



## The Psychobiology of Humor and Laughter

Like all psychological phenomena, humor is based on a large number of complex biological processes taking place in the brain and nervous system. To experience humor, an individual must first perceive playful incongruity in a stimulus event. This perceptual process draws on systems located in many regions of the cerebral cortex involved in visual and auditory perception, language comprehension, social cognition, logical reasoning, and so forth. When humor is perceived, these cognitive processes stimulate emotional systems associated with positive feelings of mirth and amusement, involving areas in the prefrontal cortex and limbic system. These emotion systems also release a cocktail of biochemical molecules, producing further changes in the brain and throughout the body via the autonomic nervous system and endocrine system. In addition, the activation of mirthful emotion typically triggers the expressive responses of smiling and laughter, which involve the brainstem and its connections to the forebrain, as well as nerves leading to muscles in the face, larynx, and respiratory system.

The investigation of these sorts of biological processes in humor lies within the domain of biological psychology (also known as psychobiology or physiological psychology), the branch of the discipline that studies the relation between behavior and the body, particularly the brain. Biological psychology is part of a broader field of study known as neuroscience, which also includes disciplines such as neurophysiology, neuroanatomy, and brain biochemistry. Although the study of humor and laughter has not been a major focus in biological psychology, there has been a small

but steady output of research on this topic over the years. The recent publication of several functional magnetic resonance imaging (fMRI) studies (e.g., Azim et al., 2005) as well as articles on topics such as the evolution of humor and laughter (e.g., Gervais and Wilson, 2005) suggest that interest in this topic is increasing (see also Vaid, 2002).

As we will see, biological research on humor and laughter highlights the importance of emotional components of humor in addition to the cognitive aspects, pointing to humor as an interesting topic for investigating the interplay between emotion and cognition more generally. As such, the psychobiological study of humor may be viewed as a subject within the newly developing field of affective neuroscience (Panksepp, 1998). Our discussion of biological aspects of humor also provides an opportunity to focus more closely on many interesting questions concerning the nature and functions of laughter.

In this chapter, I will begin by discussing laughter as an emotional display that expresses the positive emotion of mirth, followed by an overview of research on the acoustics, respiration, phonation, and facial expressions of laughter, as well as the autonomic and visceral concomitants of mirth. The subsequent discussion of laughter in nonhuman animals will underscore the close connection between humor, laughter, and play. I will then explore several other laughter-related topics, including pathological laughter conditions, laughter and the brain, and tickling as a stimulus for laughter. Next, I will turn to investigations of the brain areas involved in the cognitive and emotional processing of humor, including studies of humor in patients with localized brain damage as well as studies of normal subjects using EEG and fMRI. Finally, I will discuss theories about the evolutionary origins and adaptive functions of humor and laughter.

## THE NATURE OF LAUGHTER

As many authors have noted, boisterous laughter comprises a very strange set of behaviors. A hypothetical alien from outer space would certainly be struck by the oddity of this behavior, noting the loud, barking noises that are emitted, the repetitive contractions of the diaphragm and associated changes in respiration, the open mouth and grimaces caused by contractions of facial muscles, the flushing of the skin, increased heart rate and general physiological arousal, production of tears in the eyes, loss of strength in the extremities, and flailing body movements (cf. Askenasy, 1987; Keith-Spiegel, 1972). Such hearty laughter seems to take over the whole organism in an uncontrollable and compulsive way, conveying almost overwhelming feelings of enjoyment and amusement. It is also very contagious and difficult to fake (van Hooff and Preuschoft, 2003). What a peculiar way for people to respond to the perception of humor!

Koestler (1964) characterized laughter as a physiological reflex, and suggested that it is the only domain in which a highly complex mental stimulus (i.e., humor) produces such a stereotyped reflexive response. However, as van Hooff and Preuschoft

(2003) have pointed out, the term *reflex* is a misnomer because, unlike reflexes, laughter is highly dependent on motivational and emotional states and social context. Instead, laughter seems to be best characterized as a “fixed action pattern,” a ritualized and largely stereotyped behavior pattern that serves as a communication signal.

### Laughter and Emotion

As Charles Darwin (1872) noted in *The Expression of the Emotions in Man and Animals*, laughter is essentially an emotional expression, a way of communicating to others that one is feeling a particular emotion. Thus, laughter is one of many largely hardwired behavior patterns used by humans to communicate a wide range of positive and negative emotions, including various facial expressions (e.g., scowling, frowning), vocal sounds (e.g., gasping, screaming), bodily actions (e.g., trembling, shaking the fist), changes in speech patterns (e.g., shouting, whining), and so on. In the case of laughter, the particular emotion that is communicated is a pleasurable feeling closely related to joy. As noted in Chapter 1, researchers have not yet settled on an agreed-upon technical name for this emotion, with different scholars referring to it as “amusement,” “humor appreciation,” or “exhilaration.” I prefer the term *mirth*, which captures its emotional nature as well as its association with humor and laughter.

The emotion of mirth is therefore primary, with laughter (along with smiling) being an emotional display. The more intense the emotion, the stronger the expressive display. At low levels of intensity, mirth is expressed by a faint smile, which turns into a broader smile and then audible chuckling and laughter as the emotional intensity increases. At very high intensity, it is expressed by loud guffaws, often accompanied by a reddening of the face as well as bodily movements such as throwing back the head, rocking the body, slapping one’s thighs, and so on. Although, as we will see, there is evidence that smiling and laughter may have different evolutionary origins, they are very closely related in humans, with smiling and laughter occurring along a continuum of emotional intensity. The same facial muscles are involved in laughter and smiling, with stronger contractions of longer duration occurring in laughter than in smiling (Ruch, 1993). The close connection between smiling and laughter is also evident in the fact that laughter typically begins as a smile and, after the laughter ends, gradually fades smoothly back into a smile once again (Pollio, Mers, and Lucchesi, 1972).

Like all emotions, mirth has behavioral, physiological, and experiential components. In addition to the vocalizations, facial expressions, and bodily actions that characterize the expressive behavior of laughter, mirth involves a range of physiological changes that take place in the brain, autonomic nervous system, and endocrine system, along with subjective feelings of pleasure, amusement, and cheerfulness. I will discuss each of these components in the following sections. As we will see, the emotion of mirth that is expressed by laughter also appears to be closely related to play. Much of the laughter of early childhood may be seen as an expression of the exuberant

delight associated with physical play activities such as running, chasing, and rough-and-tumble play-fighting, as well as incongruous playful actions such as peek-a-boo games.

Since social play is an important activity in juveniles of all mammal species, the evolutionary origins of mirth and laughter in play may well extend to our earliest mammalian ancestors some 60 million years ago. As children's cognitive and linguistic abilities develop, they begin to laugh not only at physical play, but also in response to the sorts of playful manipulation of incongruous ideas, words, and concepts that we call "humor." Thus, humor may be viewed as a cognitive-linguistic form of play that elicits the emotion of mirth which, in turn, is typically expressed through laughter.

Humor may not be the only stimulus that elicits the emotion of mirth and the laughter that expresses it. This emotion may also be elicited by several other stimuli, including nitrous oxide ( $N_2O$ , or "laughing gas") and possibly tickling (Niethammer, 1983; Ruch, 1993). At any particular time, an individual's threshold for experiencing mirth can be raised or lowered by a variety of factors, such as the social context (e.g., feelings of safety, the presence of other people who are laughing), one's current mood (cheerfulness versus depression; Deckers, 1998; Ruch, 1997), health status, level of fatigue, ingestion of alcohol or psychoactive drugs (Lowe et al., 1997; J. B. Weaver et al., 1985), and more enduring personality traits such as one's overall sense of humor (Ruch, 1993).

### Acoustics of Laughter

The characteristic that most strikingly distinguishes laughter from other human activities is the loud and distinctive sounds that are emitted. As we will see, the function of these laughter sounds appears to be both to communicate to others one's joyful and playful emotional state, and to induce this same emotional state in the listeners (Gervais and Wilson, 2005). In recent years, researchers have begun to study the acoustics (sound properties) of laughter, employing methods commonly used by ethologists to investigate animal vocalizations such as bird songs. In this research, recordings of human laughter are digitized and then analyzed using computer-based spectrographic procedures to examine their audio waveforms, frequency patterns, and other acoustical characteristics. The unit of analysis in these studies is usually the series of "ha-ha-ha" sounds that are made during a single exhalation. Researchers refer to such a laugh episode as a *laughter bout*, and the individual "ha" syllables are referred to as *calls* (Bachorowski et al., 2001), *notes* (Provine and Yong, 1991), or *pulses* (Ruch and Ekman, 2001).

Psychologists Robert Provine and Yvonne Yong (1991), at the University of Maryland, analyzed the acoustical properties of 51 laughter bouts produced by male and female university students and staff members. To obtain recordings of laughter, they approached people in public places with a tape recorder and asked them to "simulate hearty laughter." Most people found it very difficult to laugh on command, and their first attempts were typically strained and artificial, presumably because they were not

actually experiencing the emotion of mirth that laughter normally expresses. However, the funniness of the activity itself, along with the clowning and kidding of the experimenters, typically caused the subjects to begin feeling amused and they started laughing spontaneously and naturally. It was these natural and spontaneous bouts of laughter that were subsequently analyzed.

These analyses revealed that, on average, each laugh bout consisted of four individual notes or calls, although there was considerable variability in this number, ranging from one to as many as 16 in some laughter samples, but typically no more than eight. Each laugh note within a bout was found to begin with a protracted voiceless aspirant (i.e., a hissing *h* sound not produced by vibration of the vocal cords). This was followed by a forcefully voiced vowel-like sound with an average duration of about 75 milliseconds. Another voiceless aspirant then followed, with an average duration of about 135 milliseconds, followed by the next voiced vowel sound. Thus, each complete “ha” note was about 210 milliseconds in duration, resulting in about five notes typically being emitted per second. Not surprisingly, the fundamental frequency (corresponding to the perceived pitch) of male laughter (averaging 276 Hertz) was lower than that of females (502 Hertz), reflecting the lower pitch of men’s voices. Each laugh note showed a clear harmonic structure, with numerous secondary frequencies occurring as multiples of the fundamental frequency, producing a richly harmonious quality.

Based on their analyses, Provine and Yong emphasized the stereotypical nature of laughter, observing that there was very little variability across people in such characteristics as the overall duration of individual notes. Regardless of the number of notes in a given bout of laughter, the duration of each note (onset-to-onset inter-note interval, or INI) seemed to remain fairly constant, at about 210 milliseconds. However, the voiced segment (“vowel sound”) of each note became slightly shorter from the beginning to the end of a laugh bout, while the intervening unvoiced (*h* sound) segments became correspondingly longer, thus maintaining the same overall duration for each note. They also observed that the amplitude (loudness) of each voiced note segment decreased from the beginning to the end of a bout. Interestingly, when played backwards, a laugh bout sounds quite normal, except for the fact that it becomes progressively louder instead of quieter. This is quite different from human speech, which does not sound at all normal when played backwards.

Because Provine and Yong’s (1991) analyses were conducted on a relatively small sample of laughs obtained from people who were asked to produce laughter on demand, they may not have been representative of the full range of laughter that occurs naturally in social settings. Consequently, they may have concluded that laughter is more stereotyped and unvarying than it actually is. More recently, Jo-Anne Bachorowski and her colleagues (2001), at Vanderbilt University, conducted more extensive acoustical analyses of laughter using recordings of 1024 laughter bouts from 97 male and female university students. To obtain a wide range of naturalistic laughter samples, recordings were made while the participants were watching humorous videotapes in a comfortable laboratory setting, either alone or in same-sex or mixed-sex dyads.

In contrast to the stereotypy of laughter emphasized by Provine and Yong, these researchers found evidence of a great deal of variability and complexity in the acoustic properties of laughter. Several different types of individual laugh calls (notes) were identified, including voiced “songlike,” unvoiced “gruntlike,” and unvoiced “snortlike” calls, in addition to “glottal pulses,” and “glottal whistles.” Several of these different types of calls were often observed within a single bout of laughter, and there was little consistency within individual participants in the types of calls that they produced from one laugh bout to another. However, some general sex differences were observed. Females produced significantly more bouts containing voiced, songlike calls, whereas males produced more unvoiced, gruntlike laughs. Men and women did not differ, though, in the frequency of unvoiced snortlike laughs. Although there were no sex differences in the overall number of laugh bouts produced in response to the humorous videotapes, men’s bouts tended to be slightly longer than women’s, with more calls per bout.

On average, laugh bouts were comprised of 3.4 calls per bout, with a total duration of 870 milliseconds, but there was a great deal of variability in these numbers. Laugh bouts typically began with a fairly long call (280 milliseconds duration) followed by a series of shorter calls (lasting 130 milliseconds each). Like Provine and Yong, these researchers found that the unvoiced *b*-sound segments between calls tended to be shorter at the beginning of a bout and then became progressively longer toward the end. Analyses of fundamental frequencies of calls also indicated a considerable amount of variability, both between and within individuals. Indeed, the fundamental frequencies were often found to change over the course of an individual call, either rising or falling in pitch. Compared to shorter bouts, longer bouts of laughter tended to have higher mean fundamental frequencies and greater shifts in frequency within calls.

Analyses of the vowel sounds in voiced calls revealed that these are not nearly as distinct or clearly articulated as the vowels of speech, but tend to be a central, unarticulated *schwa* (like the *a* sound in “about”). Contrary to the observations of Provine and Yong (1991), “ho-ho” and “he-he” laughs were extremely rare, while “ha-ha” was much more common. Nonetheless, there was some evidence that individuals tend to have distinct laughs based on slight variations in the vowel sounds and other vocal characteristics that they produce while laughing. Bachorowski and her colleagues concluded that laughter is much less stereotyped than claimed by Provine and Yong (1991), but instead should be conceptualized as a “repertoire of sounds.” Arguing that laughter has an important social communication function (discussed in Chapter 5), they suggested that these different sounds of laughter are combined in various ways to communicate subtle differences in emotional meanings to other people.

In a series of experiments, Silke Kipper and Dietmar Todt (2001, 2003a, 2003b), at the Free University of Berlin, took a somewhat different approach to studying the acoustics of laughter. Using computer equipment, they systematically modified various acoustical parameters of natural laughter bouts, such as the duration of laugh notes, the fundamental frequencies, and amplitude (loudness). They then had participants listen to these altered laugh bouts and asked them to rate the degree to which

these laughs sounded like normal laughter, as well as rating their emotional responses to them. Among a number of interesting findings, these researchers found that laughter can diverge to a considerable degree on various acoustical parameters and still be perceived as normal laughter. Moreover, laugh bouts that showed substantial variability across calls were considered more natural and elicited more positive emotional responses as compared to more stereotyped bouts containing little variability. These findings cast further doubt on the view of laughter as a highly stereotyped vocalization. Additional findings from these studies supported the view of laughter as a method of communicating positive emotions and eliciting similar emotional responses in others. For example, the more natural-sounding a laugh bout was rated to be, the more it elicited a positive emotional response (for additional acoustical research on laughter, see Mowrer, 1994; Mowrer, LaPointe, and Case, 1987; Nwokah et al., 1999; Vettin and Todt, 2004).

### Laughter Respiration and Phonation

To produce the distinctive sounds of laughter, we make use of a number of muscles that control our breathing, larynx, and vocal apparatus (for a detailed description see Ruch and Ekman, 2001). The normal human breathing cycle consists of inspiration, inspiration pause, expiration, and expiration pause. Regardless of where the person happens to be in this cycle, laughter typically begins with an initial forced exhalation (Lloyd, 1938), which brings the lung volume down to around functional residual capacity (i.e., the volume that remains after a normal expiration). This is followed by a sustained sequence of repeated, rapid, and shallow expirations, which, when accompanied by phonation, produce the “ha-ha-ha” of laughter. By the end of this expiratory laugh bout, the lungs reach residual volume (i.e., the air volume remaining in the lungs after maximal expiration). Thus, laughter typically occurs at a low lung volume, forcing out more air from the lungs than occurs during normal breathing. Following a laughter bout, a quick inhalation occurs, filling the lungs once again to normal capacity. Another laughter bout may then follow. Due to this unusual amount of expiration, laughter produces a greatly increased breathing amplitude, up to 2.5 times greater than that which occurs during normal breathing.

The predominantly expiratory respiration pattern during laughter is produced by saccadic contractions of muscles that are normally passive during expiration, including the diaphragm, abdominal (*rectus abdominus*), and rib cage (*triangularis sterni*) muscles (Ruch and Ekman, 2001). Along with the action of these respiratory muscles, respiration during laughter is also regulated by the larynx, which serves as a valve separating the trachea from the upper aerodigestive tract. In the larynx, the glottis (comprising the vocal folds) initially closes to prevent the air from being exhaled too quickly, causing a buildup of subglottal air pressure. The glottis, aided by the arytenoid cartilages, then begins to open and close rhythmically, permitting short bursts of pressurized air to escape. Each time the glottis closes to a narrow slit, the vocal cords begin to vibrate, producing the “ha” sounds. Because the glottis continues to move and change shape while these vibrations are occurring, the fundamental



frequency (pitch) of the sound produced rises and falls during each individual call, as well as changing from one call to the next, rather than maintaining a constant frequency. Each time the glottis opens more widely, it stops vibrating, and the escaping air produces the unvoiced *b* sound between each voiced call.

These sound vibrations are carried through the vocal tract, whose shape amplifies or dampens various frequency characteristics of the sounds, and finally the air escapes through the mouth or nose. The amount of tension on the vocal cords; position of the larynx, tongue, and jaw; shape of the mouth and lips; and even the degree of contraction of various facial muscles (all of which can be influenced by the person's current emotional state) further influence the sound quality of the laughter. As found in research on the acoustics of laughter (Bachorowski et al., 2001), there is also a great deal of variability, both within and between individuals, in the patterns of respiration and phonation during laughter (W. F. Fry and Rader, 1977; Svebak, 1975, 1977). Thus, people seem to have distinctive "laugh signatures," making their laughs as recognizable as their voices. However, individuals also demonstrate a great deal of variability in their laughter acoustics depending in part on their current emotional state, resulting in characteristic fearful, embarrassed, aggressive, and other emotionally tinged laughs in addition to pure enjoyment laughs.

### Facial Expressions of Laughter and Smiling

Besides the loud and distinctive "ha-ha-ha" sounds, laughter is characterized by a distinctive facial display, which closely resembles smiling. This emotional facial display is another way laughter serves as a communication signal. Paul Ekman and his colleagues, at the University of California at San Francisco, have conducted extensive research on facial expressions of emotion, including smiling and laughter (Ekman, Davidson, and Friesen, 1990; Ekman and Friesen, 1978; Frank and Ekman, 1993). Although they have identified 18 different types of smiles, Ekman and his colleagues have found only one that is reliably associated with genuine enjoyment or amusement. They have named this smile the *Duchenne display*, after the French anatomist who first identified it in 1862. Other types of smiles are associated with feigned amusement ("forced" or "faked" smiles) or the presence of negative emotions such as embarrassment or anxiety mixed with the enjoyment.

The Duchenne display involves symmetrical, synchronous, and smooth contractions of both the *zygomatic major* and the *obicularis oculi* muscles of the face (see Figure 4). The zygomatic major is the muscle in the cheeks that pulls the lip corners upwards and backwards, while the obicularis oculi is the muscle that surrounds each eye socket and causes wrinkling of the skin at the outer sides of the eyes ("crow's feet"). Although most types of smiles involve contractions of the zygomatic major, only genuine enjoyment smiles also involve the obicularis oculi, which is less subject to voluntary control. Smiles that involve other facial muscles besides these two generally indicate the presence of other (often negative) emotions besides pure enjoyment. For example, contractions of muscles in the forehead during smiling tend to be associated with negative emotions (S. L. Brown and Schwartz, 1980).





FIGURE 4 The Duchenne display expresses genuine mirth. Note the “crow’s feet” at outsides of eyes due to contraction of *obicularis oculi* muscles. © Barbara Penoyar/Getty Images/PhotoDisc

The Duchenne display occurs in laughter as well as smiling, although laughter often includes some additional muscles, such as those involved in opening the mouth and lowering the jaw (Ruch and Ekman, 2001). Thus, the presence or absence of the Duchenne display can be used by researchers (as well as any careful observer in social interactions) to determine whether a person’s smiling or laughter is expressing genuine, spontaneous enjoyment or if it betrays other emotions or is being used to feign amusement. In particular, the presence of “crow’s feet” wrinkles along the outsides of the eyes is an indicator of genuine amusement.

Ekman and Friesen (1978) have developed the Facial Action Coding System (FACS) for use by trained observers to code the various facial action units controlled by different muscles of the face in the expression of different emotions. Although this system requires some training and practice, it is very useful for researchers who are interested in studying laughter, as it provides them a way of distinguishing between Duchenne and non-Duchenne laughter. There is a considerable amount of research evidence that laughter with and without the Duchenne display has very different psychological meanings.

Differences between Duchenne and nonDuchenne laughter were demonstrated in a study by Dacher Keltner and George Bonanno (1997) at the University of California at Berkeley. They videotaped interviews of adults whose spouses had died six

months previously, and used the FACS to code the laughter produced by these participants during the interviews. Greater frequencies of Duchenne laughter were found to be significantly correlated with more positive emotions such as happiness and joy, and less negative emotions such as anger, distress, and guilt. The amount of Duchenne laughter was also positively associated with better social adjustment, recollections of a more satisfactory relationship with the deceased spouse, and better current relationships with others. In contrast, non-Duchenne laughter was not related to any of these variables.

The videotapes, with the sound turned off, were later shown to college students who were asked to rate them on a number of dimensions. More frequent Duchenne laughter in the bereaved participants was significantly correlated with higher self-ratings of positive emotions in the observers themselves and with the observers' judgments that the participant was healthier, better adjusted, less frustrated, and more amusing. Thus, subtle differences in facial expressions during laughter, signaling the presence or absence of the Duchenne display, communicate quite different emotional states, and these expressions in turn influence the emotional responses of observers. These findings further highlight the role of laughter as a form of emotional communication.

### AUTONOMIC AND VISCERAL CONCOMITANTS OF MIRTH

Like other emotions, the emotion of mirth that is expressed by laughter also produces changes in many parts of the body via the autonomic nervous system and the endocrine (hormone) system (Cacioppo et al., 2000). Since the 1960s, many researchers have investigated mirth-related changes in heart rate, skin conductance, blood pressure, skin temperature, muscle tension, and so on. In these studies, participants are attached via electrodes and sensors to polygraph machines, and various psychophysiological variables are assessed while they are exposed to humorous stimuli such as comedy videotapes. Control conditions involving nonhumorous, emotionally neutral stimuli, or stimuli that elicit other emotions (e.g., fear, sadness, anger), are also included for comparison. Although there have been some inconsistent findings (e.g., Harrison et al., 2000; Hubert and de Jong-Meyer, 1991), the results of these investigations generally indicate that mirth is associated with increased activity of the sympathetic nervous system, the branch of the autonomic nervous system associated with the well-known fight-or-flight response (see McGhee, 1983b, for a review of early research).

Lennart Levi (1965) found significant increases in adrenaline and noradrenaline output (measured in urine samples) while subjects watched a comedy film as compared to watching an emotionally neutral nature film, and these humor-related increases were comparable to those found with fear- and anger-evoking films. Other experiments have found mirth-related increases in heart rate, skin conductance, and other variables associated with sympathetic arousal (Averill, 1969; P. S. Foster, Webster, and Williamson, 2002; Godkewitsch, 1976; Goldstein et al., 1975; Hubert

and de Jong-Meyer, 1990; J. M. Jones and Harris, 1971; Langevin and Day, 1972; Marci, Moran, and Orr, 2004). These effects indicate activation of the sympathetic-adrenal-medullary (SAM) system, the well-known fight-or-flight response of sympathetic nervous system arousal under the control of the hypothalamus, which is also involved in stress-related emotional responses such as fear and anger. In several of these experiments, the participants were asked to rate the funniness of the humor stimuli, and significant positive correlations were found between these funniness ratings and the amount of increase in physiological arousal. Thus, higher levels of amusement (which presumably indicate stronger feelings of mirth) were systematically related to greater increases in sympathetic nervous system activation.

In addition to SAM activation, there is some evidence that extended periods of mirth are associated with activation of the hypothalamic-pituitary-adrenocortical (HPA) system, the classic stress response that causes the adrenal cortex to release cortisol into the bloodstream. Although exposure to a fairly brief (nine minutes duration) humorous animated cartoon did not produce an increase in salivary cortisol levels (Hubert and de Jong-Meyer, 1990), a longer (90 minutes duration) and arguably more humorous film (a Monty Python movie) did produce significant increases in cortisol compared to an emotionally neutral nature film (Hubert et al., 1993). In the latter study, 50 percent of participants showed HPA activation, as indicated by significantly increased cortisol levels relative to baseline, starting about one hour after the beginning of the comedy film and continuing for one hour after the film ended. The amount of increase in cortisol over baseline was also found to be positively correlated with participants' ratings of the funniness of the film, indicating that the more amusing the film was perceived to be (and therefore the more mirth experienced), the more cortisol was released.

It is worth noting that these increases in physiological arousal are likely best viewed as a function of the emotion of mirth rather than being a consequence of laughter *per se*. Significant increases in heart rate and skin conductance have also been found when a mirthful emotional state was induced by having research participants vividly remember or imagine a humorous experience, without actually laughing (P. S. Foster et al., 2002). In addition, the observed correlations between funniness ratings and changes in physiological variables support the view that the degree of arousal is related to subjective feelings of amusement rather than to the amount of laughter. Thus, rather than laughter causing physiological arousal, it seems more accurate to view both laughter and peripheral autonomic arousal as being relatively independent (although correlated) consequences of the emotional state of mirth.

Overall, these research findings indicate that mirth is associated with a pattern of increased arousal similar to the fight-or-flight response, which prepares the body for vigorous activity. However, there is also some evidence for the common notion that mirth causes a loss of muscle tone. With vigorous laughter, people often feel a weakness in their limbs and occasionally even fall to the floor, and the expression "weak with laughter" is common to many languages (Overeem, Lammers, and Van Dijk, 1999). An early study found a decrease in muscle tone in the forearm of subjects while they were laughing (Paskind, 1932). More recently, Sebastiaan Overeem and his

colleagues (1999) examined the effects of mirth on the *H*-reflex, which is assessed by electrically stimulating a nerve in the leg and using electromyography (EMG) to measure the resultant activation of an adjacent muscle. The strength (amplitude) of this reflex is governed by descending pathways from the brain. A severe reduction in amplitude is indicative of motor inhibition or muscle weakness, such as that seen in cases of cataplexy, in which afflicted individuals suddenly collapse due to a general loss of muscle tone.

In their study, Overeem and colleagues found that the *H*-reflex decreased by almost 90 percent while individuals were laughing in response to humorous slides. A subsequent study demonstrated that this effect is due to the emotion of mirth underlying laughter, rather than the respiratory or motoric effects of laughter itself (Overeem et al., 2004). Thus, there appears to be truth to the idea that laughter causes muscle weakness, although it seems more accurate to say that this weakness is caused by the mirthful emotion underlying laughter. This phenomenon is the basis of theories suggesting that laughter is a “disabling mechanism” whose function is to prevent individuals from acting in counterproductive ways (Chafe, 1987), as well as suggestions that humor and laughter might be used in psychotherapy as a relaxation induction technique (Prerost and Ruma, 1987).

It may seem puzzling that the positive emotion of mirth is accompanied by the same general pattern of physiological arousal as are stress-related negative emotions like fear and anger. If mirth is a positive emotion that is presumably beneficial to health, why does it have the same physiological effects as stress-related emotions that are known to be injurious to health? One possible explanation for these findings has to do with the hypothesis that the positive emotion associated with laughter originated in rough-and-tumble play. Just as many systems of the body are rapidly mobilized for the exertion of either fighting or fleeing during times of threat, many of these same systems may also be activated for the exuberant, exciting, and prosocial chasing, fleeing, jumping, and wrestling of mammalian play. It should also be noted that stress-related illnesses tend to result from chronic activation and inadequate recovery from sympathetic arousal (Mayne, 2001). The more phasic short-term arousal associated with mirth is therefore less likely to have such adverse consequences.

Moreover, it is still unclear whether the physiological arousal associated with mirth is identical to the arousal accompanying negative stress-related emotions, or whether it is different in some respects. There is some evidence that mirth and other positive emotions may be distinguished from negative emotions on the basis of the overall pattern of physiological changes associated with them (Christie and Friedman, 2004; Harrison et al., 2000). For example, positive emotions, compared to negative emotions, seem to involve a smaller increase in blood pressure and less autonomic activation overall (Cacioppo et al., 2000). However, the research to date is inconclusive, and there continues to be some controversy concerning the “emotional specificity” of autonomic nervous system activity.

Some researchers (e.g., Gray, 1994; LeDoux, 1994) have also pointed out that peripheral changes in the autonomic nervous system and endocrine system may be the wrong place to look for physiological differences among different emotions, since

these systems have to do with functions that may be common to many different emotions, such as energy requirements, metabolism, and tissue repair. Instead, they have argued that more important differences are likely to be found in the brain systems that underlie different emotions. Thus, although the somatovisceral changes accompanying mirth may be quite similar to those associated with negative emotions like anger and fear, there are likely to be important differences in the brain systems underlying these emotions, including the biochemical molecules (e.g., neuropeptides, neurotransmitters, opioids) that are produced (Panksepp, 1993, 1994). These in turn may have different implications for health, such as different effects on components of the immune system (Kennedy, Glaser, and Kiecolt-Glaser, 1990). This is an important topic for future investigation. Potential effects of humor and laughter on physical health will be discussed in greater detail in Chapter 10.

## LAUGHTER IN NONHUMAN ANIMALS

Although some writers have suggested that humans are the only animal that laughs (e.g., Stearns, 1972), there is good reason to believe that homologous behaviors also exist in other animals, particularly our closest ape relatives. Charles Darwin (1872), who viewed laughter as an expression of the positive emotions of joy and happiness, described a form of laughter that is emitted by young chimpanzees when they are being tickled. This observation has been supported by more recent primate research, which suggests that laughter in humans is homologous with (i.e., has the same evolutionary origin as) the *relaxed open-mouth display* or “play face” seen in monkeys and apes (Preuschoft and van Hooff, 1997; van Hooff, 1972; van Hooff and Preuschoft, 2003).

### The Play Face

Van Hooff and Preuschoft (2003, p. 267) described this facial expression as follows:

The mouth is opened wide and the mouth corners may be slightly retracted. In most (but not all!) primate species the lips are not retracted but still cover the teeth. In many species this facial posture is often accompanied by a rhythmic staccato shallow breathing (play chuckles) and by vehement but supple body movements. The posture and movements, both of the face and of the body as a whole, lack the tension, rigidity, and brusqueness that is characteristic of expressions of aggression, threat, and fear.

The play face, as the name suggests, occurs while the animals are involved in social play. Play is a common activity among juveniles, not only in primates but in all mammal species and even some birds. In play, many activities that are normally important for survival, such as hunting, fighting, mating, fleeing, and simple locomotion (jumping, sliding, pirouetting), are performed “just for fun,” with a great deal of exuberance and energy. Young primates spend many hours in playful mock fighting,

chasing, attacking, wrestling, and tickling one another, perhaps as a way of programming various cortical functions and developing the social skills needed to perform such behaviors in more “serious” contexts later in life (Gervais and Wilson, 2005; Panksepp, 1998). Since many of these behaviors would normally be construed by other individuals as aggressive and could lead to serious retaliation and physical harm, animals need a way of clearly signaling to others that these activities are not serious, but are merely intended “for fun.” In primates, this communicative signal is the play face, along with the breathy, panting laughter-like grunts that accompany it in some species.

It is interesting to note that, by means of the play face, animals demonstrate an ability to distinguish between reality and pretense, seriousness and play, which, as we have seen in Chapters 1 and 5, are arguably the essence of humor. Thus, one can make the case that a rudimentary form of humor—in addition to laughter—is evident even in nonhuman animals. Interestingly, chimpanzees and gorillas that have been taught to communicate by means of sign language have been observed to use language in playful ways, such as punning, humorous insults, and incongruous word use, indicating a rudimentary sense of humor (see Gamble, 2001, for a review). Moreover, this humorous use of sign language in apes is typically accompanied by the play face, providing further evidence for the close connection between linguistic humor and play.

With our more highly developed cognitive and linguistic capacities, we humans are able to extend these playful behaviors into the realm of concepts and ideas, creating nonserious, playful alternative realities that we share with one another through language. Thus, humor in humans appears to have originated in social play, an ancient mammalian emotion-behavior complex. Interestingly, comparable play faces occur in many other mammals besides primates. For example, the canidae (dogs, wolves, and foxes) and ursinae (bears) have a gape-mouthed play face in which the upper teeth remain covered, which is accompanied by boisterous, frolicsome body movements and rapid panting that is very reminiscent of the play panting of primates (van Hooff and Preuschoft, 2003). Thus, the evolutionary origins of the relaxed open-mouth play face, which in humans seems to have evolved into laughter, appear to go back many millions of years.

### Laughter and Smiling in Apes

The “laughter” that was observed by Darwin in chimpanzees is a staccato, guttural, throaty panting sound associated with rapid and shallow breathing, which typically accompanies the relaxed open-mouth play face display. A similar pattern is seen in many other primates, including gorillas, orangutans, and macaques, although the vocalization is less pronounced in some species (van Hooff and Preuschoft, 2003). A major difference between the laughter of humans and chimpanzees is that, in chimpanzee laughter, the breathing involves a rapid alternation between shallow inhalations and exhalations, with single sounds being produced during each inhalation and exhalation. In contrast, as we have seen, human laughter involves a series of multiple



“ha-ha-ha” sounds occurring during a single exhalation, with no vocalization during the intervening inhalations. Consequently, chimpanzee laughter sounds very different from that of humans (Provine, 2000). Thus, although the two forms of laughter appear to have the same evolutionary origins, they have diverged considerably in the 6 million or so years since our common ancestor with chimpanzees (Gervais and Wilson, 2005; Owren and Bachorowski, 2001).

Chimp laughter and the play face are readily elicited during playful interactions between human caretakers and juvenile chimpanzees in zoos. As with human infants, tickling and peek-a-boo games containing an element of surprise, occurring in a relaxed and trusting social atmosphere, are particularly effective elicitors of laughter in chimps. Among conspecifics (i.e., members of the same species), play faces and the voiced breathing laughter occur during boisterous rough-and-tumble play-wrestling and play-chasing. The individuals alternate between chasing and being chased, coordinating their activities by means of these play signals (van Hooff and Preuschoft, 2003). It is easy to see parallels in the boisterous laughter of human children during rough-and-tumble play, and only a short step to the more intellectually-based play with words and ideas in the laughter-evoking humor of human adults.

Although the play face and laughter in primates often occur in the context of play fighting and “quasi-aggression” (Butovskaya and Kozintsev, 1996), comparative research does not support the view that laughter originated in aggressive displays used to intimidate and ridicule adversaries and signal one’s superiority over them (cf. Gruner, 1997). Instead, the research tends to support Darwin’s view of laughter as an original expression of happiness, joy, and high spirits associated with play (van Hooff and Preuschoft, 2003). Drawing on his studies of the neural bases of play in laboratory rats, Panksepp (1998) provided considerable evidence that play and aggression are mediated by different brain systems (see also D. P. Fry, 2005).

At the same time, though, researchers recognize that laughter, like play, tends to be competitive and can be used in aggressive ways. Indeed, Panksepp (1998) describes rough-and-tumble play in all mammal species as “joyful social exchange with a strong competitive edge” (p. 284). During bouts of play, animals frequently pin each other down, and one individual often emerges as the more dominant. However, for the playful interactions to continue, this individual must also allow the less dominant one to “win” quite frequently. In much the same way, teasing and other forms of verbal play in humans appear to be ways of competing in a friendly way, and those who tease others are required also to playfully accept the teasing directed at them by others.

Interestingly, smiling likely has a somewhat different evolutionary origin than laughter (van Hooff and Preuschoft, 2003). While laughter appears to be related to the relaxed open-mouth display, smiling in humans seems to be homologous to another facial pattern, the *silent bared-teeth display*, which is seen in primates as well as many other species of mammals. In this display, the animal retracts its mouth corners and lifts its lips, baring its teeth, while keeping its mouth more or less closed. When shown by a lower-status individual, this display is a signal of fearful submission and appeasement; in a higher-status individual, it signals friendly reassurance and



lack of hostile intent. Thus, rather than simply being a more subdued, low-intensity form of laughter, smiling seems to have originated in a different signal altogether. Functional differences between smiling and laughter are still apparent to some degree in humans, with smiling occurring more often than laughter in nonhumorous contexts such as friendly greeting, signaling of appeasement, and embarrassment.

Nonetheless, smiling and laughter, though apparently originating in different displays, seem to have moved quite closely together in humans, to the point where they often represent different degrees of intensity of the same emotional state. Thus, a smile may be an expression of mild amusement in response to a joke, whereas a laugh communicates much greater enjoyment (Ruch, 1993). This is reflected in many languages, in which the word for smile is a diminutive of the word for laughter (e.g., French *sourire* and *rire*). I will return to the discussion of possible evolutionary origins of smiling and laughter in a later section.

### "Laughter" in Rats?

Thus far, we have considered evidence that the origins of human laughter go back at least as far as the evolutionary ancestors that we share with our closest living relative, the chimpanzee, and, in the form of the play face, even to the common ancestors of all primates. Recently, biological psychologist Jaak Panksepp and his colleagues at Bowling Green State University have provided intriguing evidence that a form of laughter may even exist in rats (Panksepp, 2000; Panksepp and Burgdorf, 2000, 2003). They have found that laboratory rats produce a high-frequency (approximately 50 kHz), ultrasonic chirping sound during social rough-and-tumble play and also when being tickled by human handlers. Although humans are unable to hear these sounds without the aid of specialized sound equipment, they are within the auditory range in which rats communicate.

Rats seem to be most ticklish on the nape of the neck, although they also apparently enjoy a "full body" tickle. When they have previously been tickled by a human hand, they will eagerly approach that hand rather than one that has merely petted them, chirping all the while. Like laughter among humans, this rat "laughter" appears to be contagious, and young rats generally prefer to spend time with older animals that produce more of this chirping sound as compared to those that do not. This chirping "laughter" is also readily conditioned using both classical and operant methods, and animals will run mazes and press levers for an opportunity to be tickled and "laugh." Rat "laughter" can easily be amplified or reduced by selective genetic breeding, indicating that it reflects a heritable emotional trait. As we will see in later chapters, a comparable genetically based trait in humans may underlie our concept of "sense of humor" (Ruch and Carrell, 1998).

Panksepp and Burgdorf (2003) have suggested that this chirping "laughter" arises from organized "ludic" (from Greek *ludos* = play) brain circuits that form the "emotional operating system" for the positive emotion of joy (or what I call mirth), which is activated during social play, and which may be common to all mammals. They postulated that play-related joy has an important social facilitation and bonding function

in mammals, promoting cooperative forms of social engagement and helping to organize social dynamics. They suggested that rough-and-tumble play in rats, accompanied by chirping “laughter,” may provide a useful animal model for researchers to investigate the brain structures mediating positive emotions relating to play and laughter, in much the same way that other animal models have been used to elucidate the brain mechanisms of negative emotions such as fear and anger (Panksepp, 1998).

Research using this model has already begun to shed light on the neural bases of positive playful emotion. For example, this research suggests an important role of endorphins and other opioids, the morphine-like substances created in certain brain sites. Low doses of morphine increase play in rats, whereas the opiate antagonist naloxone (which inhibits the effect of opioids) decreases play (Panksepp, 1998). These findings suggest that opioid systems may also be involved in mirthful humor and laughter in humans. Human laughter is very different from ultrasonic chirping in rats, and many researchers believe it is too much of a stretch to view the two as having any real evolutionary connection (Gervais and Wilson, 2005). Nonetheless, they may both relate to homologous brain structures found in all mammals which have an important social-emotional function and an ancient evolutionary origin relating to social play. Thus, these animal studies suggest that the feelings of hilarity and mirth that we experience in humor originated in the exhilaration and joy of rough-and-tumble social play that is a prominent activity of all mammals.

## PATHOLOGICAL LAUGHTER

Brain disorders involving pathological laughter are well known in the neurological literature, and numerous cases have been reported since the late 1800s (Duchowny, 1983; Forabosco, 1998; Poeck, 1985). The study of pathological laughter, in connection with knowledge of the underlying brain abnormalities, is one way that neuroscientists have been able to make inferences about the brain sites that may be involved in normal laughter. Although pathological laughter closely resembles natural laughter, it is considered abnormal because of the presence of unusual motor patterns, or a lack of accompanying pleasant and mirthful emotional experience, or because it occurs in an inappropriate social context in the absence of humorous stimuli.

Duchowny (1983) distinguished three major categories of pathological laughter, each of which has different clinical manifestations and anatomical substrates: (1) excessive laughter, (2) forced laughter, and (3) gelastic epilepsy. *Excessive laughter* conditions involve emotional lability, heightened feelings of mirth and euphoria, an inability to inhibit laughter, and a lack of insight into the abnormality of the laughter. These conditions most commonly occur in adulthood and tend to be associated with disorders such as schizophrenia, mania, and dementia. These disorders appear to affect parts of the brain involved in emotion production and regulation, including structures in the limbic system and parts of the frontal lobes.

In *forced laughter* conditions, the second broad category of pathological laughter, patients experience involuntary outbursts of explosive, self-sustained laughter, often accompanied by autonomic disturbances of heart rate, vasomotor control, and sphincter tone. Although they may appear to others to be feeling genuinely amused, these patients usually do not subjectively experience the positive emotion of mirth that normally accompanies laughter, but instead often experience it as unpleasant, embarrassing, and something to be endured. Many patients with this condition also exhibit pathological crying, with fits of laughter merging into crying or vice versa. It is occasionally even difficult to tell whether they are laughing or crying. This indicates that some of the brain centers controlling laughter and crying are located very close together (likely in the part of the brainstem called the pons), suggesting a close link between the positive emotions of social play and the distressing emotions associated with social separation (Panksepp, 1998).

Conditions involving forced laughter typically begin in adulthood and can result from a variety of disorders, including degenerative brain conditions such as Parkinson's disease, multiple sclerosis (MS), and amyotrophic lateral sclerosis (ALS), as well as tumors and lesions in various parts of the brain due to cerebrovascular accidents (strokes) and brain injury. In the condition called *fou rire prodromique*, uncontrolled laughter lasting up to a half hour or even longer signals the onset of a stroke in the brainstem. In some tragic cases, people have literally laughed themselves to death. Pathological "forced laughter" conditions have been associated with lesions in many areas of the brain, ranging from the frontal and temporal lobes of the cortex and the pyramidal tracts to the ventral mesencephalon, the cerebellum, and the pons (Wild et al., 2003; Zeilig et al., 1996). In most of these cases, the effect of the lesions seems to be chronic disinhibition of laughter-generating circuitry (i.e., an inability to inhibit or modulate laughter normally), rather than an excitatory effect.

The third general category of pathological laughter, *gelastic epilepsy* (from Greek *gelos* = laughter) involves relatively rare epileptic conditions in which the seizures predominantly take the form of bouts of laughter. These seizures are often accompanied by motor convulsions, eye movement abnormalities, and autonomic disturbances. During the seizures, patients typically (but not always) lose consciousness and are therefore unaware of the laugh attack. In cases in which the patients remain conscious during the seizure, some report a pleasant feeling of mirth, but others experience the laughter as inappropriate and even unpleasant. The laughter typically lasts less than a minute, but can be more prolonged when associated with complex partial seizures (Arroyo et al., 1993). Gelastic epilepsy usually begins in childhood, and cases have even been reported in newborn infants, demonstrating that the neural circuits for laughter are fully developed at birth (Sher and Brown, 1976).

Brain-imaging studies have identified several brain regions that are associated with gelastic seizures, most importantly the hypothalamus, temporal lobes, and medial frontal lobe (Arroyo et al., 1993). The most common type of gelastic epilepsy, which has also been studied most extensively, is associated with hypothalamic hamartomas, which consist of nonmalignant abnormal tissue growth in the hypothalamus. Research has shown that hypothalamic and pituitary hormones are released during these

seizures, and it appears that the abnormal hypothalamic electrical activity has excitatory effects, spreading to areas in the neighboring limbic system and also to the brainstem to produce the psychophysiological manifestations of laughter (Wild et al., 2003). These findings suggest that the hypothalamus likely has an important role in normal laughter as well. As noted earlier, the hypothalamus is well-known as a control center for the autonomic arousal associated with the fight-flight response, as well as regulating a range of motivational states including hunger and sexual arousal (as psychology professors frequently explain to their students, the hypothalamus is responsible for the four “*f*’s”: feeding, fighting, fleeing, and sexual intercourse).

## LAUGHTER AND THE BRAIN

Studies of patients with brain lesions demonstrate that there are two separate pathways in the brain that can lead to the production of smiling and laughter, one voluntary and unemotional, and the other involuntary and emotional. Some patients who have suffered a stroke or other brain injury, causing them to be unable to voluntarily move their facial muscles (volitional facial paresis), are nonetheless able to smile and laugh normally when they find something funny (i.e., when they experience the emotion of mirth). On the other hand, some patients with lesions of subcortical nuclei in regions such as the basal ganglia (as in Parkinson’s disease) are unable to show spontaneous, emotional facial expressions when they are subjectively feeling amused, but are able to smile voluntarily on command (Wild et al., 2003).

The voluntary facial movements likely originate in the motor strip on the cerebral cortex and arrive quite directly at the face via the corticospinal tracts of the pyramidal motor system, whereas the involuntary, emotional movements arise from subcortical nuclei and arrive at the face via the extrapyramidal system, involving many emotion-related regions in the basal ganglia, limbic system, and brainstem (Frank and Ekman, 1993). There is also evidence that voluntary control of laughter is mediated by ventral areas of the mesencephalon and pons, whereas emotional control involves dorsal areas of these same structures (Wild et al., 2003). These findings help to explain the differences in facial expressions associated with genuine (Duchenne) and feigned (non-Duchenne) smiling and laughter, discussed earlier.

Further evidence for separate neural substrates of emotional and voluntary smiling and laughter was provided by a recent study that made use of positron emission tomography (PET), a brain-imaging technique (Iwase et al., 2002). The brains of healthy participants were scanned while they were smiling, either spontaneously in response to humorous videotapes or voluntarily while watching nonhumorous videotapes. The results showed different patterns of regional cerebral blood flow (rCBF) during the two different types of facial expression. In particular, emotional smiling led to greater activation of areas of the cortex involved in the processing and integration of visual information (bilateral occipital and occipitotemporal cortices and left anterior temporal cortex), as well as cortical areas that are closely related to the limbic system and are involved in emotional reward (ventromedial orbitofrontal cortex and

medial prefrontal cortex). In contrast, nonemotional voluntary facial movements mimicking smiling led to greater activation of areas of the frontal cortex involved in voluntary facial movement (facial area of the left primary motor strip and bilateral supplementary motor area).

In addition to evidence that different brain circuits are involved in voluntary and emotional forms of smiling and laughter, there is also evidence from cases involving electrical brain stimulation that the cognitive aspects of humor can be dissociated from the emotional and motoric components. When patients are undergoing brain surgery for treatment of epileptic seizures, surgeons commonly electrically stimulate various areas of the exposed surface of the brain, in order to localize areas that should and should not be removed. The patients remain conscious during this procedure. These electrical probes occasionally trigger laughter in the patients, with or without accompanying feelings of mirth.

As one example, Fried and colleagues (1998) described a 16-year-old female patient who consistently began to laugh whenever her brain was stimulated in a small region of the supplementary motor area located on the left frontal lobe of the cortex. The laughter was accompanied by subjective feelings of merriment and mirth in the patient. Interestingly, each time she laughed due to electrical stimulation, the patient attributed her laughter to various stimuli in her environment. For example, she would say that she had laughed because of the funny appearance of a picture of a horse that she happened to be looking at, or because the people in the room seemed to be behaving in an amusing way. It is important to note that this patient's epilepsy never involved gelastic seizures.

Although the exact brain mechanisms are not fully understood, this remarkable case provides evidence of the way cognitive components of humor can be dissociated from the emotional and motor components of mirth and laughter. In our normal experience, higher-level cognitive processes involved in the perception of humorous incongruity cause stimulation of the limbic and brainstem regions involved in the experience of mirth and production of laughter, but when those same mirthful feelings and laughter behaviors are triggered artificially with an electrical probe, the brain generates cognitive-perceptual incongruities to try to account for these emotional experiences.

Based on evidence from cases of pathological laughter, electrical brain stimulation, and animal studies, neuroscientists are beginning to piece together the circuits of the brain that are involved in the positive emotion of mirth and the production of laughter, although many of the details are still unknown (Arroyo et al., 1993; MacLean, 1987; Parvizi et al., 2001; Wild et al., 2003). As with other emotional systems (Panksepp, 1998), the structures and systems underlying laughter and mirth are distributed throughout the brain, including regions in the neocortex, basal ganglia, diencephalon, limbic system, and brainstem.

Parvizi and colleagues (2001) distinguished between emotion induction and emotion effector sites involved in mirth and laughter. Normal emotional laughter is initiated by perceptions of humorous incongruity or the recall of humorous memories, involving association areas of the cerebral cortex. These activate various *emotion induction* sites located in the telencephalon (cerebral cortex and limbic system), which

are involved in “turning on” the emotion of mirth, and likely include areas of the ventromedial prefrontal cortex, basal temporal cortex, anterior cingulate cortex, amygdala, and ventral striatum (part of the basal ganglia). I will discuss these brain bases of cognitive and emotional aspects of humor in more detail in a later section describing neuroimaging studies.

When activated, the induction sites work on *emotion effector* (expression) sites, including the motor and premotor areas of the cerebral cortex (initiating facial and bodily movements), the hypothalamus (subserving autonomic responses such as increased heart rate and flushing), thalamus, periaqueductal gray matter, reticular formation, cranial nerve nuclei (controlling facial, laryngeal, and respiratory actions), and parts of the brainstem, all of which are involved in smiling and laughter as the expression of mirth. Most authors agree that there is likely a final common pathway for laughter located in the brainstem (possibly in the dorsal area of the pons) that coordinates the respiratory, laryngeal, and facial components of laughter (Wild et al., 2003). Laughter is triggered at this site by input from the various effector sites, and signals are sent out from here to the cranial nerves to activate the relevant muscles of the body.

In addition to excitatory input triggering laughter, inhibitory signals arriving in the brainstem from various higher centers in the brain serve to inhibit inappropriate laughter. Most researchers believe that the “forced laughter” type of pathological laughter described earlier is due to damage involving the corticobulbar tract, a motor pathway originating in the frontal cortex and terminating in cranial motor nuclei in the pons and medulla, which results in a failure of these laughter-inhibition mechanisms (Mendez, Nakawatase, and Brown, 1999). Parvizi and colleagues (2001) have also hypothesized a possible role of the cerebellum in modulating the intensity and duration of laughter. According to this view, the cerebellum receives information concerning the current social-emotional context from the cortex and telencephalic structures and feeds this information back to various effector sites.

In this way, laughter may be inhibited or amplified, depending on its appropriateness to the social and emotional situation (e.g., whether one is at a party or a funeral). However, when a stroke or other disease causes lesions to specific regions of the cerebellum or to the relevant structures and pathways leading into or out of it, this modulation does not take place, resulting in pathological laughter occurring in socially and emotionally inappropriate contexts (Parvizi et al., 2001). In sum, although further research is needed to clarify the exact brain sites and pathways involved, it is clear that laughter is a complex activity involving cognition, emotion, and motoric behavior, and requiring the coordinated activation of a wide range of brain regions, including parts of the cerebral cortex, the limbic system, and the brainstem.

## TICKLING AS A STIMULUS FOR LAUGHTER

Why do we laugh in response to being tickled? Why is it impossible to tickle oneself? As we have seen, many juvenile animals tickle each other during play, and tickling frequently stimulates laughter in human children and adults, as well as



chimpanzees and other primates, and possibly even rats (Panksepp and Burgdorf, 2000). Provine (2004) suggested that the pleasurable, reciprocal give-and-take of tickling may be viewed as a prototype of mammalian social play. The laughter associated with tickling appears to be accompanied by a pleasurable feeling of mirth similar to the emotion accompanying laughter when it is elicited by humor. However, tickling can also be quite aversive, and it was reportedly even used as a form of torture in medieval times. The social context is also important: tickling only produces laughter in a safe and trusting environment (Harris, 1999).

Tickling and its curious relationship to humor and laughter raise a number of intriguing questions that have been pondered by philosophers since the time of Socrates and Aristotle. Although the first survey study of tickling and laughter was conducted more than 100 years ago (Hall and Allin, 1897), more systematic empirical investigations of tickling have only begun quite recently.

Jaak Panksepp (2000) has argued that the merriment and laughter associated with tickling involve the same emotional brain regions as humor-elicited laughter. Hence, he suggested that the study of brain processes involved in tickling-related “laughter” in rats can tell us a good deal about the neural bases of humor and laughter in humans. This view is similar to the one proposed much earlier by Charles Darwin (1872), who suggested that tickling is essentially a humorous experience, eliciting laughter via the same emotional mechanisms as those involved in humor. In other words, both humor and tickling elicit the emotion of mirth, which in turn is expressed through laughter. Since a similar idea was proposed at about the same time by a German physiologist named Hecker, this view has come to be known as the Darwin-Hecker Hypothesis.

The current research evidence regarding this hypothesis is somewhat mixed, however. Alan Fridlund and Jennifer Loftis (1990), at the University of California in Santa Barbara, found some support for the hypothesis in a questionnaire study that showed that the more individuals reported being very ticklish, the more they also reported that they tend to laugh, giggle, and smile in response to jokes and other forms of humor. Similarly, Christine Harris and Nicholas Christenfeld (1997), at the University of California in San Diego, found a positive correlation between the degree to which participants were actually observed to laugh and smile while they were being tickled in the laboratory, and how much they laughed in response to a comedy film. Both these studies indicate that people who are more ticklish also tend to laugh more in response to humor, suggesting a close relationship between tickling and humor as elicitors of laughter, and thus providing support for the Darwin-Hecker Hypothesis.

However, a second part of the study by Harris and Christenfeld failed to support the prediction that tickling and humor would have a “warm-up effect” on each other. Participants were no more likely to laugh in response to being tickled after having seen a comedy film than after watching a nonhumorous control film. Similarly, participants laughed the same amount in response to a comedy film regardless of whether or not they had previously been tickled. These results appear to cast doubt on the idea that tickling and laughter both elicit the same positive emotion of mirth. If this were the case, then when this emotion is elicited by means of tickling, it should sub-



sequently lead to greater laughter in response to humor, and vice versa. The authors concluded that, although there seem to be relatively stable individual differences in people's threshold for laughter regardless of whether it occurs in response to tickling or to humor, the two types of laughter do not share a common emotional basis.

A more recent experiment by Christine Harris and Nancy Alvarado (2005) casts further doubt on the Darwin-Hecker Hypothesis. They used the FACS to analyze the facial expressions of participants who were laughing and smiling while being tickled, and compared them with facial expressions of the same individuals while listening to a comedy audiotape and while experiencing the pain of having their hand immersed in ice-cold water. Both tickling and comedy were associated with Duchenne smiles and laughter, whereas these expressions did not occur during pain. However, tickling was also associated with a greater proportion of non-Duchenne smiles along with a number of facial movements indicating negative emotions and distress, which were not seen in the comedy condition but were evident in the pain condition. The participants also reported lower levels of amusement and higher levels of unpleasant feelings, anxiety, and embarrassment in the tickling condition compared to the comedy condition. Furthermore, Duchenne smiles were correlated with self-reported unpleasant feelings as well as positive feelings in the tickling condition, but only with positive feelings in the comedy condition. Overall, these results suggested that the laughter elicited by tickling is not as purely pleasant and enjoyable as that elicited by humor.

The results of the latter two studies cast doubt on the Darwin-Hecker Hypothesis that humor and tickling both produce the same emotion of mirth, which is expressed through laughter. The authors suggested that, whereas humor-elicited laughter is mediated by a pleasant emotional state, laughter in response to tickling is a more reflexlike, nonemotional response. If these conclusions are correct, then they cast doubt on views that posit a close connection among tickling, mirth, and humor, including Panksepp's (2000) suggestion that tickling-elicited "laughter" in rats can be used as an animal model to study mirth. This issue requires further investigation, perhaps using brain-imaging techniques to compare the brain areas activated by tickling and humor.

Why are we unable to tickle ourselves? Since the same cutaneous stimulation is experienced very differently depending on whether it is produced by the self or by another person, there must be some mechanism whereby the brain distinguishes between these two sources of stimulation, canceling the ticklish effect when it is self-produced. As Provine (2004) noted, in the absence of such a mechanism, people might be constantly tickling themselves accidentally! One study used fMRI to examine differences in brain activity when participants tickled themselves on the hand compared to when the tickling was done by an experimenter (Blakemore, Wolpert, and Frith, 1998). The results showed lower activity in the cerebellum when the tickling was self-produced rather than externally produced, suggesting that the differentiation may take place in this structure of the hindbrain. As we saw earlier, the cerebellum has also been implicated in the modulation of laughter based on information about the social context (Parvizi et al., 2001).

Although we cannot tickle ourselves, there is some evidence that it may be possible to be tickled by a nonhuman machine. Harris and Christenfeld (1999) led blindfolded participants to believe that they would be tickled either by a “tickle machine” or by a human hand, although in both conditions they were actually tickled in the same way by a research assistant. The results showed that the subjects laughed just as much when they believed they were being tickled by a machine as when they thought they were being tickled by a person. Thus, laughter elicited by tickling does not seem to be dependent on the belief that it is being done by a human being.

Although this research has begun to address the interesting phenomena of tickling and laughter, there are still many questions that await further investigation. In particular, further study of the brain areas involved in tickling versus humor should help to answer the question of whether tickling elicits the same pleasurable emotion as that produced by humor (as suggested by Panksepp, 2000), or whether it is emotionally quite distinct from humor (as suggested by Harris, 1999). Further investigations may also provide some clues to the evolutionary functions of ticklish laughter. Did ticklishness evolve (as some theorists have suggested) as a means of motivating individuals to develop combat skills to protect certain vulnerable areas of the body from attack (Gregory, 1924; Harris, 1999)? Or is it a way of facilitating social bonding in the context of joyful play, as others have proposed (Panksepp, 2000; Provine, 2004)?

## THE NEURAL BASIS OF COGNITIVE PROCESSES IN HUMOR

So far in this chapter, I have been focusing particularly on laughter and the emotion of mirth that it expresses. In this section I will turn to research on the neural underpinnings of the cognitive component of humor. If we think of the cognitive processes involved in humor (discussed in Chapter 4) as the “software” or “mental programs,” here I am discussing the “hardware,” the brain structures and circuits in which these programs “run.” Our understanding of the brain bases of humor comes from several lines of research, including neuropsychological studies of deficits in humor comprehension observed in patients with brain damage, EEG studies of brain-wave activity during humor processing in normal individuals, and, more recently, neuroimaging studies using fMRI to identify the brain regions that are activated when people are exposed to humorous stimuli.

