



Humor and Health

At the height of the Cold War, Norman Cousins, a famed political activist, journalist, and editor, labored tirelessly for the Committee for Sane Nuclear Policy. This committee was no joke. At the time, it seemed like an atom bomb might drop in a flash. But while others all around the world were quivering in their sneakers, Cousins helped establish the treaty between the former USSR and the US that banned nuclear arms testing, earning him commendations from President Kennedy and Pope John XXIII—splendid honors in a tense and troubled time.

After an important trip to Russia in the mid-1960s, Cousins learned that he had a rare and fatal form of arthritis. Rather than taking the diagnosis lying down, he turned to diverse and unorthodox sources as part of his treatment. His health care team included humorists—everyone from E. B. White to the Marx Brothers. At the time, biological science suggested that medical mirth was ridiculous. The idea of comedy as a cure, however, may be as old as the Bible. As stated in Proverbs 17:22, “A merry heart doeth good like a medicine....” Although I

don't see God doing a ton of laughing in that text, the idea of good cheer aligning with good health seems ancient. Cousins's treatment included a lot more than Harpo's honking horn. He declined the trays of food filled with white sugar and flour that they served him at the medical center where he received treatment. He turned to wholesome eats instead of Pot Noodles. He took the health establishment to task for knee-jerk, short-sighted approaches that paid little attention to anything but prescription drugs. He felt that certain medicines were doing him more harm than good, and ended up staying away from aspirin and other over-the-counter pain relievers.

This refusal to take such medications left him few options for his debilitating pain. Indeed, he could turn to strong opiates, with their odd side effects, or simply suffer. Instead, he hoped that humor could come to his rescue. Perhaps several minutes of chuckles were a good way to keep the agony away. Well, except for the agony that his guffaws would create for other hospital patients. The hospital was depressing anyway, so he moved out of it to give himself incomprehensibly large doses of intravenous vitamin C, building up to 25 grams per day. (Do not try this at home.) He spent time admiring the zest and optimism of remarkable nonagenarians like the medical missionary Albert Schweitzer and the virtuoso cellist Pablo Casals. He emulated their devotion to music, their will to live, and their passionate sense of purpose. And of course, outside the hospital, he could watch all the funny flicks that he thought would ease his aches and agony. But would all of this work?

OH, THE PAIN!

Pain is a complicated phenomenon. It waxes or wanes with attention, mood, hunger, and fatigue—and how loudly my kids are playing. Cousins decided that laughter worked as a great way to tackle his aches. Groucho Marx helped ease his hurts.

Since then, humor's impact on pain has actually become quite well established. Laboratory experiments on the topic usually present a funny video, or one that is equally interesting but less funny, and then expose participants to a painful stimulus. The most popular of these aversive stimuli is the cold pressor test—a euphemism for having people stick their hands in freezing water until they can't stand it anymore. Although not every study supports comedy as a painkiller, the studies that didn't support humor's analgesic effects often had samples too small to detect anything. Most of the big studies support Cousins's anecdotes, with a few caveats.

Humor as an Analgesic

The comedy-and-pain research gets complicated. The studies reveal several general themes. First, humor can reduce pain, but the mechanism behind the analgesia is unclear. Second, the more enjoyable the humor, the better the pain relief. Even my grandmother could have told Norman Cousins that, but the lab results are more convincing than she would have been. Third, comedy's impact might vary with a person's sense of humor. Finally, humor helps best when people believe it will. This literature is growing, but a couple of experiments illustrate these points well.

First, mirth improves our threshold and tolerance for pain. In a classic report, folks who listened to a Lily Tomlin stand-up routine later withstood more discomfort than those who waited quietly or who listened to an ethics lecture (Cogan, Cogan, Waltz, & McCue, 1987). The ethics lecture was not supposed to be the painful stimulus. Instead, experimenters pumped up a blood pressure cuff until participants cried "Uncle!" Sure enough, folks who viewed something funny could take more pressure before they claimed to feel any agony. Chalk up one for humor helping pain.

Second, other labs have confirmed that comedy creates analgesia. They also extended the findings to reveal the import

of the duration and timing of comedy. More is better when it comes to comedy helping pain. Though Cousins emphasized that 15 minutes of chuckles would often do the trick for him to fall asleep, a 45-minute film reduced pain more than shorter clips did. The timing was also critical, as is so often the case with humor. Comedy's superior effect over a neutral alligator documentary or a depressing Holocaust flick showed up only a half hour after the movies were over, not while folks watched them (Weisenberg, Raz, & Hener, 1998). Generally, humor's analgesic effects improve after the comedy is over (e.g., see Nevo, Keinana, & Teshimovsky-Arditi, 1993). Better to hear George Carlin for a while before your arm has to go in the freezing water than get the first punch line when your elbow's already an icicle. And even comic reruns beat the distracting dead bodies of *Night and Fog*. The delayed onset of analgesia seems to work for adults, but not children. One study with kids showed that they tolerated pain better during a funny video rather than after it (Stuber et al., 2009). Perhaps comedy takes longer to kick in as we age. That's certainly the case with lots of other stimulation. Cousins didn't mention this delay, but his pain was from a genuine disease rather than an irritating stimulus (or experimenter).

The laboratory work provides splendid experimental control, but few of us spend a lot of time dunking our hands in ice water or squishing our arms with a blood pressure cuff. Experiments with more natural sources of pain are not as common. One shows that patients recovering from surgery, who watched funny movies of their own choosing, used smaller amounts of minor painkillers, like aspirin, than patients who watched dramatic flicks. Unfortunately, the humor did not alter the use of major analgesics like opiate drugs (Rotton & Shats, 1996). Results like these make it hard to say if humor's impact on pain has practical implications. More work with natural sources of pain, like tooth extractions or medical procedures, could add important information to this literature. Of course, it worked for Cousins, so he didn't wait around for articles to publish.

