Humor Theories and the Physiological Benefits of Laughter

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There are 3 main theories used to explain the functions of humor: (1) the relief theory, (2) the incongruity theory, and (3) the superiority theory. While these theories focus on the specific role that humor plays for people in situations such as dealing with misfortune, making sense of rule violations, and bonding with others, we propose that underlying each of these theories are the physiological benefits of laughter. We draw on findings from empirical studies on laughter to demonstrate that these physiological benefits occur regardless of the theory that is used to explain the humor function. Findings from these studies have important implications for nurse practitioners working in hospice settings, long-term care facilities, nursing homes, and hospitals. KEY WORDS: humor, laughter, physiological benefits

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Humor and laughter have long been recognized as central to the human condition; in fact, their benefits were noted in some of the world’s earliest printed texts. A hymn from the Rig Veda, the earliest of the 4 Hindu religious scriptures, the Vedas (c. 1200–900 BC), refers to “fun making for the creation of laughter” (IX.112.4). Gruner1 points out that humans laughed before they told jokes, for there was a time when humans did not have language, but were capable of laughter. The universal expression of laughter is upheld by many theorists as evidence of laughter’s biological roots. Studies of joking relationships in different cultures (eg, Radcliffe-Brown2) indicate that these relationships serve to maintain social harmony and stability. The fact that one cannot tickle oneself and evoke genuine laughter further suggests that laughter is controlled by social cues and interactions.3–5

From an evolutionary perspective, laughter, like all traits that are passed on through natural selection, must have survival value. Laughter serves many functions essential to human survival—a bonding function, a peacemaking function, and a health-boosting function. McDougall6 proposed that laughter evolved as a protective shield, not as a coping mechanism for people’s own misfortune, but because humans needed to have empathy for others in order for the human race to survive. In addition to developing this theory of the evolutionary functions of laughter, McDougall7 was also one of the first psychologists to bring attention to the physiological benefits of laughter. The physiological benefits that have implications for nursing practice will be explored within the framework of humor theories after reviewing laughter’s use as a coping mechanism.

LAUGHTER AS A COPING MECHANISM

Some theorists suggest that laughter and humor are instinctive coping mechanisms that help people deal with the disappointments and struggles of life.8,9 Specifically, it is believed that by finding humor in stressful or potentially threatening situations, people can replace negative with positive affect, thereby giving them an increased ability to cope with negative states of affairs.10–12 Humor based on incongruities, or things that appear inappropriate for their context, is particularly well suited to reappraising negative situations from different, less threatening perspectives.13 By being in touch with their patients’ emotions and sense of psychological well-being, nurse practitioners can decide when it might be useful to encourage their patients to engage in positive reframing. As Dossey and Keegan14 explain, nurses can help relieve their patients’ stress by helping them to find humorous perspectives in their problems. That being said, it is also important to be sensitive to

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patients’ reactions to humor. Just as 2 clients with the
same symptoms may not always get the same
medication, different patients may require different
doses and different types of humor.
Throughout history, oppressed people have used
humor as a survival tool. Referring to its use in Native
American communities, Luna et al commented,

In Indian humor, you can make fun of anything and
even at the worst times . . . I think what I came to
realize is that it’s a way of easing the pain, that
laughter is a good cure and that maybe if we didn’t
laugh so much, we would be depressed.15

Likewise, in “Man’s Search for Meaning,” Frankl16
documented his and his fellow prisoners’ use of joking
and humor while imprisoned in Nazi concentration
camps. In the words of Vereen et al, “People
consistently see [humor’s] value in shaping their
perspective in times of difficulty and in helping them
to adjust to stressful situations.”17(p10) Such
perspective shaping might be particularly useful for
patients suffering with debilitating diseases or for
family members dealing with uncertainty about the
future outcomes of loved ones. So as not to be viewed
as unprofessional when using humor to lighten the
seriousness of patients’ conditions, nurses should
provide a brief explanation of the role of humor in
helping to reframe situations along with information
on the health benefits of humor.14

Anecdotal accounts of the stress-reducing effects of
humor are supported by research on humor’s
effectiveness in reframing stressors. Cann and Etzel,18
for example, used a sample of 176 university students
to examine the relationship between individuals’ sense
of humor and their perceived personal stress. The
participants completed 3 measures of sense of humor,
in addition to 3 positive personality measures related
to happiness, hope, and optimism. It was found that
having a sense of humor was associated with lower
perceptions of stress and higher levels of optimism,
hope, and happiness.