### Humor and Brain Injury

Clinical observations of patients with right hemisphere damage (RHD) resulting from strokes or other injury to the brain have long suggested that the right hemisphere likely plays an important role in the processing of humor. Although these patients typically have normal linguistic abilities, they often (but not always) display marked changes in their personality, engaging in socially inappropriate behavior, making humorous but often crude or offensive comments, and laughing inappropri-

ately (Brownell and Gardner, 1988). They are also often impaired in understanding the discourse and behavior of others, failing to understand jokes told by other people, and missing the main point of a story. Although they understand the details of a story, they seem to be unable to piece them together into a coherent interpretation. In addition, they often have difficulty extracting inferences and nuances from communication, misunderstanding sarcasm and indirect requests.

In contrast, patients with unilateral left hemisphere damage (LHD) typically do not show the same personality changes and inappropriate social behavior. Although they are often aphasic (i.e., they have marked language impairment due to the fact that language functions are located in the left hemisphere in right-handed people), they typically display a normal level of social awareness and understanding. In addition, to the extent allowed by their linguistic impairments, they are usually able to extract the main point of a story or conversation, to draw inferences, and to combine elements of a story into a coherent whole. These clinical observations suggest that RHD patients may have particular difficulty in understanding and appreciating at least some forms of humor.

Amy Bihrlé and her colleagues at the Boston University School of Medicine conducted a study in which they compared RHD and LHD patients in their ability to comprehend humor (Bihrlé, Brownell, and Powelson, 1986). Due to the language impairments common in LHD patients, it was important to use nonverbal humor stimuli to ensure that any differences between the groups were not simply due to differences in language abilities. Accordingly, the humor stimuli used in the experiment were a series of captionless comic strips, each containing four picture panels forming a narrative, with the final picture introducing a humorous ending much like the punch line of a verbal joke. The participants were presented with the first three panels of each comic strip and were instructed to select which of two alternative pictures would make the funniest ending. In each case, one of the alternatives was the original, humorous "punch line" picture, whereas the other (less humorous) alternative varied in the degree to which it contained incongruity (surprising elements) and resolution (coherence with the preceding narrative). By examining the types of alternatives that were chosen incorrectly by the participants, the researchers could identify particular components of humor comprehension with which they had difficulties.

Overall, RHD patients performed significantly more poorly than did LHD patients in selecting the correct joke ending, suggesting a particularly important role of the right hemisphere in humor comprehension. More specifically, RHD patients were found to be much more likely than LHD patients to select incorrect endings that contained an incongruous non sequitur but that did not show coherence with the earlier part of the narrative. In other words, these incorrect endings contained incongruity without resolution. For example, instead of the correct, funny ending, they would often select a slapstick ending (e.g., a picture of someone slipping on a banana peel) that did not have any relevance to the story. Thus, they seemed to be aware that humor involves some sort of incongruity (and often some element of aggression), and were able to recognize the presence of incongruity, but they had difficulty identifying which incongruous endings made most sense in relation to the rest of the story.

This lack of relevance or coherence may account for the clinical observation that RHD patients often engage in silly, socially inappropriate forms of humor (i.e., humor that is not relevant to the social situation). On the other hand, when LHD patients made errors, they were more likely than RHD patients to choose incorrect endings that did not contain any incongruity, but simply provided an ordinary, unsurprising completion to the story. Thus, they had some difficulty in recognizing incongruity.

In a second part of their study, which examined only the RHD patients, Bihrlé and her colleagues (1986) employed a similar methodology using verbal jokes instead of visual cartoons as humor stimuli, to determine whether a similar pattern of deficits would be found with verbal humor. The results closely replicated the findings with the nonverbal humor, with RHD patients frequently selecting incorrect joke punch lines that contained incongruity (often of a slapstick nature) but no coherence or resolution. Similar findings were also obtained in other studies by Brownell et al. (1983) and by Wapner et al. (1981). Overall, these results suggested that the left hemisphere of the brain plays a role in perceiving incongruity, whereas the right hemisphere is important for making coherent sense of (i.e., resolving) the incongruity within the social context (Bihrlé, Brownell, and Gardner, 1988; Gillikin and Derks, 1991; McGhee, 1983b).

More recent research suggests that part of the difficulty of RHD patients in comprehending humor may have to do with deficits in “theory of mind,” which is the ability to attribute beliefs and intentions to other people in order to explain or predict their behavior (Brownell and Stringfellow, 2000). Francesca Happé, Hiram Brownell, and Ellen Winner (1999) tested humor comprehension in groups of RHD and LHD patients and non-brain-damaged control participants using nonverbal cartoons that either did or did not require a sophisticated theory of mind in order to understand and appreciate the humor fully. In the theory of mind cartoons, the humor depended on what a character mistakenly thought or did not know. For example, in one cartoon a man is playing a guitar and singing on a balcony of a high-rise apartment building, while two women, one on the balcony above him and the other on the balcony below, are listening with rapt attention, each apparently thinking that he is serenading her. To understand the joke, one must be able to recognize differences in the knowledge of each of the characters.

Participants were presented with pairs of cartoons, each pair comprising an original humorous cartoon and a modified version in which the key humorous element was replaced, and were asked to choose which of the two was funnier. The results indicated that RHD patients, as compared with both the LHD patients and normal control subjects, showed significantly more errors in identifying the humorous cartoons involving theory of mind, but did not differ in their ability to identify the cartoons that did not require theory of mind. In contrast, LHD patients did not differ from non-brain-damaged controls on either type of cartoon.

Brownell and Stringfellow (2000) suggested that deficits in theory of mind, which have also been found in RHD patients in other research, may account for the pattern of humor comprehension deficits that were found in these patients in previous

research. In particular, they speculated that the resolution of humor (i.e., the ability to “make sense” of incongruity), which has been found to be the aspect of humor in which RHD patients have particular difficulty, often depends on a theory of mind. Impairments in theory of mind, which is very important for appropriate social and emotional functioning, may also help to account for the socially inappropriate forms of humor often observed in these patients. Further research is needed to explore these hypotheses more fully (see also Lyons and Fitzgerald, 2004, for a discussion of humor in autism and Asperger syndrome, which are thought to involve deficits in theory of mind).

Although previous research indicated an important role of the right hemisphere in humor comprehension, a study by Prathiba Shammi and Donald Stuss (1999), at the University of Toronto, indicated that it is the right frontal lobe in particular that seems to be most important. They tested patients with single focal brain damage restricted to the frontal (right, left, or bilateral) or nonfrontal (right or left) brain regions as well as age-matched normal controls. The participants were given several humor tests to assess various aspects of humor comprehension and appreciation, including both verbal and nonverbal forms of humor. In general, similar deficits in humor comprehension that were previously found in RHD patients were found in this study, but only for patients with right frontal lobe damage. In addition, the patients with right frontal lesions reacted with less emotional responsiveness (smiling and laughter) to all the humorous materials as compared to those with lesions in other brain areas.

The authors noted that the frontal lobes, and particularly the right frontal lobe, appear to be especially involved in the integration of cognition and emotion, due to their connections to the limbic system as well as many other cortical regions. In addition to the integration of cognition and emotion, the frontal lobes have been shown to play a crucial role in a number of cognitive functions that are likely important for humor comprehension, including narrative discourse, abstract and nonliteral interpretation, working memory, problem solving, and indirect forms of communication such as irony, affective intonation, and sarcasm.

### EEG Studies

In addition to studying deficits in humor comprehension in patients with brain damage, researchers have investigated the brain areas involved in humor in healthy subjects using EEG techniques, in which the electrical activity of the brain is measured by means of electrodes attached to the scalp. To determine whether the left or right hemisphere is more active in humor, Sven Svebak (1982), then at the University of Bergen in Norway, measured the amount of discordant alpha wave activity occurring at sites on the right and left occipital lobes of subjects while they watched a comedy film. Those who laughed while watching the film (and therefore presumably found it highly amusing) showed less discordant right-left alpha activity than did those who did not laugh, suggesting coordinated activity of both hemispheres during mirth.

To test whether this finding was simply due to respiratory effects of laughter (perhaps causing differences in blood oxygen levels), a second study included conditions in which subjects were instructed to hyperventilate and hypoventilate, as well as humorous and nonhumorous film conditions. The results replicated the first study and also demonstrated that the greater concordance in alpha activity across the hemispheres associated with laughter was not simply caused by laughter-related changes in respiration. Overall, then, these studies suggested that both hemispheres of the brain work together in a coordinated manner during humor and mirth rather than one hemisphere being more active than the other.

In another EEG study of humor, Peter Derks and colleagues, at the National Aeronautics and Space Administration, examined event-related potentials (ERPs) associated with joke comprehension and appreciation (Derks et al., 1997). ERPs are spikes in positively or negatively polarized brain wave activity occurring at very brief intervals after an event, and have been found to indicate different types of information processing. Using 21 EEG electrodes at various locations on the scalp, brain wave activity was monitored while participants were presented with a series of verbal jokes on a computer screen. Electromyographic (EMG) recordings were also taken on the zygomatic muscle of the face to detect the presence or absence of smiling and laughter, indicating whether or not each joke was found amusing by the subject.

The results showed that all of the jokes, regardless of whether or not smiling or laughter occurred, produced an increase in positive polarization of brain waves with peak amplitude about 300 milliseconds (P300) following presentation of the punch line. In addition, for the jokes that were associated with zygomatic muscle activity, this was followed by a negative polarization with peak amplitude at about 400 milliseconds (N400). In contrast, this N400 wave did not occur after jokes that did not elicit zygomatic activity, and were therefore presumably not found to be amusing.

Previous research has shown that P300 waves indicate the cognitive activity of categorization, whereas N400 waves occur when categorization is disrupted due to an incongruous or unexpected element, resulting in an extension of the categorization process. In terms of the schema concepts discussed in Chapter 4, P300 following a joke can be viewed as indicating the activation of a schema to make sense of the information in the joke, whereas N400 indicates the disruption of this process and the search for an alternative schema due to the detection of an incongruity ("frame-shifting"). The fact that the N400 wave only occurred with jokes that were found to be amusing suggests that these were the jokes that triggered the activation of an alternate schema (corresponding to the "resolution" stage in two-stage theories of humor). As noted in Chapter 4, the simultaneous activation of two or more incompatible schemas seems to be the hallmark of humor. Thus, this study provided EEG evidence that corresponds quite well to the schema-based cognitive research discussed previously. In addition, consistent with the findings of Svebak (1982), this study found similar levels of activity in both hemispheres of the brain, suggesting that both hemispheres are involved in humor processing.



A more recent EEG study by Seana Coulson and Marta Kutas (2001), at the University of California at San Diego, found the N400 wave following the presentation of humorous sentences but not nonhumorous sentences, replicating the finding of Derks and colleagues (although the results were somewhat less consistent). Although this study also found evidence of a positively polarized wave, this occurred at 500 to 700 milliseconds, considerably later than that observed in the study by Derks and colleagues. In addition, subjects who showed a high level of joke comprehension revealed simultaneous positive and negative waves in different brain regions during this time period.

These authors interpreted the positive polarities as reflecting the surprise component of joke processing and the negative polarities as indicating the frame-shifting needed to reestablish coherence. They argued that the fact that these occurred during the same time period indicates that the surprise and coherence components of humor comprehension occur simultaneously in different brain regions, rather than following the temporally sequential pattern suggested by two-stage incongruity-resolution models of humor (e.g., Suls, 1972). In summary, although there were some differences between these two studies, both seem to provide evidence of positive and negative polarity ERPs corresponding to incongruity and resolution components of humor comprehension.

### Brain-Imaging Studies

Recent advances in neuroimaging techniques such as fMRI have enabled researchers to study the brain regions involved in a wide range of psychological processes in normal individuals. fMRI uses high-powered, rapidly oscillating magnetic fields to scan the brain and detect small changes in blood oxygenation levels (which are indicative of changes in neuronal activity) in specific regions of the brain. Several recent studies have employed this method to investigate humor. These investigations have begun to map out the areas in the cortex involved in the cognitive comprehension of humor as well as subcortical areas in the limbic system underlying the emotional response of mirth.

In a study conducted at University College London, MRI was used to scan the brains of participants while they listened to riddles containing either phonological jokes (simple puns based on word sounds) or semantic jokes (containing more complex incongruities based on semantic meaning), as well as a set of nonhumorous control riddles (Goel and Dolan, 2001). After each item, the subjects were instructed to indicate, by pressing a key, whether or not they found it amusing, and after the scan they reviewed the jokes and rated them for funniness. Analyses of the brain areas that were differentially activated by the two different types of jokes indicated that somewhat different networks were involved. In particular, the semantic jokes induced greater activation in regions of both the left and right temporal lobes that are involved in semantic processing of language. In contrast, the phonological jokes induced greater activation in areas of the left frontal lobe that have been implicated in the processing of speech



sounds, which have particular relevance in puns. Thus, different brain areas appear to be involved in the cognitive processing of different types of humor.

Besides these cognitive processes, this study also examined emotional components of humor by identifying brain areas that were differentially activated in response to jokes that were rated as funny, as compared to those rated as unfunny. Funniness ratings presumably reflect the degree to which each stimulus elicited mirth in the participants. These analyses revealed that, regardless of joke type, funnier jokes were associated with significantly greater activation of the medial ventral prefrontal cortex, an area at the front of the brain with connections to the limbic system that plays an important role in integrating cognitive and emotional processes. This was one of the areas that was also found to be activated during emotional, as opposed to voluntary, laughter in the study by Iwase and colleagues (2002) discussed previously.

Another fMRI study, conducted at Stanford University, found further evidence for the involvement of emotion-related brain centers in humor, particularly the well-known mesolimbic reward centers (Mobbs et al., 2003). While being scanned in an MRI machine, participants viewed, in random order, 42 humorous cartoons and 42 nonhumorous control cartoons in which the humorous elements had been removed. The data were analyzed to identify the brain regions that were differentially activated in response to humorous versus nonhumorous cartoons. Several of the regions that showed greater activation to humorous cartoons were in the left hemisphere of the cerebral cortex, presumably involving cognitive processing of humorous information. These included: (1) an area at the junction of the left temporal and occipital lobes (which was suggested by the authors to be important in the perception of incongruous or surprising elements of humor); (2) an area of the left frontal lobe including Broca's area (which is involved in semantic processing and integrating language and long-term memory, and may therefore be important for the perception of coherence or resolution of incongruity); and (3) the supplementary motor area of the left frontal lobe (presumably reflecting motor aspects of expressive smiling and laughter). The latter area is the one found by Fried and colleagues (1998) to produce mirthful laughter when electrically stimulated during surgery.

In addition to these cortical areas, this study found that humorous as compared to nonhumorous cartoons also produced significantly greater activation in several sub-cortical regions, including the anterior thalamus, ventral striatum, nucleus accumbens, ventral tegmental area, hypothalamus, and amygdala (Figure 5). These regions form the core of the so-called mesolimbic reward network, a well-researched system that employs dopamine as the major neurotransmitter, and which is implicated in a variety of pleasurable, emotionally rewarding activities, including ingestion of mood-altering drugs like heroin and alcohol, eating, sexual activity, listening to enjoyable music, looking at photographs of attractive faces, and playing video games (for a review, see Schultz, 2002). Thus, at a neurological level, the positive emotion elicited by humor appears to be closely related to the pleasurable feelings associated with these other activities. Of particular interest was the finding of a significant positive correlation between the funniness ratings of individual cartoons and the degree of activation of the nucleus accumbens, which has consistently been shown to be important in psy-

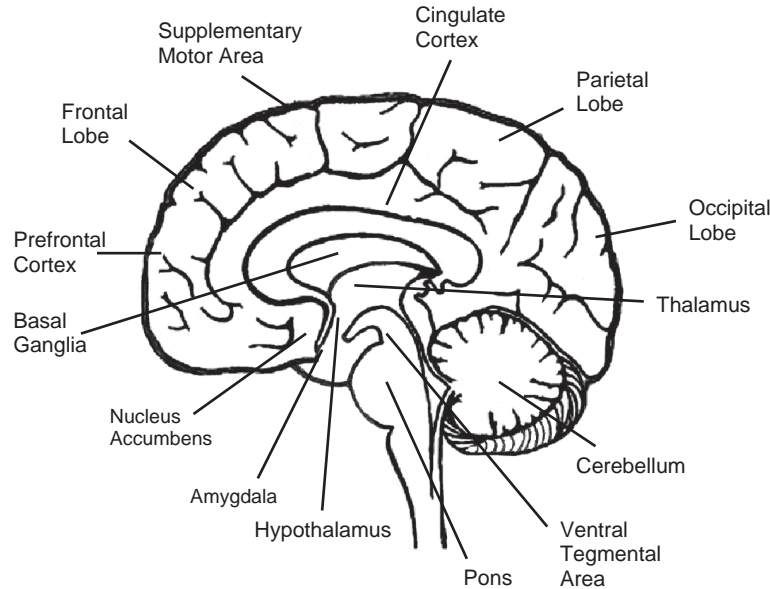


FIGURE 5 Brain regions involved in cognitive and emotional components of humor and laughter.

chologically and pharmacologically driven rewards, suggesting that this structure is particularly important in the pleasurable emotion associated with humor.

These patterns of cortical and subcortical regions activated by humorous versus nonhumorous cartoons were replicated in three subsequent investigations, two by the same team of researchers at Stanford University (Azim et al., 2005; Mobbs et al., 2005), and one by researchers at the California Institute of Technology (K. K. Watson, Matthews, and Allman, in press). One of these studies also examined sex differences in brain responses to humor (Azim et al., 2005). Although women and men showed similar overall patterns of brain activity, women revealed greater activation in the left prefrontal cortex and in the mesolimbic regions including the nucleus accumbens, suggesting that they enjoyed the cartoons more. Another of these studies examined correlations between personality traits and brain activation in response to humor (Mobbs et al., 2005). Participants with lower scores on a measure of neuroticism were found to have higher levels of activation in the mesolimbic reward circuitry, including the nucleus accumbens, suggesting that humor induces a stronger pleasure response in more emotionally stable individuals. There was also greater humor-related brain activation in extraverted as compared to introverted participants, indicating a greater responsiveness to humor in these individuals as well. These findings suggest a biological basis to correlations that have been found between these personality traits and various measures of sense of humor, which I will discuss in greater detail in Chapter 7.

Taken together, these brain-imaging studies provide intriguing evidence concerning the regions of the cerebral cortex that are involved in the cognitive processing of various types of humor, as well as the cortical and subcortical (limbic) regions mediating the pleasurable emotion of mirth that is induced by the perception of humor. Although the studies of humor in patients with brain lesions seem to suggest a particularly important role of the right hemisphere, the brain-imaging research (like the EEG studies) indicates that humor involves coordinated activities of many regions in both hemispheres. As noted earlier, the brain lesion findings implicating right hemisphere involvement in humor may reflect a particular role of that hemisphere in social comprehension skills, such as theory of mind, which are important for understanding humor within its social context. The brain-imaging studies suggest that the left hemisphere is also very much involved in processing other aspects of humor.

In addition to research investigating brain regions involved in the comprehension and enjoyment of jokes, some fMRI studies have looked at the brain areas that are activated by the sound of laughter. As we saw in the Chapter 5, Provine (2000) suggested that the contagiousness of laughter might be due to a hypothetical center in the brain that responds selectively to the distinct sounds of laughter, inducing feelings of mirth and causing the listener to laugh in turn. Gervais and Wilson (2005) suggested that this laughter-response center may consist of specialized mirror neurons, a type of neuron that is active not only when the individual is performing a particular behavior but also when observing someone else perform the same behavior (Rizzolatti and Craighero, 2004). Research has shown that certain mirror neurons also respond to the perception of emotions in others, inducing an empathic response in the observer.

An fMRI study by Kerstin Sander and Henning Scheich (2001) found that listening both to laughter and to crying elicited strong activation in the amygdala, part of the limbic system which, as we have seen, is an important center of emotion processing that is activated by humor. A more recent fMRI investigation compared the brain areas that were active when participants listened either to laughter, speech, or nonvocal sounds (M. Meyer et al., 2005). While both speech and laughter produced activation in auditory processing regions of the temporal lobes, the activation was stronger in the right hemisphere with laughter and in the left hemisphere with speech. Thus, the right hemisphere may be more strongly involved in responses to laughter if not to humor. This study also found that hearing laughter activated a section of the motor area in the right frontal lobe that has previously been implicated in the vocal expression of laughter, providing further evidence for a close link between laughter reception and expression mechanisms. Further research is needed to determine whether any of these areas can be identified as the laughter-mirroring center hypothesized by Provine (2000) and by Gervais and Wilson (2005).

Although only a small number of fMRI investigations of humor and laughter have been conducted as yet, they are beginning to provide intriguing information about how the brain responds to humor. It is important to note, though, that the confined space of an MRI machine does not permit researchers to study events in the brain associated with the creation and perception of spontaneous forms of humor occur-

ring in naturalistic social interactions, and this research is therefore limited to the comprehension and enjoyment of jokes and cartoons and responses to recorded laughter. There are also some discrepancies in findings across these studies, likely due to differences in the types of humor stimuli and experimental paradigms that were used. Despite the limitations of the methodology, there is still much more to learn with this approach, and this will likely continue to be an exciting area of research in coming years.

## EVOLUTIONARY THEORIES OF HUMOR AND LAUGHTER

Several lines of evidence indicate that humor, mirth, and laughter are likely a product of natural selection (Gervais and Wilson, 2005; Weisfeld, 1993). Humor and laughter are universal in the human species, and laughter as an expression of mirth emerges early in life. Infants begin to laugh in response to social stimuli by around four months of age, and cases of gelastic epilepsy in newborns indicate that the mechanisms for laughter are present at birth (Sher and Brown, 1976). Additional evidence that laughter is an innate behavior pattern, rather than being learned through imitation, comes from the fact that children who are born blind and deaf laugh normally (Goodenough, 1932). As we have seen, the evidence from studies of pathological laughter, brain lesion studies, and brain-imaging research all suggest that there are specific neural circuits for humor, mirth, and laughter. Moreover, the evidence of laughter and play-related positive emotion in other animals further attests to their evolutionary origins.

The animal research discussed earlier indicates that humor and laughter in humans likely originated in social play. Thus, the adaptive functions of humor are likely closely linked to the functions of play more generally. Many theorists have suggested that the evolutionary benefits of play have to do with facilitating the development of various adaptive skills (Bateson, 2005; Panksepp, 1998). For example, some have suggested that play helps individuals learn competitive and noncompetitive social skills, such as behaviors that facilitate social bonding and cooperation or those that promote social rank, leadership, and communication. Others have suggested nonsocial functions of play, such as increasing physical fitness, cognitive abilities, and creativity (P. K. Smith, 1982). Panksepp (1998) summarized research showing that adult rats that have been deprived of play during the juvenile period, as compared to those that have abundant play experience, are less effective in competitive encounters, are less valued as social partners by others, are more fearful in social situations, and have decrements in certain problem-solving abilities.

With the evolution of an enlarged cerebral cortex and increased capacity for language, abstract thinking, self-awareness, theory of mind, and so on, humans have extended the functions of play, mirth, and laughter by developing the ability to play with ideas, words, and alternative realities by means of the ludic mental activity of humor (Caron, 2002). Glenn Weisfeld (1993) proposed an evolutionary theory of the adaptive functions of humor that emphasizes its continuity with play. Just as physical

play in animals seems to provide them the opportunity to practice competitive and noncompetitive social and physical survival skills in a nonthreatening context, humor, in this theory, is a means for humans to playfully practice important skills relating to social cognition and interpersonal behavior. Through humorous anecdotes, teasing, joking, and wordplay, humans are able to safely probe sensitive social issues concerning such topics as sexuality, aggression, and social status; engage in playful competition; explore incongruous counterexamples, and so on. Thus, the adaptive functions of humor as playful cognitive activity in a social context appear to be an extension of the original functions of mammalian physical play into the realm of cognition.

Besides these benefits of the cognitive aspects of humor, part of its adaptive function may have to do with the positive emotion associated with it. According to Barbara Fredrickson's (2001) Broaden-and-Build Theory, the adaptive functions of positive emotions in general, including the humor-related emotion of mirth, is to *broaden* the scope of the individual's focus of attention, allowing for more creative problem solving and an increased range of behavioral response options, and to *build* physical, intellectual, and social resources that are available to the individual for dealing with life's challenges. Evidence in support of this theory has been provided by recent research conducted by Fredrickson and her colleagues on mirth and other positive emotions (e.g., Fredrickson and Branigan, 2005; Fredrickson et al., 2000). These ideas are also consistent with the suggestion made by Michelle Shiota and her colleagues (2004) that positive emotions, including humor-related mirth, play an important role in the regulation of interpersonal relationships.

Although human laughter appears to have originated in play, it has evidently undergone considerable evolutionary change since we diverged from our nearest living relative, the chimpanzee, some 6 million years ago. As noted earlier, human laughter sounds quite different from that of chimpanzees and other primates, and is based on a different respiratory pattern. Thus, there appears to have been some adaptive pressure on the formal characteristics of laughter in the evolutionary history of our species. Matthew Gervais and David Wilson (2005) refer to these modifications as a process of ritualization, whereby "a signal changes in structure so that it is more prominent and unmistakable, and thus more readily perceptible" (p. 415).

When did this distinctively human form of laughter evolve? Robert Provine (2000) argued that the divergence from apelike to humanlike laughter did not begin until after the development of bipedalism in our hominid ancestors (presumably the *australopithecines*) some 4 million years ago, since walking on two legs freed the thorax from the mechanical constraints of quadrupedal locomotion and allowed for the greater control over respiration that is needed for human laughter (as well as language). In turn, Gervais and Wilson (2005) suggested that the human form of laughter was likely fully developed before the evolution of language (which is thought to have begun with *Homo habilis* around 2 million years ago), since brain studies indicate that laughter originates in subcortical, limbic, and brainstem areas shared with other primates, and not in the more recently evolved neocortical areas in which language is based. If this reasoning is correct, laughter must have taken its contemporary human form sometime between 2 and 4 million years ago.

Why did laughter in humans become ritualized in this way? Gervais and Wilson (2005) proposed a theory drawing on contemporary views of laughter as an emotion-induction mechanism. In particular, they suggested that the changes that occurred in laughter were ones that made it increasingly effective at inducing the play-related positive emotion of mirth in other members of a group, and thereby recruiting them to engage in social play. In turn, social play and the positive emotion associated with it presumably provided the various adaptive benefits discussed earlier. Individuals who were more adept at becoming playful during times of safety and eliciting a playful state in others through laughter would have benefited from increased fitness within the group. In addition, groups composed of members who more frequently engaged in laughter would have a competitive advantage over other groups. (For an alternative, “selfish gene” theory of the evolution of laughter, see Owren and Bachorowski, 2001.)

Besides the play-related functions of humor, mirth, and laughter, over the course of human evolution humor seems to have been adapted for a number of additional functions by means of co-optation. A number of such additional functions have been proposed by various theorists (see Vaid, 1999, for a review of evolutionary theories of humor). For example, as we saw in Chapter 5, Mulkay (1988) suggested that humor was co-opted as a mode of interpersonal communication. Along the same line, Richard Alexander (1986) proposed an evolutionary theory of humor that emphasizes its aggressive as well as its bonding aspects. Using the concepts of ostracism and indirect reciprocity, he suggested that humor evolved as a way of favorably manipulating one’s status in a social group to improve one’s access to resources for reproductive success. Jokes and other disparaging forms of humor that make fun of members of an out-group are a means of lowering their status and ostracizing them, while more affiliative forms of humor are a method of enhancing the status and fostering the cohesiveness of members of the in-group.

Geoffrey Miller (1997, 2000) has proposed a theory that focuses on the creativity of humor rather than its aggressiveness, suggesting that sexual selection played a major role in its evolution. According to this view, a witty sense of humor, like linguistic skills and creativity, is an indicator of superior intellectual aptitude, a genetically based trait that enhances one’s ability to compete successfully for resources. Thus, humor is a “fitness indicator,” a signal for “good genes,” increasing the individual’s perceived desirability as a potential mate. This theory accounts for the well-replicated finding (discussed in Chapter 5) that a sense of humor is seen by people in all cultures as one of the most desirable characteristics in a prospective mate, and particularly in women’s choice of a male partner (Feingold, 1992). The preferred selection of partners with a sense of humor would ensure that, over time, genes involved in the formation of brain systems underlying humor creation and appreciation would proliferate in the population.

Some recent studies have investigated hypotheses derived from Miller’s sexual selection theory. Eric Bressler and Sigal Balshine (2006) presented male and female undergraduates photographs of two individuals (both either male or female) along with statements that were supposedly written by them. The statements from one of



each pair always contained humor, and the other did not. The participants were then asked to rate these individuals on a number of perceived personality traits and to select the one that was most desirable as a relationship partner. The results revealed that female subjects preferred the humorous over the nonhumorous male as a potential partner, whereas no such preference appeared when males were rating females or when participants of either gender were rating individuals of the same sex. These results were interpreted as providing support for Miller's theory that a sense of humor evolved as a means of attracting potential sexual partners, and particularly for males to attract females.

Although research has shown that both men and women consider a sense of humor to be a desirable characteristic in a prospective mate (Daniel et al., 1985; Feingold, 1992), sexual selection theory would suggest that the two sexes may have somewhat different ideas about what a desirable sense of humor is. Women may think of a man with a good sense of humor as someone who makes them laugh, whereas men may think of a woman with a sense of humor as someone who laughs at their jokes. A recent study by Bressler and colleagues provided some support for this hypothesis (Bressler, Martin, and Balshine, 2006). When presented with descriptions of two individuals of the opposite sex and asked to choose which one was more attractive as a potential romantic partner, women were more likely to choose the one who produced humor and made them laugh over the one who appreciated their humor, whereas men were more likely to choose the humor appreciator over the humor producer.

A number of other evolutionary theories have been proposed, each suggesting somewhat different adaptive functions for humor. For example, humor and laughter have been viewed as a "disabling mechanism" that prevents us from doing things that would be counterproductive (Chafe, 1987), or as a form of "vocal grooming" which, like physical grooming in primates, facilitates social bonding (Dunbar, 1996). Another theory views laughter as a "false alarm," signaling to others that a stimulus or event is unimportant and nonserious (Ramachandran, 1998). Although many of these theories seem quite plausible, there is little research evidence to support most of them. Like evolutionary psychology in general, evolutionary theories of humor need to provide testable hypotheses making them potentially falsifiable so that they can be more than merely "just so" stories (Gould, 2002). In the end, we may never have definitive answers concerning the origins and adaptive functions of humor. Nonetheless, these sorts of evolutionary theories are useful if they generate interesting new hypotheses, stimulating new lines of research, and providing a better understanding of the phenomena.

## CONCLUSION

The psychobiological study of humor, mirth, and laughter contributes interesting new perspectives and insights, complementing the findings from other areas of psychology. The biological approach to humor calls our attention particularly to the emotional aspects of this phenomenon. The cognitive-perceptual component of



humor draws on many cortical brain circuits involved in information processing. When humorous incongruity is perceived, a distinctive emotional state is elicited, which I have referred to as mirth. Comparative studies of nonhuman animals suggest that this emotion originates in play, a social activity that apparently serves important adaptive functions. Recent brain studies, using animal models as well as neuroimaging in humans, are just beginning to unravel the “emotional operating system” of mirth, the specialized brain structures and circuits that underlie this emotion. These studies have already implicated the well-known dopaminergic mesolimbic reward centers, as well as the role of opiates and various neuropeptides. Further research in this area, part of the growing field of affective neuroscience, will likely yield many interesting discoveries, not only about the brain circuits, but also the brain biochemistry of humor-related mirth and the potential interactions of these biochemicals with other systems of the body, including the endocrine and immune systems.

The emotion of mirth typically also triggers the expressive behavior of laughter, which communicates to others the presence of this emotional state in the individual. Laughter is characterized by a distinctive pattern of vocalizations, respiration, and facial expression. Although we often view laughter as the “cause” of changes in autonomic arousal and brain biochemistry, it seems more appropriate to view all of these as effects of the emotion of mirth. Laughter is essentially a social behavior, a fixed action pattern that serves an interpersonal communication function. It has a contagious effect, as the sound of laughter elicits feelings of mirth in others, causing them to laugh as well.

The biological approach also draws attention to the evolutionary basis of humor. A type of play-related laughter occurs in our closest ape relative, the chimpanzee, as well as other primates, and it has even been suggested that homologues of laughter may be seen in the play activities of rats, suggesting that the origins of mirth and laughter may extend to our earliest mammalian ancestors. The play face and related vocalizations in nonhuman animals signal a distinction between reality and pretense, seriousness and fun, indicating a rudimentary conception of humor. With the exponential growth in the human cortex, and the associated increase in cognitive abilities including language, abstract reasoning, self-awareness, and theory of mind, humans have taken social play to a new level. By playing with language and ideas in the verbal equivalent of competitive rough-and-tumble play, an activity that we call “humor,” we activate the same emotional brain circuits, autonomic arousal patterns, and behavioral displays that are involved in actual physical play. Although play is largely a juvenile activity in most animals, and rough-and-tumble play typically ends with childhood in humans as well, play in the form of humor continues to be an important activity throughout adulthood in humans, serving important social functions. By testing hypotheses derived from various evolutionary theories of humor, research in the field of evolutionary psychology may help to elucidate its adaptive functions, as well as take research on humor into interesting new avenues. In sum, while research in the field of psychobiology has made considerable progress in furthering our understanding of the origins, nature, and biological bases of humor, mirth, and laughter, this promises to be an exciting area of further research in the future.



## Personality Approaches to the Sense of Humor

How would you describe one of your friends to another person? In addition to physical characteristics such as height and hair color, you would likely mention various personality traits, describing his or her level of friendliness, intelligence, competitiveness, or generosity. Chances are that you would also mention his or her sense of humor, saying something like “She often makes me laugh,” or “He always sees the funny side of things.” Thus, sense of humor may be viewed as a personality trait (or, more accurately, a set of loosely related traits), referring to consistent tendencies to perceive, enjoy, or create humor in one’s daily life.

Personality has to do with “an individual’s habitual way of thinking, feeling, perceiving, and reacting to the world” (Magnavita, 2002, p. 16). Personality traits are hypothetical constructs that describe the ways people differ from one another and that enable us to make predictions about how they will behave in various situations. Although people’s behavior is partly influenced by situational factors (you are more likely to tell jokes at a party than at a funeral, for instance), individuals also display some degree of consistency across situations (some people are more likely than others to tell jokes in any particular situation).

A personality trait may be viewed as a dimension along which all people can be placed, with some falling at the very high or low ends of the scale and others somewhere between the extremes. Personality psychologists seek to identify the various traits that account for behavioral, cognitive, and affective differences among people,

to create reliable and valid measures for quantifying these traits, to explore the relationships among different traits and their ability to predict particular behaviors and affects, and to investigate the biological, social, and psychological factors that account for such individual differences.

Among the many traits that they have investigated, sense of humor has long been a topic of interest to personality psychologists. Several of the most influential early personality researchers and theorists, including such disparate thinkers as Hans Eysenck (1942), Raymond Cattell (Cattell and Luborsky, 1947), Gordon Allport (1961), and Sigmund Freud (1960 [1905]), investigated humor and found a place for it in their theoretical systems (for a review, see R. A. Martin, 1998). In the past few decades, the study of sense of humor as a personality trait has continued to be one of the most active areas of research in the psychology of humor. Researchers have developed a number of tests for measuring different aspects or components of this construct, and numerous studies have been conducted to investigate how these humor-related traits correlate with other personality dimensions and predict relevant behavior.

A particular interest in much of the recent research has been the role of sense of humor in mental health and coping with stress. I will discuss the mental health implications of sense of humor in Chapter 9. In this chapter, I will focus on the conceptualization and measurement of individual differences in humor and their association with other personality dimensions. I will begin by exploring what we mean by sense of humor, noting that this concept seems to comprise several different dimensions. I will then discuss various approaches that researchers have taken in defining and measuring this concept and will review research examining relationships between these different humor measures and other personality traits. These approaches include: humor appreciation measures, which assess the degree to which individuals enjoy different types of humor; self-report measures of various components of sense of humor; measures of people's ability to produce humor; and a *q*-sort technique for assessing humor styles. I will then discuss factor analytic research examining interrelationships among these different measurement approaches. Finally, I will review some research investigating the personality traits of professional comedians.

## WHAT IS SENSE OF HUMOR?

As we saw in Chapter 1, the concept of sense of humor developed in the nineteenth century. In its original meaning, it had an aesthetic connotation, referring to a faculty or capacity for the perception or appreciation of humor, something like a sense of beauty in art or an ear for music. At that time, the word *humor* also had a narrower meaning than it has today, referring to a sympathetic form of amusement that was linked to pathos, and was distinguished from wit, which was seen as more aggressive and less socially desirable (Ruch, 1998a; Wickberg, 1998). The sense of humor, as a character trait relating to this positive form of amusement, therefore also took on a very socially desirable connotation, and came to be viewed as one of the

most positive traits a person could have. Over the years, however, the meaning of *humor* has broadened to cover all types of mirthful phenomena, and *sense of humor* has also been extended to include a much wider range of humor-related traits, while retaining its very positive connotation. Thus, a sense of humor has become a very desirable but also a very poorly defined personality characteristic.

Most people think of themselves as having a good sense of humor. As the American essayist Frank Moore Colby wittily observed, “Men will confess to treason, murder, arson, false teeth, or a wig. How many of them will own up to a lack of humor?” (quoted in Andrews, 1993, p. 431). Gordon Allport (1961) found that, when asked to assess their own sense of humor, 94 percent of research participants rated it as either average or above average, with only 6 percent acknowledging a below-average sense of humor (statistically, of course, 50 percent of the population are below average). Herbert Lefcourt and I (1986) replicated this finding 25 years later in a study of university students.

People generally associate a sense of humor with many desirable characteristics beyond merely the tendency to create or enjoy humor. When research participants were asked to rate the personality traits of a hypothetical person with a “well above average sense of humor,” as well as someone with a “below average sense of humor,” the high-humor person was rated as being significantly more friendly, pleasant, cooperative, interesting, imaginative, creative, clever, admirable, intelligent, and perceptive, and significantly less complaining, cold, mean, and passive (Cann and Calhoun, 2001). At the same time, though, the high-humor person was also rated as being more impulsive, boastful, and restless, and less mature, indicating that the sense of humor concept does contain some less desirable characteristics as well. On the major personality dimensions of the well-known Five Factor Model (FFM) of personality (McCrae and John, 1992), this same study found that people with an above average sense of humor are perceived to be more emotionally stable, extraverted, open to experience, and agreeable, but less conscientious than their low-humor counterparts.

While everyone wants to believe they have a good sense of humor, which is thought to be associated with many desirable qualities and characteristics, no one seems to know exactly what a sense of humor *is*. Indeed, Cann and Calhoun (2001) questioned whether this popular but nebulous concept has any consistent, specific referents at all, or whether it is simply a relatively nonspecific configuration of socially desirable characteristics. As Louise Omwake (1939, p. 95) stated over 65 years ago, the sense of humor “is so all-inclusive and highly prized that to say of another: ‘He has a grand sense of humor’ is almost synonymous with: ‘He is intelligent, he’s a good sport, and I like him immensely.’” If sense of humor is to be a scientifically useful trait concept that can be measured reliably and validly in personality research, it obviously needs to be defined more carefully and precisely.

As I have noted in earlier chapters, humor is a complex phenomenon that touches on many aspects of our daily lives. It is a type of mental play comprising social, cognitive, emotional, and expressive components. It also takes many forms, including canned jokes, spontaneous conversational witticisms, irony, puns, double entendres,

amusing anecdotes, and unintentionally funny speech and actions. In addition, it serves a wide variety of psychological functions, including the cognitive and social benefits of the positive emotion of mirth; its many uses in interpersonal communication and influence, which can be both prosocial and aggressive; and its use as a tension-relief and coping mechanism. People can be producers of humor, amusing others and making them laugh, and they can also respond to the humor created by others. As a personality trait or individual difference variable, the concept of sense of humor can relate to any of these different components, forms, and functions of humor. Indeed, researchers investigating this trait have taken many different approaches, each focusing on somewhat different aspects of this complex phenomenon. Not surprisingly, when sense of humor is conceptualized in these different ways, it tends to be associated with different dimensions of human behavior, cognition, and personality.

When we say that someone has a sense of humor, then, we may mean many different things. Personality psychologist Hans Eysenck (1972) pointed out three different possible meanings. First, saying someone has a sense of humor may mean that he or she laughs at the same things that we do (*qualitative* meaning). Second, we may mean that the person laughs a great deal and is easily amused (*quantitative* meaning). Third, we may mean that the person is the “life and soul of the party,” telling funny stories and amusing other people (*productive* meaning). Eysenck went on to argue that these three different “senses of humor” are not necessarily highly correlated with each other.

Franz-Josef Hehl and Willibald Ruch (1985) expanded on Eysenck’s list, noting that individual differences in sense of humor may relate to variation in: (1) the *ability to comprehend* jokes and other humorous stimuli (i.e., to “get” the joke); (2) the way in which individuals *express* humor and mirth, both quantitatively and qualitatively; (3) their *ability to create* humorous comments or perceptions; (4) their *appreciation* of various types of jokes, cartoons, and other humorous materials; (5) the degree to which they actively *seek out* sources that make them laugh, such as comedy movies and television programs; (6) their *memory* for jokes or funny events in their own lives; and (7) their tendency to use humor as a *coping mechanism*. Elisha Babad (1974) also distinguished between humor *production* (the ability to create humor) and *reproduction* (the tendency to retell jokes that one has heard from others) and showed that the two are uncorrelated. Yet another meaning commonly associated with sense of humor is the idea of *not taking oneself too seriously* and the ability to laugh at one’s own foibles and weaknesses.

Sense of humor may therefore be variously conceptualized as a *habitual behavior pattern* (tendency to laugh frequently, to tell jokes and amuse others with spontaneous witticisms, to laugh at other people’s humor productions), an *ability* (to create humor, to amuse others, to “get the joke,” to remember jokes), a *temperament trait* (habitual cheerfulness, playfulness), an *aesthetic response* (enjoyment of particular types of humorous material), an *attitude* (positive attitude toward humor and humorous people), a *world view* (bemused, nonserious outlook on life), or a *coping strategy* or *defense mechanism* (tendency to maintain a humorous perspective in the face of adversity).

These different ways of conceptualizing sense of humor also lend themselves to different measurement approaches in personality research. For example, humor appreciation tests employing funniness ratings of jokes and cartoons may be used to measure sense of humor when it is defined as an aesthetic response. If sense of humor is conceived as a habitual behavior pattern, however, it may be better to measure it with self-report scales in which respondents rate the degree to which various statements describe their typical humor-related behaviors, thoughts, feelings, and attitudes. Alternatively, ratings obtained from peers or trained observers may be used to quantify typical humor behaviors. On the other hand, the measurement of sense of humor as a cognitive ability requires the use of maximal performance tests similar to measures of intelligence or creativity, such as tasks in which participants' humor productions are judged for funniness and originality. As we will see, each of these different conceptualizations and measurement approaches has been employed by different researchers.

In summary, sense of humor does not seem to be a unitary trait. Instead, it is best conceived as a group of traits and abilities having to do with different components, forms, and functions of humor. Some of these may be closely related to each other, while others are likely to be quite distinct (R. A. Martin, 2003). For example, whereas people with a good ability to create humor likely also tend to enjoy making other people laugh, they do not necessarily also tend to use humor in coping with stress in their daily lives. Researchers who wish to investigate hypotheses concerning sense of humor need to be careful to identify which meaning of the construct is theoretically most relevant to their research questions, and select the measurement approach that is most appropriate.

## INDIVIDUAL DIFFERENCES IN HUMOR APPRECIATION

Does the type of humor that a person finds most amusing tell us something about his or her personality? This idea, which has been popular for centuries, is reflected in the observation of the German poet Johann Wolfgang von Goethe that "men show their character in nothing more clearly than by what they think laughable" (quoted by Ruch and Hehl, 1998, p. 109). Based on this idea, some clinicians have proposed that asking psychotherapy patients to tell their favorite jokes might be a useful type of projective test that could be analyzed to diagnose their problems and identify their unresolved needs and conflicts (e.g., Strother, Barnett, and Apostolakos, 1954; Zwerling, 1955).

This view is also the basis of a number of humor appreciation tests that have been developed by personality researchers over the past 50 years to indirectly assess various personality traits (e.g., Cattell and Tollefson, 1966). Indeed, most of the research on individual differences in sense of humor prior to the 1980s was based on this humor appreciation approach, and it continues to have some popularity today. In this approach, research participants are presented with a series of jokes, cartoons, and other humorous materials, and are asked to rate them on such dimensions as



funniness, enjoyment, and aversiveness. The humor stimuli are clustered into various categories, either on a theoretical basis or by means of factor analysis, and separate scores are computed by summing participants' ratings within each category. In this approach, then, sense of humor is defined in terms of the degree to which the individual enjoys particular types or categories of humor.

### Theoretically-Based Content Approaches

In many of the early humor appreciation tests, the humor stimuli (primarily jokes and cartoons) were categorized by the experimenters or other experts on the basis of their content themes. These content categories were typically derived from particular theories of humor, and the measures were then used in research to test these theories. For example, to test Freud's theory that repressed sexual and aggressive drives are released through humor, jokes, and cartoons were typically classified into sexual, aggressive, and nonsense (also referred to as innocent or nontendentious) categories. As noted in Chapter 2, most of the research on psychoanalytic humor theory used this approach. For example, the Mirth Response Test, developed by Jacob Levine and his colleagues (1951), consisted of 36 cartoons that were judged to tap various sex- and aggression-related themes. Subjects' positive and negative responses to the cartoons were thought to reveal their unconscious needs and unresolved conflicts relating to these themes.

Research using the theoretically derived content-based humor appreciation approach provided some evidence that people's level of enjoyment of various types of jokes and cartoons is related to certain personality traits. For example, one early study found that participants who preferred jokes containing sexual and aggressive themes over more intellectually-based humor had more aggressive themes in their Thematic Apperception Test (TAT) stories, lower scores on a measure of intellectual values, less psychological complexity, and higher scores on a measure of extraversion (Grziwok and Scodel, 1956). Some other studies also found positive correlations between extraversion and liking of sexual humor (e.g., G. D. Wilson and Patterson, 1969).

In addition, participants with more conservative attitudes tended to prefer "safe" types of humor (e.g., puns), whereas those endorsing more liberal views expressed greater appreciation of overtly "libidinal" (e.g., sick and sexual) types of humor (G. D. Wilson and Patterson, 1969). In general, more highly anxious individuals, as compared to their less anxious counterparts, were found to enjoy humorous materials less, although studies differed as to whether this effect occurred with all types of humor (Hammes and Wiggins, 1962), or only with aggressive (J. Doris and Fierman, 1956) or nonsense humor (Spiegel, Brodtkin, and Keith-Spiegel, 1969). One study even found some significant correlations between participants' funniness ratings of jokes containing anal themes (i.e., jokes about defecation and flatulence) and measures of "anal" personality traits such as obstinacy, negativism, hostility, cleanliness, and thrift (O'Neill, Greenberg, and Fisher, 1992).

As in the psychoanalytically inspired research, humor appreciation tests were also used in many of the studies investigating disparagement theories of humor (also

reviewed in Chapter 2). These tests typically comprised hostile humor that was categorized by the researchers according to the identity of the proponents and targets of the jokes. Overall, these studies demonstrated that people tend to enjoy disparagement humor that makes fun of people toward whom they have some antipathy (La Fave et al., 1976; Wicker et al., 1980; Wolff et al., 1934; Zillmann and Cantor, 1972, 1976). As noted in Chapter 5, researchers have also used similar methods to study the relationship between sexist attitudes and the enjoyment of sexist humor (e.g., Henkin and Fish, 1986; Moore et al., 1987; Thomas and Esses, 2004).

In summary, a large number of studies have been conducted over the years with humor appreciation tests containing theoretically derived, content-based categories of humorous stimuli. Most of this research was conducted prior to the 1980s, although some researchers have continued to employ this approach more recently to study subjects' appreciation for particular types of humor, such as "sick" jokes (Herzog and Bush, 1994; Herzog and Karafa, 1998), sexist humor (Greenwood and Isbell, 2002; Ryan and Kanjorski, 1998), or "perspective-taking" humor (Lefcourt et al., 1997).

Although some interesting results have been obtained, this approach to classifying humorous materials is subject to several criticisms (Ruch, 1992). Researchers typically did not empirically evaluate the reliability and validity of their humor classifications, nor did they test the assumption of homogeneity of participants' responses to humorous stimuli within a given category. As Eysenck (1972) observed, individuals often do not agree about which aspects of a joke or cartoon they find salient or why they consider it to be funny or unfunny. The dimensions used by a researcher in categorizing humorous stimuli may therefore not be relevant to the way the participants themselves perceive and respond to them. In this regard, an early study by Landis and Ross (1933) found no relation between subjects' classifications of a number of jokes and the way these jokes had been classified by the experimenters, even when the subjects were provided with the categories and their definitions.

In addition, because researchers using this approach selected particular humorous stimuli to fit their theories, they were unable to determine whether their classification systems applied to all kinds of humor or merely to a subset. Finally, since many of the humor appreciation tests were used in only one or two studies by individual researchers, it is difficult to compare the results across different studies. Because of these weaknesses, this approach has not led to much accumulation of knowledge about the nature of sense of humor.

### Early Factor Analytic Studies

An alternative to the theoretically derived content-based method of categorizing humor stimuli involves the use of factor analysis techniques. Rather than constructing a test based on a particular theory, this approach seeks to build a theory on the basis of empirically derived factor dimensions. Factor analysis is a statistical technique for examining correlations among a large set of variables and identifying a smaller number of dimensions (i.e., factors) that account for most of the variance. This method has been used extensively by personality researchers to search for basic

personality traits, as in the FFM mentioned earlier. Over the years, some humor researchers have also applied this technique to identify basic dimensions of humor appreciation.

The general strategy in this approach is to obtain a large number of jokes, cartoons, and other humorous stimuli that are considered to be representative of the whole domain. These materials are then rated for funniness by a large number of research participants. By factor-analyzing these ratings, researchers can determine the implicit dimensions underlying people's appreciation of humor. Jokes and cartoons whose ratings are highly correlated tend to cluster together in the same factor, whereas those whose ratings are uncorrelated fall into different factors. By examining the characteristics that are shared by the humorous stimuli that load on each factor, researchers can identify the relevant dimensions that people implicitly use in their appraisals of these stimuli.

Early factor analytic studies of humor appreciation were conducted by Hans Eysenck, a well-known German-British personality researcher (reviewed by Nias, 1981). Noting that most theories of humor were developed by philosophers and based on speculation, Eysenck sought to develop a theory based on empirical evidence. To do this, he administered collections of verbal jokes, cartoons, and incongruous photographs to 16 participants (a very small sample by today's standards) who were asked to rank-order them for funniness and to indicate which ones they enjoyed (Eysenck, 1942). Factor analyses of these data revealed a small general factor, indicating individual differences in the degree to which people find any kind of humor to be funny. In addition, the analyses revealed three specific factors or dimensions of humor, which were labeled as (1) sexual versus nonsexual; (2) simple versus complex; and (3) personal versus impersonal.

Eysenck also examined the correlations between participants' ratings of humor on the three factors and their scores on a personality test. Sexual and simple jokes were found to be preferred by extraverted individuals, while complex and nonsexual jokes were preferred by introverts. These factor analytic results were generally replicated by Eysenck (1943) in another study in which he administered five sets of humorous stimuli, including jokes, cartoons, and funny limericks, to 100 adults representing a broad cross section of British society.

Based on these factor analytic findings, Eysenck (1942) proposed a theoretical model of humor comprising three components or facets: cognitive (corresponding to the complexity of the humor), conative (having to do with motivation or impulse expression), and affective (relating to emotional aspects). He further combined the conative and affective components under the term *orectic*, which has to do with the "joyful consciousness of superior adaptation" associated with humor. He noted that different traditional theories of humor focus on one or another of these humor facets. The cognitive aspects are emphasized in incongruity theories of humor, the conative in superiority/disparagement theories, and the affective in theories that stress the positive emotions associated with laughter. According to Eysenck, Freud's theory combined elements of all three components.

Eysenck also suggested that each of these components may be present in a given joke to varying degrees, and individual differences in sense of humor may be conceptualized in terms of the degree to which people enjoy humor containing these different elements. For example, he suggested that introverts are more likely to enjoy humor in which the cognitive element predominates, whereas extraverts tend to prefer humor in which the orectic aspects are paramount. Further support for this view was provided by Wilson and Patterson (1969) who found a significant correlation between participants' scores on a measure of extraversion and their funniness ratings of sexual jokes. However, as we will see, other researchers have failed to replicate this finding (Ruch, 1992). Overall, then, Eysenck was one of the first researchers who attempted to develop a general theory of sense of humor based on factor analytic studies of humor appreciation.

Raymond Cattell was another well-known pioneer of general personality research who conducted early factor analytic studies of humor appreciation. Cattell and Luborsky (1947) collected a set of 100 jokes that were considered to be representative of a broad range of humor and relatively free of cultural bias. A sample of 50 male and 50 female undergraduate students were asked to rate the funniness of each joke on two different occasions. Factor analyses revealed 13 clusters of jokes that appeared to have adequate internal consistency and test-retest reliability. Subjects' scores on each of these clusters were subsequently submitted to an additional factor analysis, resulting in five fairly orthogonal (i.e., uncorrelated) factors. Based on the themes of the jokes loading on each factor, the factors were tentatively labeled as: (1) good-natured self-assertion; (2) rebellious dominance; (3) easy going sensuality; (4) resigned derision; and (5) urbane sophistication. The authors suggested that these clusters and factors of humor appreciation might be related to the 12 to 16 general personality factors identified by Cattell (1947) in his factor analyses of personality traits.

To test these ideas, in a subsequent study Luborsky and Cattell (1947) examined the correlations between individuals' funniness scores on the 13 joke clusters and their scores on 10 personality dimensions measured by the Guilford-Martin temperament inventory. Six of these personality dimensions were found to be significantly correlated with funniness ratings of various joke clusters, allowing for further refinement of the cluster labels. These findings caused the authors to be quite optimistic about the possibility of using these humor appreciation factors as a method of assessing more general dimensions of personality. For example, one joke factor was found to be correlated with extraversion, and it was suggested that those jokes could be used as an objective measure of this trait. These ideas were subsequently incorporated into the IPAT Humor Test of Personality (Cattell and Tollefson, 1966), which was designed to assess humor preferences in each of these factors as a way of indirectly measuring more general personality traits.

Despite the effort that went into developing the IPAT humor test, it had several weaknesses and was never widely used. The reliabilities of the scales were quite low, and the stability of the factor structure was questionable. Other researchers factor-analyzed the same set of jokes and found an entirely different factor structure (Yarnold

and Berkeley, 1954). Part of the problem seems to have been the use of a forced-choice response format, resulting in the overextraction of numerous weak and unstable factors and suppression of stronger and more stable factors (Ruch, 1992). In addition, very little research was conducted to evaluate the validity of the humor factor scores as measures of more general personality traits. This test has been used in only a few published studies to investigate such topics as personality traits of effective counselors (Kush, 1997), the relation between humor appreciation and perceived physical health (Carroll, 1990), and gender differences in humor appreciation (Carroll, 1989; Hickson, 1977).

### Ruch's Factor-Analytic Investigations

The early factor-analytic studies of humor appreciation were limited by small sample sizes and a number of methodological weaknesses. In the early 1980s, Willibald Ruch, an Austrian psychologist who is now at the University of Zurich in Switzerland, set out to investigate the factor structure of humor appreciation in a more thorough and systematic way (for a review, see Ruch, 1992). To ensure a comprehensive representation of humor types, he began by amassing a set of 600 jokes and cartoons that were obtained from a wide range of sources. Many were taken randomly from popular magazines and joke books, while others were selected as representative of the categories discussed in the humor literature and used in previous studies.

Over a series of factor-analytic studies conducted by Ruch and his colleagues, differing but overlapping sets of jokes and cartoons from this initial pool were administered to a number of samples of male and female participants representing a broad range of ages, social class, occupations, and health status (Hehl and Ruch, 1985; McGhee, Ruch, and Hehl, 1990; Ruch, 1981, 1984, 1988; Ruch, McGhee, and Hehl, 1990). The materials were also translated into several languages, and studies were conducted with samples in Austria, Germany, England, Turkey, France, Italy, and the United States (Forabosco and Ruch, 1994; Ruch and Forabosco, 1996; Ruch and Hehl, 1998; Ruch et al., 1991).

These factor-analytic studies revealed three stable and robust factors that appear to account for most of the variance in humor appreciation and are consistently found across different humorous stimuli and in all populations studied. Interestingly, the first two factors have to do with structural aspects of humor, rather than content themes. The first of these, labeled *incongruity-resolution* humor (INC-RES), comprises jokes and cartoons in which the incongruity introduced by the punch line can be resolved by information available elsewhere in the joke. In these jokes, there is a sense of having “gotten the point” or understood the joke once it is resolved. Most of the “canned” jokes that people relate in social settings, consisting of a setup and a punch line, fit into this category. This type of humor is consistent with the two-stage incongruity-resolution models of humor discussed in Chapter 3 (e.g., Suls, 1972).

The second factor, labeled *nonsense* humor (NON), also relates to joke structure rather than content. Jokes and cartoons in this category also contain a surprising or incongruous element, but the incongruity is not fully resolved, giving the appearance

of making sense without actually doing so. This type of humor might be described as bizarre, fanciful, off-the-wall, or zany. In this humor there is not a sense of “getting” the joke, but rather one of enjoying a fanciful incongruity for its own sake. Many of Gary Larsen’s *Far Side* cartoons, as well as the zany humor of *Monty Python’s Flying Circus* have been found to load on this factor (Ruch, 1992, 1999). Thus, contrary to the assumption made by earlier researchers that humor should be categorized according to its content or themes, Ruch’s research demonstrated that people’s humor preferences have more to do with structure than with content.

The third factor, labeled *sexual* humor (SEX) is composed of jokes and cartoons containing obvious sexual content themes, indicating that people tend to be fairly consistent in the degree to which they enjoy or dislike sexual humor. Most of these sexual humor materials were also found to have secondary loadings on one or the other of the first two structural factors, depending on whether the humor contained resolved or unresolved incongruity. An example of a SEX joke with a secondary INC-RES loading is the following:

“So how was Scotland?” the father asked his daughter, who had just returned from a vacation. “Is it true they all have bagpipes?” “Oh, that’s just one of those silly stereotypes,” replied the daughter. “All the ones I met had quite a normal one.”

The incongruity of the daughter’s reply is resolved when we recognize that she misunderstood her father’s question about bagpipes to be referring to the appearance of Scottish men’s genitals. In contrast, a cartoon that loaded on the SEX factor with a secondary NON loading shows a hen lying on her back with her legs in the air, saying to a rooster who is facing her, “Just once . . . for a change.” A hen desiring sex in the “missionary position” is incongruous, and this incongruity cannot be resolved by finding some additional information that enables one to “get the joke.”

The SEX factor, which was the only one found by Ruch that had to do with content, has also consistently been found in other factor-analytic studies (e.g., Eysenck, 1942; Herzog and Larwin, 1988). Although, as we have seen, many past researchers have classified humor stimuli on a theoretical basis into various additional content categories, such as aggressive, hostile, sexist, scatological, anal, or sick humor, Ruch’s investigations did not reveal any such content factors, even though he was careful to include examples of all these kinds of humor among his stimuli. Instead, humor containing these sorts of themes always loaded on one or the other of the two structural factors. Thus, apart from sexual themes, individuals do not appear to respond in any consistent way to jokes or cartoons based on the topic of the humor. Instead, the degree to which people enjoy humor seems to be primarily influenced by whether or not the incongruity is resolved, or “makes sense” in some way.

