Is Laughter the Best Medicine? Humor, Laughter, and Physical Health

Rod A. Martin
Department of Psychology, University of Western Ontario, London, Ontario, Canada

Abstract
This article examines research evidence for the popular idea that humor and laughter have beneficial effects on physical health. Potential theoretical mechanisms for such effects are discussed first. Empirical evidence for beneficial effects of humor and laughter on immunity, pain tolerance, blood pressure, longevity, and illness symptoms is then summarized. Overall, the evidence for health benefits of humor and laughter is less conclusive than commonly believed. Future research in this area needs to be more theoretically driven and methodologically rigorous.

Keywords
humor; laughter; health; immunity; pain

Belief in beneficial effects of humor and laughter on physical health has become increasingly popular in recent years. The media frequently report claims about scientific evidence for health benefits of humor and laughter. Some practitioners have even begun to advocate the use of "therapeutic humor" in the treatment of illness and maintenance of health, and clowns and comedy carts have become familiar sights in many hospitals. The idea that laughter is good for one's health can be traced to biblical times, and was revived periodically by various physicians and philosophers through the centuries. In recent decades, interest in the healing power of laughter was given new impetus by the best-selling account by Cousins (1979) of his recovery from a progressive and painful rheumatoid disease after treating himself with daily bouts of laughter, along with massive doses of vitamin C.

THEORETICAL MECHANISMS

How might humor and laughter influence physical health? There are at least four potential mechanisms, each involving a different aspect of humor, and each suggesting different implications for the application of humor to well-being. First, laughter might produce physiological changes in various systems of the body, which may have beneficial effects on health. Various authors have suggested, for example, that vigorous laughter exercises and relaxes muscles, improves respiration, stimulates circulation, increases the production of pain-killing endorphins, decreases the production of stress-related hormones, and enhances immunity. According to this theoretical model, hearty laughter is crucial in the humor-health connection, whereas humorous perceptions and amusement without laughter would not be expected to confer any health benefits.

Second, humor and laughter might affect health by inducing positive emotional states, which may in turn have beneficial effects on health, such as increasing pain tolerance, enhancing immunity, and undoing the cardiovascular consequences of negative emotions (Fredrickson, 2000). Compared with the first model, this model gives humor and laughter a less unique role in health enhancement, as they are only one means of increasing positive emotions, along with love, joy, optimism, and so forth. Furthermore, according to this model, overt laughter may not even be necessary for health benefits to occur, because humor and amusement may induce positive moods even without laughter.

Third, humor might benefit health indirectly by moderating the adverse effects of stress on health. A considerable body of research indicates that stressful life experiences can have adverse effects on various aspects of health, including suppression of the immune system and increased risk of infectious disease and heart disease (O'Leary,
1990). A sense of humor may enable individuals to cope more effectively with stress by allowing them to gain perspective and distance themselves from a stressful situation, enhancing their feelings of mastery and well-being in the face of adversity. Indeed, there is considerable experimental and correlational evidence for stress-modulating effects of humor, at least with regard to the effects of stress on moods such as anxiety and depression (Martin, Kuiper, Olinger, & Dance, 1993; Newman & Stone, 1996). Individuals with a good sense of humor may cope more effectively with stress than other people do, and therefore might also experience fewer of the adverse effects of stress on their physical health. According to this model, the cognitive-perceptual components of humor are more important than mere laughter, and the ability to maintain a humorous outlook during times of stress and adversity is particularly important. Humor and laughter during nonstressful circumstances would be less relevant to health. This view also introduces the possibility that certain styles of humor (e.g., mildly self-deprecating humor) may be more adaptive and health-enhancing than others (e.g., sarcasm).

Finally, humor may indirectly benefit health by increasing one's level of social support. Individuals with a good sense of humor may be more socially competent and attractive than other people, and better able to reduce tensions and conflicts in relationships, which might result in greater intimacy and more numerous and satisfying social relationships. In turn, the greater levels of social support resulting from these relationships may confer stress-buffering and health-enhancing effects (Cohen & Wills, 1985). In this model, the focus is on interpersonal aspects of humor and the social competence with which the individual expresses humor in relationships, rather than on the simple response of laughter or even a generally humorous outlook on life. This model also emphasizes the importance of distinguishing styles of humor that are potentially socially maladaptive from humor that facilitates relationships.

**RESEARCH FINDINGS**

About 45 published studies have examined the relation between humor or laughter and various aspects of physical health, including immunity, pain tolerance, blood pressure, longevity, and illness symptoms. The main findings of these studies are briefly summarized in this section (for a more detailed review, see Martin, 2001).