Different aspects of humor, such as turning
negatives into positives, being optimistic, and having
hope in life, are all effective coping strategies.
Research shows that believing in the benefits of
laughter alone is sufficient for the body to experience
physiological benefits, such as decreased pain.
Mahony et al19 conducted a study to determine
expectation benefits of laughter on pain threshold
levels. The participants included 100 undergraduate
students who were informed that humor would either
decrease or increase their discomfort. After viewing a
Seinfeld episode, participants completed humor
ratings, and their pain discomfort thresholds were
measured. Participants who were informed that they
would experience decreased discomfort thresholds
showed lower blood pressure valve readings ($M = 128.17$ mm Hg) in response to a blood pressure cuff
treatment. Participants who were told that their pain
discomfort thresholds would increase had higher pain
discomfort levels ($M = 152.4$ mm Hg). The higher
pressure readings for those who were told that their
pain discomfort thresholds would increase indicate
that people’s expectations of being able to tolerate pain
influence their actual ability to tolerate it. Interestingly,
it was also found that watching humorous videos
raised pain tolerance thresholds regardless of the
expected outcomes, indicating interplay between the
actual physiological benefits of laughter and effects
based on expectations. It is worth noting that
humor-related increases in pain tolerance have been
confirmed in several controlled experiments.20–23

A Japanese study on the benefits of laughter
involving 23 individuals with type 2 diabetes and an
unaffected control group found that laughter decreased
the level of blood prorenin in individuals with diabetes
and neuropathy by 196.6–166.7 ng/L and in
individuals with diabetes without neuropathy by
93.4–60.4 ng/L.24 Prorenin receptor genes, which are
bonding agents that result in elevated levels of protein,
increased with laughter by 1.49 fold in participants
with diabetes, whereas there were no significant
changes in participants without diabetes. The
researchers noted that there is a close relationship
between diabetic complications and anxiety and
depression. In addition, the renin-angiotensin system
(RAS) and diabetes are closely related, and imbalance
of the RAS may contribute to depression-like
behaviors. The results of this study suggest that
laughter can prevent exacerbation of diabetic
neuropathy, and by extension may also serve to lessen
symptoms of anxiety and depression associated with
diabetic complications or depression-like behaviors
associated with imbalance of the RAS.

Elevated mood results from increased serotonin
release and synthesis caused by motor activity.25
Happiness levels have also been correlated with
serotonin synthesis, suggesting a mutual interaction
between serotonin synthesis and mood.26 Recent
research shows that the physical act of laughter is
comparable to mild aerobic exercise and can,
therefore, improve mood in the same way that exercise
Szabo compared mood effects in individuals after watching a 20-minute comedy video, running on a treadmill for 20 minutes, and watching a nonhumorous documentary video. It was found that the comedy video produced similar outcomes to the aerobic exercise in terms of positive mood increases and emotional distress decreases.

Gutwirth cautioned that “scientific speculation meets up with folk wisdom in the confident identification of laughter with health and well-being.” However, research from the medical field demonstrates that there is nothing speculative about laughter’s contribution to health and well-being. There is empirical evidence supporting laughter’s ability to (a) increase pain tolerance, (b) increase energy expenditure, (c) reduce the effects of bronchial asthma, (d) decrease skin-related allergic reactions, and (e) decrease exacerbation of diabetic neuropathology. These findings have particularly important implications for nurse practitioners.