Besides factor-analyzing the humor *stimuli*, Ruch also investigated the factor structure of participants’ *responses* to humor. Using a number of different positive and negative rating scales, Ruch found two response factors: (1) a positive enjoyment or *funniness* factor, and (2) an *aversiveness* or rejection factor. These were only weakly negatively correlated, indicating that individuals who find a particular joke to be very funny do not necessarily rate it as low on aversiveness. For example, an individual



might view a sexist or racist joke as very funny but also very aversive. Thus, funniness or enjoyment ratings alone do not adequately assess people's responses to humor; it is also important to evaluate their negative reactions. Furthermore, research by Igor Gavanski (1986) indicated that these sorts of funniness and aversiveness ratings primarily reflect people's cognitive evaluations of humor stimuli, rather than their emotional response (i.e., the degree of mirth experienced), which is more strongly gauged by the amount of smiling and laughter displayed. This partial dissociation between cognitive and emotional responses to humor explains why many studies have found only weak correlations between funniness ratings and the degree of smiling and laughter.

Based on his factor-analytic studies, Ruch (1983) constructed the 3WD (*Witzdimensionen*) humor test to assess individuals' ratings of funniness and aversiveness of jokes and cartoons on the three identified factors. A 50-item version (form K) and two parallel 35-item versions (forms A and B) are available. The jokes and cartoons are printed in test booklets, and respondents are instructed to rate their funniness and aversiveness on 6-point scales. The total funniness and aversiveness scores for each factor have been shown to have good internal consistencies and test-retest reliabilities. Scores on the three factors are moderately positively intercorrelated, indicating that, to some degree, individuals who enjoy (or dislike) one type of humor also tend to enjoy (or dislike) the others.

### Personality Correlates of the 3WD Dimensions

Numerous studies have been conducted to examine correlations between scores on the three factors of the 3WD humor test and a variety of personality traits (reviewed in Ruch, 1992; Ruch and Hehl, 1998). The total funniness ratings across the three factors have been found to be weakly correlated with extraversion, indicating that extraverts are somewhat more likely than introverts to enjoy all kinds of jokes and cartoons. In addition, the total aversiveness scores are weakly correlated with neuroticism, indicating that people who generally experience more negative emotions such as anxiety, depression, or guilt tend to dislike all kinds of jokes and cartoons. This is particularly true for neurotic individuals who are also introverted and who are high on tender-mindedness, a construct relating to empathy, concern for others, tolerance, and democratic values. These findings are consistent with recent fMRI findings (discussed in Chapter 6) that people who are high in extraversion and those who are low in neuroticism show greater activation of the reward centers in the limbic system of the brain on exposure to humorous cartoons (Mobbs et al., 2005). Interestingly, total funniness scores on the 3WD have also been found to be negatively correlated with religious fundamentalism and orthodoxy, indicating that people who are high in these types of conservative religious orientation are less likely to enjoy all types of jokes and cartoons (Saroglou, 2003).

Much of Ruch's research has focused on personality traits having to do with conservatism, tolerance of ambiguity, and sensation seeking in relation to the two structure-related humor dimensions (NON and INC-RES). Since the appreciation of

nonsense humor requires the individual to tolerate and even enjoy residual incongruity, bizarreness, and absurdity, Ruch hypothesized that this type of humor would be enjoyed by people who have a high tolerance for ambiguity, a general sensation-seeking orientation, and a preference for complex, novel, and unstructured stimuli. On the other hand, since INC-RES humor is more unambiguous and uncomplicated, and generally involves the application of stereotypes to resolve the incongruity, the enjoyment of this type of humor was predicted to be related to greater conservatism and a general need for structured, uncomplicated, stable, unambiguous, and safe forms of stimulation.

Research conducted by Ruch and others has provided a good deal of support for these predictions. Measures of conservative and authoritarian personality traits and attitudes have consistently been found to be positively correlated with funniness ratings of INC-RES humor and with aversiveness ratings of NON humor (Hehl and Ruch, 1990; Ruch, 1984; Ruch and Hehl, 1986a, 1986b). Thus, individuals who espouse more conservative views (as measured by scales of intolerance of minorities, militarism, religious fundamentalism, education to submission, traditional family ideology, capitalism, economic values, and value orthodoxy) and authoritarian attitudes (punitiveness, intolerance of ambiguity, law-and-order attitude) are more likely to enjoy humor in which the incongruity is resolved and one can "get the joke," and to dislike more bizarre or zany humor that does not seem to "make sense."

In one study, for example, Ruch and his colleagues asked participants to indicate the degree to which they believe criminals should be punished for a range of crimes such as fraud, robbery, rape, and murder (Ruch, Busse, and Hehl, 1996). As predicted, the results revealed that the more these individuals enjoyed INC-RES humor, the more severely they thought criminals should be punished for all types of crime (i.e., longer prison terms). If you are charged with a crime, you may wish to avoid a judge who enjoys these kinds of jokes! Not surprisingly, since older people generally tend to be more conservative than younger people, they also tend to enjoy INC-RES jokes more (Ruch et al., 1990).

Sensation seeking is a personality trait involving a need for varied, novel, and complex sensations and experiences, and a willingness to take risks. People who are high on sensation seeking tend to enjoy having new and stimulating experiences through art, music, travel, food, and even taking psychedelic drugs and living an unconventional lifestyle. Research with the 3WD has shown that individuals with high scores on measures of sensation seeking, as well as related constructs such as venturesomeness and hedonism, enjoy nonsense humor significantly more than incongruity-resolution humor (Hehl and Ruch, 1985, 1990; Ruch, 1988). Enjoyment of NON humor has also been found to be positively correlated with the openness to experience dimension of the FFM (Ruch and Hehl, 1998). In addition, greater enjoyment of NON humor is weakly related to higher intelligence, whereas enjoyment of INC-RES humor tends to correlate with lower intelligence (Ruch, 1992).

Other studies have examined preferences for stimulus uncertainty and complexity in relation to these structural factors of humor appreciation. In one study, participants were asked to wear prism glasses that distort the normal visual field by flipping

it upside-down or left-to-right. Those with higher funniness ratings of NON humor kept the glasses on for a longer time and moved around more while wearing them, indicating a greater willingness to experiment with this novel experience (Ruch and Hehl, 1998). Enjoyment of NON humor was also shown to be significantly correlated with preference for more complex and abstract forms of art, whereas enjoyment of INC-RES humor was related to preference for simpler, more representational types of art. When research participants were instructed to arrange black and white plastic squares into an aesthetically pleasing configuration, the productions of individuals with greater appreciation of NON humor were judged to be more complex (Ruch and Hehl, 1998).

Overall, then, the two humor structures appear to partly represent the opposite poles of some personality dimensions (e.g., simplicity-complexity), while also partly relating to entirely different dimensions. In particular, INC-RES humor tends to correlate with conservative and authoritarian *attitudes* and *values*, whereas NON humor relates to variables involving *imagination* and *fantasy*. The relation between conservative attitudes and values and the enjoyment of INC-RES humor is likely due to the fact that stereotypical attitudes (e.g., about particular ethnic groups) need to be invoked in order to resolve the incongruity of most of these kinds of jokes. Individuals with more conservative attitudes may have easier access to the information required for resolving the incongruity and may also derive greater satisfaction from the resulting support that is provided to their belief systems. On the other hand, the stronger association of imagination and fantasy with enjoyment of NON humor is likely explained by the fact that this type of humor involves a greater deviation from reality and requires a willingness to accept improbable events and enter the world of fantasy.

With regard to the content factor of sexual humor, research with the 3WD indicates that enjoyment of this category of humor relates most strongly to the tough-minded versus tenderminded dimension of social attitudes. Toughmindedness is characterized by independent, rational, self-sufficient, and unfanciful dispositions, whereas tendermindedness has to do with empathy, concern for others, sentimentality, tolerance, and democratic values. Regardless of the structure of the joke or cartoon, toughminded individuals tend to show greater enjoyment of sexual humor, whereas tenderminded people tend to rate such humor as being more aversive (Ruch and Hehl, 1986b). Moreover, the more highly a given joke or cartoon loads on the sexual factor, the stronger the correlation between its funniness ratings and the toughmindedness versus tendermindedness dimension, indicating that the enjoyment of sexual humor may be viewed as an indicator of toughminded attitudes (Ruch, 1992).

Some additional correlations have been found when SEX humor is divided into NON and INC-RES types on the basis of its structure. For example, enjoyment of sexual humor with the incongruity-resolution structure (INC-RES SEX) is correlated positively with both conservatism and toughmindedness, resulting also in positive correlations with variables such as authoritarianism, intolerance of ambiguity, political and economic conservatism, technical interests, and support for education toward submissiveness, and negative correlations with aesthetic and social interests (Hehl and Ruch, 1990; Ruch and Hehl, 1986b, 1987). Thus, enjoyment of sexual humor that is

based on the incongruity-resolution structure (i.e., the most common kinds of sexual jokes that people frequently tell in social situations) has little to do with sex *per se*, but instead has to do with toughminded conservatism (authoritarianism). Interestingly, since authoritarian individuals tend to have exaggerated concerns about “sexual goings-on,” their enjoyment of sexual humor of the incongruity-resolution type seems to have more to do with rigid sexual preoccupations than with sexual permissiveness or pleasure (Ruch, 1992).

On the other hand, enjoyment of sexual humor that is based on the nonsense structure (NON SEX), and is therefore more fanciful and bizarre, is unrelated to conservative attitudes (although still related to toughmindedness), but is positively correlated with scales of disinhibition, sensation seeking, hedonism, interest in sex, and sexual libido, permissiveness, pleasure, and experience (Hehl and Ruch, 1990; Ruch and Hehl, 1986b, 1988). Thus, it is only the appreciation of sexual humor of the nonsense structure type that is related to positive sexual attitudes and experience.

In summary, Ruch's research with the 3WD has gone a long way in clarifying the nature of individual differences in appreciation of jokes and cartoons. An important finding is that people's enjoyment of these forms of humor is determined not so much by the content but by the structure of the humor. In particular, individuals tend to respond quite differently to jokes and cartoons in which the incongruity is resolved and there is a sense of “getting the joke” versus those in which the incongruity is unresolved and which might be described as bizarre, fanciful, off-the-wall, or zany. Sexual topics are the only content domain in humor for which individuals show consistent response patterns.

This research also indicates that there is truth to the long-held view that the type of jokes a person enjoys tells us something about his or her personality. However, the particular personality traits associated with humor appreciation are not as self-evident as one might expect. It may be surprising to many that people who enjoy the sorts of jokes that are most commonly told in social contexts (i.e., incongruity-resolution jokes) tend to be individuals with conservative values and attitudes. When such jokes are of a sexual nature, their enjoyment also indicates toughminded, unsympathetic, intolerant, and authoritarian attitudes. On the other hand, the enjoyment of the more bizarre and fanciful nonsense humor (which is more likely to be encountered in cartoons, literature, and films than in canned jokes) indicates greater openness, tolerance for ambiguity, sensation seeking, intelligence, and enjoyment of novelty and complexity. When this sort of humor contains sexual themes, its enjoyment indicates more liberal (although still toughminded) attitudes and greater sexual permissiveness and enjoyment.

## SELF-REPORT MEASURES OF SENSE OF HUMOR DIMENSIONS

The humor appreciation approach to conceptualizing and measuring sense of humor, discussed in the previous section, focuses on canned jokes and cartoons which, as I have pointed out in earlier chapters, comprise only a small fraction of the forms of humor that people encounter in their daily lives. Moreover, this approach is limited

to people's enjoyment of these types of humor, and does not include their tendency to create humor spontaneously and to amuse other people in their everyday lives. Consequently, this approach to sense of humor, although it has produced many interesting research findings, seems to address only a limited aspect of the many ways individuals may habitually differ from one another in regard to humor.

In the mid-1970s, researchers began to develop self-report measures of sense of humor as an alternative to the humor appreciation approach, in order to investigate some of these other humor-related individual-difference dimensions. This change in methodology was associated with a shift in interest toward the everyday functions of humor, including its role in interpersonal relationships, coping with stress, and mental and physical health. These sorts of research questions required measures that assess the degree to which people create, enjoy, and engage in humor in their daily lives, and researchers with this perspective began to question whether humor appreciation measures were appropriate for these purposes (Lefcourt and Martin, 1986).

Although the humor appreciation approach provided a great deal of interesting information about the personality traits of individuals who enjoy particular types of humor (and indeed, Ruch was just beginning to conduct his more systematic research on this topic around the same time), this approach did not seem to capture some of the dimensions of sense of humor that were of interest to this new generation of researchers. The fact that an individual rates jokes and cartoons as funny does not necessarily mean that he or she engages in humor in daily life. Indeed, in a large multitrait-multimethod study of sense of humor, Elisha Babad (1974) found no relationship between individuals' scores on humor appreciation tests and either peer- or self-ratings of their tendency to appreciate, produce, or reproduce humor in their daily lives. In contrast, self-ratings were significantly correlated with peer-ratings of these dimensions of sense of humor.

Thus, it appeared that self-report measures may be a more valid approach for assessing certain aspects of sense of humor that are not tapped by humor appreciation tests. An initial concern of researchers was that self-report humor tests might be particularly susceptible to a social desirability bias. In other words, because a sense of humor is such a desirable characteristic, research participants might not be objective when rating their own sense of humor and might tend to overestimate it. Although this may well occur when people are asked to rate their overall sense of humor, subsequent research indicates that questions focusing on specific humor-related behaviors or attitudes do not seem to be strongly contaminated by social desirability (Lefcourt and Martin, 1986). Over the years, a number of different self-report scales have been developed, each designed to measure a somewhat different component or aspect of sense of humor. In the following sections, I will discuss a few of the more widely used measures (for a more complete listing, see Ruch, 1998b).

### Svebak's Sense of Humor Questionnaire

Norwegian psychologist Sven Svebak (1974a, 1974b), now at the Norwegian University of Science and Technology in Trondheim, was one of the first researchers to

break with the tradition of focusing on humor appreciation using funniness ratings of jokes and cartoons, and initiated the measurement of sense of humor using self-report questionnaires. In one of the earliest articles to specifically present a theory of sense of humor as a personality trait, Svebak (1974b) observed that smooth social functioning requires the construction of a shared, rational “social world.” However, this shared perspective on the world is somewhat arbitrary, and can also be constraining and stifling. Sense of humor, like creativity, is “the ability to imagine . . . irrational social worlds, and to behave according to such fantasies *within* the existing (real) social frame in such a way that the latter is not brought into a state of collapse” (Svebak, 1974b, p. 99). Thus, “humor may be said to be a defense against the monotony of culture more than against bodily displeasure” (p. 100).

Svebak suggested that individual differences in sense of humor involve variations in three separate dimensions: (1) *meta-message sensitivity*, or the ability to take an irrational, mirthful perspective on situations, seeing the social world as it might be rather than as it is; (2) *personal liking* of humor and the humorous role; and (3) *emotional permissiveness*, or the tendency to laugh frequently in a wide range of situations. With regard to the components of humor that I have discussed in earlier chapters, the first of these dimensions relates primarily to the cognitive component, having to do with a nonserious outlook and an ability to shift perspective in a creative manner. The second dimension involves playful attitudes and a lack of defensiveness toward humor, and the third relates to the positive emotion of mirth and its expression through laughter.

Svebak (1974a) constructed the Sense of Humor Questionnaire (SHQ) to measure individual differences in each of the three dimensions posited in his theory, with seven items for each dimension. Examples of the items in each subscale are as follows: (1) metamessage sensitivity (M): “I can usually find something comical, witty, or humorous in most situations”; (2) liking of humor (L): “It is my impression that those who try to be funny really do it to hide their lack of self-confidence” (disagreement with this statement results in higher scores on the scale); and (3) emotional expressiveness (E): “If I find a situation very comical, I find it very hard to keep a straight face even when nobody else seems to think it’s funny.” Individuals completing the measure are instructed to rate the degree to which each item is descriptive of them, using a four-point Likert-type scale. Initial research revealed moderate correlations between the M and L and the M and E dimensions, and no correlation between L and E, indicating that the three dimensions were relatively independent of one another.

Subsequent research using this measure indicated acceptable psychometric properties (reliability and validity) for the M and L scales, but inadequate values for the E scale (Lefcourt and Martin, 1986). In studies employing this measure, therefore, researchers tended to use only the first two subscales. Support for the validity of these two scales has been provided by significant correlations with peer ratings of humor, as well as with other self-report humor tests (to be described below). The measure was used in research on stress-buffering effects of sense of humor, which I will discuss in Chapter 9. Svebak (1996) later published a shorter, six-item version of



the SHQ (SHQ-6) which comprises three items each from the original M and L scales. These six items were found to form a single factor in a factor analysis of SHQ data from nearly 1000 participants, and reliability analysis of the scale revealed a good internal consistency. The SHQ-6 has also been used in research on humor and stress (Svebak, Götestam, and Jensen, 2004), and Svebak (1996) recommended its use in large-scale survey research in which a short measure of sense of humor is required.

### The Situational Humor Response Questionnaire

Herbert Lefcourt and I developed the Situational Humor Response Questionnaire (SHRQ) at the University of Waterloo for use in our research on the stress-moderating effects of sense of humor (R. A. Martin and Lefcourt, 1984). In developing this scale, we focused particularly on the emotional-expressive component of humor, that is, smiling and laughter. Thus, we defined sense of humor as the frequency with which a person smiles, laughs, and otherwise displays amusement in a wide variety of situations. In adopting this definition, we were making the assumption that overt expressions of smiling and laughter are indicators of the emotion of mirth that is elicited by the perception, creation, and enjoyment of humor in one's daily life.

The scale comprises 18 items that present participants with brief descriptions of situations (e.g., "if you were eating in a restaurant with some friends and the waiter accidentally spilled a drink on you"). These include both pleasant and unpleasant situations, ranging from specific and structured to general and unstructured, and from relatively common to relatively unusual. For each item, respondents are asked to rate the degree to which they would be likely to laugh in such a situation, using five response options ranging from "I would not have been particularly amused" to "I would have laughed heartily." In addition to the 18 situational items, the scale contains three self-descriptive items relating to the frequency with which the participant generally laughs and smiles in a wide range of situations.

The SHRQ has been found to have acceptable internal consistency and test-retest reliability (Lefcourt and Martin, 1986). Males and females typically do not obtain different mean scores. The validity support for the SHRQ is quite extensive (see Lefcourt and Martin, 1986; R. A. Martin, 1996). For example, individuals with higher scores on the SHRQ displayed higher frequency and duration of spontaneous laughter during unstructured interviews and also recorded more frequent daily laughter in three-day diaries (R. A. Martin and Kuiper, 1999). SHRQ scores also have been found to correlate significantly with peer ratings of participants' frequency of laughter and tendency to use humor in coping with stress. In addition, scores have correlated significantly with the rated funniness of monologues created by participants in the laboratory. Individuals with higher SHRQ scores were also found to make more spontaneously funny comments in a nonhumorous creativity task. The SHRQ is uncorrelated with measures of social desirability, providing evidence of discriminant validity (Lefcourt and Martin, 1986). The measure has been used extensively in research on sense of humor in relation to mental and physical health, which will be discussed in Chapters 9 and 10.

Lambert Deckers and Willibald Ruch (1992b) found no significant correlations between the SHRQ and either the total score or the three factor scores on Ruch's 3WD measure of humor appreciation. Thus, as Lefcourt and I (1986) had hypothesized, tests of humor appreciation employing respondents' ratings of the funniness or aversiveness of jokes and cartoons represent a completely different construct from that assessed by self-report humor measures such as the SHRQ. Individuals might rate particular types of jokes and cartoons on the 3WD as being very very humorous without necessarily engaging in much humor in their daily lives.

On the other hand, the SHRQ has been found to be positively correlated with extraversion (Ruch and Deckers, 1993), indicating that individuals who tend to laugh readily in a range of situations (as indicated by high scores on the SHRQ) tend also to be characterized by extraverted traits such as sociable, people-oriented, active, talkative, optimistic, fun-loving, and joyful. In addition, the SHRQ is correlated with sensation-seeking, a variable that is also associated with extraversion, indicating that individuals who tend to laugh frequently also tend to seek highly arousing thrills, adventure, and varied experiences, and are easily bored (Deckers and Ruch, 1992a). Interestingly, social drinkers with higher scores on the SHRQ have also been found to have higher rates of alcohol consumption (Lowe and Taylor, 1993). This finding may also be a function of extraversion, since other research indicates that extraverted individuals tend to drink more alcohol than do introverts (M. Cook et al., 1998).

The SHRQ has been criticized for defining sense of humor purely in terms of laughter frequency (Thorson, 1990). Indeed, as I have acknowledged, laughter can occur without humor, and there can be humor without laughter (R. A. Martin, 1996). Nonetheless, correlations between the SHRQ and various measures of personality and well-being are comparable to those found with other self-report humor measures such as the Coping Humor Scale (to be discussed next), suggesting that it assesses a more general sense of humor trait than simply the tendency to laugh. A study by Lourey and McLachlan (2003) indicates that the SHRQ relates to perceptions of humor and not merely laughter frequency. Moreover, research showing positive correlations between participants' scores on the SHRQ and their humor production ability indicates that it taps into humor creation and not just laughter responsiveness. This broader construct validity of the measure may be due to the inclusion of a number of items describing unpleasant or mildly stressful situations. Consequently, more than merely assessing the frequency of laughter *per se*, the SHRQ appears to address the tendency to maintain a humorous perspective when faced with unpleasant or potentially embarrassing events.

A potentially more serious shortcoming of this measure is that the situations described in the items are specific to university students' experiences (and even more particularly those of Canadian students), and it is therefore less suitable for other populations. Furthermore, the situations described in the items have become somewhat dated over time and may be difficult for many people to relate to today. For these reasons, the SHRQ would likely benefit from a careful revision if it is to be used in further research.

### The Coping Humor Scale

The Coping Humor Scale (CHS) is another measure that Herbert Lefcourt and I developed in the context of our research on sense of humor as a stress-moderating personality trait (R. A. Martin and Lefcourt, 1983). Instead of attempting to assess a broad sense of humor construct, this test was designed to measure more narrowly the degree to which individuals report using humor in coping with stress. Thus, it focused specifically on one particular function of humor. The CHS contains seven items that are self-descriptive statements such as “I have often found that my problems have been greatly reduced when I tried to find something funny in them” and “I can usually find something to laugh or joke about even in trying situations.” Research with the CHS has demonstrated marginally acceptable internal consistency and acceptable test-retest reliability (R. A. Martin, 1996).

There is also considerable support for the construct validity of this scale (summarized by Lefcourt and Martin, 1986; R. A. Martin, 1996). For example, scores on the CHS have correlated significantly with peer ratings of individuals’ tendency to use humor to cope with stress and not take themselves too seriously. In addition, the CHS was significantly correlated with the rated funniness of participants’ humorous monologues created while watching a stressful film, but not with the spontaneous funniness of responses in a nonstressful creativity task, indicating that it specifically relates to the production of humor in stressful situations. In another study, dental patients with higher scores on the CHS were found to engage in significantly more joking and laughter before undergoing dental surgery (Trice and Price-Greathouse, 1986).

The measure is generally uncorrelated with measures of social desirability, thereby lending discriminant validity support. With regard to other personality traits, the CHS has been found to be positively related to self-esteem, stability of self-concept, realistic cognitive appraisals, optimism, sense of coherence, and extraversion, and negatively related to dysfunctional attitudes and neuroticism (R. A. Martin, 1996). Thus, it seems to primarily assess humor in an extraverted, emotionally stable type of personality. Research using the CHS in relation to mental and physical health will be discussed in more detail in Chapters 9 and 10. The CHS does have some psychometric limitations, however, particularly a relatively weak internal consistency resulting from low item-total correlations of some items.

### The Humor Styles Questionnaire

Many of the self-report humor scales were developed for research on humor in relation to mental and physical health, and nearly all of these were based on the assumption that a sense of humor is inherently beneficial to health and well-being. However, as we have seen in earlier chapters of this book, humor does not always seem to be used in psychologically beneficial ways. For example, the hostile, manipulative, and coercive uses of humor that were discussed in Chapter 5 do not seem to be very conducive to healthy interpersonal relationships. Indeed, it could be argued that humor is essentially neutral with regard to mental health: its implications for health depend on how it is used by the individual in interacting with other people.

Since most humor measures do not distinguish between positive and negative uses of humor, however, they are limited in their usefulness for studying potentially detrimental aspects.

Recently, my students and I have developed the Humor Styles Questionnaire (HSQ), a measure designed to distinguish between potentially beneficial and detrimental humor styles (R. A. Martin et al., 2003). The focus of this measure is on the functions for which people spontaneously use humor in their everyday lives, particularly in the domains of social interaction and coping with life stress. Based on a review of past theoretical and empirical literature, we hypothesized four main dimensions, two of which were considered to be relatively healthy or adaptive (affiliative and self-enhancing humor) and two relatively unhealthy and potentially detrimental (aggressive and self-defeating humor).

*Affiliative humor* refers to the tendency to say funny things, to tell jokes, and to engage in spontaneous witty banter, in order to amuse others, to facilitate relationships, and to reduce interpersonal tensions (e.g., "I enjoy making people laugh"). This is hypothesized to be an essentially nonhostile, tolerant use of humor that is affirming of self and others and presumably enhances interpersonal cohesiveness. *Self-enhancing humor* refers to the tendency to maintain a humorous outlook on life even when one is not with other people, to be frequently amused by the incongruities of life, to maintain a humorous perspective even in the face of stress or adversity, and to use humor in coping (e.g., "My humorous outlook on life keeps me from getting overly upset or depressed about things"). This humor style is closely related to the construct assessed by the earlier Coping Humor Scale.

On the other hand, *aggressive humor* is the tendency to use humor for the purpose of criticizing or manipulating others, as in sarcasm, teasing, ridicule, derision, or disparagement humor, as well as the use of potentially offensive (e.g., racist or sexist) forms of humor (e.g., "If someone makes a mistake, I will often tease them about it"). It also includes the compulsive expression of humor even when it is socially inappropriate. This type of humor is viewed as a means of enhancing the self at the expense of one's relationships with others.

Finally, *self-defeating humor* involves the use of excessively self-disparaging humor, attempts to amuse others by doing or saying funny things at one's own expense, and laughing along with others when being ridiculed or disparaged (e.g., "I often try to make people like or accept me more by saying something funny about my own weaknesses, blunders, or faults"). Thus, it deals with the use of humor to ingratiate oneself with others, as discussed in Chapter 5. It also involves the use of humor as a form of defensive denial, to hide one's underlying negative feelings or avoid dealing constructively with problems. This style of humor is seen as an attempt to gain the attention and approval of others at one's own expense.

It is important to note that, although the HSQ assesses the way people "use" humor in their everyday lives, no assumption was made that these uses are consciously or strategically chosen. Instead, we assumed that people tend to engage in humor quite spontaneously and are often unaware of its social or psychological functions in a given situation. Thus, the items had to be worded quite carefully to address the

relevant functions indirectly, much like items on a self-report measure of defense mechanisms.

The HSQ was developed using construct-based test construction procedures over a series of studies with fairly large samples of participants ranging in age from 14 to 87 years (R. A. Martin et al., 2003). This methodology resulted in four stable factors that were corroborated by means of confirmatory factor analysis. The final measure contains four eight-item scales, each of which has demonstrated good internal consistency. The HSQ has been translated into a number of languages and administered to participants in various countries in North and South America, Europe, and Asia, and the four-factor structure has been replicated in all cultures studied to date (Chen and Martin, *in press*; Kazarian and Martin, 2004; *in press*; Saroglou and Scariot, 2002).

With regard to relationships among the scales themselves, moderate correlations are typically found between self-enhancing and affiliative humor and between aggressive and self-defeating humor, indicating that the two positive and the two negative styles of humor, while conceptually and empirically distinguishable, tend to covary. In addition, aggressive humor tends to be weakly correlated with both affiliative and self-enhancing humor, suggesting that even positive styles of humor may include some aggressive elements.

Research conducted to date has provided promising evidence for the construct validity of each scale, as well as discriminant validity among the four scales (P. Doris, 2004; Kazarian and Martin, 2004; Kuiper et al., 2004; R. A. Martin et al., 2003; Saroglou and Scariot, 2002). For example, scores on each of the scales have been found to correlate significantly with peer ratings of the corresponding dimensions. The affiliative and self-enhancing humor scales also tend to be positively correlated with other well-validated self-report humor measures such as the SHQ, SHRQ, and CHS, whereas the aggressive and self-defeating humor scales are generally unrelated to other humor measures, indicating that these two presumably detrimental styles of humor are not well-measured with other tests.

One self-report measure, the Multidimensional Sense of Humor Scale (MSHS; Thorson and Powell, 1993a) has been shown to be significantly positively correlated with all four HSQ scales, indicating that this earlier humor test does not distinguish between potentially beneficial and detrimental uses of humor, making it somewhat less useful for investigating the role of humor in mental health. Not surprisingly, scores on the self-enhancing humor scale tend to be quite strongly correlated with scores on the conceptually similar Coping Humor Scale (Kuiper et al., 2004). Since the self-enhancing humor scale has better reliability than the CHS, this newer measure seems to be a better instrument for use in research on humor as a coping mechanism.

With regard to other personality and mood variables, the two measures of “healthy” styles of humor are generally positively related to indicators of psychological health and well-being such as self-esteem, positive emotions, optimism, social support, and intimacy; and negatively related to negative moods such as depression and anxiety. In contrast, aggressive humor is positively correlated with measures of

hostility and aggression and negatively correlated with relationship satisfaction. Similarly, self-defeating humor is positively related to measures of psychological distress and dysfunction, including depression, anxiety, hostility, and psychiatric symptoms, and negatively related with self-esteem, psychological well-being, social support, and relationship satisfaction. These findings support the view that the different humor styles are differentially related to aspects of psychological well-being.

The four scales have also been found to correlate differentially with measures of the FFM, which posits five major dimensions accounting for most of the variance in personality traits (R. A. Martin et al., 2003; Saroglou and Scariot, 2002). Although there were some differences in the patterns of correlations found among English-speaking Canadian and French-speaking Belgian participants, extraversion was generally found to be positively correlated with affiliative, aggressive, and (more weakly) self-enhancing humor, but unrelated to self-defeating humor. Neuroticism, on the other hand, was unrelated to affiliative humor, negatively related to self-enhancing humor, and positively related to both aggressive and self-defeating humor. In turn, affiliative and self-enhancing humor were both positively correlated with openness to experience, while aggressive and self-defeating humor were both negatively correlated with agreeableness and conscientiousness. Thus, these four styles of humor appear to be located in quite different regions of the personality space represented by the FFM, suggesting that they represent disparate ways in which people with differing personality traits express and experience humor in their everyday lives.

Some research has also begun to explore relationships between the HSQ scales and measures of culture-related personality traits such as individualism and collectivism (Kazarian and Martin, 2004; in press). In general, affiliative humor appears to be related to the cultural orientation of collectivism (which emphasizes the interdependence of individuals with respect to broader social groups), whereas aggressive humor is more related to individualism (which views individual needs as taking precedence over group needs). Further cross-cultural research is needed to determine whether the HSQ dimensions reflect different styles of humor found in people from different cultures. For example, Western cultures, which tend to be more individualistic, might be expected to have more aggressive humor styles, whereas people from more collectivistic Eastern cultures may be higher on affiliative humor.

Interestingly, although negligible differences are found between men and women on the two presumably positive styles of humor, males tend to have significantly higher scores than females on the two presumably detrimental humor styles, suggesting that men tend to use negative forms of humor more than women do (cf. Crawford and Gressley, 1991). Older participants have been found to obtain lower scores than younger people on both affiliative and aggressive humor, suggesting that people may have a decreasing tendency to engage in these more extraverted types of humor as they age. Among women, self-enhancing humor was found to be higher for older than younger individuals, suggesting an increase in this coping style of humor with greater age and life experience. Longitudinal research is needed, however, to test whether these observed age differences are due to developmental changes over the lifespan or to cohort effects.



Overall, then, the HSQ assesses dimensions of humor that are not tapped by previous tests and, in particular, it is the first self-report measure to assess social and psychological functions of humor that are less desirable and potentially detrimental to well-being. In Chapter 9, I will discuss additional research that has used this measure in the study of humor and mental health.

### The State-Trait Cheerfulness Inventory

When we say that someone has a good sense of humor, we may mean that the person tends to maintain a cheerful mood and a nonserious, playful attitude much of the time, even in situations where other people might be likely to become distressed. This way of conceptualizing sense of humor, which focuses on the emotional component and the playful, nonserious character of humor, was proposed some time ago by Howard Leventhal and Martin Safer (1977). More recently, Willibald Ruch and his colleagues have adopted this perspective in their investigations of trait cheerfulness, which they view as the temperamental basis of sense of humor (for a review, see Ruch and Köhler, 1998).

In this view, individual differences in sense of humor are based on presumably innate, habitual differences in cheerfulness, seriousness, and bad mood. While each of these can be viewed as temporary states or moods, individuals are assumed to differ in traitlike ways with regard to how consistently they experience these states. *Trait cheerfulness* is an affective trait or temperament involving a prevalence of cheerful mood and mirth, a generally good-humored interaction style, a tendency to smile and laugh easily, and a composed view of adverse life circumstances. *Trait seriousness* (versus playfulness) is a habitual frame of mind or mental attitude toward the world, comprising a tendency to perceive even everyday events as important, a tendency to plan ahead and set long-range goals, a preference for activities that have a rational purpose, and a sober, straightforward communication style that avoids exaggeration and irony. In Michael Apter's (2001) terminology (discussed in Chapters 1, 3, 4, and 5), this relates to the degree to which people tend to be in the telic (serious, goal-oriented) versus the paratelic (playful, activity-oriented) mode. Individuals who would typically be viewed as having a sense of humor would be those who are low on this trait. *Trait bad mood* is an affective disposition involving a prevalence of sad, despondent, and distressed moods; a generally ill-humored interaction style (sullen, grumpy, grouchy); and a negative response to cheerfulness-evoking situations and people. Again, high-humor people would tend to be low on this dimension.

Ruch and his colleagues constructed the trait form of the State-Trait Cheerfulness Inventory (STCI-T) to assess individual differences in habitual cheerfulness, seriousness, and bad mood (Ruch, Köhler, and Van Thriel, 1996). These scales have been shown to have good internal consistencies and test-retest reliabilities. Factor analyses on data obtained in several countries have consistently confirmed the existence of the three distinct factors. Cheerfulness tends to be weakly negatively correlated with seriousness and moderately negatively correlated with bad mood, while seriousness and bad mood are weakly positively correlated. A state version of the State-

Trait-Cheerfulness Inventory (STCI-S) was also constructed to assess the presence of each of the three mood states over shorter periods of time (Ruch, Köhler, and van Thriel, 1997).

A number of studies have demonstrated good validity for the STCI-T. Scores on each of the three trait scales were significantly correlated with peer ratings of the same dimensions (Ruch, Köhler, et al., 1996) and with the corresponding mood states as measured by the STCI-S (Ruch and Köhler, 1999). Studies have also shown that individuals with high scores on the trait cheerfulness scale, as compared to those with low scores, are less likely to develop a depressed mood and serious frame of mind when they are exposed to negative mood induction procedures such as reading a melancholy story or engaging in a series of boring tasks in a depressing, windowless room with black walls and poor lighting (Ruch and Köhler, 1998, 1999).

Similarly, individuals with high trait cheerfulness scores, as compared to those with low scores, are also more likely to smile and laugh (showing the Duchenne display of genuine mirth) and to have enhanced feelings of state cheerfulness in mirth-inducing situations, such as inhalation of nitrous oxide (laughing gas), exposure to a clowning experimenter, or the sudden, unexpected appearance of a jack-in-the-box (Ruch, 1997; Ruch and Köhler, 1998). These findings provide support for the validity of trait cheerfulness as representing a habitually high threshold for negative moods and a low threshold for mirth, laughter, and positive moods in general.

To examine the validity of the trait seriousness scale of the STCI-T, participants in one study were instructed to create humorous captions for a series of cartoons. As predicted, individuals with lower scores on trait seriousness (indicating greater habitual playfulness) were found to create a greater number of humorous captions, and their captions were rated as more funny, witty, and original (Ruch and Köhler, 1998). On Ruch's 3WD measure of humor appreciation, individuals with low (as opposed to high) seriousness scores tended to prefer nonsense over incongruity-resolution humor. In addition, higher seriousness scores were related to higher aversiveness ratings for all types of humor, indicating that more serious individuals are more likely to reject all forms of humor (Ruch and Köhler, 1998). These findings provided support for (low) trait seriousness as a general attitude or frame of mind characterized by a more playful perspective and a greater receptiveness to humor.

Studies have also examined the relationships between the STCI-T scales and more general personality dimensions such as the FFM, and models of positive and negative affectivity (Ruch and Köhler, 1998). Overall, cheerfulness was associated with extraversion/energy, agreeableness/friendliness, emotional stability/low neuroticism, and positive affectivity. Thus high trait cheerfulness is a characteristic of agreeable, stable, extraverted types. Bad mood, in contrast, showed the opposite pattern of correlations, but with a stronger contribution of neuroticism and negative affectivity and a weaker loading on extraversion and positive affectivity. Thus, bad mood is characteristic of disagreeable, neurotic introverts. Finally, seriousness was consistently associated with low psychoticism/conscientiousness and introversion.

In summary, this temperament-based approach provides an interesting perspective on the meaning of sense of humor. In this view, individuals who are typically

described as having a “good sense of humor” tend to be people who are habitually in a cheerful mood, who maintain a playful, nonserious attitude toward life, and who are infrequently in a bad, grouchy mood. Different styles of humor may have to do with different combinations of the three traits. For example, an acerbic, caustic sense of humor might involve low seriousness, moderate cheerfulness, and high bad mood. On the other hand, people who are easily amused at others’ humor but not very witty themselves might be high on cheerfulness, low on bad mood, and relatively high on seriousness.

Since trait cheerfulness has been shown to be a predictor of robustness of positive mood in experimental studies, this construct also seems to be a potentially useful way of conceptualizing sense of humor as a trait that contributes to coping with stress and enhancing psychological health. As Ruch and Köhler (1998, p. 228) suggested, individuals who are high on trait cheerfulness may “have a better ‘psychological immune system,’ protecting them against the negative impact of the annoyances and mishaps they meet in everyday life and enabling them to maintain good humor under adversity.” This measure would therefore likely be useful in research on physical and mental health benefits of humor, particularly in the context of humor as resilience to psychosocial stress.

### SENSE OF HUMOR AS AN ABILITY

Some conceptualizations of sense of humor view it as a form of creative ability or aptitude. In this approach, the ability to perceive humorous incongruities, to create jokes, funny stories, and other humorous productions, and to make other people laugh is viewed as a skill, like the ability to draw a picture or solve a math problem. Individuals who are gifted with this creative talent are presumably the amateur comedians who keep their friends “in stitches” and are the “life of the party,” while the supremely talented few may become professional comedians and comedy writers. This conception of sense of humor seems to be most appropriately measured by means of ability tests that assess maximal performance, rather than the typical behavior assessed by self-report scales. This approach has been taken by a few researchers over the years.

Alan Feingold, a researcher affiliated with Yale University, has long been a proponent of the view of sense of humor as a kind of aptitude. Feingold (1982, 1983) developed tests of humor perceptiveness and humor achievement comprising questions about joke knowledge, in which participants were required to complete famous jokes (e.g., “Take my wife, \_\_\_\_\_”; Answer: “please”) and identify the names of comedians associated with particular jokes (e.g., “I get no respect” linked with Rodney Dangerfield). Respondents’ scores on these tests were based on the number of questions that were answered correctly. Scores on this test were positively correlated with intelligence, and (not surprisingly) individuals with high scores were found to be avid viewers of comedy television shows.

Feingold and Mazzella (1991) expanded on this earlier work, developing additional tests to assess two proposed types of verbal humor ability or wittiness: (1)

*memory for humor*, which they hypothesized to be akin to crystallized intelligence; and (2) *humor cognition*, thought to be comparable to fluid intelligence. Memory for humor was assessed by tests of humor information and joke knowledge (similar to Feingold's earlier measure of humor perceptiveness), while humor cognition was measured with tests of humor reasoning and joke comprehension. Again, these were all maximal performance tests in which scores were based on the number of correct answers. Their research findings revealed significant correlations between traditional measures of verbal intelligence and the tests of humor cognition, whereas memory for humor was not strongly related to intelligence. Humor reasoning was also correlated with the Remote Associates Test, a measure of creative thinking.

In a subsequent article, Feingold and Mazzella (1993) suggested that verbal wit-tiness may be viewed as a multidimensional construct composed of the mental ability dimension of humor cognition, in combination with social and temperamental factors influencing humor motivation and communication. Overall, then, Feingold and Mazzella's conceptualization of humor ability appears to be a fairly narrow construct, relating particularly to individuals' familiarity with well-known jokes and popular comedians. However, the psychometric properties of their measures are not well-established, and they have not gained wide acceptance among other humor researchers.

Other humor production tests have been developed by researchers over the years to examine individual differences in the ability to create or produce humor. Most of these were designed for use in individual studies, and they have typically not been standardized. In this approach, research participants are typically presented with various stimuli, such as caption-removed cartoons or silent movies, and are instructed to make up as many funny responses as they can to go with these stimuli. The fun-niness of their responses is then rated by the experimenters, yielding a score for humor production ability. Some of these studies have examined the relationship between humor production ability and various other personality traits.

For example, Robert Turner (1980) examined the association between humor production ability and self-monitoring, a personality trait having to do with the degree to which individuals are sensitive to environmental cues of social appropriateness and regulate their behavior accordingly. Humor ability was assessed in two ways. In one of these, participants were asked to make up witty captions to go with a series of cartoons in which the original captions had been removed. In the second method, participants were seated at a table on which were placed a number of miscellaneous objects, such as a tennis shoe, a wristwatch, and a box of crayons. The participants were instructed to create a three-minute comedy monologue, describing these objects in a funny way, after being given only 30 seconds to collect their thoughts. In both methods, the participants' humorous productions were rated by judges for wittiness.

The results revealed that, as predicted, individuals with higher scores on a measure of self-monitoring, as compared to those with lower scores, produced responses that were rated as significantly more witty on both humor production tests. The author suggested that the tendency to attend to and respond to social cues and

the reactions of others enables people who are high in self-monitoring to develop skill in creating and delivering humor successfully over the course of their lives. In contrast, those who are low in self-monitoring, because they do not attend as much to the responses of others, do not learn as readily from those responses and therefore do not develop as much skill at producing humor. Consistent with these results, other research has found a positive correlation between self-monitoring and a self-report measure of the tendency to initiate humor in social interactions (Bell, McGhee, and Duffey, 1986). Thus, self-monitoring may be an important personality trait that contributes to the development of the ability to produce humor. These findings suggest that humor creativity should be viewed as a type of social skill (see also Dewitte and Verguts, 2001, for a similar selectionist account of sense of humor development).

Other researchers have used similar humor creation tests to examine the association between humor production ability and more general forms of creativity (reviewed by O'Quin and Derks, 1997). As discussed in Chapter 4, a number of theorists have noted close connections between humor and creativity, pointing out that both involve divergent thinking, incongruity, surprise, and novelty (Ferris, 1972; Murdock and Ganim, 1993; Treadwell, 1970; Wicker, 1985; Ziv, 1980). For example, Arthur Koestler (1964) considered humor, scientific discovery, and artistic creation (all of which involve the process of bisociation) to be forms of creativity.

Researchers investigating these hypotheses have assessed participants' humor creation abilities by rating the funniness of their responses to a variety of tasks, including creating humorous captions for cartoons (Babad, 1974; Brodzinsky and Rubien, 1976; Ziv, 1980) and TAT cards (Day and Langevin, 1969), generating witty word associations (Hauck and Thomas, 1972), and making up funny presidential campaign slogans (Clabby, 1980). In general, these studies revealed positive but moderate correlations between these funniness ratings and a variety of measures of creativity, including the Remote Associates Test (in which participants must identify a concept that links two seemingly unrelated words) and tests in which participants are asked to come up with unusual uses of a common object such as a brick. A meta-analysis of this research found an average correlation of .34 between humor production ability and creativity (O'Quin and Derks, 1997). These authors concluded that, although creativity and humor production do involve similar mental processes, they are nonetheless distinct. Whereas humorous productions are typically creative, individuals can be creative without being funny.

How is humor production ability related to other dimensions of sense of humor? As noted earlier, research has generally indicated little or no relation between measures of humor production and humor appreciation (Babad, 1974; Köhler and Ruch, 1996; Koppel and Sechrest, 1970), indicating that, somewhat surprisingly, people who are able to create humor successfully do not necessarily enjoy or respond with amusement to various kinds of jokes and cartoons. On the other hand, some positive but generally weak correlations have been found between measures of humor production ability and several self-report humor scales, including the SHRQ, CHS, Metamessage Sensitivity scale of the SHQ, and (low) Seriousness scale of the STCI-T (Köhler and Ruch, 1996; Lefcourt and Martin, 1986; Ruch, Köhler, et al., 1996).

The use of ability measures of humor production is an approach that merits further investigation. In addition to self-monitoring and creativity, this method would seem to be useful for evaluating other variables besides self-monitoring and creativity (e.g., intelligence, tolerance for ambiguity, curiosity) that contribute to humor production.

## SENSE OF HUMOR AS STYLES OF HUMOROUS CONDUCT

When we say that someone has a sense of humor, we are implying that we have frequently observed this person engaging in a variety of humor-related behaviors in a range of situations. For example, we may have seen the person telling jokes or humorous stories, making spontaneous witty comments, laughing at a variety of amusing events, and so on. Based on these observations, we may also characterize the person's overall humorous style in various ways, using descriptors such as *reflective*, *sarcastic*, *irreverent*, or *sardonic*. Thus, the concept of sense of humor may be viewed as a socially constructed description of a person's typical humor-related conduct. In other words, sense of humor may be seen as a set of labels that we ascribe to people based on our observations during our interactions with them. What are the basic dimensions by which people classify different styles of humor in everyday conduct, and what are the patterns of humor-related behaviors that are associated with these different dimensions? These questions have been the focus of research conducted by Kenneth Craik and his colleagues at the University of California at Berkeley (Craik, Lampert, and Nelson, 1996; Craik and Ware, 1998).

To investigate the dimensions of humor based on observable behavior, Craik and his colleagues began by developing a list of 100 descriptive statements that were intended to capture all the important facets of the domain of everyday humorous conduct (described by Craik and Ware, 1998). Examples of these descriptions include: "Uses good-natured jests to put others at ease," "Has difficulty controlling the urge to laugh in solemn situations," "Enjoys witticisms which are intellectually challenging," and "Spoils jokes by laughing before finishing them." Each of these statements was then printed on a separate card to form the Humorous Behavior *Q*-sort Deck (HBQD). Subsequent research with this card deck employed the standard *q*-sort technique, in which observers are asked to sort the cards into a series of piles indicating the degree to which each description is characteristic of a particular target person.

In one study (described by Craik and Ware, 1998), participants were asked to sort the cards to describe a hypothetical person with a high sense of humor. Correlations among the card sorts of the participants revealed high agreement in the popular conception of what it means for someone to have a sense of humor. Averaging across the card sorts of all the subjects, the researchers were able to identify the humor styles that are generally perceived to be positively and negatively associated with this concept, as well as those that are seen as irrelevant. Positively related to the concept of sense of humor were items having to do with good-natured wittiness, a cheerful



disposition, and skillful humor ability. Negatively associated items were those involving aggressive, inappropriate, and maladroit attempts at humor. Enjoyment of intellectual wit and ethnic jokes, along with ingratiating uses of humor, were deemed to be irrelevant to the concept. Thus, this method proved useful for exploring the way most people typically conceptualize a sense of humor.

In another study (also described by Craik and Ware, 1998), participants were asked to sort the HBQD cards to describe the styles of humor of several famous comedians, such as David Letterman, Woody Allen, and Bill Cosby. Again, good interrater reliabilities were found. Correlations between the mean card sorts for different comedians were then computed to examine the degree to which their humor styles were perceived to be similar. For example, Arsenio Hall and Whoopi Goldberg were perceived to have fairly similar styles, whereas Woody Allen and Lucille Ball were less similar. This *q*-sort method could be a potentially useful technique for researchers to use in quantifying the degree of similarity in humor styles between pairs of individuals, such as married couples or friends. These similarity scores could then be correlated with other relationship variables such as marital satisfaction or the long-term stability of the friendships to examine the degree to which similarity in humor styles contributes to these aspects of relationships.

To identify the major dimensions underlying different perceived styles of humor, a large number of university students were asked to describe their own humor styles using the HBQD, and these card sorts were then subjected to factor analysis (Craik et al., 1996). This analysis revealed five bipolar factors, which were labeled as: (1) socially warm versus cold; (2) reflective versus boorish; (3) competent versus inept; (4) earthy versus repressed; and (5) benign versus mean-spirited humorous styles. It was suggested that these five factors represent the major implicit dimensions by which people characterize one another's sense of humor. In future research using this procedure, an individual's humorous style could be described (either by the individual or, more preferably, by trained observers) by means of a card sort with the HBQD, and factor scores for each of the five factors could be computed for that individual. These scores could then be used in investigating their correlations with other personality, social, and affective variables that might be of interest to the researcher.

As one example of such research, Craik and colleagues (1996) examined correlations between factor scores on the (self-administered) HBQD and scores on a measure of extraversion in a sample of university students. Greater extraversion (as compared to introversion) was found to be associated with more socially warm and also more boorish humor styles. The other three humor style factors were unrelated to extraversion-introversion. Other studies examined correlations between the HBQD factors and scores on the subscales of the California Psychological Inventory (Craik et al., 1996) and the major personality dimensions of the FFM (Craik and Ware, 1998). The results demonstrated that each of these general personality dimensions is characterized by a unique constellation of humorous styles, suggesting that people with different personality traits have different corresponding styles of humor. For example, individuals who are high on the FFM dimension of agreeableness tend to be characterized by a socially warm, competent, and benign humorous style. On the other hand,

neuroticism was associated with an inept (as opposed to competent) humor style. Further research is needed to replicate these findings and explore relationships with other personality constructs. In addition, this methodology may be useful for future research investigating such questions as the role of different humorous styles in interpersonal relationships, coping with stress, and mental health generally.

In summary, the HBQD represents a method for investigating sense of humor that takes a different perspective than the approaches using humor appreciation, self-report, and humor production measures. However, research using this approach has been quite limited so far, and its potential utility for exploring other facets of sense of humor remains largely unexplored. An initial step that seems necessary for future research is to determine the stability and replicability of the identified factors. In this regard, a recent factor analytic study of the items from the HBQD did not replicate the original factor structure (Kirsh and Kuiper, 2003), although this may have been due to the use of a self-rating format using Likert scales rather the original *q*-sort method. Because it was originally developed for use by trained observers, the use of the HBQD in a self-report format also seems questionable. Many of the items appear to be difficult to understand by untrained raters and many refer to behaviors that are not readily accessible to self-observation (e.g., “Enhances humorous impact with a deft sense of timing;” “Delights in the implicit buffoonery of the over-pompous”). Nonetheless, this approach, when used as originally intended, appears to be a potentially interesting avenue for future investigations.

## HOW MANY DIFFERENT SENSES OF HUMOR EXIST?

As we saw at the beginning of this chapter, most people seem to think of sense of humor as a unitary construct, although its meaning in popular usage tends to be quite vague and ill-defined. Over the years, personality researchers have attempted to clarify and refine the meaning of this concept, defining and measuring it in a number of different ways. In the current state of the literature, with the proliferation of measurement instruments over recent years, sense of humor seems to comprise a plethora of apparently distinct trait dimensions. There are three factors of humor appreciation measured with the 3WD, numerous constructs measured by many different self-report humor tests, five styles of humorous conduct assessed by the HBQD, and an unknown number of components of humor production ability. After starting out with a seemingly simple idea, sense of humor turns out to be exceedingly complicated!

Do we really need this many different trait concepts, however, to meaningfully describe individual differences in humor? It would seem to be desirable for personality psychologists to identify the degree to which all these different traits are inter-correlated and to determine whether individual differences in humor can be captured using a more parsimonious set of basic dimensions. To answer these questions, researchers should ideally administer all the existing measures to large samples of individuals representing a broad cross section of the population across different cultures. Factor analyses could then be conducted on these data to identify the underlying

factor structure. This would be similar to the approach that was taken with personality traits in the development of the FFM (John, 1990). Additional research could then explore the relations between the identified core humor factors and broader personality dimensions such as the FFM to determine the degree to which sense of humor dimensions overlap with known personality factors or are fairly unique. Only a limited amount of research along these lines has been conducted so far, focusing primarily on self-report measures.

Using data from a sample of German adults from the general population, Willibald Ruch (1994) conducted a factor analysis of seven sense of humor scales from four different self-report measures, including the SHRQ, CHS, SHQ, and Ziv's (1981) measure of humor appreciation and creativity. Also included were the three subscales of the Telic Dominance Scale (TDS) (Murgatroyd et al., 1978), which relate to seriousmindedness, planfulness, and arousal avoidance (i.e., the inverse of a habitually playful, humorous frame of mind). This analysis yielded only two factors. All the sense of humor scales loaded highly positively on the first factor, which was tentatively labeled *cheerfulness*. This finding suggests that these different self-report tests, although they were designed to measure different components or aspects of sense of humor, actually all assess a common underlying dimension. The second factor, labeled *restraint versus expressiveness*, was found to be related only to the SHRQ, the Emotional Expressiveness scale of Svebak's SHQ, and (in the opposite direction) the subscales of the TDS.

To explore these dimensions further, Ruch examined the relations of these two humor factors, as well as each of the individual humor scales, with the three superfactors of extraversion, neuroticism, and psychoticism, which were viewed by Eysenck (1990) as being the most basic, biologically based temperament dimensions of personality. All of the sense of humor scales loaded positively on extraversion, as did the first (cheerfulness) factor found in the factor analysis. Thus, these self-report humor scales all appear to relate primarily to the general personality dimension of extraversion, which comprises traits such as sociable, lively, active, assertive, sensation-seeking, carefree, dominant, and the tendency to experience positive moods. Overall, a sense of humor seems to be a characteristic of extraverts rather than introverts. In addition, the SHRQ and Emotional Expressiveness scale of the SHQ (along with the second overall humor factor) loaded positively on the psychoticism dimension, which, among other traits, relates to low impulse control. This relationship is likely due to items on the SHRQ and SHQ-E scales that describe laughing in situations in which laughter is not typically seen to be appropriate.

Somewhat surprisingly, none of the humor scales were strongly loaded on the neuroticism dimension, with only a weak negative loading for the SHQ-M scale. Thus, individuals with high scores on these humor scales do not necessarily experience less negative emotions than do those with low humor scores. Contrary to popular opinion, people with a strong sense of humor, as measured by these self-report scales, are not necessarily very emotionally stable and well-adjusted. Overall, this study indicated that the various self-report humor scales do not assess substantially different humor dimensions, but instead form one main factor that is quite strongly related to

extraversion. Ruch suggested that measures of humor appreciation and the ability to produce humor are likely not related to these temperament dimensions, although he did not test this assumption in this study.

In a later study, Gabriele Köhler and Willibald Ruch (1996) conducted a similar factor analysis of 23 humor-related self-report scales using another sample of German adults. In addition to the scales used in the previous study, this analysis also included the cheerfulness and seriousness facet subscales of the STCI-T, the Multidimensional Sense of Humor Scale (MSHS; Thorson and Powell, 1993a), and the Humor Initiation Scale (HIS; Bell et al., 1986). Once again, only two factors were found. The first factor, again labeled *cheerfulness*, had strong loadings for all the scales except for the seriousness facet subscales of the STCI-T. The second factor, labeled *seriousness*, had strong positive loadings for the STCI-T seriousness scales, and generally weak negative loadings for most of the remaining humor scales.

The authors concluded that these results provided support for Ruch's model of the temperament basis of sense of humor (discussed earlier). Most self-report humor tests appear to relate strongly to trait cheerfulness, and they also tend to capture a low seriousness or playfulness component to varying degrees. Once again, the first factor was found to be strongly related to extraversion, and in this study it was also somewhat negatively related to neuroticism. In addition, the second factor was again related to psychoticism, with greater psychoticism being associated with lower seriousness, or greater playfulness. Thus, most of the variance in self-report humor scales seems to be captured by the Eysenckian temperament dimensions of extraversion and psychoticism and, less so, by (low) neuroticism.

This study also included measures of humor appreciation (the 3WD) and a test of humor production ability (a cartoon captioning task), although unfortunately these were not included in the factor analysis. Correlational analyses revealed that, as in previous research, humor appreciation and humor production measures were unrelated to each other. In addition, self-report measures purporting to assess humor appreciation were only weakly correlated with the 3WD appreciation scores, while self-report scales designed to assess humor production were generally unrelated to the rated funniness of participants' cartoon humor productions (with the exception of the SHQ-M scale). Overall, these findings suggest that three distinct humor constructs are assessed by measures of (1) humor appreciation (the 3WD), (2) humor production, and (3) self-report scales, with the latter measures reflecting the two broad dimensions of cheerfulness and, to varying degrees, (low) seriousness. Further research is needed to replicate these findings with other populations and to include newer humor measures, such as the HSQ and the HBQD.

## PERSONALITY CHARACTERISTICS OF PROFESSIONAL HUMORISTS

Do professional comedians have particular personality traits that differ from those of other people? One commonly held belief is that comedians tend to be depressive individuals who hide their dysphoria behind a mask of superficial hilarity. An old story

tells of a man going to a doctor to complain of feelings of depression and despondency. The doctor encourages him to attend a performance of a famous comedian who is extremely funny and will be sure to lift his spirits. The patient replies that he is that comedian.

Two studies have investigated the personality traits of professional comedians. Taking a psychoanalytic approach, Samuel Janus (1975, 1978) studied the intelligence, educational level, family background, and personality structure of 55 male and 14 female comedians, all of whom were said to be famous and successful. Data were collected using clinical interviews, early memories, dreams, handwriting analyses, projective tests, and the Wechsler Adult Intelligence Scale (WAIS). Based on his interpretations of these data, Janus concluded that comedians tended to be superior in intelligence, angry, suspicious, and depressed. In addition, their early lives were characterized by suffering, isolation, and feelings of deprivation, and they used humor as a defense against anxiety, converting their feelings of suppressed rage from physical to verbal aggression.

Many of the comedians were also described as shy, sensitive, and empathic individuals whose comedic success was due in part to an ability to accurately perceive the fears and needs of their audiences. Overall, these findings appear to provide support for the popular view of professional comedians as generally unhappy people. However, the validity of the results is questionable, due to the use of some dubious assessment methods and the lack of a control group, making it difficult to know whether these characteristics are unique to comedians or may be shared, for example, by noncomic entertainers.

Seymour Fisher and Rhoda Fisher (1981) conducted a more well-controlled study of the personality characteristics and childhood memories of 43 professional comedians and circus clowns (whom they designated collectively as “comics”). To control for possible non-comedy-related variables involved in being a public performer, these researchers included an age-matched comparison sample of professional actors. They administered a semistructured interview, the Rorschach inkblot test, the TAT, and several standardized personality questionnaires to all participants.

