Emotions: A Psychological Understanding

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A Description of the Book: Understanding Emotions

This book is intended to give undergraduate university students a broad understanding of the biological, cognitive, and social influences on emotions. Later sections of the book will also introduce students to some situations when we need to control our emotions and to show how we may do so. It is assumed that the reader will have an understanding of basic psychological concepts and terms, usually through having taken a first-year psychology course at university. However, others who are curious about the reasons behind emotions are welcome to explore the book.

The book is divided into five sections: biological foundations; cognitive foundations; social influences; specific emotions; and finally, emotional problems and techniques for controlling one’s emotions. At this time, only the sections on the biological influences and the cognitive influences have been completed. The biological foundations section introduces readers to the logic of, and evidence for, an understanding of emotions in terms of evolutionary psychology. This naturally leads to an introduction to the nervous systems that give rise to our bodily feelings. In turn, brain circuits and the influence of hormones are discussed. Finally, because about half of personality differences with our population are related to genetic differences, the relationship between personality and emotions will be explained. Two of the topics within the biological foundations section that have broad appeal to students are excitation transfer theory and alexithymia. Excitation transfer theory describes how the strength of our emotional experience at a given point of time might be influenced, without our awareness, by an emotion that we just experienced earlier (i.e., several minutes ago). Alexithymia refers to individuals who cannot describe and do not understand emotions to the same extent as do the rest of us.

The cognitive foundations section starts by describing how our emotions can influence what we attend to in the world. For example, very anxious people often automatically focus their attention on the negative things in the environment. Another attentional bias we have is to focus on facial expressions of emotions. Following this section on attention is a discussion of
the work of Ekman and others on specific facial expressions (e.g., how the eyebrows and/or eyelids move) associated with each emotion. This expands into a discussion of the stages of interpersonal (sexual) attraction in social settings such as bars. In these social settings people consciously use a variety of nonverbal signals to entice others and also transmit and receive a variety of unconscious nonverbal signals that indicate their degree of attraction. A major theme in the discussion of facial and other nonverbal expressions will be the interplay of both conscious and unconscious processes. The cognitive section proceeds to the generally accepted notion that our emotions are usually determined by our appraisals: how we consciously or unconsciously believe the situation affects us personally. The cognitive foundations section closes with a description of how emotions affect memory, a discussion on repressed memories, and how the emotions we feel influence the decisions that we make.

The social influences section will discuss how socialization influences what, and how much, we feel in a given situation. This section will focus on examples of how culture, family, and gender affecting one’s emotional experiences. After the background provided in the first three sections (biological, cognitive, and social), the fourth section will discuss specific emotions in some detail. The fifth section will discuss how problems in the emotional interactions between parents and their children can lead to serious negative consequences, such as delinquency in some cases. This will be followed by a discussion of the nature of stress and how stress can cause physical and mental health problems. One example that will be used is sexual harassment in high school (which frequently affects half of the student population), sexual harassment among students when dating, and the psychological consequences of these events. Finally, an introduction will be given to the characteristics associated with high emotional intelligence and how we can constructively deal with our emotions when needed.
Understanding Emotions is Crucial to Understanding People

"Emotion and cognition are the fundamental psychological functions" (Zajonc, 1981, p. 103).

Why should we understand emotions? The answer is obvious to many of us: our emotions are what define our quality of life. If we are happy, then life is great. The feelings associated with our first real kiss, falling in love, or becoming a parent, are precious to us. However, if we are depressed, then life is a difficult challenge.

Yet, the feelings associated with divorce or the death of a loved one, complete the color of our lives, helping to define us. Emotions themselves are often a reflection of what has happened to us, such as finding a lover, but emotions are not simply a reflection of things or events in our lives. Emotions such as persistent anxiety or shyness can affect the quality of our lives without being tied to specific events. So, although things or events influence our emotions, our emotions are the best index of our quality of life.

The human experience is thinking and feeling, changing, growing, remembering, and living with others. To understanding the human mind, one needs to look at its foundations: emotions, cognition (thinking), and biology. These three components always interact and overlap. All of this occurs in a social world, and it is within the social world that most of our thinking and our emotions take place.

Our success in the social world depends, in large part, on an understanding of our own emotions, on our ability to read the emotions of others, and on our ability to influence our own emotions and the emotions of others. Couples therapists often see the perception and regulation of emotions as central to a couple’s success. Greenberg and Goldman (2008) believed that depressed, anxious, and traumatized individuals need to learn how to access their problem emotions, regulate them, and finally be able to transform them into something more adaptive.
So, it can be argued that emotions determine our quality of life, that they are fundamental to understanding human psychology, and they certainly influence our success in the social world. Perhaps at this point we should ask the simple question: what is an emotion? The answer to this is more complex than you may have imagined.

There have been a number of very different definitions of what emotions are, each definition capturing one particular aspect of emotions. For example, it has been suggested that emotions are bodily changes (James, 1894; 1962) that result in subjective experiences of pleasure or pain (Frijda, 1988); that emotions have an adaptive aspect that increase our chances of survival and reproduction; that emotions are ways that people interact with others (Frijda, 1988); that emotions depend on an individual’s goals (Campos, Dahl, & He, 2010); and that emotions involve cognitive and expressive (verbal and nonverbal) components. All this is true, but perhaps a different wording may be easier to understand. Like James, I define emotions as a feeling (a bodily change). The feeling is triggered by past or present persons, experiences, or things in the environment. The triggers lead to our automatically (unconsciously) evaluating how the person, event, or experiences affects us personally or affects things we care about. Further conscious thoughts may change our feelings or their intensity. These feelings and evaluation processes are the result of our biology; a biology that has been shaped by human evolution.

There are two important aspects of this definition, or description, of emotions that are not understood by the average person and so need to be noted. First, there is a biological side of emotions that needs to be understood, and our biology needs to be understood in the context of human evolution. Emotions helped our early ancestors to adapt to their environment, to have children, and to raise them to become the next generation. The second important aspect of emotions that needs to be noted is that our thoughts influence our emotions, and that some of this thinking occurs at an automatic (unconscious) level.
Biological Foundations

Evolution

The evolutionary history of the human species has influenced what we feel and when we feel our emotions. In fact, it is almost only through the lens of evolutionary history that our emotions make sense. However, this all supposes that evolution is true. While almost all biologists and the vast majority of psychologists accept the theory of evolution as true, the majority of the United States public does not accept the theory of evolution. Who’s right? Let’s have a brief look at what the theory of evolution assumes, the evidence behind evolutionary theory, and how the theory of evolution applies to psychology.

Simply put, the theory of evolution assumes three things:

1. That species change (evolve) over time.
2. There are individual differences (variations) in traits, including psychological traits that have a genetic basis.
3. If someone survives to have more children than typical because of a genetic trait, then that trait becomes more common in later generations. This is called natural selection, and it can change how frequent a trait is in the population, causing a species to evolve.

There is a strong accumulation of evidence that the theory of evolution is right (Quammen, 2004). Much of this evidence comes from research on plants and animals, because they have shorter lifespans than do humans, allowing us to see changes in these other species over generations. Here is an overview of some of the evidence for evolution.

1. Humans have caused animal and plant species to change over generations. Humans have long engaged in the domestic breeding of animals and in the breeding of plants. For example, over successive generations people bred those individual dogs that best display whatever trait people were interested in selecting. The result of this has been that we now have breeds of dogs that are very different from each other (e.g., beagle vs Newfoundland dog) and
from the original dogs. The same has been true for agricultural plants.

2. We have observed some species change over a short time span, in response to a change in their environment (Quammen, 2004). For example, prior to the industrial revolution in England, most individuals of one particular type of moth (Peppered moths) had white wings, with a few having black wings. During the industrial revolution, factories and households poured black soot out of their chimneys. As a result, black soot was everywhere, which made it easy for birds to spot the white moths and eat them. As a consequence, the black moths were more likely to survive and reproduce, changing the general appearance of the species.

A second example of a species evolving over a relatively short time span is the bacterium *C. difficile*. Due to the frequent use of antibiotic drugs, and the tendency of patients to not finish taking all of their prescriptions, bacteria that had some resistance to antibiotics were more likely to survive. These were the bacteria what were increasingly able to survive and replicate. Thus, bacteria that are genetically resistance to antibiotics are much more prevalent today, than they were 40 years ago. The result of this has been a marked increase in human deaths to bacteria such as *C. difficile*.

3. The fossil record has demonstrated not only that species change, but that over tens of thousands of years, a species can change so much that it becomes a new species (Quammen, 2004).

4. The studies of the present day body structures of animals and an analysis of their DNA have independently confirmed that some animal species are more related to each other than are other animal species (Quammen, 2004).

5. Complex organs in animals evolve. The study of mollusks has demonstrated how the eye has evolved from an organ that only senses light or dark, to one that functions similar to the human eye (Campbell et al., 2008).

6. It is certainly possible that life evolved out of nonorganic chemicals. Around about 1950, Millar (as cited in Bronowski, 1976) in a laboratory passed electricity (representing lightning) through a container that held gases thought to be present in the early atmosphere (before life existed on earth). This was done for days. The result over time was the creation of amino acids within the container. Amino acids are the biological foundation of life.
That an evolutionary influence on emotions exists should be of no surprise. Emotion expressions, and understanding them, are adaptive and they help us to have and to raise children. For example, if someone is happy and smiles, it should be safe to approach. Expressing and understanding this expression, must have helped our early ancestors to survive and reproduce.

[Would you want to have sex with someone who was frowning at you? Perhaps I should ask if you are likely to get sex from someone who is frowning at you?] If someone is angry, it signals that it may not be safe to approach. Staying away from someone who was angry helped our early ancestors stay in the gene pool; those who did not stay away from others who were very angry at them… There is no question that feeling love towards a partner increases the likelihood of having sex and producing children, while feeling love towards one’s children means that the children are more likely to survive to get the chance to reproduce.

Charles Darwin believed that many, but not all, emotional expressions are innate in humans. He used 4 kinds of evidence to argue that emotional expressions are not learned: (1) some expressions appear in similar forms in both lower animals and humans, (2) emotional expressions development early in infancy, (3) similar expressions are evident in both the blind and the sighted, and (4) that emotional expressions are universal: similar expressions occurring across different cultures. The evidence is generally supportive of Darwin’s position that some emotions are innate.

In Darwin’s book "The expression of emotions in man and animals" (1872), he hypothesised a basic continuity of emotional expressions from lower animals to humans. He suggested that the baring of the fangs of the dog or wolf is related to the sneer of the human adult. He noted that the flushing of the face during anger is seen in humans almost regardless of race, and is also seen in certain species of monkeys. In fear, a variety of animals make themselves try to look bigger. For example, in cats, they arch their backs and their hairs puff out. In angry humans, they expand their chest, thrust their head forwards, stand erect, and sometimes their body hair will stand on end.

Perhaps the most interesting studies (Ginsburg, 1977; Ginsburg, Pollman, & Wauson, 1977) in this vein were of aggression and altruism (helping behavior) in school children. These studies found that playground fights would end when one child displayed submissive nonverbal
behaviors. These submissive behaviors were head bowing, shoulder slumping, kneeling, lying motionless on the ground, and shoe tying. It was suggested (Ginsburg et al., 1977) that this is similar to wolves fighting wherein the submissive gesturing of exposing the throat ends the wolves' fight. What was also found with the school children was that if the aggressor failed to stop fighting when the other child nonverbally signalled submission, then bystanders would step in to stop the fight (Ginsburg, 1977). However, while children (4th and 5th graders) watching video tapes of the fights could correctly predict when the fight would end, they were unable to verbally explain why they knew when the fight would stop. Thus, it would appear that these submissive behaviours are triggered and responded to at an unconscious level in humans.

Evidence in support of Darwin’s observation that emotional expressions develop early in infancy is a little more complex. Infants’ abilities to send and receive emotional communications are not at all well developed at birth, but instead emerge as the brain develops. At birth, the infant brain only weights about 25% of its eventual adult weight (Bjorklund, 2005). Similarly, infants’ visual systems are quite immature at birth. Until 6 months of age infants’ vision is fuzzy and they cannot focus well. Due to these visual limitations, it is only at about 3 months of age that they learn their mother’s face, the face they have seen pretty constantly. Further, it is only at about 6 months of age that they can tell the difference between familiar faces and strangers’ faces. It is at this point (6 months), now equipped with a well developed visual system, that they can distinguish several different emotions, and can tell the difference between mild versus intense emotions on the expressions of others. Keeping these limitations of the newborn’s visual system in mind, there is evidence for an early biological component in the emotions of: happiness, surprise, anger, sadness, disgust, and fear (LaFreniere, 2000). These emotions are all evident in the first year of life, although they mature through experience with others and feedback from others. Other emotions (such as shame, guilt, or jealousy) emerge later during development (LaFreniere, 2000). Darwin had also
argued that some emotions were innate because similar expressions are evident in both the blind and the sighted. Again, there is good evidence for this position. There is compelling evidence that facial expressions of emotion are not simply a product of observational learning (Matsumoto & Willingham, 2009), as Darwin had reported. Although there have only been 10 studies of the spontaneous expressions of the congenitally blind, all 10 found that blind individuals produced the same emotional expressions as sighted individuals (Matsumoto & Willingham, 2009). Indeed, both sighted and nonsighted Olympic athletes display similar emotional expressions to winning or not winning (Matsumoto & Willingham, 2009). Thus, studies of the congenitally blind provide evidence for a strong genetic component for emotional expression, at least for the emotions of happiness (to winning) and sadness (to losing). Interestingly, while the congenitally blind spontaneously display these emotions, they cannot consciously produce them on demand.

There is good evidence that emotional expressions are universal, although not everyone agrees. Although the universality of emotional expressions was studied in the late 1800s and early 1900s, the now classic evidence comes from a later study by Ekman and Friesan (1971). Ekman and Friesan tried to answer whether particular emotion expressions are understood the same way by people from all cultures, by seeing if people who had almost no contact with the modern Western society would be able to correctly read the facial expressions of Westerners. They focused on members of an isolated tribe in the South East Highlands of New Guinea (a large island in the South Pacific) who had minimal contact with Westerners and no contact with the Western media. Participants from the tribe were read a short story that involved either happiness, sadness, anger, disgust, surprise, or fear. The stories were chosen to be meaningful to the members of the tribe. For example, the sad story was that a child had died. After hearing the story, participants chose which of three pictures of different facial expressions best described the emotion conveyed by the story. The people who posed the emotions in the pictures were all Westerners. The results were that for 20 of 23 sets of three pictures, members of the tribe chose the correct picture between 65-100% of the time, significantly greater than chance. Because these tribe members who had minimal contact with Westerners could correctly interpret the facial expression of Westerners, this was taken as evidence for the universality of emotional expressions: that people everywhere exhibit and understood the same facial
expressions of happiness, sadness, anger, disgust, surprise, and fear.

Not everyone believes that emotions are universal. In a major review article, Russell (1994) disputed the "fact" that emotions are universally recognized from facial expressions. Russell pointed out that in research done in the 1920s, different subjects used different emotional labels to describe the same expression. However, later researchers overcame this problem by grouping related emotions (e.g., wonder, amazement, and surprise). Nevertheless, Russell correctly pointed out that most people find it difficult to identify real-time emotions if the contextual cues have been removed.

In Russell's own review of studies that have been similar to the Ekman and Friesan (1971) study, Russell found a difference between the performance of Western participants and that of African participants. When looking at how well participants categorize facial expressions from another culture as either happy, surprise, sadness, fear, disgust, or anger, Western participants would correctly categorize a particular facial expression about 80% of the time, while African subjects would correctly categorize a given facial expression about 50% of the time. Japanese subjects show a similar pattern to the African subjects for the emotions of fear, disgust, and anger.

Russell found the data involving the recognition of facial expressions by isolated tribes unconvincing. He pointed out that the tribes had some contact with Westerners and suggests that some experimenter basis may have affected the results.
Russell noted that highly educated people are more likely to recognize facial expressions than are people with little education. He also noted that facial judgments tend to be relative; a judgment of a single face tends to depend on what other faces have been shown.

In a rebuttal, Ekman (1994) strongly disagreed with Russell's assessment of the
literature. Ekman believed that there are some universals and some cultural differences in emotional expression. This indeed is the case. Ekman pointed out that for the data that Russell presented, only 14% of the variance directly related to culture, and only 3% of the variance related to the interaction between culture and emotion. Thus, the vast majority of people’s judgments (83% of the variance) was associated with correctly categorizing the emotional facial expressions of someone from another culture. It should also be noted that if people were only performing at a chance level on this task, they would only be correct about 17% of the time if six emotions was displayed and at 33% if three emotions were displaced. Non-Westerners were clearly performing better than chance. The only possible exception was the “African” sample’s accuracy for sadness, but this was not the case for the Ethiopian sample.

As for cultural specifics, Ekman cited one of his earlier studies (Ekman, 1972) which involved videotaping the spontaneous facial expressions of Japanese and Americans in a laboratory setting while they watched a stressful film of a ritual that involved bodily mutilation. Ekman (1972) found similarity in the spontaneous facial expressions of distress displayed by both Japanese and Americans, particularly in the display of disgust. Displays of sadness were also frequent in the two groups (but twice as likely among the Japanese).

Every researcher seems to agree that the expression of happiness is interpreted the same way by people of every culture. Every researcher agrees that culture can influence when we feel particular emotions, and the degree to which we mask emotions, trying not to reveal what we are actually feeling – something we all do at times (e.g., when talking to potential mates, when talking to our bosses, etc.). What now is also clear based on comparative (across species) research, developmental research, studies of the congenitally blind, and cross-cultural research is that there is a small set of emotions that all normal people experience. We all experience these emotions because (as we will see later) evolution has given
particular biological structures that give rise to these emotions.

**What are the basic emotions?**

Several researchers have tended to see emotional experience as simply composed of two underlying psychological dimensions: (a) how pleasant or unpleasant something is, and (b) how strongly this is felt. However, many others make the assumption that evolution has endowed humans with a small number of basic (or primary or fundamental) emotions. These evolution-influenced researchers of emotions (e.g., Plutchik, 1994) often assume that all other emotions are mixtures or blends of the primary emotions. From this perspective, one needs to identify the basic emotions and explain what other emotions are derived from which blends.

While critics of an evolutionary perspective (e.g., Turner & Ortony, 1992 - who see emotion as dependent on cognition) argue that there is no satisfactory criterion for "basicness," there are criteria that can be applied to identify basic emotions. To identify basic emotions, researchers can: (a) use factor-analysis (Plutchik, 1994). This involves looking for high intercorrelations within a set (or better yet, several sets) of data, perhaps ratings of emotions. The assumption is that if two or more emotions are always highly correlated then a single basic emotion must underlie them. (b) Look for separate physiological systems (Ekman, 1992; Izard, 1992) for each basic emotion. (c) Examine whether facial expressions are the same for two "different" emotions (Ekman, 1992). If the facial expressions are the same, then they are more likely to be the same emotion. (d) Conduct a developmental study of which emotions we are born with, and which emotions are learned. These four approaches could be used as criteria for "basicness".

Let's see what others have proposed as basic emotions. Ekman (1992) proposed that happiness, surprise, fear, sadness, anger, disgust (and maybe contempt) are the basic emotions. He has presented evidence (Ekman, 1994; Ekman & Friesan, 1971) that these 6 or 7 emotions have unique facial expressions and that these facial expressions are universally recognized. That is, no matter what cultural or racial group, everyone interprets the unique facial expressions of these emotions in the same way.

Along with his colleagues, Ekman also reports different autonomic nervous system
activity for: anger, fear, sadness, and disgust. Ekman argues that happiness and contempt do not have distinct ANS patterns because it would not have helped humans’ evolutionary survival.

Izard (2007) proposed that interest, joy/happiness, fear, sadness, anger, and disgust, are basic emotions. He believed that love, depression, and anxiety are the result of some combination of these basic emotions. Izard (2007) thought that each basic emotion is a gestalt composed of particular neural networks, nonverbal expressive behaviors (i.e., facial expressions and body language), and feelings/motivations. Thus, each basic emotion is associated with a particular combination of facial responses that correspond to a particular subcortical program. Emotions pre-empt consciousness and tend to trigger a particular response strategy. People may learn particular cues that cause an emotion, but they do not learn the basic emotion itself. For Izard (1993), higher cognition is not a necessary condition to provoke emotions, but higher cognition is involved in our experiencing the range of emotions beyond the basic ones.