**Immunity**

A number of experimental studies have examined the effects of amusement and laughter on various components of the immune system by taking saliva or blood samples from participants before and after exposing them to humorous stimuli, such as comedy videotapes. The majority of these studies have examined only salivary immunoglobulin A (S-IgA), a component of the immune system that is found in saliva and is involved in the body's defense against upper respiratory infections. A handful of additional studies have measured circulating blood levels of a wide variety of hormones, several kinds of white blood cells, and other components of the immune system.

Most (but not all) of these studies have reported significant changes in at least some components of immunity following exposure to comedy. However, numerous methodological problems with the studies make it difficult to draw firm conclusions. In particular, most of the studies did not include adequate control conditions to control for such factors as normal daily fluctuations in immunity levels, the effects of exposure to an interesting videotape, and possible effects of other positive and negative emotions. Consequently, it is difficult to determine whether the observed changes in immunity were specifically due to laughter, or to amusement and positive emotions generally, or to generalized emotional arousal, or to some other nonspecific variable present in the experimental conditions. In addition, in most of the studies, the researchers did not directly monitor participants' laughter, so it is impossible to determine whether overt laughter (as opposed to mere amusement) is necessary to produce the observed changes in immunity.

A further difficulty is that the findings are rather inconsistent across studies and across immune-system variables, with some studies showing immuno-enhancing effects, others showing immunosuppressive effects, and still others showing no effects with particular components of immunity. The small sample sizes and large numbers of statistical tests performed in many of these studies also raise concerns that the reported findings are no more than would be expected by chance alone. Thus, although the findings are somewhat promising, more well-controlled studies are clearly needed before any firm conclusions may be drawn concerning the effects of humor and laughter on the immune system.

Besides these laboratory experiments, several studies have examined correlations between levels of S-IgA and participants' sense of humor as measured by self-report scales. Although two early studies with small sample sizes found sizable positive correlations between sense-of-humor scores and S-IgA, a number of later studies with larger sample sizes failed to replicate...
these findings. Dobbin and I (Martin & Dobbin, 1988) also found support for a stress-moderating hypothesis: Individuals with higher scores on a sense-of-humor test were less likely than individuals with lower scores to show a stress-related decrease in immunoglobulins over $1\frac{1}{2}$ months.

**Pain Tolerance**

A number of studies have examined potential analgesic effects of laughter by testing participants’ pain threshold or tolerance before and after exposing them to comedy videotapes. These studies have generally been more carefully controlled and methodologically rigorous than the immunity research. Most of the studies have had several control groups, controlling for such factors as distraction, relaxation, and negative emotion. Overall, these studies provide fairly consistent evidence that exposure to comedy results in increases in pain threshold and tolerance that do not appear to be simply due to distraction. There is also some evidence from field studies that the analgesic effects of humor observed in the laboratory may extend to clinical interventions, but only with mild to moderate levels of pain.

However, because none of these studies have examined correlations between overt laughter and changes in pain tolerance, it is unclear whether the effects are due to laughter in particular or to positive emotions associated with amusement. Moreover, studies that have included negative-emotion control conditions have demonstrated similar increases in pain threshold and tolerance after exposure to videotapes inducing negative emotions such as disgust, horror, or sadness. These findings suggest that the observed analgesic effects may occur with both positive and negative emotional arousal, rather than being specific to laughter or amusement. It is also important to note that, contrary to frequent claims in the media, there is no evidence to date that these changes in pain tolerance are due to laughter-stimulated increases in naturally occurring opium-like substances such as endorphins. Indeed, some studies have shown that levels of endorphins in the blood do not change following exposure to comedy.

**Blood Pressure**

Although some people have speculated that hearty laughter may lead to a reduction in blood pressure over time, experimental studies indicate that laughter is actually associated with short-term increases in blood pressure and heart rate, but no longer-term effects. However, in a correlational study, Lefcourt, Davidson, Prkachin, and Mills (1997) found sex differences in correlations between sense-of-humor test scores and systolic blood pressure (SBP) during a series of stressful laboratory tasks. Women showed the expected negative correlations between sense of humor and SBP, whereas the correlations for men were in the opposite direction, higher humor being associated with higher SBP. These authors suggested that the findings may be due to differences in the ways in which men and women express humor, with women engaging in more tolerant, self-accepting, and adaptive forms of humor, potentially leading to more beneficial physiological effects.