Mechanisms of Mirth

So humor can decrease pain. The question, of course, is, How? There might be more than one mechanism here—see Figure 5.1. Cousins hypothesized about a lot of ways that humor could turn into analgesia, but he had no way to test his ideas.

Endorphins?

My reductionistic pals are quick to jump to the idea that endorphins (the body's natural source of analgesia and euphoria) squirt happily in response to every chuckle, leading to delighted numbness. The laughter movement loves this notion, too. Two studies have failed to find that comedy increases blood levels of endorphins appreciably (Berk et al., 1989; Itami, Nobori, & Teshima., 1994). Psychologists, particularly those who hate to see biology take over the field, seem to like this finding. In contrast, other simple interventions that can decrease sensitivity to pain increase blood levels of endorphins quite well. For example, a brief run on a treadmill (Oktedalen, Solberg, Haugen, &

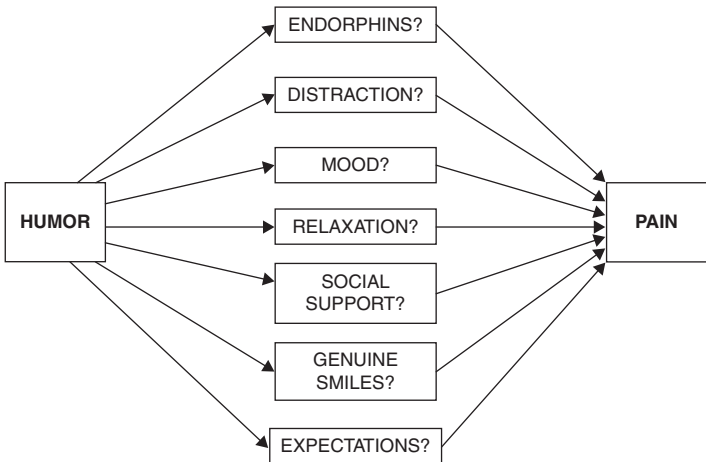


FIGURE 5.1 Ways that humor could combat pain.

Opstad, 2001), or some quick pokes from acupuncture needles (Agro, Liguori, Petti, Cataldo, & Totonelli, 2005), decrease pain and crank up endorphins.

These results make humor sound extra special, as if it can decrease pain through some mysterious mechanism that sidesteps body chemicals. I hate to miss a chance to rib reductionists or the laughter movement, but it's hard to argue that humor doesn't alter endorphins, based on these two studies. The samples are simply too small. For example, the Berk experiment cited above, which showed no impact of humor on endorphins, had five guys who watched a funny flick and five who did not. It's hard to conclude that, based on 10 people, something doesn't happen. Even if endorphin release had doubled, it might still not have been significant for a sample so small. The impact of humor on endorphins needs more work with bigger samples. Until that research is done, endorphins may have to remain in the running as one way that humor might alter pain. Nevertheless, a few mechanisms bigger than your average polypeptide are worth examining, too.

Distraction and Mood?

Although endorphins don't seem to explain humor's impact on pain, explanations related to distraction or improved mood seemed worthy of investigation. Perhaps humor takes our minds off our aches and stings. Cousins mentioned this option in his work. Distraction certainly can help pain, as several experiments emphasize. Encouraging folks to "fugget about it" can dull anything that smarts, and not just among Italians (e.g., see Wender et al., 2009). But humor may work even better than simple diversions. One experiment (Cogan et al., 1987) revealed that listening to Bill Cosby alleviated pain better than various distracting tasks did, including hearing one of Edgar Allan Poe's riveting tales. The Poe story and the Cosby monologue were comparably distracting, but comedy improved tolerance for pain better. The superiority of comedy suggests that its impact might arise from more than diversion alone. In addition, as I

mentioned, subsequent work showed that humor's analgesic effect kicks in primarily *after* exposure to comedy rather than right away. The pain relief remains for at least 20 minutes after the jokes are over, too. This delayed and sustained effect is also inconsistent with the idea that distraction explains humor's impact (Zweyer et al., 2004). Cosby can't help your pain via distraction if you're not listening to him anymore. An improved mood seems like a reasonable explanation for this effect. But the pain relief remains even after changes in mood have dissipated (Weisenberg et al., 1998; Zweyer, Velker & Ruch, 2004). Folks still don't hurt even when the happiness has worn off. So at least part of humor's impact on pain must arise from something other than distraction or mood.

Relaxation?

With mood or distraction out of the running as the sole source of comedy's analgesic effect, another obvious guess concerns relaxation. The idea that the humor works via relaxation alone doesn't quite fly, either. Researchers have yet to do the definitive experiment on this idea. Laughter is actually more arousing than relaxing. That's why I can't laugh my children to sleep. Chuckles tend to increase physiological measures of arousal like heart beat or sweating, or they have little to no effect on arousal at all (Ruch, 1993; Sakuragi, Sugiyama, & Takeuchi, 2002). This result seems at odds with most recommendations involved in pain management, the techniques designed to keep agony at bay. Most treatments designed to help with pain take huge steps to reduce arousal rather than increase it, but laughter heightens arousal rather than reducing it (Weisenberg, Tepper, & Schwarzwald, 1995). Relaxation battled pain nicely in many of these same studies on humor's impact, with both strategies working equally well (Cogan et al., 1997; Dale et al., 1991). It's nice to know that mellowing out can ease pain when folks simply don't feel like joking around. In addition, there are times when relaxation techniques sound dry and dull, so comedy may be the best choice.

