behaviour doesn't yield insight about the world at large. As statisticians, our goal is to capture the feelings of the hive mind. Luckily, we have a nice way to quantify how viewers feel about television – ratings! Now we can attempt to estimate the effect of a couple's first kiss on a show's ratings.

The preface: Pardon our interruption

Our pursuit of quantifying this kiss effect, falls into a space called *causal inference*. Causal questions are particularly tricky to answer, because they require us to be able to say that event A (the couple finally kisses for the first time) directly causes event B (a change in the show ratings) without any interference from other events (such as the introduction of a new subplot) happening under the hood. Luckily, statisticians have some tools that can help with these types of questions.

One such tool is the *interrupted time series* (ITS) model.¹ ITS models allow us to look at the trend in a sequence of observations over time and the effect of an interruption on that trend. The model takes advantage of a hypothetical situation called the *counterfactual*, an alternative timeline where the interruption never happens (Figure 1).

Suppose we think that viewers, on average, feel the same way I do about Nick and Jess's on-screen kiss in *New Girl*. Then, in the real timeline, Nick and Jess's kiss in Season 2

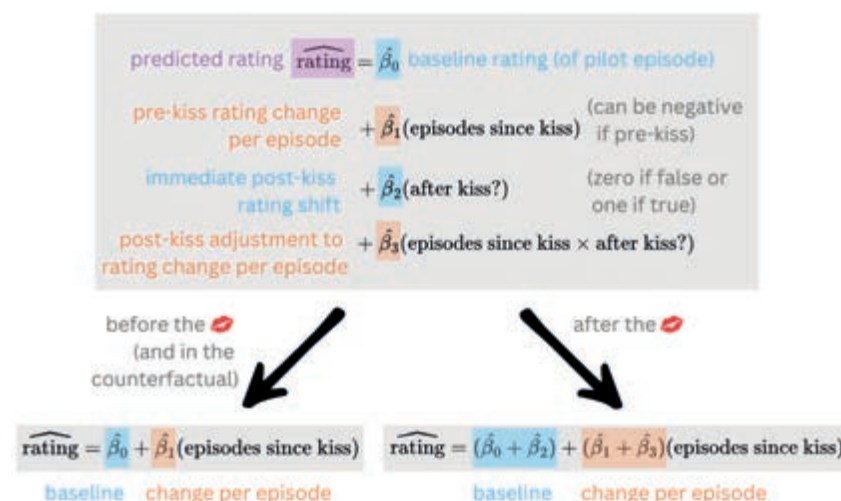


Figure 1: The interrupted time series model uses data on episode ratings to estimate the kiss effect. With a little clever rearranging of model terms, we can break the interrupted time series model down into two cases. The counterfactual extends the before-kiss model to contrast the post-kiss model.

would interrupt the ratings trend and force the ratings to go up and stay up. However, in our alternative timeline (the counterfactual), Nick and Jess never kissed in Season 2, and the trend would stay exactly the same. To figure out the kiss effect, we would look at the difference between our counterfactual and our reality. Specifically, we're looking to estimate the trend before the kiss, the immediate change caused by the kiss, and the new trend after the kiss. To share the love, we can extend this idea from one couple in a single show to explore how the kiss effect plays out across the genre.

The pilot: meet the couples

To use the ITS model, we first need some data. Luckily, the internet is full of TV fans who have strong opinions about love. After scouring the internet for lists of these will-they-won't-they duos, we end up with 137 couples from 108 different shows going all the way from *Cheers* and *Who's the Boss?* in the late 1970s and early 1980s to *Never Have I Ever* and *Abbott Elementary* in the last few years. For each of these couples, we grab data from the Internet Movie Database (IMDb) and Wikipedia. Specifically, we record the season and episode of the first kiss, the couple's internet popularity (in mentions), the number of seasons in the show, and when the show premiered. We then identify the 20 most mentioned will-they-or-won't-they couples

across all the lists and further pull episode ratings for the full run (as of late 2023).