An example of emotion without cognition would be free-floating anxiety, which is when an individual is often anxious but without any reason or cause that the individual can identify.

Thus, to summarize Izard's view, fundamental emotions have: a specific neural basis, a specific facial expression, a distinct feeling, an origin in evolutionary-biological processes, and a motivating property that serves adaptive functions.

Plutchik’s theory

Robert Plutchik is both a clinician and a researcher in emotions. Plutchik (1994) proposed that anticipation, joy, trust, fear, surprise, sadness, disgust, and anger are basic emotions. Plutchik has described how each of these basic emotions can vary in strength, resulting in a different emotion (see Figure 1). Specifically, the emotion that corresponds to the weaker and stronger expression of each basic emotion is as follows:
Furthermore, he suggested that depression, mania, and paranoia are extreme versions of, respectively, sadness, joy, and disgust.

Plutchik also specified what additional (secondary) emotions result from the blending of basic emotions. Specifically:

<table>
<thead>
<tr>
<th>Secondary emotion</th>
<th>Elemental basic emotions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Love</td>
<td>= joy + trust</td>
</tr>
<tr>
<td>Submission</td>
<td>= trust + fear</td>
</tr>
<tr>
<td>Awe</td>
<td>= fear + surprise</td>
</tr>
<tr>
<td>Disapproval</td>
<td>= surprise + sadness</td>
</tr>
<tr>
<td>Remorse</td>
<td>= sadness + disgust</td>
</tr>
<tr>
<td>Contempt</td>
<td>= disgust + anger</td>
</tr>
<tr>
<td>Aggression</td>
<td>= anger + anticipation</td>
</tr>
<tr>
<td>Optimism</td>
<td>= anticipation + joy</td>
</tr>
<tr>
<td>Guilt</td>
<td>= joy + fear</td>
</tr>
</tbody>
</table>

Plutchik’s primary emotions (plus their variations in intensity) and secondary emotions are illustrated in Plutchik’s color wheel (see Figure 1). The circle defines the degree of similarity of emotions. Note that the emotions line up in opposites.
Plutchik (1994) believed that emotions increase an individual’s chance of survival by priming for, or initiating, appropriate behaviours for the situation at hand. Genes indirectly effect emotions by providing a blueprint for the structure and functioning of important biological components (such as the autonomic nervous system and the brain), which in turn influence behaviour. Plutchik also believed that our emotional reactions are effected by how we cognitively evaluate events. We decide whether events are of significance to us, and if so then
physiological changes occur that can create urges that initiate, or suppress, particular behaviours.

There is substantial overlap in the lists of basic emotions proposed by Ekman, Izard, and Plutchik. They agree that happiness, fear, sadness, anger, and disgust (and perhaps surprise) are basic emotions. Others have suggested that love and pride are also basic emotions, but there is not currently general agreement on whether these are indeed basic emotions.

More than other researchers, Plutchik has most explicitly suggested which combination of basic emotions form which secondary emotions. However, We need to keep in mind that while some emotions (e.g., jealousy) are indeed closely linked to basic emotions (e.g., fear and anger in the case of jealousy), there have been few studies on whether basic emotions are indeed “elements” of other (secondary) emotions (Campos et al., 2010).

If basic emotions are hardwired into us, then they must be programmed into our biological system, likely our autonomic nervous system and the brain. While the autonomic nervous system and the brain are the major biological substrates of emotions, other biological systems such as the endocrine system (hormones) and even the respiratory system, may also play a role.

**Autonomic (Sympathetic\Parasympathetic) Nervous System**

The autonomic nervous system directly interacts with our organs, muscles, and hormonal glans within our body. Because of its influence on our body, the autonomic nervous system is a key regulator of our feelings. The autonomic nervous system can be subdivided into two components: (a) the sympathetic nervous system and (b) the parasympathetic nervous system. Only one of these systems can be activated at a given time. The sympathetic nervous system has been molded by our evolutionary history to prepare us to fight, flee, or mate.

Let us imagine that you are on a dock on a lake with someone who you find really attractive. You are both sitting close to each other on the dock. There is not another soul around. It is a beautiful, warm day with not a cloud in the sky. You lean in towards the other person while he or she leans towards you. So what happens to your body? Well, the
sympathetic nervous system is activated and it causes: your heart rate to increase (so you can pump blood to muscles where it will be needed); your breathing rate to increase (so you will have more oxygen in the blood for exertion); your digestive system to shut down (so that you will have more blood for other organs or muscles); your muscles to tense (preparing you for action), causing hair to stand up on your skin (which people sometimes refer to as “goose bumps”); your pupil in each eye to dilate – widen (sharpening your vision); and adrenaline to be released into your bloodstream (providing additional energy for action). So, the sympathetic nervous system, through this coordinated bodily response primes us for action. To quite a large extent, this bodily response is the same whether we are getting ready to run from a predator, to fight for our life, or when we are forced to listen to our boss yell at us. So, it should be no surprise that a variety of emotions (e.g., anger, fear, and surprise) are linked with the activity of the sympathetic nervous system. An exception to this is sadness. Sadness is linked with activation of the parasympathetic nervous system. The parasympathetic nervous system is linked with relaxation, rather than preparing for action. When we are sad, we are less likely to feel like doing things.

The nature of the link between emotions and the autonomic nervous system has long been a matter of debate. In the late 1800’s, William James and Carl Lange offered an alternative to our common sense understanding of emotions. Common sense tells us that when we see an event, we have some feeling (e.g., sadness) and this feeling then results in physiological reactions (e.g., crying). However, James and Lange reversed these events. They believed that the physiological reactions occurred first and then resulted in the subjective feeling. Thus, they believed that we are sad because we are crying. Furthermore, James perceived that the physiological reactions occurred from direct perception (that is, with no conscious or perhaps even cognitive component). However, a more recent clarification (Ellsworth, 1994) of James writings has suggested that James’ theory was actually more nuanced than most people realized. According to this clarification, James suggested that a stimulus may cause an interpretation on our part (an appraisal) about its meaning, which in turn causes a bodily response, which in turn triggers a feeling (i.e., stimulus → interpretation → bodily response → affect). Most people have, perhaps mistakenly, taken the James-Lange theory to be: Stimulus → bodily response →
James believed that his theory applied only to "coarser" emotions, such as grief, fear, rage, and love. The physiological reactions that he referred to were autonomic, hormonal, and muscular.

James suggested that two types of evidence support his theory. First, he said it's impossible to imagine an emotion taking place separate from a bodily experience. Second, people can sometimes report feelings (such as anxiety, sadness, or happiness) without knowing why. So, James' evidence was often anecdotal.

For Lange, a physiologist, emotions were specifically the result of the functioning of the cardiovascular system. Emotional structures were generally seen by Lange as subcortical [unconscious].

In opposition to the James-Lange theory, W. B. Cannon (in the 1920's) did not believe that emotions could be the result of a perception of unique physiological changes (Hothersall, 1995). Cannon believed that the autonomic nervous system gave basically the same response no matter what it was that the individual felt. In addition, the physiological system was too slow to react, as well as not having enough diversity in reactions, to cause the diversity of emotional reactions. Cannon, unlike James, believed that specific brain structures were probably involved in emotions.

So, were James and Lange correct, or was Cannon correct? There is some modern empirical evidence that is consistent with the James-Lange theory (but Cannon was correct that specific brain structures affect particular emotions). There are distinct physiological differences associated with different emotions (Critchley, 2009; Stephens, Christie, & Friedman, 2010). For example, heart rate increases when someone sees a happy or disgusted faces while heart rate decreases when someone sees a sad or angry face (Critchley, 2009). However, the physiological differences in emotions are apparently small, while the similarity in autonomic responses across emotions is large. And, it seems that not everyone shows physiological differences across emotions. Physiological variables such as heart rate may also vary with the situation even when the specific emotion is held constant. So, the relationship between autonomic responses and emotions is complex. Still, Stephens et al. (2010) were able to use differences in autonomic
responses to correctly classify experimentally induced emotions (i.e., anger, fear, sadness, surprise, amusement, or contentment) 44.6% of the time.

Another surprising line of evidence that is consistent with the James-Lange theory comes from facial expressions. The facial feedback hypothesis holds that particular muscle activation that underlie our facial expressions cause us to feel specific emotions. It is kind of a “smile and you will feel happy, frown and you will feel sad” theory. What surprises most people is that the evidence suggests that this is indeed true, although the effect is of a small magnitude. When people are asked to hold a pencil in their mouth (across the corners of their mouth) in a way that causes them to smile, they are slightly happier then when they hold a pencil in the mouth (with the pencil pointing straight out) in a way that causes them not to smile (Soussignan, 2002). Posing an emotional facial expression, like a smile or a frown, even when people do not realize they are doing so, actually causes a small increase in their emotional experience. Similarly, having people not move their facial muscles decreases their emotional response, even when they are unable to guess the purpose of the study (Davis, Senghas, & Ochsner, 2009). People who have Botox injectioned into their face, which paralyzes some muscle movement, experience a slight decrease in the strength of their positive emotional response to a selected video clip (Davis, Senghas, Brandt, & Ochsner, 2010). This was in comparison to those in a control group who received injections of a substance that was a filler that did not affect muscle movement (Davis et al., 2010). However, the Botox group did not experience an expected decrease in the magnitude of their negative feelings to a video clip with negative emotional content, which might suggest a weak or inconsistent effect.

A variant of facial feedback is facial mimicry. When we watch actors or listen to others talking to us, we often mimic the facial expression of the speaker. When we do this, it can trigger an emotion within us that corresponds to the speaker’s facial expression (Stel & van Knippenberg, 2008). Furthermore, facial mimicry often happens without our conscious awareness, and can influence autonomic responses such as heart rate (McIntosh, 1996).

An intriguing question is how exactly does making a facial expression cause us to feel a particular emotion? A partial explanation is given by the vascular theory of emotional efference (McIntosh, Zajonc, Vig, & Emerick, 1997; Zajonc, Murphy, & Inglehart, 1989). This theory
suggests that muscle movements of the face may directly or indirectly (by regulating air intake through the nose) influence the temperature of blood going to the brain and thereby affects brain functioning. Biochemical processes are generally temperature sensitive (Zajonc et al., 1989). The theory assumes that decreased brain temperature causes pleasurable emotions.

Zajonc et al. (1989) points out that the carotid artery interacts with the cavernous sinus (a vein which comes from the face) just before the carotid enters the hypothalamus. Thus, the cavernous sinus (from the face) can cool the carotid, which in turn influences the temperature of the hypothalamus. So, what Zajonc is proposing is a mechanism whereby the physical component can cause changes in one's subjective emotion, with minimal cognitive processing.

In support of the vascular theory of emotional efference, it has been found that: (a) changing facial muscles effects the amount of air breathed, and correlates with an indirect measure of brain temperature; and (b) inhibiting how much air can be breathed causes negative emotions, also correlating with an indirect measure of brain temperature (McIntosh et al., 1997). It is also well established that aerobic exercise (which increases breathing) can be successful in alleviating depression. However, the vascular theory of emotional efference can only be part of the explanation for how facial expressions effect emotions (McIntosh et al., 1997). It provides an explanation for feeling happy versus feeling sad, but it does not explain how facial expressions of any of the other basic emotions results in their associated feelings.

One line of evidence that appears not to support the James-Lange theory comes from Paraplegics. These people have reduced information coming from the autonomic nervous system to the brain. If the body triggers emotional feelings as James suggested, then people with reduced information from their body (i.e., spinal cord patients) should experience emotions less strongly than do other people. The findings from these types of studies have been mixed, with some reporting reduced emotions for individuals after becoming paraplegic, while other studies have reported an increase in emotional experience for individuals after becoming paraplegic. Recent studies (Cobos, Sánchez, Pérez, & Vila, 2004; Dickson, Allan, & O’Carroll, 2008) have generally found that the subjective emotional experience of patients, after their spinal cord damage, has not changed, or has increased, especially for sadness. In one study (Cobos et al., 2004) that had spinal cord patients rate their reactions to individual emotion
provoking stimuli, paraplegics did not differ from control subjects in feeling joy, love, fear, and anger, but felt heightened levels of sadness.

So, there appears to be support for the James-Lange theory from some lines of research, but not from others. We know that the autonomic nervous system is involved in our perception of emotions, and that feedback from at least facial muscles influences emotional feeling. Does this affect how clinical and counselling psychology should be practiced? Perhaps it should. It should remind us that the reaction of the body should not be forgotten; that in addition to changing people’s maladaptive thinking, we should also be teaching people how to turn off or turn on their sympathetic nervous systems, which would sometimes include teaching people how to relax their facial muscles.

Excitation transfer theory

Excitation transfer theory (Zillmann & Bryant, 1974) describes how we do not always consciously understand the activity of our sympathetic nervous system, and how this can heighten our emotional experience. This theory assumes two things (Leventhal & Tomarken, 1986). First, it assumes that activity of the sympathetic nervous system does not just suddenly stop. Rather, sympathetic nervous system arousal gradually reduces over time. Second, it assumes that people often mistakenly think that their feeling (partially from sympathetic arousal) only results from one cause, when this is not always true. Thus, the theory predicts that “left over” arousal from a previous situation can combine with arousal from a later situation resulting in an increased emotional experience that the individual only attributes to the later situation. This can actually explain why make-up sex can be so electric: left over arousal from arguing can combine with sexual arousal and this combined arousal is only attributed to the sex. Excitation transfer theory also explains why horror movies usually have some comic scenes embedded within the film: left over arousal from the comedy combines with the arousal from a later scary scene, making us feel even more scared.

Leventhal and Tomarken (1986) noted that the results of a number of studies have provided evidence supporting excitation transfer theory. This evidence included findings that (a) physical exercise can heighten later feelings of anger, (b) physical exercise can heighten later
feelings of sexual excitement, (c) sexual excitement can heighten later feelings of aggression, (d) sexual excitement can heighten subsequent enjoyment of music, and (d) excitement from humour can heighten later feelings of aggression. So, the transfer of arousal can be between very different emotions.

Excitation transfer theory might partly explain why two reality television show dating contestants (Jake and Vienna), who were both very scared of heights, seemingly become more strongly attracted to each other after being tied together to a single bungee cord and jumped from a tall bridge over a rock canyon, only to then share a passionate kiss as they hung upside down tied to their bungee cord. Presumably, the very strong fear induced arousal from their jump from the bridge combined with the arousal from their kiss, making the experience of that kiss even more passionate. Interestingly, the effects of excitation transfer are lessened when the individual realizes the causal linkage to the earlier event (Leventhal & Tomarken, 1986).

**Brain Circuits**

Although the body plays an important role in emotional experience, so does the brain. It is in the brain that we evaluate the emotional significance of people and situations, and it is in the brain where we decide how to react. When emotional, versus non-emotional, stimuli are presented in a controlled laboratory setting, there is enhanced sensory processing in the occipitotemporal area (D’Hondt et al., 2010). Subsequently, emotional stimuli may cause activity in the amygdala and activity in the medial prefrontal cortices (D’Hondt et al., 2010). However, after the sensory processing, different areas of the brain tend to be involved in processing different emotions (see Table 2). This is evidence that emotions are more complex than when described (as recommended by some researchers) by simply two dimensions: (a) degree of pleasantness, and (b) degree of arousal. Rather, there are separate (e.g., basic) emotions that are to some extent processed by different areas of the brain (Buck, 1999; Vytal & Hamann, 2010).
A recent meta-analysis (Vytal & Hamann, 2010) of 83 human neuroimaging studies found that basic emotions consistently have distinct neural processing centers, but with some overlap in the activated neural centers. The study utilized results from studies that either induced emotions or had participants view emotional facial expressions or emotion provoking pictures. The meta-analytic technique used a quantitative spatial analysis of the previous findings to average the results and find distinct clusters (locations) of increased activity in the brain. The results of the meta-analysis are as follows. Happiness triggered the greatest activity in the right superior temporal gyrus, with 8 other brain locations of activation. Sadness triggered the greatest activity in the left medial frontal gyrus, with 34 other brain locations of activation. Anger triggered the greatest activity in the left inferior frontal gyrus, with 13 other brain locations of activation. Fear triggered the greatest activity in the left amygdala, with 11 other brain locations of activation. Finally, disgust triggered the greatest activity in the right insula and in the right inferior frontal gyrus, with 14 other brain locations of activation.
The partial independence of different brain areas in processing different emotions can be seen when people are exclusively presented with pictures of faces showing one of several emotions. In a meta-analysis (Fusar-Poli et al., 2009) of 105 studies (totaling 1600 participants) using this procedure with each study utilizing functional magnetic resonance imaging techniques, it was found that the brain responded differently to disgusted, happy, sad, angry, and fearful faces compared with neutral faces. For both disgusted and angry faces, a part of the outer cortex called the insula was particularly active, but much more active (and active in both right and left hemispheres) for disgusted faces. The thalamus also was particularly active for disgusted faces. For the angry faces, the insula was active only in the left hemisphere, along with part of the occipital cortex being particularly active.
### TABLE 2. BRAIN REGIONS ASSOCIATED WITH CONSCIOUS EMOTIONAL PROCESSING.

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Brain regions</th>
</tr>
</thead>
</table>
| Happy    | right superior temporal gyrus<sup>a</sup>  
          | amygdala<sup>b</sup>               
          | cerebellum<sup>b</sup>            |
| Surprise | parahippocampal gyrus<sup>c</sup>   |
| Sadness  | left medial frontal gyrus<sup>a</sup>  
          | amygdala<sup>b</sup>               
          | lingual gyrus<sup>b</sup> (cortex)  
          | anterior cingulate<sup>d</sup> (cortex)  
          | ventral septal               
          | dorsal preoptic area         
          | cerebellum<sup>b</sup>          |
| Fear     | left amygdala<sup>b</sup>            
          | medial frontal gyrus<sup>a</sup> (cortex)  
          | cerebellum<sup>a</sup>            |
| Disgust  | right insula<sup>a, d</sup>          
          | right inferior frontal gyrus<sup>a</sup>  |
| Guilt    | cingulated gyrus<sup>e</sup>         
          | medial frontal cortex<sup>e</sup>    
          | insula<sup>e</sup>                |
| Anger    | left inferior frontal gyrus<sup>a</sup>  
          | Left insula<sup>b</sup>            
          | cerebellum<sup>b</sup>            |
| Lust     | septal<sup>f</sup>                   
          | Thalamocingulate<sup>f</sup>      
          | Hypothalamus<sup>f</sup>          |

DIAGRAM FROM WIKIPEDIA SHOWING THE INSULA, (JAN. 23, 2007). ORIGINAL FROM GRAY’S ANATOMY.
For both fearful and happy faces, the amygdala was active in both hemispheres, but much more for fearful faces. Happy faces also activated a part of the cortex involved in arousal to emotional sights (Fusar-Poli et al., 2009). In contrast, fearful faces activated a different part of the cortex (medial frontal gyrus), one that is involved with inhibiting emotion and conscious monitoring of emotions before making a decision (Fusar-Poli et al., 2009). Viewing sad faces
evoked activation in the amygdala and a part of the cortex (lingual gyrus) in the back of the brain.

Although the amygdala is involved in processing fearful, happy, and sad pictures, it is different parts of the amygdala involved in processing these three emotions (Fusar-Poli et al., 2009). We should also note that there is commonality in brain functioning for various emotions. The cerebellum is active in the processing of disgusted, happy, sad, angry, and fearful faces (Fusar-Poli et al., 2009). Perhaps this reflects some general arousal and/or mimicry to emotional faces.

Other evidence is also consistent with basic emotions corresponding to separate neural circuits, but with some overlap. For example, a variety of types of patients who have had damage to the insula have difficulty in recognizing disgust in others and in experiencing disgust.
themselves (Ibañez, Gleichgerrcht, & Manes, 2010). However, this area of the cortex is not exclusive to disgust, but also appears to play a role in major depression (Ibañez et al., 2010). Trait anxiety has been linked to increased amygdala reactivity (Hariri, 2009), and sadness has been linked to a neural circuit involving the anterior cingulate, the ventral septal, the dorsal preoptic area.

Lust is often classified as a motivation rather than as an emotion. However, it has been suggested (Buck, 1999) that emotion and motivation are part of a common system. If we accept this suggestion, then it is worth noting that lust (along with submission, attachment, and playfulness) is part of a separate neural circuit composed of the septal area, thalamocingulate influence, and the front of the hypothalamus (Buck, 1999). The septal area is part of the cingulate gyrus in front of the thalamus. The septal area is a pleasure center in the brain and rats will continually press a bar if an electrical stimulation is then delivered to the septal area.