Social Support?

Another explanation that has always haunted me when I look at this work concerns social support. We've seen that plenty of humor involves having other people around. Social support helps combat pain in multiple studies. The mere presence of a supportive friend in the room decreases pain ratings in a couple of experiments. One of my personal favorites takes this result one step further (Master et al., 2009). Heterosexual women reported less pain in response to an aversive temperature probe if they could gaze at a photo of a boyfriend. (It was just a little piece of metal that heated up, so the ethics committee let it slide.) Gazing at a photo of some other guy or a chair didn't do the trick. A particularly crafty aspect of this experiment helped rule out distraction, too. The women had to hit a button as quickly as they could whenever they heard the computer beep—a task that measures what is called “secondary reaction time.” Those who were more distracted should have taken longer to respond to the beep, but they were equally fast regardless of what photo they viewed. So the superior pain relief doesn't appear to arise from the distracting effects of a partner's beauty. Something about the social-support aspect of viewing a boyfriend's picture helped pain tolerance, and it wasn't just distraction from the pain.

Obviously, social support can help analgesia. Cousins stressed the import of good relationships between doctors and patients, leading him to better communication with his own physician. Turning relationships with health care providers into social support sounds great for all aspects of medicine. We've seen how inherently interactive and interpersonal humor is. Perhaps humor's impact on pain works via this path, too. Although watching a comedian might not seem much like gazing at a photo of a romantic partner, there's something a little more social about it than reading or listening to Poe's *The Raven*. For most stand-up performances, it feels as if the comic is talking directly to the audience. In contrast, Poe's short stories don't address the reader or listener quite as directly. He doesn't seem to be interacting with an audience in the way a good comedian

can. I'd bet that hearing a best pal or a dreamy date tell some good jokes might decrease pain even more. There is no harm in using social support and humor together.

Sincere Smiles

Several experiments reveal that people can endure more discomfort after watching funny material than after watching less funny stuff, even if the material is equally engaging. Further support for the idea appears in a study that linked genuine smiles, rather than polite grins, to pain tolerance (Zweyer et al., 2004). These researchers videotaped participants while they watched *Mr. Bean at the Dentist* and recorded what are called "Duchenne smiles." Guillaume Duchenne, a French neurologist of the 1800s, distinguished between truly happy smiles and other smirks. Plenty of people can fake a smile by turning up the corners of their mouths, no matter how mortified or depressed they feel. Duchenne pointed out that truly delighted smiles also include raised cheeks and a crinkling of flesh around the eyes (crow's feet), thanks to the orbicularis muscles around the eyes.

Folks in the Zweyer study who showed more Duchenne smiles held their hands in ice water longer before they said that their hands hurt. They also kept their hands in the water longer than folks who showed fewer Duchenne smiles. The smiles data were particularly interesting because they varied with pain while subjective reports of enjoyment did not. More of the genuine smiles meant less pain, but more of the reported enjoyment did not. Saying you're happy and actually being happy might be two different things. This is a nice example of how a subtle behavioral measure of amusement can be better than subjective reports. We can fake our responses on a questionnaire, but it's hard to fake a true smile. If you do find yourself in a predicament where you have to smile and make it look genuine, try to think of something sincerely amusing. Our smiles may tell more than our words or even our laughter. Laughter, which can also be faked, didn't predict pain. A particularly ingenious aspect of this experiment

required some participants to exaggerate their laughter and smiling while they watched the film. This condition parallels some of the laughter movement's practices, where people sit in a circle and laugh at nothing for minutes on end—a situation frighteningly similar to moments I've witnessed in a psychiatric ward. Those who forced their laughter in this study tolerated less pain than those who really laughed. Genuine enjoyment with sincere smiles helps ease pain, but feigned reactions don't help.

Expectancy: Does Thinking Make It So?

One last caveat about pain concerns expectations. Plenty of research in my lab and others shows that many things happen because we think that they will. For example, people who think that alcohol will make them hostile are more likely to get in fights after drinking (Smucker-Barnwell, Borders, & Earleywine, 2006). Expectations prove important for humor and pain, too. In one experiment, some participants read a paragraph that led them to believe that humor made pain worse; others read a paragraph that made them think that humor made pain less severe. They then watched the infamous "Soup Nazi" episode of *Seinfeld*, and endured the ubiquitous blood-pressure-cuff test for discomfort. Those told that humor would make pain worse found the cuff uncomfortable at much less pressure than those told that humor should make tolerance for pain better. They even did worse than participants who weren't told anything at all about pain and humor (Mahony, Burroughs, & Hieatt, 2001). Apparently, at least part of the impact of humor on pain stems from our belief that it should help. Cousins certainly bought the idea, much to his benefit.

PUTTING CARTS BEFORE HORSES

By the 1970s, Cousins's use of comedy made the headlines. It spread like a viral video of naked celebrities. The connection between

humor and health started a flurry of oddball claims for the power of laughter. Some of the hysteria around Cousins and his treatment is understandable. Frustration with medicine was high at the time. Societal perceptions of physicians as cold and aloof were even worse than they are today. The idea that the medical establishment needed more levity struck a public neuron. There had to be a better way to get better. The thought of grins and giggles working better than pills and potions had an undeniable appeal.