**Longevity**

Two studies have examined the hypothesis that individuals with a greater sense of humor will live longer. Rotton (1992) found that the life duration of comedians and humor writers did not differ from that of serious entertainers and authors. Friedman et al. (1993) reported analyses of data from 1,178 male and female participants in the Terman Life-Cycle Study, who have been followed since 1921. A composite measure of cheerfulness was derived from parents’ and teachers’ ratings of these individuals’ sense of humor and optimism at the age of 12. Surprisingly, survival analyses revealed that individuals with higher rated cheerfulness at age 12 had significantly higher mortality rates throughout the ensuing decades. The authors suggested that these results might have been due to more cheerful individuals being less concerned about health risks than less cheerful individuals were, and therefore taking less care of themselves. In any case, the existing evidence, though scanty, does not support the hypothesis that a sense of humor increases longevity.

**Illness Symptoms**

Several researchers have examined simple correlations between tests of sense of humor and overall health, as measured by self-report checklists of physical symptoms. A few of these studies have found significant negative correlations between these variables, indicating that individuals with a greater sense of humor report fewer symptoms of illness and medical problems. Other studies, however, have failed to replicate these findings. Additionally, some studies have found a stress-moderating effect of sense of humor on self-reported illness symptomatology, although these findings have not been replicated in other studies.

It is important to note that self-report measures of illness symptoms are notoriously confounded with negative emotionality or neuroticism, making them somewhat unreliable measures of health.
(Watson & Pennebaker, 1989). Because sense of humor tends to be negatively related to neuroticism, observed correlations between sense of humor and self-reported illness symptoms may be due to this shared neuroticism component rather than any actual health benefits of humor. Indeed, research indicates that correlations between sense of humor and physical-symptom measures disappear after controlling for neuroticism.

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

Overall, the existing empirical evidence concerning health benefits of humor and laughter is less convincing than what is often portrayed in popular-media reports. However, despite these rather equivocal findings, there is reason to pursue further investigations, using more systematic, careful, and rigorous research methods and more sophisticated theoretical formulations. The methodological weaknesses in much of the experimental research, including inadequate controls and generally small sample sizes, often make it difficult to draw conclusions one way or the other. In addition, several of the hypothesized mechanisms discussed earlier have not been adequately tested, and little attention has been given to distinguishing particular styles of humor that may be more healthy than others. Given the longevity and popularity of the idea of health benefits of humor, and the important implications of such an effect if indeed it exists, more careful investigation is warranted.

Each of the four hypothesized mechanisms discussed earlier merits more thorough investigation. Much of the past experimental research involving exposure to comedy videotapes was presumably based on the hypothesis that laughter produces health-enhancing physiological changes in the body. However, most of these studies failed to monitor the actual occurrence of laughter, to distinguish various types of laughter (e.g., genuine vs. feigned), or to examine the relation between duration, frequency, or intensity of laughter and physiological outcomes. Thus, it may be that genuine physiological effects of particular types or degrees of laughter have gone largely undetected because of sloppy methodological procedures. In addition, as noted, more adequate control groups are needed to rule out possible alternative explanations for findings.

The hypothesis that health effects of humor may be mediated by positive emotion has also not received adequate research attention. Laboratory studies with comedy conditions should include control conditions eliciting non-humor-related positive emotions and negative emotions, in addition to emotionally neutral conditions, so that researchers can examine the degree to which any observed effects are specific to humor and laughter, are common to positive emotions generally, or occur with negative as well as positive emotional arousal.

The stress-moderating hypothesis also merits further investigation using more sophisticated approaches. Certain types of humor may be effective in coping with certain types of stress. Recently developed measures that distinguish between potentially beneficial and deleterious uses of humor (Martin, Puhl-Doris, Larsen, Gray, & Weir, in press) may yield more meaningful results than previous humor scales that tended to blur these distinctions. Alternatively, it may be beneficial to examine individuals intensively over time rather than to compare individuals at one point in time, so that processes of coping and use of humor can be studied.

Finally, the hypothesis that health benefits of humor are mediated by social support has received almost no research attention. It seems intuitively likely that compared with serious individuals, humorous individuals find it easier to attract friends and develop a rich social-support network, and therefore gain the well-established health benefits of social support. However, little research has examined the effects of humor on social support or other aspects of interpersonal relationships.

In conclusion, despite the popularity of the idea that humor and laughter have significant health benefits, the current empirical evidence is generally weak and inconclusive. More carefully conducted and theoretically informed research is needed before one can have any confidence that humor or laughter affects physical health in a positive way.

Recommended Reading


Note

1. Address correspondence to Rod A. Martin, Department of Psychology, University of Western Ontario, London, Ontario, Canada N6A 5C2; e-mail: ramartin@uwo.ca.

References