Before fitting the model to answer our question about the kiss effect, it is always a good idea to look at our data and check for any interesting patterns. I had two specific questions in mind:

1. *When did shows start using this trope?*
The will-they-won't-they trope isn't new, with an early example being *Pride and Prejudice* by Jane Austen. However, the couples most cited on the internet all appear in the last 50 years' worth of television, and most of them appear on shows that premiered within the last 30 years (Figure 2).
2. *When are producers caving in to fan pressure and finally airing episodes with first kisses?* It is not fair to directly compare a three-season show, like *Shadowhunters*, against a show that goes on for over 20 seasons, like *Grey's Anatomy*. Instead, we measure when the kiss occurs by computing the percentage of the show's run as of late 2023 that appears after the kiss. We notice that with the exception of shows premiering in the 1990s, these kisses come fairly early in their shows' runs. Across all decades (1980s–2010s), typical couples (technically, the median) had their first kiss with over two-thirds of the show left to go (Figure 3).

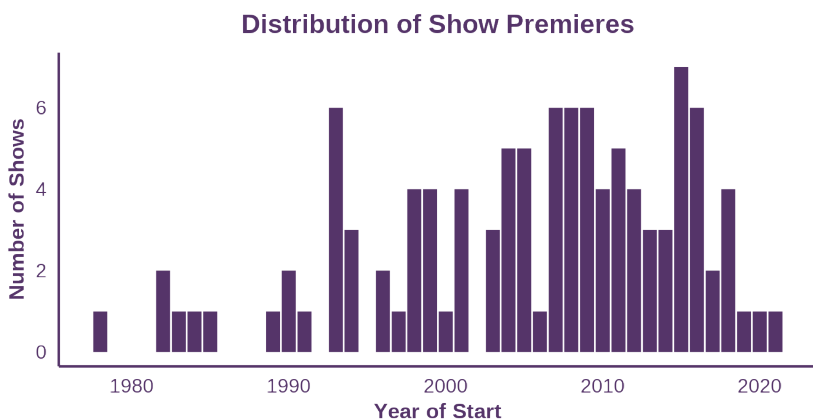


Figure 2: Shows from as early as the 1980s that feature the trope are still popular today. The highest bars are years where the most shows with will-they-won't-they couples premiered.

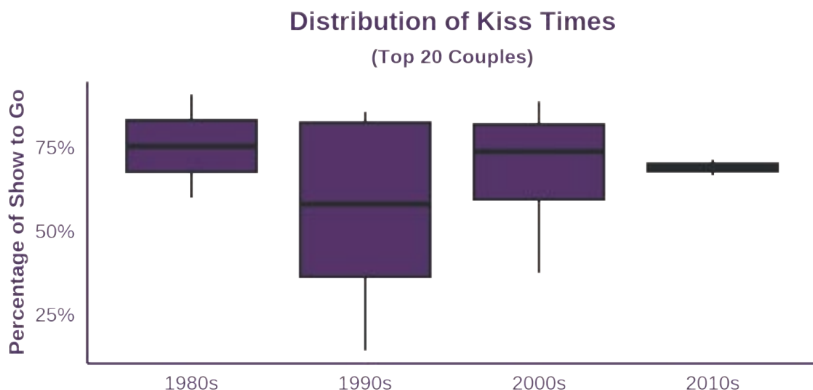


Figure 3: Most shows had a lot of plot still to cover after their couples’ first kisses. Does this mean the ratings were high enough to save the show? You can find the “typical” (read: median) couples by looking for the horizontal line in the middle of each decade’s box.