THEORIES OF HUMOR

Three main theories explain the functions of humor: the relief theory, which focuses on physiological release of tension; the incongruity theory, which focuses on contradictions between expectations and experiences; and the superiority theory, which focuses on sense of supremacy over others. Each theory accounts for the role of humor in specific situations: relief humor for relaxing tensions during social interactions, incongruity humor for presenting new perspectives, and superiority humor for criticizing opposition or unifying a group. The purpose that humor serves in any given situation may be open to interpretation, but the physiological effects are not. Cognition is needed to understand humor, but it is not needed for the physiological effects of laughter to occur. In other words, individuals will experience similar bodily reactions regardless of whether they laugh due to tension release or through appreciation of incongruities. The following section demonstrates how the physiological benefits of laughter underlie the 3 main theories about the functions of humor.

Relief theory

According to the relief theory, people experience humor and engage in laughter because they sense that stress is reduced in doing so. Alternately, people may laugh at something humorous, which then results in a feeling of mirth and sense of relief. Relief may involve a cognitive release from anxiety or a physical release of tension. The physiological benefits of laughter most closely align with this theoretical perspective as many negative health conditions are exacerbated by stress, and laughter has been shown to reduce the symptoms of such conditions. In individuals with bronchial asthma, for example, negative emotional states can induce airway constriction, while positive emotional states can relieve airway constriction. Thus humor and laughter, and the resulting emotion, mirth, can unite the body and mind.

Kimata conducted 2 experiments to assess the effects of viewing humorous videos on bronchial responsiveness to methacholine—an allergy-inducing medication. The participants in the first experiment consisted of 20 healthy individuals and 20 individuals with house dust mite allergic bronchial asthma. Methacholine challenge tests were administered before and after participants watched a humorous or nonhumorous film. It was found that bronchial responsiveness to methacholine was significantly reduced for individuals with house dust mite–sensitive bronchial asthma. In the second experiment, bronchial responsiveness to the epigallocatechin gallate (EGCg) allergen was tested in 15 healthy individuals and 15 individuals with EGCg bronchial asthma before and after viewing a humorous or nonhumorous film. It was found that bronchial responsiveness to EGCg was again significantly reduced because of watching the humorous film. Kimata concluded that pulmonary function in individuals with bronchial asthma was improved by positive emotional states—which could be activated through the cognitive functions of humor and the physical acts of laughter—and was aggravated by negative emotional states associated with the symptoms of bronchial asthma.
and neurotrophin-3 blood levels were then measured in response to allergen skin prick tests. Compared with individuals who had watched the nonhumorous video, levels on all measures were lower in individuals who had viewed the humorous video. These findings indicate that the relief theory of humor has some medical basis; humor can indeed aid in the reduction of the physiological effects of stress.

There are a few other studies that indicate that humor can help reduce anxiety states and mood disturbances. For example, Szabo et al\textsuperscript{35} investigated the effects of humor, exercise, music, and sitting on anxiety and total mood disturbances in 20 healthy women. Each participant was tested for anxiety and total mood disturbances for 5 minutes before and 5 minutes after each intervention, which involved watching a humorous video, cycling at 50\% of maximum heart rate, listening to music, or sitting quietly. Effect size changes of anxiety state between pre- and posttreatments demonstrated that compared with exercise, music, and sitting, humor had the greatest impact on reducing anxiety state and total mood disturbances. This finding is particularly noteworthy, given the accepted function of aerobic exercise as an antidepressant and the protective role such exercise plays against the harmful effects of stress.\textsuperscript{26}

\textbf{Incongruity theory}

The incongruity theory purports that people laugh at things that surprise them or at things that violate an accepted pattern—with a difference close enough to the norm to be nonthreatening, but different enough from the norm to be remarkable. The incongruity theory emphasizes cognition; individuals must have rationally come to understand typical patterns of reality before they can notice differences. A humorous situation must involve the perceiver simultaneously having in mind one view of the situation that seems normal and another view of the situation in which there is a violation of the natural order.\textsuperscript{36} This theory has support in neuroimaging research, which shows that the parts of the brain involved in resolving incongruities are activated while processing cartoons.\textsuperscript{37–39}