The two groups did not differ on measures of depression or overall psychological health, casting doubt on the view that comedians are more psychologically disturbed than other people. However, a number of interesting statistically significant differences did emerge between the two groups. Compared to the actors, the comics’ responses revealed a significantly greater preoccupation with themes of good and evil, unworthiness, self-deprecation, duty and responsibility, concealment, and smallness. In addition, the comics, as compared to the actors, described their fathers in more positive terms and their mothers in a more negative manner. These findings suggested that their comic tendencies may have originated in early family dynamics.

Most of these professional comics indicated that they had developed their comedic abilities early in childhood, and many had been “class clowns” in school. In order to investigate further the possible childhood dynamics involved in becoming a comic, Fisher and Fisher conducted another study in which they used self-report questionnaires to compare the personality characteristics and attitudes of the parents of a

group of children identified as class clowns with the parents of children who did not show these comic characteristics. Compared to the mothers of noncomic children, personality testing revealed that the mothers of the comic children were significantly less kind, less sympathetic, less close and intimately involved with their children, and more selfish and controlling, and that they wanted their children to take responsibility and grow up more quickly. For their part, the fathers of the comic children were more passive than those of the noncomic children.

On the basis of the combined findings from these two studies, Fisher and Fisher theorized that professional comics develop their humor skills in childhood as a means of entertaining others, gaining approval, and asserting their goodness, in the context of a relatively uncongenial family environment characterized by limited maternal affection and warmth, a need to take on adult responsibilities at an early age, and a sense that things often are not what they appear to be on the surface. Moreover, as children they tend to take on a parentified healing role, learning to provide psychological support and reassurance to their parents by means of a humorous persona. By making their parents laugh at their funny antics, they are able to gain the attention and approval of otherwise unaffectionate and rejecting parents. Thus, humor in these individuals seems to be a means of coping with feelings of anxiety and anger associated with a generally harsh and uncongenial family environment.

Overall, then, although this research does not support the popular view that professional comedians are depressed or otherwise psychologically disturbed, it does suggest that humor in these individuals serves as a defense or coping mechanism for dealing with adversity in early life. The well-honed comedic skills required for a successful career as a comic may well be developed as a means of compensating for earlier psychological losses and difficulties. As we will see in Chapter 8, similar mechanisms may be involved in the development of a comic sense of humor in at least some ordinary individuals who do not become professional comedians.

## CONCLUSION

A sense of humor is seen by most people as an important personality characteristic. It is one of the main dimensions by which people tend to characterize others, and is viewed as a very desirable trait in potential friends and romantic partners (Sprecher and Regan, 2002). But what exactly *is* sense of humor? As we have seen, this concept has taken on many positive connotations over the years, while becoming increasingly vague and ill-defined. The research reviewed in this chapter suggests that sense of humor is not a unitary construct. Instead, it can be conceptualized and measured in a number of different ways, each focusing on different aspects of humor. Furthermore, these different ways of defining it are not necessarily highly correlated with one another, and they relate in quite different ways to other personality traits.

Research with a variety of different sense of humor measures is beginning to clarify the nature and correlates of these humor-related traits, showing how they interact with other dimensions of personality and behavior. With regard to the humor



appreciation approach, Ruch's work with the 3WD has contributed a great deal to our understanding of individual differences in the enjoyment of humor in the form of jokes and cartoons. Interestingly, this research demonstrates that individual differences in humor appreciation have more to do with structural aspects than with the content or topic of the jokes, contrary to the assumptions of many past researchers. These investigations have also uncovered some very interesting correlations between these structural humor appreciation dimensions and a variety of more general personality traits, showing that the types of humor that individuals enjoy reflect their levels of conservative versus liberal social attitudes, sensation seeking, toughmindedness, and so on.

Other researchers have taken an ability approach to sense of humor, defining it in terms of the ability to produce humor and amuse others. People who do well on these types of tests presumably excel in the cognitive abilities needed to generate the sorts of nonserious incongruities that are the hallmark of humor. Research using this approach indicates that individuals who are more aware of and responsive to the reactions of others to their own behavior (i.e., those who are high in self-monitoring), as well as those who are generally more creative and capable of divergent thinking, tend to be better at producing humor and making others laugh. Thus, an aptitude for humor production may be viewed as a type of social skill as well as a creative ability.

The many different self-report measures that have been created in recent years were designed to assess different components or aspects of sense of humor. A considerable amount of evidence for reliability and validity has been found for several of these measures. However, factor analytic research suggests that most of these self-report scales load on only one or two major factors. The strongest factor has to do with a cheerful temperament and an extraverted, sociable disposition, while the other involves a playful, nonserious attitude. These dimensions provide support for Ruch's temperament model of sense of humor, and also reflect the social, emotional, and cognitive components of humor that I have discussed at earlier points in this book.

Until recently, a limitation of self-report humor measures has been their unique focus on positive, desirable aspects of humor. The HSQ represents a more recent tendency among researchers to consider also more negative and socially undesirable functions of humor in social interaction. As we will see in Chapter 9, researchers have recently begun to explore the implications of these and other negative humor styles for interpersonal relationships and psychological well-being. The HBQD represents another potentially interesting method of investigating individual differences in humor styles using *q*-sort ratings by observers. This method appears to be particularly useful for examining popular conceptions of what a sense of humor is, as well as providing a method for quantifying similarities and differences in humor styles between individuals and examining relationships between various humor styles and other personality traits and behaviors.

One view that seems to be emerging in the research is that different personality traits are reflected in different humor dimensions. In other words, people express their particular personality traits through their humor. Thus, it may be that extraverts

express humor in different ways and enjoy different types of humor than do introverts. Similarly, more agreeable people tend to have a friendly style of humor, while hostile individuals tend to use humor in more aggressive ways. Other styles of humor may be differentially associated with neuroticism versus emotional stability, as well as openness and conscientiousness.

In summary, a considerable amount of research has been conducted on various dimensions of sense of humor as a personality trait, providing a growing scientific understanding of this ubiquitous tendency of humans to play with language and ideas. In the following chapters, I will discuss research investigating how these various components of sense of humor develop during childhood, and how they relate to aspects of psychological and physical health.



## The Developmental Psychology of Humor

We have seen in previous chapters that humor is a complex phenomenon involving a range of psychological functions. These include cognitive processes relating to perception, language, concept formation, memory, problem solving, and creativity; play and emotion; social relationships and communication; and biological processes taking place in the brain and extending into other parts of the body. Although nearly everyone engages in humor to some degree, individuals differ from one another in their humor comprehension and production, the types of humor that they enjoy, and the way they use and express humor in their daily lives. In this chapter, we will see that all these psychological aspects of humor begin to emerge soon after birth and continue to develop over the course of childhood and into adulthood.

What are the typical patterns of humor development in children? How do children's developing cognitive, social, and emotional capacities interact with their ability to understand, enjoy, and produce humor? What are the contributions of genetic and social environmental factors to the development of individual differences in children's sense of humor, and how does a sense of humor influence the child's cognitive, social, and emotional functioning? How does humor change over the course of adulthood, and what are the changing social and emotional functions of humor in later life? These and other related questions have been the focus of a considerable body of research that has accumulated over the past 40 years on the developmental psychology of humor.

Developmental psychologists make use of empirical research methods to study psychological development over the life span. Employing a variety of research methods, including observational studies, experiments, surveys, and case studies, and using retrospective, cross-sectional, and longitudinal designs, they seek to understand the processes of change in cognition, language, emotion, social functioning, and so forth. Developmental psychologists take a multifaceted perspective, recognizing that psychological development involves a complex interplay of genetics, biology, parental and family influences, and other social environment factors. All these aspects of psychological development in general apply as well to the development of humor. In this chapter, I will discuss theories and research findings on the developmental psychology of humor, examining the development of smiling and laughter in infancy and early childhood, the origins of humor in children's play, the relation between humor and cognitive development, humor as emotional coping in childhood and adolescence, social aspects of humor development, individual differences in humor, and humor in later adulthood and old age.

### SMILING AND LAUGHTER IN INFANCY AND EARLY CHILDHOOD

Infants typically begin to smile during their first month, initially in response to tactile stimulation (e.g., tickling, rubbing the skin) accompanied by the sound of a caregiver's voice, and a month or so later in response to visual stimuli such as moving objects and lights. In the following months, babies begin to smile when they recognize objects such as the general configuration of a face and, eventually, the faces of specific individuals such as their parents or siblings, indicating that they have developed a cognitive schema, or mental representation, of that object. Smiling appears to be most likely to occur when an optimal amount of effort (not too little or too much) is required for recognition (McGhee, 1979).

Laughter first appears in the context of infant-caregiver interaction sometime between 10 and 20 weeks of age, and it quickly becomes a frequent part of the interactions between infants and their caregivers. Researchers have observed that young infants typically produce one to four laughs in a ten-minute face-to-face play session with their mother (Fogel et al., 1997). In an early study at the University of Minnesota, Alan Sroufe and Jane Wunsch (1972) investigated the stimuli that trigger laughter during the first year of life by having mothers engage in a variety of behaviors with their infants, such as making lip-popping sounds, tickling, displaying unusual facial expressions, and playing peek-a-boo games. They found that laughter occurs with increasing frequency and in response to a greater variety of maternal behaviors over the course of the year. The types of stimuli producing laughter also change over the year. Tactile and auditory stimuli that produce relatively high rates of laughter at 7 or 8 months (e.g., kissing on the bare stomach or making the sound of a horse) are less likely to do so by 12 months. In turn, visual and social actions (e.g., walking with an exaggerated waddle, or the "I'm going to get you" game) are more likely to induce laughter at 12 months than at 8 months. The authors noted that the stimuli that

become most effective in inducing laughter with increasing age are those that seem to make the greatest cognitive demands on the infant.

Overall, the actions that trigger laughter seem to be ones that are unexpected or incongruous with regard to the child's developing cognitive schemas. When the mother walks like a penguin, sucks on a baby bottle, or dangles a piece of cloth from her mouth, these actions deviate from the familiar behavior that the infant has come to expect. Based on these observations, Sroufe and Wunsch proposed an incongruity-based cognitive-arousal theory of laughter in infants. They suggested that laughter occurs in response to an unexpected or incongruous event, which is appropriate to the infant's cognitive level but does not mesh with his or her developing schemas. Such incongruous events initially attract the attention of the child, inducing efforts at information processing, and producing accompanying physiological arousal. If the infant's interpretation of the event is negative due to feelings of insecurity or perceptions of threat, he or she will cry and engage in avoidance behaviors; however, if the interpretation is positive, due to perceptions of a safe and playful environment, he or she will smile or laugh and engage in approach behaviors.

The authors noted that their data provided little support for the ambivalence view of laughter that has been proposed by some theorists, according to which laughter is associated with a concurrent mixture of both positive and negative emotions. Instead, they observed that, although an infant might first respond to an incongruous stimulus with some apprehension and hesitation, once laughter begins the affective tone seems to be purely positive and is accompanied only by approach behaviors rather than vacillation. Thus, laughter in infants appears to occur in response to the perception of an incongruous object or event in a safe, playful, and nonthreatening social context. As noted in Chapter 4, contemporary theories suggest that the perception of nonserious incongruity is also the basis of humor in adults.

Some later experiments used the "peek-a-boo" game to investigate various factors that influence the amount of smiling and laughter exhibited by infants in response to incongruous events. In this game, a familiar person hides his or her face for a few seconds and then suddenly reappears in front of the infant, saying "peek-a-boo!" while smiling and making eye contact with the infant. Infants between 6 and 12 months frequently smile and laugh upon seeing the person reappear. The disappearance and reappearance of a familiar face in a playful context seems to be particularly enjoyable to infants when they are in the process of mastering "object permanence," the recognition that objects continue to exist even when they are not visible to the child (Shultz, 1976).

One study (MacDonald and Silverman, 1978) showed that one-year-old children are more likely to smile and laugh in response to this game when it is carried out by their mother as compared to a stranger (indicating the importance of familiarity and perceptions of security) and when the mother rapidly approaches them during the game rather than moving away from them (indicating the importance of increasing arousal).

Gerrod Parrott and Henry Gleitman (1989), at Georgetown University, investigated the role of expectations in six- to eight-month-old infants' enjoyment by

inserting occasional “trick trials” in a series of standard peek-a-boo trials. In these trick trials, one person would hide and a different person would reappear in his or her place, or else the same person would reappear but in a different location than in the standard trials. The results showed that the infants smiled and laughed much less frequently in response to the trick trials than the standard trials, whereas the trick trials produced more eyebrow-raising, indicating surprise or puzzlement instead of amusement.

These findings suggest that infants at this age have well-formed expectations about the identity and location of the returning person, and that conformity to these expectations contributes to their enjoyment of the game, whereas large deviations from expectations induce puzzlement rather than enjoyment. The authors suggested that when deviations from expectations are too great, the infant is unable to “resolve” the incongruity by assimilating it into an overarching schema, thereby making sense of it in some way. Thus infants, like older children and adults, are not always amused by just any sort of incongruity or deviation from their expectations, but prefer deviations that can be reinterpreted in a way that makes sense. In addition to these cognitive aspects, the trick trials, being so deviant from the infants’ experience, might have induced a serious, nonplayful reaction of puzzlement in the infants, interfering with the playful state of mind that is required for humor.

The importance of social factors in laughter was demonstrated by a study that found that infants never smiled or laughed in response to an impersonal analogue of the peek-a-boo game in which a toy, instead of a person, was made to disappear and suddenly reappear, whereas they frequently smiled and laughed in response to a person playing the game (Shultz, 1976). Thus, laughter right from its inception tends to be a form of social communication. Infant laughter typically occurs during interactions with parents and other caregivers, who in turn tend to laugh in response to the infants.

More recent research by Evangeline Nwokah and her colleagues at Purdue University have investigated in greater detail the social nature of laughter as a means of communicating emotional information between infants and caregivers (Fogel et al., 1997; Nwokah and Fogel, 1993; Nwokah et al., 1999; Nwokah et al., 1994). For example, Nwokah and colleagues (1994) conducted a longitudinal study in which they observed the laughter of mothers and their infants during free play sessions over the first two years of the infants’ lives, to examine the timing and temporal sequence of laughter in interpersonal interaction. They found that infant laughter increased in frequency over the first year and remained fairly stable during the second year (averaging about .3 laughs per minute by age two), whereas the rate of laughter in the mothers remained quite stable over the two years (at about .55 laughs per minute). By the second year, the rate and duration of laughter was significantly correlated between mothers and infants, meaning that the more a particular mother laughed, the more her infant laughed. Thus, laughter appears to be modeled by the mother during the first year and stabilizes in the infant by the second year.

By the time the infant is one year of age, both mother and infant can anticipate that by altering their tone of voice, facial expressions, and actions, they can induce



laughter in each other. For example, by engaging in incongruous behaviors such as putting a toy on her head, the mother can encourage laughter in the infant, although the likelihood of laughter also depends on such factors as the timing, element of surprise, emotional state of both the mother and infant, and attention of the infant (Fogel et al., 1997). Thus, laughter is clearly a social process, serving an emotional communication function.

As children progress into the preschool or nursery school years, their laughter occurs increasingly in the context of playful interactions with other children in addition to caregivers. Charlene Bainum and her colleagues at the University of Tennessee observed groups of three-, four-, and five-year-old children in a nursery school to investigate laughing and smiling during structured and unstructured play (Bainum, Lounsbury, and Pollio, 1984). No differences were found between girls and boys in the overall frequency of smiling and laughter across the three age groups. The social nature of smiling and laughter was again clearly demonstrated by the fact that 95 percent of these behaviors occurred when children were interacting with others, and only 5 percent occurred when alone. Laughter increased in frequency from age three to five, whereas smiling decreased over this age span. By the age of five, children laughed an average of 7.7 times per hour during play. Smiling and laughter in three-year-olds occurred more often in response to amusing nonverbal actions (e.g., funny faces or body movements), whereas in five-year-olds they appeared more frequently in response to amusing verbal behaviors (e.g., funny comments, stories, songs, or unusual word usage).

In all three age groups, laughter occurred most frequently in response to intentional humor rather than events that were unintentionally funny. Interestingly, children were somewhat more likely to laugh at the funny things they themselves said or did, rather than the behavior of others, indicating that laughter was often used as a signal to indicate that particular behaviors were meant to be funny. Although the majority of laughter occurred in response to socially positive or at least neutral humorous behavior, there was an increase from ages three to five in the proportion of laughter occurring in response to socially negative behaviors such as teasing, shoving, or ridicule.

Compared to laughter, smiling occurred in response to a wider variety of events, especially incidental (not intentionally funny) events, although it also occurred along with laughter in the context of intentional silliness/clowning events. Thus, although some instances of smiling may be viewed as a diminished form of laughter, indicating a lower level of amusement, smiling also serves a broader range of social functions than does laughter.

What are the acoustic characteristics of young children's laughter? Nwokah and her colleagues (1993) conducted acoustical analyses of 50 samples of laughter emitted by three-year-old children while interacting with their mothers. They identified four distinct types of laughter in these children: (1) *comment laughs*, comprising a single laughter syllable or note with a fundamental frequency (pitch) close to that of normal speech, and lasting about 200 milliseconds; (2) *chuckle laughs*, consisting of either one note with two peaks or two notes, with a somewhat higher pitch and a total duration

of about 500 milliseconds; (3) *rhythmical laughter*, comprising three or more notes with a similar fundamental frequency as the chuckle and more complex harmonic structure, lasting 1 to 1.5 sec; and (4) *squeal laughter*, involving a single note of about 500 milliseconds duration with a very high-pitched fundamental frequency.

The duration of individual notes or syllables within all the different kinds of laughs (with the exception of squeal laughter) was very similar to that found in adult laughter (approximately 200 to 220 milliseconds). Some minor differences in acoustic structure were observed between children's and adults' laughter, largely due to children having less control over the vocal apparatus. The authors concluded that different kinds of laughs are used to communicate different degrees of emotional intensity as well as qualitatively different emotional experiences. For example, chuckle laughter often occurs in response to an accomplishment on the part of the child, whereas rhythmical laughter tends to occur in a wide variety of high-arousal social contexts, often where both partners are laughing.

## HUMOR AND PLAY

As we have seen in earlier chapters of this book, humor is closely related to play. Research on laughter in chimpanzees and other animals, discussed in Chapter 6, suggests that the evolutionary origins of laughter arise in the context of rough-and-tumble social play. Developmental psychologists studying humor have also noted that laughter and humor develop in human children in the context of play (see Figure 6), and many view humor as a particular form of mental play (Barnett, 1990, 1991; Bergen, 1998b, 2002, 2003; McGhee, 1979).

What exactly is play? Although there is little agreement among play researchers and theorists about how to define this nebulous concept, most would agree that it is an enjoyable, spontaneous activity that is carried out for its own sake with no obvious immediate biological purpose (Berlyne, 1969). Michael Apter (1982) suggested that play is best viewed as a state of mind rather than a characteristic of certain types of activities. Thus, one can engage in almost any activity in a playful way, as long as one has a nonserious, activity-oriented (rather than goal-oriented) mental set.

There are many similarities between humor and play (Bergen, 2002). Laughter and play both emerge at a similar age in infants (around four to six months), and both are facilitated by similar social contexts. Humor and play are both enjoyable, and they share similar characteristics regarding motivation, control, and reality. They both involve an "as if" attitude, they are enjoyed for their own sake without having an obvious serious purpose, and they both occur in safe settings with people who are trusted. They also both seem to involve consolidation and mastery of newly acquired skills and concepts. Moreover, children are socialized into play and humor by their caregivers in similar ways and in similar contexts. Just as parents initiate their infant children into the "play frame," teaching them to recognize the verbalizations and behaviors that signal "this is play," parents also teach their children the meaning of



FIGURE 6 Humor develops during childhood in the context of social play. © SW Productions/Getty Images/Brand X Pictures

the “humor frame” by means of facial expressions, behavioral and vocal exaggerations, and verbal labels indicating “this is funny.”

Doris Bergen (1998a), a developmental psychologist at Miami University in Ohio, asked parents of children from ages one to seven to keep a record of the events that the children themselves perceived to be funny. Most of the reported examples of children’s humor took place in the context of play and involved playful manipulations of language and actions. Common examples included: expressed joy in mastery and movement play (e.g., tickling games, chasing), clowning (e.g., exaggerated facial or bodily movements or voices), performing incongruous actions (e.g., rolling up a red placemat and pretending to eat it as a “Fruit Roll”), and playing with sounds and word meanings (e.g., chanting or singing nonsense words).

The close connection between humor and play is also reflected in research showing that children with a greater sense of humor tend to engage in more play in general. Lynn Barnett (1990) developed a measure for assessing children’s playfulness in which sense of humor is included as one of the subscales. The sense of humor scale

includes items relating to the frequency of joking, playful teasing, telling funny stories, and laughing with other children. In addition to humor, the measure, which was designed to be used by adult observers to rate children's playfulness, also includes scales for physical, social, and cognitive spontaneity and manifest joy. Research with this measure has shown that the sense of humor scale is significantly correlated with a number of other measures of general playfulness in children, lending further support to the close link between humor and play (Barnett, 1991). Similarly, a study of humor in nursery school children by Paul McGhee and Sally Lloyd (1982) showed that the strongest predictor of children's verbal and behavioral humor initiation and laughter responsiveness was the frequency with which they engaged in social play.

Although humor and play are closely related, they are not exactly the same thing. A small child dressing up in her mother's fancy dress and high-heeled shoes and putting on lipstick may be engaging in enjoyable make-believe play, but she does not necessarily find it to be humorous or "funny." However, if she puts the dress on backwards, wears the shoes on her hands, or gives herself a clown face with the lipstick, she might perceive this to be humorous and expect other people to laugh at it as well. Thus, humor involves a greater degree of incongruity, bizarreness, exaggeration, or discrepancy from the way things normally are, along with a playful attitude.

At what point in a child's development can we say that humor first diverges from other forms of play? When we see a six-month-old infant laughing in response to the peek-a-boo game, it is tempting to assume that he or she is experiencing humor; however, according to some researchers, this is not necessarily the case. Laughter in infants and young children might be used to communicate a variety of positive emotions, and not just humor. When then do children begin to laugh at things that are "funny" and not just "fun"? This has been a topic of some controversy among developmental psychologists.

According to Martha Wolfenstein (1954), an early psychoanalytically-oriented researcher of humor in children, humor does not emerge until sometime in the second year of life, when make-believe play becomes differentiated into two strands, which she called "serious" make-believe and "joking" make-believe. In both kinds of make-believe, the child pretends that something is real, but knows that it is not. In serious make-believe, the focus is on the pretense or illusion of reality, whereas in joking make-believe the emphasis is on the recognition of unreality. Thus, a child engaging in serious make-believe play may become engrossed in taking on a role, pretending to be a "mommy" or a "truck driver," and carrying out activities that closely resemble those of a real mother or truck driver. In humor, however, the child will intentionally distort reality, behaving in unusual or exaggerated ways with the intention of causing someone to laugh.

Paul McGhee (1979), a prominent early developmental humor researcher, also saw a close link between humor and make-believe play. His theory of humor development was strongly influenced by the more general theory of cognitive development formulated by the well-known Swiss psychologist Jean Piaget (1970). Similarly to Wolfenstein, McGhee argued that genuine humor does not begin until the middle of the second year of life, when children begin to develop the capacity for fantasy, pre-

tense, or make-believe play. This corresponds to the transition from the sensorimotor stage to the preoperational stage in Piaget's theory. At this stage, children begin to represent schemas internally instead of relying on direct manipulation of objects to gain knowledge of the world (the concept of cognitive schemas was discussed in Chapter 4).

The most significant achievement at this age is the ability to use symbols and signs, including words, to represent other objects. According to Piagetian theory, when a child perceives information that does not fit with his or her existing schema about a particular object or event, he or she experiences incongruity. To make sense of this incongruous information, the child normally either reinterprets the perceived information to make it fit with the existing schema (*assimilation*, in Piaget's terms), or modifies the schema so that it can incorporate the new information (*accommodation*). In this way, the incongruity is eliminated and the child's intelligence is expanded.

According to McGhee (1979), these processes for making sense of events can occur in two ways: either through "reality assimilation," which is more serious and reality-based, or "fantasy assimilation," which is more playful and makes use of pretense and make-believe. In the latter type of assimilation, which is the essence of humor, the child responds to incongruity by playfully applying the wrong schemas to objects, treating one object as if it were another one. In this way, children can create experiences in their fantasy world that they know cannot take place in reality. Thus, in McGhee's view, humor essentially involves the perception of an incongruity along with fantasy assimilation.

For example, a child might pretend to comb her hair with a pencil, thus stretching the pencil schema to make it incorporate characteristics of a comb. The schema is not permanently altered in fantasy assimilation, as it is in reality assimilation, but is temporarily applied incorrectly. Based on developmental research by Piaget and others, McGhee argued that children are not capable of this sort of fantasy assimilation until they acquire the capacity for symbolic play at around 18 months of age. In McGhee's view, then, the six-month-old infant who laughs in response to the peek-a-boo game is not really experiencing humor, even though he or she may perceive the situation to be incongruous and obviously enjoys it.

In contrast to both Wolfenstein and McGhee, developmental psychologists Diana Pien and Mary Rothbart (1980) argued that symbolic play capacities and fantasy assimilation are not necessary for the appreciation of humor. Instead, they proposed that humor requires only the recognition of incongruity along with a playful interpretation of that incongruity, and they argued that both these abilities are present by the time infants first exhibit laughter, around the fourth month. Although infants at this age do not have internalized mental schemas, they do develop sensory and motor schemas based on their interactions with the physical world, and they are able to recognize events that are incongruous with respect to these developing schemas. In support of their view, they cited the research by Sroufe and Wunsch (1972) described earlier, which indicated that infants laugh in response to visual and social events that involve discrepancy from familiar sensorimotor schemas.

Although Pien and Rothbart agreed with McGhee (and Piaget) that make-believe play does not begin until the preoperational stage, they pointed out that by four months of age infants are capable of simple forms of playful behavior involving practice, exploratory, and manipulative play with objects; motor play; and social play (see also Garner, 1998). Following Piaget, they defined play as actions that are carried out for the pleasure of the activity alone, involving assimilation with little or no serious attempt to accommodate existing schemas to fit a stimulus. They argued that this ability to respond playfully is all that is necessary for incongruity to be perceived as humorous. To respond to incongruity in a playful way, the infant merely needs to be in a safe, nonthreatening environment. In Pien and Rothbart's view, then, a six-month-old infant laughing at the peek-a-boo game is actually experiencing humor.

The question of when humor first occurs in infants may be impossible to resolve, since it depends in part on how one defines humor. Perhaps the most we can say is that humor originates in play and gradually becomes differentiated from other forms of play as the child's cognitive abilities develop (Bergen, 2003). Most researchers today seem to avoid the question of when humor begins in children, focusing on overt behaviors like smiling and laughter and avoiding making inferences about subjective cognitive experiences such as humor. Nonetheless, most would agree that by the end of their second year, children are able to distinguish between humor and other forms of play. This also becomes more evident as children's developing language skills enable them to describe certain events as "funny" or "silly," in addition to laughing at them.

## HUMOR AND COGNITIVE DEVELOPMENT

As we have seen in this and earlier chapters, most researchers and theorists view incongruity as an essential component of humor. Incongruity may be viewed as a deviation or discrepancy from one's normal expectations. As discussed in Chapter 4, these expectations are based on one's cognitive schemas, the mental representations stored in memory. Children, as well as adults, tend to laugh at objects or events that do not conform to their existing schemas. Since schemas gradually develop throughout childhood as the individual gains experience and familiarity with the world, the kinds of objects and events that are perceived to be incongruous with respect to these schemas—and therefore humorous—also change over time. Things that seem incongruous and funny at an early age become mundane and less humorous at a later stage of cognitive development, whereas the older child's more sophisticated schemas enable him or her to perceive and enjoy new kinds of incongruity and more complex forms of humor that are not comprehensible to the younger child. Thus, the development of a sense of humor in children parallels their overall cognitive development. The effects of cognitive development on humor comprehension and appreciation have been the focus of a great deal of theoretical work and empirical research since the early 1970s.



### McGhee's Four-Stage Model of Humor Development

Based on a variety of research findings, Paul McGhee (1979), then at Texas Tech University, proposed four stages of humor development in children that correspond to general trends in cognitive development. As we saw earlier, McGhee argued that the appreciation of humor does not begin until the middle of the second year of life, when children progress into the preoperational stage of cognitive development and acquire the capacity for make-believe or fantasy play. The first stage of humor development, which McGhee named *incongruous actions toward objects*, therefore begins at this age. According to McGhee, children at this age are able to represent objects with internal mental schemas, and their humor consists of playfully assimilating objects into schemas to which they do not normally belong.

For example, a child might hold a leaf to her ear and begin talking to it as if it were a telephone. The child's recognition of the inappropriateness of the action is an important component of the humor: if the child simply misapplies a schema without recognizing the error, this may provoke laughter in adult observers but not in the child. Indeed, one way children often learn to behave in humorous ways is when their inadvertent cognitive errors unintentionally produce laughter in their parents and others. Once they discover that such incongruous actions can cause people to laugh, they begin to intentionally engage in such behavior to evoke laughter in others (Bariaud, 1988).

McGhee's second stage of humor development, called *incongruous labeling of objects and events*, begins early in the third year, when the child is able to begin using language in playful ways. At this stage, the humorous use of language involves mislabeling objects or events. For example, children at this age may derive a great deal of amusement from calling a dog a cat, a hand a foot, an eye a nose, and so on. The child must understand the correct meaning of the word and must be aware that he or she is applying it incorrectly for it to be perceived as humorous. Thus, the child's mastery of the correct usage of the word seems to be the critical factor in determining when it will be misapplied in a playful manner to create humor.

The third humor stage, called *conceptual incongruity*, begins around three years of age when, according to Piaget, the child begins to realize that words refer to classes of objects or events that have certain key defining characteristics. Humor in this stage involves the violation of one or more attributes of a concept rather than simply mislabeling it. For example, instead of simply finding it funny to call a cat a dog, a child at this stage might find humor in imagining or seeing a picture of a cat with more than one head that says "moo" instead of "meow."

More recently, however, Johnson and Mervis (1997) questioned the cognitive basis of the transition from stage two to stage three. They pointed out that the Piagetian idea of a transition from "preconcepts" to "true concepts" at this age has not held up well in the research on children's early conceptual development. Instead, infants' prelinguistic categories have been shown to be based on the same principles as the categories of adults. These authors suggested that the transition from stage two to

stage three in McGhee's model may simply reflect a change in what children tend to talk about. Children first learn names for objects, allowing them to create stage-two humor involving mislabeling of objects. Later, they begin learning words for the attributes of objects, leading to the enjoyment of stage-three humor involving incongruous attributes.

During this time, children also develop more complex syntactic abilities, enabling them to engage in various types of language play, including repetitious rhyming of words and the creation of nonsense words (e.g., "ringo, dingo, bingo"). Children at this age also begin to enjoy simple riddles, although those they typically tell may be best described as "preriddles," since they follow the structure of riddles without involving the play on words or concepts found in the true riddles enjoyed at a later stage (Yalisove, 1978).

McGhee's fourth and final stage of humor development, called *multiple meanings*, begins around seven years of age, when children progress from the preoperational to the concrete operations stage in Piaget's theory of cognitive development (Piaget, 1970). Children in the concrete operations stage are able to manipulate schemas in their minds, imagining the effects of various actions on objects (i.e., "operations") without having to carry them out behaviorally. They are also able to understand conservation, recognizing that physical matter does not magically appear or disappear despite changes in form. In addition, they are able to carry out reversibility of thinking, or the recognition that operations can be reversed so that their effects are nullified. Children at this stage also become less egocentric, and begin to be able to recognize that other people's perspectives may be different from their own. All of these cognitive abilities contribute to their ability to appreciate more sophisticated kinds of humor that play with reality in more complex ways.

With regard to linguistic abilities, children at this stage begin to recognize the ambiguity inherent in language at various levels, including phonology, morphology, semantics, and syntax (Shultz and Pilon, 1973; Shultz and Robillard, 1980). They are therefore able to enjoy the play on words and double meanings that are an important component of many jokes and riddles (Whitt and Prentice, 1977; Yalisove, 1978). For example, children at this age would be able to understand the double meaning involved in the following riddle (McGhee, 1979, p. 77):

"Why did the old man tiptoe past the medicine cabinet?"

"Because he didn't want to wake up the sleeping pills."

In addition to understanding puns and other jokes based on double meanings and language play, children at this age are able to understand other kinds of abstract humor based on logical inconsistencies and requiring inferential thinking. Several studies by McGhee (1971a, 1971b) showed that preoperational children had difficulty understanding the meaning of various jokes and cartoons containing abstract incongruities, whereas those who had achieved concrete operations demonstrated better comprehension.

McGhee (1979) viewed stage four humor as the final stage in humor development, noting that this type of humor continues to be enjoyed into adolescence and

adulthood. However, we might speculate that some further development takes place with the onset of Piaget's formal operations stage beginning in early adolescence (Piaget, 1970). In this stage, the individual's thinking becomes more abstract and is governed more by logical principles than by perceptions and experiences. Individuals at this age have a more flexible, critical, and abstract view of the world. They are able to mentally manipulate more than two categories of variables at the same time, to detect logical inconsistencies in a set of statements, to hypothesize logical sequences of actions, and to anticipate future consequences of actions. All of these cognitive capacities no doubt enable the individual to play with ideas and concepts at a more abstract level than is possible in the concrete operations stage (Führ, 2001).

For example, individuals at this stage might begin to enjoy existential jokes about the meaning of life, as well as jokes that play with traditional joke structures and forms. In one study in which children were asked to produce their favorite riddle (Yalisove, 1978), those in grades two to seven tended to provide riddles based on language ambiguity (e.g., "Why do birds fly south? It's too far to walk"), whereas by grade ten they were more likely to give absurdity-based riddles (e.g., "How can you fit six elephants into a Volkswagen Beetle? Three in the front and three in the back"). Overall, then, the cognitive development of humor may be viewed as the development of more sophisticated mental structures and cognitive abilities with which the individual is able to engage in the perception and creation of playful incongruities.

### The Role of Incongruity and Resolution in Children's Humor

Thomas Shultz and his colleagues at McGill University in Montreal conducted a number of early studies on the relationship between cognitive development and humor appreciation (for a review, see Shultz, 1976). They based their research on the incongruity-resolution theory of humor (discussed in Chapter 3), which proposes that humor is composed of an incongruity that can be resolved in some way. This model of humor is best illustrated by jokes, in which an incongruity in the punch line is typically resolved by reinterpreting some ambiguous information in the joke setup. These researchers were particularly interested in the relative contribution of incongruity and resolution to humor appreciation in children at different stages of cognitive development.

In one study, Shultz and Horibe (1974) presented children in grades one to seven with a series of intact and modified jokes. In some of the modified jokes, the incongruity was removed, and in others the incongruity remained but the resolution was removed. For example, one of the original jokes was the following:

Woman: Call me a cab.

Man: You're a cab.

The resolution-removed version of this joke was:

Woman: Call a cab for me.

Man: You're a cab.

The incongruity-removed version was:

Woman: Call me a cab.

Man: Yes, ma'am.

The results of this study showed that, for children in grades three to seven, the original jokes were perceived to be funnier than the resolution-removed jokes, which in turn were funnier than the incongruity-removed jokes. However, for children in grade one, there was no difference in perceived funniness between the original and resolution-removed jokes, whereas both were funnier than the incongruity-removed jokes. These results were interpreted as indicating that younger children find humor in incongruity alone and do not require the incongruity to be resolved. Beginning sometime between grades one and three, and presumably continuing into adulthood, resolution of the incongruity becomes important for humor appreciation. This conclusion was further supported by the fact that, when asked to explain the meaning of the original jokes, children in grade one had great difficulty in comprehending joke resolutions, particularly in identifying the hidden meaning of the ambiguity in the joke setup.

The authors noted that the transition from enjoyment of incongruity alone to resolvable incongruity seems to occur at about the same age when children typically progress from the preoperational to the concrete operational stage of cognitive development, suggesting that the increased mental abilities of this later stage may be necessary for the child to appreciate and enjoy the resolution components of humor. Thus, this transition from incongruity-only humor to incongruity-resolution humor corresponds to the beginning of McGhee's fourth stage of humor development. The conclusions drawn from this study were further supported by similar findings in another study by Shultz (1974a) using humorous riddles instead of jokes.

A subsequent study at the University of Oregon by Diana Pien and Mary Rothbart (1976), however, cast some doubt on Shultz's conclusions. These researchers pointed out that the types of jokes used in these studies were based on linguistic ambiguities that may have been too difficult for six-year-old children to understand. The failure to appreciate resolution at this age may therefore simply have been due to comprehension difficulties with the particular stimuli used, rather than a reduced importance of resolution in humor generally. Indeed, these authors demonstrated that, when simpler jokes and cartoons were used as stimuli, four- and five-year-old children were able to understand resolution of incongruity and showed a preference for jokes containing resolution rather than incongruity alone (see also similar findings by A. J. Klein, 1985).

Pien and Rothbart reasoned that these findings were inconsistent with Shultz's view that children progress from a stage of enjoying incongruity alone to the enjoyment of incongruity plus resolution. They argued instead that incongruity with or without resolution may be perceived as humorous at all ages from infancy to adulthood. This view seems to be consistent with more recent research findings. As noted earlier, the "peek-a-boo" study by Parrott and Gleitman (1989) that included "trick" trials suggested that some degree of resolution may be important for humor even in infancy. On the other hand, Ruch's factor-analytic studies of jokes and cartoons that were discussed in Chapter 7 (e.g., Ruch and Hehl, 1998) indicate that adults also can enjoy humor containing incongruity without resolution (i.e., nonsense humor). Thus, the presence or absence of resolution does not seem to be an important factor in

humor development, but instead characterizes two different kinds of humor across the lifespan.

Moreover, as Bernard Lefort (1992) pointed out, jokes, riddles, and cartoons are particular narrative forms that are communicated in a social context as a sort of game between the teller and the listener. What Shultz called *resolution* may be better viewed as a particular class of techniques used in these forms of verbal humor to simultaneously activate incongruous multiple schemas (see also Attardo, 1997). In other forms of humor, such as spontaneous witticisms, these techniques may not be as necessary for incongruous schema activation. As they gain experience with jokes, children learn to organize their comprehension activity around this narrative framework, internalizing the traditional rules of the game. Thus, developmental research based on jokes and riddles, such as the studies by Shultz and colleagues, may tell us more about children's developing understanding of the traditional joke structure than about their experience of humor more generally.

### Humor and Cognitive Mastery

McGhee's model of humor development suggests that, once children have mastered particular cognitive abilities, they soon begin to create humor by playing with these abilities in incongruous ways. As McGhee (1983a, p. 115) put it, "Once a child becomes confident of the normal relationship between stimulus elements or achieves a new level of understanding through acquisition of new cognitive skills, he/she enjoys distorting that knowledge or understanding in the guise of a joke." Evidence from a number of studies of children's humor indicates that children particularly enjoy humor that plays with concepts that they have only recently mastered, rather than those with which they are very familiar (McGhee, 1974).

In an early study of humor and cognitive development, researchers at Yale University presented cartoons to children in the second, third, fourth, and fifth grades (Zigler, Levine, and Gould, 1966). The researchers noted the degree to which the children smiled and laughed in response to the cartoons, and also asked them to explain the meaning of each cartoon. Not surprisingly, the children showed an increasing comprehension of the cartoons across the four grades, with fifth-grade children exhibiting the greatest understanding of the humor. However, the pattern of smiling and laughter in response to the cartoons did not follow the same pattern. The frequency of smiling and laughing increased from the second to the fourth grades, paralleling the children's increasing comprehension, but in the fifth grade there was a steep drop to the level shown by children in the second grade. Thus, although they understood the humor better, fifth-grade children did not find it nearly as funny as did those in preceding grades. At this age, the cartoons seemed to be too simple and therefore no longer amusing.

The authors proposed a "cognitive congruency" hypothesis to explain these findings, suggesting an inverted-*U* relationship between cognitive difficulty and enjoyment of humor. Cartoons that make too great a cognitive demand on a child are not understood and are therefore not enjoyed, but those that make too little demand are

not found to be funny, even though they may be understood. Thus, humorous stimuli are enjoyed if they are congruent with the complexity of the child's cognitive schemas. Further support for this hypothesis was found in a subsequent study by the same authors in which cartoons with different levels of difficulty were administered to children at three different grade levels (Zigler et al., 1967). Children at each grade level preferred cartoons with an intermediate level of difficulty, and this optimal difficulty level increased across the three grades.

Two experiments conducted by McGhee (1976) provided additional support for this hypothesis. In the first study, children of varying ages were first assessed for their ability to understand conservation of mass using standardized tests. Conservation of mass refers to the recognition that objects, such as a piece of modeling clay, retain the same mass even when they change shape. The children were then presented with a series of jokes that were based on a humorous violation of conservation concepts. The following is an example of such jokes:

Mr. Jones went into a restaurant and ordered a whole pizza for dinner. When the waiter asked him if he wanted it cut into six or eight pieces, Mr. Jones said: "Oh, you'd better make it six! I could never eat eight!"

Analyses of the participants' funniness ratings of the jokes revealed a significant curvilinear effect, with the highest ratings being given by children who had just recently acquired conservation skills, and lower ratings given both by those who had not yet achieved conservation and by older children who had presumably attained these skills several years earlier. A similar inverted-*U* pattern of results was obtained in the second study, in which children were first tested for their understanding of the Piagetian concept of class inclusion (the ability to recognize that an object can be a member of more than one class at the same time), and were then presented with jokes that involved a violation of this principle. Again, the jokes were rated as most funny by the children who had just recently mastered the concept that was violated in the jokes.

McGhee interpreted these findings as supportive of the cognitive congruency hypothesis, suggesting that children derive the greatest pleasure from humor that presents an optimal level of challenge to their cognitive structures. Humor that is too difficult or too easy to understand is not enjoyed as much. The cognitive congruency hypothesis was also supported by several studies examining associations between children's cognitive development and their comprehension and enjoyment of humorous riddles (Park, 1977; Prentice and Fathman, 1975; Whitt and Prentice, 1977; Yalisove, 1978).

### Cognitive Development of Irony and Sarcasm

Most of the early empirical research on cognitive aspects of humor development focused on children's comprehension and appreciation of "canned" forms of humor, such as jokes, cartoons, and riddles. As I have noted in earlier chapters, these types of humor are context-free and portable, and are therefore quite easy to study in the lab-



oratory. However, they represent only a small part of the humor encountered by children (as well as adults) in everyday life (Bergen, 1998b; R. A. Martin and Kuiper, 1999). Most humor in childhood arises from spontaneous verbal and nonverbal behaviors during playful social interactions, such as wordplay, silly gestures and actions, incongruous fantasy play, teasing, irony, sarcasm, and practical jokes (Bergen, 1998a; Fabrizi and Pollio, 1987b; McGhee, 1980b). Investigation of these kinds of naturally occurring humor poses greater challenges to researchers, since they depend more on the constantly changing social context. Nonetheless, in recent years there has been some research on the development of children's comprehension of certain types of conversational humor, particularly irony and sarcasm (see Creusere, 1999, for a review). This cognitive developmental research parallels the psycholinguistic research on irony and sarcasm in adults that was discussed in Chapter 4.

As noted in Chapter 4, irony is a humorous figure of speech that is used to communicate indirectly a message that is the opposite of the literal meaning of a sentence. For example, someone who says "What a beautiful day!" when the weather is cold and stormy actually intends to communicate "What an awful day." Irony is also closely related to sarcasm, which depends for its effect on "bitter, caustic, and other ironic language that is usually directed against an individual" (Gibbs, 1986, p. 3). For example, if someone says "You're so graceful" in response to someone tripping and falling, this is an ironic statement that may also be sarcastic. On the other hand, irony can also be used in making indirect compliments as well as criticisms. For example, a high-achieving student who receives an A on a test might be told by a classmate, "You'd better work harder next time!"

To understand and appreciate irony and sarcasm, children must develop the ability to make several complex linguistic and social inferences. First, they need to recognize that the intended meaning of the ironic statement is not the surface meaning, and therefore they must learn to substitute the true meaning for the literal meaning. In addition, they need to recognize the pragmatic (i.e., social and communicative) functions of irony in speech. Two such functions have been identified by researchers. First, irony is used to tinge or mute the implied criticism or praise, making the criticism less negative and the compliment less positive than they would be using literal language. Second, irony is used to convey humor, based on the incongruity between the literal and implied meanings, and is therefore meant to be funny (Dews et al., 1995). Developmental researchers have investigated how children develop an understanding of these different aspects of irony.

A number of studies have shown that the ability to understand the intended meaning of ironic statements does not develop in children until about age six (e.g., Creusere, 2000; de Groot et al., 1995; Winner et al., 1987). This comprehension ability appears to depend on the development of a "theory of mind," or the ability to infer a speaker's beliefs or intentions. In particular, to understand that a statement is meant to be ironic, one needs to infer not only what the speaker actually intends, but also that the speaker believes that the listener understands this implied meaning as well. Failure to make these inferences will lead to a misinterpretation of the irony as either a literally true statement or a lie.

Kate Sullivan and her colleagues at the University of Massachusetts (Sullivan, Winner, and Hopfield, 1995) found that children between five and eight years of age were only able to distinguish between a lie and a humorous false statement in a story if they had already developed the theory-of-mind ability to attribute second-order ignorance (i.e., recognizing that one person in a story does not know what another person knows). Interestingly, without this ability, even the presence of different vocal intonations in lies versus jokes did not enable children to recognize that a joke was not intended as a lie. However, the more difficult theory-of-mind ability to attribute second-order false belief (i.e., recognizing that one person in a story misperceives what another person is thinking) was not needed for children to be able to distinguish between a lie and a joke, indicating that only some aspects of a theory of mind are necessary for irony comprehension (see also Winner and Leekam, 1991).

Other research has investigated the development of children's comprehension of the pragmatic functions of irony. Shelly Dews and her colleagues (1996) at Boston College conducted two studies to investigate children's understanding of the muting function and humorous nature of ironic insults. In the first study, they presented groups of five- and six-year-olds, eight- and nine-year-olds, and college students with brief clips from television cartoons containing instances of ironic criticism, literal criticism, and literal compliments. The participants were tested for their understanding of the intended meanings of the statements, and were asked to rate them for meanness and funniness.

Consistent with other research, children's ability to understand the implied meaning of the ironic criticisms was found to emerge between five and six years of age. Interestingly, the results also showed that, as soon as they were able to understand the meaning of ironic criticism, children recognized that it was less mean or insulting than literal criticism, indicating an understanding of the muting function of irony. However, an understanding of the humorous nature of irony apparently does not develop until some time later. It was not until the eight- to nine-year-old age range that children began to perceive ironic insults as being funnier than literal ones. In turn, the college students gave even higher funniness ratings to the ironic insults, suggesting that a full appreciation of the humorous aspects of irony may not develop until adolescence or early adulthood.

The second study extended these findings by manipulating the degree to which ironic criticisms were subtle or obvious, and the degree to which they were presented in a deadpan or sarcastic tone of voice. The results showed that, at all ages, more subtle forms of indirect irony are considered more insulting than are more obvious and direct forms. However, adults find the subtler forms of irony funnier, while children find the more obvious forms funnier. Thus, the appreciation that a meaner remark can also be funnier appears to develop with age. The perceived meanness and funniness of the ironic insults were also influenced by voice intonation. At all ages, a sincere or deadpan intonation made the irony seem less insulting and funnier than did a sarcastic intonation. A sarcastic tone of voice seems to convey annoyance, whereas a deadpan or sincere intonation signals playfulness and humor.

More recently, Melanie Harris and Penny Pexman (2003), at the University of Calgary, investigated the development of children's understanding of the social functions of ironic compliments as well as criticisms. Children ages five to eight were presented with puppet shows depicting ironic and literal criticisms and compliments. The results with ironic and literal criticisms generally replicated the findings of Dews et al. (1996), indicating that children recognize the muting function of ironic criticism as soon as they begin understanding the implied meaning, but the recognition of humor in ironic criticism does not begin until some time later. Indeed, even the older children in this sample did not perceive the ironic criticism to be funny.

With regard to ironic compliments, the results revealed that only a minority of children correctly interpreted the implied meaning, and the proportion of correct responses did not increase between ages five and eight. Thus, comprehension of ironic compliments seems to develop at a later age than comprehension of ironic criticisms. One possible explanation for this finding is that children may be more likely to encounter sarcasm than ironic compliments in their daily lives. Alternatively, it may be because ironic compliments involve a double negation, which is likely more difficult to understand.

In addition, this study revealed that children rated ironic compliments as less nice than literal compliments as soon as they were able to understand them, indicating that, as with ironic criticism, the muting function of irony is recognized early on. However, across all the age groups, there were no differences in the funniness ratings of ironic and literal compliments, both of which were rated as being serious, indicating that the humorous aspects of ironic compliments are not appreciated by children in this age range. Further research with children older than eight years of age is needed to determine the age at which children begin to perceive humor in this form of irony.

In summary, by investigating the development of children's comprehension of the meaning and pragmatic functions of irony and sarcasm, researchers are beginning to extend the study of cognitive aspects of humor development beyond canned jokes, cartoons, and riddles, and into conversational forms of humor that frequently occur in everyday interactions with others. These types of humor depend more on the social context, and require an understanding of a variety of linguistic and social factors such as speaker intentions, theory of mind, vocal intonation, and so on. In addition to irony and sarcasm, further research is needed to explore the development of children's ability to understand and appreciate other forms of verbal and nonverbal interpersonal humor. As well as furthering our understanding of children's humor development, research in this area may yield interesting insights into the development of social cognition more generally.

## HUMOR AS EMOTIONAL COPING

Besides the cognitive aspects of humor, a number of developmental researchers have suggested that humor serves as a method for children to cope with emotionally

arousing and threatening topics. By joking and laughing about issues that normally arouse feelings of anxiety and tension, children are able to feel less threatened and gain a sense of mastery. As we have seen, Freud (1960 [1905]) suggested that jokes are a way of expressing taboo topics relating to sex and aggression in a socially acceptable manner, allowing the individual to release feelings of anxiety associated with these topics. Similarly, Levine (1977) extended the idea of humor as a form of cognitive mastery (discussed earlier) to suggest that humor and laughter are a way of asserting mastery in emotional and interpersonal, as well as cognitive, domains.

In her psychoanalytically-based case studies of humor in children, Wolfenstein (1954) noted that much of children's humor relates to potentially painful, anxiety-arousing, or guilt-inducing topics such as death, violence, destruction, punishment, illness, bodily functions, sexuality, and stupidity. By engaging in the playful fantasy of humor, the child is able to transform a threatening situation into something to be laughed at and enjoyed. Writing about play more generally, Sutton-Smith (2003) suggested that "play can be defined as behavioral parody of emotional vulnerability because it both mimics and inverts the primary emotions ironically" (p. 13). The essential function of play, he suggested, "is to make fun of the emotional vulnerabilities of anger, fear, shock, disgust, loneliness, and narcissism" (p. 13). Humor, as a form of mental play, presumably serves these functions as well.

Loeb and Wood (1986) outlined a developmental model of humor based on Erikson's eight stages of psychosocial development, suggesting that humor may be one method of dealing with conflicts arising from the successive developmental crises of trust versus mistrust, autonomy versus shame, initiative versus guilt, industry versus inferiority, and so on. Similarly, Paul McGhee (1979) noted that the topics that children are most likely to make jokes and laugh about at different ages are ones that are commonly associated with tensions, conflicts, and anxieties at each stage of development. For young children going through the trials and tribulations of toilet training, when toilet-related activities and accidents increasingly become sources of emotional tension, a great deal of laughter is generated by scatological humor relating to defecation, urination, flatulence, and so on. The mere repetition of toilet-related words ("poo-poo," "pee-pee," "fart") is enough to produce howls of laughter.

As preschoolers become aware of and concerned about physical differences between the sexes, this also becomes a topic for joking. Continuing feelings of conflict and tension about sexual activity throughout childhood and into adulthood contribute to the ongoing popularity of sexual jokes. The strong emphasis placed on intellectual achievement and rationality during the school years also produces anxieties about intellectual performance, leading to a great deal of joking about stupidity and irrational behavior. The use of humor to cope with potentially threatening topics is also seen in the popularity among children and adolescents of "sick" jokes, "dead baby" jokes, and "disgusting" or "gross-out" humor in movies and television programs depicting flatulence, projectile vomiting, and other bodily functions (Herzog and Bush, 1994; Herzog and Karafa, 1998; Oppliger and Zillmann, 1997).

Although a considerable amount of research has examined the role of humor in coping in adults (which I will discuss in Chapter 9), empirical research on children's use of humor in emotional coping is unfortunately very limited (R. A. Martin, 1989).

Danish psychologist Martin Führl (2002) administered the Coping Humor Scale (CHS) along with a questionnaire about the uses of humor in coping to 960 children between the ages of 10 and 16 years. Factor analyses revealed three factors: (1) the use of humor to cope with uncertainty and stress; (2) aggressive humor making fun of others; and (3) humor as a means of improving one's mood. Boys were found to use more aggressive forms of humor in coping, whereas girls were more likely to report using humor as a mood booster. The use of humor for coping with uncertainty and stress increased with age for both boys and girls. With increasing age, girls were more likely to report using humor as a mood booster, whereas boys' reported use of this function of humor decreased slightly. Further research is needed to examine the effectiveness of different types of humor in coping with various sources of emotional distress, as well as developmental changes in the use of humor for coping beginning earlier in childhood.

### INTERPERSONAL ASPECTS OF HUMOR IN CHILDREN

As we have seen, humor and laughter are essentially social phenomena. Infants begin to laugh in the context of interactions with their caregivers, and most of the laughter of preschool children occurs when they are with other children or adults. The predominantly interpersonal nature of humor is also apparent as children progress through the elementary and high school years. Besides being a form of play, humor is an important aspect of interpersonal interaction and communication, serving a variety of social functions (Chapman, Smith, and Foot, 1980). As noted in Chapter 5, the inherent incongruity and ambiguity of humor makes it useful for communicating messages and influencing others in situations in which a more direct, serious mode of communication might be problematic for a variety of reasons.

Simons and colleagues discussed a number of possible functions of humor in children's social interactions from infancy through adolescence (Simons, McCluskey-Fawcett, and Papini, 1986). In infants, humorous interactions with parents may play a role in the development of attachment relationships, which have been shown to be very important for later social and emotional development (Ainsworth, Bell, and Stayton, 1991). Humor may be one way of coping with separation anxiety and asserting oneself during the process of gaining greater autonomy during toddlerhood. During middle childhood, it may be important for socialization, establishing and maintaining peer groups, communicating and enforcing norms, and influencing social status within groups. These functions continue into adolescence, where humor also becomes important in negotiating sexual relationships. These ideas remain largely speculative at present, however, as little research has been conducted on the social functions of humor in children or the way these functions develop through childhood and adolescence. Much of the early research on social aspects of humor focused on how the presence of other children influences a child's perceptions of humor. More recently, research on teasing has begun to address the social aspects of aggressive types of humor. These research topics are discussed in the following sections.

### Social Influences on Humor Appreciation and Laughter

A considerable amount of research has shown that the amount of laughter that children display in response to humor is influenced by various aspects of the social situation. For example, the effects of modeling on children's laughter were demonstrated by an experiment that found that preschool children laughed much more frequently while listening to a humorous audiotape after they had observed another child laughing at the same tape as compared to a condition in which the other child did not laugh at the tape (G. E. Brown, Wheeler, and Cash, 1980).

In a series of experiments during the 1970s, Antony Chapman, at the University of Wales, examined the effects of social context on humorous laughter in children (for a review of this research, see Chapman, 1983). In one study (Chapman, 1973b), seven-year-old children listened to a humorous audiotape on headphones either by themselves ("alone" condition), with a nonlistening companion of the same age and sex ("audience" condition), or with another child who was also listening to the same tape ("coaction" condition). The participants in the coaction condition laughed and smiled more frequently and rated the tape as funnier than did those in the audience condition, who in turn displayed more mirth and higher funniness ratings than did those in the alone condition. These results indicate that the perception and enjoyment of humor are facilitated by the mere presence of another person, and even more so when the other person also shares the humor experience.

A subsequent study showed that the amount of laughter exhibited by children while listening to a humorous audiotape was directly related to the frequency of laughter in a companion (Chapman and Wright, 1976). Other experiments revealed that children laughed and smiled more frequently at the tape when they were sitting closer to the companion (Chapman, 1975a) and when they were sitting face-to-face with the companion rather than back-to-back (Chapman, 1976). Another experiment showed that children in small groups laugh and smile more at a humorous audiotape when their companions look at them while laughing as compared to when they look at someone else (Chapman, 1975b). These studies provide further evidence that laughter is primarily a form of social communication, and that sharing the social situation with others facilitates the enjoyment of humor.

### Teasing Among Children

Children become aware of the aggressive uses of humor at an early age. As early as age three, the presence of aggressive verbal and nonverbal behavior is a potent factor in determining children's perceptions of humor (Sinnott and Ross, 1976), and aggression continues to be an important determinant of humor preferences throughout childhood (Pinderhughes and Zigler, 1985). For example, by age three, boys show a preference for humor that disparages girls rather than boys (McGhee and Lloyd, 1981). As soon as children begin to develop a strong positive sense of racial-ethnic identity between three and six years of age, they begin to enjoy humor that disparages members of other racial-ethnic groups (McGhee and Duffey, 1983). Children



also learn at an early age about the coercive effects of humorous ridicule. By six years of age, children will avoid behaviors for which they have observed others being ridiculed in a humorous way (Bryant et al., 1983).

Teasing is an aggressive form of humor that occurs frequently in childhood. According to Shapiro, Baumeister, and Kessler (1991), teasing comprises three components: aggression, humor, and ambiguity (see also Keltner et al., 2001). As noted in Chapter 5, the humorous and ambiguous nature of teasing allows the source to say things that would be face-threatening and potentially unacceptable if communicated in a serious mode, since the source can always say "I was just joking" if the communication is not well received by the target. The aggressive and humorous elements of teasing may be combined in different proportions. When the aggressive component predominates, teasing is perceived as more hostile and hurtful, whereas teasing containing greater humor may be perceived as benign and enjoyed by the target as well as the source.

Jeremy Shapiro and colleagues (1991), at the Child Guidance Center in Cleveland, asked children in grades three, five, and eight to describe their experiences of teasing and being teased. The most commonly reported forms of teasing were making fun of an attribute or behavior of the target (28 percent), calling the target humorous names (25 percent), and simply laughing at the target (11 percent). The most common topics of teasing were physical appearance (especially being fat), intellectual performance (especially stupidity, but also being too smart in school), and physical performance. The most common reasons given for teasing were retaliation (i.e., teasing in response to someone else's teasing) and playing or joking around. In addition, 51 percent of the participants identified aggressive bullies as the most frequent teasers, whereas 23 percent identified popular, funny, lively children. The most frequent targets of teasing were timid, physically small "losers," unpopular children, overweight children, and children with lower intelligence. Thus, teasing seems to be carried out by socially dominant children against those with less social status who do not conform to group norms. Overall, teasing seems to be a way of asserting and maintaining status within the peer group as well as censuring behaviors in others that violate group norms.