But the culture took the idea of the healing powers of humor and went well beyond the data. Suddenly everyone from CEOs to cab drivers had clown troupes and mirth ninjas pestering them to pay for humor-enhanced programs designed to combat the dreaded sniffles. Pseudoprofessional “joyologists” started hawking newsletters, “readers’ di-jests,” and “funliners” that advertised their “funsulting” firms. Laughter clubs with names containing moan-worthy puns sprung up in every state. (I’ll spare you.) Suddenly any fool could burn a weekend and a few hundred bucks to become a Certified Laughter Leader. I wish that I were kidding. Each organization mentioned Cousins almost invariably, citing his work as if it were definitive, divine evidence that chuckles cured cancer, even though he had in fact had arthritis. We’ve seen that humor can genuinely help ease pain. A close look at the research on immune function, allergies, erectile dysfunction, and longevity reveals some promise for laughter’s health benefits. Nevertheless, throwing away antibiotics in favor of animation is ill advised. In addition, a blithe, nonchalant attitude about symptoms of sickness might lead people to avoid health professionals, making illness worse.

CAN LAUGHTER CURE THE COMMON COLD?

Dr. Patch Adams, the fun-loving physician with a toy duck on his head, defied stereotypes of the grumpy, overworked

practitioners who rush dozens of patients a day out the door with a quick poke and a prescription. Robin Williams played the jocular doctor in the movie named after the man. He mentions that laughter is supposed to enhance biological functions galore, including those that would improve immunity. Perhaps old Dr. Adams is right. The reasoning behind this work is simple. Yucking it up might fire immune cells, protecting folks against various viruses and bugs. Two lines of research have examined this idea. Laboratory experiments show folks comedies and measure various antibodies in blood or saliva. Correlational studies ask people about their sense of humor and any physical symptoms. The results have been inconsistent, and many of the studies have had methodological quirks. Jokes aren't going to replace the flu shot anytime soon. Nevertheless, comedy has some potential for keeping immunity rolling.

The human immune system is a phenomenally intricate set of interacting biological structures. Hormones, proteins, cells, and enzymes work dynamically to protect us against toxic nastiness. This elaborate system adapts to everything from bacteria to parasites. It essentially learns to recognize these noxious agents and neutralize them quickly. The fact that our bodies can remember some previous bug and battle it efficiently is marvelous. The immune system is vital to all our vaccinations against the diseases that few ever get anymore—mumps, measles, rubella, and polio. No single aspect of this complex system is the perfect measure of immune function, but a couple of components that appear in saliva and blood are good predictors of who will and who won't get sick. That's why many undergraduates have donated bodily fluids in the name of humor science.

Secretory immunoglobulin A (S-IgA), an antibody found in saliva, is a decent measure of protection against respiratory infections. White blood cells of various types (lymphocytes like natural killer and T cells) play an integral role in the battle against illness. Most experiments on humor and health focus on these indices by sampling a test tube full of blood or spit. Studies like these are pricey. Finding out the exact number

of antibodies in human fluids is not a kitchen-sink exercise. Getting grants for humor research of this type is an uphill battle, too. Nevertheless, researchers put together as much data as possible on shoestring budgets. I should emphasize that relaxation, imagery, writing poems, hypnosis, and even a stressful task can improve S-IgA measures, too (see Benham, Nash, & Baldwin, 2009). But humor may be more fun than searching for a rhyme for "tangerine."

One early study showed that a video of one of Richard Pryor's stand-up comedy routines increased S-IgA levels, but a comparably interesting, less funny film did not. Although the sample was a mere nine people, and nobody is as funny as Richard is, these data still offered hope that comedy might enhance immune function. Another set of three experiments offered further support for the idea, but again with small samples (Lefcourt, Davidson-Katz, & Kueneman, 1990). Participants exposed to comedy showed improved S-IgA, which looked quite encouraging. But a closer look at these data reveals that the baseline S-IgA measures before the humor intervention weren't always taken on the same day or in the same locale, weakening conclusions. These measures of immune function can vary dramatically across time and places. With a sample this small, a couple of odd readings that stem from a change in date or location can make the results look as if comedy is helping when really the improvement arose from something else. In subsequent experiments, humor helped increase S-IgA levels in some folks, but provided no help to others (Labott, Ahleman, Wolever, & Martin, 1990; Lambert & Lambert, 1995; Perera, Sabin, Nelson, & Lowe, 1998). Other work either failed to replicate any effects, or found that comedy actually reduced immune function. For example, an experiment with eight male medical students revealed that natural killer cell activity dropped after they watched a comedy video (Kamei, Kumano, & Masumura, 1997). It wasn't clear at the time why sometimes humor was working, while other times it wasn't.

Not Just Comedy, but Laughter

Anytime a literature is this mixed, with effects appearing in some studies but not in others, a few things could be going on. The simplest explanations involve subsets and small samples. The research on comedy and immune function is no different. Often, either humor works only for a subset of people, like those who laughed genuinely or folks with a great sense of humor, or else the samples are all too small to detect humor's impact consistently. An illustrative study looked at natural killer cells—the wonderful little corpuscles floating around our bodies, eager to assassinate any budding tumor or virus—in 33 women (Bennett, Zeller, Rosenberg, & McCann, 2003). Those in the humor group watched a stand-up routine in the company of other women in the same condition. The other group watched a distracting video, also with other women who were participating. Comparisons between those who watched the comedy routine and those who didn't revealed—drum roll, please—a big fat nothing. The comedy routine didn't alter their immune function either way.