The neural processing of guilt may depend on what is causing us to feel guilty. Feeling guilty over a deviation from one’s values is associated with increased processing in the cingulated gyrus, medial frontal cortex, and insula (Basile et al., 2011). On the other hand, feeling guilty over personal interactions does not involve increased activation in the insula (Basile et al., 2011). Perhaps the former type of guilt involves an element of self disgust?

It is important to remember the forest (the implication) and not just the individual trees (the various brain circuits) when looking at the brain circuits associated with emotions. The finding that there are different brain circuits associated with particular emotions is consistent with an evolutionary approach to emotions. We are biologically hardwired to experience the basic emotions.

**Unconscious Brain Processing**

Based on animal research, LeDoux suggested that there are two separate neural circuits involved in experiencing fear: a subcortical (unconscious) and a cortical (conscious) circuit (LeDoux, 1994). In the subcortical circuit visual information is first processed by the thalamus with information then directly passed to the amygdala. The amygdala will then send a danger signal to the autonomic nervous system. The second pathway involves information being
passed from the thalmus to the visual cortex. In the visual cortex more sophisticated visual processing takes place, so that you can better understand what the stimulus is (e.g., a snake or a stick). This "extra" processing takes more time. If it is something to be afraid of, that information is relayed from the visual cortex to the amygdala. The subcortical and cortical pathways may both be working at the same time, but a quick fear reaction may first be felt as the result of the subcortical (automatic\unconscious) circuit, and it may take a few moments until the individual realizes why it is that he or she feels afraid.

Brain imaging research has found similar separate conscious and unconscious circuits in people. While the conscious processing of a fearful face is associated with increased processing in the left amygdala, dorsal anterior cingulate, and medial prefrontal cortex, subliminal exposure to a fearful face is associated with increased activity in the right amygdala and ventral anterior cingulate areas (Williams et al., 2006). While conscious processing of a surprised face is generally associated with increased processing in the parahippocampal gyrus, subliminal exposure to a surprised face is associated with increased activity not only in the parahippocampal gyrus, but also in the fusiform gyrus, the right thalamus, and the right amygdala (Duan, Dai, Gong, & Chen, 2010). Thus, in people there are clearly separate neural pathways for conscious and unconscious processing. It is no surprise that we sometimes experience an emotion before we know why. The brain automatically (unconsciously) processes information to decide whether it is personally relevant to us or not.

Prefrontal cortex

The prefrontal cortex has an important role in emotional regulation. The prefrontal cortex is involved when we try to feel better by rethinking the meaning of an event (reappraisal) or by trying to think of the emotion provoking situation in a more emotionally detached manner (Koenigsberg et al., 2010). There may be a variety of cortical regions involved when we directly experience or think about emotional situations. For example, when we try to distance ourselves (i.e., trying to be a detached observer) from emotional social pictures, the following brain regions are active: dorsal anterior cingulate; medial and lateral prefrontal cortex; precuneus; posterior cingulate cortex; intraparietal, superior and middle temporal gyri.
(Koenigsberg et al., 2010). Another part of the cortex, the orbital frontal cortex, has direct connections with the hypothalamus, amygdala, and brainstem, and automatically regulates the duration, frequency, and intensity of positive and negative emotional states. Of major clinical relevance, patients with posttraumatic stress disorder show decreased prefrontal cortical activity when viewing negative pictures compared to control subjects (Luan, Briton, Taylor, Fig, & Liberzon, 2006). Thus, although LeDoux (1994) said that it is quite difficult to get rid of emotional memories and that suppression of relatively permanent negative emotional memories may be the best clinical approach, this is often difficult to achieve.

**Hemispheric specialization of emotions**

There is evidence that the right hemisphere is more active in the processing of negative emotions while the left hemisphere is more active in the processing of positive emotions (Balconi & Mazza, 2010; Hecht, 2010). EEG recordings have found increased left frontal cortical activity when viewing happy faces, increased right frontal cortical activity when viewing fearful or angry or surprised faces, but no cortical differences when viewing sad or neutral faces (Balconi & Mazza, 2010). In people who are depressed, there tends to be increased neural activity in the right hemisphere and decreased neural activity in the left hemisphere (Hecht, 2010). Damage to the left (more positive emotions) hemisphere is associated with depressed mood while damage to the right (more negative emotions) hemisphere is associated with elevated mood (Hecht, 2010). Nevertheless, laterality in emotional processing appears to be neither complete nor simple. Recent meta-analyses (Fusar-Poli et al., 2010; Vytal & Hamann, 2010) of FMRI studies have found particular regions of the left hemisphere involved in the processing of sadness, and anger, as well as a region of the right hemisphere involved in the processing of happiness. Perhaps it is best to suggest that there is somewhat more processing in the right cortical hemisphere for negative emotions and somewhat more processing in the left cortical hemisphere for negative emotions.

The hemispheric differences in the processing of emotional words are consistent with the differences in the processing of faces. Wexler, Warrenburg, Schwartz, and Janer (1992) used a dichotic listening task where two words were presented at the same time, one to each ear.
In each word pair, the words differed from each other only in their initial consonant. One of the words was emotionally neutral while the other was either emotionally positive or emotionally negative (hug, tug/died, bide). When these pairs are presented, people consciously experience only one of the words.

Wexler et al. (1992) measured EEG and EMG activity when the words were presented. EMG measures electrical activity from particular muscles in the face; certain facial muscles are associated with particular facial expressions and, thus, with particular emotions. For example, in conjunction with negative emotions, there is activity in the corrugator muscle (that furrow the brow during frowning) and a decrease in right frontal alpha (EEG) activity. In conjunction with positive emotions, there is an increase in zygomatic muscle activity (that raise the corner of the mouth in a smile), and a decrease in left frontal alpha activity.

What they found was that frontal EEG alpha activation for emotional words that were not consciously processed showed interesting hemisphere effects. Here, activation tended to be left side dominant for positive emotional words, but right hemisphere dominant for negative emotional words. They found the right hemisphere more active in unconscious affect trials and the left hemisphere more active in conscious affect trials.

Support for the finding of right hemisphere dominance in unconscious processing also comes from a study by Ladavas, Cimatti, Del Pesce, and Tuozzi (1993). They studied the processing of emotional stimuli in a single split-brain patient in whom the two hemispheres has been completely disconnected through surgery. Their subject was a right-hemisphere dominant, 40-year-old, male. He was shown slides containing either neutral, sexual, or disgusting (e.g., rotten food) content. These stimuli were presented either above or below visual threshold, and were presented to the left or right hemisphere. The subject's task on each trial was to first identify the emotional category of the stimuli, and second, to report the content of the slide.

They found that even for the subliminally presented slides the patient could correctly identify the emotional category of the slides, but that he could not identify the content of the slides, either through verbal identification or through a forced-choice recognition task. Heart rate data taken during the experiment consistently indicated that when the patient was presented subliminal emotional information there were changes in heart rate for both sexual and
disgusting material presented to the right hemisphere, but no heart rate changes for material presented to the left hemisphere. When presented stimuli slow enough to be consciously processed, both hemispheres processed the information and caused increases in heart rate for the sexual and disgusting information.

The results of the Ladavas et al. (1993) study suggested that it was the right hemisphere that unconsciously processed both sexual and disgusting information. Furthermore, the findings demonstrate that the brain is unconsciously processing information, causing a physiological reaction, without conscious awareness of the content of the information.

**Hormones**

Basic emotions are not only differentiated on the basis of neural pathways, but also on the basis of hormonal activation. This was the conclusion of Henry (1986) on reviewing animal and human research on hormonal responses associated with emotions. Once particular emotional neural circuits are activated, the endocrine system is also activated so that various hormones are released within the body. This results, for example, in changes in blood pressure, pulse, norepinephrine secretion, and testosterone level. Henry (1986) outlined how the overall profile of endocrine activation differs for anger, fear, depression, and elation (see Table 3).

In anger, blood pressure, pulse, and norepinephrine level increases, epinephrine slightly increases, and testosterone increases. In fear, there are moderate increases in blood pressure, pulse, and norepinephrine level, an increase in epinephrine, and a moderate increase in cortisol (an androgen like substance). In depression, there is a slight decrease in pulse, a decrease in testosterone, and an increase in cortisol, ACTH (which is associated with loss of effort, submission, and inhibition of behaviour), and endorphins. In elation, there is an increase in testosterone, and a decrease in cortisol, ACTH, and endorphins. In a situation of helplessness, cortisol levels are high and testosterone levels are low.
TABLE 3. SYMPATHETIC AND ENDOCRINE ACTIVITY FOR SOME EMOTIONS (FROM HENRY, 1986)

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Blood pressure</th>
<th>Pulse</th>
<th>Norepinephrine</th>
<th>Epinephrine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Fear</td>
<td>↑</td>
<td>↑</td>
<td>P</td>
<td>↑</td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serenity</td>
<td>↓</td>
<td>↓</td>
<td>↓</td>
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</tr>
<tr>
<td>Elation</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Testosterone</th>
<th>Cortisol</th>
<th>ACTH</th>
<th>Endorphins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>↑</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fear</td>
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<td>Depression</td>
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<td>Serenity</td>
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</tbody>
</table>

Hormones appear to have interesting associations with human behavior. Much of these effects have to do with sexual desire, but other behaviors are affected as well, and male behavior is affected as well as is female behavior. For example, normal maternal behavior is, in part, influenced by oxytocin, vasopressin, and prolactin (Douglas & Ludwig, 2008) and maternal postpartum depression may, in part, be associated with mothers’ estrogen, or prolactin levels (Bloch, Rotenberg, Koren, & Klein, 2005). Similarly, men’s hormone levels have been associated with how they interact with their children. Men with higher levels of prolactin and lower levels of testosterone are more sympathetic to the cries of infants (Fleming, Corter, Stallings, & Steiner, 2002). Prolactin levels are positively correlated ($r = .26$) to how much time men spend in coordinated exploratory play with their first-born infant (Gordon, Zagoory-Sharon, Leckman, & Feldman, 2010). Father’s oxytosin levels relate ($r = .29$) to how much time the father and his first-born infant mirror each other in social behavior and emotions during interactions together (Gorden et al., 2010). Finally, paternal postpartum depression exits at rates similar to those of maternal postpartum depression, and may, partially, be associated with the father’s testosterone, estrogen, vasopressin, cortisol, and prolactin levels (Pilyoung & Swain, 2007).
Lust

Theorists as disparate as psychoanalysts and evolutionary psychologists agree on one thing: sex is a powerful motive that influences much of our behavior, sometimes in automatic reactions that are often below our conscious awareness. However, sex is not the only biological motive that influences what we do, and in fact it is not even the most powerful motive. Our most powerful biological motive is to survive. Survival trumps sex. Other biological states, such as sleep deprivation, can also overpower our sexual motive feelings, but nevertheless, our sexual motivation feeling is a powerful force behind much of what we do. It is quite fitting that one article (i.e., Mass, Holldorfer, Moll, Bauer, & Wolf, 2009) on women’s sex drive was titled “Why we haven’t died out yet ...”

The relationship between lust and other emotions, such as love, is not always simple. While young adolescents may conflate lust with love, adolescents who advocate “friends with benefits” separate sex with friends from feelings of love or commitment. However, college students see lust and love as strongly linked, and perceive relationships that involve a strong mutual sexual desire as happier and more satisfying (Regan, 1998).

Our own emotional expressions affect how sexually attractive others see us. Canadians rate pictures of smiling women as more sexually attractive than pictures of women with either a neutral, shameful, or prideful facial expression (Tracy & Beall, 2011). The size of this effect is significant, a rating of one point higher on a nine point scale. On the other hand, Canadians rate pictures of prideful men as more sexually attractive than they do pictures of smiling men (Tracy & Beall, 2011). This is likely because pride signals higher social status (Tracy & Beall, 2011), and evolution appears to have endowed some women with a tendency to be attracted to men who have the resources to protect a women’s offspring. People’s feelings of lust are not always as simple as we might think.

Sexual relations within a relationship can significantly affect our satisfaction with the relationship, but within heterosexual couples, men and women do not always understand that the strength of their partner’s sexual drive is somewhat different than their own. It is not uncommon for partners to differ in the strength of their sex drives. In fact, although there are
individual differences, women generally desire sex less often than do men (Baumeister, 2000; Baumeister, Catanese, & Vohns, 2001). The gender differences in sexual drives exist for biological and/or environmental reasons, and in turn influence several aspects of sexual behavior. In a review of the literature, Petersen and Hyde (2010) found that men reported slightly more sexual experience and more permissive attitudes than did women. Males were moderately more likely to masturbate, view pornography, and engage in casual sex. Men were more likely than women to hold more liberal attitudes toward premarital sex, to endorse the sexual double standard, and to report sexual satisfaction. Women were slightly more likely than men to feel fear or anxiety or guilt about sex, have permissive attitudes toward having sex with emotional commitment, and hold positive attitudes toward gay men. However, while gender differences exist in these areas of sexual behavior and attitudes, most of these differences tend to be of small magnitude (Petersen & Hyde, 2010). No gender difference existed in reported attitudes toward extramarital sex, attitudes toward sex when engaged to be married, attitudes toward masturbation, and attitudes toward lesbians.

The biology behind lust involves brain centers and hormones. Sexual arousal increases activation of the “reward” system in the brain and the deactivation of an inhibitory circuit from the frontal lobe. Other specific brain regions have also been linked to sexual arousal in both men and women. Several fMRI studies have found that viewing sexual pictures results in activation in the visual cortex, the parietal lobe, the orbitofrontal and the anterior cingulate cortex regions, the ventral striatum (part of the limbic system), and the amygdala (Salonia et al., 2010). The hypothalamus becomes activated with sexual signals, and is more easily activated by visual signals in men than in women (Salonia et al., 2010). We all “know” that about men from the everyday world where men seem forever distracted by the mere sight of women around them!

Hormones have been linked to sexual desire and sexual behavior. Testosterone is the hormone that is responsible for men’s sexual drive. For men, high testosterone levels are directly related to a high desire to date others (van Anders & Goldey, 2010). Testosterone increases in sexually experienced men when they simply talk with women, although not during morning conversations (van Anders & Gray, 2007). It also increases with exercise. Women
tend to find men with higher testosterone levels more attractive, at least for short-term relationships, but males with higher testosterone levels are more likely to have extramarital affairs, and to divorce (van Anders & Gray, 2007). Men who are relatively more “feminine” looking are thought to be better marriage material. However, when women know that a man who has higher testosterone levels also has a history of being faithful, then they tend to rate him as the most attractive, although the size of this effect is small (partial $\eta^2 = 0.15$; Quist, DeBruine, Little, & Jones, 2012).

The production of testosterone declines slowly with age in men. In middle-aged men, the decrease is about 1% per year, which explains why middle-aged men who are healthy (particularly cardiovascularly healthy) are still interested in sex.

Hormones also have indirect effects on men’s sexual behavior. Testosterone is positively related to dominance, but only if stress levels are low (as reflected by low cortisol) in individuals (Mehta & Josephs, 2010). A man’s social status, including perceived dominance, relates to how attractive many women see that man. High cortisol (a stress hormone) levels are correlated with feeling anxiety and with social avoidance (Mehta & Josephs, 2010). Van der Meij, Buunk, and Salvador (2010) found a moderate ($r = .55$) correlation between how attractive men found an unfamiliar woman they were with, and the cortisol level in men. It was assumed that the men were nervous when waiting with a woman who they thought of as a potential mate. However, of the 21 men who rated the woman as quite attractive (5 or 6 on a 7-point scale), only 12 actually showed an increase in cortisol. An interesting question is why did cortisol not increase in the other men? The obvious answer is that they were probably not stressed by an attractive woman. Perhaps they were more extroverted or more socially or sexually skilled, and so are not stressed when they meet an attractive woman.

Women’s sexual drive is more complicated, more nuanced, than men’s sexual drive. Incredibly, it has been asserted that 48% of North American women have no sex drive, and that much of this is related to hormone levels (Vanderhaeghe & Pettle, 2007). This assertion should not be lightly dismissed as estimates from surveys suggest that from 7.2 - 54.8% (Emerson, 2010), or from 20 - 30% (Both, Laan, & Schultz, 2010), of women in the United States have low sexual desire. Low sexual desire tends to increase with age, but the percentage of women for
whom this causes distress seems not to change with age (Emerson, 2010).

Testosterone plays a key role in women’s sexual drive. As such, the availability of chemicals used by the body to produce testosterone can affect the strength of a woman’s sex drive. L-arginine is an amino acid involved in the production of nitric oxide, which is in turn used in the production of luteinizing hormone, which in turn is used in the production of testosterone. Thus, L-arginine can be seen as responsible for sexual arousal in women (Vanderhaeghe & Pettle, 2007) and, interestingly, is only available through one’s diet (i.e., meat, chicken, turkey, nuts, and milk products).

DHEA, another precursor of testosterone, is produced in the adrenal glands in both men and women (Vanderhaeghe & Pettle, 2007). This hormone is at peak production in women during their twenties, and then declines. This may partly explain the decline with age in the strength of women’s sex drive. As women age, dopamine levels also tend to decrease. As dopamine inhibits prolactin, and prolactin inhibits testosterone, the net result with aging is a decrease in levels of testosterone, and thus a decreased sex drive (Vanderhaeghe & Pettle, 2007). Overall, testosterone levels in women peak at about age 25 and drop to about half of that levels after women have reached menopause (Both et al., 2010).

Hormonal fluctuations make women’s sexual desire more complicated than men’s sexual desire. Sexual desire often varies with the phase of a woman’s menstrual cycle. Wang and Johnston (1993) measured women's responses to pictures (some of them of men) at different times during the women’s menstrual cycle. They found that when progesterone was assumed to be high, eroticism was low. The fertile phase of the menstrual cycle is when sexual desire tends to be at higher levels (Mass et al., 2009). This is when women are most attracted to male faces, masculine bodies, and male social dominance (Gangestad, Thornhill, & Garver-Apgar, 2010). Interestingly, the low progesterone levels during the fertile phase of the menstrual cycle are also associated with increased accuracy of emotional recognition of facial expressions (Derntl, Kryspin-Exner, Fernbach, Moser, & Habel, 2008), which may facilitate successful interactions with potential mates.

Among women who have a hysterectomy, which results in lower testosterone levels, 35-44% report a low sex drive (Graziottin, Koochaki, Rodenberg, & Dennerstein, 2009). This can
often lead to conflict with their partner because he will be interested in having sex but she is often just not interested. These women frequently experience a number of negative emotional consequences (Dennerstein, Koochaki, Barton, & Graziottin, 2006). Over 80% of these women feel that they are letting their partner down and/or are unhappy, over 70% feel disappointed and/or frustrated, over 60% feel sad and/or hopeless and/or upset, over 50% feel angry, and over 40% have low self-esteem (Graziottin et al., 2009). In comparison, these emotions are experienced less than 10% of the time in women with normal sexual desire (Graziottin et al., 2009).

For both men and women, the earlier they reached puberty and the earlier their first sexual arousal, then the slightly stronger their adult sex drive (Ostovich & Sabini, 2005). Heterosexual women, and bi-sexual women, with a higher sex drive are more attracted to both men and women than are women with a lower sex drive (Lippa, 2007). However, heterosexual men, and lesbians, with a higher sex drive are simply more strongly attracted to women (Lippa, 2007). Thus, it appears that the sexual response of some women tends to be more flexible that of most men (Salonia et al., 2010).

There is yet another way that women’s lust is more complicated than is men’s lust. Chivers (2010) suggested that women are more likely than men to be physiologically aroused (as measured by blood flow to the genitals) but not subjectively feel sexually aroused. Men are more likely to experience a direct correspondence between their physical and mental arousal. More specifically, for women the correlation between subjective arousal and a physiological measure of arousal is .26, whereas for men the correlation is .66 (Chivers, Seto, LaLumiere, Laan, & Grimbos, 2010).