A limited amount of research has examined developmental changes in the content and form of teasing in childhood. Given the function of teasing as a way of enforcing social norms, it is not surprising that developmental changes in teasing tend to parallel changes in the types of norms that are most relevant at different ages, such as possessiveness and aggression during the preschool years, associations with members of the opposite sex during elementary school, fashion-related and dating behavior in puberty, and behaviors related to experimentation with sex and drug use during adolescence and early adulthood (Keltner et al., 2001; Warm, 1997).

The style of teasing also changes over the course of development. In particular, teasing tends to become less blatantly aggressive, more humorous and playful, and more subtle as individuals move from late childhood into adolescence (Keltner et al., 2001; Warm, 1997). These changes may be partly related to developments in the comprehension of irony and sarcasm discussed earlier. As we saw, recognition of the

humorous aspects of ironic language does not develop until late childhood and adolescence, even though the potential for using irony to convey indirect criticism is recognized by age six. Younger children are therefore less able to employ playful language cues such as the use of irony to mitigate the hostility of their teasing. As a result, younger children's teasing tends to be more overtly hostile, hurtful, and insulting. Any humor that is involved is often meant for the benefit of the witnesses at the expense of the recipient (Scambler, Harris, and Milich, 1998).

These developmental changes in the style of teasing are also reflected in children's perceptions of the functions and effects of teasing. Although children of all ages emphasize the hurtful nature of teasing, older children and adolescents begin to recognize that it can sometimes also have positive functions and outcomes, such as pointing out undesirable behaviors in a playful way and indirectly communicating acceptance and friendship (Shapiro et al., 1991; Warm, 1997).

Some researchers have investigated how children respond to teasing and have attempted to identify the types of responses that might be most effective. In the survey by Shapiro et al. (1991), the most common response to teasing reported by children was reciprocating teasing with a verbal comeback or teasing of their own (39 percent), followed by ignoring the teasing (24 percent), laughing along (12 percent), fighting (10 percent), and reporting the teasing to an authority figure (4 percent). When teachers were asked what they considered to be the most effective response to teasing, 91 percent recommended simply ignoring the teaser.

Douglas Scambler and colleagues (1998), at the University of Kentucky, conducted an experiment in which they showed children between the ages of 8 and 11 one of three versions of a videotape in which a child responded in different ways to being teased by other children: (1) ignoring; (2) an angry, hostile response; and (3) a humorous response. The participants rated the humorous response as most likely to be effective, followed by ignoring, with the hostile response being rated as least effective. Interestingly, the humorous response produced more positive evaluations of the teaser as well as the recipient of the teasing. Thus, responding with humor may be even more effective than ignoring, as it might defuse the conflict situation and potentially turn it into a prosocial interaction. The authors suggested that children who are frequent targets of teasing should be taught to practice lighthearted, humorous responses to use in such situations. Similar results were obtained in a subsequent experiment by Robin Lightner and colleagues that looked at empathic responding as well as ignoring, humorous, and hostile reactions to teasing (Lightner et al., 2000).

Further research is needed to examine actual interactions, instead of artificial scenarios, to capture the emotional elements in teasing situations and examine the effectiveness of various responses with different types of teasing among children of different ages and personality characteristics.

## INDIVIDUAL DIFFERENCES IN CHILDREN'S SENSE OF HUMOR

So far in this chapter I have been discussing developmental changes in humor that are characteristic of most children. However, children do not all develop a sense

of humor to the same degree; the individual differences in humor that we discussed in the previous chapter begin to emerge in early childhood. Besides studying normative trends in humor development, researchers have therefore also investigated the ways children at a given age differ from one another in the degree to which they initiate and appreciate humor. Why do some children more than others develop a tendency to laugh easily and frequently, a heightened enjoyment of humor, or an ability to tell jokes and make others laugh? To what extent do genetic and environmental factors influence the development of a sense of humor? How do parental behaviors and the family environment contribute to humor development in children? What other personality characteristics and behaviors are associated with a sense of humor in children at various ages? These are some of the sorts of questions regarding individual differences in children's humor that researchers have sought to answer.

As we saw in Chapter 7, sense of humor is not a unitary concept. Individual differences in sense of humor can be conceptualized and measured in many different ways, including differences in the frequency of laughter, ability to comprehend humor, appreciation of various kinds of humorous stimuli, tendency to initiate humor and make others laugh, and so on. These different definitions of sense of humor are reflected in the various measurement approaches taken by different researchers in studying individual differences in children's humor as well. Research findings that relate to the development of one of these components of sense of humor do not necessarily apply to others.

### Genetic Factors in Sense of Humor

In recent decades, numerous twin studies have provided evidence that genetic factors play a substantial role in individual differences in temperament and personality generally (Rowe, 1997). The general strategy in this research involves comparing the correlations on a particular personality trait between pairs of monozygotic (i.e., identical) and dizygotic (i.e., fraternal) twins. A genetic contribution to the trait is indicated when higher correlations are found in identical as compared to fraternal twin pairs. Using multivariate statistical modeling procedures, the relative contribution of genetic as well as shared and nonshared environmental influences can be estimated. Shared environmental influences are those that are experienced similarly by both members of a twin pair, such as the general family environment, whereas nonshared influences have to do with experiences that differ between a pair of twins both within and outside the family. A few of these types of studies have been conducted to examine the degree to which genetic and environmental factors may contribute to the development of various aspects of the sense of humor.

David Nias and Glenn Wilson (1977), at the Institute of Psychiatry in London, used the classic twin study methodology to investigate individual differences in humor appreciation in 100 pairs of young adult identical and fraternal twins. The participants were asked to rate the funniness of 48 cartoons that had been classified as non-sense, satirical, aggressive, or sexual. The correlations between the pairs of twins for each category of humor averaged about .45, but did not differ between the fraternal and identical twins, indicating that individual differences in the appreciation of these

humor categories do not appear to have a genetic basis. On the other hand, the sizable magnitude of the average correlations indicated that environmental influences shared by both members of a pair play a fairly substantial role in the development of their humor preferences. Thus, shared environmental influences, such as the effects of being raised within a particular family, appear to play a more important role than genetic factors in determining the degree to which individuals enjoy particular types of humor. A subsequent more detailed analysis of the same data led to similar conclusions (G. D. Wilson, Rust, and Kasriel, 1977).

In a more recent twin study by Lynn Cherkas and colleagues at St. Thomas Hospital in London, 127 pairs of female twins (71 monozygotic and 56 dizygotic) ages 20 to 75 were asked to rate the funniness of five *Far Side* cartoons by Gary Larson (Cherkas et al., 2000). As we saw in the last chapter, these rather bizarre, “off-the-wall” cartoons have been found in previous research to load on Ruch’s (1992) non-sense factor of humor appreciation, as opposed to the incongruity-resolution factor. The results replicated the earlier findings of Nias and Wilson (1977). Whereas significant correlations were found between the pairs of twins on the funniness ratings of each of the five cartoons, these correlations did not differ between the fraternal and identical twins, indicating no genetic contribution to individual differences in the enjoyment of these cartoons. Multivariate model-fitting analyses confirmed that the data were best explained by a model that allowed for the contribution of both shared and nonshared environmental factors, but not genetic effects. Thus, this study provided further evidence that a sense of humor, when defined as the appreciation of particular types of humor, develops primarily as a result of environmental influences both within and outside the family of origin.

Besides the humor appreciation approach, another way of thinking about the sense of humor construct is to view it as a temperament-based affective trait. As we saw in Chapter 7, Willibald Ruch and his colleagues have proposed that individual differences in humor may be conceptualized in terms of temperamental differences in cheerfulness (e.g., Ruch and Köhler, 1998). Temperament refers to relatively stable characteristics of response to the environment, such as activity level, sociability, and emotionality, which are observed in infants as early as the first months of life (A. H. Buss and Plomin, 1984). To explore possible genetic and environmental factors in temperament, researchers at the University of Wisconsin (Goldsmith et al., 1999) conducted a study of 302 pairs of 3- to 16-month-old infant twins (121 identical and 181 fraternal). Several dimensions of temperament were assessed by means of maternal ratings on a standardized questionnaire, as well as laboratory observations. Factor analysis of the temperament variables revealed two main factors: (1) positive affectivity, composed of frequency of smiling and laughter, duration of orienting, and soothability; and (2) negative affectivity, composed of distress in response to limitations and novelty, and activity level. The positive affectivity factor seems to be most relevant to Ruch’s concept of trait cheerfulness and sense of humor in general, whereas negative affectivity likely corresponds to neuroticism and Ruch’s concept of trait bad mood.

Multivariate model-fitting analyses revealed that positive affectivity was best explained by a model that included additive genetic (40 percent), shared environ-

mental (34 percent), and nonshared environmental effects (25 percent). Very similar results were obtained when the frequency of smiling and laughter was analyzed separately. Thus, the degree to which an infant tends to respond with smiling and laughter, as well as his or her overall positive emotionality, appears to be influenced by both genetic and environmental factors. Of particular interest here is the finding of a shared environmental component, indicating that children's positive affectivity is partly influenced by factors that are common to children within the same family, such as maternal personality or attachment security. Similar findings of shared environmental effects on positive emotionality have been found in other twin studies of infants, preschoolers, and adults (Goldsmith, Buss, and Lemery, 1997; Tellegen et al., 1988).

On the other hand, the analyses revealed that negative affectivity was best explained by a model containing only additive genetic (64 percent) and nonshared environmental effects (36 percent). Thus, negative emotionality also appears to be influenced by both genetic and environmental factors. However, the environmental influences in this case are not those that are shared by all children within the same family, but instead have to do with ways in which children in the same family may have different experiences. In summary, this study indicates that sense of humor, when viewed as an emotional temperament trait, is influenced by both genetic and environmental factors.

In addition to research on humor appreciation and emotional temperament, two studies have investigated genetic and environmental contributions to sense of humor using self-report humor measures. In an early twin study, identical and fraternal adolescent twins were asked to rate the degree to which they felt they had a good sense of humor on a 7-point scale (Loehlin and Nichols, 1976). A significantly larger correlation was found between identical as compared to fraternal twins, suggesting a genetic contribution to individual differences in self-rated humor. A very weak correlation for fraternal twins indicated that environmental influences are of the non-shared rather than the shared variety.

The second study, described by Beth Manke (1998), at the University of Houston, examined individual differences in interpersonal humor expression in adolescents. Instead of using pairs of identical and fraternal twins, however, this study made use of pairs of adolescent siblings who had been raised in the same families but were either nonadopted (therefore sharing approximately 50 percent of their genes) or adopted at birth (therefore not sharing any genes). As in the twin studies, a larger correlation between nonadopted compared to adopted sibling pairs would indicate a genetic effect. A self-report questionnaire was used to assess the degree to which each participant typically engaged in humor and laughter (e.g., telling jokes and funny stories, laughing or joking about embarrassing or upsetting events, laughing at comedy movies and television programs) in their relationships with their mother, their sibling, and their best friend.

Multivariate model-fitting analyses revealed that a significant proportion (over 25 percent) of the variance in humor use with mothers and siblings can be attributed to genetic factors. In contrast, genetic influences were negligible for use of humor in

relating to best friends. The author suggested that the lack of a genetic contribution to humor in interactions with friends may have been due to the shorter duration of these relationships. Genetic influences may become more apparent in longer-term relationships in which humor patterns have become more stabilized. In addition, the analyses revealed a sizable environmental influence on humor use with mothers, siblings, and friends (accounting for over 50 percent of the variance). These effects were of the nonshared variety, suggesting that growing up in the same family does not make siblings similar in their humor expression.

Overall, then, this research suggests that a sense of humor is a product of both genetics and environment, with the relative contributions of these two types of influence varying with different components of this trait. When sense of humor is defined in terms of the appreciation of particular types of humorous material, genetic influences appear to be negligible, and most of the variance can be attributed to both shared and unshared environmental effects. The types of things people laugh at are determined primarily by their past experiences within and outside their family of origin. When a temperament-based approach is taken, defining sense of humor in terms of positive emotionality and the tendency to laugh and smile frequently, genetic factors appear to play a more significant role, although both shared and unshared environmental influences are also important. Finally, a sizable genetic contribution, as well as nonshared environment influences, is found with self-report measures assessing overall sense of humor and the tendency to engage in humorous interactions with family members. Interestingly, there seem to be differences in the degree to which genetic factors contribute to humor expression in different relationships, with humor in relating to peers showing less genetic contribution than with family members. It is important to note that these studies allow for the estimation of the overall effects of genetic and environmental influences, but they are not able to identify the specific genes or environmental factors that are responsible for individual differences in humor. Further research is needed to address these questions.

### Family Environment Factors in Sense of Humor Development

These heritability studies suggest that, although genetics play a role, environmental factors are also important in the development of most dimensions of sense of humor. One influential aspect of the environment is the family. Children likely learn to express and enjoy humor in the context of their early relationships with their parents and other family members. Two competing hypotheses have been proposed concerning the way interactions with parents may influence the development of a sense of humor, referred to as the modeling/reinforcement and the stress and coping hypotheses (Manke, 1998). According to the Modeling/Reinforcement Hypothesis, parents who enjoy humor themselves and who laugh and joke a good deal serve as humorous role models and are likely to positively reinforce their children's attempts at humor initiation, leading to greater humor and laughter in the children (McGhee, Bell, and Duffey, 1986). On the other hand, the Stress and Coping Hypothesis sug-



gests that a sense of humor may develop in children as a way of coping with distress, conflict, and anxiety in an uncongenial family environment. For these children, humor may be a way of releasing hostile feelings or gaining attention and approval from parents who are otherwise rejecting and nonnurturing (McGhee, 1980b). There is some research evidence in support of both of these hypotheses.

Paul McGhee (1980b) described a study of nursery school and elementary school children at the Fels Research Institute in Ohio, in which observational ratings were obtained for the children's frequency of laughter and behavioral and verbal attempts to initiate humor during peer interactions in free-play sessions. Because these children were part of an ongoing longitudinal study, data were also available on a number of measures of antecedent maternal behaviors that had been assessed during their infancy and earlier childhood. In support of the stress and coping hypothesis, correlational analyses with the nursery school children revealed that those who showed greater amounts of humor tended to have mothers who babied and overprotected them but showed little affection and closeness.

Among both boys and girls at the elementary school age, greater humor expression was associated with a greater tendency of mothers to leave the children alone to solve problems on their own, even when some assistance would have been appropriate. Greater humor in elementary school girls was also related to a lack of maternal protectiveness and a home environment characterized by conflict, unpleasantness, repression, and insecurity. Thus, the development of a sense of humor in children seemed to be associated with rather uncongenial parental behaviors toward the children. No relation was found between children's humor behaviors and their mothers' own tendency to engage in humor during interactions with the child, casting doubt on the Modeling/Reinforcement Hypothesis.

Further support for the Stress and Coping Hypothesis was provided by a study of male adolescents conducted at Vanderbilt University (Prasinos and Tittler, 1981). Using a peer nomination technique, the participants were divided into humor-oriented, moderately humor-oriented, and non-humor-oriented groups. Individuals in the humor-oriented group, as compared to those in the other two groups, reported significantly less cohesion and greater conflict in their families on a family environment measure and significantly greater distance from their father in a figure-placement test.

The research by Fisher and Fisher (1981) on professional comedians and comic children, described in Chapter 7, also lends support to the Stress and Coping Hypothesis. Professional comedians described their relationships with their mothers as more negative than did noncomic entertainers. Questionnaire data also revealed that the mothers of comic children, as compared with mothers of noncomic children, were significantly less kind, less sympathetic, less close and intimately involved with their children, and more selfish and controlling, and they wanted their children to take responsibility and grow up more quickly. Taken together, these studies provide some support for the view that children may develop a sense of humor as a way of coping with feelings of anger and anxiety, and as a means of gaining attention and approval from parents who are otherwise distant and unsupportive.

On the other hand, some support for the Modeling/Reinforcement Hypothesis was found in a study by Paul McGhee and colleagues (1986) at Texas Tech University. Male and female university students and a group of elderly women completed a self-report measure of humor initiation as well as a questionnaire about their parents' tendency to engage in humor when they were growing up. Among male students, humor initiation was positively correlated with father's humor, whereas female students showed a positive correlation between laughter responsiveness and mother's humor. Among the elderly women, those with higher scores on humor initiation and laughter responsiveness reported that their mothers engaged in higher levels of joking, clowning, and playful teasing when the participants were growing up. No significant correlations were found between participants' humor scores and the modeling of humor by the opposite-sex parent. These findings suggested that the greatest early modeling influences on humor development may come from the same-sex parent. However, these findings should be viewed as rather tentative, since they were based on recall data that may be subject to memory biases.

Overall, the existing research seems to lend stronger support to the Stress and Coping Hypothesis than to the Modeling/Reinforcement Hypothesis. However, more thorough investigation is required before firm conclusions may be drawn. Most of the evidence to date is based on studies with small sample sizes, and the Modeling/Reinforcement Hypothesis in particular has not been adequately investigated. Future research should examine possible effects of family environment and parental behaviors on a broader range of aspects of children's sense of humor, and the possibility of curvilinear relationships should also be examined.

In the end, there may be some validity to both the Modeling/Reinforcement and the Stress and Coping hypotheses. Some children raised in uncongenial family environments may develop a sense of humor to cope and gain acceptance, especially if they learn that their humorous behaviors are positively reinforced by attention and approval from parents who are otherwise harsh and unaffectionate. Other children, who are raised in more secure and nurturing environments, may develop a sense of humor as a consequence of parental modeling and reinforcement. As we have seen in previous chapters, humor serves a variety of different social functions, and there are likely to be several different pathways in the development of individual differences in humor.

An additional weakness of this research is that it does not control for possible genetic confounds in the observed relations. Any associations that are found between parents' behavior and their children's later sense of humor may be due to the genes that are shared by parents and children rather than to causal effects of the parental behavior on the child's sense of humor. One way to test for this possibility is to compare the associations between family environment and children's sense of humor in adoptive and nonadoptive families. If a stronger relation is found for nonadoptive than for adoptive children, this would suggest that the effect is at least partially mediated by the greater genetic similarity between parents and nonadopted children.

This approach was taken in a study reported by Beth Manke (1998) that investigated the relation between family environment variables and interpersonal humor

expression in male and female adolescents who were either raised by their biological parents or were adopted at birth. In this longitudinal study (part of which was described in the previous section), the general family environment and maternal parenting practices had been assessed when the adolescents were 9 to 11 years of age by means of questionnaires completed by the mothers. The data analyses revealed only a few significant correlations between these family environment measures and measures of interpersonal humor that were completed several years later by the adolescents. The results provided weak and somewhat contradictory support for the Stress and Coping Hypothesis.

Of particular interest to the present discussion, though, was the finding that any significant associations that did emerge occurred only with the nonadopted children and not with the adopted children. This finding suggests that associations between the family environment and children's sense of humor development may be genetically mediated, rather than being a direct causal effect. In other words, certain combinations of genes (which are passed from parents to their biological children) may contribute both to particular parenting practices and to the development of a sense of humor in children, whereas these parenting practices might not directly influence sense of humor development. These conclusions are only tentative, however, since this is the only study of this kind conducted so far, the sample size was fairly small, and the parenting behaviors were assessed only during middle childhood.

Further research along these lines is clearly needed, using a variety of approaches to measure sense of humor in children, and broader, more objective assessments of parental behaviors and family environment beginning at an earlier age in the children's development. An alternative method of controlling for the confounding effects of genetics in studying effects of parenting on children's sense of humor is the "children of twins" design, which compares parent-child associations in identical versus fraternal twins and their offspring (D'Onofrio et al., 2003).

### Personality and Behavioral Correlates of Children's Sense of Humor

What other personality traits, abilities, and behaviors are associated with having a sense of humor in children? Once again, the answer depends in part on how we define sense of humor. Several studies have investigated individual differences in children's tendency to initiate humor and make other children laugh in the playground and classroom. Associations between these humor initiation measures and various other interpersonal behaviors, traits, and abilities have been examined in children of different ages. In one study of four- and five-year-old nursery school children, those who were rated by their teachers as being more likely to initiate humor in interactions with peers were found to have more advanced language skills and were rated by their mothers as having a temperament characterized by greater activity and approach, rather than social withdrawal (Carson et al., 1986).

In the longitudinal study by Paul McGhee (1980b) discussed earlier, associations were examined between children's general interpersonal behavior during free play in their preschool years and their later frequency of verbal and behavioral humor

initiation and laughter with peers when they were either in nursery school or elementary school. Among nursery-school-age children, those who engaged in more frequent laughter and initiation of humor had previously been observed to engage in more frequent unprovoked verbal and physical aggression and retaliation to aggression with their peers. More humorous children also tended to be those who were taller and heavier and who had exerted more effort on mastery of gross-motor skills (which are particularly involved in physical play activities seen in the playground) and less effort on intellectual activities and mastery of fine-motor skills (which are needed for writing, art, and other academic activities observed in the classroom). In addition, while unrelated to overall intelligence, greater verbal humor initiation was observed in children who had developed better language abilities at an earlier age. Overall, these findings suggest that humorous behavior with peers in nursery school children occurs particularly in aggressive, physically large, active children with better gross-motor than fine-motor skills and precocious language development.

Similar patterns were observed with the elementary school children. Among both boys and girls, those who engaged in greater amounts of verbal and nonverbal humor initiation and who were rated by observers as having a greater sense of humor tended to be those who had previously been rated as being more physically and verbally aggressive, more dominant, and exerting more effort on activities requiring gross-motor rather than fine-motor skills. High-humor children also tended to have had more precocious speech development and better language skills, and were rated by observers as being more creative at an early age (McGhee, 1980a). In addition, they were rated as seeking more help, attention, and affection from adults, and were more likely to engage in imitation during play. By elementary school, greater humor was no longer associated with weight or height, although it was still related to greater social dominance.

A study by Sandra Damico and William Purkey (1978), at the University of Florida, examined personality traits of 96 eighth-grade children in 10 different junior high schools who were identified by their classmates as being “class clowns” (i.e., students who “joke and clown around a lot” and “make others laugh”). In comparison with a randomly selected group of nonclown classmates, the class clowns (who were much more likely to be male than female) were rated by their teachers as being higher in social assertiveness, cheerfulness, and leadership, but also more unruly and attention-seeking, and less likely to complete their academic work. On a measure of self-concept, class clowns were more likely to describe themselves as leaders, vocal in expressing ideas and opinions, confident about speaking up in class, satisfied with themselves, and self-confident. However, they also rated themselves as being less well-understood by their parents and displayed more negative attitudes toward their teachers and principal.

Although humorous children may be perceived by their teachers as somewhat unruly and disruptive, other studies indicate that they tend to be very popular with their classmates. Lawrence Sherman (1988), at Miami University in Ohio, had children in three fourth-grade classes rate the sense of humor and the degree to which they liked the other children in their class. The mean liking ratings for each child

were used to compute a measure of the child's social distance within the class. A strong correlation was found between the mean humor ratings and social distance scores, indicating that children who were perceived to have a better sense of humor were more well-liked by their peers. This association between perceived humor and social distance was stronger among same-sex peers than among opposite-sex classmates.

These findings were replicated in a subsequent study using classes of 9-, 12-, and 15-year-old children (Warners-Kleverlaan, Oppenheimer, and Sherman, 1996). The latter study revealed that, among 12- and 15-year-olds, the association between sense of humor and social distance became equally strong for cross-gender and within-gender ratings. Thus, as children enter adolescence and begin to take a stronger interest in members of the opposite sex, a sense of humor seems to be an important component of one's popularity with both sexes. This study also indicated that pre-adolescent children tend to define a sense of humor in terms of funny actions and joke-telling, whereas adolescents define it more in terms of witty verbal skills.

Some additional research suggests that the pattern of behavioral and personality correlates of the tendency to initiate humor with peers may change as individuals progress into adolescence. Michael Fabrizi and Howard Pollio (1987b), at the University of Tennessee, observed children in grades 3, 7, and 11 during classroom periods, and coded how frequently each child initiated humor and made other children laugh. No differences were found between boys and girls in the frequency of humor initiation. Among children in grade three, the frequency of humor initiation was unrelated to the children's general classroom behavior or their interactions with their teachers.

However, by grade seven, children who engaged in more frequent humor initiation tended to be those who were generally more disruptive in class, calling out rather than raising their hands for permission to speak, frequently leaving their seat, interacting more often with peers, and spending less time doing their school work. Not surprisingly, the more humorous children were also more likely to receive disapproval and reprimands for off-target behavior from their teachers. Although the pattern of correlations was similar in grade 11, humor in these older children seemed to be somewhat less disruptive. The authors concluded that, whereas humor initiation in grade 7 seemed to be part of a constellation of acting-out behaviors, by grade 11 it seemed to be associated with being a popular child who knows the rules of the classroom and is sought out by his or her peers.

In a subsequent study, Fabrizi and Pollio (1987a) found that children in grade seven who engaged in more frequent humor initiation in the classroom and were more frequently nominated by their peers as being "the funniest in the class" tended to have lower scores on a measure of self-esteem. By grade 11, however, there was no association between humor initiation and self-concept. These findings seem to be inconsistent with the positive self concept found in class clowns in the Damico and Purkey (1978) study, although the differences may be due to the fact that the latter study used a more extreme group of humorous children drawn from a larger population, rather than examining correlations within the classroom.

On the other hand, whereas no correlation was found between humor initiation and creativity among children in grade 7, more frequent humor initiation in grade 11 was significantly correlated with higher scores for originality, flexibility, and elaboration on a test of creative thinking as well as higher teacher ratings of creativity. These findings suggest that being funny with peers is associated with different behaviors and personality characteristics at these different ages. During early adolescence (grade seven), making one's peers laugh is associated with going against authority, acting out, being silly, and having low self-esteem. In later stages of adolescence (grade 11), making one's peers laugh is less strongly related to disruptive behavior and low self-esteem, and more strongly related to creativity and popularity with peers.

Although this correlational research does not permit us to draw conclusions about causality, these studies, taken together, provide some indication of the possible developmental trajectory of children who become particularly adept at initiating humor and amusing their peers. Temperamentally outgoing and active preschoolers who are verbally and physically aggressive learn at an early age that aggressive behavior is likely to meet with disapproval from adults as well as rejection from peers. Those children with strong verbal skills or gross-motor abilities may learn that a more acceptable way of gaining acceptance from peers and minimizing disapproval from adults is to channel these abilities into verbal and physical humor that generates laughter in others. In elementary and junior high school, the ability to make others laugh leads to increased popularity and a position of dominance and leadership among peers, but it also increasingly brings the child into conflict with the demands of the classroom, resulting in these children having a conflicted relationship with authority figures and being perceived by teachers as disruptive and unruly. By high school, humorous children continue to be socially dominant and assertive, but somewhat less disruptive, and as they hone their humor abilities they also become more creative in their thinking in general.

This description of the hypothesized course of humor development seems consistent with the existing data. However, because most of the research to date has used cross-sectional designs, we do not know for certain if the children who are most humorous in kindergarten are the same ones who make their friends laugh in high school, or whether different children take on this humorous role at different age levels. Longitudinal research is needed to examine the stability of humor initiation across childhood and adolescence.

Besides defining sense of humor in terms of humor initiation during interactions with peers, researchers have also examined individual differences in children's humor appreciation and their ability to comprehend and produce humor using jokes and cartoons. Ann Masten (1986), at the University of Minnesota, assessed the sense of humor of children in grades five to eight using measures of humor appreciation (funniness ratings of cartoons), amount of laughter and smiling in response to the cartoons, humor comprehension (ability to explain the point of the cartoons), and humor production (ability to generate witty cartoon captions). The children's social competence was also assessed by means of teacher and peer ratings on a standardized questionnaire, and their academic competence was measured using intelligence and achievement tests.



With regard to social competence, children with higher levels of humor comprehension and production were rated by their peers as higher on sociability and leadership and lower on emotional sensitivity and social isolation. They were also rated by their teachers as showing more cooperativeness, attention, and initiative. Correlations with the amount of laughter and funniness ratings of cartoons showed similar, although somewhat weaker, patterns. With regard to academic competence, correlational analyses showed that children who displayed more laughter in response to cartoons, humor comprehension, and humor production tended to have higher IQ and academic achievement scores. None of the humor measures were significantly correlated with peer or teacher ratings of aggressiveness, oppositional behavior, or disruptiveness in the classroom.

Using the same humor measures as in the Masten (1986) study, a similar pattern of findings emerged in a subsequent investigation of social and academic competence in children ages 9 to 14 (Pellegrini et al., 1987). Factor analyses of a variety of social and cognitive competence measures revealed that the amount of laughter in response to cartoons, humor appreciation, comprehension, and production measures all loaded on a "social comprehension" factor, along with measures of interpersonal understanding and means-ends problem solving. Thus, these sense of humor measures formed part of a social cognition dimension involving maturity of understanding about the social world and the ability to achieve social goals and solve interpersonal problems. This dimension was in turn positively related to teacher and peer ratings of social competence, popularity, friendliness, and leadership. It was also significantly but weakly related to academic achievement. In addition, humor comprehension and production both loaded on a factor of divergent thinking, along with measures of creativity and cognitive reflectivity and accuracy (cf. Brodzinsky, 1975; Brodzinsky, 1977).

Overall, the findings of these two studies suggest that when sense of humor is defined in terms of humor production ability and comprehension and appreciation of cartoons, it tends to be positively correlated with social competence and maturity, sociability, cooperative behaviors, academic achievement, and intellectual abilities, and unrelated to aggressiveness and disruptive classroom behavior. Of course, the direction of causality in these correlational findings is unknown. These findings are quite different from the pattern of correlations described earlier in research defining sense of humor in terms of children's tendency to make their peers laugh. In that research, humor initiation tended to be related to a history of aggressiveness, disruptive classroom behavior, inattention to school work, and a generally conflicted relationship with authority figures. Thus, correlations between sense of humor and particular personality traits, competencies, and behaviors may be quite different, depending on the way sense of humor is defined and measured.

## HUMOR AND AGING

How does the sense of humor change as people progress through adulthood and into old age? Our discussion of humor development in this chapter has focused

particularly on the period from infancy to adolescence. However, further developments in the production, comprehension, enjoyment, and social functions of humor likely occur throughout the lifespan, along with changes in cognitive abilities, psychosocial needs and concerns, social relationships, attitudes, coping with adverse life events, and so on. Because only a few studies have investigated humor in older adults, however, our knowledge in this area is very limited.

A major limitation of research comparing aspects of humor in older and younger adults is that this approach does not permit us to determine whether any observed differences are due to developmental changes that occur with aging, or whether they are due to cohort effects. If elderly people are found to differ from younger people in their humor abilities, styles, comprehension, or appreciation, this may be due to the fact that they grew up in a different era, with different cultural norms and expectations, different popular role models, different educational opportunities, and so on. Longitudinal research, following individuals over many years, is needed to investigate changes in humor over the course of individuals' lives. Since no studies of this kind have been conducted, we must be cautious in our interpretation of the existing cross-sectional research.

Some research suggests that declines in cognitive abilities in the elderly may be associated with reduced comprehension of humor. A study at Purdue University found that, among participants ages 50 to 80 years, greater age was associated with lower comprehension but also greater appreciation (higher funniness ratings) of jokes (Schaier and Cicirelli, 1976). In addition, those older participants who were found to have a reduced understanding of conservation of volume on standard Piagetian tasks also showed lower comprehension and appreciation of jokes involving violations of conservation, but not nonconservation jokes.

The authors concluded that these findings provide further support for the cognitive congruency hypothesis (discussed earlier). In the first part of life, increases in cognitive abilities enable children to understand and appreciate more cognitively challenging forms of humor; however, as their abilities increase still more and a joke becomes too easy, their appreciation decreases. In the later part of life, as cognitive ability begins to decline with age, comprehension of jokes also declines. This leads to an increased appreciation of the humor as the joke places more cognitive demand on the individual, up to the point where he or she no longer understands the joke, when appreciation again declines.

In a more recent study at the University of Toronto, elderly participants (mean age = 73 years), as compared to younger people (mean age = 29 years), made significantly more errors in selecting the humorous punch line on a joke completion test and also made more errors in selecting the funnier cartoon when presented with pairs of nonverbal cartoon drawings (Shammi and Stuss, 2003). In contrast, the two age groups did not differ in their performance on a nonhumorous story completion task, indicating an equal ability to understand narrative language. In the elderly participants, performance on the verbal joke test was also significantly correlated with performance on neuropsychological tests of working memory and verbal abstract ability, while the nonverbal cartoon test was significantly related to measures of

working memory, speed of visual scanning, mental flexibility, and visual perceptual abilities. All of these abilities have been found in previous research to be related to frontal lobe functioning. The deficits in performance on the verbal and nonverbal humor tests in the elderly were much less severe, however, than those seen in patients with right frontal lobe brain damage. With regard to humor appreciation, the elderly participants, in comparison to the younger ones, rated humorous materials as significantly funnier. Drawing on findings from previous brain research on humor comprehension (discussed in Chapter 6), the authors of this study concluded that subtle declines in frontal lobe functioning in the elderly may lead to some impairment in cognitive processing of humor, while leaving the affective enjoyment of humor intact.

To investigate age differences in humor appreciation in adults, Willibald Ruch and colleagues (1990) examined correlations between age and humor appreciation on the 3WD humor test in a sample of more than 4000 German participants ranging in age from 14 to 66 years. Enjoyment of incongruity-resolution (INC-RES) humor increased significantly across the age span in a linear fashion, whereas enjoyment of nonsense (NON) humor decreased with age. These age differences in the enjoyment of the two categories of humor were found to be fully accounted for by a corresponding increase with age in scores on a measure of conservatism. As noted in Chapter 7, greater preferences for INC-RES over NON humor are related to more conservative social attitudes.

Thus, the more conservative attitudes of older as compared to younger adults are reflected in differences in the kind of humor that they enjoy. In particular, older people are more likely to enjoy humor in which incongruity is resolved (as in most "canned" jokes) and less likely to enjoy the more offbeat types of humor containing unresolved incongruity. Of course, as with all of this cross-sectional research, we do not know whether the older participants became increasingly conservative and had corresponding changes in their humor appreciation over the course of their lifetime, or whether they were always more conservative and always enjoyed INC-RES humor more than did the group born at a later time.

Some research has also examined age differences in younger and older adults' scores on self-report humor measures. A study using the Multidimensional Sense of Humor Scale (MSHS) with a sample of adults ages 18 to 90 found no age differences in overall humor scores (Thorson and Powell, 1996). However, older participants were somewhat more likely than younger ones to report producing and appreciating humor and using humor to cope with stress, whereas they tended to report a more negative attitude toward humorous people. My colleagues and I also examined age differences in scores on the Humor Styles Questionnaire in more than 1000 participants ranging in age from 14 to 87 years (R. A. Martin et al., 2003). Older adults were found to have significantly lower scores than younger ones on both affiliative and aggressive humor, indicating that older people are less likely to engage in friendly joking and laughing with others and are also less likely to use humor to disparage, ridicule, or manipulate others. On the other hand, older women (but not men) had higher scores than younger ones on self-enhancing humor, indicating a generally more

humorous outlook on life and greater use of perspective-taking and coping humor. No age differences were found with the self-defeating humor scale.

Taken together, these findings suggest that humor may serve different functions for adults at different periods of the lifespan. In younger people, humor may be more important for expressing aggression in socially acceptable ways, establishing relationships, and testing one's social standing in the peer group, whereas humor in older people (especially women) may have more to do with coping with stress and maintaining a humorous outlook on life. These findings suggest potentially interesting avenues for future longitudinal research exploring changes in humor abilities, enjoyment, and functions over the lifespan.

## CONCLUSION

Laughter begins to emerge in infants around four months of age, and occurs in response to perceptions of incongruity in a playful, safe context. Right from its inception, laughter functions as a form of social communication. The incongruous tactile stimuli, actions, sounds, and facial expressions that trigger laughter in infants gradually evolve into an internalized sense of humor, as developing schemas enable the child to manipulate mental representations of concepts and language in incongruous ways.

Much research has examined associations between humor development and the development of cognitive abilities through childhood. As cognitive capacities become more complex, children are able to perceive and enjoy more sophisticated forms of playful incongruity. Humor appreciation signals mastery of concepts, as humor that playfully violates recently acquired concepts is funnier than humor that is either cognitively too difficult or too simple. Children's ability to understand and enjoy conversational forms of humor such as irony and sarcasm also depends on their level of cognitive development.

Social and emotional aspects of humor continue to play a major role throughout childhood. Humor as a form of communication serves many social functions in children as well as adults. Joking and laughing with others about taboo topics and anxiety-arousing issues and experiences is an important way for children to manage negative emotions such as anxiety, guilt, and insecurity in the face of an often bewildering and threatening world.

Individual differences in sense of humor begin to emerge in early childhood. The relative proportion of genetic and environmental influences on sense of humor differs depending on how humor is defined and measured. With regard to familial influences on sense of humor development, research has tended to support the Stress and Coping Hypothesis, although evidence has also been found for the Modeling/Reinforcement Hypothesis. Some children may develop a strong sense of humor due to a rather dysfunctional family environment in which humor emerges as a way of coping with negative emotions and gaining attention and approval from otherwise nonnurturing parents, whereas others may develop a sense of humor as a result of growing up in a well-functioning family in which humor is valued and modeled.

Sense of humor defined as a tendency to frequently initiate humor and amuse one's peers is associated with having been physically active, dominant, and aggressive, and having precocious language abilities in the preschool years, and disruptive classroom behavior during elementary school, but also popularity among peers and creativity in high school. Sense of humor defined as the ability to comprehend and produce humor in the laboratory is associated with social competence, cooperativeness, initiative, and leadership.

In the latter part of the life span, declining cognitive abilities may be associated with reduced comprehension of humor, but no reduction in humor appreciation and enjoyment. More conservative attitudes in older as compared to younger adults are associated with greater enjoyment of incongruity-resolution and reduced enjoyment of nonsense humor. Older adults tend to use humor in less aggressive and affiliative ways, but their greater breadth of life experience may enable them to have a generally more humorous outlook on life and an increased ability to use humor in coping with life stress.

The study of humor development in childhood and across the lifespan offers many interesting research opportunities. Although many studies have examined the role of cognitive development in the comprehension and appreciation of "canned" jokes, cartoons, and riddles, only a limited amount of research has examined cognitive developmental aspects of more spontaneous forms of verbal and nonverbal humor that occur in everyday social interactions. Further research is also needed on the social functions of humor in infancy and childhood and changes in these functions through childhood and adolescence. Research on developmental aspects of the role of humor in emotional coping is also needed.

With regard to individual differences in sense of humor, our knowledge of familial and other social environmental influences on humor development is still very limited. Research on this topic needs to employ methodologies that enable researchers to control for possible genetic confounds. Finally, further research is needed on changes in various components of sense of humor in later life, as well as changes in the social and emotional functions of humor in the elderly. In all these areas, longitudinal research designs are needed to augment the findings of cross-sectional research. Thus, although the existing research has provided a great deal of interesting information about the development of humor, many questions remain to be answered.



## Humor and Mental Health

In recent decades, a sense of humor has come to be viewed not only as a very socially desirable personality trait but also as an important component of mental health. Besides boosting positive emotions and counteracting negative moods like depression and anxiety, humor is thought to be a valuable mechanism for coping with stressful life events and an important social skill for initiating, maintaining, and enhancing satisfying interpersonal relationships (Galloway and Cropley, 1999; Kuiper and Olinger, 1998; Lefcourt, 2001). A good deal of research in the psychology of humor in the past two decades has focused on the relation between humor and various aspects of mental health.

Our discussion of the implications of humor for mental health in this chapter brings us to clinical psychology, the branch of psychology having to do with the study, assessment, and treatment of psychological disorders, as well as the study and promotion of factors contributing to positive mental health and well-being (Seligman and Peterson, 2003). Clinical psychology is both a research discipline and an applied profession. In this chapter, I will focus on the research aspect, exploring empirical findings concerning the role of humor in psychological health and well-being; applied issues will be the focus in Chapter 11, where I will consider applications of humor to psychotherapy.

Mental health is often defined in negative terms as the absence of psychological disturbance or emotional distress. In this chapter, I will take a more positive approach, defining it in terms of three general capacities that seem to be essential for



an individual to thrive and flourish. These are: (1) the ability to regulate negative emotions and enjoy positive emotions; (2) the ability to cope with stress and adapt to change; and (3) the ability to establish close, meaningful, and enduring relationships with others. In the following sections I will describe research investigating the potential benefits of humor for each of these three components of positive mental health.

## HUMOR AND EMOTIONAL WELL-BEING

As we have seen in earlier chapters, one component of humor is the positive emotion of mirth that is elicited. When people engage in humor and laughter, they tend to feel more cheerful and energetic, and less depressed, anxious, irritable, and tense. In the short term, at least, humor seems to boost positive moods and counteract negative emotions. Thus, one way a sense of humor may be beneficial to mental health is by contributing to one's ability to regulate or manage emotions, which is an essential aspect of mental health (Gross and Muñoz, 1995).

### Experimental Investigations of Humor and Emotions

The effects of humor on mood have been demonstrated in a number of laboratory experiments. In two studies, Willibald Ruch (1997) exposed participants to humor either by having them interact with a clowning experimenter or by showing them comedy videotapes. The frequency, intensity, and duration of their smiling and laughter were coded using the criteria for the Duchenne display which, as we saw in Chapter 6, indicates genuine amusement. The more the participants smiled and laughed in this way, the more their self-reported feelings of cheerfulness and mirth increased over baseline. Thus, smiling and laughter are an expression of the positive emotion of mirth that is induced by the perception of humor, and the more intense this emotion, the greater the laughter. Interestingly, there were no correlations between the participants' pre-existing (baseline) moods and the degree to which they smiled and laughed at the humorous stimuli, confirming that positive emotions were a consequence rather than a cause of humorous amusement.

Other research suggests that smiling and laughter by themselves, even without humor, can induce positive feelings of mirth. For example, when participants were asked to rate the funniness of cartoons while holding a pen in their mouth in a way that caused them to contract the facial muscles normally associated with smiling (as compared to subjects who held the pen in a way that inhibited such muscle contractions), they rated the cartoons as funnier and reported greater increases in positive mood (Strack, Martin, and Stepper, 1988). Laboratory studies have also found significant increases in positive mood in subjects following sessions of forced, nonhumorous laughter (Foley, Matheis, and Schaefer, 2002; Neuhoff and Schaefer, 2002). Thus, the act of smiling and laughing, even when done artificially, seems to induce feelings of amusement and mirth, at least temporarily.

Besides increasing positive moods, there is experimental evidence that humor can reduce negative moods. One experiment found that exposure to a four-minute humorous film led to a significant reduction in reported feelings of anxiety relative to baseline (C. C. Moran, 1996). Another study compared the mood effects of watching a 20-minute comedy videotape, running on a treadmill for 20 minutes, and watching a nonhumorous documentary video (Szabo, 2003). Compared to the aerobic exercise, the comedy video produced similar increases in positive mood and decreases in emotional distress and even greater reductions in anxiety, and both comedy and exercise showed significantly stronger mood effects than did the nonhumorous control video (these results were replicated by Szabo, Ainsworth, and Danks, 2005). Taken together, these findings suggest that humor produces positive short-term emotional changes that are at least comparable if not superior to the effects of vigorous physical exercise.

There is also some evidence that humor can counteract the effects of experimentally induced depressed moods. Using a standard laboratory mood-induction technique, Amy Danzer and her colleagues (1990) induced dysphoric moods in female undergraduate students and then randomly assigned them to either humorous audiotape (stand-up comedy), nonhumorous audiotape (an interesting but unfunny geography lecture), or no tape conditions. Participants in all three groups showed significant increases in self-reported depressed moods following the mood induction, indicating that this procedure was effective, but only those in the humor condition showed a significant posttreatment reduction in dysphoria back to baseline levels, suggesting that humor counteracted the depressed mood.

Besides influencing positive and negative moods, there is experimental evidence that humor-related mirth affects one's general outlook on life. One study found that participants who watched a comedy videotape, as compared to those who viewed a nonhumorous video, reported a significantly greater increase in feelings of hopefulness (Vilaythong, Arnau, Rosen, and Mascaro, 2003). Another experiment suggested that humor can change one's perceptions of a boring task into an interesting one (Dienstbier, 1995). After watching either a comedy or nonhumorous videotape, participants engaged in several repetitive and boring proofreading tasks. Those who had viewed the comedy video, as compared to those in the control group, reported higher levels of energy and elation and rated these tasks as being more challenging and invigorating, although they did not actually achieve better performance on the tasks. Thus, the positive emotion associated with humor seems to make people more hopeful, more energetic, and less susceptible to boredom.

The preceding experiments provided fairly consistent evidence of short-term effects of humor on positive and negative moods and feelings of well-being in the laboratory. Based on these findings, one would expect that exposing people to humorous stimuli repeatedly over a number of weeks or months should result in overall improvements in their prevailing moods and general outlook on life. However, when researchers have investigated longer-term psychological effects of repeated exposure to humorous stimuli over fairly extended time periods, the results have generally been rather disappointing.

In one study, patients with chronic schizophrenia in one ward of a psychiatric hospital were shown 70 comedy movies over a three-month period, while those in another ward were shown an equal number of nonhumorous dramatic movies (Gelkopf, Kreitler, and Sigal, 1993). After these interventions, comparisons were made between the two groups on 21 measures relating to staff-rated and self-rated moods, psychiatric symptoms, physical health symptoms, physiological variables, and cognitive functioning. Significant benefits were found on only six of these variables, most of which involved perceptions of the patients by hospital staff. In particular, the patients who had watched the comedy movies, compared to those in the other group, were rated by the staff as having significantly lower levels of verbal (but not behavioral) hostility, anxiety/depression, and tension, and the patients themselves reported greater perceived social support from the staff. The authors of the study acknowledged that these rather meager findings may have had more to do with the effects of the movies on the perceptions of the hospital staff than on the actual functioning of the patients.

Even fewer psychological benefits of humor were found in other intervention studies. James Rotton and Mark Shats (1996) randomly assigned patients recovering from orthopedic surgery to watch either four feature-length comedy movies, four dramatic but nonhumorous movies, or no movies during the two days postsurgery. The results showed no differences between the humorous and non-humorous movie conditions in levels of self-rated emotional distress and pain over the two days. However, both of the movie-watching groups reported less distress and pain than did those in the no-movie control condition, indicating a beneficial effect of watching movies of any kind, but no particular benefit of humor.

Similarly, in a study of elderly residents of a long-term care facility, no significant differences in self-reported prevailing moods were found after six weeks of watching humorous versus nonhumorous feature-length movies three days per week, although both groups showed equal improvements in mood over the course of the study (E. R. Adams and McGuire, 1986). Finally, in an experiment in which undergraduate participants were randomly assigned to six weekly 1½-hour sessions of either laughter-induction exercises, relaxation training, or didactic health education presentations, the laughter-induction sessions were found to be no more effective than the nonhumorous health education lectures, and significantly less effective than the relaxation sessions, in reducing total mood disturbance and anxiety (White and Camarena, 1989).

In summary, although the experimental laboratory research indicates that humor and laughter have beneficial short-term mood effects, there is little evidence of longer-term psychological benefits of repeated exposure to humorous movies or participation in laughter sessions over a period of days or weeks. These findings raise questions about the benefits of humor interventions such as those provided by laughter clubs, in which members meet regularly to engage in laughter-induction exercises (Kataria, 2002).

Although the research in this area is still quite limited, the evidence to date suggests that simply laughing for an hour or two a few times a week has little lasting

effect on individuals' overall well-being. This may be because the humor is not integrated into the participants' day-to-day experiences. Perhaps such interventions would have greater benefits if they were designed to increase the frequency of humor and laughter arising spontaneously during people's everyday social interactions, influencing the way they respond to ongoing life experiences, and thus contributing to more effective emotion regulation. This would presumably require training people how to take a more humorous perspective on their daily experiences and to produce humor in their interactions with others.

However, very little research has investigated the degree to which people can actually be taught to increase their tendency to engage in humor in the course of their daily lives. In the only published study of this kind, Ofra Nevo and her colleagues evaluated the effectiveness of a seven-week, 21-hour training program for increasing sense of humor in high school teachers, but found only limited evidence of success (Nevo, Aharonson, and Klingman, 1998). The program led to increased peer ratings of humor production and appreciation, as well as more positive attitudes toward humor in the participants, but it did not improve their ability to produce humor, as assessed by tests of humor creativity, or their scores on self-report humor measures. Unfortunately, the effects of the intervention on psychological well-being were not examined. In view of the efforts being made by some health care professionals to promote mental and physical health by means of various interventions designed to improve people's sense of humor (e.g., McGhee, 1999), there is clearly a need for further research to determine whether it is even possible to change the quantity or quality of people's everyday use of humor.

### Correlational Studies of Trait Humor and Emotional Well-Being

If humor in general is beneficial to psychological well-being, then individuals who engage in humor more frequently in their everyday lives (i.e., those with a greater sense of humor) should tend to be generally less depressed, anxious, and pessimistic, less likely to experience burnout and to develop psychiatric disorders, and they should have greater self-esteem, optimism, and overall feelings of well-being. Numerous studies have investigated these hypotheses by examining correlations between individuals' scores on various trait measures of sense of humor and a variety of measures of emotional and psychological well-being.

Studies of university students using the Coping Humor Scale (CHS), Situational Humor Response Questionnaire (SHRQ), and Sense of Humor Questionnaire Metamessage Sensitivity (SHQ-M) and Liking of Humor (SHQ-L) scales (discussed in Chapter 7) have found moderate negative correlations between some (but not all) of these humor scales and measures of neuroticism, anxiety, and depression, and positive correlations with self-esteem (Deaner and McConatha, 1993; Kuiper and Borowicz-Sibenik, 2005; Kuiper and Martin, 1993). Which humor scales are significantly correlated with which well-being measures tends to vary across studies. Research using the Multidimensional Sense of Humor Scale (MSHS) has also found significant but generally weak negative correlations between this humor test and

measures of depression, death anxiety, pessimism, and the tendency to worry about various life concerns (Kelly, 2002; Thorson and Powell, 1993b, 1994; Thorson et al., 1997).

Some studies investigating stress-moderating effects of humor (which will be described in more detail later in this chapter) have also reported significant negative correlations between various self-report humor scales and measures of depression (Anderson and Arnoult, 1989; Nezu, Nezu, and Blissett, 1988; Overholser, 1992; Porterfield, 1987; Safranek and Schill, 1982), mood disturbance (Labott and Martin, 1987; Lefcourt et al., 1995), and emotional burnout (P. S. Fry, 1995). However, some other studies found no simple correlation between sense of humor tests and anxiety (Nezu et al., 1988), mood disturbance (R. A. Martin and Lefcourt, 1983), or positive moods (Kuiper, Martin, and Dance, 1992).

To investigate the association between sense of humor and self-esteem, Nicholas Kuiper and I examined correlations between four humor scales (CHS, SHRQ, SHQ-M, and SHQ-L) and various measures of self-concept in undergraduate participants (Kuiper and Martin, 1993). All four humor tests were found to be positively correlated with a measure of self-esteem. In addition, three of them were negatively related to the discrepancy between participants' actual and ideal self-ratings on a series of 60 self-descriptive adjectives, indicating that those with higher humor scores had a greater congruence between the way they actually perceived themselves and the way they would ideally like to be. In addition, two of the humor tests were significantly related to the temporal stability of self-ratings on these adjectives over a one-month period, indicating that participants with higher humor scores had a more stable self-concept. Finally, participants with higher scores on all four humor scales were significantly less likely to endorse dysfunctional, unrealistic, and perfectionistic self-evaluative standards. Overall, this study indicated that individuals with higher scores on at least some of these humor measures tend to have a more positive, congruent, stable, and realistic self-concept.

In addition to research on university students, a study of elderly residents of assisted living facilities found that those with higher scores on the CHS tended to have higher levels of emotional health, positive mood, and zest for life (Celso, Ebener, and Burkhead, 2003). A study of well-being among noninstitutionalized elderly women and men also found that higher scores on the SHRQ and CHS were significantly associated with better morale but unrelated to overall life satisfaction (Simon, 1990). In addition, a study of the relation between humor and burnout among instructors in a school of nursing found that higher scores on the CHS were related to significantly lower levels of depersonalization and higher levels of perceived personal accomplishment, but were unrelated to emotional exhaustion (Talbot and Lumden, 2000).

Whereas the preceding research was conducted with nonclinical samples, a few studies have also investigated whether psychiatric patients have lower sense of humor scores, on average, than do people without diagnosed psychiatric disorders. One study compared a group of hospitalized adolescent psychiatric patients and a group of normal adolescents and found no differences in their average scores on the CHS or

measures of humor creation ability and humor appreciation, casting some doubt on the benefits of humor for mental health (Freiheit, Overholser, and Lehnert, 1998). Similarly, a study of defensive styles in clinically depressed patients found no difference in humor scores between those who had recently attempted suicide and those who had not (Corruble et al., 2004).

One study did report that hospitalized adult psychiatric patients diagnosed with depression or schizophrenia had significantly lower scores on at least some trait humor measures as compared to scale norms derived from university students (Kuiper et al., 1998). However, it is questionable whether this was an appropriate comparison group, due to differences in age, education level, and social background. Overall, then, although the research on this question is quite limited, there is little evidence that high humor individuals are less likely to have psychiatric disorders than are those with less of a sense of humor. Some clinicians have pointed out that clinically depressed people do not necessarily display less humor than others, but their humor tends to be rather black, cynical, hostile, and excessively self-disparaging (e.g., Kantor, 1992).

Nonetheless, there is some evidence that, within groups of individuals diagnosed with clinical depression, greater emotional disturbance is associated with lower trait humor scores. In the study of hospitalized adolescent psychiatric patients, higher scores on the CHS were associated with lower levels of depression and higher self-esteem, although they were unrelated to feelings of hopelessness (Freiheit et al., 1998). The study of hospitalized adult psychiatric patients found that higher sense of humor scores tended to be associated with lower depression and higher self-esteem and positive moods among the clinically depressed patients (Kuiper et al., 1998). However, sense of humor was unrelated to symptom severity among patients diagnosed with schizophrenia. Another study of humor in hospitalized schizophrenic patients similarly found no relation between scores on the CHS and several self-report and psychiatrist-rated measures of hostility, aggression, and anger (Gelkopf and Sigal, 1995). Thus, although a greater sense of humor seems to be related to lower severity of disturbance in clinically depressed individuals, this does not seem to be the case among persons with schizophrenia.

In the correlational research described so far, the overall evidence for mental health benefits of a sense of humor is not overwhelming. Some correlations have been found between sense of humor, as measured by self-report scales, and various components of emotional well-being, but the associations often tend to be quite weak and the findings have been somewhat inconsistent across studies. Nicholas Kuiper and I (1998a) examined the results of five correlational studies to determine how sense of humor compares with another positive personality characteristic commonly thought to be important for mental health, namely optimism. These studies employed four sense of humor scales (CHS, SHRQ, SHQ-M, and SHQ-L), a test of dispositional optimism, and various measures of psychological well-being. The analyses revealed that higher scores on the sense of humor scales were only weakly associated with greater optimism. In relation to a multidimensional measure of psychological well-being, higher scores on the humor tests were associated with only one subscale assessing personal growth, but they were unrelated to self-acceptance, positive relations



with others, autonomy, environmental mastery, and purpose in life. In contrast, optimism was much more strongly related to all six of these components of psychological well-being.

The humor scales were also almost entirely uncorrelated with a measure of mental health-related assumptions about the world and other people, whereas optimism was significantly related in positive ways to most of these world beliefs. Consistent with other research, the sense of humor scales did show moderate positive correlations with self-esteem, and negative correlations with anxiety, depression, fear of negative evaluations, and social avoidance and distress. However, optimism was more strongly related to all of these well-being measures. Thus, although these sense of humor measures are associated with some aspects of emotional well-being, the correlations appear to be generally weaker and less extensive than are those with other “positive personality” constructs such as optimism.

These rather weak and inconsistent associations between trait measures of sense of humor and well-being can perhaps be explained by research (discussed in Chapter 7) showing that most self-report humor tests load primarily on the general personality factor of extraversion, but only weakly, if at all, on the neuroticism factor (Köhler and Ruch, 1996; Ruch, 1994). Extraversion has to do with the general tendency to experience positive emotions, as well as traits such as sociable, lively, and active. On the other hand, neuroticism, which is unrelated to extraversion, involves emotional instability, moodiness, irritability, and the tendency to experience negative emotions, such as depression, anxiety, and hostility. Not surprisingly, most measures of psychological well-being load primarily (negatively) on the neuroticism factor (DeNeve, 1999).

The fact that the two broad personality dimensions of extraversion and neuroticism are uncorrelated with each other may explain why the sense of humor measures (relating primarily to extraversion) tend to be only weakly associated with well-being measures (relating mainly to neuroticism). Since dispositional optimism is more strongly (inversely) associated with neuroticism than are the humor measures, it also tends to correlate more strongly with well-being measures. This begs the question of whether there are some dimensions of humor that are more strongly associated with neuroticism, either negatively or positively, which are not well measured by the self-report humor tests used in the research discussed so far. This question is addressed in the next section.

### Distinguishing Potentially Healthy and Unhealthy Humor Styles

People use humor in their interactions with others in many different ways and for different purposes. As noted in Chapter 5, humor serves numerous interpersonal functions, some of which may contribute to greater social cohesiveness and enhanced communication between people, whereas others may be more coercive, disparaging, or ingratiating. Although overall sense of humor may be weakly related to emotional health, as suggested by research described in the previous section, perhaps some of

the ways people use humor are more strongly associated with well-being, whereas other forms of humor may even be associated with poorer psychological health.

This way of thinking about the connection between humor and mental health is consistent with the views of psychologists writing about this topic in the past. For example, when Sigmund Freud (1928) referred to humor as the “highest of the defense mechanisms” (p. 216) and described it as “something fine and elevating” (p. 217), he was not speaking about humor in the broad sense that we generally associate with it today, but instead he was giving it a narrow meaning, consistent with the terminology of the nineteenth century. As noted in Chapter 1, humor in this sense referred exclusively to a sympathetic, tolerant, and benevolent form of amusement, and was distinguished from wit, which was viewed as more sarcastic, biting, and cruel (Wickberg, 1998).

In a similar way, psychologists like Abraham Maslow (1954), Gordon Allport (1961), and Walter O’Connell (1976) suggested that especially well-adjusted individuals are characterized by a particular style of humor that is nonhostile, philosophical, and self-deprecating while remaining self-accepting. These authors viewed this healthy form of humor as relatively rare, in contrast with most of the humor occurring in everyday social interactions and in the media. Interestingly, they also suggested that healthy forms of humor are not necessarily extremely funny, being more likely to trigger a chuckle than a hearty laugh. Maslow (1954) even suggested that the particularly well-adjusted people that he characterized as “self-actualizing” would likely be perceived by the average person as “rather on the sober and serious side” (p. 223).

These ideas suggest that psychological health relates not only to the *presence* of certain kinds of adaptive humor but also to the *absence* of other more unhealthy forms of amusement. Rather than assuming that humor in general is beneficial for mental health and well-being, as most recent researchers seem to have done, it may therefore be important to return to earlier views which made a distinction between beneficial and detrimental forms of humor.

This view of humor as being potentially detrimental as well as beneficial to mental health was the rationale for our development of the Humor Styles Questionnaire (HSQ; R. A. Martin et al., 2003), which I described in Chapter 7. In developing this measure, we identified two styles of humor that have been discussed in the literature as being potentially unhealthy: one involving the use of humor to enhance the self at the expense of others, and the other involving the use of humor to gain approval and attention from others at the expense of one’s own psychological needs. We hypothesized that these two humor styles may capture some of the forms of humor that psychologists like Allport and Maslow viewed as less likely to be found in people who are particularly psychologically healthy.