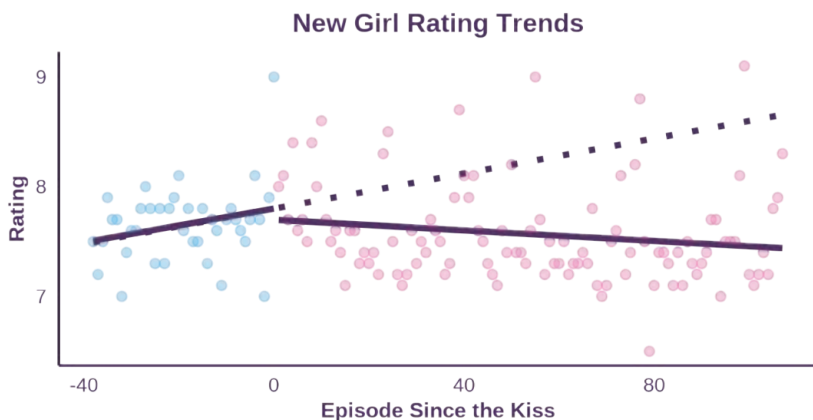


Figure 4: Did *New Girl* go downhill after Nick and Jess’s first kiss? Each point represents an episode of the show, where higher points received higher ratings. The solid lines represent the actual trend, whereas the dashed line represents the counterfactual trend.

► The cliff-hanger: so, what happened?

We now fit our ITS model to estimate the kiss effect. There are actually two ways to think about interpreting what we find. First, if we fit separate models to each couple’s data individually, we can look at the kiss effect of one specific couple’s kiss on their show’s ratings. Second, if we fit one model to all of the shows’ data together, we can look at the kiss effect *on average* rather than with respect to a specific couple.

Let’s first look at a few examples of individual couples and shows, starting with Nick and Jess from *New Girl* (Figure 4). In the pre-kiss portion of the show (episodes represented by blue dots in the plot), we see ratings going slightly up, and the counterfactual (the dotted line) would be if that trend persisted across the entire show. Sadly, the real ratings seem to fall prey to the Zeigarnik effect, which suggests that folks tend to pay more attention to things that are unfinished.² The ratings are expected to immediately drop by 0.1 rating points after the first kiss (episodes represented by pink dots in the plot) and decrease by 0.003 rating points per episode for the remainder of the show’s run, never to recover (the right-hand piece of the solid line). However, like good statisticians, we quantify our uncertainty with confidence intervals before totally giving up on Nick and Jess.

The confidence intervals give a plausible range of where our kiss effect might actually land. In short, a confidence interval adds some wiggle room around the model’s guess at the trend in ratings. Different levels of confidence are possible, depending on how willing we are to accept the possibility of being wrong about the true size of the kiss effect, but 95% is commonly used. In our case, the 95% confidence interval for the immediate interruption in *New Girl* episode ratings following Nick and Jess’s first kiss is between a 0.34 decrease and a 0.14 increase in ratings.

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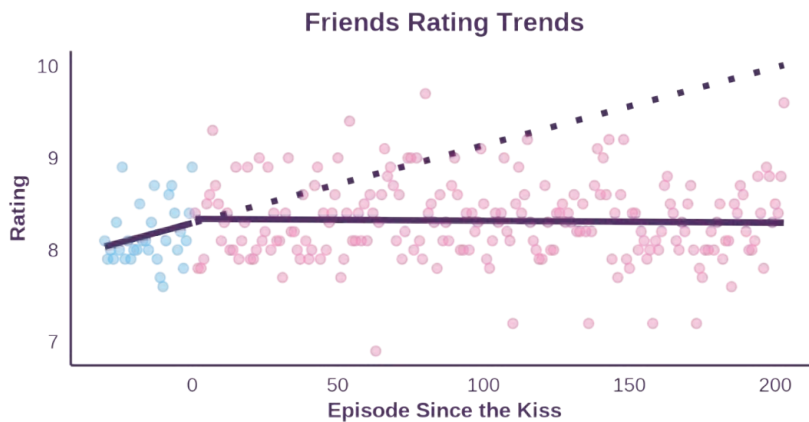


Figure 5: Ross and Rachel's story isn't over after they kiss. Each point represents an episode of the show, where higher points received higher ratings. The solid lines represent the actual trend, whereas the dashed line represents the counterfactual trend.