By no means do hormones play the sole role in lust. Personal, relationship, and cultural factors are all important in determining the strength of one’s sex drive (Emerson, 2010). Upbringing, personal experiences, and socialization affect what we think about sexual relations, and our thoughts have a major influence on our sexual behavior. It has been found that sexual failure/disengagement thoughts are negatively related to desire (r = -.50) while erotic thoughts are positively related to sexual desire (r = .60) for both women (Nobre, 2009) and men (Carvalho & Nobre, 2011). A More restrictive attitude about sex is also related to lower levels of men’s
sex drive (Carvalho & Nobre, 2011). Feelings of anxiety, fear of pain, depressed mood, low self-esteem, low relationship satisfaction, or stress can all lead to a lower sex drive in women (Both et al., 2010).

Women with a high sex drive are much more likely than women with a low sex drive to think about sex, to enjoy fantasizing about sex and get quickly aroused doing so, to believe that they are better than most women at sex, and to really enjoy masturbating to orgasm (Wentland, Herold, Desmarais, & Milhausen, 2009). Feelings of intimacy also positively affect women’s sexual arousal (Both et al, 2010). Women commonly report having sex for reasons of pleasure, love, or commitment (Meston, Hamilton, & Harte, 2009). However, middle-aged women are more likely than younger women to report having engaged in sex a higher proportion of times to reduce stress, to retain their mate, to boost self-esteem, for social status, or, for a few women, for purposes of revenge (Meston et al., 2009).

Finally, personality may also be related to one’s sex drive. Among women, being highly competitive to get a male sexual partner(s) was associated with lower agreeableness (Buunk & Fisher, 2009). These would be women who might say that other women do not like them. Men who are highly competitive to get a female sexual partner(s) tend to have high levels of both neuroticism and extraversion (Buunk & Fisher, 2009).

Diet and Emotions

It is clear that biological processes can affect emotions. As we have seen, the autonomic nervous system, brain circuits, and hormones are all closely linked with emotions. It is also clear that some of these processes operate at a level outside of our conscious awareness. Are the same things true of our consumption of food? Can the foods we eat affect our emotions and in ways of which we may be unaware? The empirical literature in this area has just recently begun, but a recognition is emerging that some foods can indeed help prevent depression (and in some cases anxiety) and that most of us are not aware of these specific relations.

There is a consensus (e.g., Logan, Jacka, Craig, & Prescott, 2016; Molendijk, Malero, Sanchez-Pedreno, Van Der Does, & Martinez-Gonzalez, 2018; Su, Matsuoka, & Pae, 2015) that
the consumption of food containing Omega-3 polyunsaturated fatty acids lowers the odds of an individual experiencing major depression and improves the symptoms in someone already experiencing major depression (Su et al., 2015). However, the magnitude of the effect of consumption of Omega-3 polyunsaturated fatty acids on depressive symptoms is small, with effects sizes generally found between .17 - .23 (Su et al., 2015). Nevertheless, this is about the same effect size found for antidepressant medication, but without the side-effects of antidepressant medication (Su et al., 2015).

Omega-3 fatty acids are mainly found in fatty fish (e.g., salmon). Food sources of just the precursor (alpha-linolenic acid) of Omega-3 fatty acids include: flax seeds, soybeans, and green-leaf vegetables (Su et al., 2015), although a recent meta-analysis found no effect of soybean consumption on depression (Molendijk et al., 2018).

Various other specific foods have also been individually linked with lowering the chance of being depressed and/or anxious (see Table 4), although some (e.g., Miyake et al., 2018) researchers have suggested that our focus should be on larger patterns (diet) of eating. One meta-analysis (Molendijk et al., 2018) of 24 studies found that (a) people who ate a Mediterranean diet had 0.78 lower odds of experiencing depressive symptoms, and (b) that people who ate a health/prudent diet had 0.64 lower odds of experiencing depressive symptoms. Both of these diets emphasized fish and vegetables, and the longer people had been on either of these diets, the less they tended to experience depressive symptoms. In contrast, depressive systems were unrelated to consumption of fruit, nuts/seeds/soy, legumes (e.g., beans, peas, lentils, chickpeas), or whole grains (Molendijk et al., 2018).

Similarly, in a study (Miyake et al., 2018) restricted to pregnant Japanese women, those who ate healthy or Japanese diets were at less risk of depressive symptoms, while eating a Western diet was unrelated to depression. Interesting, again the longer the compliance to a healthy or Japanese diet, the less symptoms of depression experienced by the women. Both the healthy and Japanese diets emphasized fish and vegetables. Besides these specific foods, pregnant Japanese women tended to have lower levels of depressive systems when they consumed higher levels of vitamin D, calcium, isoflavones, and manganese (Miyake et al., 2018).
Several studies have found that those who ate a vegetarian diet were, surprisingly, at a slightly increased risk of experiencing depression (Hibbeln et al., 2018). In one study of males (Hibbeln et al., 2018), vegetarians scored higher than non-vegetarians (5.25 vs 4.18) on a scale where scores of 12 or more suggest severe depression. This difference in depression scores existed even after controlling for a variety of socio-demographic factors, including family history of depression and childhood psychiatric contact. Interestingly, the trend (p = .103) was towards higher scores the longer people had been vegetarian (Hibbeln et al., 2018). It may be deficiencies in vitamin B12, iron and/or zinc that increased the risk of depression in those restricting themselves to a diet without meat or fish (Hibbeln et al., 2018).

Interestingly, foods may produce their effect by stimulating the growth of certain bacteria within the human gut. Parashar and Udayabanu (2016) reviewed animal studies demonstrating
that “good bacteria” (e.g., lactobacilli and bifidobacterium) are negatively correlated with stress and social anxiety in rats. Experimental studies with humans (including double blind, placebo controlled experiments) have demonstrated that the introduction of probiotics, which contain “good” bacteria, lower anxiety, depression, and stress in people who are not part of a clinical population (Parashar & Udayabanu, 2016). Lactobacilli, bifidobacterium, and other good bacteria are present in many yogurts, kefir, and fermented vegetables (Cryan & Dinan, 2015). Neuroimaging studies have shown that the introduction of bacteria in diets can indeed alter brain functioning (Cryan & Dinan, 2015).

Despite the everyday knowledge that individuals often have “comfort foods” that they turn to in times of stress, the finding that the kind of food one consumes affects our emotions though the intermediate step of gut bacteria, may require something of a paradigm shift for psychologists. We need to understand that there are many times more microorganisms in the human gut than there are cells in the human body (!)(Parashar & Udayabanu, 2016), and that certain foods provides the nutrients to foster the propagation of particular types of bacteria within the gut (Logan et al., 2016). The critical questions then is how do gut bacteria affect emotions? The theory is that they do so by affecting brain functioning (Cryan & Dinan, 2015).

It has been suggested (Cryan & Dinan, 2015; Parashar & Udayabanu, 2016) that there are six pathways by which the microorganisms in the gut might affect the brain. 1. Information is transferred both ways between the gut and the brain via the vagus nerve of the autonomic nervous system. 2. The gut is connected with the entric nerves (referred to as the 2nd brain) which communicate with the [1st] brain. 3. The gut influences the immune system which in turn may affect the brain. 4. Information may be sent through short-chain fatty acids. 5. Some neurotransmitters, such as serotonin and GABA, are produced by bacteria in the gut. 6. The gut can affect the hormonal system by influencing hypothalamic-pituitary-adrenal functioning (Cryan & Dinan, 2015). So, it appears that gut bacteria and humans share a symbiotic relationship in which each can affect the other (Parashar & Udayabanu, 2016), strange though this may seem! [The extent to which food affects our other everyday basic or secondary emotions has yet to be adequately addressed.]
Personality and Emotions

Our emotional reactions are partly a result of our particular set of personality traits, and these personality traits are determined by interesting and complex relationships between genetic influences and environmental factors. Infant development illustrates nicely the effects of genes and the environment on personality traits that are tied with emotional reactions. It turns out that infants are born with different temperaments: “Easy,” which involves generally being in a positive mood and open to new experiences; “Difficult,” which involves generally being irritable and reacting negatively to changes in routine; “Slow-to-warm-up,” which involves being somewhat moody and adapting slowly to new experiences; and about 35% of children who do not fit the three identified temperament types. Infant temperament will not only affect the reactions of infants but it can also influence the emotions of the parent. Having an infant with a difficult temperament when one is not expecting it, or when one does not know what to do, can be very stressful for some North American parents. However, although infant temperament appears genetically determined, parenting style can change infant temperament. If an infant is born with a difficult temperament but the parents are calm, restrained, but require their child to follow their rules, then the child’s temperament will likely change (which in Western culture usually means that the parents will get more sleep and be happier!).

Childhood shyness is a personality trait that is closely tied to emotions. Shy children are more anxious than are other children. While there is a genetic predisposition towards shyness, it is only extremely inhibited children (and extremely uninhibited children) who are consistently so doing childhood (Kagan, Resnick, & Snidman, 1988). These consistently shy children have higher heart rates than do their peers and are more likely to experience unusual fears such as of being kidnapped, or of violence on television, or of being alone in their bedroom at night (Kagan et al., 1988). When shy boys become shy adults, they are more likely than their peers to get married later in life, to show lower achievement in their career, and to have marital instability (Caspi, Elder, & Bem, 1988). This suggests that shy males are, perhaps, somewhat more likely than their peer to experience negative emotions in life. It would be interesting to see the extent that relaxation and social skills training might change the pathway in life of shy boys.
Shy girls, on the other hand, tend to take a pathway in life that, arguably, avoids some of the anxiety that comes with uncertainty. When shy girls become shy women they are more likely than their peers to follow the traditional gender stereotype of marrying, having children, and being a stay–at-home mom (Caspi et al., 1988). Shyness (introversion) in adults is moderately associated with anxiety and depression (Kotov, Gamez, Schmidt, & Watson, 2010). So, the personality trait of extreme shyness may influence the individual’s emotional reactions and life course during childhood and adulthood. However, for most children shyness is not a stable trait and so does not predictably affect one’s life course.

Personality tends to become more stable as we get older. We do not know how much of this increased stability is related to: (a) genes more often turning “off” and “on” early in development than in adulthood, or (b) to our experiencing a more stable environment as we get settled as adults, or (c) to something else entirely. Nonetheless, Roberts and DelVecchio (2000) found that the correlation for personality trait stability (how one ranks compared to others) was .31 in childhood, .54 during college/university, .64 at age 30, and .74 between ages 50-70. Thus, it seems that our personality is pretty stable during adulthood. However, even in late middle-age to early old-age the correlation is not perfect; some people’s personality changes. The personality traits that Roberts and DelVecchio (2000) focused on in adulthood were the “Big Five”: extroversion, neuroticism, agreeableness, conscientiousness, and openness to experience. For adults, the Big Five personality traits correlate with two general measures of emotions: positive emotionality and negative emotionality. The strongest relations are between (a) extraversion and positive emotionality, and (b) neuroticism and negative emotionality.

**Extraversion**

The personality dimension of extraversion is a reflection of social outgoingness. At one end of the dimension are extraverts who are usually friendly and socially outgoing, while at the other end of the dimension are introverts who are usually shy. Extraverts are more likely to be active, excitement seeking (McCrae et al., 2010), assertive (DeYoung, 2010), ambitious, exhibitionist, and socially dominant (Morrone-Strupinsky & Lane, 2007). The various subtraits that compose extraversion are sometimes conceptualized as belonging to one of two
components: (a) emotional warmth in social situations, and (b) arousal to positive stimuli (Morrone-Strupinsky & Lane, 2007).

Extraverts are more likely than others to be happy. Extraversion accounts for between 2-16% of happiness (Nettle, 2009). One of the things that extraverts do to help them feel happy is to re-evaluate negative events in a more positive way (Wang, Shi, & Li, 2009). They tend to see the glass as half full and they appear to be more attuned to the pleasant things in life.

Extraversion is positively associated with self-ratings of feeling joy ($r = .66$), love ($r = .59$), pride ($r = .58$), contentment ($r = .48$), compassion ($r = .33$), awe ($r = .34$), and amusement ($r = .26$) (Shiota, Keltner, & Oliver, 2006). Extraversion is positively related to the frequency, strength and duration of the experience of these various positive emotions (Verduyn & Brans, 2012). Extraverts are also seen by their peers as experiencing pride ($r = .34$) and contentment ($r = .26$) (Shiota et al., 2006).

Regarding the direction of causal relations, extraversion, at least partially, causes positive emotions. One study (McNiel & Fleeon, 2006) experimentally manipulated extraversion by having participants act in either an extraverted or introverted manner in two sessions when talking with others. Those who acted in an extraverted manner reported feeling more positive emotions and were rated by observers as showing more positive emotions. Keep in mind that social skills training can increase extraversion (Nelis et al., 2011).

Most of us probably intuitively know that being able to be outgoing and to easily make friends feels good. Probably because they have good social skills and a positive attitude, extraverts have more romantic relationships than do others (Nettle, 2009).

At the same time, extraverts experience just as many negative emotions as do other people (Nettle, 2009). So, extraverts experience more happiness but just as much pain and sorrow as others. In fact, their family life may actually be less stable because of their tendency to be restless (Nettle, 2009). When that happens, extraverts tend to cope with marital stress through compromise and self-blame, as well as through confrontation and withdrawal (Lee-Baggley, Preece, & DeLongis, 2005).

Neuroticism
The personality dimension of neuroticism is a reflection of some people’s tendency towards anxiety and emotional instability. People high in neuroticism are more anxious, tense, touchy, irritable, impulsive and emotionally unstable. Fear, sadness, guilt, and hostility are all strongly related to neuroticism. People high in neuroticism are more likely to express themselves through emotional venting (Boytes & French, 2011) or affective aggression (Egan & Lewis, 2011). They are also more likely to later apologize (Howell, Dopko, Turowski, & Buro, 2011).

People high in neuroticism are more vulnerable (McCrae et al., 2010) and more likely to experience fatigue (Grühn, Kotter-Grühn, & Röcke, 2010). When they are feeling sad then they are more likely than others to experience nostalgia (i.e., sad and yet wistful joyous memories and feelings) when listening to music (Barrett et al., 2010). They are also more likely to worry, be self-conscious, and to be self-critical. They have a tendency to feel sorry about themselves.

Neurotic people are less likely than others to be happy. Neuroticism accounts for between 6-28% of happiness (Nettle, 2009), a fairly significant amount. However, individual differences in neuroticism are [only] moderately related to genetic differences (Sprangers et al., 2010), which means that environmental factors have a moderate effect on differences in neuroticism within the population. The silver lining in all this is the possibility that environmental factors may cause people high in neuroticism to change their thinking, leading them to become less neurotic and happier with life.

The thinking of people who are high in neuroticism is different than those who are low in neuroticism. People high on neuroticism see, and think of, the glass as half empty. They fail to perceive a negative situation in a more positive way (Wang et al., 2009). They are more likely to see threats when others do not (Hervas & Vazquez, 2011). They are more likely to ruminate about a situation (Hervas & Vazquez, 2011). That is, they are more likely to think about the situation over and over and over again, perhaps trying to understand why others did what they did or how they themselves might have acted differently.

Those high on neuroticism are less likely to regulate their negative emotions than are other people (Ng & Diener, 2009). Wang et al. (2009) found that those Mainland Chinese students who are high in neuroticism are less likely than their peers to reevaluate a situation in a
more positive light. People high in neuroticism also engage in more wishful thinking and more withdrawal from situations (Connor-Smith & Flachsbart, 2007). These various problematic thought processes contribute to their experiencing more negative feelings (Wang et al., 2009). For some people this can also lead to relationship problems or other serious problems.

An example of how neuroticism affects family life is the finding that men who are both high in neuroticism and stressed at work, upon returning home after work tend to have negative interactions with both their spouse and children (Wang, Repetti, & Campos, 2011). Neuroticism before marriage predicts later separation and divorce (Lahey, 2009).

As for even more serious consequences, neuroticism is strongly associated with anxiety disorders and is moderately associated with depression (Kotov et al., 2010).

People high in neuroticism are more likely to engage in risky behaviors and are more likely to be dependent on alcohol or drugs. Neuroticism is related to not only the quality but also the longevity of an individual’s life (Lahey, 2009).

**Agreeableness**

Agreeableness reflects a tendency to actively try to get along with, and help, other people. Highly agreeable people are considerate of the feelings and desires of others (DeYoung, 2010). Those high in agreeableness are more understanding of the thoughts and intentions of others, and have more empathy towards others (DeYoung, 2010). This would explain why there is a weak positive relationship between agreeableness and both the frequency and intensity of feeling sad (Pearman, Andreoletti, & Isaacowitz, 2010). Their higher empathy means that people high in agreeableness reactive slightly more than others, in sad situations. People who are high in agreeableness are good at controlling their own emotions (Pearman et al., 2010) and at suppressing socially disruptive emotions (DeYoung, 2010).
Conscientiousness and perfectionism

Conscientiousness reflects one’s tendency towards self-discipline and organization (DeYoung, 2010). High conscientiousness has been associated with academic and occupational success, and with behaviors that enhance health and longevity (DeYoung, 2010). Not surprisingly, in a large sample of German adults, consciousness (and openness to experience) was positively correlated with positive emotions (Grühn et al., 2010). However, like most things, too much conscientiousness is not always a good thing.

Traits that are subcomponents of the Big Five, or that are extreme of one of the Big Five personality dimensions, have also been linked to emotions. An example is perfectionism, which can be considered as the high end of conscientiousness (Costa & McCrae, 2010). A perfectionist is an individual who frequently strives to be perfect (e.g., in university courses, in work, etc) and who often feels very negatively (anxious or depressed) when he or she does not perform absolutely perfectly (e.g., “only” getting 93 on a university exam). Associated with perfectionism are a number of thought processes that lead to negative emotions: (a) catastrophizing (i.e., thinking that the worst consequences will happen) (b) rumination (i.e., continually thinking about the “failure”), and (c) self-blame (Rudolph, Flett, & Hewitt, 2007). If one member of a romantic couple is a perfectionist then the couple is more likely to experience conflict, and the perfectionist is more likely to later experience symptoms of depression (Mackinnon et al., 2012). If perfectionists do not live up to their own expectations in a given sport, they often experience shame and guilt. However, it has been suggested that the process of striving to improve is healthy; what can be maladaptive is the unrealistic concern that one is not being perfect (Stoeber, 2011).

A general point that I wish to stress about personality traits is that although personality traits have a genetic component and are largely stable in adulthood (Terracciano, McCrae, &
Costa, 2010), they can change for some if the environment or the individual’s thinking processes change. Changes in the environment can sometimes cause genes to turn on or off. Nelis et al. (2011) demonstrated that 18 hours of emotional competency training lead to an increase in extraversion and agreeableness, and a decrease in neuroticism that lasted to the final assessment (6 months after training). This type of training can lead to an improved quality of life. So, although it may not be easy, someone who is high on neuroticism and/or perfectionism can be taught to change their thinking, or might experience an epiphany because of some significant life changing experience, with the result being that life becomes more enjoyable for both them and the others around them.

Alexithymia

Alexithymia is a clinical construct involving poor emotional self-awareness on the part of an individual. They have problems in being aware of, describing, and understanding their own emotions. For example, stressful situations do elicit sympathetic nervous system arousal in people high in alexithymia, but these individuals do not perceive themselves as anxious (Pollatos et al., 2011). Also, males (but not females) with high levels of alexithymia may misinterpret the increased heart rate associated with an emotion as chest pain that requires medical attention (White, McDonnell, & Gervino, 2011). People with high levels of alexithymia also tend to have a lack of imagination (i.e., a lack of fantasies) and show a tendency towards concrete externally-oriented thinking, as opposed to emotionally driven thinking. It is estimated that alexithymia occurs in about 10% of the general population.

For some, alexithymia appears to be a stable personality trait. Approximately 30-33% of difference on the (normally distributed) dimension of alexithymia has been related to genetic factors (Walter, Montag, Markett, & Reuter, 2011). There appears to be processing anomalies in several brain regions: the insula, cingulate cortex, and corpus callosum (Wingbermühle, Theunissen, Verhoeven, Kessels, & Egger, 2012). From a biological perspective there may actually be two subtypes of alexithymia. Type 1 involves the lack of transfer of information (via the corpus callosum) from the right to left hemisphere, resulting in problems in both descriptions of emotions and in emotional coping skills (Wingbermühle et al., 2012). Type 2
only involves problems in emotional coping skills (Wingbermühle et al., 2012).

For other people, alexithymia may be a temporary state brought about because of brain injury or post-traumatic stress disorder (Wingbermühle et al., 2012). Self-reports of childhood abuse and neglect are moderately correlated with alexithymia in adulthood. One study (Thorberg et al., 2011) found that quality of adult attachment accounted for 25% of the variance in alexithymia.