The first of these, *aggressive humor*, is the tendency to use humor for the purpose of criticizing or manipulating others, as in sarcasm, teasing, ridicule, derision, or disparagement humor (e.g., “If someone makes a mistake, I will often tease them about it”), as well as the use of potentially offensive (e.g., racist or sexist) forms of humor.

It also includes the compulsive expression of humor even when it is socially inappropriate (e.g., “Sometimes I think of something that is so funny that I can’t stop myself from saying it, even if it is not appropriate for the situation”). Most of us know people who tend to use humor in these sorts of aggressive and domineering ways.

The other potentially unhealthy style, *self-defeating humor*, involves the use of humor to ingratiate oneself with others, attempts to amuse others by doing or saying funny things at one’s own expense, excessively self-disparaging humor, and laughing along with others when being ridiculed or disparaged (e.g., “I often try to make people like or accept me more by saying something funny about my own weaknesses, blunders, or faults”). It also involves the use of humor as a form of defensive denial (Marcus, 1990), to hide one’s underlying negative feelings or avoid dealing constructively with problems (“If I am having problems or feeling unhappy, I often cover it up by joking around, so that even my closest friends don’t know how I really feel”).

A prominent example of what we consider to be the use of self-defeating humor was Chris Farley, a popular American comedian in the early 1990s who honed his zany comedic skills as an overweight child with a desperate need to be liked by others. Despite the outstanding success that he achieved as a young adult through his hilarious and rather compulsive sense of humor, he seemed to harbor a deep self-loathing, destroying himself at an early age through alcohol, drugs, and overeating. Rather than contributing to effective coping, his humor seemed to be a way of denying the severity of his problems and deflecting the concerns of his friends. John Belushi, who met a similar end in the midst of a brilliant comedy career, seems to be another example of this self-defeating humor style. Interestingly, in our research with the HSQ, aggressive and self-defeating humor turned out to be significantly positively correlated with each other, indicating that people who use one potentially unhealthy style tend to use the other as well.

We also identified two styles of humor that we thought might be positively associated with psychological well-being, one having to do with the use of humor to promote positive interpersonal relationships and the other with the use of humor to cope with stress and regulate emotions. The first of these, *affiliative humor*, refers to the tendency to say funny things, to tell jokes, and to engage in spontaneous witty banter, in order to amuse others, to facilitate relationships, and to reduce interpersonal tensions (e.g., “I enjoy making people laugh”; “I don’t have to work very hard at making other people laugh—I seem to be a naturally humorous person”). We viewed this as an essentially nonhostile, tolerant use of humor that is affirming of self and others and presumably enhances interpersonal cohesiveness. However, research with the HSQ has shown that, at least in North American samples, affiliative humor turns out to be weakly correlated with aggressive humor, suggesting that it may tap into the use of teasing, which may at times be friendly and prosocial, but also risks becoming aggressive.

The second presumably healthy humor style is *self-enhancing humor*, which refers to the tendency to be frequently amused by the incongruities of life, to maintain a humorous perspective even in the face of stress or adversity, and to use humor as an

emotion-regulation mechanism (e.g., "My humorous outlook on life keeps me from getting overly upset or depressed about things"). This humor style is closely related to the construct assessed by the earlier Coping Humor Scale. Subsequent research has found that self-enhancing humor tends to be fairly strongly related to affiliative humor, a finding that emphasizes the essentially social nature of humor, but it is unrelated to aggressive and self-defeating humor, suggesting that this may be the healthiest of the four humor styles. We consider it to be the closest of the four to the traditional, narrowly defined concept of humor, which was viewed by Freud (1928) as a healthy defense mechanism or coping style.

Research examining correlations between the subscales of the HSQ and previous self-report humor scales provided support for our view that this new measure taps into distinct dimensions of humor that are not well differentiated (or not even assessed at all) by the earlier measures (R. A. Martin et al., 2003). For example, the CHS, although quite strongly related to self-enhancing (as well as affiliative) humor, has also been found to be correlated with aggressive humor, suggesting that it may not be as pure a measure of positive humor uses as the self-enhancing humor scale. Worse still, the MSHS was found to be positively correlated with all four HSQ scales, indicating that it taps into potentially unhealthy aggressive and self-defeating humor as well as potentially healthy forms of humor. This may account for the generally weak correlations with well-being measures found in research using the MSHS.

Other humor measures such as the SHRQ, SHQ, and Cheerfulness scale of the State-Trait Cheerfulness Inventory (STCI-T) were found to be positively correlated with affiliative and self-enhancing humor, but unrelated to aggressive and self-defeating humor. Thus, although there is less evidence that these earlier humor measures capture unhealthy aspects of humor, the addition of the two negative forms of humor in the HSQ might be useful for exploring these more negative aspects of humor that have not been assessed by previous scales. Interestingly, with regard to gender, whereas negligible differences have been found between men and women on the two presumably healthy styles of humor, men on average tend to have higher scores on the two potentially negative styles, suggesting that men and women do not differ in their healthy uses of humor, but men may be more likely to use humor in unhealthy ways (R. A. Martin et al., 2003).

Our initial studies with the HSQ provided general support for our view that these different humor styles are differentially related to psychological health and well-being (R. A. Martin et al., 2003). Affiliative and self-enhancing humor were found to be negatively correlated with anxiety and depression, and positively correlated with self-esteem and a measure of overall psychological well-being, the correlations with self-enhancing humor being somewhat stronger than those with affiliative humor. In contrast, higher scores on self-defeating humor were found to be associated with greater anxiety, depression, and psychiatric symptoms, and lower self-esteem and overall well-being. Aggressive and self-defeating humor styles were also both related to hostility and aggression. Thus, as expected, less use of these negative humor styles (particularly self-defeating humor) seems to be related to more healthy psychological functioning.

When the four HSQ scales were entered together into regression equations to predict the various measures of emotional well-being, sizable multiple correlations were found (averaging about .50). These correlations were considerably stronger than those typically found in earlier studies of humor and well-being, indicating that, by combining uses of humor that are negatively related to well-being with those that are positively related, we were able to account for a greater proportion of the variance in well-being variables. With regard to the broad personality dimension of neuroticism, affiliative humor was found to be unrelated, whereas self-enhancing humor was negatively related, and both aggressive and self-defeating humor were positively related to this personality factor. Thus, as expected, the different HSQ scales seem to differentiate styles of humor that are positively related, negatively related, and neutral with regard to neuroticism, suggesting that emotional stability is associated not just with the *presence* of certain styles of humor, but also with the *absence* of other styles. Humor appears to be neither inherently healthy nor unhealthy; its relation to mental health depends on how it is used in everyday life.

Several additional recent studies with the HSQ have added to these findings. Nicholas Kuiper and his colleagues (2004) found that higher scores on self-enhancing humor were associated with lower levels of depression, anxiety, and negative affect, and higher levels of self-esteem and positive affect. The pattern of correlations with affiliative humor was similar, but generally weaker. In contrast, self-defeating humor showed the exact opposite pattern of correlations: greater use of this type of humor was associated with higher levels of depression, anxiety, and negative affect, and lower levels of self-esteem. Aggressive humor, however, was unrelated to the emotional well-being measures. In another study, Vassilis Saroglou and Christel Scariot (2002) administered a French translation of the HSQ to Belgian university and high school students, and found that individuals with higher self-esteem reported greater use of affiliative humor and lower use of self-defeating humor. Self-defeating and aggressive humor were also both associated with lower levels of motivation for academic success.

Paul Frewen and his colleagues similarly found that individuals who reported higher levels of depressed moods tended to report lower use of self-enhancing and (to a lesser degree) affiliative humor, and greater use of self-defeating humor (Frewen, Brinker, Martin, and Dozois, in press). This study also looked at measures of sociotropy and autonomy, two personality dimensions that have been found to be vulnerability factors for depression. *Sociotropy* refers to the degree to which one's sense of self-worth is based excessively on one's perceived likableness to others, making one socially dependent and vulnerable to depression when experiencing interpersonal criticism or rejection. On the other hand, *autonomy* has to do with the degree to which one is invested in preserving independence and defining self-worth in terms of personal achievement, and it is associated with increased vulnerability to depression when people experience achievement-related failures. After controlling for current depression levels, sociotropy was found to be negatively related to self-enhancing humor and positively related to self-defeating humor. Autonomy, in turn, was associated with both self-defeating and aggressive humor. Thus, negative forms of humor appear to

be associated with personality traits that make people vulnerable to depression. On the other hand, self-enhancing humor, being negatively related to sociotropy, may serve to protect the individual from becoming depressed during experiences of social rejection.

Previous research has shown that individuals who engage in the cognitive style of rumination (i.e., those who tend to repeatedly go over negative events and feelings in their mind) are particularly vulnerable to depression. A recent study of university students using the HSQ found that individuals with higher scores on self-enhancing and (more weakly) affiliative humor are less likely to engage in rumination (M. L. Olson et al., 2005). Moreover, this study found evidence that these two positive humor styles can buffer the effect of rumination on depression. In particular, participants with lower scores on these two humor styles showed a strong correlation between their frequency of rumination and dysphoric mood symptoms, whereas those with higher humor scores did not show any association between these two variables.

Overall, the correlational findings obtained so far suggest that self-enhancing humor is particularly related in a positive way to emotional well-being, supporting our view that this is an especially healthy humor style. For its part, affiliative humor seems to be somewhat more weakly related to emotional health, producing correlations that are more in line with those found with previous trait humor measures. In contrast, self-defeating humor is consistently negatively associated with well-being measures, indicating that this use of humor to ingratiate oneself with others at one's own expense and deny the presence of negative emotion is particularly related to unhealthy functioning. On the other hand, aggressive humor appears to be largely unrelated to overall psychological well-being. Although earlier theorists such as Freud, Maslow, and Allport seemed to view aggressive forms of humor as being particularly problematic for overall psychological health, our research findings do not provide much support for this view. As we will see later in this chapter, however, aggressive humor seems to play a particularly negative role in regard to the quality of one's close interpersonal relationships.

Before leaving this topic, it is important to note that all of these findings are correlational, and they therefore do not permit us to determine the direction of causality between sense of humor and mental health. For example, the frequent use of self-defeating humor may cause people to be more prone to depression, have lower self-esteem, and so on, but it is equally possible that people engage in this humor style as a consequence of having low levels of psychological well-being. Similarly, although the frequent use of self-enhancing humor may cause people to be less prone to emotional disturbance, it is also possible that being more psychologically healthy causes people to use humor in this way. It may also be the case that humor styles and components of psychological health have no causal connection at all, but are both consequences of a third variable, such as neuroticism. The most we can say at the present time is that emotional well-being tends to be associated with the presence of self-enhancing and affiliative uses of humor and the absence of self-defeating humor.



One way for researchers to address these questions of causality may be through the use of daily experience methods or event-sampling procedures, in which the use of different styles of humor as well as various aspects of psychological well-being are assessed repeatedly in individuals over a period of days or weeks (Reis and Gable, 2000). By examining time-lagged associations, it may be possible to determine whether more frequent use of particular styles of humor is followed or preceded by changes in well-being over hours or days, providing some indication of the direction of causality in these associations. I will have more to say about these sorts of research methods later in this chapter.

## HUMOR, STRESS, AND COPING

A second general way humor may potentially be beneficial to mental (as well as physical) health has to do with its use in coping with stressful life experiences. A considerable amount of research has shown that high levels of stressful events, such as natural disasters, relationship conflicts, work pressures, and financial problems, can have adverse effects on one's mental and physical health, producing such negative outcomes as emotional disturbance, cognitive inefficiency, and behavioral impairments (A. K. Johnson and Anderson, 1990; Sanderson, 2004).

However, these sorts of negative outcomes of stress are not inevitable. Based on the theoretical framework of Richard Lazarus and his colleagues (e.g., Lazarus and Folkman, 1984), a great deal of research has shown that psychological appraisal and coping processes play an important role in determining whether or not potentially stressful life experiences result in adverse physiological and psychological outcomes. Over the years, many theorists have suggested that the ability to respond with humor in the face of stress and adversity may be an important and effective coping skill (Freud, 1928; Lefcourt, 2001; Lefcourt and Martin, 1986). Norman Dixon (1980) even suggested that humor may have evolved in humans specifically for this purpose.

Many authors have noted that humor, because it inherently involves incongruity and multiple interpretations, provides a way for individuals to shift perspective on a stressful situation, reappraising it from a new and less-threatening point of view. As a consequence of this humorous reappraisal, the situation becomes less stressful and more manageable, and the individual is less likely to experience a stress response (Dixon, 1980). Walter O'Connell (1976) described humorous people as being "skilled in rapid perceptual-cognitive switches in frames of reference" (p. 327), an ability that presumably enables them to reappraise a problem situation, distance themselves from its immediate threat, and thereby reduce the often paralyzing feelings of anxiety and helplessness. Similarly, Rollo May (1953) stated that humor has the function of "preserving the self . . . It is the healthy way of feeling a 'distance' between one's self and the problem, a way of standing off and looking at one's problem with perspective" (p. 54).

As noted in Chapter 2, superiority theory, which views humor as a form of playful aggression, can also be seen as a basis for conceptualizing humor as a coping mechanism. By poking fun at other people and situations that would normally be viewed as threatening or constricting, one is able to gain a sense of liberation and freedom from threat and thereby experience positive feelings of well-being and efficacy. As Horace Kallen (1968) wrote, "I laugh at that which has endangered or degraded or has fought to suppress, enslave, or destroy what I cherish and has failed. My laughter signalizes its failure and my own liberation" (p. 59). Other authors, taking an existential approach, have emphasized the sense of liberation, mastery, and self-respect provided by humor in the face of adversity (Knox, 1951; Mindess, 1971). Thus, as a means of asserting one's superiority through playful aggression, humor is a way of refusing to be overcome by the people and situations that threaten one's well-being. At the same time, though, with the use of aggressive forms of humor in coping there is a risk of cynicism, hostility, and impairment of social relationships.

Although coping humor may at times involve an aggressive element, some theorists have also emphasized the importance of being able to laugh at one's own faults, failures, and limitations, while maintaining a positive sense of self-esteem. Gordon Allport (1950) stated, for example, that "the neurotic who learns to laugh at himself may be on the way to self-management, perhaps to cure" (p. 280). By not taking oneself too seriously, one is able to let go of excessively perfectionistic expectations while remaining motivated to achieve realistic goals. There is an important distinction, however, between self-deprecating humor based on a fundamental sense of self-worth and excessively self-disparaging humor arising from a negative self-concept, as measured by the self-defeating humor scale of the HSQ.

### Experimental Investigations of Humor as a Stress Moderator

A number of experiments have been conducted to investigate the effectiveness of a humor manipulation in mitigating the emotional or psychophysiological effects of mildly stressful laboratory stressors. Herbert Lefcourt and I (Lefcourt and Martin, 1986) instructed university students to make up either a humorous narrative, a non-humorous "intellectual" narrative, or no narrative while they were watching a silent film entitled *Subincision*, which depicts a rather gory and evidently painful circumcision ritual performed on adolescent boys in a tribe of Australian aborigines. The results revealed that, among female participants, those who created a humorous narrative (as compared to those in the other two conditions) reported less negative emotions and displayed fewer behavioral indicators of distress (e.g., averted gaze, grimacing, hand-rubbing) while watching the film, providing evidence of a stress-moderating effect of humor. The male participants, however, showed minimal distress in all three conditions, suggesting that the film was not very stressful for them.

A similar methodology was used by Michelle Newman and Arthur Stone (1996) in an experiment in which male college students were instructed to create either a

humorous or a serious narrative while watching a film depicting gruesome accidents in a lumber mill. Compared to those in the serious narrative condition, the participants in the humorous condition reported less emotional distress and had lower skin conductance and heart rate and higher skin temperature for up to 15 minutes following the film, indicating a reduced stress response. Taken together, these studies provided some evidence that participants who actively create humor to reframe a potentially stressful situation have a lower stress response, as measured by self-rated moods, behaviors, and physiological reactions (see also Lehman et al., 2001).

Instead of having participants create humorous narratives during stressful situations in the laboratory, other researchers have used comedy videotapes as a humor manipulation. Arnie Cann and his colleagues showed male and female participants either a humorous stand-up comedy video, a nonhumorous nature video, or no video, after they had viewed a stressful segment of a movie depicting an airplane crash (Cann, Holt, and Calhoun, 1999). Analyses of self-rated moods following the intervention revealed that the humorous video enhanced positive emotions but did not reduce anxiety relative to the nonhumorous video.

In a subsequent experiment, Cann and his colleagues compared the effects of exposure to a humorous versus a neutral videotape either before or after participants watched a stressful film depicting scenes of death (Cann, Calhoun, and Nance, 2000). Regardless of whether the intervention preceded or followed the stressful film, the humorous video produced lower ratings of depression and anger and higher positive moods compared to the neutral video. For anxiety-related moods, however, the humorous intervention was only effective when it was presented before the stressful film rather than after it. The authors suggested that the elevated positive emotions associated with humor may serve to counteract feelings of depression and anger, whereas the effects of humor on anxiety may be more cognitively mediated: humor preceding the stressor might work as a cognitive prime, changing the way subsequent events are interpreted and thereby reducing subsequent anxiety.

In addition to the use of emotionally distressing films, researchers interested in the effects of humor on stress have employed various types of frustrating tasks, such as unsolvable anagrams and difficult mental arithmetic problems, to produce mild stress in the laboratory. One study found that exposure to humorous cartoons mitigated the performance-impairing effect of working on unsolvable anagrams (Trice, 1985). Another experiment similarly found that exposure to a humorous videotape, compared to a nonhumorous video, was effective in reducing anxiety following an unsolvable anagram task, but only among male participants (Abel and Maxwell, 2002). However, a study using a 10-minute mental arithmetic task to induce a mild state of anxiety found no differences among comedy, relaxation, and neutral videotapes on state anxiety, heart rate, or skin conductance (White and Winzelberg, 1992). Although this study failed to demonstrate a stress-moderating effect of humor, this may have been due to the minimally stressful nature of the arithmetic task.

In an experiment by Nancy Yovetich and her colleagues, stress was induced by falsely informing participants that they would receive a painful electric shock 12 minutes later (Yovetich, Dale, and Hudak, 1990). While waiting for the supposed

shock, the participants listened either to a humorous audiotape, a nonhumorous tape, or no tape. Overall, the participants showed increasing levels of self-rated anxiety and heart rate across the 12-minute period, indicating increased anticipatory anxiety. However, those in the humorous tape condition showed a less steep increase in self-reported anxiety (but no difference in heart rate) as compared to those in the other two conditions, providing some evidence of a stress-buffering effect of humor.

In summary, although the results have not always replicated, these experimental laboratory studies provide some support for the hypothesized stress-buffering effects of humor. When participants actively create humor during mildly stressful experiences, or when they are exposed to comedy before or after such events, they tend to report more positive and less negative moods and show less stress-related physiological arousal as compared to participants in control groups. These studies extend the findings of the laboratory experiments described earlier, indicating that the general effects of humor on moods also occur in mildly stressful conditions.

Although these lab experiments allow researchers to identify the direction of causality between humor and stress responses, their rather artificial nature makes it difficult to generalize the findings to everyday experiences. In particular, the stressors used in these experiments are much milder and of shorter duration than real-life stressors, and the humor manipulations with solitary subjects in the laboratory are only an approximation of the way humor is typically experienced in everyday life. It is therefore important to augment these laboratory findings with more naturalistic types of research examining the use of humor in coping with real-life stressors. I will discuss this sort of research in the following sections.

### Correlational Studies of Sense of Humor and Coping Styles

As we saw earlier, theorists have suggested a number of possible ways in which humor might serve to mitigate the effects of stress. For example, taking a humorous perspective on a stressful situation might enable individuals to alter their frame of reference, changing appraisals of negative threat into ones of positive challenge, and increasing feelings of mastery and control over the situation. Other potential coping-related functions of humor include enhancing social support, denying reality, venting aggressive feelings, and providing distraction. A number of studies have explored these different hypotheses by examining correlations between various sense of humor scales and measures assessing the types of cognitive appraisals and coping styles participants typically use when dealing with stress.

In one study, Nick Kuiper and colleagues (1993) examined the relationship between the Coping Humor Scale and university students' cognitive appraisals of their first midterm examination in an Introductory Psychology course. The results showed that, prior to the exam, students with higher scores on the CHS appraised it as more of a positive challenge rather than a negative threat. Following the exam, those with high CHS scores reappraised the exam as being more important and positively challenging if they had done well on it, but lowered their importance and challenge ratings if they had done poorly. They also adjusted their expectations of how well they would

do on the next exam in a realistic manner, based on their performance on the previous one. In contrast, those with low CHS scores rated the exam as being more important if they did poorly rather than well on it, and failed to adjust their expectations about the next exam according to their past performance.

Higher CHS scores were also found to be associated with lower scores on a measure of dysfunctional attitudes involving unrealistic and perfectionistic expectations about achievement and social relationships. These findings provide some support for the idea that one way a sense of humor may relate to better coping with stress has to do with the types of cognitive appraisals that individuals make about potential stressors. Those with a greater tendency to use humor in coping with stress appear to appraise potentially stressful situations as more challenging rather than threatening, and to evaluate their own performance and adjust their expectations for future performance in a less perfectionistic and more realistic and self-protective manner.

The relation between sense of humor and appraisal processes was also investigated in other research by Nicholas Kuiper and his colleagues (Kuiper, McKenzie, and Belanger, 1995). In one study they had participants complete a negative life events measure for the past month, and then asked them questions about the degree to which they were able to change their perspective or point of view when attempting to cope with these stressful events. Individuals with high scores on the CHS, in comparison with low scorers, reported that they were more likely to make a conscious effort to view their problems from alternate perspectives and were better able to do so, and that these changes in perspective resulted in more positive perceptions of the events. In a second study, they examined subjects' cognitive appraisals while completing a challenging picture-drawing task. Participants with higher sense of humor scores appraised the task as being more of a positive challenge and less of a negative threat and reported putting more effort into accomplishing it, providing further evidence that individual differences in humor are related to different ways of appraising potentially stressful events.

Several studies have also examined correlations between sense of humor scales and measures of people's typical styles of coping with stress. One study (Kuiper et al., 1993) found that the CHS was positively correlated with both emotional distancing (e.g., "Don't let it get to me;" "Refuse to think too much about it") and a confrontive coping style (e.g., "Stand my ground and fight for what I want"), suggesting that the use of humor in coping involves both emotional self-protection and active confrontation of problems. A study of humor and coping in women business executives (P. S. Fry, 1995) found that the CHS and SHRQ were positively associated with both emotion-focused (i.e., regulation of one's emotional reactions) and existential (i.e., taking a detached, philosophical approach to problems) coping orientations. Specific coping strategies associated with humor included seeking practical and emotional social support, expressiveness (venting emotions), tension-reduction (e.g., use of relaxation techniques), and acceptance ("Accept each day as it comes;" "No matter how bad things are, they could always be worse").

In another study examining correlations between several self-report humor scales (CHS, SHRQ, and SHQ) and a measure of defensive coping styles, these sense of humor measures were generally found to be related to the coping styles of minimization (denial), replacement (sublimation), substitution (displacement), and reversal (reaction formation), although the pattern of correlations differed for different humor scales and for males and females (Rim, 1988). Finally, a study using the MSHS found that higher scores on this humor scale were associated with greater use of planful problem solving, positive reappraisal, distancing oneself, and emotional self-management (Abel, 2002).

Overall, these studies suggest that high-humor individuals tend to have more realistic and flexible and less threat-related cognitive appraisals of potentially stressful situations, and that they tend to deal with stress using a variety of coping strategies and defenses, particularly those involving self-protective cognitive reframing and emotional management. Once again, however, it is important to note that the correlational approach of these studies does not permit us to determine the direction of causality. It may be that humor directly contributes to these cognitive appraisal and coping styles, but it is also possible that humor is simply a by-product of these styles of coping, or that both humor and associated coping styles are independent consequences of some other traits (e.g., extraversion). Also, this trait approach to measuring humor and coping styles does not provide much insight into the actual processes involved when humor is used in coping, or the context in which this occurs.

### Humor in Coping with Specific Life Stressors

There is a great deal of anecdotal evidence, as well as some empirical research, indicating that humor can be beneficial for emotional survival in dealing with extreme and uncontrollable stressful situations such as prisoner of war and concentration camps. One study evaluated the psychological health of 82 surviving crew members of the *USS Pueblo* shortly after their release from 11 months of imprisonment in North Korea in 1969 (C. V. Ford and Spaulding, 1973). Humor was one of several coping strategies that were found to be significantly associated with better psychological adjustment. Coping humor in this stressful situation took the form of joking about the characteristics of captors, giving funny nicknames to the guards and fellow prisoners, and telling jokes to one another.

More recently, Linda Henman (2001) reported a qualitative study based on interviews with more than 60 American servicemen who had been prisoners of war (POWs) in Vietnam. Despite being in captivity for over seven years and enduring isolation, starvation, torture, and beatings, these individuals showed a remarkable level of adjustment. When asked about their methods of coping, most of the participants emphasized the importance of humor in maintaining their resilience. Humor was described as a way of eliciting positive emotions, maintaining group cohesion and morale, and fighting back at the captors. By cracking jokes about the guards and about the



hardships they endured, the POWs were able to gain a sense of mastery and invincibility in a situation over which they had no real control. It is worth noting that the use of humor in coping occurred primarily during interactions among the POWs, rather than while they were alone. One participant observed that “the larger the group, the more lighthearted things were. The smaller the group, the more intense things were” (p. 86). Some of the prisoners even risked torture to tell a joke through the walls to another prisoner who needed cheering up.

The importance of humor in coping with atrocities has also been emphasized by concentration camp survivors. In recounting his experiences as a prisoner in a Nazi concentration camp during World War II, Viktor Frankl (1984) described humor as “another of the soul’s weapons in the fight for self-preservation” (p. 63). Recognizing the importance of humor in maintaining morale, he and his fellow prisoners agreed to tell each other amusing stories every day. One favorite form of humor involved joking about the ways their experience of imprisonment might affect them after their liberation. For example, one prisoner joked that at future dinner engagements they might forget themselves and ask the hostess to ladle the soup from the bottom of the pot to get the treasured vegetables instead of the watery broth on top. Their jokes also included a good deal of mockery of the guards, which gave them a feeling of superiority over their captors. Such uses of humor were also depicted in Roberto Benigni’s 1997 movie, *Life is Beautiful*, in which a Jewish father engages in humorous antics to shield his son from the horrors of a Nazi death camp, denying reality by pretending that the Holocaust is nothing but a game in which the winner gets to ride in a tank.

Although humor appears to be an effective way of coping with the extreme and uncontrollable horror of being a prisoner of war, research on the use of humor in less severe and more controllable stressful situations has been less clear-cut. For example, studies investigating the use of humor in coping with high-stress occupations have produced mixed results. One study provided evidence for the effectiveness of humor in coping with stress among soldiers undergoing an intensive combat training course in the Israeli army (Bizi, Keinan, and Beit-Hallahmi, 1988). Humor production and appreciation were assessed using both self-report measures and peer ratings, and the quality of coping under stress was evaluated using ratings by peers and commanding officers. Greater peer-rated (but not self-rated) humor was found to be significantly related to higher peer ratings of performance under stress and higher commander ratings of initiative and responsibility. This was especially true for active humor (generating joking comments rather than merely laughing at others’ humor). These findings were interpreted as providing support for the view that a sense of humor is associated with better coping during stressful military training.

In contrast, however, a recent study of health care staff working with AIDS and cancer patients suggested that the use of humor as a coping strategy may actually have *negative* rather than positive consequences (Dorzi et al., 2003). The coping styles of 528 physicians and nurses in 20 hospitals in northern Italy were assessed using a measure called the Coping Orientations to Problem Experiences (COPE) (Carver, Scheier, and Weintraub, 1989), which contains a scale assessing the use of humor in

coping. In addition, the participants completed measures of anxiety, depression, and emotional burnout. Surprisingly, the data analyses revealed that higher levels of humor in coping were associated with *greater* emotional exhaustion and feelings of depersonalization. Since this study was correlational, the direction of causality between humor use and burnout is unclear. Nonetheless, the results cast some doubt on the overall effectiveness of humor in coping in a high-stress health care setting.

Some qualitative research on the use of humor in stressful occupations helps to shed some light on these puzzling findings. Using a participant observer approach, Joan Sayre (2001) observed the use of humor among staff in a psychiatric unit. She found that it could be divided into two broad categories, a fairly benign “whimsical” type (incongruous witticisms, bravado, and self-denigrating humor) and a more aggressive “sarcastic” type (discounting, malicious, and gallows humor). Sarcastic humor was more common than whimsical humor among the staff, and most of the humor was directed at making fun of patient behaviors when out of earshot of the patients. Although the relative benefits of the different types of humor were not directly tested in this study, the author suggested that, whereas some of these uses of humor seemed to be beneficial in managing anxiety in a socially acceptable manner, the more aggressive forms appeared to promote negative, cynical attitudes toward patients, which might actually have impaired therapeutic effectiveness and contributed to morale problems.

A similarly mixed view of the benefits of humor emerged in a qualitative study in which emergency personnel were interviewed about their methods of coping with the stress of handling dead bodies following major disasters such as airplane crashes and explosions (McCarroll et al., 1993). Although some participants viewed humor as an important tension reducer, others expressed reservations about its appropriateness. Similar reservations were also expressed in a review of research relating to the potential benefits and risks of the use of humor for coping in emergency work (C. Moran and Massam, 1997). Overall, then, the use of humor in coping with work-related stress seems to have mixed benefits. As we have seen earlier in this chapter, probably not all forms of humor are beneficial for coping; instead, whether or not it contributes to better coping likely depends on the style or type of humor used.

Research on the use of humor in coping with life-threatening illness has also yielded somewhat equivocal findings. In one study, 59 women who had been diagnosed with breast cancer were asked to complete measures of moods and coping strategies (using the COPE) before surgery, immediately after surgery, and at 3-, 6-, and 12-month follow-ups (Carver et al., 1993). Greater use of humor in coping was found to be associated with reduced emotional distress, but this relation was significant at only two of the five assessment times (three-month and six-month follow-up).

In a larger study of coping with breast cancer, 236 patients completed the COPE as well as measures of emotional distress (Culver et al., 2004). No significant correlations were found between humor in coping and any of the measures of emotional distress, raising questions about the overall effectiveness of humor as a means of

coping with breast cancer. However, a limitation of both of these studies, as well as some of the research on coping with work-related stress described earlier, was the use of the COPE humor scale. This test has been shown to be positively correlated with all four subscales of the Humor Styles Questionnaire, indicating that it does not distinguish between potentially beneficial affiliative and self-enhancing humor and potentially detrimental aggressive and self-defeating humor styles (R. A. Martin et al., 2003).

Using observational methods instead of relying on self-report humor scales, a longitudinal study of bereavement by George Bonanno and Dacher Keltner (1997) provided evidence for a beneficial effect of benign humor in coping with the death of one's spouse. Men and women who had lost their spouse six months previously were videotaped during an interview about their relationship with their deceased partner. The tapes were subsequently coded for Duchenne and non-Duchenne smiles and laughter, and measures of emotional adjustment and physical health were obtained at 14 and 25 months postloss. Analyses showed that a greater frequency of Duchenne smiling and laughter (indicating genuine amusement) during the interview was a significant predictor of fewer grief symptoms (e.g., intrusive memories of the deceased, emotional numbness, inability to part with the deceased person's possessions, depressed mood) at 14 and 25 months, even after controlling for moods at the time of the interview. Thus, the ability to experience humor early in bereavement, as demonstrated by smiling and laughter showing genuine mirth while talking about the deceased spouse, was associated with better emotional adjustment more than a year later. Further analyses of the same data by Keltner and Bonanno (1997) found that individuals who displayed more frequent Duchenne (but not non-Duchenne) laughter during the interview reported more positive and less negative moods and showed a greater dissociation between verbal reports of distress and autonomic arousal, suggesting that one of the benefits of genuine humor in coping may be that it enables the individual to dissociate from negative emotions.

In summary, although many authors have proposed that humor may be a beneficial way of coping with occupational stress, bereavement, illness, and other major stressors (e.g., Sumners, 1988; van Wormer and Boes, 1997), empirical evidence for such benefits is limited and somewhat mixed. Once again, the inconsistent findings may be due to a failure on the part of researchers to distinguish among different uses of humor, some of which may be effective for coping in some types of situations but less so in others, while other uses of humor may actually be detrimental in coping with certain stressors. For example, highly aggressive or macabre gallows humor may be almost essential to survival in the nearly hopeless situation of a prison camp, but may contribute to feelings of cynicism, alienation, and burnout in a stressful work environment where other more constructive forms of coping are available. In addition, mildly self-deprecating and whimsical uses of humor might enhance group morale and cohesiveness in a work setting, but frequent teasing and practical jokes might impair morale. Because of the multifaceted functions of humor and their widely varied social and emotional effects, it seems to be overly simplistic to view humor in

general as a purely beneficial method of coping. Further research is clearly needed to investigate in more detail the potential benefits and pitfalls of different styles of humor in coping with particular stressors.

### Sense of Humor as a Stress Moderator

The idea that humor is beneficial for coping with stress suggests that people with a greater sense of humor should be less likely to suffer the adverse emotional and physiological consequences of stressful life events. Although high-humor individuals may be just as likely as their low-humor counterparts to experience stressors such as financial losses, occupational pressures, unemployment, death of a loved one, and relationship breakups, their more frequent use of humor might enable them to appraise these stressors as less threatening, garner more social support, and generally cope more effectively, resulting in less likelihood of becoming emotionally distressed and physically ill as a consequence of the stressors.

A popular way of testing this hypothesis is the stress-moderator paradigm (Cohen and Edwards, 1989), in which researchers use questionnaires and other testing procedures to assess three types of variables: (1) some aspect of sense of humor measured as a personality trait; (2) the frequency of major stressful life events or minor daily hassles experienced over a specified period of time in the recent past, such as the preceding six months; and (3) current levels of particular adaptational outcomes, such as prevailing levels of depression or anxiety or the number of different illness symptoms experienced recently. By using hierarchical multiple regression analyses with a stressor  $\times$  sense of humor interaction term, researchers can determine whether the strength of the association between the frequency of stressors and adaptational outcomes varies as a function of level of sense of humor. The stress-buffering hypothesis is supported when the correlation between stressors and negative outcomes is found to become weaker as sense of humor increases across participants, and when high levels of stressors are associated with less disturbance among high-humor as compared to low-humor individuals (Figure 7). A number of studies using this paradigm have been conducted over the past two decades, using a variety of different sense of humor tests, stressor measures, and outcome variables.

Herbert Lefcourt and I reported three studies that employed different methods of assessing sense of humor and found fairly consistent evidence of a stress-moderating effect of humor (R. A. Martin and Lefcourt, 1983). In each of these studies, we used a life events checklist to assess the number of major life stressors that our undergraduate participants had experienced during the preceding year, and a test of overall mood disturbance (depression, anxiety, tension, anger, fatigue) as our outcome measure. Each study employed different methods of assessing sense of humor. In the first study, using self-report trait humor measures, we found a significant stress-buffering effect with the SHRQ, CHS, and SHQ-L, indicating that individuals with higher scores on these measures were less likely to report disturbed moods after experiencing high levels of stressful experiences.

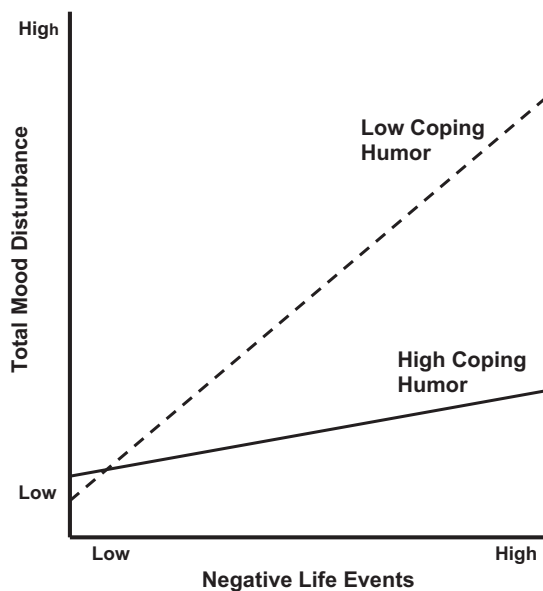


FIGURE 7 Stress-moderating effect of sense of humor. As the number of stressful life events increases, individuals with higher scores on the Coping Humor Scale show a less steep increase in mood disturbance as compared to those with lower scores on this humor measure (from Martin & Lefcourt, 1983).

In the second study, we assessed sense of humor using a behavioral measure of humor production ability. Participants were asked to make up a humorous narrative in the laboratory, describing a number of objects in a funny way, and these monologues were subsequently rated for overall funniness. Once again, the results revealed a significant stress-moderating effect: individuals who were better able to make up a funny monologue on demand in this rather difficult task showed less likelihood of becoming emotionally distressed following high levels of life stress.

The third study employed a similar humor-production approach, this time involving an even more stressful laboratory situation. The participants were instructed to create a humorous narrative while watching the *Subincision* film, and when the rated funniness of their narratives was used as the measure of humor in regression analyses, the results once again revealed a significant stress-buffering effect of humor production ability. We speculated that those individuals who were able to create funnier narratives in these mildly stressful conditions in the laboratory might also be the ones who tend to engage in humor more frequently during times of stress in their everyday lives, enabling them to cope more effectively and therefore become less emotionally distressed.

These encouraging initial findings were subsequently followed up in a number of similar studies by various researchers, some of which replicated our stress-moderator findings while others did not. One study using both cross-sectional (within one time

period) and prospective analyses (assessing stressors and sense of humor at one time point to predict prevailing moods two months later), found a significant stress-moderating effect of the CHS and SHRQ in the prediction of depression but not anxiety (Nezu et al., 1988).

A study of coping among women business executives also found significant stress-buffering effects of the CHS and SHRQ using a measure of minor daily hassles as the stressor measure and tests of self-esteem and emotional burnout as the outcome measures (P. S. Fry, 1995). Another study found a significant stress-moderating effect of the MSHS in the prediction of illness symptoms and anxiety, although the anxiety finding was only significant for male participants (Abel, 1998). In addition, my student James Dobbin and I found stress-buffering effects of three self-report humor scales on the negative relationship between daily hassles and levels of salivary immunoglobulin-A, a measure of immunity, indicating that high-humor individuals, compared to those with less of a sense of humor, were less likely to have reduced immunity after experiencing high numbers of stressful hassles (R. A. Martin and Dobbin, 1988).

Taking a somewhat different approach, Nicholas Kuiper, Kathy Dance, and I (1992) used the stress-moderator paradigm to examine interactions between sense of humor measures and both positive and negative life events in predicting positive rather than negative moods. Consistent with the stress-buffering hypothesis, we found significant interactions between the frequency of stressful negative life events and the CHS, SHRQ, and SHQ-M in predicting positive affect. Among individuals with low scores on these humor scales, more frequent negative events were associated with lower levels of positive moods, whereas those with high humor scores tended to maintain high levels of positive moods regardless of the number of negative events they had experienced. Analyses using the frequency of recent positive life events (e.g., enjoyable experiences, successful achievements) in the place of negative stressors also revealed significant interactions with the two subscales of the SHQ in predicting positive affect, indicating that the frequency of positive events was more strongly related to increased positive moods for high-humor as compared to low-humor individuals. These results suggested that, besides helping one to maintain one's positive moods during times of stress, a sense of humor seems to enhance the enjoyment of positive events.

In a later study, Kuiper and I (1998b) employed a daily diary approach to investigate the stress-buffering hypothesis. In this study, adult men and women from the community were asked to keep a three-day record of each time they laughed, as well as completing measures of the number of stressful events they experienced over the course of each day and their levels of positive and negative moods each evening. Interestingly, correlational analyses revealed that people who laughed more frequently over the three days did not necessarily experience more positive or less negative moods overall. Instead, the relationship between laughter and moods depended on their levels of daily stress. In particular, a significant stress-moderating effect revealed that greater numbers of stressful life events were associated with more negative moods, but only among individuals with a low frequency of laughter. In contrast, individuals with a



higher frequency of daily laughter had relatively low levels of negative moods regardless of their stress levels. Similar effects were found with positive moods, but only among men.

A recent study examined the potential role of humor in coping with the effects of mathematics performance anxiety in women (T. E. Ford et al., 2004). Female college students were administered a mathematics test in either high- or low-threat conditions. In the high-threat condition, they were told that this test assesses mathematical aptitude and has been found to be more difficult for women than men; in the low-threat condition, they were told that it assesses the process of general problem solving and that men and women tend to perform equally well on it. In support of the stress-buffering hypothesis, the results revealed a significant interaction between scores on the CHS and threat condition in predicting performance on the test and self-reported anxiety. Whereas all participants performed well on the test and had low anxiety scores in the low-threat condition, greater coping humor was related to better test performance and lower anxiety in the high-threat condition. These results suggested that the use of humor in coping with stress may reduce the effects of stereotype threat on women's mathematics-related anxiety and performance.

Although the foregoing research was generally quite supportive of the hypothesis that a sense of humor may buffer the adverse psychological effects of stress, some other investigations have failed to replicate these findings. One early study found no evidence of a stress-buffering effect of humor on depression or anxiety (Safranek and Schill, 1982). However, sense of humor was assessed in this study by means of a humor appreciation test in which participants were asked to rate the funniness of several categories of jokes. The null results may have been due to the fact that the enjoyment of various types of jokes likely has little to do with the degree to which individuals actually use humor in coping with life stress (Lefcourt and Martin, 1986).

A more serious challenge to the stress-buffering hypothesis came from a study by Albert Porterfield (1987) with more than 200 participants that did not find any evidence of stress-moderating effects of humor using the CHS and SHRQ as humor measures, the same test of major life stressors that Lefcourt and I had used in our original studies, and measures of depression and physical illness symptoms as the outcome variables. Another study with more than 700 participants also failed to find a stress-moderating effect of the CHS in predicting physical illness symptoms (Korotkov and Hannah, 1994). Similarly, a study of 334 undergraduates did not find a significant stress-moderating effect of coping humor on mood disturbance (Labott and Martin, 1987).

Even more confusing results were found in a study by Craig Anderson and Lynn Arnoult (1989). In this study, undergraduates completed the CHS, a measure of major life stressors, and tests of negative affect, depression, insomnia, physical illness symptoms, and an overall health rating. No evidence of a stress-moderating effect of coping humor was found on negative affect, depression, or illness symptoms. On the other hand, the interaction between CHS and stressors was significant in the prediction of overall wellness and insomnia. However, closer examination of the interaction revealed that the results for wellness were in the wrong direction: high-humor

individuals showed a *stronger* association between stressful events and poor health than did low-humor individuals. Only the results for insomnia were in the predicted direction.

A study by James Overholser (1992) also produced some results contradicting the stress-buffering hypothesis. Undergraduate participants completed three different types of humor measures: the CHS, humor appreciation (participants' funniness ratings of a set of cartoons), and humor production ability (rated funniness of cartoon captions created by participants). The outcome measures were tests of depression, loneliness, and self-esteem. Regression analyses using the CHS revealed a significant interaction with major life stressors only in the prediction of depression, among females but not males. However, the correlation tables reveal that this effect was in the wrong direction: females with high CHS scores showed a stronger association between stress and depression than did those with low scores on this humor test. A few significant interactions were also found between stressors and humor production ability in predicting loneliness (for both males and females) and self-esteem (for females only). However, since the direction of these effects was not reported, it is unknown whether they also were in the wrong direction.

In summary, the stress-moderator research using the multiple regression approach has yielded some rather inconsistent evidence for stress-buffering effects of a sense of humor. Nine studies found at least some significant stress-moderating effects, three obtained no significant results, and two produced results in the wrong direction. There does not seem to be any clear pattern to the particular humor scales, stressor measures, or outcome variables that did and did not produce significant findings. Although there are enough positive findings in this research to warrant some optimism about the stress-buffering potential of a sense of humor, it is difficult to discern from this research which particular uses of humor are beneficial for coping with which sorts of stressors to produce which types of outcomes.

### Process Approaches to Investigating Humor in Coping

The inconsistent patterns of findings from the stress-moderator studies described in the previous section may be due in part to several inherent weaknesses of this research methodology (Somerfield and McCrae, 2000). These include reliance on trait measures of humor, retrospective assessment of stressors occurring over a period of time, and use of a between-person, cross-sectional design. Since the variables are typically assessed at only one point in time, this stress-moderator paradigm provides only a static "snapshot" of what is an inherently dynamic coping process. Furthermore, a high score on a trait measure of sense of humor does not necessarily mean that an individual actually used humor to cope with the particular stressors that are measured by the life events checklists. Consequently, this approach does not allow researchers to examine directly how particular types of humor are used on a day-to-day basis to cope with specific ongoing stressors.

Howard Tennen and colleagues have advocated the use of a more "real-time" approach to stress and coping research, assessing proximal stressors, coping efforts,

and adaptational outcome variables repeatedly in individuals as they occur over a period of days or weeks (Tennen et al., 2000). By capturing these variables closer to their actual occurrence, researchers can minimize recall error while studying coping processes within individuals over time. Such data can be analyzed using multilevel analysis procedures such as Hierarchical Linear Modeling (HLM; Bryk and Raudenbush, 1992), which combine the advantages of both an idiographic and a nomothetic approach. This approach to analyzing stress-moderating effects of humor is conceptually similar to the multiple regression method described in the previous section, but the focus is on changes within individuals over time rather than differences between individuals at one time. In other words, the methodology enables researchers to examine whether individuals show evidence of higher or lower levels of well-being on days when they engage in particular styles of humor to cope with particular types of stressors, relative to other days when they experience similar stressors but do not use those humor styles.

So far, this process-oriented approach has been used in only one study examining potential stress-buffering effects of humor, which was conducted by my former graduate student, Patricia Doris (2004), as part of her PhD research. Twice a week for three weeks, university students participating in this study were asked to log onto an Internet website at the end of the day and complete a brief questionnaire, recording their stressful experiences, negative moods, and uses of humor during that day. The humor questions were modified items from the Humor Styles Questionnaire, asking participants how frequently they had engaged in affiliative, self-enhancing, aggressive, and self-defeating styles of humor that day. Thus, humor was assessed in terms of the frequency with which individuals engaged in various humor behaviors on a particular day, rather than their typical or habitual humor tendencies, as in trait measurement approaches. Stressful events and moods were also assessed for the same day, rather than being measured retrospectively over weeks or months. HLM analyses were used to examine the interactions between day-to-day stressors and humor use in relation to daily negative moods both within and between participants concurrently.

The results revealed significant stress-moderating effects for self-enhancing, aggressive, and self-defeating humor, but not affiliative humor. In each case, a higher number of stressful events was associated with more negative moods on days when participants did not engage in these types of humor, whereas stressful events did not result in such negative moods on days in which participants engaged more frequently in these three humor styles. Although these findings will need to be replicated before we can place much confidence in them, they provide preliminary evidence for the stress-buffering effects of three of the four HSQ humor styles.

The results with self-enhancing humor were exactly as expected, suggesting that the use of this healthy style of humor to cope with stress is an effective way of regulating one's moods when experiencing daily stressors. The finding of similar results with both aggressive and self-defeating humor may at first seem surprising, but they also make some sense. As suggested earlier, although aggressive uses of humor may be potentially injurious to relationships in the long run, aggressively making fun of people and situations that are perceived as threatening to one's well-being may be a

way of reducing immediate feelings of threat and associated negative moods. Similarly with self-defeating humor, on days when one is experiencing a great deal of stress, the use of humor to ingratiate oneself with others and deny one's feelings may be a way of boosting one's spirits and mitigating the negative emotional effects of stress, at least in the short run. Moreover, the temporary alleviation of negative emotion may act as a reinforcer for the use of these aggressive and self-defeating types of humor, even though the longer-term effects may be detrimental to well-being, explaining why these potentially maladaptive uses of humor tend to be maintained in some individuals as habitual coping styles. Thus, although aggressive and self-defeating humor styles may mitigate the emotional effects of stress in the short term, they may be more maladaptive in the longer run.

Interestingly, the use of affiliative humor did not appear to moderate the effects of daily stress on negative moods. Instead, this type of humor showed a direct mood effect, with greater uses of daily affiliative humor being associated with less negative and more positive moods regardless of stress levels. It is worth noting that in this study, Doris also used the traditional cross-sectional multiple regression paradigm to examine stress-moderating effects of humor, using several trait measures of humor including the HSQ, CHS, and SHRQ, major life events assessed retrospectively over six months, and prevailing moods. The failure to find any significant stress-moderating effects in these analyses further underscores the weaknesses of the cross-sectional trait approach.

The process-oriented repeated measures approach, using multilevel analysis procedures such as HLM, appears to be a promising methodology for further research on the role of humor in coping with stress. Future research could also examine the relative benefits of particular styles of humor in coping with different types of stressors. For example, stressors could be categorized on the basis of whether they involve conflicts with close friends or acquaintances, problems at work, failures to achieve an academic or work goal, and so on, as well as the participant's degree of perceived control over the events. Different styles of humor may be more or less effective with different types of stressors.

Researchers might also wish to consider other potentially relevant styles of humor besides those assessed by the HSQ. Other adaptational outcomes should also be examined, including specific mood states, psychophysiological arousal levels, illness symptoms, and so forth. In addition, different sampling procedures could be used over different time periods. For example, the availability of small handheld computers now makes it possible to collect ongoing data relating to stressors, humor use, moods, and even physiological arousal in "real time" over the course of the day. These methods may enable researchers to examine the process of humor use in coping in a more fine-grained manner.

## INTERPERSONAL ASPECTS OF HUMOR IN MENTAL HEALTH

As we have seen throughout this book, humor typically occurs in the context of social interaction. Until recently, however, as in other areas of the psychology of

humor, much of the research on humor and mental health has tended to ignore its inherently social nature. Viewing humor as a form of interpersonal interaction allows us to think about how it may contribute to social relationships, which in turn may have an impact on the individual's psychological health.

There is a great deal of research indicating that social relationships have a profound influence on one's level of happiness and general psychological well-being (for a review, see Berscheid and Reis, 1998). Summarizing the research in this area, Harry Reis (2001) stated that "there is widespread evidence that socially involved persons are happier, healthier, and live longer than socially isolated persons do" (p. 58). For example, married people, on average, tend to have better mental and physical health than do unmarried people. Research has also shown that people with better social skills, enabling them to form close and satisfying relationships, are less likely to experience depression, anxiety disorders, and other forms of psychological disturbance (Segrin, 2000). Meaningful relationships with others are also important for the provision of social support, which can protect the individual from the adverse effects of stress (Berscheid and Reis, 1998). On the other side of the coin, there is an abundance of research showing that loneliness is related to unhappiness and a range of mental and physical problems (Berscheid and Reis, 1998).

The importance of social connectedness for well-being likely has a biological basis. Evolutionary psychologists view social relationships as one of the most important factors responsible for the survival of the human species (D. M. Buss and Kenrick, 1998). The evolutionary significance of close relationships is also emphasized by attachment theory (Bowlby, 1982), which suggests that the ability to form secure interpersonal attachments originates in the relationship between infants and their caregivers, and continues to play an important role in one's close relationships and in the ability to regulate emotions throughout one's life.

In view of the social functions of humor discussed previously in this book, it seems reasonable to propose that humor may play a role in the initiation and maintenance of satisfying and enduring social relationships, such as those with close friends, marriage partners, and colleagues at work (Shiota et al., 2004). These relationships, in turn, can contribute in positive ways to the individual's level of mental health. Besides enhancing partners' enjoyment of the relationship through playful interactions, socially skilled uses of humor may aid in confronting and resolving difficulties and facilitate the resolution of conflicts that inevitably occur in all relationships.

In addition, the humor that is shared by relationship partners during times of life stress may be an important way they help each other to cope. Thus, humorous interactions between partners can be a way of regulating emotion, augmenting positive enjoyment and reducing feelings of distress originating either within or outside the relationship itself. On the other hand, maladaptive uses of humor, such as aggressive teasing or self-defeating humor, may have detrimental effects on relationships. In particular, individuals who use humor in these unhealthy ways may have difficulty initiating and maintaining close relationships, leading to adverse consequences for well-being.

### **Humor as a Facilitator of Healthy Relationships**

Some correlational studies have examined associations between trait measures of humor and several variables relevant to personal relationships. For example, self-report humor scales have been found to be positively correlated with measures of intimacy (Hampes, 1992, 1994), empathy (Hampes, 2001), social assertiveness (Bell et al., 1986), and interpersonal trust (Hampes, 1999). As noted in Chapter 5, studies of dating and married couples have shown that individuals who perceive their partner to have a good sense of humor tend to be more satisfied with their relationship, as compared to those who view their partner as less humorous (Rust and Goldstein, 1989; Ziv and Gadish, 1989). Moreover, people who are happily married often attribute their marital satisfaction, at least in part, to the humor they share with their spouse (Lauer et al., 1990; Ziv, 1988a). Researchers observing styles of interaction between married spouses during discussions of problems in their marriage have found that spouses who are more satisfied with their marriage, as compared to those who are unhappily married, show higher levels of humor and laughter and more reciprocated laughter during these problem discussions (Carstensen et al., 1995; Gottman, 1994).

However, there is also some evidence that humor may play a negative as well as a positive role in close relationships, particularly in men. Herbert Lefcourt and I found that, among women, scores on the CHS were positively correlated with marital satisfaction and positive engagement in a problem discussion between spouses, whereas for men higher CHS scores were associated with lower marital satisfaction and greater destructiveness (negative affect and verbal negativity) during the discussion (Lefcourt and Martin, 1986). A study of newly married couples (described in Chapter 5) found that greater humor expression by husbands during a problem discussion, when accompanied by higher levels of major stressful events in the couple's life, predicted a greater likelihood that couples would be separated or divorced 18 months later (Cohan and Bradbury, 1997). The authors suggested that husbands' use of humor during times of stress may be a way for them to temporarily deflect problems and avoid the anxiety associated with talking about them, but without actively confronting and resolving them. Hence, humor expressed by the husband in the context of major life stress might be associated with less distress in the short term but not with longer-term marital stability.

The possibility of negative as well as positive effects of humor in relationships is consistent with our discussion throughout this chapter. It is only quite recently, however, that researchers have begun to address these issues in the context of relationships, attempting to identify negative as well as positive forms of humor. In a qualitative study of dating relationships, for example, Amy Bippus (2000b) drew a distinction between humor that serves a bonding function and more negative types, such as cruel, inappropriate, and overbearing humor that may be injurious to the relationship. In addition, the recently developed Relational Humor Inventory, which was designed for studying humor in close relationships, contains separate scales for assessing positive, negative, and instrumental uses of humor by each



partner (de Koning and Weiss, 2002). Preliminary data indicate that these different scales are differentially associated with marriage partners' levels of relationship satisfaction.

A few recent studies have also made use of the HSQ to examine associations between these potentially healthy and unhealthy humor styles and variables having to do with close relationships. For example, in our initial studies with the HSQ (R. A. Martin et al., 2003), we found that individuals with higher scores on affiliative humor and lower scores on self-defeating humor tended to report higher levels of intimacy in their close relationships. In addition, self-enhancing humor was positively related to the degree to which participants felt satisfied with the social support provided by their friends, whereas self-defeating humor was negatively correlated with this variable.

One of my graduate students, Gwen Dutrizac, and I found that higher affiliative and self-enhancing humor scores were associated with lower levels of loneliness and interpersonal anxiety, whereas higher self-defeating humor was related to higher levels of these negative feelings (R. A. Martin and Dutrizac, 2004). Some studies have also examined associations between the HSQ scales and measures relevant to attachment. In a study of Lebanese university students, Shahe Kazarian and I found that participants with higher scores on the self-defeating humor scale were significantly more likely to report anxious attachment in their relationships with close friends (Kazarian and Martin, 2004). On the other hand, those with higher affiliative humor scores were significantly less likely to report avoidant attachment styles.

Similarly, in their study of Belgian high school and university students, Saroglou and Scariot (2002) reported a correlation between self-defeating humor and insecure attachment in participants' relationships both with their friends and with their mothers. Self-defeating humor was also associated with more fearful-avoidant and anxious-ambivalent models of the self. Overall, these findings indicate that affiliative and self-enhancing humor are associated with a variety of positive relationship indicators, whereas self-defeating humor is particularly related to more negative experiences of relationships in general.

Other studies have examined associations between humor styles on the HSQ and participants' satisfaction with specific relationships. As part of her doctoral dissertation, Patricia Doris (2004) asked university students who were in a dating relationship to rate their own and their partners' humor styles using the HSQ, as well as their satisfaction with the relationship. Self-ratings and partner ratings of affiliative and self-enhancing humor were found to be associated with greater relationship satisfaction. On the other hand, greater use of aggressive humor in oneself or one's partner was associated with greater dissatisfaction with the dating relationship.

Similarly, in a study of humor in the initiation and maintenance of same-sex friendships among university students, another one of my students, Jennie Ward (2004), found that individuals who engaged in more affiliative and less aggressive humor were rated by their friends as being more enjoyable to interact with, and as fulfilling more positive friendship functions, such as companionship, intimacy, emotional security, and affection. These studies suggest that the use of affiliative and (to

a somewhat lesser extent) self-enhancing humor may be beneficial for relationship satisfaction, whereas aggressive humor in either partner seems to be particularly associated with relationship dissatisfaction.

These differential correlations between HSQ scales and satisfaction in close relationships suggest that healthy humor styles may be viewed as a type of social competence, whereas unhealthy humor styles may be related to social skills deficits. To test this hypothesis, Jeremy Yip and I examined the HSQ, as well as the trait form of the STCI, in relation to subscales of the Interpersonal Competence Questionnaire (ICQ) (Buhrmester et al., 1988), a measure of the degree to which participants perceive themselves to have various social skills needed to initiate and maintain satisfying relationships (Yip and Martin, *in press*). The results showed that higher scores on affiliative and self-enhancing humor and trait cheerfulness were associated with greater reported abilities in both initiating relationships (e.g., "Finding and suggesting things to do with new people whom you find interesting and attractive") and personal disclosure (e.g., "Confiding in a new friend and letting her or him see your softer, more sensitive side").

In contrast, greater use of aggressive humor was related to lower reported abilities both in providing emotional support (e.g., "Helping a close companion cope with family or roommate problems") and conflict management (e.g., "When angry at a companion, being able to accept that he or she has a valid point of view even if you don't agree with that view"), whereas trait cheerfulness was positively associated with both of these abilities. Finally, greater use of self-defeating humor was associated with lower ability to engage in negative assertion (e.g., "Telling a companion you don't like a certain way she or he has been treating you").

Similar patterns of correlations between the HSQ and the ICQ were also reported by Nicholas Kuiper and his colleagues (2004). Overall, these findings provide support for the idea that the positive forms of humor may be viewed as a type of social skill, whereas aggressive and self-defeating humor may be considered to be social skills deficits. These correlational findings need to be followed up with further research exploring in more detail the appropriate and inappropriate ways humor is actually used in each of these social skill domains.