Although the incongruity theory does not focus on the physiological benefits of laughter evoked through experiencing incongruities, it is clear that such laughter does have physiological benefits. Buchowski et al\textsuperscript{30} used 94 friend dyads to study the effects of heart rate and energy expenditure during genuine laughter. Participants watched a series of film clips intended to elicit either laughter or a neutral response. Prior to viewing the clips, baseline energy expenditure and heart rate were measured. Laughter, heart rate, and rate of energy expenditure were analyzed at 1-minute intervals throughout the intervention. Findings indicated statistically significant ($P < .001$) increases in participants’ energy expenditure and heart rate during laughter as compared with periods of rest. Specifically, during laughter, energy expenditure increased by up to 20\% above resting. This increase in energy expenditure translated to an annual weight loss of 0.5 to 2 kg.

In addition to the promising implications of laughter’s contribution to weight loss, it is also worth noting that laughter was likely to have been evoked in this study through participants’ experiences of incongruity. Participants were asked to bring a friend to the testing site so as to make “The social context of the testing environment . . . conducive to eliciting laughter.”\textsuperscript{30(p132)} Participants were not aware that laughter was the focus of the study, and once they entered the test site—an environmentally controlled airtight room—they were told to sit passively and not to talk to their friends. To test participants’ resting energy expenditure, the video began with a 30-minute clip of England’s landscape. This clip was followed by a series of humorous and nonhumorous video clips. It is quite likely that much of the laughter evoked during this testing session resulted from the incongruities experienced by participants; they were told to bring a friend to the test site, but when they arrived they were instructed not to talk to their friends (but rather to sit passively next to them). In addition, participants most likely experienced surprise at viewing humorous videos following a video of England’s landscape. As participants were not aware of the purpose of this study, these situations would have activated incompatible frames of reference—in other words, they typified incongruities.

\textbf{Superiority theory}

The superiority theory proposes that laughing at faulty behavior can reinforce unity among group members.\textsuperscript{40} It is believed that superiority humor serves 2 important societal functions: it maintains social order as laughter, rather than aggression, is invoked toward those who refuse to comply with rules and through laughing together at others, it reinforces group unity.\textsuperscript{41,42} While the latter may seem like a malicious form of humor, it
Laughter is a method of communication that promotes affiliative and cooperative behavior, and antiphonal laughter—laughter that co-occurs or immediately follows that of a social partner—specifically, has the potential to reinforce mutually pleasurable experiences. As well as conveying emotional information about oneself, laughter elicits similar emotions in others and therefore serves a bonding function. Provine noted from observations of 1200 episodes of laughter expressed by people interacting in public places that most laughter occurred during routine comments rather than in response to joke-telling, which provides further evidence of the bonding functions of laughter.

If laughter serves a social bonding function, it should be no surprise that it also serves to increase people’s likeability. Reysen found that viewers rated individuals who were laughing in photographs and video clips as higher on likeability than individuals who were not laughing, and it did not matter if the laughter was genuine or fake. In addition, individuals who displayed genuine laughter in the videos and photographs were rated significantly \((P < .001)\) higher on likeability than those with neutral expressions.

Overall, findings from these studies indicate that laughter plays an important role in social interactions, both in terms of unifying members of a group, as the superiority theory suggests, as well as in influencing people’s perceptions of others as likeable. If the physiological benefits of this situation are not immediately obvious, consider the role of social support in maintaining people’s sense of well being.

Low social support has been associated with high levels of stress and depression and negative mood hostility is a risk factor for the development of coronary heart disease (CHD) and poor survival of those with coronary artery disease (CAD). People with negative mood hostility are likely to have low levels of social support and people who are liked by others are likely to have high levels of social support. Loneliness has been related to unhappiness and a range of mental and physical problem. Conversely, people who are liked tend to be happy—an emotional state that has been associated with numerous positive outcomes, including immunity and physical well-being.

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**REFERENCES**