Social skills can be a problem for those with alexithymia. People with alexithymia can have difficulty in recognizing emotions in others. They are less likely to be sociable and are more likely to have social problems (Nicolò et al., 2011). They tend to be cold: lacking social intimacy and lacking empathy. They tend to be insensitive to their sexual partners and because of this often have multiple sexual partners.

Individuals with high levels of alexithymia are much more likely than others to develop anxiety disorders and depression (Wingbermühle et al., 2012). Perhaps because their emotional responses are less likely to be modified by thought processes, alexithymia is also correlated with eating disorders, drug and alcohol abuse.

Alexithymia has been linked to narcissism and to psychopathy. However, according to Louth, Hare, and Linden (1998) alexithymia is not the same thing as psychopathy. They suggest that while psychopaths may charm others, individuals high in alexithymia tend to bore others. Psychopaths may fake emotions they do not experience, whereas people high on alexithymia cannot fake their emotional responses because they do not understand their emotions well enough to do so. Incarcerated female prisoners who are high in alexithymia are more likely to engage in violent crimes, perhaps because they cannot imagine or sense the feelings of victims (Louth et al., 1998).
Summary of the Biological Foundations of Emotions

So, this section on the biological foundations of emotions, hopefully, demonstrated that emotions evolved because of our evolutionary history. As a result, humans share a small number of basic emotions. These basic emotions are associated with distinct brain processes and hormonal reactions. Some of this physiological processing of emotions occurs at an automatic (unconscious) level. Genetic differences also give rise to personality differences, which have a significant impact on emotional experience. However, these personality differences and their associated styles of emotional responding are not necessarily fixed, but may sometimes be altered by environmental events and by changes in an individual’s thought processes.
Cognitive Foundations

Emotions can partially, but only partially, be understood from the biological perspective. To better understand emotions the biological perspective needs to be complemented by both the cognitive and social perspectives. In this second major section of this book, I will focus on the cognitive perspective on emotions.

In general, the cognitive perspective is concerned with describing the mind and how it works. In relation to emotions, the cognitive perspective looks at how the individual’s mind both influences, and is influenced by, emotions. One interesting aspect that the cognitive perspective examines is how emotional information is processed at both an unconscious and a conscious level. Surprisingly, we are consciously aware of only a small portion of the information that our brain initially processes about the world. For example, at the very beginning of visual perception, approximately 130 million rod and cone cells in the retina of our eyes register visual information. However, only 1-2 million axons leave the eyes via the optic nerve. Thus, information gets condensed and selected at the very beginning of perceptual processing. Similarly, we can only consciously think of so many things at any given time; our conscious awareness has a limited capacity. As a result, our mind sometimes works at a problem that is bothering us at an unconscious level, particularly when our conscious thoughts have been pulled to some other matter. (Have you ever suddenly thought of an answer, without at that moment consciously trying, to a question that you gave up trying to answer several hours ago?) So, our mind processes some perceptual and cognitive information at an unconscious (automatic) level. However, while I will draw a distinction between unconscious and conscious processing, keep in mind that the exact boundary between unconscious and conscious information can be hazy. For example, the point between unconscious and conscious detection of stimuli (visual, auditory, or otherwise) can be altered by factors such as motivation or fatigue.

The cognitive perspective concerning emotions tries to answer a host of other questions. For example, what exactly are we processing? How do we convey our emotions? How can we use our thinking to control our emotions? Do our emotional experiences affect our memory of events? Do the particular emotions we experience influence the decisions we make in our lives?
This section on cognitive foundations will attempt to answer, at least partially, each of these questions.

However, our introduction to the cognitive perspective starts with the process of attention. After all, our mind cannot react to something that is going on in front of us if we are not paying attention!

**Attention and Emotion**

As part of the process of visual perception, we have unconscious biases that cause us to focus on particular aspects of the world, sometimes to the exclusion of other aspects of visual information. One of these biases is a tendency to focus on emotional information. Simply put, emotional stimuli are attention grabbing (Ni et al., 2011). These emotional stimuli can be scenes or objects that evoke emotions (by the stimuli being associated with emotions in our minds), or these stimuli can be other people’s emotional facial expressions (Biggs, Kreager, Gibson, Villano, & Crowell, 2012) or body posture (Bannerman, Milders, & Sahraie, 2010). We sometimes process these things even when they are outside of our present focus of attention. For example, we appear able to process facial expressions of anger versus happiness even when most of our attentional resources are engaged in completing another task (Shaw, Lien, Ruthruff, & Allen, 2011). When pictures of facial displays of emotions are presented it appears that attentional resources are automatically allocated to processing the emotional faces (Roesch, Sander, Mumenthaler, Kerzel, & Scherer, 2010).

Once we attend to an emotional stimulus, it appears that one path the information takes is directly from the occipital lobe to the neural centres that correspond to the appropriate emotion (Hofelich & Preston, 2012). Such early unconscious processing may lead to later enhanced conscious (cortical) processing (Homes, Vuilleumier, & Eimer, 2003). At the same time, we often focus extra attentional resources on emotional stimuli (Roesch et al., 2010) to further process their possible relevance to us. These shifts to selective attention may be seen (by using evoked potential recording methodology) at 100ms after a stimulus has been presented.

Sustained selective attention to emotional stimuli can be seen at 300ms after the
stimulus has been presented (Holmes et al., 2003), and this is when conscious processing is clearly present (Williams et al., 2004), and of course can last as long as it is important to the individual.

The neural system that involves unconscious processing of emotional stimuli (e.g., fearful faces; Williams et al., 2004) appears to be, in part, separate from the system involved in the conscious processing of emotional stimuli. So, there is a path that stimuli take in perception that goes from very quick unconscious processing to, sometimes, conscious processing. If a stimulus is initially assumed by the mind\brain to be unimportant, then presumably it is not processed (much or at all) further. However, if the stimulus is deemed to be important, it is conceivable that further unconscious processing could proceed in parallel with conscious (deliberate) consideration.

When do we Start Unconsciously Attending to Faces?

One of our attentional biases is to focus on emotional faces. How quickly do we start to process emotional facial expressions? It turns out that this happens very quickly indeed. It only takes 39ms for most individuals to be able to judge subtle facial expressions as displaying a threat. In one study (Bar, Neta, & Linz, 2006), these judgments were independently concurred with by others ($r = .55$) who got to see the same faces for a longer (1700ms) exposure time. In fact, for the most highly threatening faces, the correlation between the judgments of the 39ms and 1700ms exposure groups was $r = .94$. To perhaps give you a better feeling for how fast this is, 100ms is one-tenth of a second. Thus, people make this judgment of a facial threat in less than one-tenth of a second.

One study (Kirouac & Dore, 1984) investigated recognition accuracy for people’s facial expressions of basic emotions (pictured on slides) as a function of exposure time (10 - 50ms). It was found that people could recognize a happy face at better than chance levels after an exposure of only 20ms. People could recognize facial expressions of surprise, disgust, anger, sadness, and fear at better than chance levels after only 30ms of exposure. Asymptotic levels of accuracy were reached for happiness at 30ms; for surprise at 40ms; and for disgust, anger,
sadness, and fear at 50ms (Kirouac & Dore, 1984). Similarly, another study (Williams et al., 2004) found that most of their participants could detect, with better than chance accuracy, a facial expression of fear at 20ms, with accuracy increasing to 95% at 50ms for this early detection system.

At both a conscious and unconscious level, people pay particular attention to threatening, fearful, or anxiety provoking things in the world (Sutton & Altarriba, 2011). For example, we are more likely to pay attention to angry faces than to faces with a neutral expression. We are also more likely to follow the fleeting gaze of an angry than a happy or neutral face (Becker, 2010). This makes sense from an evolutionary perspective as avoiding dangerous things in the world will increase the chance of our survival (Sutton & Altarriba, 2011). So, the perceptual system has a built in bias to allocate a disproportionate amount of its limited attentional resources to processing negative things in the environment and this actually occurs very early in the process of visual perception. Nevertheless, we are best at recognizing happy faces, and at doing so very quickly. From an evolutionary perspective this also makes sense, as we are more likely to choose happy people as mates, and we are more likely to have sex with someone when he or she is happy.

Not surprisingly, there are considerable individual differences in detection sensitivity for facial expressions of emotions. One study (Pessoa, Japee, & Ungerleider, 2005) found that 2 of their 11 participants could actually detect other people’s facial fear expressions that were presented for only 17ms and then immediately masked by a neutral facial expression. (Masking inhibits further processing of the original stimulus.)

Other aspects of people’s faces related to emotions are also processed very quickly, although perhaps not quite as quickly as are the facial expressions of basic emotions. It only takes 40ms of viewing a person’s face before being able to make an initial judgment of that person’s social dominance (Rule, Adams, Ambady, & Freeman, 2012). When individuals were presented faces for 100ms, they were able to judge the faces on: aggression, competence, likeability, trustworthiness, and attractiveness (Willis & Todorov, 2006). We should note that it is possible that these judgments might be made more quickly (i.e., with less visual information), as no exposure of less than 100ms was
tested in this latter study.

We appear to be predisposed to attend to physically attractive people early in our attentional sequence. In speed dating we assess a potential date’s physical attractiveness, his or her body weight for height, age, and race, and decide whether we want to date that individual, all within three seconds (Kurzban & Weeden, 2005). Thus, some of that initial attraction we have for someone may be based on our very quick assessment of that individual’s attractiveness, personality, and how they match with our own.

When we are in romantic relationships we frequently need to consciously inhibit some automatic attentional biases. Specifically, we tend to inhibit our subjective attention to very attractive others who, potentially, could be an alternative partner (Maner, Rouby, & Gonzaga, 2008). Simply put, this helps to maintain our current relationship, and individuals may question their partner’s intentions when their partner does not inhibit his or her attention to attractive potentially alternative partners (Guys, are you listening to this?!!).

One of the other things that we automatically process, because our visual system is biased to do so, at a very early perceptual stage is gross aspects of body language that signal another person’s emotional state. We only need 33ms to make a decision about someone’s emotional state based on strong body language signals (Stienen, Tanaka, & de Gelder, 2011). The Ginsburg et al. (1977) finding (discussed earlier on pp. 6-7) that a child’s nonverbal behaviour predicts the end of a fight without people being aware of this, demonstrated that our processing of the body language of others can guide our own behaviour without our conscious awareness that this is so.

We sometimes also unconsciously process and then mimic the body posture, gestures, tones of speech, or facial expression of others (Uleman, Saribay, & Gonzalez, 2008). We do this when we socialize with others. The feedback from our facial muscles (remember the facial feedback hypothesis?) allows us to feel something of what others are feeling. It helps us to connect with others, to empathize.

What happens after our mind detects and identifies emotional stimuli? When stimuli are highly pleasant for us we quickly shift our attention to them and focus additional attentional resources on them (Ni et al., 2011). The processing of an emotional stimulus can sometimes
enhance the processing of any subsequent stimulus because of the continued focusing of attention resources. Emotional stimuli can enhancing the processing of coarser information and can also automatically facilitate motor responses initiated within 100ms (Bocanegra & Zeelenberg, 2012).

Paradoxically, the processing of an emotional stimulus can also inhibit the processing of subsequent stimuli (Most & Wang, 2011), especially the processing of the details of the subsequent stimulus (Bocanegra & Zeelenberg, 2012). This subsequent inhibited processing can result from either (a) having reached processing capacity limitation (Most & Wang, 2011) or (b) perceptual defense – when the “self” actively censors emotionally threatening stimuli. So, some emotional situations can help lead to an insight about a problem, while other emotional situations may lead to us not functioning well at all.

Our attention to stimuli is also affected by (a) our immediate emotional state and (a) our personality. Our expectations can shift our attentional resources to search for particular things (Becker, 2010). For example, when we are happy we are more likely to broadly pay attention a scene, focus our attention more on positive things, and more fully process the second of two stimuli (Vermeulen, 2010). When we are sad we are more likely to have narrowed (focused) attention (Srinivasan & Hanif, 2010; Zeelenberg & Bocanegra, 2010), focus our attention on negative things, are less likely to accurately “see” (identify) the second of two stimuli (Vermeulen, 2010), and have more difficulty disengaging our attention from negative things (Biggs et al., 2012).

Our personality biases our emotional state. Individuals who are high in neuroticism are generally anxious people who look for the negative things in the world. People who are highly anxious narrow their attention and focus it on threats, then have a more difficulty disengaging their attention from any threat. Fox (1996) conducted an interesting laboratory study of the attention processes of highly anxious people. She had people simply classify a number as odd or even, while a distractor word (neutral of threatening) was also presented. Sometimes the words were presented subliminally (14ms and masked). Fox found that highly anxious participants (but not people low in anxiety) took longer to classify a number when a threatening word was subliminally presented near the number. Thus, the highly anxious people appeared to
be unconsciously searching for threats. Interestingly, this bias to unconsciously look for threats only occurred if participants already consciously knew that some words were threatening. One of the things this study nicely illustrated is that most mental events are a combination of both conscious (controlled) and unconscious (automatic) processes. It would be a mistake to ignore the importance of the conscious regulation of our attention. When we consciously move our attention away from frightening movie scenes, we are less scared by the movie. Indeed, we need to regulate our inner attention away from negative thoughts in order to keep us from being anxious or depressed (Johnson, 2009).

In this section on attention I’ve narrowly focused on visual attention. However, we automatically attend to several senses at once, such as the visual and auditory senses. Typically, more attention is devoted to the processing of emotional visual information than emotional auditory information (Collignon et al., 2008). However, if the visual information is ambiguous, our mind then automatically pays more attention to the auditory information (Collignon et al., 2008), such as the pitch and speed of speech.

Reading Facial Expressions

One of the things our mind pays particular attention to is the facial expressions of others. Surprisingly, although the facial expressions of basic emotions are universal (Ekman & Friesan, 1971; Ekman, 1994), and although we are biased to attend to facial expressions of emotions, many of us often do not accurately read someone’s true feelings from his or her facial expressions. This is partly due to the fact that people are often trying to mask their true feelings. For example, do you sometimes hide what you are feeling when you are dating someone, not wanting to give away your feelings until you know the other person better, or perhaps you feel forced to mask your feelings when your boss has criticized your work? Many people try to mask their emotions in these and other situations and some people try to mask their emotions in most situations.

Reading facial expressions can sometimes be challenging. Facial expressions can be subtle and fleeting. Some facial expressions do not communicate a specific emotion but just the presence or absence of emotion (Motley, 1993). Adding to the difficulty in accurately
identifying the facial expression of basic emotions is that faces of a particular demographic group (e.g., different ages or races) can look different until one has more experience with people of that group. Also, a given facial expression on a given person looks different when the face is seen from different angles. To deal with these difficulties, most of us rely on the context, the situation, to interpret what someone else is feeling (Motley, 1993). However, some of us (and not just autistic individuals) are just not very good at reading facial expressions and this can cause a variety of social problems. Fortunately, we can improve our ability to read other people’s facial expressions. To become better at reading faces we need to learn what specific facial features to attend to, what features go with each emotion, and we need to practice this skill.

Ekman and Friesan (1978) provided a comprehensive description of the facial muscle movements involved with emotions. The major visible facial change for each basic emotion is as follows:

**Surprise** involves the raising of the eyebrows (both the inner and outer part of each brow), raising of the upper eyelids, and the jaw dropping.

**Happiness** involves raising the corners of the mouth and raising the cheeks with muscles active at the corner of the eyes. This is obviously a smile, but note that it is a true enjoyment smile as opposed to a nonenjoyment smile. Let me explain these two different smiles.

Enjoyment smiles (called Duchenne smiles) involve the activation of the zygomatic major muscle (that pulls up the corner of the mouth) and the orbicularis oculi muscle (around the eyes). Nonenjoyment smiles only involve raising the corners of the mouth. A nonenjoyment smile is a false smile that we make when we do not want others to know that we did not really enjoy something. For instance, if a friend told a joke that was not really funny, maybe you gave a nonenjoyment smile after the punchline, just to be polite, to be social, and not offend the other
There are some additional, more subtle, differences between Dechenne and nonenjoyment smiles. The zygomatic major muscle shows a smoother action in a Duchenne smile than in a nonenjoyment smile (Frank, Ekman, & Friesen, 1993). In addition, the zygomatic major muscle in Duchenne smiles is usually active between 0.5 and 4 seconds, but is frequently active for a longer time in nonenjoyment smiles (Frank et al., 1993). So, sometimes you can detect a false smile because it has been on the face for “too” long.

**Anger** involves a number of facial features. In anger the eyebrows pull down. The upper eyelid raises while the lower eyelid tenses. The lips narrow and press together hard.

**In fear** the inner and outer eyebrows raise and the brows pull together. This pulling together can sometimes be seen in a wrinkling of the skin between the brows when the emotion is being experienced. The upper eyelid raises and the lower eyelid tenses [This should actually be the same for both anger and fear]. Finally, the mouth stretches horizontally.

**Sadness** involves raising the inner eyebrows (but not the outer eyebrows). In addition, in sadness the corner of the mouth pull down, the chin raises, and the cheeks may be active pulling up towards the lower lip.
**Disgust** is expressed through raising the upper lip and wrinkling the nose.

**Contempt** is seen when the corner of one side of the mouth is pulled back, often in conjunction with the head tilting back.

There are a number of websites that are designed to help someone to identify what emotions people are experiencing by their facial displays. Try linking to the following sites on YouTube:

**Facial Expression Tutorial by Khappucino.**
http://www.youtube.com/watch?feature=player_detailpage&v=TrgNKGjSyxA

**The Art of Deciphering Facial Expressions.**
http://www.youtube.com/watch?feature=player_detailpage&v=m72bqvf_qDg

**Basic Emotions (LIE TO ME).**
http://www.youtube.com/watch?feature=player_detailpage&v=LHraznv4pHQ
TABLE 4 (FROM GOSSelin, PERRON, & BEAUPRE, 2010)
FACIAL ACTION UNITS WITH THEIR APPEARANCE CHANGES AND ASSOCIATED EMOTIONS

<table>
<thead>
<tr>
<th>FACS Name</th>
<th>Appearance Change</th>
<th>Associated Emotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner brow raiser</td>
<td>Raises only inner part of the eyebrow</td>
<td>Fear, sadness, surprise</td>
</tr>
<tr>
<td>Outer brow raiser</td>
<td>Raises only outer part of the eyebrow</td>
<td>Fear, surprise</td>
</tr>
<tr>
<td>Brow lowerer</td>
<td>Lowers eyebrows and pull them together</td>
<td>Anger, fear, sadness</td>
</tr>
<tr>
<td>Upper lid raiser</td>
<td>Raises the upper lid, exposing more of the upper portion of the eyeball</td>
<td>Anger, fear, surprise</td>
</tr>
<tr>
<td>Cheek raiser</td>
<td>Raises the cheek, causing crow’s feet and wrinkles below the eye</td>
<td>Happiness, sadness</td>
</tr>
<tr>
<td>Lid tightener</td>
<td>Raises and tightens the lower eyelid</td>
<td>Anger</td>
</tr>
<tr>
<td>Nose wrinkle</td>
<td>Wrinkles and pulls the skin upward along the sides of the nose</td>
<td>Disgust</td>
</tr>
<tr>
<td>Upper lip raiser</td>
<td>Raises the upper lip and causes bend in its shape</td>
<td>Anger, disgust</td>
</tr>
<tr>
<td>Nasolabial furrow deepener</td>
<td>Deepens the middle portion of the nasolabial furrow</td>
<td>Sadness</td>
</tr>
<tr>
<td>Lip corner puller</td>
<td>Pulls lip corner up diagonally toward the cheekbone</td>
<td>Happiness</td>
</tr>
<tr>
<td>Lip corner depressor</td>
<td>Pulls the lip corner down</td>
<td>Sadness</td>
</tr>
<tr>
<td>Lower lip depressor</td>
<td>Pulls the lower lip down, flattens the chin boss</td>
<td>Disgust</td>
</tr>
<tr>
<td>Chin raiser</td>
<td>Pushes chin boss and lower lip upward</td>
<td>Anger, disgust</td>
</tr>
<tr>
<td>Lip stretcher</td>
<td>Stretches lips horizontally</td>
<td>Fear</td>
</tr>
<tr>
<td>Lip funneler</td>
<td>Funnels lips outward, pulling in medially on the lip corners and turning out at least one lip</td>
<td>Anger</td>
</tr>
<tr>
<td>Lip tightener</td>
<td>Tightens the lips, making them appear more narrow</td>
<td>Anger</td>
</tr>
<tr>
<td>Lip pressor</td>
<td>Presses the lips together, tightens and narrows the lips</td>
<td>Anger</td>
</tr>
<tr>
<td>Lips part</td>
<td>Parts lips to a limited extent</td>
<td>All 6 Emotions</td>
</tr>
<tr>
<td>Jaw drop</td>
<td>Parts lips so that space between the teeth can be seen</td>
<td>All 6 emotions</td>
</tr>
<tr>
<td>Mouth stretch</td>
<td>Stretches mouth open quite far</td>
<td>Fear, surprise</td>
</tr>
</tbody>
</table>
Reese (1993) has suggested that interest is associated with a unique facial expression: riveted eyes and a still head. Is this what happens when we see someone who interests us? So, interest basically involves a "hard stare". If we do not what someone to know we are interested in us then we may look at them surreptitiously, but some people may do this noticeably as part of flirting.