The studies discussed so far have examined correlations between humor scales and overall ratings of relationship satisfaction. This approach to measuring satisfaction requires participants to make generalizations about a large number of interactions with another person that have taken place over an extended period of time, and to summarize this complex process in a single rating. To obtain more process-oriented and proximal assessments of the quality of social interactions, two recent studies have employed daily diary methods, obtaining repeated assessments of participants' positive and negative experiences with daily social interactions as they occurred over a period of several weeks.

John Nezlek and Peter Derks (2001) had participants keep a daily record every day for two weeks, recording all of their social interactions lasting more than 10 minutes, and rating each one for enjoyment, level of intimacy, and feelings of self-confidence. Using HLM to analyze the data, the researchers found that participants

with higher scores on the Coping Humor Scale rated their daily social interactions as being more satisfying and they also reported feeling greater self-confidence during these interactions. However, coping humor was unrelated to the total number of people interacted with each day or to the perceived intimacy of interactions. The authors suggested that people who use humor to cope may be more enjoyable to be with, providing others with more positive forms of support through their humor, resulting in greater enjoyment and efficacy in interactions.

In the other study of this kind, Gwen Dutrizac and I conducted a similar daily diary study of social interactions using the HSQ as our measure of humor (R. A. Martin and Dutrizac, 2004). We had undergraduate participants keep a diary of daily social interactions two days a week for three weeks. We focused only on interactions with “close others,” such as close friends, romantic partners, parents, and siblings. At the end of each day, the participants indicated how many close others they interacted with that day, the number of positive and negative verbal interactions and activities they had with these people, and the frequency of both giving and receiving empathic responses in these interactions.

HLM analyses revealed that higher affiliative humor on the HSQ was associated with more frequent daily positive activities with close others (doing enjoyable things together), while self-enhancing humor was correlated with more frequent positive verbal interactions (engaging in enjoyable conversations). On the other hand, both aggressive humor and self-defeating humor were related to more frequent negative verbal communications and activities (e.g., arguments and criticism). In addition, self-enhancing humor was associated with more giving and receiving of empathic responses, whereas aggressive humor was related to less giving and receiving of empathy. Like Nezlek and Derks (2001), we found no correlation between HSQ scales and the overall frequency of interactions with others, suggesting that humor is related to the quality but not the quantity of social interactions. Taken together, these two studies provide further evidence that greater use of adaptive humor styles and less use of aggressive and self-defeating humor styles are related to more satisfying day-to-day interactions with others.

Another approach to investigating the role of different humor styles in relationships is to observe directly individuals' humor while they are interacting with relationship partners. We have recently developed a reliable observational coding system for rating the degree to which individuals engage in each of the four styles of humor identified by the HSQ during social interactions. This method was used in a recent study to rate the degree to which each member of pairs of heterosexual dating couples used affiliative and aggressive humor during a 10-minute discussion of a problem in their relationship (Martin, Campbell, and Ward, 2006). The results indicated that, although both styles of humor were positively correlated with observer ratings of funniness (demonstrating that both are indeed humorous), they had very different relationship outcomes. The more an individual was observed to use affiliative humor during the discussion, the more his or her partner reported increased feelings of closeness, less emotional distress, greater perception that the problem had been resolved, and greater overall satisfaction with the relationship. In contrast, the more individuals were observed to use aggressive humor, the less their partners felt the problem

had been resolved and the less satisfied they were with the relationship overall. Thus, this study was able to show a direct link between these positive and negative styles of humor and relationship partners' subsequent feelings and perceptions, demonstrating that humor can have both positive and negative effects on close relationships, depending on whether it is used in affiliative or aggressive ways.

In summary, the research on social relationships using the HSQ, although as yet quite limited, has provided general support for the view that these positive and negative styles of humor are differentially correlated with a number of variables having to do with individuals' experiences of close relationships, which in turn are important for mental health. Higher levels of both affiliative and self-enhancing humor tend to be associated with greater skill in initiating relationships and self-disclosure of personal information, more positive interactions with close others, more satisfying relationships with friends and dating partners, and lower levels of loneliness and interpersonal anxiety. Affiliative humor is also related to lower levels of avoidant attachment and greater intimacy in relationships, while self-enhancing humor is associated with greater perceived social support and giving and receiving of empathy.

In contrast, greater use of aggressive humor is related to more frequent negative interactions with others, less giving and receiving of empathy, reduced ability to manage conflict and provide empathy in social relationships, and lower satisfaction with dating relationships and friendships, both for oneself and one's partner. Thus, although aggressive humor is less strongly related to overall emotional well-being variables (as we saw previously), it seems to be particularly associated with social skills deficits and maladaptive social interaction styles and therefore more unsatisfactory relationships.

Finally, greater use of self-defeating humor tends to be associated with a reduced ability to assert oneself in relationships, more negative interactions with close others, higher levels of loneliness, interpersonal anxiety, and anxious and insecure attachment, and lower perceptions of intimacy and social support. Overall, then, the neuroticism-related characteristics of self-defeating humor that were seen with general well-being variables seem to carry over into one's feelings about social relationships as well, although, unlike aggressive humor, this negative style of humor does not seem to be related to negative feelings and dissatisfaction in one's relationship partners.

It is important to note, however, that many of these studies were correlational, using trait measures of humor, and were therefore unable to determine the direction of causality between humor and relationship satisfaction. Additional research using observational methods is needed to determine whether different styles of humor have causal effects on relationship outcomes. Also, further research using event-sampling procedures might be useful for studying humor use in everyday social events as they occur in natural contexts (for a discussion of this methodology, see Reis, 2001).

### Interpersonal Aspects of Coping Humor

While humor appears to play a role in facilitating healthy personal relationships, it is also important to note that social relationships likely play a significant role in the

use of humor in coping with life stress, which I discussed earlier. As we have seen throughout this book, humor typically occurs in the context of social interactions, and this is also likely true of the use of humor in coping. As seen in the study of POWs in Vietnam (Henman, 2001), individuals usually do not begin laughing or cracking jokes about their problems when they are all by themselves. Instead, coping humor typically takes the form of joking comments and other types of playful communication among individuals during or shortly after the occurrence of stressful events.

For example, by cracking jokes with one another during the course of a particularly stressful work situation, coworkers may be able to alter their appraisals of the situation and thereby minimize the amount of negative emotion that might otherwise be elicited. Alternatively, while sitting together in a coffee shop at the end of a stressful day, they might begin jesting and laughing about some of the day's events, enabling them to relieve tension and manage residual emotions. Similarly, coping humor can arise when one person is describing his or her experiences of a recent or ongoing stressful situation to a close friend or romantic partner. Humor may be introduced into the discussion either by the individual who experienced the stressor or by the listener who is providing emotional support. In either case, the humor may provide the stressed individual an alternative way of looking at the stressor, alleviating feelings of distress and enhancing positive emotions. Thus, as sociologist Linda Francis (1994) pointed out, humor may be used to manage other people's emotions as well as one's own.

To date, only a few studies have examined these interpersonal aspects of humor as a coping mechanism. In one recent study, Sharon Manne and her colleagues (2004) observed 10-minute interactions between women who were undergoing treatment for breast cancer and their spouses. These dyads were instructed to discuss a cancer-related issue identified by the patient as being a problem and about which she wanted support from her partner. Each turn of speech during the discussion was coded for various types of social interaction, including benign, nonsarcastic humor. Sequential analyses showed that when husbands responded with humor to the cancer patients' self-disclosures, the patients subsequently tended to report significantly lower levels of distress about their cancer. These findings suggest that a husband's sensitive use of humor in response to his wife sharing her worries and concerns about breast cancer may lessen the threat of the cancer, helping her to gain perspective and reduce feelings of distress.

Research by John Gottman and his colleagues (1998), which was discussed in Chapter 5, also shows how humor may be a way of regulating emotions in one's marriage partner. This study found that, when married couples were engaged in discussions about problems in their marriage, the use of nonsarcastic humor by wives was predictive of greater marital stability over the following six years, but only when the wives' humor led to a reduction in their husbands' heart rate during the conversation. This finding suggests that humor may be beneficial during times of marital stress when it is used as a way of emotionally calming one's spouse and thereby enabling him to remain engaged in problem-solving efforts.

Amy Bippus (2000a) also investigated the outcomes experienced by individuals when their friends use humor in attempting to comfort them during times of stress. In this study, university students were asked to complete a questionnaire about a recent time when they confided to a friend about an emotionally upsetting experience or problem and the friend responded with humor. The results indicated that the effectiveness of the friend's humorous response (i.e., the degree to which it resulted in increased positive moods and feelings of empowerment, and decreased rumination about the problem) depended on the quality (i.e., funniness and appropriate timing) of the humor, its relevance to the problem, and the degree to which it seemed to be given purposefully. In addition, humor responses appeared to be most effective when they were given in the context of a relationship in which humor is a typical part of the interactions between the partners, where both partners normally use humor in coping with stress (as shown by high scores on the CHS), and when the humor was presented in a way that conveyed feelings of concern and a lack of negative criticism or disparagement, and provided an alternate perspective on the problem.

In summary, a limited amount of research has examined the interpersonal context in which humor is used to cope with stress, and the processes of social interaction that are involved. This is a potentially very fruitful topic for future investigation. For example, future research could investigate the effects of humor when it is introduced by the person who is experiencing stress as compared to when it is introduced by the person providing social support, as well as the relative benefits of different styles and topics of humor with different types of stressors.

## CONCLUSION

As we have seen in previous chapters of this book, humor is a complex process involving cognitive, emotional, and interpersonal aspects. All of these facets of humor have implications for mental health and emotional well-being. When people joke with one another about their problems or about a potentially threatening life situation, they are able to change their perceptions of the situation, their emotional state, and the nature of their relationships with each other. However, the research reviewed in this chapter suggests that the link between humor and psychological health is more complex than it might first seem.

Experimental laboratory research has provided a considerable amount of support for the view of humor as an emotion-regulation mechanism. At least in the short term, humor produces an increase in positive feelings of exhilaration and well-being, along with perceptions of mastery and control, and a reduction in negative feelings such as anxiety, depression, and anger. There is also research evidence that humor can mitigate the negative emotions, physiological arousal, and behavioral impairments that often occur as a result of stressful life experiences.

While humor may be a useful mechanism for regulating emotions and coping with stress in the short term, however, correlational research using trait measures of sense of humor suggests that the longer-term implications for mental health may



depend on the way people use humor in their daily lives. Individuals who use humor to cope in ways that are sensitive to their own and other people's broader psychological needs are likely to experience enhanced feelings of self-esteem and emotional well-being and more satisfying relationships with others in the longer term. On the other hand, if humor is used to temporarily boost one's positive emotions and mitigate stress at the expense of others by means of sarcasm, teasing, or other types of aggressive humor, it may lead in the longer term to interpersonal difficulties and conflicts, and generalized feelings of alienation from others. Similarly, if humor is used at one's own psychological expense by ingratiating oneself with others, excessively disparaging oneself, or avoiding dealing constructively with the underlying causes of one's problems, it may produce temporary feelings of well-being, but at the cost of less healthy functioning in the longer term.

Overall, then, it would appear that humor is inherently neither psychologically healthy nor unhealthy. Just because someone is very funny and able to make others laugh does not necessarily mean that he or she is particularly well-adjusted psychologically. As suggested by earlier psychologists such as Maslow (1954) and Allport (1961), the role of humor in mental health seems to have as much to do with the kinds of humor an individual does *not* display as the kinds of humor he or she *does* express.

Another way of putting this is that a healthy sense of humor is an important component of overall mental health. People who are psychologically well-adjusted, with satisfying personal relationships, tend to use humor in ways that enhance their own well-being and closeness to others. For example, they may engage in friendly joking to communicate an optimistic outlook on a stressful situation, to encourage others during times of distress, or to express underlying feelings of acceptance and affection in the midst of an argument. However, less well-adjusted individuals who are aggressive and hostile, or those with low self-esteem and a vulnerability to negative emotionality, tend to use humor to communicate their aggression and cynicism, to manipulate, demean, or control others, to ingratiate themselves, or to hide their true feelings from others. Indeed, since no one is completely psychologically healthy or completely unhealthy, most people likely use humor to some degree in all of these ways at different times and in different contexts.

Throughout this chapter, I have noted several limitations of the existing research as well as promising questions and methodologies for future research. A major limitation of much of the research in this area is the use of correlational methodologies, which do not allow researchers to determine the direction of causality between humor and well-being. It is unclear from the existing research whether more healthy forms of humor contribute to greater psychological health or whether different styles of humor are merely a consequence of healthy and unhealthy psychological functioning. Other methodological limitations include the use of cross-sectional designs, self-report trait measures of sense of humor, retrospective assessments of stressors, and general, traitlike evaluations of well-being and relationship satisfaction. All of these preclude the possibility of studying the ongoing processes involved in the use of humor in coping with stress and negotiating interpersonal interactions. These approaches also tend to ignore the interpersonal nature and functions of humor.

Rather than merely seeking to find simple correlations between sense of humor scales and various aspects of mental health, or interactions between sense of humor and life stress measures in predicting overall well-being, future research should attempt to determine which types of humor in which social contexts are beneficial and detrimental for which aspects of mental health. Some humor styles, such as aggressive humor, may be beneficial for some aspects of mental health (e.g., short-term regulation of one's own emotions) but deleterious for others (e.g., long-term maintenance of close relationships). They may also be more beneficial for coping with some types of stressors (e.g., being a prisoner of war) than others (e.g., dealing with difficult patients in a psychiatric ward).

To address these kinds of questions, I have suggested that future research could make use of daily experience methods or event-sampling procedures, in which the actual use of different styles of humor during the course of the day is evaluated in "real time" over a period of days or weeks (Reis and Gable, 2000). This approach could be used to study humor as a coping mechanism by including repeated assessments of stressful events and ongoing indicators of emotional and physical well-being. The role of humor in social relationships could also be examined by including measures of various aspects of daily social interactions. Another potentially useful approach for further research is the use of observational methods to study the processes of humor in interpersonal interactions. For example, the social functions of humor, as well as its effect on coping with stress, could be examined during conversations between dyads (friends, married partners, or even strangers) while they are discussing a stressful situation that has recently been experienced by one or both of them.

Finally, there has been little research examining the question of whether individuals can improve their sense of humor and learn to use it in more healthy and less unhealthy ways. To address this question, intervention studies are needed, making use of role-playing procedures, creativity exercises, and other techniques over multiple sessions to train individuals in effective humor skills. Outcome measures could be used to examine the effectiveness of such humor-training sessions, relative to other non-humorous interventions, in improving humor usage and enhancing aspects of psychological well-being. This type of research is necessary before we can begin to advocate the use of humor and laughter to promote mental health.



## Humor and Physical Health

The idea that humor and laughter are good for one's health has become very popular in recent years, among the general public as well as many health care practitioners. This is actually not a new idea; the health benefits of laughter have been touted for centuries. The medicinal value of mirth and cheerfulness, as well as the health-impairing effects of negative emotions, were affirmed thousands of years ago in a biblical proverb which states that "a merry heart does good like a medicine, but a broken spirit dries the bones" (Proverbs 17:22).

Since the time of Aristotle, a number of physicians and philosophers have suggested that laughter has important health benefits, such as improving blood circulation, aiding digestion, restoring energy, counteracting depression, and enhancing the functioning of various organs of the body (for reviews, see Goldstein, 1982; Moody, 1978). This idea has become increasingly popular in recent years, as modern medical discoveries like endorphins, cytokines, natural killer cells, and immunoglobulins have been added to the list of bodily substances that are thought to be beneficially affected by humor and laughter.

Within psychology, research on the potential benefits of humor on physical health falls within the domain of health psychology, which is concerned with the way behavior, cognitions, and emotions can influence health, wellness, and illness. Health psychologists conduct research on such topics as the physiological effects of psychosocial stress; the influence of cognitive appraisals, coping, social support, and other psychological factors on stress; the effects of emotions on immunity; psychological aspects

of pain and disease; the promotion and maintenance of health; and the relationship between patients and health care providers.

Rejecting the traditional biomedical model of health and illness as overly simplistic, health psychologists espouse a biopsychosocial model, which views health as determined by psychological, social, and cultural factors, in addition to biological causes (Engel, 1977). Clinical health psychology is a professional specialty area within clinical psychology that seeks to apply the research findings of health psychology and related disciplines to the development of treatment interventions for helping people to cope effectively with stress, modify their behavior in more health-enhancing ways, manage pain, cope with chronic illness, and so forth.

Over the past two decades, about 50 published articles have reported empirical investigations that bear on the relationship between humor and physical health. In addition to psychologists, these studies have been conducted by researchers from medicine, nursing, and other fields. In this chapter, I will begin by discussing recent developments in the popularization of claims for health benefits of humor and laughter. I will then explore several theoretical mechanisms by which humor and laughter could potentially influence health. In the remainder of the chapter, I will provide an overview of research on the effects of humor on various aspects of health, including immunity, pain tolerance, blood pressure, illness symptoms, and longevity, examining the current state of the evidence and discussing some of the questions that remain to be answered (for a more detailed review of this research, see R. A. Martin, 2001).

## POPULAR BELIEFS ABOUT HUMOR AND HEALTH

The current popularity of ideas about medicinal benefits of humor and laughter can be traced in large part to the publication by Norman Cousins of an article in the *New England Journal of Medicine* entitled “Anatomy of an illness” (Cousins, 1976), which was later expanded into a best-selling book by the same name (Cousins, 1979). Cousins, a well-known American magazine editor, recounted in these writings how he had been diagnosed in the early 1960s with a very painful, chronic, and debilitating rheumatoid disease called *ankylosing spondylitis*, and was told by his doctor that he had only a 1-in-500 chance of recovering fully. Aware that medical science had little to offer in the way of cure except medication to ease the pain of the disease, Cousins searched through the medical literature and learned about recent research suggesting health-impairing effects of stress-related negative emotions, as well as potential benefits of vitamin C. With the cooperation of his physician, he decided to check himself out of the hospital and undergo a self-prescribed treatment plan involving frequent daily laughter, along with massive doses of vitamin C. To induce positive feelings which, he hoped, would counteract any adverse effects of negative emotions, he laughed as often as possible by watching old episodes of the television program *Candid Camera*, Marx Brothers movies, and other comedy films, and reading joke books. The story of his eventual recovery from the disease is now well-known.

During the course of this treatment, Cousins observed that 10 minutes of hearty laughter had a reliable analgesic effect, providing two hours of pain-free sleep. In addition, he reported that episodes of laughter reliably resulted in reductions in the sedimentation rate, the rate at which red blood cells descend in a test tube, which is a measure of inflammation. These observations led to the hypothesis that laughter reduces pain, perhaps by stimulating the production of endorphins, the morphinelike substances produced by the brain, as well as the suggestion that laughter enhances immune system functioning.

Although the story of Norman Cousins is widely cited as evidence for the health benefits of laughter, it is important to note that such anecdotal cases do not provide scientific evidence, but need to be followed up with controlled experiments. It is unknown whether his recovery was due to the laughter, the Vitamin C, particular personality traits such as the will to live, or to some totally unrelated factor, or whether the disease may even have been misdiagnosed in the first place. Indeed, in a later article, Cousins (1985) himself downplayed the role of laughter in his recovery, emphasizing the importance of positive emotions in general as a context for the application of traditional medical treatments.

The case of Norman Cousins appeared at a time when many North Americans were becoming dissatisfied with traditional Western medicine, and alternative approaches to medicine were growing in popularity. The idea that laughter could have curative properties fit well with this zeitgeist. Over the years since then, numerous popular magazine articles have reported claims of scientific research purportedly showing evidence of beneficial effects of humor and laughter on various aspects of health, further bolstering these beliefs in the public mind. As one example, an article in a recent issue of *Reader's Digest* (Rackl, 2003) claimed that scientists have demonstrated that humor and laughter can alleviate allergy symptoms, increase pain tolerance, strengthen the immune system, reduce the risk of stroke and heart disease, and even help diabetics control their blood sugar levels.

Stimulated by these ideas, a burgeoning "humor and health movement" has developed, made up of nurses, physicians, social workers, psychotherapists, educators, clowns, and comedians, who enthusiastically promote the therapeutic benefits of humor through conferences, seminars, workshops, books, videotapes, and Internet websites. As noted in Chapter 1, the Association for Applied and Therapeutic Humor (AATH) is a professional society of individuals whose members are interested in the application of humor and laughter in medicine, social work, psychotherapy, education, and so on (available at [www.aath.org](http://www.aath.org)).

In addition, the "laughter club movement," which was started in India in 1995 by a physician named Madan Kataria, has witnessed remarkable growth in the past decade, forming chapters throughout the world. Believing that even nonhumorous laughter is beneficial for physical, mental, interpersonal, and spiritual health, adherents of this movement meet regularly to engage in group laughter as a form of yogic exercise. According to Kataria (2002), the mission of the movement is nothing less than to bring about "world peace through laughter!" The humor and health movement also received a boost in 1998 with the release of the movie *Patch Adams*,

starring Robin Williams, which depicted the true story of an unconventional physician who augmented his medical interventions by making his patients laugh in response to his comic interactions with them (described also in P. Adams and Mylander, 1998). Laughter rooms, comedy carts, and “therapeutic clowns” have now become familiar sights in many hospitals.

The remarkable range of bodily functions that are said to be helped by laughter and humor, according to contemporary claims, reminds one of the advertised benefits of patent medicines a century ago. Laughter is said to provide exercise for the muscles and heart, produce muscle relaxation, improve blood circulation, reduce the production of stress-related hormones such as catecholamines and cortisol, enhance a wide range of immune system variables, reduce pain by stimulating the production of endorphins, reduce blood pressure, enhance respiration, regulate blood sugar levels, and remove carbon dioxide and water vapor from the lungs (W. F. Fry, 1994; McGhee, 1999). As such, laughter has been said to provide some degree of protection against cancer, heart attacks, stroke, asthma, diabetes, pneumonia, bronchitis, hypertension, migraine headaches, arthritis pain, ulcers, and all sorts of infectious diseases ranging from the common cold to AIDS (W. F. Fry, 1994; McGhee, 1999). With such a range of effects, it would seem that laughter threatens to put the major pharmaceutical companies out of business!

Many of the claimed health benefits of laughter are unproven and appear quite fanciful. For example, although it is often claimed that laughter provides the same health benefits as jogging and other forms of physical exercise, there is no published research evaluating this claim. It seems likely that one would need to laugh for quite a long time in order to consume a significant number of calories; people are likely better off taking up a more vigorous form of exercise if they wish to lose weight or enhance their cardiovascular fitness.

Other claims are essentially unfalsifiable and therefore of little scientific merit. An example is the suggestion that laughter reduces the risk of bronchial infections and pneumonia by expelling moist residual air from the lungs, resulting in a reduction of excess moisture that would otherwise encourage pulmonary bacterial growth (W. F. Fry, 1994). The difficulty with this claim (apart from the fact that there is no empirical evidence that laughter actually reduces moisture levels in the lungs) is that one could make an equally convincing argument for health-enhancing benefits of laughter regardless of the direction of its physiological effects. If it turned out that laughter somehow increased, rather than decreased, the pulmonary moisture level, one could come up with an equally plausible-sounding argument that it is beneficial because it keeps the lungs from drying out and shriveling up. Thus, regardless of what effect laughter may have on a particular system of the body, a “just-so story” can be concocted to explain why this effect is beneficial. It is interesting to note that one curmudgeonly nineteenth-century author used similar kinds of arguments in the opposite way to support his contention that laughter is actually *harmful* to physical health (Vasey, 1877)!

Part of the attraction of humor and laughter as a form of alternative medicine is that it is inherently enjoyable and, unlike many other health-promoting activities, it



does not require giving up pleasurable habits like smoking and overeating. The fact that it is free, in contrast to the high costs of many traditional and nontraditional treatments, makes it even more attractive. Given the popularity of these views, one runs the risk of being labeled as a killjoy if one questions whether humor and laughter actually produce the medical benefits that are claimed. However, a scientific approach requires that we examine the evidence.

As we saw in the previous chapter, there is good reason to believe that laughter can improve one's mood and that a healthy sense of humor can be beneficial for coping with stress and enriching one's relationships with others, enhancing one's quality of life. What is the evidence, however, that humor and laughter can also have a beneficial impact on aspects of physical health, such as strengthening the immune system, reducing pain, or prolonging the duration of one's life? As we will see, the existing evidence is rather weaker and more inconsistent than the media reports would lead us to believe.

### HOW MIGHT HUMOR AFFECT HEALTH?

The idea of health benefits of humor is more complex than it might first appear. For one thing, physical health is not a unitary concept. There are many different aspects and components of health, and they are not all correlated. Factors that are beneficial for some aspects of health might even be harmful for others. In addition, as previous chapters of this book have shown, humor is a complex phenomenon, involving cognitive, emotional, behavioral, physiological, and social aspects. Different components of humor could conceivably affect different aspects of health in a variety of ways (R. A. Martin, 2001).

If humor is beneficial for health, then presumably people with a greater sense of humor enjoy better physical health and live longer lives. But what aspects or components of "sense of humor" are likely to be health-enhancing? As noted in Chapter 7, there are numerous ways of conceptualizing this personality trait. Different dimensions of sense of humor might be related to health in different ways, and some may be more relevant to health than others. Indeed, some aspects or styles of humor (e.g., aggressive or self-defeating humor) might actually be detrimental to health in some ways.

Thus, it is important to consider the possible mechanisms by which humor could influence health. Systematic research is needed to investigate each of these potential mechanisms and to determine which components and aspects of humor are important and which are not. Only when we have gained such knowledge can we begin to design effective therapeutic interventions based on these findings. In general, five potential mechanisms may be considered, each involving different aspects of humor (and hence different ways of conceptualizing what it means to have a "healthy" sense of humor), and each suggesting different implications for health care interventions.

First, health benefits might result from some of the physiological effects of *laughter* itself, as suggested by many people over the years. As we saw in Chapter 6,

laughter is a facial and vocal expression of the emotion of mirth that involves respiratory, muscular, and vocal activity. As mentioned earlier, psychiatrist William Fry (1994) suggested that the muscular activity occurring in many parts of the body during vigorous laughter may be viewed as a form of aerobic exercise, burning calories and providing many of the well-known health benefits of physical exertion. He also suggested that laughter enhances pulmonary function, enabling the lungs to expel stale residual air containing built-up carbon dioxide and water vapor, thereby potentially reducing the risk of bronchial bacterial infections.

These ideas are quite speculative, but if they are correct, then it would be necessary for people to actually laugh in order to gain such benefits; simply being amused or feeling cheerful without laughing would not be enough. Indeed, laughter might even be expected to provide these effects without humor (e.g., feigned or forced laughter), as advocated by leaders of the laughter club movement (Kataria, 2002). The object of one's laughter would also seem to be unimportant: hostile laughter directed at other people should be just as effective as more friendly forms. From this perspective, the person with a "healthy" sense of humor is the one who laughs uproariously as often as possible, and therapeutic humor interventions should be aimed simply at encouraging people to engage in frequent and intense laughter.

A second potential mechanism whereby humor could conceivably influence health is through the physiological effects of the *positive emotion* (i.e., *mirth*) that accompanies humor and is expressed by laughter. As noted in Chapter 6, this pleasurable emotion is mediated by activity in the limbic system and other parts of the brain and, like other emotions, produces changes in the autonomic nervous system and endocrine system that extend throughout the body. Some of these physiological effects of mirth might have beneficial health effects. For example, the increased heart rate resulting from sympathetic arousal might provide a sort of cardiac workout (W. F. Fry, 1994).

We also saw in chapter 6 that there is evidence from animal studies suggesting the production of endorphins and other opiates during play, which might also occur with humor-related mirth, resulting in a greater tolerance for pain (Panksepp, 1998). Researchers are just beginning to explore the various neuropeptides that are released by the brain during states of positive as well as negative emotions (Panksepp, 1993), and some of these mirth-related biochemicals might conceivably have beneficial effects on various components of the immune system as well as other bodily functions (W. F. Fry, 1994).

It should be noted that, although popular writings on humor and health often attribute these sorts of physiological changes to vigorous laughter, they are more properly viewed as effects of the emotion that is communicated by laughter, as noted in Chapter 6. Thus, actually laughing out loud may not be necessary to achieve these effects: humor-induced feelings of mirth may be all that is needed. Nonhumorous exercises for inducing laughter, such as those used in laughter clubs, might not be very effective unless they also elicit the positive emotion of mirth along with the laughter.

In addition, it is worth noting that these potential benefits might not be specific to mirth, but might also result from other positive emotions that are not specifically humor-related, such as joy, happiness, and love, which might share many of the same brain circuits (Panksepp and Burgdorf, 2003). Thus, positive emotions, regardless of how they are generated, may have analgesic (Bruehl, Carlson, and McCubbin, 1993) or immunoenhancing effects (Stone et al., 1987) or may have an “undoing” effect on the potentially harmful cardiovascular consequences of negative emotions (Fredrickson and Levenson, 1998). If these hypotheses are correct, then they give humor and laughter a less unique role in health enhancement, as they are only one means of increasing positive emotions. In this view, a “healthy” sense of humor would involve a generally cheerful temperament characterized by happiness, joy, optimism, and a playful approach to life (Ruch and Carrell, 1998), and therapeutic interventions should aim at increasing people’s positive emotions by a variety of means in addition to humor. The promotion of laughter would be less important than seeking to enhance positive emotions.

Third, humor might benefit health through *cognitive* mechanisms, by moderating the adverse effects of psychosocial stress on health. A large body of research has demonstrated that stressful life experiences can have adverse effects on various aspects of health, such as suppression of the immune system (Uchino, Kiecolt-Glaser, and Glaser, 2000) and increased risk of heart disease (Esler, 1998), through the chronic production of various stress-related hormones such as catecholamines and cortisol. As noted in Chapter 9, humor may be an effective way of coping with stress, reducing its adverse effects on physical health as well as moods. A humorous outlook on life and the ability to see the funny side of one’s problems may enable individuals to cope more effectively with stress by allowing them to gain perspective and distance themselves from stressful situations, enhancing their feelings of mastery and well-being in the face of adversity (R. A. Martin et al., 1993; R. A. Martin and Lefcourt, 1983). As a consequence, these individuals may experience fewer of the adverse effects of stress on their physical health.

In this hypothesized stress-moderator mechanism, the cognitive-perceptual aspects of humor would be more important than laughter, and the ability to maintain a humorous outlook during times of stress and adversity would be particularly important; humor during nonstressful times would be less relevant to health. This view also introduces the possibility that certain types of humor (e.g., perspective-taking humor) may be more adaptive and health-enhancing than others (e.g., excessively self-disparaging humor). If this view is correct, therapeutic humor interventions should be viewed as a component of stress management training, focusing on teaching individuals ways of using humor to cope with stress in their daily lives.

Fourth, humor might indirectly benefit health through an *interpersonal* mechanism by increasing one’s level of social support. As noted in Chapter 9, individuals who are able to use humor effectively to reduce interpersonal conflicts and tensions and to enhance positive feelings in others may consequently enjoy more numerous and satisfying social relationships. As a result, they may enjoy the well-established

stress-buffering and health-enhancing effects of close relationships (House, Landis, and Umberson, 1988; Kiecolt-Glaser and Newton, 2001). This hypothesized mechanism focuses on interpersonal aspects of humor and the social competence with which individuals express humor in their relationships, rather than the frequency with which they engage in laughter. The target and nature of the humor becomes even more important in this model. Here, a “healthy” sense of humor would involve the use of humor to enhance relationships with others in an affiliative and nonhostile manner. Therapeutic humor interventions would be seen as an adjunct to social skills training, teaching individuals to develop a socially facilitative sense of humor, along with other skills for developing, maintaining, and enhancing intimate relationships.

Finally, a fifth (*behavioral*) mechanism by which humor might hypothetically have a beneficial effect on health is by promoting a healthy lifestyle. For example, one could speculate that people with a better sense of humor, because of their presumably higher self-esteem and more optimistic outlook on life, are more likely to engage in healthy behaviors such as obtaining regular physical exercise, eating healthy foods, maintaining an appropriate body weight, and refraining from smoking and excess alcohol consumption. However, research evidence bearing on this hypothesis, although rather limited, actually suggests that, if anything, the effects are the opposite: high-humor individuals seem to be more likely to engage in unhealthy lifestyles.

For example, in a longitudinal study of humor and physical health among Finnish police officers, Paavo Kerkkänen, Nicholas Kuiper, and I (2004) found that higher scores on some sense of humor scales (but not others) were associated with greater obesity, increased smoking, and factors associated with greater risk of cardiovascular disease. Similarly, the Terman life-cycle study, which followed a large sample of highly gifted individuals over many decades (to be discussed in more detail later in this chapter), found that those who were rated as being more cheerful as children (i.e., having a higher sense of humor and greater optimism) were more likely to smoke and consume alcohol as adults (L. R. Martin et al., 2002).

These apparent associations between humor and unhealthy lifestyle behaviors may be due in part to the more extraverted personality traits of high-humor individuals (Ruch, 1994). Past research has shown that extraverted individuals, in comparison with introverts, are more likely to drink alcohol (M. Cook et al., 1998), to smoke (Patton, Barnes, and Murray, 1993), and to be obese (Haellstroem and Noppa, 1981). Although such findings of an association between sense of humor and unhealthy lifestyle behaviors need to be studied in more detail before we make too much of them, they do suggest that humor may actually have some deleterious as well as potentially beneficial health consequences.

In summary, there are several different theoretical models of the mechanisms by which humor might potentially influence health. Each model suggests different approaches to the application of humor in health care and health promotion. In order to ensure that treatments are likely to be effective, systematic research should be conducted to test each of these models before developing such interventions.

## HUMOR AND IMMUNITY

The immune system is an exceedingly complex and dynamic network of many types of white blood cells (lymphocytes) and biochemical molecules distributed throughout all parts of the body, whose function is to discriminate between “self” and “nonself” antigens and protect the body from foreign invaders (Sanders, Iciek, and Kasprovicz, 2000; Uchino et al., 2000). Given the large number of components and the dynamic nature of the immune system, there is no single way of measuring overall immunocompetence. In recent years, research in the field of psychoneuroimmunology has demonstrated that there are intimate connections between the immune system and the brain, which communicate with one another by means of a variety of molecules such as neurotransmitters, hormones, neuropeptides, and cytokines. Psychological factors can therefore influence immunity, just as immunological factors can affect psychological functioning.

There is now considerable evidence that different emotional states have an influence on immunity through these brain-immune system communication channels (for a review, see Booth and Pennebaker, 2000). In particular, some research indicates that negative emotions, such as anger, depression, and fear, can adversely affect various components of immunity, and that these effects can result in poorer health. However, the effects vary for different aspects of immunity, with some immunity components also showing improvement in response to negative moods. The effects also seem to depend in part on the psychosocial context. It is therefore incorrect to assume that there is a one-to-one correspondence between specific emotions and specific immune system changes (Booth and Pennebaker, 2000).

Overall, potential effects of positive emotions on immunity are less well-documented than the effects of negative emotions, although this may be due to less attention having been given to positive emotions by researchers. Nonetheless, several studies have investigated hypothesized effects on immunity of the positive emotion associated with humor.

### Experimental Investigations

To study effects of humor on immunity, researchers have conducted experiments in which they obtained blood or saliva samples before and after participants watched humorous videotapes in the laboratory, and then conducted assays on these samples to determine the levels of various components of immunity, such as the secretion rates of various immunoglobulins and the ability of different types of lymphocytes to detect and combat antigens. A significant prevideotape to postvideotape change in these immunological variables suggests possible effects of humor on immunity.

Of course, these experiments also require appropriate control conditions, in which participants also watch nonhumorous (but equally interesting) videotapes, to ensure that any observed effects are due to humor and not some other factor, such as simply watching an interesting and enjoyable videotape, or the increases and decreases in biological variables (diurnal cycles) that occur naturally over the course of the day.

To determine whether any observed effects are specific to humor, or are also found with other positive or negative emotions, it is also desirable to include control conditions in which other emotions are elicited.

In addition, to explore possible mechanisms of any observed humor-related changes in immunity, researchers should examine the correlations between these immunological changes and such variables as the frequency of laughter and ratings of funniness, enjoyment, and moods obtained from the participants in the comedy condition. The relative strengths of these correlations can provide an indication of whether the effects are due to laughter in particular, or to the positive emotions associated with humor, or to other factors. For example, if changes in immunity are found to be significantly related to the duration or intensity of laughter, even after controlling for mood changes, this would suggest that laughter influences immunity even beyond the effects of mirth. Unfortunately, most of the research to date has not included the control conditions and observational measures needed to explore these sorts of questions.

The majority of the immunity-related experiments that have been conducted so far have examined only secretory immunoglobulin A (S-IgA), a component of the immune system found in saliva that is involved in the body's defense against upper respiratory infections. A number of investigations outside of the humor field have shown phasic (short-term) increases in levels of S-IgA in saliva while subjects are performing emotionally stressful, exciting, or challenging tasks in the laboratory (Harrison et al., 2000), whereas more tonic (longer-lasting) decreases in S-IgA levels have been found during times of life stress, such as when students are writing major examinations (Deinzer et al., 2000).

In the first published study of humor and immunity, Kathleen Dillon and her colleagues had nine college students individually watch a 30-minute comedy videotape (Richard Pryor performing stand-up comedy) and an emotionally neutral control videotape in counterbalanced order (Dillon, Minchoff, and Baker, 1985). The data analyses revealed a significant increase in the levels of S-IgA in saliva while the participants watched the comedy film, whereas no change in S-IgA was observed during the control film. Thus, humor appeared to produce at least a short-term improvement in this component of immunity.

These findings inspired Herbert Lefcourt and his colleagues to conduct a series of three experiments with larger sample sizes examining effects of exposure to comedy on S-IgA (Lefcourt, Davidson-Katz, and Kueneman, 1990). In each study, participants either listened to a comedy audiotape or watched a comedy videotape in small groups. All three studies showed significant increases in S-IgA following exposure to comedy relative to a baseline measure, providing further support for the findings of Dillon and her colleagues (1985). However, these studies had some methodological weaknesses that made the results somewhat inconclusive. Many of the baseline assessments of S-IgA were taken on different days, at different times of day, and in different locations than the postcomedy measures. In addition, these studies did not have adequate control groups. It is therefore difficult to know whether the observed effects were



specifically due to humor or whether they may have resulted from some other uncontrolled variables.

Better controls were used by David McClelland and Adam Cheriff (1997) in a series of three studies in which participants were shown either a comedy or a documentary control videotape. No consistent prevideotape to postvideotape increases in S-IgA were observed in the documentary videotape control conditions, whereas, in the comedy conditions, more subjects showed an increase than a decrease in S-IgA. Similar findings of humor-related increases in S-IgA have been obtained in three other experiments (Labott et al., 1990; Lambert and Lambert, 1995; Perera et al., 1998). However, two additional well-controlled experiments failed to replicate these findings (Harrison et al., 2000; Njus, Nitschke, and Bryant, 1996), casting some doubt on their reliability.

Besides the research on S-IgA, a few other laboratory experiments have examined effects of exposure to comedy videotapes on a variety of immunological variables assayed in blood samples. One of these, conducted by Lee Berk and his colleagues (1989), received a great deal of attention in the media and has frequently been cited in the humor and health literature. The participants in this study were 10 male medical personnel, five of whom were assigned as a single group to watch a 60-minute comedy video, whereas the other five sat quietly in a room together for an hour. Blood samples were collected via intravenous catheters in the forearm at several intervals before, during, and after the stimulus conditions, and assays were conducted for 19 immunity and endocrine-related variables. Among the participants in the comedy video group, the results showed significant increases from baseline in six immunity-related variables (T cell helper/suppressor ratio, blastogenesis, IgG, IgM, natural killer cell activity, and complement C3), suggesting immunoenhancing effects of humor. However, since comparisons were not reported for the control condition, we can only assume that similar changes did not also occur in those participants who did not watch the humorous video.

Although some promising results were obtained in this study, there are a number of methodological limitations that weaken our ability to draw firm conclusions. These include a small sample size, an inadequate control condition, and a very large number of statistical analyses, increasing the risk that the observed effects could simply have been due to chance. In addition, most of the immunity-related results of this study were never published in a peer-reviewed journal article, but were only reported in conference papers, leaving many details of the methodology and analyses unknown and therefore difficult to evaluate. Since the researchers did not measure the amount of laughter or moods of the participants, they were unable to examine the degree to which these factors mediated the effects. Overall, although this study showed some intriguing findings, it does not provide the sort of conclusive scientific evidence of immunoenhancing effects of laughter that have often been claimed for it.

Some additional experiments have also reported humor-related changes in various components of immunity measured in blood samples (L. S. Berk et al., 2001; Itami, Nobori, and Texhima, 1994; Kamei, Kumano, and Masumura, 1997; Mittwoch-Jaffe

et al., 1995; Yoshino, Fujimori, and Kohda, 1996). However, these studies also tended to have only small numbers of participants and inadequate controls. In addition, the results were rather inconsistent across the studies, with some showing immuno-enhancing effects, others showing immunosuppressive effects, and still others showing no significant effects with particular components of immunity. For example, whereas Berk and colleagues (2001) reported increases in T-cell helper-suppressor ratio and Natural Killer (NK) cell activity with exposure to comedy, Kamei and associates (1997) did not replicate the T-cell ratio finding and found a *decrease* in NK cell activity. Overall, then, although the existing experimental laboratory research suggests that exposure to comedy may have some short-term effects on some components of immunity, more systematic and well-controlled research is needed before any firm conclusions can be drawn concerning the exact nature of these effects.

There appears to be a particular interest in the potential health benefits of humor among researchers in Japan, as witnessed by some of the studies mentioned above, as well as several other more recent investigations that were conducted in that country. Hajime Kimata recently reported research suggesting that humor can reduce allergic reactions in individuals with allergies. In one study, after watching a humorous movie, individuals with dermatitis showed less severe allergic reactions in response to skin prick tests involving allergens such as house dust mites and cat dander, as compared to the more severe reactions that occurred after they watched a nonhumorous documentary film (Kimata, 2001).

In another study comprising two separate experiments, patients with allergy-related bronchial asthma showed reduced asthmatic reactions to allergens after they had watched a comedy videotape, whereas no such effect was found with a nonhumorous control film (Kimata, 2004b). This same researcher also found that watching a comedy film, but not a nonhumorous control film, resulted in a reduction in certain allergy-related immunoglobulins in the tears of patients with allergic conjunctivitis, an inflammatory eye condition (Kimata, 2004a). Taken together, these experiments suggest that, rather than enhancing immunity, humor may suppress the excessive immune responses that occur in certain allergic reactions by reducing the secretion of immunoglobulins such as IgE and IgG.

In another Japanese study, after watching a comedy videotape, healthy participants were found to have a significant increase in free radical scavenging capacity (FRSC), as indicated by increased levels (relative to baseline) of certain molecules in their saliva that are involved in the elimination of free radicals from the mouth (Atsumi et al., 2004). Free radicals are molecules that have been implicated in inflammation, aging, and the development of some types of cancer. Although this study was limited by the fact that it did not include a nonhumorous control condition, the amount of increase in FRSC was found to be significantly correlated with participants' ratings of their enjoyment of the videotape, suggesting a possible mediating role of mirth.

An additional Japanese study, although unrelated to immunity, is worth mentioning here. In this investigation, individuals with type 2 diabetes were found to have significantly lower blood glucose levels after eating a meal on a day when they had

previously attended a comedy show, as compared to a day when they had attended a nonhumorous, monotonous lecture (Hayashi et al., 2003). The authors theorized that neuroendocrine effects of mirthful emotion may have suppressed the elevation of glucose, suggesting that engaging in humor might be beneficial to people with diabetes to help control their glucose levels. These recent Japanese investigations suggest a number of intriguing possibilities of beneficial immunological and endocrine effects of humor-related positive emotion and laughter. However, the evidence is still far from conclusive. Further research is needed to replicate and explore the mechanisms of these effects in greater detail, using larger samples and more rigorous methodologies, before we can be confident of their reliability and clinical utility.

### Correlational Studies

A limitation of the sorts of experiments described in the previous section is that they are not able to determine whether there are any long-term health benefits of humor and laughter on immunity. Even though there may be statistically significant short-term changes in immunity-related variables with exposure to comedy in the laboratory, it is important to determine whether such changes have any longer-term clinical significance. If humor has clinically meaningful beneficial effects on the immune system, then it should be possible to demonstrate that individuals who engage in laughter and humor more frequently (i.e., those with a greater sense of humor) have generally greater immunocompetence and are less likely to suffer from infectious illnesses over time. In other words, there should be a positive correlation between sense of humor and immunity-related variables and a negative correlation between sense of humor and rates of infectious illnesses. Although research on this question is limited, the results to date have generally been disappointing.

With regard to infectious illnesses, McClelland and Cheriff (1997) found no correlation between several self-report measures of sense of humor and the frequency or severity of colds experienced by participants, either retrospectively or prospectively over a period of three months. Several studies have also examined correlations between levels of S-IgA measured in saliva and participants' sense of humor as assessed by self-report scales. Although two early studies with very small sample sizes reported sizable positive correlations between scores on the Coping Humor Scale (CHS) and S-IgA (Dillon et al., 1985; Dillon and Totten, 1989), some later studies with larger sample sizes failed to replicate these findings (Labott et al., 1990; Lefcourt et al., 1990; R. A. Martin and Dobbin, 1988).

It should be noted, however, that immunity levels are likely to fluctuate considerably over time, so that levels obtained in a single assay may be too unreliable to expect significant correlations with a trait measure of humor. Future research should aggregate immune measures across a number of assays over a period of time and examine correlations with trait humor test scores. An even better method would be to take a longitudinal approach, examining possible associations between day-to-day fluctuations in participants' experiences of humor, laughter, and cheerfulness, and corresponding fluctuations in their levels of various immunity variables over a number

of days or weeks. A link between humor and immunity would be supported if increases and decreases in immunity from day to day are systematically related to the experience of more or less humor on those days.

Finally, James Dobbin and I conducted a study to determine whether sense of humor as a personality trait might moderate the effects of life stress on immunity (R. A. Martin and Dobbin, 1988). Numerous past studies have shown that stress can have an adverse effect on various components of the immune system (Uchino et al., 2000). As we saw in Chapter 9, there is some evidence that people with a greater sense of humor are better able to cope with stress, and they might therefore also be less likely to experience the adverse effects of stress on immunity. In our study, using undergraduate students as participants, we administered a measure of daily stress and assayed S-IgA levels in saliva samples on two different occasions 1½ months apart. Sense of humor was assessed using several self-report scales, including the SHRQ, CHS, and SHQ.

The results revealed that daily stress scores at Time 1 were negatively related to S-IgA levels at Time 2, indicating an immunosuppressive effect of stress. More importantly, significant stress-moderating effects were found on this relationship with three of the four sense of humor measures. In each case, participants with low humor scores showed strong negative correlations between stress and immunoglobulins, whereas this association was much weaker or even nonexistent among those with high humor scores. Although these findings are in need of replication, they suggest that the stress-moderating effects of humor that have been found in other studies with mood measures may also extend to effects of stress on immunity.

Overall, despite the claims that are often made in the popular media and “humor and health” literature, the existing evidence for beneficial effects of humor on immunity is still rather weak and inconclusive. Although a number of laboratory experiments have found significant changes in some components of immunity while participants were watching humorous videotapes, these findings have not always been replicated, with some results even going in opposite directions in different studies. The correlational studies have generally failed to find significant associations between sense of humor and immunity, raising questions about the long-term clinical significance of the short-term effects that have been found in the laboratory.

It should also be noted that none of the laboratory studies assessed the frequency of Duchenne laughter and smiling or the funniness of the comedy videotapes. Future research should include such measures to examine whether they are correlated with the strength of any observed changes in immunity, thereby providing further evidence that the effects are due to mirth. The studies also have tended to be very small, with numerous methodological weaknesses. Part of the difficulty here seems to be that, unfortunately, very little funding is available for conducting these sorts of experiments, which tend to be quite costly. Research on possible effects of humor on immunity does not seem to have a high priority for the government granting agencies and pharmaceutical companies that fund most of the health-related research. Consequently, researchers in this area have had to make do with small-scale studies, cutting corners

on the types of control groups and other design features that are needed in order to draw firm conclusions.

## HUMOR AND PAIN

As noted earlier in the chapter, the case of Norman Cousins suggested that laughter may have a pain-reducing effect, perhaps due to the hypothesized release of endorphins in the brain when people are experiencing mirthful emotion. Since then, several experiments have been conducted to determine whether humor can be shown to increase pain tolerance under controlled laboratory conditions. These investigations have employed research designs similar to those used in the immunity research, testing participants' pain threshold or tolerance before and after exposing them to comedy videotapes and comparing the findings with those obtained in nonhumorous control conditions.

Pain threshold and tolerance are measured using procedures that were developed in traditional experimental studies of pain, in which participants are exposed to painful (but not harmful) stimuli. The most popular of these is the cold pressor procedure, in which participants are asked to immerse their arm in a tub of ice cold water for up to a few minutes. Pain threshold is defined as the amount of time elapsed before the participant reports the stimulus to be painful, while pain tolerance is the duration of time before the individual cannot tolerate the stimulus any longer and wishes to terminate it (i.e., remove his or her arm from the ice water).

These experiments have generally been more carefully controlled and methodologically rigorous than the immunity research (likely because they are less expensive to conduct). Most of the studies have had several control groups, controlling for such factors as distraction, relaxation, and negative emotion. For example, Rosemary Cogan and her colleagues conducted an experiment in which college students were randomly assigned to either humor (an audiotape of Lily Tomlin performing stand-up comedy), relaxation (a progressive muscle relaxation tape), dull narrative (a lecture on ethics), or no-treatment control conditions (Cogan, Cogan, Waltz, and McCue, 1987). The results showed no difference between the laughter and relaxation groups on pain threshold measures obtained following the manipulation; however, thresholds for both of these groups were significantly higher than those for the dull narrative and no-treatment conditions. Thus, exposure to humor and relaxation both produced increases in the amount of noxious stimulus that participants were able to experience before they began to perceive it as painful, suggesting that humor, like relaxation, may have an analgesic effect.

In a second study, these same authors sought to rule out other possible alternative explanations for these findings by assigning students to either comedy (an audiotape of Bill Cosby performing stand-up comedy), interesting narrative (an absorbing Edgar Allen Poe story), dull narrative (an ethics lecture), active distraction (performing a multiplication task), or no-treatment conditions. The results revealed that

participants' pain thresholds following these conditions were significantly higher in the comedy condition than in all the other groups. These results indicate that the humor-related increase in pain tolerance was not simply due to distraction or absorption, suggesting a possible physiological mechanism. Similar results have been obtained in other well-controlled experiments (J. Weaver and Zillmann, 1994; Weisenberg, Tepper, and Schwarzwald, 1995; Zillmann, Rockwell, Schweitzer, and Sundar, 1993), providing fairly consistent evidence that exposure to comedy results in increased pain threshold and tolerance.

There is also some evidence that the analgesic effects of humor observed in the laboratory may extend to clinical interventions, but perhaps only with moderate rather than severe levels of pain. In a field study, James Rotton and Mark Shats (1996) assigned hospitalized orthopedic surgery patients to one of three conditions: (1) a humorous movie group, who watched four feature-length comedy movies during the two days post-surgery; (2) a nonhumorous movie group, who watched four dramatic movies; or (3) a no-movie control group. The results showed lower levels of minor analgesic (e.g., aspirin) usage during the two days post-surgery in participants watching the humorous movies as compared to those in the other two groups. However, these effects did not extend to the use of major analgesics such as Demerol and Percodan. Furthermore, these findings were only obtained among patients in the humorous movie condition who were permitted to choose which movies they would watch; those who were not given any choice over the comedy movies they were to watch actually showed significantly *higher* levels of analgesic usage compared to the control groups. Thus, watching humorous films that are not consistent with one's own humor preferences may be aversive rather than beneficial.

Although these studies suggest that exposure to humor can reduce pain, it is interesting to note that similar effects are also found with negative emotions. Experiments that have included negative emotion control conditions, in addition to comedy conditions, have demonstrated similar increases in pain threshold and tolerance with exposure to videotapes inducing emotions like disgust, horror, or sadness. For example, Matisyohyu Weisenberg and colleagues (1995) found equal increases in pain tolerance in a group of participants exposed to a comedy film and a group exposed to a disgusting horror film, both of which showed greater pain tolerance than those in neutral-film and no-film control conditions. Similar results were found in other studies comparing the effects of humor to tragedy (Zillmann et al., 1993) and sadness (J. Weaver and Zillmann, 1994). These findings suggest that the observed analgesic effects may occur with both positive and negative emotional arousal, rather than being specific to mirth.

Although these humor-related increases in pain tolerance and threshold appear to be quite robust, the exact mechanisms involved are still not clear. The effects appear to take some time to build up, since they have only been found in studies that tested pain tolerance after the comedy film ended and not while participants were still watching the film (Nevo, Keinan, and Teshimovsky-Arditi, 1993). Furthermore, Weisenberg and colleagues found that the increased pain threshold and tolerance continued for 30 minutes after exposure to a humorous videotape, even after participants'



self-rated moods had returned to baseline (Weisenberg, Raz, and Hener, 1998). The authors interpreted these findings as indicating that humor-related mirth induces physiological changes that affect the sensory components of pain, rather than simply altering the cognitive-affective-motivational components of pain, and that these physiological changes take some time to develop and continue even after initial mood changes have dissipated.

A study by Diana Mahony and her colleagues suggests that humor-related increases in pain tolerance may be mediated by expectancies (Mahony, Burroughs, and Hieatt, 2001). In this study, before being shown a humorous videotape, the participants were told either that humor is known to increase pain tolerance (positive expectancy condition), or that humor has been shown to *decrease* pain tolerance (negative expectancy condition), or they were told nothing about the effects of humor on pain (no expectancy condition). The positive expectancy and no expectancy groups both showed significantly greater increases in pain thresholds following exposure to the comedy videotape, as compared to the negative expectancy group. These results suggest that the analgesic effects of humor may be a sort of placebo effect. However, this does not negate the possibility that they are mediated by physiological processes, since placebo analgesic effects have been shown in other studies to be mediated by physiological mechanisms including endorphin production in the brain (Benedetti, 2002).

Until recently, none of the humor and pain studies had examined correlations between the frequency of participants' laughter during the comedy film and changes in their pain tolerance, and it was therefore unclear whether the effects are due to laughter in particular, to the positive emotion of mirth, or to some other factor such as the cognitions involved in humor. A recent experiment by Karen Zweyer and her colleagues was designed to address this question. In this study, participants watched a comedy film (*Mr. Bean at the Dentist*) that contained sound effects but no dialogue, and they were instructed to either (1) enjoy the film but inhibit all smiling and laughter, (2) smile and laugh as much as possible during the film, or (3) produce a humorous narrative while watching the film (Zweyer, Velker, and Ruch, 2004). Using the cold pressor procedure, pain tolerance was measured before, immediately after, and 20 minutes after the film. The researchers also videotaped the participants during the procedure, and subsequently coded their facial expressions for genuine (Duchenne) and forced (non-Duchenne) smiling and laughter, using the Facial Action Coding System (which was described in Chapter 6).

Overall, the three conditions yielded similar significant increases in pain threshold and tolerance relative to baseline, which were evident immediately after the film and continued 20 minutes later. These results indicate that neither laughter nor humor production are necessary, beyond feelings of amusement, for the pain reduction effect to occur. Moreover, the observed increases in pain tolerance were found to be positively associated with genuine enjoyment smiles (Duchenne display), but not with the frequency or intensity of laughter. In fact, voluntary efforts to exhibit or amplify laughter-related positive emotions were actually *negatively* associated with pain tolerance. Although these findings should be replicated before we can draw firm

conclusions, they cast doubt on the hypothesis (derived from the case of Norman Cousins) that hearty laughter is necessary for the increase in pain tolerance to occur. Instead, the results suggest that the mechanisms have more to do with the amusement-related positive emotion of mirth. Laughter does not seem to be necessary and, in fact, forcing oneself to laugh seemed to have a contrary effect (a finding that may be problematic for the laughter club movement).

In summary, there is quite consistent empirical support for Norman Cousins' observation that laughter reduces pain, although the evidence suggests that the effect is not due to laughter *per se*, but rather to the positive emotion of mirth that accompanies humor and that is typically expressed by laughter. The research also indicates that these analgesic effects occur with negative as well as positive emotions. We still do not know, however, whether the humor-related increases in pain tolerance are mediated by endorphins. Indeed, the popular view that humorous mirth is associated with endorphin production in the brain has not yet been substantiated by research. In fact, experiments that have assessed levels of beta-endorphin in blood samples have not found any changes in this variable when participants were exposed to comedy films (L. S. Berk et al., 1989; Itami et al., 1994). However, blood tests may not be sensitive to changes in opiate levels occurring in the brain. One potential method for investigating the endorphin mediation hypothesis would be to determine whether humor-associated increases in pain tolerance disappear when participants are first given the opiate antagonist Naloxone. If Naloxone, which blocks endorphin receptors in the brain, cancels out the pain-reducing effect of humor, this would indicate that the effect is mediated by endorphins. This is an interesting question that should be pursued in future research.

### HUMOR, BLOOD PRESSURE, AND HEART DISEASE

Although some authors have speculated that frequent hearty laughter may lead to a reduction in blood pressure (e.g., McGhee, 1999), experimental studies indicate that laughter is actually associated with short-term increases in blood pressure and heart rate, but no longer-term effects. Sabina White and Phame Camarena (1989) conducted a six-week intervention study to examine the effects of laughter on systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR). They randomly assigned participants to a laughter treatment group, a relaxation group, or a health-education control group, each of which met for 6 weekly sessions of 1½ hours. The results showed no significant pre-session to post-session changes in DBP, SBP, or HR in the laughter or health-education groups, whereas the relaxation group showed significantly lower post-session HR and SBP in comparison with both of the other groups. Thus, this study did not support the hypothesis that sustained laughter results in lower levels of heart rate and blood pressure over time.

In a study of the relation between trait sense of humor and blood pressure, Herbert Lefcourt and his colleagues examined correlations between participants' scores on the Situational Humor Response Questionnaire (SHRQ) and the Coping

Humor Scale (CHS) and their SBP and DBP levels during a series of stressful laboratory tasks (Lefcourt, Davidson, Prkachin, and Mills, 1997). No significant correlations were found between the sense of humor scales and DBP, but an interesting sex difference was revealed in the pattern of correlations with SBP. Women with higher scores on the sense of humor measures, as compared to women with lower scores, were found to have generally lower levels of SBP, supporting the idea that a sense of humor is negatively related to blood pressure. However, the opposite relation was found for men: those with higher humor scores had *higher* overall levels of SBP as compared to their low-humor male counterparts. The authors suggested that these findings may be due to differences in the way men and women express humor, with women perhaps engaging in more tolerant, self-accepting, and adaptive forms of humor, potentially leading to more beneficial physiological effects (Crawford and Gressley, 1991). In contrast, greater humor in men may reflect greater competitiveness and aggressiveness, resulting in more elevated blood pressure. These findings hint at the possibility that different styles or types of humor may have quite different health consequences.