But once the researchers looked at those who did and who didn't show mirthful laughter while watching the comedy routine, an interesting pattern of results appeared. Laughter, not just comedy, may be the key to health. Comedy enhanced immune function for those who laughed at it, but not for those who didn't. The subset of folks who laughed had comedy improve their immunity. The eight women who didn't laugh at the video (based on observer ratings of giggles) showed a significant *drop* in their natural killer cell activity. Sitting around watching something that's supposed to be funny can be a drag if you don't think it's worth a chuckle. It must be even worse when you're in a group of other folks who are laughing. These data suggest it decreased immune function. In contrast, the nine women who did laugh showed increased natural killer cell activity. Their immune function was also significantly higher than the immune function of everyone else in the study, too.

So the effect appears only for the people who laugh. Perhaps previous studies that show no impact of comedy on immunity missed humor's impact because they failed to assess laughter. Some of the participants in the comedy groups of these studies might have laughed and improved their immune function, but their improvement got washed out by the declines experienced by those who watched the comedy routine, but didn't laugh. By ignoring laughter, the studies suggest that humor has no impact when really there's an effect for a subset of folks.

The Curse of Small Samples

The small sample sizes in the humor and immune function research create another issue. In fact, the problem of small samples has been rampant in a lot of humor research. It's been an issue in all of psychology for decades. Statisticians assume that a result from a bigger group of people is more likely to generalize to everyone. Data from a thousand people are worth more than data from two. Imagine that you heard that watching "The Psychology Comedy Hour" improved immune function. Those who watched it had better immune function than those who watched an equally riveting show that wasn't funny—say, "The Psychology Drama Hour." Then you learn that the study had a million people in each group. Sounds impressive. Now imagine that you heard it worked for five people. Obviously, you'd be more skeptical. Something that worked for the million people who watched the comedy show is probably going to apply to almost everybody similar to the folks in the experiment. Something that worked for a couple of Janes or Joes might be a fluke.

For this reason, studies of huge samples can be statistically significant even if the effect is small. The huge groups who watched the comedy show need not differ a ton from those who didn't, but the effect is still considered significant because the sample is so big. Immune function might improve only by a small percentage in the study where a million people watched

a funny flick. But since the result appeared in so many people, it'll count as statistically significant. In contrast, immune function could double in the study of five people and it still might not be significant. Statisticians just don't trust small samples as much because they are too likely to fail to represent everybody else who is relevant. So if the sample is small, only a huge effect counts as significant.

As I've mentioned, many of the humor and immune function studies rely on small samples. Funding is tight and these are expensive measures. Since the samples are small, some studies may fail to find any impact of humor on immune function even though it's genuine. The inconsistent findings may arise simply because each of the studies don't have very many participants. To show how a small effect can be hard to replicate, let's assume that the comparison between those who laughed and those who didn't in the Bennett study on natural killer cells was the True Effect. I mean capital *T* true, the size of the effect in the population. That is, if we asked some omniscient deity how big the difference was between all of those people in the world who would have laughed and who wouldn't have laughed, it would turn out to be exactly the same as the Bennett data. For atheists, assume we got everyone in the world to watch comedy. Some laughed; some didn't. Let's assume that the difference between those who laughed and those who didn't was the exact same difference as the one found in Bennett's study. (For my propeller-headed statistician friends, this was a *d* of .74—a large effect for the field of psychology.) Let's assume that's the true effect in the population. What would that mean for studies that are small? Some would definitely show significant effects, but many small ones would miss it. Please let me explain.

Obviously, it's too costly to get everyone in the world to watch the Marx Brothers movie *Monkey Business*, so we'll take a sample of people. It seems like this should be easy enough. We could grab the same number of people as Bennett did (33), and things ought to turn out the same for us as they did for her. But

there's a chance it might not work for us even though it worked for Bennett. Even if the effect is true in the population, a sample this small might miss an effect of this size. We simply wouldn't have enough people to detect it. How come? Some of the folks who have less of a response to the comedy (good or bad) might end up in our sample, simply by accident. We might catch someone on a bad day who behaved oddly and didn't laugh when she might have under other circumstances. We might grab someone whose immune function was a little out of whack for reasons we don't know. The math is a little hairy, but it turns out that the chance of finding this effect again with the same sample sizes (9 who laughed, 24 who didn't) is a shade less than .60. That's a 60% chance of finding the effect even though it's true. Seems like a lot of work for only a 60% chance of payoff. There ought to be a way to improve our chances of finding the effect in our sample, especially if it's true in the real world.

Fortunately, there's a way. Increasing our chances of finding the significant difference would require more people. To replicate this result of improved immune function, we'd need 24 in each group (48 in total) to have a good chance (80%) of finding this effect again. Why is the bigger sample better? Now, if we happen to grab someone who's having a bad day, we've got a better chance of finding someone else who is having a good day to balance it out. We've also got more chances of finding folks who are having normal days. If we happen to grab someone whose immune function was whacky, we've got a better chance of grabbing someone else whose immune function is whacky in the opposite way. If we wanted even better odds—say, a 95% chance—we'd need 82 people (41 who laughed and 41 who didn't). In short, to replicate this effect, even if it's the Absolute Truth, we'd need to run a big experiment. In fact, it would take an experiment bigger than the combination of almost all studies on the topic so far. Humor's impact on immune function may not be much, but genuine laughter's impact might be meaningful. We won't know until someone gets fourscore and two people into the lab to give this a shot. (For my propeller-headed

friends again, power of .8 and .95 with a one-tailed alpha would require the sample sizes mentioned above.)