**Lying**

Part of the difficulty in reading facial expressions is that people are often trying to mask (hide) what they are feeling. One of the times when people work hardest to mask their facial expressions is when they are trying to lie. (It does not go over well if you say you are “truly sorry” while you are also grinning from ear to ear!) The truth is that almost everyone lies at least some of the time, and some people lie frequently. Extroverts and high self-monitors (people who are particularly concerned with how others view them) lie more often than do other people. Now, sometimes people lie to spare the feelings of others, but most lies are told to serve one’s own motives. So, how can we tell if someone is lying to us?

A police force might use a polygraph, or lie detector test, to try to tell if someone is lying (although they could not submit the result in court). The polygraph indirectly measures lying by measuring changes in anxiety. The polygraph measures whether an individual’s sympathetic nervous system’s level of activation increases in response to particular yes or no questions, usually related to some crime. Sympathetic activation is gauged by the polygraph measuring breathing pattern, blood pressure, and the level of sweating (Meijer & Verschuere, 2010).

The accuracy of the polygraph partly depends on the tester using the right questions for the particular case and “demonstrating” to the test taker that the polygraph is completely accurate. In reality, a trained tester will detect deception at a much better than chance level, but far from perfectly. A trained tester using a polygraph can detect lying over 74% of the time. However, anywhere from 10 - 20% of the time innocent people tend to be falsely classified as lying (Meijer & Verschuere, 2010). In addition, a polygraph is not accurate with people who can control their sympathetic nervous system’s activation or for whom their sympathetic activation is depressed (e.g., psychopaths and people who are somewhat depressed).
Although the use of a polygraph does not guarantee accuracy (and because few of us carry one around in our pockets!) you might say “So what! Who needs a polygraph? I can tell when someone is lying!” However, most of us are actually not very good at detecting deception. In fact, many people who need to detect deception as part of their job are not very good at telling whether or not someone is lying. For example, Vrij (1993) had confederates either lie or tell the truth during a structured police interview that was videotaped. The videos were played back to 91 police detectives who had to say whether the person was lying or not. The result was that the detectives’ accuracy was no better than chance but the detectives were none-the-less very confident of their judgments. Although one detective did achieved 70% accuracy, 44% of the detectives scored worse than chance. One mistake the detectives made was that they associated lying with (a) less smiling, and (b) more arm or hand movements. Although one study (Biland, Pyb, Allione, Demarchi, & Abric, 2008) of French women found that liars were more likely to show fake smiles and embarrassment smiles, smiling or not is generally unrelated to deception, and less (not more) arm and hand movements is actually associated with lying (Vrij, 1993).

After performing a meta-analysis of 247 studies, Bond and DePaulo (2008) came to two conclusions about our ability to detect lying. First, they suggested that we are rarely accurate in detecting deception in real-time situations (i.e., as it is actually occurring). Evidence consistent with this conclusion comes from a separate meta-analysis (i.e., Aamodt & Custer, 2006) that found that both experts and general citizens tend to be accurate less than 55% of the time (when chance performance would be 50%). Second, Bond and DePaulo suggested that there are almost no individual differences in this very poor ability to detect lying. They described individual differences in the ability to detect lying as “minicule” (p.486). They suggested that our ability to detect lying is unrelated to our: age, sex, education, confidence, expertise, Machiavellianism, or self-monitoring tendency.

In contrast, O’Sullivan (2008) argued that there are indeed meaningful individual differences in the ability to detect lying. O’Sullivan found that some select police experts perform significantly above chance levels. Specifically, she identified 11 different groups of police officers (one group was Canadian parole officers) who performed between 60% and 88% in detecting lies/truths. (However, note that 8 other police forces scored between 48-56%).
O’Sullivan found that detection accuracy was correlated with: being left-handed, emotion recognition accuracy, training or attentional instructions, professional experience, honesty/moral values, and social or academic intelligence. Evidence for the importance of training is provided by the finding that some police officers are very accurate in detecting criminal lies but not emotional lies, while some therapists are very accurate in detecting emotional lies but not criminal lies (O’Sullivan, 2008).

In fact, even Bond (2008) later admitted that there are some “very rare” experts who consistently perform at 80%+ accuracy levels when dealing with felons telling truths and lies. He found 2 experts (out of 112 law enforcement professionals) who performed at 80%+ accuracy on each of the 4 occasions that they were tested.

So, the ability of untrained people to detect deception is not very good, but the ability of some experts to detect deception is quite good, but not perfect. How can we tell when someone is lying?

One approach is actually to avoid any specific detection strategy and just to reply on our unconscious processing. Albrechtsen, Meissner and Susa (2009) found that their participants actually did 10—15% better when they simply used their “intuition.” In other words, they simply gave their unconscious processing free rein. However, this is not as good a level of detection as shown by some police forces who had specific training to detect lying.

A second approach to improve the detection of lying is to increase the cognitive load of the liar. Lying requires a high level of cognitive resources as liars are controlling their behavior and monitoring what they are doing so that they will not be caught. Further increasing their cognitive load might mean less available resources for controlling behavior while lying, resulting in the appearance of more verbal and nonverbal cues of lying. Vriji et al. (2008) increased the cognitive load by having subjects recall their story in reverse chronological order and this improved the accuracy of the police in detecting lying by 12%. Specifically, in the cognitive load condition (but not in a control condition) liars supplied less details and context, talked more slowly and with more hesitations, and more often blinked their eyes or moved their foot or leg. This fits with Vriji’s (2008) suggestion that focusing on verbal cues (speech errors, speech fillers, pauses, voice) and memory details (perceptual, spatial, temporal details, logical
structure) increases detection accuracy.

A third approach to detect lying relies on reading facial expressions. Ekman suggested that facial leaks of automatically experienced emotions (such as guilt or fear) may be present when someone is engaged in an emotional lie. Facial leaks are when some of the muscles used in the facial expression of an experienced emotion are not completely suppressed and so are instead briefly expressed on the face. For example, someone might try to mask that they are feeling sad but their chin muscles involved in the emotional facial expression of sadness are briefly activated. Facial leaks are often difficult to detect as some emotional leaks may only be present for 1/25th of a second. Nevertheless, Bond (2008) found that it was the ability to detect nonverbal cues, such as facial leaks, that differentiated experts from non-experts in their ability to detect lies.

So, each of these three approaches might help you to detect whether someone is lying. However, note that it is impossible to “read” everyone. Some people are simply very accomplished liars. Still, it is important for us to tell someone’s true intentions, such as whether they are attracted to us, or not.

Interpersonal attraction in bars

We do not usually think of it this way, but our evolutionary heritage has some influence on who sexually attracts us and on our thinking processes and communication when we try to initiate relationships with those who attract us. Some of these influences are evident in public spaces such as in bars or at parties. In these situations, as we are thinking about what to say and do while gauging the intent and sincerity of the other person, we are both consciously and unconsciously reading that person’s faces and body language. This leads to a a set sequence of stages in the communication between people sexually attracted to each other: (a) looking at the other, (b) approaching and initiating conversation, (c) light touching, (d) the first kiss, and (f) perhaps later, in private, sex (Naworynski, 1993).

There are a variety of strategies that are used to begin the sequence. Some women deliberately place themselves where they will be discovered by a man who interests them (Perper, 1989). For example, the woman might move into an area close to where the man is
standing. Many women will signal interest by looking and smiling at a particular man, while other women will go through a repeated sequence of glancing at a particular man and then looking away (Moore, 1985). Still other women signal that they are generally looking for someone of interest by a look that is a 5-10 second sweep of room not directed at any individual, or they might engage in a “parade” using exaggerated hip sway and a tightened stomach with their chest out, to attract a man’s interest (Moore, 1985).

Both men and women who flirt are more likely to attract interest from others. Flirting is used both to attract initial interest and when the couple are talking. Besides the different types of looking, the nonverbal cues in flirting that women use include: the head toss (where the face is tilted upwards for less than 5 seconds); head nods during conversation; tilting their head about 45 degrees which presents their neck; flicking their hair; licking their lip; pouting; smiling; laughing or giggling at another’s comments; whispering in the ear of the person of interest; gesticulation during speech; primping clothing; caressing one part of their own body\face; and caressing an object (Moore, 1989). The frequency of women’s flirting behaviors is often a better predictor of men’s approaches than is the attractiveness of the women, and those women who are the most flirtatious are 8 times more likely to be approached by men (Moore, 1985).

When men flirt they often puff up their chest, show off their muscles, and brag about themselves (Naworynski, 1993). In an observational study (Renninger, Wade, & Grammer, 2004) of men’s behavior in bars, a number of nonverbal behaviors by men were associated with preferential attention from women. These nonverbal behaviors included signaling interest through brief glances at a woman of interest, and signaling the man’s own status through his: (a) taking up more space in the bar, (b) frequently changing his position in the bar, and (c) touching other men who did not touch him back. Flirting tends to be reciprocated for both men (r = .68) and women (r = .69) (Back et al., 2011).

In a speed dating study, flirting (as measured from auditory recordings) was associated with more subsequent date requests from others (Back et al., 2011). Those who flirted more tended to be those who were more attractive and who had a high opinion of their value as a mate. Those who only flirted with one person were more likely to choose that person for a date.
However, flirting can also sometimes be ambiguous or involve deception to try to discern someone else’s intentions while hiding one’s own intentions (Back et al., 2011).

Once a man and woman signal their interest, one of them must approach the other and initiate conversation. The man might approach the women, a situation that typically creates a high level of anxiety in the man (Perper, 1989). Alternately, the women might approach the man, perhaps asking for help with something. Either way, once the approach has been made and received, the couple have to talk.

Initial conversation is often about trivial things as the two people look for areas of mutual interest (Perper, 1989). Similarity in interests, attitudes, and personalities are major factors in interpersonal attraction (Miller, 2012) and people often look for a mutual area(s) of interest on which they can build the conversation, and perhaps some sort of relationship.

The conversations frequently involve some of the flirting behaviours previously mentioned. As time goes on, it may also involve body synchronization. In body synchronization, both partners might come to move their hands or head at the same time. They might both drink at the same time. They might both adopt the same posture. Many people are not aware of this mutual synchronization of body movements that occur as intimacy builds (Perper, 1989).

If the conversation goes well, the couple, who initially stood at a “V” angle to each other, gradually begin a process of turning to face each other (Perper, 1989). The gradual turning of the position of our bodies is another aspect of the process of sexual attraction that operates unconsciously for most of us. Accompanying this turning of our bodies, the gaze of each partner becomes more focused on the face and body of the other partner (Perper, 1989). Most of us are aware of our focused attention on the other person, focused to the exclusion of much that is going on around us.

After the partners have begun to turn towards each other, the woman will often initiate the first touch as a signal of warm interest (Perper, 1989). This may be a light touch on the man’s hand, arm or shoulder. A gentle touch when individuals face each other is considered both flirtatious and signals romantic interest. These gentle touches may be on the face, shoulder, forearm or elsewhere. Intimacy increases if the man reciprocates the touch, but
deceases if he does not. If touching is mutually reciprocated and continues then it may signal a mutual sexual interest (Perper, 1989). Some women might also use the, not as subtle, signal of leaning towards and brushing her body against the man.

Finally, at some point one person will kiss the other, and this will happen either in a public space or in private. It need not be a long passionate kiss (although it can be). However, it is a signal of the growing sexual interest between the two people.

**Appraisals**

Cognitive theories of emotion believe that what we think about events affects our emotions. For example, cognitive theories of emotion often assume that we make appraisals: we weigh the personal significance of events, and this has a major impact on our emotional reactions and behaviour (van Peer, Granjean, & Scherer, 2014). Appraisals are an assessment of how the situation affects our well-being, leading to a specific emotional reaction (Moors, Ellsworth, Scherer, & Frijda, 2013). This makes intuitive sense. When someone flirts with us, how we feel about it depends on our personal goals. If it is someone who we desire and the situation is right, then we feel happy. If it is someone who we do not want flirting with us, we might feel, depending on the exact situation, annoyed or angry or afraid. If it is someone who is way, way, too old for us, we might feel disgusted. Thus, appraisals can explain why two people can experience different emotions when faced with the same situation: they appraised the situation differently (Brosch, 2013). Appraisals are subjective in nature and so may not always follow objective reality (Tamminen & Crocker, 2014). For example, we may feel fearful about someone when there is no objective reason for this feeling. We simply have just incorrectly appraised that that the individual may harm us.

A central, and perhaps counterintuitive, aspect of appraisals is that appraisals occur rapidly at an automatic (unconscious) level (Moors et al., 2013), although we may later become aware of them and consciously change (reappraise) these initial appraisals. The assumption that appraisals can occur automatically is consistent with findings about other automatic cognitive processes. Although we tend to believe that we are always consciously controlling our behaviour, there is experimental evidence that much\most of behaviour is activated
automatically prior to a conscious awareness of our decision to initiate the behaviour (Corr, 2010; Libert, 1985; Velmans, 1991).

Some of this evidence comes from studies of the brain’s electrical activity (e.g., Libert, 1985). What appraisals do is they help our limited capacity cognitive system to allocate attentional resources to what is important for us (Clement & Dukes, 2013) and when we later become consciously aware (because of the increased attentional resources associated with something important to us) of a thought or action, then we can inhibit or alter that thought or action (Corr, 2010).

Have you ever done something without thinking and you were not even sure why you did it? Frijida (2010) believed that one’s appraisal of an event can change a motivational state, leading to an action, and this occurs at the automatic level in the case of impulsive actions. Impulsive actions seem to happen without effort and are driven either by the presence of a stimuli or an emerging thought (Frijida, 2010). The appraisal leads to the selection, depending on the circumstance, of a seemingly appropriate action schema (an organized way of thinking or behaving). Sometimes these action schemes are not put into direct action, and may simply be manifested as impulsive thoughts or daydreams (Frijida, 2010). There is always a constant cycling of: appraising events, experiencing the resultant emotions, and coping with the events\emotions (Tamminen & Crocker, 2014).

Of major interest have been the types of appraisals that we make. Although different theories postulate slightly different appraisal dimensions, most theories contain dimensions related to intrinsic pleasantness, expectancy, goal relevance (van Peer et al., 2014), and personal ability to cope. Lazarus, a clinician interested in the relations between stress and coping, distinguished two types of appraisals: primary and secondary appraisals (Smith & Lazarus, 1993). Primary appraisals concern the relevance of an interaction for one's own goals. Secondary appraisals decide on credit and blame, one's coping potential, and future expectations.

Similarly, Flykt, Dan, and Scherer (2009) distinguished two stages of appraisal. The first stage is an unconscious evaluation of the pleasantness of the event. This occurs within the first 300-450msec after an event. So, this is occurring within approximately one-third of a
second after an event. The second stage is an evaluation of whether the event helps or hinders a particular goal. This second stage also involves an assessment of the individual’s ability to cope with the event. Both stages of appraisal occur before the mind\brain decides how to respond. A further elaboration (van Peer et al., 2014) of this stage approach suggested a partially fixed sequence of processing in which novelty is processed prior to pleasantness, with other appraisal dimensions processed in parallel after these initial two (Moors et al., 2013). Some of the other commonly postulated appraisal dimensions include: likely outcome, urgency (Gentsch, Grandjean, & Scherer 2013), responsibility (Laukka & Anger Elfenbein, 2012), self-concept (Clement & Dukes, 2013), and compatibility with norms (Laukka & Anger Elfenbein, 2012). Later appraisal dimensions such as these may adjust and refine the quicker, initial appraisals (Brosch, 2013).

So, if you are at a party and someone [say, Halle Barry or Ryan Gosling] appears to move towards you, you might appraise how novel this is [never before happened!], then you would appraise how pleasant this is [extremely!!], and after that you would appraise (all at the same time) the likely outcome [your talking to this person?!], the urgency of meeting this person [?], responsibility [he or she is making the approach!], how it would affect your self-concept [self-esteem skyrockets!!!], and compatibility with norms [it’s fine to talk to someone new at a party]. This is all unconsciously processed in about a second, after which you feel something [perhaps ecstatic and nervous at the same time!].

Appraisals are affected by the person’s needs, goals, values, concerns, personality, and past experiences (Tamminen & Crocker, 2014). One part of past experience can be a long-term emotional sentiment, such as the underlying anger (or positive feelings) towards a particular category of people (Halperin, 2014). Events may also be appraised for their biological significance (Roseman & Evdokas, 2004). For example, how desirable would Hally Berry\Ryan Gosling be as a sexual partner? Finally, the factors that affect appraisals will often be social in nature, because humans are generally social animals.

What actually happens during the appraisal process? Appraisals involve a decision
mechanism, acting on appraisal outcome values, to determine the emotional outcome by then sending messages to the appropriate biological systems. Some of the appraisal values may be dichotomous (e.g., either pleasant or unpleasant, with no values in between), while others are thought to be a number of discrete values (Moors et al., 2013). It is thought that the decision is based on one or more of: (a) the outputs of an always continuing process of computation of the appraisal values, (b) an association between stimuli and past appraisal outcomes, and/or (c) perceptions leading directly to feelings and motor responses (Moors et al., 2013). When an appraisal results in conflicting outcomes, such as when a situation is both pleasant and unpleasant, the result can be mixed emotions (Shuman, Sander, & Scherer, 2013).

One of the main questions in the area of appraisals is which appraisal, or combination of appraisal dimensions, leads to which emotional experience? Generally, goal incongruent (incompatible) outcomes lead to negative emotions (Bossuyt, Moors, & De Houwer, 2014). More specifically, Bower and Forgas (2000) believed that the decision rules associated with appraisals include that: (a) loss of anticipated pleasure results in sadness, (b) blocking from a desired goal results in anger, and (c) threats to one’s body or self-esteem results in anxiety. Because there are a number of appraisal dimensions, a more precise answer to the appraisals-emotions mapping question often requires the consideration of more than a single appraisal dimension. For example, threat appraisals lead to negative emotions but if one appraises that one has sufficient copying resources, a challenge appraisal leads to positive emotions (Tamminen & Crocker, 2014).

Lazarus (1994) assumed that there is a core relational meaning underlying each emotion. These relational meanings reflect the outcome of one or more appraisals, and were proposed to lead to particular emotional response.
There are other proposals about the specific appraisal outcomes that lead to specific emotions. For example, Feather and McKee (2009) suggested that the following appraisals will lead to certain emotions:

<table>
<thead>
<tr>
<th>Core Relational Meaning</th>
<th>Emotion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Something is done against me that threatens my self-esteem</td>
<td>→ anger</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>→ anxiety</td>
</tr>
<tr>
<td>Immediate personal physical danger</td>
<td>→ fear</td>
</tr>
<tr>
<td>I broke a moral code</td>
<td>→ guilt</td>
</tr>
<tr>
<td>Failure to live-up to one's ideal</td>
<td>→ shame</td>
</tr>
<tr>
<td>Experienced a lasting loss</td>
<td>→ sadness</td>
</tr>
<tr>
<td>Wanting something possessed by someone else</td>
<td>→ envy</td>
</tr>
<tr>
<td>Possible loss of another's affection to someone else</td>
<td>→ jealousy</td>
</tr>
<tr>
<td>Too close to something that might make you ill</td>
<td>→ disgust</td>
</tr>
<tr>
<td>Progressing well towards a goal</td>
<td>→ happy</td>
</tr>
<tr>
<td>Accomplishing something that boosts one's self-esteem</td>
<td>→ pride</td>
</tr>
<tr>
<td>Change from moving away from a goal to moving towards it</td>
<td>→ relief</td>
</tr>
</tbody>
</table>
Note that Feather and McKee’s (2009) assumption that we appraise a situation on whether we think that the outcome was deserved or not is consistent with the previous suggestion (i.e., Laukka & Anger Elfenbein, 2012) that we appraise compatibility with norms.