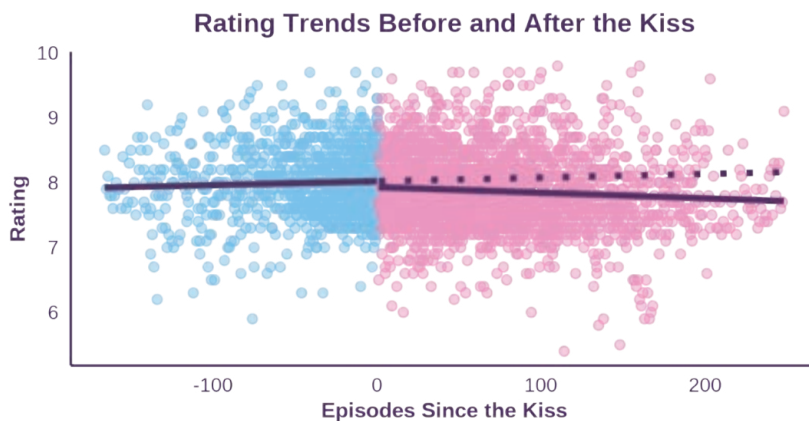


Figure 6: We can get a better sense of the average kiss effect by zooming out to look at all 20 of our top couples together. Look at the difference in direction on that counterfactual!

Thus, despite the slight visible jump in Figure 4 when going from before to after the kiss, there is not enough evidence in our data to support that one truly exists. Both increases and decreases in ratings fall into our uncertainty range. Also, despite the plot showing a switch from a per-episode increase before the kiss to a decrease after, the data similarly cannot exclude the possibility of no change at all.

This effect looks a little different for Ross and Rachel from *Friends* (Figure 5). Here, there's basically no immediate jump in the ratings after their first kiss (an expected decrease of just 0.05 rating points), but they still do start dropping (barely, by less than a thousandth of a rating point) each episode after. After checking the 95% confidence

interval on the immediate interruption here, the jump could be anywhere from a 0.33 decrease to a 0.42 increase in ratings, so there's still a possibility that there wasn't one. We again observe a noticeable difference between reality (the solid line) and the counterfactual (the dashed line), meaning that Ross and Rachel's kiss also impacted the post-kiss ratings.

Finally, we look at the overall kiss effect across the 20 most mentioned couples (Figure 6). When we zoom out to consider the average effect of a kiss, we see a somewhat similar effect to that of either of the individual couples (Ross/Rachel and Nick/Jess). The ratings slowly build until the kiss and then exhibit a very slight immediate

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drop. That drop is followed by a slow decline in ratings lasting until the end of the show's run. However, the (dotted) counterfactual looks much more similar to the real timeline than its single-couple counterparts. Since we have more data when we look at the overall kiss effect, the 95% confidence interval is a little tighter (i.e., the data supports possibilities that are less extreme). Plausible values for the immediate jump in the ratings now range from a 0.23 decrease to a 0.05 increase. Sadly, it looks like the Zeigarnik effect may be in play, even in the overall model, but there is still the possibility of no interruption or even a bump in ratings! This time, the 95% confidence interval on the immediate ratings interruption lies between a 0.22 decrease and a 0.05 increase. As with our two example couples, we can't say for certain in which direction the ratings jump given the data.

The finale: spin-offs, take note!

Unfortunately, it seems like my TV habits differ from the rest of the world. While I can't wait to see how a love story plays out, the Zeigarnik effect kicks in quickly for other viewers. Show ratings start to decline after the "will-they-won't-they couple finally have their first kiss, and in many cases they continue to decline for the rest of the show, never to attain pre-kiss levels. If Hollywood producers want to keep their ratings high and viewers interested, they may want to consider either standing strong and delaying these moments to the end of the show or introducing another dramatic storyline to the plot. So much for love, right? ■

References

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2. Hammadi, A. and Qureishi, F. K. (2013) Relationship between the Zeigarnik effect and consumer attention in advertisement. *World Journal of Social Sciences*, 3(4), 131–143.