A GOOD SENSE OF HUMOR AND IMMUNE FUNCTION

Since people who watch stand-up routines that make them laugh can improve their immune function, perhaps those with a good sense of humor have better immune function, too. Maybe those folks with a good sense of humor laugh a lot throughout the day, as if they're watching the stand-up routine of life. Research suggests that this isn't quite the case. A good sense of humor on its own failed to correlate with current cold symptoms or predict subsequent sniffles (McClelland & Cheriff, 1997). A couple of larger, more generalizable studies of a sense of humor and immune function also showed no link between the two (Labott et al., 1990; Lefcourt et al., 1990). Instead, something else seems to be going on. It's not that a sense of humor alters immune function directly; it buffers people against the immunity-zapping aspects of stress. Technically, this is a humor-moderated impact of stress on immune function. A moderator is something that alters the relationship between two other things—stress and illness in this case. Students with little sense of humor found their S-IgA levels plummet as their daily hassles increased over a 6-week period. Those with a good sense of humor maintained their immune function even as hassles mounted (Martin & Dobbin, 1988).

Humor's Impact on Folks With Allergic Reactions

As these stress, humor, and immune function results imply, comedy doesn't simply crank up antibodies directly. A series of studies performed in Japan has examined humor's impact

on the lives of folks with allergic reactions. Some of these reactions arise from overactive immune function rather than from a lack of immunity. Allergies can turn one's immune function on its head. Sometimes an allergic reaction suggests that immune responses are too big rather than too small. Nevertheless, Chaplin and Mr. Bean can come to the rescue. Chaplin's *Modern Times* improved asthmatics' performance on tests of breathing (Kimata, 2004a), which requires decreasing, rather than increasing, an immune response. Comedy also altered immunoglobulin levels in the tears of folks with allergic eye reactions, so their eyes wouldn't turn red and get teary as much (Kimata, 2004b). Humor also improved sleep and altered a sleep-related hormone in kids with dermatitis (Kimata, 2007a). In addition, a comical flick increased the sleep-inducing hormone melatonin in the breast milk of moms. Their babies showed smaller allergic reactions after feeding, too (Kimata, 2007b).

Another series of studies focused on humor and dermatitis. Funny movies helped patients with skin problems, like dermatitis, keep their skin hydrated, maintain their testosterone levels (Kimata, 2007c), produce a microbe-fighting protein in their sweat (Kimata, 2007d), and even alter immunoglobulins in their sperm (Kimata, 2009). Some of these reactions required more immune cells; others required a decrease. Thus, humor doesn't simply amp up immune cells willy-nilly; it seems to alter immunity as needed. It can protect against stress, increase immune cells when they are essential, or alter other aspects of immune function, if that's what's best.

Humor's Impact on Cardiovascular Disease

As you've probably guessed by now, Cousins beat the arthritis that seemed so fatal when he first learned of it from his physician. He viewed all of his changes in diet, relationships, medications, and attitude as essential to his improvement, despite the laughter movement's focus on humor alone. Fifteen years after the diagnosis, he was living a painless, productive life, when he

suddenly had a heart attack. He again took responsibility for his own care. This time humor may have had too much to battle. Systematic work on humor examining blood pressure and heart rate suggests that 6 weekly 90-minute sessions of comedy did not help as much as relaxation (White & Camarena, 1989). The investigators didn't actually code for laughter, so there may be an impact that they missed. The participants were college students, too, so their blood pressures and heart rates weren't particularly high. Humor interventions for cardiovascular problems need more work, but these data support the need for relaxation for one and all. We might soon discover that laughter helps, but we can already count on a nap.

Trait measures of a sense of humor might show a stronger link to cardiovascular functions than mere laughter does. The Situational Humor Response Questionnaire and the Coping Humor Scale showed no links to diastolic blood pressure (the lower number, which represents the pressure between heartbeats) during a cold pressor task. But for systolic blood pressure (the higher number, reflecting pressure as the heart beats), women high in humor showed lower numbers, while men high in humor showed higher numbers during the cold stressor test (Lefcourt, Davidson, Prkachin, & Mills, 1997). This gender-moderated link between humor and blood pressure reactivity may arise because men use more hostile humor. A replication using the Humor Styles Questionnaire, which assesses hostile humor more directly, would make a nice addition to this line of research.

Another study (Clark, Seidler, & Miller, 2001) found lower scores on a version of the Situational Humor Response Questionnaire in patients who had recently been diagnosed with coronary heart disease than in their healthier relatives. This result might mean that a poor sense of humor is a risk for heart disease. Nevertheless, you'll recall that this questionnaire describes oddball predicaments and asks people how funny they would find the circumstances. I doubt that even Richard Pryor and George Carlin, who both had plenty of heart attacks, would

have found many situations worthy of laughter if they were filling out a questionnaire at the hospital where they learned about their coronary heart disease. A larger study, where people completed humor measures and then responded again years later about their medical condition, would offer better support for the idea that humor might be a buffer against coronary conditions. Until this kind of work is done, I'm afraid we're all stuck with eating right and exercising, rather than yucking it up to keep our hearts healthy.

Comic Viagra?

Far from immune function, allergy, heart attacks, or pain (at least for some of us) is the splendid physical function of sexual arousal. It may come as a bit of a surprise, but humor appears to improve erections. Norman Cousins never mentioned this effect, but I sure wish that I could ask him about it. I've never been a huge fan of the big emphasis on equating sexual health with erections. The rigid, fanatical focus on them seems to highlight performance over all else, potentially robbing sex of its intimacy and fun. Of course, I'm not down on erections. Erectile dysfunction is no laughing matter. George Burns described it as trying to shoot pool with a rope. Anything that can help ought to be a plus. I just hate to see closeness and joy confused with a hard penis. I'm sure that my lesbian friends agree.