Tong (2010) suggested some of the more complex relationships between appraisals and emotions. These are as follows:

1. If the situation is appraised as: unpleasant, unfair, is caused by someone else, a hindrance to goals, and requires effort to solve the situation → an individual will feel anger.

2. If the situation is appraised as: unpleasant, unfair, beyond one’s control, a hindrance to goals, and requires effort to solve the situation → an individual will feel sad.

3. If the situation is appraised as: unpleasant, unfair, unpredictable, beyond one’s control, a hindrance to goals, and requires effort to solve the situation → an individual will feel fear (Tong, 2010).

4. If the situation is appraised as: unpleasant, unfair, is caused by oneself [this appraisal seems situation dependent], and a hindrance to goals → an individual will feel guilt.
Appraisals make intuitive sense, but is there empirical confirmation? It has been difficult to provide empirical evidence for appraisals as much of the process occurs quickly and unconsciously, limiting the usefulness of verbal self-reports (Gentsch et al., 2013). However, several recent studies appear consistent with the influence of appraisals on emotions.

The most direct evidence for the existence and impact of appraisals can be seen in a recent study (Crespo & Fernandez-Lopes, 2014) of anger in the caregivers of elderly dependents. Caregivers felt anger when they perceived their elderly dependents as a burden. However, this only accounted for 8% of the variance in the experience of anger. Whether the caregivers expressed their anger partly depended on their coping skills (Crespo & Fernandez-Lopes, 2014).

University students’ ratings (i.e., conscious appraisals) of control and value for academic subjects are related to the experience of pride, anxiety, and boredom (Bieg, Goetz, & Hubbard, 2013). Appraisals of personal control were positively related to positive emotions and negatively related to negative emotions, while appraisals of high personal value were related to stronger feelings of both positive and negative emotions (Bieg et al., 2013).

There is weak evidence that appraisals play a role in children’s internalizing (i.e., anxiety and depression) and externalizing (aggressive) behaviour. Langer Zarling et al. (2013) found that for 6- to 8-year-olds from lower class families, the effect of exposure to interpersonal violence in the home on later internalizing and externalizing behaviour was mediated by at least four variables. The mediating variables were (a) harsh parenting, (b) maternal psychopathology, (c) child appraisals, and (d) child emotional dysregulation. These four variables accounted for 59% of the variance in internalizing behaviours and 69% of the variance in externalizing behaviours. However, it must be noted that the cognitive appraisals variable was composed of three separate measures, one of which was fear or distress from violence. Thus, the construct of appraisals in this study was partially confounded appraisals with emotional responses.

Indirect evidence of the effect of appraisals on emotions comes from a meta-analysis (Sheeran, Harris, & Epton, 2014) of 208 experimental studies of the impact of risk on behaviour, it was found that appraisal of personal risk combined with measures related to coping had a medium sized effect ($d = .45$) on people’s behaviour. Although not directly measured in the
meta-analysis, it is reasonable to assume that risk also affected emotions. The study did clearly demonstrate that conscious appraisals cause some behaviours to change (e.g., protection from sun, vaccination, or diet), but not others (e.g., getting medical tests, dental hygiene, or alcohol consumption).

**Cognitive Biases**

Long after initial appraisals are made, the way we think about people and events influence our emotions. If we change the way we think about someone it may, depending, change the way we feel about them. There is an almost infinite number of ways that this can happen and we simply call them “life.” However, there are also some common biases in people’s thinking in intimate relationships that both directly and indirectly affect emotions.

According to Miller (2012), there are a number of automatic cognitive biases that influence what we think about our intimate partners. We tend to idealize our lovers (at least at the beginning of our relationships, less so as time goes on) so that we somewhat exaggerate their positives and overlook their flaws. We also perceive our lovers to be more like us than is really the case.

We like others who say or do things that make us feel better about ourselves and we also prefer others who reinforce our own self-concept. When we have a positive self-concept and our partner reinforces that self-concept, then the relationship has a better chance of lasting. However, when we have a negative self-concept and our partner tells us good things about ourselves, we are more likely to avoid our partner because he or she is telling us things about ourselves that we do not believe. Thus, some people with negative self-concepts are more comfortable in relationships with others that belittle them than relationships with others that praise them.

Finally, people sometimes hold unrealistic beliefs that are harmful to their relationships. These beliefs include thinking that: people who truly love each other never fight, your partner should automatically know what you want, people cannot change, sex will always be great, men and women are more different than similar, and partners do not need to work on their
relationship (Miller, 2012). These unrealistic beliefs are simply not true.

Cognitive biases are not restricted to our perceptions in intimate relationships. Cognitive biases can be more general. For example, younger adults have a small attention and memory bias towards negative events rather than positive events (Reed, Chan, & Mikels, 2014). Depressed individuals have a more difficult time in turning their attention away from negative information and are more likely to interpret an event as negative. More specifically, depressed individuals look at emotionally negative words (e.g., “bad” vs “good”) more frequently and for longer periods of time, are more likely to interpret sentences in a negative way, and are more likely to later remember the negative words (Everaert, Duyck, & Koster, 2014). It appears that selective attention of negative information is associated with negative interpretations, which leads to memory recall being biased towards the negative information (Everaert et al., 2014). Similarly, when (non-depressed) people watch Hollywood movies, they focus their attention to a smaller area of the screen during emotional scenes (Subramanian, Shankar, Sebe, & Melcher, 2014). However, for these nonclinical subjects, memory for the gist was best for positive emotional scenes, while memory for details was suppressed for positive and negative emotional scenes (Subramanian et al., 2014). As we age (and our goals change), we increasingly prefer to attend to, and remember, positive rather than negative things (Reed et al., 2014). This moderately sized positivity effect can be lessened when our attention and goals are elsewhere (Reed et al., 2014).

Emotions and Memory

In some case emotions enhance memory, but in other cases emotions impede memory. We often better remember an event if it’s associated with a strong emotion (Van Damme & Smets, 2014). This is the case for flashbulb memories, which are particularly clear and vivid memories that result from a highly emotionally arousing experience (do you remember when you heard about the 9/11 terrorist attack; or do you vividly remember an emotional experience with a past romantic partner?). We tend to better remember the central events of these emotional experiences. Biologically, amygdala activation during encoding appears responsible
for the memory-enhancing effect of emotion (Onoda, Okamoto, & Yamawaki, 2009). Cognitively, strength of attachment or connectedness to a just deceased person predicted 18 months later their confidence in their flashbulb memories (Day & Ross, 2014). The level of initial surprise about the event may underlie the strength of emotion associated with flashbulb memories (Day & Ross, 2014). The number of mental rehearsals of the event may also relate to flashbulb memory consistency (Day & Ross, 2014).

On the other hand, emotions can impede memory. It is more difficult to remember the answers to trivia if you feel pressured. Bower (1980) cited Diamond, a forensic psychiatrist, as saying that amnesia occurs in about 1 out of every 3 cases following crimes of great passion. Bower suggested this as a retrieval problem caused by mood-state-dependent memory. Our recall of peripheral details of highly emotionally negative (but not positive) scenes is often impaired, presumably because of more attention being focused on the central details (Van Damme & Smets, 2014).

Words denoting emotions may form a distinct category in memory (Altarriba & Canary, 2004). Emotionally arousing words will prime the retrieval of other emotionally arousing words, even when controlling for association, frequency, word length, and valence (i.e., positive vs negative emotions) (Altarriba & Canary, 2004). Emotion words also show increased automatic interference, compared to neutral words, in a Stroop task (Sutton, Altarriba, Gianico, & Basnight-Brown, 2007). This later finding was the case for Spanish-English bilinguals whether the works were presented in Spanish or in English.

The size of working memory is positively correlated with the ability to regulate one’s emotions, with the relationship being bidirectional (Wang & Saudino, 2013). Not surprisingly, if an event causes negative emotions, this often triggers rumination (continually thinking about the event), which in turn deletes working memory (Curci, Lanciano, Rime, & Soleti, 2013), which then may decrease our ability to deal with these negative emotions.

Both genes and nonshared environmental factors influence these capacity differences in working memory, with common genes and brain structures apparently underlying both working memory and emotional regulation (Wang & Saudino, 2013). However, this does not necessarily mean that the size of one’s working memory or ability to regulate emotions is fixed. In fact, it is
clear that most individuals who are poor at regulating their emotions can be trained how to do so.

Bower demonstrated mood congruent processing. This refers to people being disposed to take in information that is consistent with their existing emotional state. Our mood also serves as a retrieval cue. So, someone who is depressed sees only the negative things (the cup is half empty!). The effects of negative emotions on memory could be critically important, at least from the standpoint of the negative rumination that is a core feature of various affective disorders (Onoda et al., 2009). Psychological resilience is associated with being able to remember positive emotions even in the face of a sad situation (Philippe, Lecours, & Beaulieu-Pelletier, 2009).

Finally, our memory for emotional events can be biased. Our recollection of how much we did or did not enjoy past events are not completely accurate. This is the case for both vacations (the memory of which often seems better than the actual experience) and pain (the memory of which is based on the peak –most intense- experience). The difference between the average of the experienced emotion and the remembered emotion is greater for unpleasant than pleasant emotions (Miron-Shatz et al., 2009).

Sleep helps to consolidate our emotional memories, as well as helping to maintain our mood, emotional regulation (e.g., of anger, anxiety, depression, and low stress) and emotional intelligence (Deliens, Gilson, & Peigneux, 2014).

**Repressed memories**

Sometimes we do not want to think about something that occurred, because it would otherwise cause us too much anxiety. Can we repress (an unconscious process that can last an extended time), or at least suppress (a conscious process), an extremely negative emotional experience (e.g., one’s own sexual abuse or domestic violence between one’s parents) for years on end? Certainly, consciousness has a limited capacity so information is constantly moved back to unconscious memory (Erdelyi, 2006). We can suppress non-traumatic thoughts for a time, although this is often difficult to do but what about traumatic memories?

Traumatic emotional memories seem well remembered by most. Prospective research
(Peterson, Morris, Baker-Ward, & Flynn, 2014) has found that personal injuries are frequently remembered by children 2 years after they occurred. Children’s memories linked with emotion (either positive or negative emotion) were 2.5 times more likely to be retained than were other memories (Peterson et al., 2014). So, traumatic memories seem to be generally well remembered.

Psychologists disagree on whether unwanted emotional memories are ever unconsciously repressed. Some (e.g., Erdelyi, 2006; McNally & Geraerts, 2009) concluded that there are at least cases of suppression of traumatic memory; people simply having forgotten childhood abuse or knowingly suppressed the memory. There have been several medically documented cases of childhood sexual abuse that have been forgotten by the individual (McNally & Geraerts, 2009) or consciously suppressed. While it is possible that there are rare cases of (unconscious) repression of emotionally traumatic events for several years, Loftus (as interviewed by Workman, 2012) has taken the strong position that there is currently no good empirical evidence for repressed memories. So, traumatic memories may be forgotten or suppressed, but at best the repression of them appears rare.

Unfortunately, there have been a number of cases of individuals who have had false memories of sexual abuse implanted into their memory by therapists (for a discussion of false memories see Herndon et al., 2014,). The power of suggestion coming from a trusted therapist who employs hypnosis might implant a false memory in some clients. It is possible to implant in some adults a false memory of a painful childhood medical procedure, but only if it involved factors such as guided imagery was used in the memory implant phase or social pressure during the memory recall test (Patihis et al., 2014). Thus, it is not surprising that mainstream psychotherapists who hold a Ph.D. were more skeptical in 2012 than in 1992 about the validity of recovered memories of abuse (Patihis, Ho, Tingen, Lilienfeld, & Loftus, 2014). Indeed, some courts have required the presence of objective evidence (such as hospital records) to corroborate accounts of the recovery of previously repressed memories (Piper, Lillevik, & Kritzer, 2008).

Emotions and Decision Making

Conventional wisdom is that greed and fear rule investors’ behavior in the stock
markets; that stocks are more likely to rise on sunny days simply because sunny days make investors happy. How much do emotions really influence our decisions in life? A recent review (Lerner, Yi, Valdesolo, & Kassam, 2015) concluded that emotions exert a strong, pervasive, and predictable effect on decisions. In fact, emotions may be the most influential factor in many important decisions in people’s lives (Lerner et al., 2015). Emotions affect decisions not only in financial situations, but probably in all areas of the human experience, including everything from intimate relationships to work life to sports performance to moral judgments.

Emotions can affect the decision process in a variety of different ways. They can affect decisions by influencing (a) what people focus their attention on (e.g., anxiety will cause people to focus on negative information), (b) whether people use a general (heuristic) or analytical type of thinking (e.g., happy people are more likely to be influenced by someone’s attractiveness than by the content of what that person is saying), (c) what weight people give to the different choices open to them (e.g., angry people are more likely to choose to retaliate), and (d) the appraisal goal behaviors that are activated (e.g., jealousy is likely to trigger behaviors intended to help retain our loved one) (Lerner et al., 2015). One’s emotions themselves also provide key information on which decisions are made (e.g., love for someone will influence decisions about a potential relationship)(Frey, Hertwig, & Rieskamp, 2014) and may provide the motivation needed to make or delay a decision (e.g., anger or fear may be the final factor leading to the end of a relationship)(Pakhomov & Sudin, 2013). Finally, individuals may come to a particular decision because of how they think the decision will make them feel in the future (Joel, MacDonald, & Plaks, 2013). For example, some individuals may decide not to ask someone on a date, or to end a relationship, because they overestimate the emotionally pain (e.g., depression, loneliness) that it might engender (Joel et al., 2013).

A classic experiment by Tversky and Kahneman (1981) demonstrated that we are not always rational (i.e., strictly logical and consistent) in our decisions. Tversky and Kahneman demonstrated that how a choice is worded (framed) can influence what we choose. When options are all framed positively, most people choose the gain that is small but that is most likely to occur, a conservative approach. When the same options are all framed negatively, then people are more likely to “gamble” on the less likely outcome if it means that they would lose
It has been suggested (Stanton, Reeck, Huettel, & La Bar, 2014) that this framing effect results from emotional reactions. We emotionally feel negatives (e.g., loses) more strongly than we feel positives (e.g., gains), so when faced with likely losses we are more inclined to gamble on the small chance of only a slight loss in the hope of experiencing only a small amount of emotional pain. So, whether we decide to go on a date with someone, or decide to stay in a relationship, should be influenced by whether we focus on the positive attributes, or on the negative eccentricities, of that same person. The main point here is that when we make decisions, we are influenced by both (a) our rational computations (or best guesses), and (b) our emotional reactions (Harlé & Sanfey, 2012), with our emotions often playing a major role.

If you are treated unfairly in love or work, do you quit even if it causes personal hardship? Many people will. Feeling angry or disgusted may override an otherwise rational response (Dunn, Evans, Makarova, White, & Clark, 2012). When we feel angry, we are less likely to engage in detailed and systematic thinking (Thiel, Connelly, & Griffith, 2012). In contrast, when we feel pessimistic, we are less likely to take action (Thiel et al., 2012). In situations where emotions may negatively affect our judgment, we can overcome this by (a) delaying the decision until a later time, (b) reappraising the situation so that it is perceived as less emotional, or (c) thinking about our decision making in a critical way (Lerner et al., 2015).

Fear can affect our decision making in interesting and important ways. Fear can cause us to sample more information from the environment before we make a decision (Frey et al., 2014). Thus, fear of making a mistake by marrying a particular person may lengthen the time before making, or accepting, a marriage proposal. Maybe fear is a factor behind a runaway bride/groom?

Worry can cause a small increase in the chance that we choose a small immediate gratification over a larger, but delayed, reward (Worthy, Byrne, & Fields, 2014). Similarly, a long exposure to fear may predispose us to choose the smaller, immediate reward, although just a brief emotional prime of fear can predispose us to choose the larger, but delayed, reward (Luo, Ainslie, & Monterosso, 2014). Perhaps the general relationship between negative emotions and an inability to wait relates to the finding that negative emotions cause both men and women to overestimate the frequency of disease, accidents, and disasters (Johnson & Tversky, 1983).
Why wait if we are pessimistic about the future?

The relationship between emotions and this type of impulsivity versus self-control is important to people’s lives. Self-control (inhibitory control) of this kind has been linked to educational attainment, health and well-being (Hoerger, Quirk, & Weed, 2011). Meanwhile, low delay of gratification (impulsivity) has been linked to higher drug usage, obesity, consumer debt and psychological problems (Hoerger, et al, 2011). The good news is that impulsivity, at least in many children, is frequently more of a strategy than a trait (Jones & Duffy, 1982) and can often be modified by parents altering their parenting style and by teachers adopting a behavior modification program.

When we feel happy we are more likely to gamble (Stanton et al., 2014), which may be why the major hotels in Los Vegas try to keep their predominately male clients happy. Mild positive emotions increase overconfidence in men, but not in women (Ifcher & Zarghamee, 2014). As overconfidence sometimes has a negative effect on economic decisions (Ifcher & Zarghamee, 2014), this raises the question of whether women financial managers or CEOs avoid the financial losses that can follow false overconfidence? Note that Culture sometimes affects the relationship between emotions and overconfidence, as sadness increases overconfidence in non-Asians but not in Asian-Americans (Ifcher & Zarghamee, 2014).

Emotions may interact with the type of task in their effect on decision making. In situations when a stand-alone decision is to be made, it has been suggested that angry and happy people are more likely to choose options that carry some risk (including sexual encounters), while fearful people are averse to taking risks. However, in situations when one decision can effect subsequent decisions, angry and happy people prefer the conservative (safe) decisions while fearful people are more likely to take risks (Bagneux, Bollon, & Dantzer, 2012).

Moral judgments are a type of decision that may affect only a few people, but depending on the situation may affect many others. It has been suggested (Olatunji & Puncochar, 2014) that emotional processing at an unconscious level occurs prior to conscious reasoning processes when making a moral judgment. Disgust appears to be an emotion that has a strong tendency to sway moral judgments (Olatunji & Puncochar, 2014). Would you vote for someone who disgusts you [say no!] Stress increases the odds of participants choosing personal gains over
the welfare of others (Youssef et al., 2012). Anger, which can trigger impulsiveness and risky decisions, appears to inhibit moral judgments while fear, which can trigger a search for additional information, appears to facilitate them (Kligyte, Connelly, Thiel, & Devenport, 2013). Angry individuals are more likely to make distorted appraisals, misperceive a situation as threatening, are slightly more likely to then retaliate against the misperceived threat, and are moderately more likely to choose less ethical decisions (Kligyte et al., 2013). Both cognitive reappraisal and relaxation can reduce the effect of initial anger on poor ethical decision making.

The influence of the display of anger in negotiations is complex. In negotiations for morally important items, expressions of angry by the other person reduces the odds that one will make a concession while expressions of sadness increases the odds that one will make a concession (Dehghani, Carnevale, & Gratch, 2014). However, in some contexts (e.g., by someone high in power) the expression of anger may increase the chance of getting a concession (Dehghani et al., 2014).

On the positive side, emotions sometimes aid decision making. Patients whose emotional processing is impaired through damage to the ventromedial prefrontal cortex are more likely than others to make suboptimal, risky financial decisions (Lerner et al., 2015). Damasio’s somatic marker hypothesis suggests that emotions serve to remind us of the rewards or punishments that resulted from our past decisions. There is some evidence that this is particularly the case in complex situations with uncertain future outcomes (Werner, Duschek, & Schandry, 2009). Positive emotions often allow us to better process information, even information that is threatening to us (Ifcher & Zarghamee, 2014). Salespeople rely on emotional awareness and regulation, rational deliberation, and intuition [rapid unconscious processing] when making decisions to close sales (Locander, Mulki, & Weinberg, 2014). Knowing when to go with one’s “gut feelings” may partially determine the success of a number of our important life decisions (Dunn et al., 2010).

