# RX COMICS TESTING 'TOONS: SKETCHING OUT COMICS RESEARCH, by Matt Cirigliano

## Article by Jeff Day

So you're thinking of creating a biomedical comic, huh? Great! You're in luck... now more than ever, cartoons and comics are pervasive in our culture. And thanks to accessible software and tech, they're easy to generate and share: around the web, in our news, and throughout our learning and living spaces.

But the curious question of how best to shape them still stands. How do we know if the comics we create will inform, comfort, or appeal to readers as we intended? Can we even test that? Well, lucky for us, there are a brave few scientific souls who are researching these very questions—and some of their observations will come as a surprise. Let's take a tour of the research so far...

We've all heard of "sequential art"—the formal name for our patchwork panels—but did you know that academics define four types of comics? Yep, there are four: **single-frame**, **short strip**, **comic book**, **and graphic novel (1**).



Single Frame Comic by Matt Cirigliano



MEDIKIDZ, Comic Book by multiple authors



Heart and Brain, Short Strip Comic by Nick Seluk



Cancer Vixen, Graphic Novel by Marisa Acocella Marchetto.

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Sadly, our friend "the comic" doesn't get much more love from the academic literature. Why? Well, Locke says that it's because they're "thrice damned": they're a "perverse" hybrid of literature and art, they're too mainstream, and they often hold "bizarre" content (2). *Sigh, hipsters.* Worse, when it comes to scientific content, comics are often stereotyped as distorting facts (3). And, because artists often run the risk of altering a writer's content, the shortage of multi-talented science experts are a constraint when it comes to science-based cartoons (4).

But it's not all bad. Actually, this latter point is common in research, even within medicine itself. In short: communicating clearly is clearly hard. For example, it's been found that what patients say may be misinterpreted and recorded by doctors (5), and artwork made for patients can baffle them if not aligned with cultural contexts and perspectives (6). But that's why research in *semiotics*, or meaning-making, is so vital to any design, including our comics. It helps better hone our message. And so, while the research says that comics can help promote, explain, and teach science topics to learners (7, 8, 9), our first goal is to ensure that readers can "see" the difference between, say, a snake consuming an elephant and a hat (10).

frames, called gutters. This taps into what psychologists call the "Gestalt", or seeing a larger whole for its parts. Surprisingly, research in cognition shows that sequential drawings, like those showing the origin of lightning, actually results in better problem-solving when compared to animation (13). Could this do us some good in comics? It's possible. Even then, while we can't fully direct how one "reads" our comics, there has been telling research that shows how certain layout rules, like manipulating the space between frames, can make cognition and interpretation a bit more intuitive (14).





Hat or snake consuming an elephant, from the *Little Prince* by Antoine de Saint Exupéry.

In some ways, though, this interpretive skill is out of our hands as creators, since memories and experiences (stored in structures called "schema") shape our reader's perspectives and in turn how they read a set of images. For example, one study on digital learning environments shows how learners can stitch together the same images to create completely different stories (**11**). Can readers do the same with our comic panels? In his book *Understanding Comics*, Scott McCloud (**12**) argues that it's possible by showing how a reader decodes a comic unconsciously with perceptions, by filling in the blanks between

Comic gutters, from Understanding Comics by Scott McCloud.

#### Alright, great. But what about appeal?

A number of studies have looked at how comics can leverage motivation and emotion as a means of connecting with readers, sometimes to foster an interest in scientific subjects. Case in point, comics have been shown to enliven potentially dull topics in visually appealing ways (**15**), provide context for science facts

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in narrative (16), help students memorize science concepts (17), comfort those who are sick (18), and intrigue or inspire with humor and narrative (8). There are plenty of popular comics to choose from too, and many can be found on the web, like XKCD, or in bookstores, like Cancer Vixen and The Stuff of Life (19, 20, 21). But be warned: when it comes to empirical research on motivation. the conclusions are still a bit soft. Each of us. like our personal schemas, have unique, elusive, and complex origins for our tastes. Some of these are cultural (e.g. growing up watching American superhero cartoons), others are individual (e.g. recalling a beloved grandparent reading Sunday comics). And so, it's hard to generalize our findings on what will appeal to readers in a broader way.

But this hasn't stopped scientists from searching, and each exploration is a testament to this resolve. Case in point, in 2010 I identified five distinct attitudes towards using a custom comic to learn biology, and showed that a subset of students was more keen than others on the style and approach used (22). Specifically, two groups claimed that educational comics make learning more enjoyable, while a third group said that, though my comic's sense of humor wasn't to their liking, it did help them learn new concepts and connect class lectures to events in the story. On the other hand, a surprising preference for realism over cartoons was found in one study on adolescent patient education materials (23). But this only goes to show how nuanced the landscape of comic research is; each comic is unique, and each group of readers has a vastly different response to media, depending on his or her preferences, upbringing, and the environmental context of a reading. So in a sense, as it is with all soft social sciences, it's hard to generalize.

#### But wait, there's hope!

If we dig deeper, there are still some fundamental rules we can work with, that touch on the basics of human perception. Here, what we're really getting at is emotional design, or the goal of creating environments that motivate, crush boredom, trigger the right emotions, and generate a sense of control (24)-and, yes, as weird as it sounds, a comic is deemed an "environment" in the learning sciences world. Comics research could benefit from these more fine-grained explorations, but sadly these kinds of studies are rare. For now, emotional design research is grounded in the field of psychology, and can be best used as a guide for creators, where choices in shape and color—like rounded characters

and warmer hues—can target desired emotional states (**24, 25**). But more on that in the next issue.

And so, this is where the research on educational comics is now: wide open. Sure, the literature claims that comics have great potential to do what want them to, but we still need to uncover more secrets on design, appeal, and use. Granted, we could always use the mainstream comics to point out the "wrongs" of fictionalized science in our learning spaces, as some have done (26). But where's the fun in that? As biomedical artists, we've got a knack for artistic talent and scientific savvy. We can hone our own content, create all new niches, and form our own hypotheses. What have we got to lose? It's a blank page. The resources are out there. All you need to do is draw the first line.

Stay tuned for next issue's breakdown on design research, and more tips on how you can create an effective educational comic!

For more on Matt's work, including a YouTube channel reviewing medical games, visit:

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