An intriguing experiment related humor to erectile dysfunction. This seminal work was performed in Japan. Thirty-six guys who had dermatitis (an allergic skin reaction) and erectile dysfunction completed questionnaires and had some blood drawn to measure levels of various hormones. For the next three nights, they brought their wives to the hospital to watch films and repeat the questionnaires and blood samples. Each movie night they ran home with instructions to get it on (Kimata, 2008): "I'm not kidding, Honey. Doctor's orders." Some couples watched funny flicks first (*The Best Bits of Mr. Bean*, Charlie Chaplin's *Modern Times*, and *There's Something about Mary*) for

three nights in a row. Others watched documentaries about the weather, again for three nights in a row. Two weeks later, they switched—not partners, but movies. Those who had already watched comedies now watched weather movies; those who had watched weather flicks now watched comedies.

Mr. Bean's best seemed to do the trick for naughty bits. After the first night of watching a comedy, the men showed spikes in testosterone, a hormone that can enhance erection. They also showed drops in estradiol, a hormone that can interfere with Mr. Happy's happiness. A questionnaire about erectile function revealed improvements, too. Some questions concerned how hard and penetrating their erections seemed. More importantly, additional queries emphasized how enjoyable and satisfying the sex was. Some of the effects were pretty big, with scores on satisfaction with intercourse doubling on the first night after watching a comedy. In contrast, the weather movies didn't raise a lot of interest, so to speak. A tale about tornadoes just doesn't create the same mood. The idea of comedy as foreplay has an intuitive appeal. It has a nice consistency with the evolutionary psychology material we discussed in the previous chapter, too.

The author of the study emphasized that the effects were significant only for the first day. He even began the title of the report with the words "Short-Term Improvement in Erectile Dysfunction . . ." If the comedy works only once in a while, perhaps couples could mix it up with a steamy romance or an erotic thriller. Visual stimuli can have a dramatic impact on an erection (Janssen, Everaerd, van Lunsen, & Oerlemans, 1994). But I wouldn't get deflated about the idea that the movies worked only for one night. I think that the author is expecting too much of humor. Sure, we don't see improvements in erections on the second and the third night of comedy. But that's not Mr. Bean's fault. It certainly doesn't belittle something about Mary. The fact that watching a comedy in the hospital conference room had any impact later in the bedroom seems miraculous. The fact that another comedy, particularly one the very next night,

didn't work right away again is no tragedy, for the following reasons.

Men with erectile dysfunction don't often have sex two nights in a row, never mind three nights in a row. In fact, Asian women who are the ages of the wives in this sample (32 years old on average) report having sex about only once a week. That estimate is not just from the women married to men who have dermatitis and erectile dysfunction, either. Even the women with husbands who have no skin conditions or arousal difficulties were included in the estimate of sexual frequency among Asian women (Schneidewind-Skibbe, Hayes, Koochaki, Meyer, & Dennerstein, 2008). With that fact in mind, these results linking comedy to erections seem more pronounced. Most libraries have free movie rentals, making comedies cheaper than anti-impotence drugs. And unlike Viagra, Ben Stiller never gave anyone vision problems (Pfizer, 2007). (All those concerns about masturbation creating blindness were clearly misplaced.) I think that married men the world over will emphasize that the humor has done all that anyone could expect in this study. In an informal poll, I asked over 5,000 men how frequently they had sex with their wives on three consecutive nights, excluding honeymoons. Those who had sex three nights in a row said that it happened only rarely—both of them. (Okay, I'm kidding.) Everybody loves Chaplin, but even he can't get the average, faithful, married guy laid three nights in a row.

CAN YOU LIVE LONGER WITH LAUGHTER?

Although the Bible praises laughter's curative powers, note that it does not say "Laughter will make you live forever" or even "Some laughter each day keeps the doctor away." An impressive test of comedy's impact on health would link humor and longevity. If people who appreciated, generated, or experienced a lot of humor also lived longer, the knock-knock-joke industry

would undoubtedly flourish. Swapping punch lines sounds like a lot more fun than eating right, exercising, and getting plenty of rest. This type of research on jokes and longevity proves very difficult. Studies that focus on other predictors of a long life can rely on animal models, providing a lot of experimental control. For example, eating less seems to help mice and monkeys live longer (Anderson, Shanmuganayagam, & Weindruch, 2009). Researchers can randomly assign animals to receive less food, so when one group ends up living longer, we know it's from the calories consumed, and not some natural correlate of eating.

But humor research can't work this same way. Imagine randomly assigning participants to solemn or witty lives. It just can't be done. Until we get monkey troops to watch videos of another monkey slipping on a banana peel, we're stuck with correlational research. We can assess aspects of a sense of humor and wait for folks to die, but we won't know if it's comedy or one of its correlates (like extraversion or mirth) that creates the effect. Nevertheless, this correlational work makes a nice first step. If there's no correlation between humor and longevity in these kinds of studies, even with all of their problems, then there is little need to pursue more difficult work on the topic.