Adam Clark and his colleagues conducted a study at the University of Maryland Medical Center to determine whether there is a correlation between coronary heart disease (CHD) and sense of humor (A. Clark, Seidler, and Miller, 2001). They administered the SHRQ (which, as noted in Chapter 7, assesses the degree to which individuals frequently laugh and smile in a wide variety of situations) to 300 consecutive patients diagnosed with CHD, as well as biological family members of these patients. The results showed that, on average, the CHD patients had significantly lower SHRQ scores than did their healthy relatives, suggesting that a lower sense of humor may be a risk factor for heart disease. Scores on this sense of humor measure were unrelated to other risk factors such as diabetes, hypertension, or cigarette smoking. However, individuals with higher SHRQ scores had significantly lower scores on a measure of hostility, which has previously been shown to be related to a greater risk of heart disease (Williams et al., 1980). Although these findings suggest that a sense of humor may provide some protection against heart disease, a serious weakness of the study is that the humor test was administered after patients had already developed the disease. The causal effect may therefore be opposite to what is proposed: people who have recently had a heart attack may be less inclined to respond to situations with humor and laughter, resulting in lower SHRQ scores. Further research is therefore needed using prospective designs to determine whether nonsymptomatic people with lower humor scores are more likely to develop heart disease at a later time.

## HUMOR AND ILLNESS SYMPTOMS

If humor and laughter confer beneficial effects on immunity and other aspects of health, individuals who laugh more frequently and have a better sense of humor should be generally less likely to become ill. To test this hypothesis, several researchers have examined simple correlations between trait measures of sense of humor, such as the

SHRQ and CHS, and overall health, as measured by self-report physical symptom checklists. Some of these studies have found the predicted negative correlations between these variables, indicating that individuals with a greater sense of humor tend to report fewer medical problems and illness symptoms (Boyle and Joss-Reid, 2004; Carroll and Schmidt, 1992; Dillon and Totten, 1989; P. S. Fry, 1995; Ruch and Köhler, 1999). Other studies, however, have failed to replicate these findings (Anderson and Arnoult, 1989; Labott and Martin, 1990; Porterfield, 1987).

Additionally, two studies found a significant stress-moderating effect of sense of humor on self-reported illness symptomatology, indicating that individuals with higher sense of humor scores were less likely to report becoming ill following high levels of stressful life events (Abel, 1998; P. S. Fry, 1995). However, these findings were not replicated in other studies with larger sample sizes (Korotkov and Hannah, 1994; Porterfield, 1987). One study even found an interaction between humor and stress that was opposite to predictions, with high-humor individuals showing a greater tendency to report illness following negative life events (Anderson and Arnoult, 1989). Thus, there is no consistent evidence that people with a greater sense of humor are less likely to become ill.

It is important to note that self-report measures of illness symptoms are often confounded with negative emotionality or neuroticism, making them somewhat unreliable measures of objective health status (D. Watson and Pennebaker, 1989). People who generally experience more negative moods, as compared to less neurotic individuals, tend to perceive themselves as being less healthy, even though they may not differ in objective health status. Because sense of humor tests tend to be somewhat 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 objective health benefits of humor. It is therefore important for researchers to partial out the effects of neuroticism in such research. This was done in only one study, and in that study the correlation between sense of humor and physical illness symptoms disappeared after controlling for neuroticism (Korotkov and Hannah, 1994).

A recent study by Sven Svebak and colleagues represented a unique opportunity to include a measure of sense of humor in a large population health study that involved the entire adult population of a county in Norway (Svebak, Martin, and Holmen, 2004). Besides completing a three-item humor measure derived from Svebak's (1996) Sense of Humor Questionnaire (SHQ-6), over 65,000 participants completed a survey about their illness symptoms in a variety of domains (e.g., nausea, diarrhea, pounding heart, dyspnea, musculoskeletal pain) and their overall health satisfaction, and were also assessed for blood pressure, height, and weight (allowing for computation of body mass index, a measure of obesity). As such, this is the largest correlational study of sense of humor and health ever conducted. However, the results provided very little evidence for a direct association between sense of humor and health. After controlling for age, no meaningful correlations were found between sense of humor and either illness symptoms or objective health indicators, although the study did find a weak relation between sense of humor and satisfaction with health.

These results suggest that, although high-humor individuals do not seem to have objectively better health, they are somewhat more subjectively satisfied with their health.

In view of the very large sample size of this survey, the broad age range of participants, and the unselected nature of the sample, these data provide quite convincing evidence that people with a greater sense of humor (at least as defined by high scores on such self-report tests as the SHQ) are no more healthy overall than are their low-humor counterparts. If a sense of humor does confer any health benefits, it would appear that either they are too subtle to be captured by such a cross-sectional design, or the type of humor involved is not adequately captured by the SHQ. For example, this study did not include a measure of life stress, so the authors were unable to examine the possibility of a stress-moderating effect of sense of humor on health. In addition, the possibility remains that effects of humor on health might emerge over time in a longitudinal design.

A study by Nicholas Kuiper and Sorrel Nicholl (2004) also bears on the relation between sense of humor and satisfaction with health. These authors suggested that it may be important to distinguish between actual and perceived physical health, and proposed that a sense of humor may contribute to more positive perceptions of physical health than may actually be warranted. Using a sample of undergraduate students, they found that individuals with higher scores on sense of humor measures reported more positive health-related perceptions, such as less fear of serious disease or death, less negative bodily preoccupation, and less concern about pain. These results are consistent with the finding of Svebak et al. (2004) that higher sense of humor is related to greater subjective satisfaction with health but not with more objective indicators of health status. These findings may help to explain the popularity of the idea that humor is beneficial for one's health. People with a greater sense of humor may perceive themselves to be healthier, showing less concern and preoccupation with symptoms of illness, even though they are not objectively healthier. Thus, although the direction of causality is unclear in correlational research such as this, it may be that humor contributes to one's quality of life without making one physically healthier.

## HUMOR AND LONGEVITY

If humor has beneficial effects on physical health, then it should be possible to demonstrate that, on average, people who more frequently engage in humor and laughter tend to live longer than their less humorous counterparts. Indeed, this would seem to be the most important test of the humor-health hypothesis. Although one could still argue that frequently engaging in humor and laughter can at least improve the quality if not the duration of life, it is difficult to see how claims for actual physical health benefits of humor can be sustained if it does not prolong life. Unfortunately, the research evidence in this regard, although limited, is not very encouraging.

James Rotton (1992), in a series of four separate studies, found no differences in the life duration of comedians and comedy writers, as compared with that of serious entertainers and authors. Interestingly, though, he found that both professional humorists and serious entertainers died at a significantly *younger* age than did people who were famous for other reasons, perhaps due to the stresses or unhealthy lifestyles of people in the entertainment industry. Thus, the ability to create humor and to make other people laugh (as epitomized in individuals who make a living by their comedic abilities) does not appear to confer any health benefits resulting in greater longevity.

Another study suggests that having a sense of humor may actually cause people to die at an *earlier* age than they would otherwise. Howard Friedman and his colleagues conducted analyses of data from 1178 male and female participants from the well-known Terman Life-Cycle Study, a longitudinal investigation that followed a cohort of intellectually gifted individuals for many decades beginning when they were children in the 1920s (Friedman, Tucker, Tomlinson-Keasey, Schwartz, et al., 1993). A composite measure of cheerfulness was derived from parent and teacher ratings of sense of humor and optimism that had been obtained on these individuals at the age of 12. Surprisingly, survival analyses revealed that those individuals who were rated as having higher cheerfulness at age 12 had significantly *higher* mortality rates throughout the ensuing decades. Thus, on average, more cheerful individuals were more likely to die at a younger age as compared to their less cheerful counterparts. The higher mortality rates were found in both men and women, and applied to all causes of death.

The authors suggested that these surprising results may be due to more cheerful individuals being less concerned about health risks and taking less care of themselves, as compared to more serious people. Ironically, the greater health satisfaction and lowered concern about health problems found in high-humor individuals (Kuiper and Nicholl, 2004; Svebak, Martin et al., 2004) may lead to a more blasé attitude toward health risks and consequently higher mortality rates.

Proponents of the health benefits of humor have sought to dismiss the findings of this study in a number of ways, suggesting, for example, that the definition of sense of humor was inappropriate, or that the results were due to the optimism component of the composite cheerfulness measure rather than the sense of humor component, or that cheerfulness in this study reflected a lack of emotional adjustment. However, these arguments do not appear to stand up under closer scrutiny. The question that was used for rating sense of humor in this study had at its positive pole the following description: "Extraordinarily keen sense of humor. Witty. Appreciates jokes. Sees the funny side of everything," and at its negative pole the following: "Extremely lacking in sense of humor. Serious and prosy. Never sees the funny side." It seems difficult to argue that this description is very different from the way most people today (including advocates of the "humor and health" movement) would describe a sense of humor.

Moreover, a follow-up analysis of these data found that the higher mortality rates remained even when the sense of humor rating was used by itself, and not just in combination with optimism (L. R. Martin et al., 2002). These analyses also found that



individuals who were rated higher on cheerfulness as children were no more likely to be neurotic or to have emotional problems later in life and, indeed, they were better adjusted and more carefree in adulthood, as well as being more extraverted. On the other hand, the analyses showed that children who were rated as more cheerful in childhood went on to smoke more cigarettes, consume more alcohol, and engage in more risky hobbies as adults, although these unhealthy lifestyle behaviors did not completely account statistically for their higher mortality rates. Overall, then, rather than supporting the hypothesis that a sense of humor increases longevity, the existing evidence, though limited, suggests that a sense of humor may actually be an illness risk factor.

## CONCLUSION

Of all the health benefits claimed for humor and laughter, the most consistent research support has been found for the hypothesized analgesic effects. After watching humorous films in the laboratory, individuals tend to be able to tolerate increased levels of pain, and there is some limited clinical evidence that humor can reduce post-surgical pain. The research suggests that the observed pain-reducing effects are likely due to amusement-related positive emotion, rather than to laughter *per se*, although similar effects are also found with negative emotions. The popular idea that these effects are mediated by the production of endorphins or other opiates in the brain has not yet been investigated, although this appears to be a plausible explanation. More extensive research is needed to explore these mechanisms and to determine whether these effects are strong enough to be useful for applications of humor in the treatment of pain resulting from clinical conditions.

With regard to possible effects of humor and laughter on immunity, the research to date is not as consistent or conclusive. Some short-term effects of exposure to comedy on some components of immunity have been observed in the laboratory, and recent findings of reduced allergic reactions are intriguing. However, these studies tend to be quite small, with many methodological limitations, and some of the findings have been inconsistent across studies. More systematic and rigorous research is needed to replicate these findings and explore possible mechanisms before firm conclusions can be drawn. Research in the general field of psychoneuroimmunology indicates that emotional states can influence immunity through the many communication channels linking the brain and the immune system. There is therefore reason to expect interactions between the emotion of mirth and immunity as well. However, these complex interactions are still not well understood, and there does not appear to be a simple one-to-one relation between specific emotions and particular changes in immunity (Booth and Pennebaker, 2000).

Although the research offers some interesting suggestions of possible effects of humor on immunity, there is little evidence that people who have a better sense of humor and laugh more frequently have better immunity, enjoy better health overall, or live longer lives. There is even some research suggesting that more humorous and

cheerful people may actually die at an earlier age than their more serious counterparts. This may be due to high-humor individuals having less concern about health issues, a more risky lifestyle, or a reduced tendency to take health problems seriously and seek appropriate medical treatment when needed.

Nonetheless, even though more humorous and cheerful people may not live longer, they may enjoy a better quality of life and greater overall life satisfaction. It also remains possible that different types of humor may affect different aspects of health in different ways. Although a cheerful sense of humor might contribute to earlier mortality by causing people to take less care of themselves overall, it remains possible that mirth could produce biochemical changes having some health benefits, or that the use of certain styles of humor could facilitate coping with stress or enhance intimate relationships, indirectly producing some positive health effects.

Those who advocate humor and laughter as a pathway to better health seem to have moved too quickly to promote their views on the basis of rather flimsy research evidence. Besides the need for more basic research in this area, the effectiveness of humor-based interventions needs to be carefully evaluated before they are widely implemented. For some proponents, this health fad may be seen as an opportunity for making money through promotional books and workshops, but many others appear to be motivated by genuine concern about helping others. In either case, a strong commitment to belief in health benefits of humor and laughter can make it difficult for advocates to evaluate the research objectively.

One could perhaps argue in defense of proponents of the “humor and health” movement that, although humor may not produce all the health benefits that have been claimed, at least it is not likely to be harmful and it can enhance people’s enjoyment if not the duration of their lives. There is certainly some merit to this line of argument. There is undoubtedly nothing wrong with encouraging people to enjoy humor and to laugh more often, especially if they are suffering from a serious illness that would otherwise reduce their enjoyment of life. However, there is a risk that unfounded claims of health benefits of humor and laughter may raise false hopes in sick individuals.

There is also a danger that an emphasis on the health benefits of humor and laughter could lead to an unjustified perception that people have more control over their health than they actually do, fostering a subtle tendency to blame people for their illnesses. Consequently, those who become ill may begin to feel guilty because they supposedly did not laugh enough. In addition, exaggerated claims about unfounded health benefits of humor and laughter can contribute to perceptions that this is nothing more than a fringe movement and a passing fad, which could dissuade researchers and funding agencies from conducting and funding well-designed large-scale experiments in this field, thereby delaying progress in identifying those health effects that may be genuine.

Theories about possible health benefits of humor need to be based on plausible biological mechanisms. From an evolutionary perspective, it seems unlikely that the primary function of humor and laughter is to improve people’s physical health. As noted in Chapter 6, comparative research suggests that the positive emotion

associated with humor is related to social play, and that laughter is an expressive behavior communicating playful emotions and intentions to others. In Chapter 5, I also discussed in some detail the many social functions of humor and laughter. Thus, the origins of humor and laughter seem to have more to do with social interaction and the social nature of human existence than with physical health. Nonetheless, it remains possible that these emotions and behaviors may have some physiological and psychological concomitants that could indirectly affect aspects of health.

The interactions between emotions and immunity that have been found by researchers likely have to do with the fact that both are involved in constructing and maintaining relationships between the individual and his or her environment (Booth and Pennebaker, 2000). Emotional feelings of distress and well-being are signals concerning the state of the organism, providing useful information for the immune system, which is also concerned with individual integrity and well-being. Hence, feelings of cheerfulness and a playful, humorous perspective may be in part a signal that one's physiological resources are adequate for dealing with threats to well-being, as well as perhaps contributing to the mobilization of those resources (Leventhal and Patrick-Miller, 2000). Thus, there are some theoretical grounds for proposing possible effects of humor on some health-related variables, even though these effects may not be the primary function of humor from an evolutionary perspective.

Despite the limitations of the existing research evidence, more systematic investigation in this area appears to be warranted by the suggestive research findings, as well as the theoretical plausibility of some sort of humor-health connections. As discussed earlier, future experimental research should include appropriate control conditions to rule out alternative explanations for findings, as well as examining the role of laughter and mirth in mediating any observed effects. Animal research may also be helpful in clarifying neural and biochemical mechanisms involved in physiological effects of play-related emotions (Panksepp and Burgdorf, 2003).

Future research should also examine the different theoretical models linking humor and health that I discussed earlier in this chapter. Most of the existing research has focused on hypothesized direct effects of laughter and mirthful emotion on physiological variables such as immunity. Little research has been conducted on possible indirect effects, such as potential health benefits of enhanced interpersonal relationships and more effective coping with stress resulting from a healthy sense of humor. Here, as suggested in the Chapter 11, it would seem to be important to distinguish between different types or styles of humor, some of which may be beneficial to health while others may even have adverse effects. In the end, it may be that, as with psychological health, the absence of certain deleterious types of humor (e.g., hostile humor) may be as important (or perhaps even more important) for physical health as the presence of other more benign forms of humor.



## Applications of Humor in Psychotherapy, Education, and the Workplace

Over the past two decades, there has been a growing interest in potential applications of humor in a variety of professional domains. In Chapter 10, I discussed possible benefits of humor and laughter for physical health, as well as the use of various humor-based interventions by health care providers. In this chapter, I will explore potential benefits (and also possible risks) of humor applied to the fields of psychotherapy and counseling, education, and the workplace.

A number of individuals working in each of these areas have enthusiastically promoted the use of humor-related techniques and interventions in their respective disciplines, and numerous articles in professional and trade journals, books, and Internet websites have appeared on this topic. Among its membership, the Association for Applied and Therapeutic Humor (AATH) includes psychotherapists, marriage and family counselors, teachers, and consultants to business and industry, along with physicians, nurses, and other health care practitioners, all of whom are interested in the way humor and laughter may be applied to their respective fields.

Most of the claims that have been made about potential benefits of humor in these different areas are based on anecdotal evidence and personal experiences, although humor advocates also frequently cite various research findings to bolster their arguments. Although the empirical research in each of these areas is quite limited, in the following sections I will explore the relevant findings, attempting to weigh the

evidence for various claims, as well as pointing out those questions that still require further study.

The topics of this chapter bring us to the applied areas of psychology, particularly clinical and counseling, educational, and industrial-organizational (I/O) psychology. Each of these branches of psychology represents a combination of professional practice and science. As practitioners, psychologists working in these fields seek to apply relevant findings and principles derived from the more basic research areas of the discipline to solve real-world problems relating to individual emotional and behavioral disturbance, teaching and education, and the world of business and industry, respectively. As scientists, they conduct empirical research to examine the effectiveness of their interventions and to answer important theoretical and practical questions relating to their fields.

As a consequence of this scientific orientation, applied psychologists tend to be rather skeptical about unsubstantiated claims regarding novel treatment interventions, teaching methods, or business practices, emphasizing instead the importance of applying empirical methods to investigate the validity of these sorts of practices. Thus, while maintaining an open mind about possible benefits of humor-related applications in these areas, a psychological perspective requires that we carefully sift through the evidence and avoid being carried away by unfounded enthusiasm.

## HUMOR IN PSYCHOTHERAPY AND COUNSELING

Based on the idea that humor has important benefits for mental health (as discussed in Chapter 9), therapists from a variety of different theoretical perspectives are showing a growing interest in the potential role of humor in psychotherapy and counseling. A number of journal articles and books have been written on this topic in recent years (Buckman, 1994; Franzini, 2000, 2001; W. F. Fry and Salameh, 1987, 1993; Gelkopf and Kreitler, 1996; Haig, 1988; Kuhlman, 1984; Lemma, 1999; Rutherford, 1994; Saper, 1987; Strean, 1994). Humor-based interventions have been advocated in the treatment of a wide variety of psychological problems ranging from depression (Richman, 2003), stress-related disorders (Prerost, 1988), obsessive-compulsive disorders (Surkis, 1993), and phobias (Ventis, Higbee, and Murdock, 2001), to antisocial personality disorder (Martens, 2004), schizophrenia (Witztum, Briskin, and Lerner, 1999), and mental retardation (Davidson and Brown, 1989).

Humor has been recommended as a useful tool in individual therapy and counseling (Rutherford, 1994), group therapy (Bloch, 1987; Bloch, Browning, and McGrath, 1983), family and marital counseling (Odell, 1996), and in the treatment of children and adolescents (Bernet, 1993) and the elderly (Prerost, 1993; Richman, 1995). The therapeutic benefits of humor have been lauded by therapists from many different theoretical schools, including Adlerian (Rutherford, 1994), behavioral (Franzini, 2000; Ventis et al., 2001), cognitive (Gelkopf and Kreitler, 1996), psychoanalytic (Bergmann, 1999; Korb, 1988), rational-emotive (Borcherdt, 2002), and strategic family therapy (Madanes, 1987).

Clinical psychologist Louis Franzini (2001) defined therapeutic humor as “the intentional and spontaneous use of humor techniques by therapists and other health care professionals, which can lead to improvements in the self-understanding and behavior of clients or patients” (p. 171). He suggested that therapeutic humor can take almost any form, including formal jokes or riddles (although these would be relatively rare), spontaneous puns or spoonerisms, behavioral or verbal parapraxes (i.e., unintentional humorous “Freudian slips”), humorous comments pointing out absurdities or illogical reasoning, exaggerations to the extreme, humorous self-deprecations on the part of the therapist, illustrations of universal human frailties, and comical observations of current social events. In order for humor to be beneficial in therapy, according to Franzini, the point of the humor should be clearly relevant to a current therapeutic issue, such as an inner conflict or a personal characteristic of the client. The immediate consequence of such therapeutic uses of humor is typically a positive emotional experience shared by the therapist and the client, ranging in intensity from quiet empathic amusement to loud laughter.

There are three general ways of thinking about potential applications of humor to therapy. First, some authors have advocated a sort of “*humor as therapy*” approach, attempting to develop a whole system of therapy that is based largely on humor. Second, humor could be the basis of *specific therapeutic techniques* that clinicians might have in their repertoire (along with a number of other, non-humor-based interventions) and which they could apply to the treatment of particular types of client problems. Third, humor may be viewed as a *communication skill* that, like other therapist characteristics such as empathy and genuineness, contributes to a therapist’s overall effectiveness regardless of his or her theoretical orientation.

In the following sections, I will explore each of these approaches in turn, examining research evidence where it exists, followed by a discussion of potential risks in the use of humor in psychotherapy and counseling. Although my focus here is on psychotherapy and counseling, much of this discussion is also relevant to the use of humor in other helping and health care professions such as social work, medicine, nursing, physiotherapy, occupational therapy, and so on (cf. du Pre, 1998; Leber and Vanoli, 2001).

### Humor-Based Therapies

A large number of different “schools” of psychotherapy were developed and promoted by various clinicians during the 1960s and 1970s. A few of these approaches emphasized the importance of fostering a healthy sense of humor as one of the main goals of therapy. According to these approaches, a humorous perspective on life is not only an important indicator of psychological health, but also a means to maintain and strengthen healthy functioning. Some of these approaches employed specific humor-based techniques to induce change in clients, while others emphasized the role of the therapist in modeling a humorous outlook and encouraging any humor that emerges naturally as the client gains a more realistic outlook and a greater ability to cope with life.



One well-known approach to therapy that makes extensive use of humor is Rational-Emotive Therapy (RET), which was developed by Albert Ellis (e.g., Ellis and Grieger, 1986). According to this approach, people develop psychological disturbance as a consequence of having irrational beliefs, dysfunctional attitudes, and unrealistic absolute standards. The aim of therapy is therefore to challenge and dispute clients' false beliefs and to replace them with more realistic and adaptive assumptions and attitudes. One way of doing this is for the therapist to use humorous exaggeration and even sarcasm to point out the absurdity of clients' irrational belief systems. Ellis (1977) wrote that "human disturbance largely consists of exaggerating the significance or the seriousness of things, and the ripping up of such exaggerations by humorous counter-exaggeration may well prove one of the main methods of therapeutic attack" (p. 4).

Besides being a way of disputing the irrational assumptions of clients, Ellis suggested that humor is beneficial in therapy because it brings enjoyment and mirth, makes life seem more worthwhile, and provides alternative ways of dealing with problems. Although Ellis's use of humor appears to be quite aggressive, he emphasized that it must be done in a way that communicates acceptance of clients and encourages them to accept themselves despite their errors and human fallibilities. Nonetheless, many clinicians are uncomfortable with such a confrontational style of humor in therapy. Most would agree that, due to its potential for harm, such humor must be employed very cautiously and skillfully, if at all.

Another therapeutic approach that employs humor to actively confront and challenge clients is Provocative Therapy, which was developed by Frank Farrelly and his colleagues (Farrelly and Brandsma, 1974; Farrelly and Lynch, 1987). Originally devised for the treatment of chronic schizophrenia, this approach was subsequently promoted as being beneficial for many types of psychological problems. Based on the assumption that clients can change their self-defeating behavior patterns and overcome psychological disturbance if they take responsibility for their own behavior, the goal of this therapy is to provoke an emotional response in clients that results in changes in their perceptions and actions. This is done by using humor to attack their beliefs, feelings, and behaviors through exaggeration and sarcasm, causing them to fight back against the therapist and eventually gain a detached, humorous perspective on their dysfunctional behavior patterns.

Although this therapeutic approach, like RET, appears to be very aggressive and even hostile, Farrelly and Lynch (1987) emphasized that the client must experience the therapist as "warmly caring and fundamentally supportive" (p. 90). Similarly, Farrelly and Brandsma (1974) stressed that "if the client is not laughing during at least part of the therapeutic encounter, the therapist is not doing provocative therapy and what he is doing may at times turn out to be destructive" (p. 95). Like Ellis's approach, provocative therapy appears to have a potential for harm if used by an unskilled therapist.

A less confrontational therapeutic system giving an important place to humor is Walter O'Connell's (1981; 1987) Natural High Therapy, a humanistic approach that borrows heavily from the ideas of Carl Jung and Alfred Adler. According to this

approach, psychological symptoms are manifestations of displaced creative energies and personality constrictions resulting from frustrating life experiences. The goal of therapy is to increase self-actualization, helping the client to move from the constrictions of being controlled by the environment and inner compulsions to a healthy sense of autonomy based on self-esteem and satisfying relationships with others. A healthy sense of humor is seen as a defining characteristic of self-actualization.

Using a didactic-experiential format and combining individual and group treatment modalities, Natural High Therapy employs a variety of techniques to promote self-actualization, including psychodrama, role playing, guided imagery, and meditation. Humor, which O'Connell (1981, p. 561) viewed as "the royal road toward self-actualization," is an intrinsic part of all of these methods. However, for O'Connell, humor was more an end than a means. Rather than forcing it onto clients, the therapist's role is one of modeling a humorous outlook and encouraging any humor that emerges spontaneously in the client.

Other clinicians who have promoted humor as an essential component of psychotherapy include Harvey Mindess (1971, 1976), Martin Grotjahn (1966, 1971), and Waleed Salameh (1987). Unfortunately, like many of the schools of therapy that arose in past decades, little research has been conducted to evaluate the effectiveness of most of these humor-based therapy systems or to compare them with other types of treatment.

### Humor as a Specific Therapeutic Technique

Rather than creating a whole system of therapy with humor as a central ingredient, some clinicians have developed specific humor-based intervention techniques for treating particular clients with particular problems. For example, Larry Ventis, a clinical psychologist at the College of William and Mary, developed an application of humor in systematic desensitization for the treatment of phobias and other fear-related conditions. Systematic desensitization is a behavioral intervention in which clients vividly imagine themselves experiencing a series of progressively more threatening fear-evoking situations while engaging in muscle relaxation exercises. The repeated pairing of a relaxation response with exposure to a feared stimulus gradually diminishes the feelings of anxiety evoked by the stimulus, enabling the individual to overcome the phobic aversion.

In an early case study, Ventis (1973) described the successful use of humorous imagery instead of muscle relaxation during a session of systematic desensitization in the treatment of a young woman who suffered from social anxiety. In another case study published around the same time, Ronald Smith (1973) reported that the use of humor in nine sessions of systematic desensitization was highly effective in reducing strong, maladaptive anger responses in a 22-year-old woman, after previous attempts at treatment using standard muscle relaxation procedures had failed.

More recently, Ventis and his colleagues (2001) conducted a more carefully controlled clinical study to investigate the use of humor in systematic desensitization in the treatment of spider phobias. Forty undergraduate students with spider phobias

were randomly assigned to either four individual weekly treatment sessions using traditional systematic desensitization with muscle relaxation, four sessions of desensitization using humor, or a no-treatment control condition. In the humor treatment condition, participants were given humor creation exercises and weekly homework assignments in which they were encouraged to generate humorous statements and images relating to spiders. In each therapy session, they were also taken through a hierarchy of mental imagery scenarios in which humorous images were paired with anxiety-evoking situations having to do with exposure to spiders.

The results revealed that participants in both the humor desensitization group and the standard muscle relaxation group showed significant and equally large reductions in their fear of spiders on self-report and behavioral outcome measures, whereas those in the no-treatment group did not show any significant improvement. Further analyses revealed that the reduction of spider phobia in the two treatment groups was mediated by increased feelings of self-efficacy. The authors suggested that the experience of humor-related positive emotion may have altered the cognitive appraisals of participants in the humor treatment group, providing them with an increased sense of self-efficacy and a greater willingness to approach and interact with spiders. Overall, this study provided evidence that a humor-based intervention may be just as effective as (but not necessarily more effective than) standard muscle relaxation in systematic desensitization for the treatment of phobias.

Another well-known therapeutic technique that has often been viewed as being based on humor is “paradoxical intention,” which was developed by Viktor Frankl (1960) and has been used for treating various problems including obsessive-compulsive symptoms, anxiety, depression, and agoraphobia. In this technique, clients are encouraged to try to increase the frequency and exaggerate the severity of their symptoms. It is assumed that these paradoxical efforts put the clients into a sort of “double bind” that can only be resolved by recognizing the absurdity of their symptoms, enabling them to develop the ability to laugh at their neurotic behavior patterns and gain a feeling of detachment from them. It might therefore seem reasonable to expect that clients with a greater sense of humor would derive more benefit from this type of treatment.

However, contrary to this hypothesis, a study by Geraldine Newton and Thomas Dowd (1990) found that the use of paradoxical interventions in the treatment of students with test anxiety was much more effective with clients having low (rather than high) scores on measures of sense of humor. The authors suggested that the high-humor participants may have treated the paradoxical intervention as merely a joke that was not to be taken seriously, and were therefore unable to experience the therapeutic “double bind” that is required for the intervention to be effective. In contrast, low-humor participants may have taken the intervention more seriously and attempted to cooperate with the therapist, resulting in the paradoxical effectiveness of the treatment. These findings suggest that, although paradoxical interventions may work by stimulating a humorous perspective toward one’s neurotic symptoms, they need to be initially taken seriously to be effective. Individuals who normally approach life with a humorous outlook may be less likely to benefit from them.

Eliezer Witztum and his colleagues (1999) described the use of paradoxical interventions and other humor-based techniques to treat delusions and hallucinations in 12 patients with chronic schizophrenia who had been hospitalized for at least eight years. After three months of more serious “persuasion therapy” failed to produce any therapeutic improvement in the patients, the therapists began using a humorous approach in individual and group therapy sessions. This involved making joking comments in a sympathetic and lighthearted manner to satirize and trivialize the patients’ delusions and hallucinations, highlighting the irony and absurdity of these symptoms through playful exaggeration, and thereby encouraging the patients not to take them overly seriously. At the end of three months of this humor treatment, evaluations of the patients’ mental state using a psychiatric rating scale revealed significant improvements in functioning in most of the patients, and these gains were found to be maintained in a three-month follow-up assessment. Although further research is needed, this small study provided promising evidence of the potential benefits of humor-based techniques in treating chronic psychotic symptoms.

### Humor as a Therapist Skill

A third approach to the role of humor in therapy is to view it as a type of social skill or interpersonal competence that contributes to therapists’ overall effectiveness, regardless of their theoretical orientation or the specific techniques they employ (e.g., Franzini, 2001; Saper, 1987). In other words, it may be important for psychotherapists to have a “good sense of humor.” As we have seen throughout this book, humor may be viewed as a form of interpersonal communication that can serve a wide variety of social functions, ranging from prosocial to aggressive. Psychotherapy is an interpersonal process, in which the relationship between the therapist and the client is arguably the main vehicle for therapeutic change (Teyber, 1988). As in most types of interpersonal relationships, humor and laughter occur quite frequently in the interactions between therapists and their clients.

One recent study of individual psychotherapy sessions found that laughter in either the client or therapist occurred on average every three minutes, with clients laughing more than twice as often as therapists (Marci et al., 2004). The ability to use humor effectively with clients may be viewed as a therapeutic skill that clinicians need to practice and refine, just as they need to develop a number of other communication skills such as empathic understanding, active listening, nonverbal communication, and so forth. In this view, then, humor is something that occurs spontaneously and naturally in the normal interactions between therapist and client, which may be used with varying degrees of skill and may be more or less beneficial to the client, rather than being a specific technique that is intentionally employed by the therapist. Humor in itself is not inherently therapeutic; to be effective, it must be used in a therapeutic manner.

A good deal of therapy outcome research indicates that the most effective therapists are those who convey an attitude of empathy, caring, and genuineness toward their clients (Bachelor and Horvath, 1999). Humor is therefore most likely to be

therapeutic if it is used in a genuine manner, communicating empathic understanding and concern for the client. On the other hand, humor may be nontherapeutic, and even harmful, if it leaves clients feeling misunderstood, if it conveys a sense of dismissing or denigrating their feelings and perceptions, or if it is used by therapists to mask their own feelings of discomfort with the issues raised by their clients.

Rather than engaging in humor unthinkingly simply because it is enjoyable, therapists need to be cognizant of the functions being served by their own use of humor and that of their clients at each stage of therapy, and evaluate its likely therapeutic effects. In view of the important role of humor in social interaction generally, and the potential benefits and risks of humor in psychotherapy, Franzini (2001) has argued that the topic of humor should be a formal component of the curriculum in the training of all psychotherapists and counselors.

Although specific techniques vary across different approaches, most types of therapy share several common goals. These include: (1) establishing positive rapport with the client; (2) gaining an accurate understanding of the client's thoughts, feelings, and behavior patterns; (3) helping clients to gain insight into their difficulties, recognize unrealistic aspects of their thinking, and develop alternative perspectives and new ways of thinking; (4) reducing levels of emotional distress and increasing feelings of well-being; and (5) modifying dysfunctional behavior patterns. A number of authors have suggested that, when used in a sensitive and empathic manner, humor might be useful to further each of these therapeutic goals (Gelkopf and Kreitler, 1996; Kuhlman, 1984; Pierce, 1994; Saper, 1987).

With regard to *establishing rapport*, it has been suggested that humor may be used to put the client at ease and reduce tension, to make the therapist seem more human, to increase the attractiveness of the therapist to the client, and to create a transitional "play space" in which the therapist and client can engage in rewarding interchange and shared reality (Gelkopf and Kreitler, 1996). Laughing together may promote feelings of intimacy and friendliness and facilitate the client's trust in the therapist. A well-timed humorous comment on the part of the therapist can often be a way of conveying empathic understanding by succinctly encapsulating ironic aspects of a client's experience, evoking a chuckle of recognition from the client. By using mildly self-deprecating humor or taking a humorous perspective on a potentially embarrassing or threatening situation that arises in the course of therapy, the therapist can also serve as a role model for the appropriate use of humor. For example, if a client criticizes or complains to the therapist, a humorous rather than a defensive response from the therapist can communicate that he or she remains hopeful and is not overwhelmed by the client's criticism and problems (H. A. Olson, 1994).

Humor may also be a vehicle for helping the therapist to *gain an accurate understanding of the client* by paying close attention to the client's humor productions. Research indicates that clients in psychotherapy are much more likely to initiate humor than are therapists, and that both clients and therapists are more likely to laugh in response to humorous comments made by the client than to therapist-initiated humor (Marci et al., 2004). This client-generated humor may be a rich source of information about the client's perceptions, attitudes, assumptions, and feelings. Clients'

humor may be used diagnostically as an indicator of their mental status and level of functioning, as well as a way of assessing progress in therapy and the effectiveness of particular interventions. For example, the presence or absence of humor may indicate the degree to which a client is feeling some control over his or her problems or is feeling overwhelmed. Clients' humor may also signal areas of conflict when the client laughs spontaneously at things that do not at first appear to be amusing, or may indicate issues of aggression or depression. Therapists should also be alert to the possibility of countertransference feelings when they find themselves using humor excessively or avoiding it altogether with particular clients (Gelkopf and Kreidler, 1996).

Since humor inherently involves the simultaneous perception of incongruous or seemingly incompatible ideas or perspectives (i.e., bisociation), it also often occurs in therapy in the context of helping the client to *gain insight and alternative perspectives*. As clients begin to overcome rigid defenses, become more aware of unconscious assumptions and attitudes, and gain new perspectives on their life situation, they often experience an "aha" experience that strikes them as humorous and produces spontaneous laughter. When therapists join into this laughter, they celebrate these new insights with their clients and further reinforce their new perspectives. In addition, therapists can also often nudge clients toward these types of insights by gently using humor to highlight the irrationality or absurdity of their assumptions and attitudes. Such humor on the part of the therapist may also help clients to gain a sense of proportion, recognizing that their problems are not as large as they seem. Appropriate uses of humor by the therapist can also help clients to take a more tolerant view of life, accepting their own imperfections as well as the limitations and uncertainties of the world around them (Ellis, 1977).

Humor may also be helpful in therapy as a means of *reducing emotional distress*. As noted in Chapter 9, a considerable amount of research indicates that humor functions as an emotion regulation mechanism, reducing negative emotions such as depression, anxiety, and hostility, and increasing positive moods. By modeling and encouraging a humorous outlook, therapists can help clients to regulate their emotions.

Laughter may also play a role in helping clients to *modify dysfunctional behavior patterns*. Shared laughter can be a form of positive reinforcement following desirable behavior change, such as when a therapist and client laugh together following the client's successful enactment of a new way of dealing assertively with a problematic interpersonal situation. In helping clients to develop assertiveness and to find more adaptive ways of coping with interpersonal problems, therapists can also teach them methods of using humor as an effective social skill. In sum, humor seems to be an important therapist communication skill which, when used judiciously, can help to work toward the goals of therapy.

### Research on Humor in the Therapeutic Process

Empirical investigations of the effects of humor as a therapist communication skill are unfortunately quite limited, and the overall findings have not been very



promising. One approach to this type of research has been to ask participants to rate their perceptions of simulated therapy sessions containing humorous and nonhumorous interventions. In one study, adults who were currently in outpatient psychotherapy were presented with a series of audio recordings of therapy sessions in which the therapists either did or did not use humor in their responses to their clients (Rosenheim and Golan, 1986). The participants were asked to rate how helpful and understanding each therapist appeared to be and the degree to which they themselves would be willing to be treated by the therapist. Contrary to predictions, the results revealed that the nonhumorous interventions, as compared to the humorous ones, were rated as being significantly more effective and were more strongly preferred by the therapy clients.

Similar findings were reported in another study using the same methodology in which the participants were schizophrenic patients in the early stages of remission from an acute psychotic episode (Rosenheim, Tecucianu, and Dimitrovsky, 1989). Once again, the results revealed a consistent preference for the nonhumorous over the humorous interventions among all patients, regardless of age, gender, education, and diagnosis (paranoid versus nonparanoid). In particular, patients rated the nonhumorous interactions as being more helpful, more likely to strengthen the therapeutic relationship, and displaying more empathy and understanding. These findings suggest that humorous interventions run the risk of not being well received by clients, and underscore the need for care in their use.

In another study, university students were asked to rate one of three videotapes of simulated counseling sessions containing no humor, facilitative (empathic and supportive) humor, or nonfacilitative (mildly derisive or distracting) humor initiated by the counselor (J. A. Foster and Reid, 1983). The results indicated that the counselor was rated as more approachable and better able to create a positive relationship in both the facilitative humor and no-humor conditions as compared to the nonfacilitative humor condition, but no differences were found between the facilitative humor and no-humor conditions. Moreover, no differences were found across all three groups in ratings of the counselor's ability to help the client achieve greater self-understanding. Overall, this study suggested that nonfacilitative humor might have an adverse effect on some aspects of treatment, but facilitative humor does not seem to show any greater therapeutic benefits compared to no humor at all.

Other studies have analyzed tape recordings of actual therapy sessions to examine the effects of humorous therapist interventions on the ongoing therapy process. Clinical psychologist Barbara Killinger (1987) studied tape recordings of 85 therapy sessions involving different clients and therapists in two different university counseling centers. Interestingly, no differences were found in the overall frequency of humor initiated by novice versus more experienced therapists or during early versus later therapy sessions. The effectiveness of the humorous interventions was examined by comparing therapist-client interactions in which the therapist made a humorous comment with randomly selected control interactions in which the therapist made a nonhumorous comment. Trained judges rated the degree to which these therapist statements facilitated subsequent client exploration and understanding and led to a

more positive attitude of the client toward the therapist. Overall, the results revealed that the humorous therapist statements did not seem to produce any greater benefits than did the nonhumorous control statements. On the contrary, those humorous comments that elicited laughter in clients were actually judged to produce significantly *less* client exploration and understanding as compared to nonhumorous statements.

Further analyses of the types of humor used by therapists in this study revealed that about 20 percent of the humor instances could be categorized as aggressive (superiority or ridicule). Although clients typically responded somewhat negatively to this type of humor, therapists were generally able to mitigate any lasting negative consequences through the immediate use of a “recovery statement,” which softened the humor in some way. Nonetheless, this typically led to a shift away from the current topic of discussion and an interruption of client self-exploration. In sum, this study further highlighted potential risks of the use of humor by therapists and the need for caution.

A similar method was used by Patrick Peterson and Howard Pollio (1982) to study therapeutic effects of client-initiated humor in group rather than individual therapy. Analyzing video recordings of five sessions of a single therapy group, they found that over 75 percent of the humor generated by group members was negatively targeted toward another group member or someone outside the group, while only seven percent involved positive remarks of any sort. Analyses of the immediate effects of laughter on the therapeutic climate of the group revealed that laughter in response to humor directed at another group member led to a significant reduction in therapeutic effectiveness, whereas laughter at humor targeting generalized others outside the group led to an increase in effectiveness. Qualitative analyses indicated that most of the humor targeting other group members appeared to be a means of diverting group discussion away from the current topic of conversation, whereas humor targeting generalized others seemed to be a method of offering support and promoting group feeling.

Jacob Megdell (1984) examined the effects of therapist-initiated humor on clients’ feelings of attraction or liking for the therapist during individual counseling sessions taking place at two alcoholism treatment centers. After the sessions, videotapes of the sessions were reviewed by the counselor and the client separately, and continuous ratings were made of each individual’s perceptions of therapist-initiated humor. The clients also made continuous ratings of their feelings toward the therapist during the session. The results revealed that client liking of the therapists tended to increase significantly following segments that were perceived as being humorous by both the therapist and the client, but not following humor that was perceived as funny by only one of them. These findings suggest a potential benefit of humor, but only when it is enjoyed by both the client and the therapist together.

Some other studies that may be relevant to psychotherapy have examined the effects of humor in physician-patient interactions. In one of these, researchers analyzed audiotapes of interactions between primary care physicians and their patients during routine office visits, in order to identify interpersonal behavior patterns that

might differentiate between physicians who had had two or more malpractice insurance claims against them and those who had none (Levinson et al., 1997). Besides using more facilitation comments (e.g., informing patients about what to expect, soliciting their opinions, checking on their understanding), physicians with no malpractice claims were found to laugh more frequently and to use more humor in their interactions with their patients.

In another study, various types of humor initiated by physicians and patients were examined in audiotapes of physician-patient visits that were given either very high or very low satisfaction ratings by the patients following the sessions (Sala, Krupat, and Roter, 2002). The results revealed that high-satisfaction as compared to low-satisfaction visits were characterized by significantly more frequent physician use of positive types of humor (e.g., playful, light humor expressing caring, support, and warmth, and relieving tension), but did not differ in physician use of negative types of humor (e.g., humor putting down self, patient, or others), which in any case occurred extremely rarely. With regard to patient-initiated humor, during high-satisfaction visits the patients were significantly more likely to engage in lighthearted, tension-relieving humor and less likely to engage in humor that disparaged themselves or the physician. The patients were also much more likely to laugh at the physicians' humorous comments during high-satisfaction as compared to low-satisfaction visits. Since this study did not involve an experimental manipulation, it is impossible to determine whether positive humorous interactions between physicians and patients were a cause or merely a concomitant of patients' feelings of satisfaction.

In summary, research on the effects of humor on the therapeutic process has been quite limited, with mixed results. Some studies have suggested that humorous interventions may be less helpful than nonhumorous ones, others have shown no difference in effectiveness, and still others have indicated some therapeutic benefits of humor. These contradictory findings may be due to the fact that different types or uses of humor can have quite different effects in therapy. Although some researchers made an effort to distinguish between positive and negative types of humor, these past studies may not have succeeded in identifying the crucial differences between therapeutic and nontherapeutic forms of humor. More carefully refined research is needed to investigate in more detail the potential benefits and risks of different types of humor in therapy. In view of the ubiquity of humor and laughter in therapy, and the many seemingly plausible hypotheses concerning its potential benefits (as well as its potential risks), this is clearly a research topic that merits further attention.

### Risks of Humor in Therapy

Although humor may potentially be beneficial for therapy, many clinicians have also pointed out that it has some inherent risks. As we have seen in previous chapters, humor may be used for many different purposes in everyday social interactions, including such negative uses as disparagement and ridicule, enforcing conformity to social norms, and avoiding dealing with problems. Even though most therapists are

careful to avoid using humor in these ways, there is a risk that their humor may be misunderstood by clients and misperceived as coercive or aggressive. Since humor is inherently ambiguous, there is always a possibility of misunderstanding. Therapists therefore need to be alert to the way their humorous comments are perceived by clients and how they affect their feelings and perceptions.

In a frequently cited article, Lawrence Kubie (1970), a psychoanalytically oriented therapist, expressed particularly strong reservations about the use of humor in psychotherapy, pointing out a number of potential risks. He noted that therapists' use of humor may convey to clients that they do not take their problems very seriously. If therapists have to explain that something they said was only intended as a joke, this is an indication that the humor was likely used inappropriately and insensitively, since the client's failure to recognize it as humor indicates a lack of therapist attunement to the client's feelings and needs. Kubie also argued that humor is sometimes used inappropriately by therapists as a defense against their own anxieties or as a way of narcissistically showing off their own wittiness. When used by clients, humor may also be an unhealthy defense mechanism, a way of avoiding dealing with problems, or a means of devaluing their own strengths and characteristics in a self-mocking way (i.e., self-defeating humor). In addition, clients may have a maladaptive aggressive humor style. By engaging in humorous interactions with these sorts of clients, the therapist may inadvertently reinforce an unhealthy style of humor.

Another risk of humor, according to Kubie, is that when the therapist treats certain topics in a humorous manner, the client may take this to mean that these topics are taboo and are not to be discussed seriously. In addition, clients may feel a need to laugh along with a therapist to show that they have a "good sense of humor," even when this superficial joviality covers underlying feelings of distress or resentment. The use of humor by the therapist may thus make it difficult for the client to express negative feelings or disagreement. Kubie (1970) concluded his article by stating, "Humor has its place in life. Let us keep it there by acknowledging that one place where it has a very limited role, if any, is in psychotherapy" (p. 866).

Although few clinicians writing on this topic have taken such an extreme view as Kubie, most seem to agree that there is some validity to his arguments. Just as they need to monitor carefully the impact of all their communications in therapy, clinicians need to be especially alert to the effects of their humor on their clients. However, this does not mean that therapy should always be serious and devoid of humor. Taking a more moderate approach, Thomas Kuhlman (1984) suggested a number of potential benefits of humor, but also pointed out that when a client is struggling emotionally with an issue, humor can be inappropriate if it diverts the client's attention away from the problem rather than facilitating the ongoing processing of information. Similarly, Robert Pierce (1994) suggested that, although it can often be beneficial, humor is inappropriate in therapy (1) when it is used to belittle, laugh at, or mimic the client; (2) when it is used defensively to divert attention away from an emotionally charged problem onto safer topics; and (3) when it is irrelevant to the therapeutic purpose, gratifying the therapist's own need for amusement and wasting valuable therapy time and energy.

Waleed Salameh (1987) developed a five-point rating scale for evaluating the appropriateness of therapists' use of humor in therapy sessions. Level 1 refers to *destructive uses of humor*, such as sarcastic and vindictive humor that elicits feelings of hurt and distrust in clients. Level 2 is *harmful humor*, which includes humor that is irrelevant or not attuned to clients' needs. This would include uses of humor where the therapist subsequently has to retract it or make amends by reassuring the client that it was not intended seriously. Level 3 refers to *minimally helpful humor*, which promotes a positive therapist-client interaction, but remains mostly a response to the client's own humor rather than being initiated by the therapist. Level 4 is described as *very helpful humor* that is initiated by the therapist and is attuned to the client's needs, facilitating self-exploration and self-understanding. Finally, Level 5 refers to *outstandingly helpful humor* that conveys a deep understanding of the client, is spontaneous and well-timed, and accelerates the process of client growth and change. Although the reliability and validity of this rating scale still need to be evaluated, it might be a useful tool for researchers wishing to investigate therapeutic humor, as well as for supervisors to evaluate the use of humor by therapists in training.

Therapists need to be especially careful in using humor with clients who have particular humor-related difficulties. Willibald Ruch and Rene Proyer (in press) have coined the term "gelatophobia" to refer to a psychological disorder characterized by a morbid fear of being laughed at and not taken seriously. They created a reliable self-report scale to assess this trait, which is thought to develop from repeated experiences of being the object of ridicule and mockery early in life. Investigations using this measure have demonstrated that clinically identified gelatophobic individuals could be reliably distinguished from patients with other types of social anxiety and depressive disorders as well as nonclinical control subjects.

The study found that people with gelatophobia are fearful of exposing themselves to others lest they be laughed at, tend to be socially avoidant and anxious, and have high levels of neuroticism and introversion and low self-esteem. They have great difficulty enjoying any kinds of humor in their social interactions, since they are always suspicious that others are laughing at their expense. Clearly, the use of humor in therapy with such individuals is fraught with difficulties, and needs to be approached with great sensitivity to avoid retraumatizing the client. Indeed, one of the goals of therapy in such cases might be to help clients gradually to overcome their aversion to humor by means of techniques that have been developed for treating other types of phobias.

A very different type of humor-related difficulty is seen in clients who use humor excessively as a way of trivializing their problems and avoiding dealing with difficulties. Psychiatrist Ned Marcus (1990) described certain types of therapy clients who engage in a pathological form of humor during therapy, treating their psychological problems and the therapeutic process itself as "all one big joke." Such uses of humor may be accompanied by other avoidant behaviors, such as frequently arriving late for sessions, failing to complete homework assignments, and generally devaluing the therapeutic process. In treating these clients, the therapist needs to be careful not to join into the humor and thereby reinforce the avoidant behavior. Marcus advocated the use of cognitive therapy techniques to help these clients become aware of the

dysfunctional automatic thoughts underlying their humor (e.g., unaccountability, incongruity, inconsequentiality), and to encourage them to gain a more realistic perspective. The goal here is not to eliminate the client's sense of humor, but to make it more integrated with reality and therefore healthier.

### Conclusion

There appears to be a growing interest among many psychotherapists and counselors in the potential role of humor in treatment. Clinicians who have written on this topic have ranged from those who enthusiastically advocate humor as a highly beneficial component of therapy, to those who express a more cautious and balanced approach, to those who perceive the risks of humor in therapy as far outweighing any potential benefits. The existence of such strongly opposing views suggests that the truth likely lies somewhere in the middle. As we have seen throughout this book, humor may be viewed as a form of interpersonal communication that can be used in therapy, just as in other social relationships, for a variety of purposes, both prosocial and aggressive.

Not surprisingly, humor occurs quite frequently in psychotherapy, just as it does in all sorts of interpersonal interactions. Like any type of communication, it can be used effectively or ineffectively in therapy. On one hand, it can be used empathically and in a caring and genuine manner to foster the therapeutic relationship and to encourage client self-exploration, insight, and change. On the other hand, it can be used inappropriately, either in an extreme way by denigrating the client to further the therapist's own needs at the client's expense, or in a more mild way by distracting from and interfering with the therapeutic process. Thus, the ability to use humor effectively and appropriately seems to be best viewed as a type of social competence (Yip and Martin, *in press*) that novice therapists naturally possess to varying degrees. The ability to use humor therapeutically is a skill that needs to be developed and honed by therapists in training, just as they need to learn a variety of other clinical skills.

Most of the existing literature on humor in therapy is based on case examples and clinical impressions. In recent years, there is growing recognition of the importance of evidence-based approaches to therapy, and the need for clinicians to employ treatment interventions that have demonstrated effectiveness. Unfortunately, apart from a few therapy outcome and process studies, there is currently little empirical research examining the effectiveness of humor-based interventions or the types of humor that may be appropriate or inappropriate for therapy. Further research is clearly needed to investigate which uses of humor may be beneficial or detrimental in treating which sorts of problems with which types of clients.

### HUMOR IN EDUCATION

Although education was traditionally seen as a rather serious and solemn undertaking, pedagogical trends in recent decades have shifted toward the promotion of a



more relaxed learning environment and an emphasis on “making learning fun.” The current prevailing philosophy of education argues that students are much more likely to be motivated to learn and to retain information if they are happy and amused than if they are feeling anxious and threatened (Oppliger, 2003). Consistent with this trend, many educators in recent years have recommended that teachers introduce humor into the classroom by sprinkling funny anecdotes, examples, and illustrations throughout their lessons, displaying comical images and sayings on the classroom walls, and encouraging frequent humor production in their students.

A number of popular books and articles in education journals written by teachers and educational experts have touted humor as a very useful and effective teaching tool with a wide range of benefits (e.g., Cornett, 1986; Struthers, 2003; Tamblyn, 2003). One author described humor as one of the teacher’s “most powerful instructional resources” and claimed that it can be used for such diverse purposes as correcting reading difficulties, controlling behavioral problems, building vocabulary, teaching foreign languages, and integrating students who are socially isolated (Cornett, 1986, p. 8).

In general, it has been suggested that humor in the classroom helps to reduce tension, stress, anxiety, and boredom; enhances student-teacher relationships; makes the classroom less threatening for students; makes learning enjoyable, creating positive attitudes toward learning; stimulates interest in and attention to educational messages; increases comprehension, cognitive retention, and performance; and promotes creativity and divergent thinking (R. A. Berk and Nanda, 1998; A. P. Davies and Apter, 1980; Ziegler, Boardman, and Thomas, 1985). The use of humor has been seen as an especially useful tool in teaching students about sensitive, anxiety-arousing topics such as death and suicide (H. A. Johnson, 1990), and in teaching courses that are typically associated with negative attitudes and anxiety, such as undergraduate statistics (R. A. Berk and Nanda, 1998). Based on the presumed cognitive, emotional, social, and physiological benefits of humor, some educators have even suggested that one of the goals of education should be to facilitate the development of a good sense of humor in students (Bernstein, 1986; Masselos, 2003).

Most of these enthusiastic endorsements of humor are based on anecdotal evidence and teachers’ reports of their own experiences in the classroom. Empirical research evaluating the claimed educational benefits of humor is unfortunately quite limited, much of it is over two decades old, little replication has taken place, and the findings have been rather mixed (Teslow, 1995). Nonetheless, there is some research on humor in education addressing the following questions: (1) How often and in what ways do teachers typically use humor in the classroom? (2) Does humor improve the classroom environment and make learning more enjoyable for students? (3) Does humor in teaching improve students’ ability to learn and retain information? (4) Does the inclusion of humor in tests and exams help to reduce test anxiety and improve student performance on the tests? and (5) Does humor in textbooks help to make them more understandable and improve students’ ability to learn the material? In the following sections I will review research findings addressing each of these questions, followed by some general caveats concerning the use of humor in education (for more

detailed reviews of research in this area, see Bryant and Zillmann, 1989; Oppliger, 2003; Teslow, 1995).

### Descriptive Studies of Teachers' Use of Humor in the Classroom

Evidence from several studies indicates that many teachers tend to use humor quite frequently in classroom settings. For example, an analysis of tape recordings of typical lectures by university professors found an average of a little over three instances of humor per 50-minute class (Bryant et al., 1980). Similar rates of humor have also been found among high school and elementary school teachers (Bryant and Zillmann, 1989; Gorham and Christophel, 1990; Neuliep, 1991). There is some evidence that male teachers tend to use humor in the classroom more frequently than do female teachers, although this sex difference appears to have diminished over the past 20 years (Bryant et al., 1980; Gorham and Christophel, 1990; Neuliep, 1991; Van Giffen, 1990).

What kinds of humor do teachers use? Although most educational experts recommend that teachers avoid the use of teasing and ridicule, there is evidence that aggressive forms of humor are actually fairly common in the classroom. In a study by Joan Gorham and Diane Christophel (1990), college students were asked to write brief descriptions of all humorous comments made by instructors during classes. Analyses of these humor descriptions indicated that over half of all instances of humor by the college instructors could be categorized as "tendentious" or aggressive, in that they involved poking fun at a person, a group of people, or an institution. As many as 20 percent of all humorous comments by instructors made fun of an individual student in the classroom or the class as a whole, while other tendentious humor targeted the topic or subject of the course, the instructor's academic department, the university, the state, or famous people at the national or international level. About 12 percent of the humor was targeted at the instructors themselves, in what might be described as self-deprecating or perhaps self-defeating humor. Less than half of the college instructors' humor did not have an obvious target. These nontendentious forms of humor included either personal or general anecdotes and stories that were either related or unrelated to the subject of the lecture, "canned" jokes, and physical or vocal comedy ("schtick"). In all, only about 30 percent of the humor was related to the lecture topic.

In another study, James Neuliep (1991) conducted a large-scale survey of high school teachers about their use of humor. The respondents were asked to describe in some detail the most recent situation in which they had used humor in the classroom. Responses to this question were used by the researcher to develop a taxonomy of teachers' humor, which contained the following categories: (1) teacher-directed humor (e.g., self-deprecation, describing an embarrassing personal experience); (2) student-targeted humor (e.g., joking insult, teasing a student about a mistake); (3) untargeted humor (e.g., pointing out incongruities, joke-telling, punning, tongue-in-cheek or facetious interactions, humorous exaggeration); (4) external source humor (e.g., relating a humorous historical incident, showing a cartoon that is related or

unrelated to the subject, humorous demonstrations of natural phenomena); and (5) nonverbal humor (e.g., making a funny face, humorous vocal style, physical bodily humor). Although teachers seemed to be generally aware of the potential risks of using overly aggressive forms of humor directed at students, humor involving teasing, insults, and joking about students' mistakes still accounted for more than 10 percent of their overall humor.

In summary, teachers appear to use humor in a wide variety of ways, including some that appear rather aggressive, such as teasing and playful put-downs of students. While much of their humor appears to be used to illustrate a pedagogical point, to make a lesson more vivid and memorable, or simply to add some levity and playful fun to the learning environment, teachers also appear to use humor for the same sorts of purposes for which humor is used in other interpersonal contexts. As noted in Chapter 5, humor serves a variety of social communication functions (e.g., social probing, enforcing social norms and control, status and hierarchy maintenance, etc.), and teachers use humor in their interactions with students for many of these purposes, just as they do in their interactions with other people.

### Teachers' Use of Humor and the Classroom Environment

Does humor improve the classroom environment and make learning more enjoyable? Research on this question has provided a fair amount of evidence that the judicious use of humor by teachers in the classroom increases students' enjoyment of learning, their perceptions of how much they learn, and how positively they feel about the course and the instructor (e.g., Wanzer and Frymier, 1999). Indeed, teachers with a good sense of humor tend to be especially popular with their students (see Figure 8). Student surveys have found that a sense of humor is typically rated as one of the most desirable characteristics of an effective teacher (Check, 1986; Fortson and Brown, 1998; Powell and Andresen, 1985).

Other research has shown that teachers who are observed to use more humor in the classroom are rated more positively by their students. One study employing tape recordings of classroom lectures to evaluate the frequency of humor used by college instructors found that teachers who told more funny stories and jokes in the classroom received more positive overall evaluations from their students, and were rated as being more effective and appealing and having a better delivery, but were not necessarily seen as being more competent or intelligent (Bryant et al., 1980).

Other research indicates, however, that some types of humor used by the teacher may have a negative rather than a positive impact on student evaluations. For example, Gorham and Christophel (1990) found that, whereas a greater proportion of humorous anecdotes and stories in college instructors' humor was positively associated with students' perceptions of how much they learned in the course and their positive attitudes toward the instructor and the course, a greater proportion of tendentious or aggressive humor was associated with less positive evaluations by students.

Some early research suggested that these effects of humor use on student appraisals occurred primarily for male instructors, whereas for female teachers humor