An intriguing, early approach to the question of humor and longevity compared comics and comedy writers to other entertainers and authors. Rotton (1992) examined encyclopedias of famous people. With a name like Rotton, he had to become a humor researcher. He compared those who were funny for a living to those who were born in the same year and who were known for something other than humorous work. Those who were funny professionally lived no longer than others did. Oddly enough, entertainers of all sorts died at a significantly younger age than other luminaries did. Entertainers lived an average of 70.5 years; other famous people (scientists, politicians, etc.) averaged about 73 years. The national average age of death at the time of the study was around 75. Perhaps an entertainer's life on the road leads to unhealthy eating, drinking, sleeping, and exercise habits. Maybe the constant pressure to

be engaging and productive took its toll on them, too. Another group that seems to suffer from plenty of scrutiny and artistic demand also dies younger: poets (see Kaufman, 2001). Perhaps the life of the artist creates just too much strain.

An alternative look at humor and longevity focused on the Terman Life-Cycle Study (Friedman et al., 1993; Martin et al., 2002). In the early 1920s, Lewis Terman recruited over 1,500 high-IQ, smarty-pants kids to participate in a study on intelligence and success. These "Termites," as they were called, provided data every 5 to 10 years for over seven decades. Contrary to expectations, funny folks died sooner than their staid pals did. As many would guess, these same people were more likely to smoke cigarettes and drink alcohol, but controlling for these behaviors didn't make the effect disappear. The funny folks still died at a younger age. The humorous kids also grew up to have some riskier hobbies, like flying planes or hunting, but these didn't explain the effect, either. Something about being funny was fatal. It may be comparable to the link between extraversion and dangerous activities that I discussed previously. Or maybe funny people laugh about their illnesses and never go to the doctor.

The authors emphasized that the link between humor and longevity may not stem from one single mechanism. A light-hearted attitude about physical symptoms might lead people to minimize concerns about health. In the long run, folks who are less concerned about health might continue to overeat, drink too much, or smoke, despite negative consequences. They might drag themselves to work when they should stay in bed. They might avoid visiting the doctor when they should. All of this could add up to dying younger. Another study related to this idea (Kuiper & Nicholl, 2004) looked at humor, symptoms, and health concerns. Those with a sense of humor reported fewer physical symptoms, suggesting that comedy could improve health. Nevertheless, the humorous folks also paid less attention to bodily sensations, worried less about illness, and showed less concern about pain. It's possible that humor doesn't relate

to health so much as it relates to one's perception of health. Humor might provide a false sense of security about health or a nonchalant attitude about pursuing healthy behaviors, leading funny folks to report fewer symptoms but then to wind up dying young because they didn't attend to their ills.

So humor does not provide the fountain of youth or the key to eternal life, but that's a lot to expect of any trait. One of the few personality characteristics that does predict mortality may not come as a big surprise. Conscientiousness, that devoted-to-the-details, painstaking, self-controlled approach to keeping organized and productive, appears to buy people a few more years of life (Martin, Friedman, & Schwartz, 2007). The mechanism behind this link is probably obvious. Conscientious folks are more likely to stay away from heavy drinking, tobacco, and other drugs, as well as reckless driving, risky sex, overeating, and suicidal behaviors (Bogg & Roberts, 2004). It's no wonder that they live longer. Their lives must feel particularly long. These effects of conscientiousness are more important than a love of comedy, which actually predicted earlier mortality. For what it's worth, Norman Cousins edited the *Saturday Review* for over 30 years—the type of job no one keeps without a great deal of conscientiousness. Although I'm tempted to reiterate the idea that everybody wants a great sense of humor but that it'll kill you, the real message is less pessimistic. Physical illness isn't always funny. A great sense of humor is delightful, but even the most hilarious people, those who laugh quickest and most often, still have to eat right, exercise, sleep, and go to the doctor if they want to live a long time.

HUMOR AND HEALTH IN A NUTSHELL

Humans have often assumed that humor would help health. Ever since Norman Cousins praised comedy as part of his recovery from a debilitating illness, the idea has spread like feral

flames. Though good old Norman outlived the allegedly fatal form of arthritis by 16 years, and kept kicking 10 years past his first heart attack, he did not survive on chortles alone. It's a little sad to think that a guy who probably saved the world from the fiery, radioactive death of a global thermonuclear war will be remembered best for falling asleep after watching *Monkey Business*.

The humor-and-health data aren't as strong as folks might hope, but the research reveals some promise. A chuckle-worthy show can keep pain at bay in the laboratory, but we're not exactly sure why. The analgesia doesn't appear to arise solely from distraction or an improved mood. It may work best for those who believe it will, just like placebos. Comic performances can improve immune function in those who find them very funny, especially if the jokes create genuine Duchenne smiles or sincere sniggers. People with a good sense of humor seem to have a built-in buffer against stress's impact on immune function. A good comedy can decrease the overactive immune reactions that create allergies, too. So laughter may crank immune function up or down appropriately. Women with a good sense of humor might have lower blood pressure reactivity than their less humorous sisters. Men with high humor scores might show more blood pressure reactivity, perhaps because of hostile humor. A good sense of humor is not likely to lead to a longer life. In fact, those who treat the symptoms of illness as a joking matter can end up dying younger. A love of laughter and plenty of guffaws, combined with a healthy diet, regular exercise, supportive relationships, appropriate medication, and a passion for life, have the potential to keep people healthy.

A funny flick can also help in a case of erectile dysfunction, but not every night for three nights in a row. There is an obvious natural progression from erectile dysfunction in physical health to research on mental health. Sexual health invariably combines purely physiological functions with important psychological ones. Physical, biological

contributors to sex rest heavily on the psychological components that make it enchanting. In many ways, the fact that humor can enhance sexual health underscores its potential contribution to psychological fitness more generally, as we'll see in the next chapter.