Social Controls\ Influences

Our culture teaches us when to express emotions and how strongly to express them. Sometimes, society teaches us that we either should not experience a certain emotion in a
particular context (e.g., we are taught as children not to be angry when a friend plays with our toys) or that we should at least mask our feelings in that context. At other times, society teaches us to enhance our experience of a certain emotion in a particular context (e.g., when our country wins a gold medal in the Olympics!) or at least our expression of that emotion.

We sometimes learn to regulate our emotions by observing what others do and the resultant outcomes for them. This observational learning may occur consciously but often observational learning occurs automatically via cognitive priming (i.e., having unconsciously seen or heard something we are more likely to later think of it ourselves). We also learn how and when to regulate our emotions through our own process of trial and error. In addition, we may learn strategies to dampen emotions (e.g., distraction, reappraisal, or relaxation) or enhance emotions (e.g., adding positive experiences together, decreasing cognitive inhibition, or increasing sympathetic arousal). These diverse types of learning occur within the context of family interactions; direct social interactions with friends, peers, co-workers and others; traditional and social media; and religious or other institutional (e.g., educational or military) teachings. Thus, socialization helps to mold our emotional expression.

In this third major section of this book I will explore the role of culture and socialization on emotions. This section will briefly introduce social constructivism theory, some empirical findings of cultural differences (including a discussion of gender differences), and then some of the specific settings in which emotions are socialized (e.g., religion, family, broader social interactions, and the media).

Social Constructivist Theory

Social constructivist theories emphasize the role of culture and the socialization process in determining emotions. The emphasis is on the function of emotion within social interactions (Barrett, 2013). These theories see emotions as briefly operating social roles within those interactions. Particular emotions are seen as social-cultural constructions rather than as distinct biological entities.

Social constructivist theories suggest that through socialization we learn social-cultural
rules about how to behave in particular situations. For example, you would react to the death of your pet differently if you spent your youth watching Disney movies about pets than if you grew up on a farm where animals were routinely slaughtered. The idea is that what you feel in a particular situation is what you learned during socialization as the appropriate experience in that situation.

These theories highlight that we often learn these rules through the process of language transmission. We listen to the descriptions by others of emotions and emotion provoking situations, and we get corrective feedback from others as we relate our own emotional experiences. Language is seen to play a key role in the acquisition and organization of our conceptual knowledge of an emotion (Lindquist, Satpute, & Gendron, 2015). As we learn the rules about emotions, we construct cognitive prototypes about each emotion (a prototype is a best example of something). These prototypes determine how we appraise situations, which in turn determines our emotional experiences.

However, constructivist theories (e.g., Tracy, 2014a) have a different view of appraisals than does the cognitively oriented approach that was discussed in the previous section of this book. Constructivist theories see appraisals as any mental process that generates the meaning for a situation and see appraisals and emotions as essentially equivalent. They believe that meanings are constructed out of past experience and must be shared between individuals for an emotion to be experienced (Tracy, 2014a).

Social constructivist theories downplay the role that the biological component has in determining emotions. They reject the notion that emotions are primarily physiological phenomena. Different emotions are not seen as distinct categories (they do not believe in basic emotions) but are seen as being variable, with their manifestation depending on the situation (Barrett, 2013). The existence of variation of responses within an emotional ‘category’ is seen as a critique of any basic emotions typology (Barrett, 2013). Instead, social constructivist theories believe that emotions emerge out of two biological dimensions: (a) degree of pleasure, and (b) degree of arousal. [Note that although emotions can be described by these two dimensions, in many situations the approach of basic emotions explains more of the variance within studies.]
While not denying a role for biology, Mesquita and Boiger’s (2014) sociodynamic theory (a variant of social constructivism) assumes that emotions are psychological constructions from the interactions between individuals. They concede that one component of emotional categories are physiological feelings (Cameron, Lindquist, & Gray, 2015), but no one-to-one correspondence is assumed between specific physiological responses and distinct emotions. While emotions are constructed from physiological feelings and other lower order biological systems, emotions are assumed to be primarily the result of social interactions (Mesquita & Boiger, 2014).

A striking assumption of social constructivist theories is that they do not believe that cultures merely determine how and when we show our emotions (this would be Ekman's notion of display rules). Rather, some social constructivist theories posit that culture determines our repertoire of emotions. This leads to several interesting predictions. Firstly, it predicts that people from different cultures will experience different emotions when in the same situation. Secondly, it predicts that a given culture could construct an emotion that is unique to that culture. For example, Cornelius (1996) argued that the Japanese emotion of amae has no corresponding emotion in North America. Amae is an attachment or dependence on another that is the opposite of the Canadian and American ideal of personal freedom and independence. It is an emotion that is thought to result from the consistently close contact between Japanese mothers and their infants (including sleeping together). Amae is also thought to relate to the later emphasis by many Japanese adults on group dependence. However, North Americans who have an anxious/resistant emotional attachment with their mothers seem to have a similar experience. It is of interest to note that although Japanese children spend much of their time with their mother, these mothers sometimes use the possibility of separation from them as a threatened punishment. Further note that Japanese children tend to be more anxious/resistant than are children from other countries (see Posada et al. 2013). Thus, perhaps amae is essentially the same as the anxiety felt by those in North America with an anxious/resistant attachment.

Social constructivist theories also [reasonably] predict that language can influence emotional experience. The extreme form of this prediction is that language determines emotional experience. However, there is evidence that is inconsistent with this extreme
position. For example, even though English speaking North Americans have no equivalent word for the German “schadenfreude” (pleasure at others’ problems), North American’s frequently admit to having experienced this emotion themselves.

The strength of social constructive theories of emotion is their emphasis on culture and socialization. Their weakness is in their downplaying of the biological component and denial of the existence of basic emotions. However, some social constructivists (e.g., Tracy, 2014b) also embrace, in addition to social/cultural influences, both biological and cognitive perspectives, and this seems like a very constructive (as in helpful!) approach.

Culture

Our understanding of our own and others’ emotions is significantly advanced by an understanding of the impact of culture. This is true of our ability to read facial expressions, and our understanding of how both internal (e.g., appraisal, regulation, and values) and external (e.g., life experiences) events affect emotions.

Although our ability to read the facial expressions of people of different cultures is largely universal for basic emotions (Ekman, 1994), there are some cultural differences (Russell, 1994). For example, Japanese and Africans show a lower accuracy for categorizing facial expressions of fear, disgust, and anger than do Westerners. These cultural differences may partially relate to differences in the avoidance of uncertainty (Altarriba et al., 2003), but differences in aversion to uncertainty does not explain all of the emotion recognition differences. For instance, East Asians are better at accurately recognizing the emotions felt by their friends than are Americans, but East Asians are worse than Americans at recognizing the emotions felt by strangers (Ma-Kellams & Blascovich, 2012). This probably relates to Eastern cultures feeling interdependent with close others but less concerned about strangers than are Americans (Ma-Kellams & Blascovich, 2012). Generally, the more interaction we have with a particular social, cultural or ethnic group, the better we are at reading the facial expressions within that group (Young & Hugenberg, 2010). If Japanese and Africans infrequently see expressions of fear, disgust, and anger (compared to Westerners) this might account for the
lower accuracy in recognizing these facial expressions.

Culture appears to exert a small effect on some aspects of emotions while exerting a larger effect on other aspects of emotions. The appraisal that triggers a given basic emotion and the subjective experience produced by each basic emotion is essentially the same across cultures (Matsumoto & Hwang, 2012). However, there are cultural differences in whether a particular event triggers a particular emotion (Shao, Doucet, & Caruso, 2015), in the strength of an emotional experience, and in our high-order thinking about these emotions (Matsumoto & Hwang, 2012). These cultural differences result from different life experiences, different appraisals, and different values. For example, female university students in Mainland China are much more likely to view erotic picture negatively than are female university students in the United States (Huang et al., 2015). This is not surprising as currently in China sex education is limited, nudity is considered offensive, and chastity is more highly valued than is the case in the United States (Huang et al., 2015).

The effect of cultural values on emotional experience can be seen in the importance of anger and shame in different countries. In Turkey, experiencing anger and shame are both promoted, consistent with the Turkish cultural principle of defending family honour (Boiger, Güngör, Karasawa, & Mesquita, 2014). In Japan, shame but not anger is promoted, consistent with the Japanese cultural principles of social harmony and keeping face (Boiger et al., 2014). In the United States, anger but not shame is promoted, consistent with the American cultural principles of individuality and entitlement (Boiger et al., 2014). These different values lead to differences in the frequency and the strength to which anger and shame are experienced in these respective countries.

Collectivist cultures (such as many Asian cultures and many indigenous cultures) often emphasize the family and larger culture. In contrast, individualistic cultures (such as most Western cultures) often emphasize the primacy of individuals and independence. Collectivistic cultures are more likely to promote the control (i.e., inhibition) of emotional expression while individualistic cultures are more likely to promote emotional expression (Allen, Diefendorff, & Ma, 2014). Emotions that occur more frequently in collectivist cultures include friendliness, respect, and sympathy, as these emotions aid social engagement (Matsumoto & Hwang, 2012).
Emotions that occur more frequently in individualistic cultures include pride, sulkiness, and frustration, as these emotions reflect personal independence (Matsumoto & Hwang, 2012) and entitlement.

Individuals in Chinese and Japanese cultures are generally less emotionally expressive in public than are North Americans. Display rules may dictate the suppression of happiness in some situations in Asian cultures while in Western cultures would dictate the expression of happiness. Japanese are more likely than Americans to associate feeling happy with others then becoming jealous. There is concern in Japan that someone being too happy could disrupt social harmony. In Japan, helping to maintain the positive social image of someone else is associated with one’s own feelings of joy (Lin & Yamaguchi, 2011). Much of Asian culture strives for calm while Western culture strives for happiness.

People in East Asian cultures are more likely to feel mixed emotions than are Westerners. Japanese sometimes experience negative events more intensely than do Americans (Grossman, Karasawa, Kan, & Kitayama, 2014). Americans appear to more often distance themselves from negative events while in East Asian the emphasis is more often on acknowledging negative events and attempting to deal with them through reappraisal (Grossman et al., 2014). For example, after doing poorly on an examination in an American university, Asians and Asian-Americans did not feel any worse than did European-Americans (Miyamoto, Ma, & Petermann, 2014). However, Asians and Asian-Americans students were moderately ($\eta^2 = .34$) less concerned with decreasing their negative emotions (anxious, disappointed, angry, and ashamed) and enhancing their positive emotions than were European-Americans (Miyamoto et al., 2014). The European-Americans were more likely to want to feel better ($d = 0.61$). As Americans age, they experience fewer negative interpersonal interactions and are less emotionally disturbed by negative situations, but there is no similar change with age for Japanese (Grossman et al., 2014).

Brazilians are even more emotionally expressive than are North Americans (just watch their soccer fans!). Brazilians are most emotionally open with their friends, rather than with their family or partner (Vikan, da Graça, Dias, & Roazzi, 2009). In contrast, Russians are often more brooding and melancholy than North Americans (Grossmann, Ellsworth, & Hong, 2012).
Russian culture focuses more on the negative than on the positive, while Americans are the opposite and focus more on the positive than on the negative (Grossmann et al., 2012).

However, a meta-analysis (van Hermert, Poortinga, & van de Vijver, 2007) of 188 studies found that cultural differences in emotional expressivity were actually relatively small (average $d = .25$). What differences did exist between cultures were associated with differences in mode of work, political systems, and religion. Emotional expressiveness positively correlated with (a) societies with more people in the service profession, (b) societies that were more democratic and had more human rights, and (c) societies that stressed individualism. The expression of more positive emotions was associated with (a) more stable societies, and (b) societies with a higher percentage of Protestants.

Some strategies for emotional regulation are more emphasized by particular cultures. Chinese men show less emotional reaction than North Americans when viewing a negative scene, and they accomplish this through emotionally distancing themselves (e.g., “I don’t really care about…”) from the negative scene (Davis et al., 2012). Japanese tend to be less expressive through the cognitive strategies of suppression and reappraisal (Matsumoto et al., 2008). A meta-analysis (Hu et al., 2014) of 48 studies found that while in individualistic cultures there is a small correlation ($r = .19$) between suppression of emotional expression and mental health problems this relationship is weaker ($r = .06$) in collectivist cultures. In other word, consistently feigning a “poker face” (i.e., being devoid of emotional expression) is more likely to cause mental health problems in Canada and America than in China and Japan.

In traditional Hindu communities in India, individuals are taught to control negative emotions through understanding and accepting a given situation (Raval, Raval, Salvina, Wilson, & Writer, 2013). Hindu mothers reported slightly less ($\eta^2 = .09$) sympathy towards expression by their children of anger and sadness, while American mothers were more likely to encourage their children to express the emotions of anger and sadness (Raval et al., 2013).

Higher-order thinking about our emotions is thought to be influenced by language, particularly by the vocabularies for particular emotions. Collectivist and individualistic cultures also represent emotions in different linguistic ways and at different levels of abstraction (Altarriba, Basnight, & Canary, 2003), but that does not necessarily mean that the emotions are
experienced in different ways. In collective cultures people’s emotional memories are more influenced by who was present in the original event, than is the case for people in individualistic cultures (Koh, Scollon, & Wirtz, 2014).

Many cultures have the same linguistic structure of emotions: (a) at the top are the two superordinate categories: positive and negative, (b) in the middle are five basic level categories: happiness, love, sadness, fear, and anger, and (c) at the bottom are a large number of subordinate categories (i.e., subcategories of the basic categories). The number of subordinate categories depends on whether particular basic emotions are emphasized to a greater or lesser extent in a given culture (Matsumoto & Hwang, 2012). The size of vocabularies within subordinate categories can also vary substantially across cultures.

Culture can influence emotions, which in turn can influence an individual’s well-being. Latinas (women from Mexican, Mexican-American, or other Latin cultural backgrounds) who are high in neuroticism tend to be less anxious and less stressed than other women also high in neuroticism but who have East Asian or East Asian-American or European-American backgrounds (Campos et al., 2014). This positive effect for highly neurotic Latinas may result from more positive emotions, better social support, and more physical proximity in their social relations within that cultural group (Campos et al., 2014).

When considering the effect of culture on emotions it is important to keep in mind that there are large individual differences within any culture (Nezlek, Kafetsios, & Smith, 2008). This is what we mean when we say that the effect of culture is small. Still, these small cultural effects are frequently quite important.

Religion

One noteworthy cultural influence on emotional experience is religion, with religious teachings and practices often aimed at heightening some emotional experiences and suppressing others. For example, Christian religions (e.g., Catholicism, Protestantism) generally emphasize love, kindness, and hope; Evangelical Christianity emphasizes intense positive emotions (e.g., awe); Buddhism emphasizes calm; and Judaism and Christianity both advocate the regulation of
envy, pride, and anger (Emmons & Paloutzian, 2003);

For the majority of people in the world, there are emotional benefits to being a member of one of the major religions. Religion can help one to emotionally bond with a community of people (Saroglou, 2011). Religious affiliation has been positively related to family quality and satisfaction (Sabatier, Mayer, Friedlmeier, Lubiewska, & Trommsdorff, 2011; Simonič, Mandelj, & Novsak, 2013). Religion also provides comfort when someone dies (Lee, Roberts, & Gibbons, 2013), as religion helps individuals to develop a meaning to life and death, and sometimes provides coping strategies (e.g., religious reappraisals such as “God’s will”) which can, for some, aid in their emotional response to traumatic events (Altmaier, 2013). However, we need to keep in mind that the effects of religion may depend on the wider culture (Sabatier et al., 2011). For example, while studies in the West frequently associate religiosity with positive mental health (Kim-Prieto & Diener, 2009), studies in Mainland China frequently find that religious groups score lower than nonreligious groups on tests of mental health (Chen, Wang, Weng, & Wang, 2012).

What empirical evidence is there that specific religions actually differ in emotional experience? One study (Kim-Prieto & Diener, 2009) of Christian, Jewish, Muslim, Hindu, and Buddhist college students (7,231 students across 49 countries) found very small (η2 = .02) religious differences in the frequency of emotions experienced within the one week period about which the students were surveyed. The study found that Christians reported the highest frequencies of feeling love while Muslims reported the highest frequencies of experiencing sadness and shame. Christians reported lower frequencies of shame than did Buddhists and Hindus. Buddhists generally did not report high frequencies of any emotion. There were no religious differences found in the frequency of experienced: happiness, gratitude, pride, anger, guilt, or jealousy (Kim-Prieto & Diener, 2009). However, we need to be cautious about inferring the effects of particular religions because the religious communities themselves may differ on a host of social and cultural variables. A separate study (Ritter, Preston, & Hernandez, 2014) of primarily Canadian and American Twitter users found that those who followed five public Christian figures were moderately more likely to tweet positive emotions (d = .36) and slightly less likely to tweet negative emotions (d = -.22) than were those who followed five public atheist
figures. These differences partially related to the more social connectedness of Christians, and partly because Christians thought more in terms of certainty and emotion while atheists thought more in terms of skepticism and reason (Ritter et al., 2014). Among a sample of American males at a religious college, religious commitment slightly correlated with feeling loved \((r = .27)\) and moderately correlated \((r = .35)\) with ratings on a scale comprised of feeling happiness, at peace, reassured, encouraged, and validated (Inman, 2014). Among Canadian university students, atheists tend to experience scenarios of love or sadness less intensely than do religious individuals (Burris & Patrican, 2011).

Religious thinking is sometimes positively related to one’s ability to cope with stress. For university students in the United States, having a higher level of personal religious beliefs was associated with lower levels of hopeless, depression, and risk of suicide (Hovey, Hurtado, Morales, & Seligman, 2014). More specifically, high religiosity was associated with high perceived emotional support, which was what lead to lower levels of hopelessness \((r = -.25)\), depression \((r = -.14)\), and suicidal thoughts and intents \((r = -.13)\). This fit with other Western studies that also found a modest relationship of religion to mental health (Hovey et al., 2014). In patients with mental illness, their religious belief can foster optimism which was associated with small to moderate increased life satisfaction and psychological adjustment (Warren, Van Eck, Townley, & Kloos, 2015). However, religious thinking is sometimes negatively related to one’s ability to cope with stress, both in China and in some samples within the West. For example, after controlling for initial level of anxiety, religiosity in early adolescence slightly predicted \((r^2 = .01)\) anxiety in mid-adolescence (Peterman, LaBelle, & Steinberg, 2014). In other words, those who participated more in religious activities in early adolescence experienced slightly higher levels of anxiety in mid-adolescence. Among a sample of young adults in Spain, faith in God showed small negative correlations with positive relations with others \((r = -.32)\) and autonomy \((r = -.17)\) while not predicting overall psychological well-being (Mayordomo-Rodríguez, Meléndez- Moral, Viguer-Seguí, & Sales-Galán, 2015).

Negative religious appraisals (e.g., seeing an event as punishment from God, or that one has been abandoned by God) can cause negative emotional reactions such as anger, anxiety, and depression (Lee et al., 2013). Among a sample of pregnant women in Spain, those who used
religious coping appraisals were slightly more likely to be anxious later in the pregnancy, while those who just used social support were less likely to be anxious (Peñacoba-Puente, Carmona-Monge, Marín-Morales, & Naber, 2013). When trying to deal with the death of others, negative religious appraisals can intensify (r = .33) and lengthen (r = -.20) the grief period (Lee et al., 2013).

Religion can lead to experiences of anxiety, sadness, guilt, fear or anger, depending on the teachings and how the teachings are imposed. For example, religion can cause subgroups to experience negative emotions; LGBT individuals can experience anxiety if they are a member of a religion that does not support their sexual orientation (Siraj, 2012). Relatedly, religion can be used to justify physical or emotional abuse, with emotional abuse including (a) rejecting others because of what they do or the group to which they belong, (b) physically threatening others, (c) fostering shame and (d) withholding affection for others (Simonič et al., 2013).

Religion by itself does not cause these instances of abuse, but can be used as the rationalization for the abuse (Simonič et al., 2013). Unfortunately, religions can cause the development of an “us” versus “them” mentality, which increases the likelihood of prejudicial thinking about “others”.

So, religious thinking often has modest positive emotional consequences and a few small differences exist among the major religions in the frequency of specific experienced emotions. However, religious thinking can also have some negative emotional consequences, depending on both the specific thoughts and the wider culture.

**Gender differences in emotions**

If you think that men and women are fundamentally similar, but not completely identical, in their emotional reactions then you are likely to have a pretty good understanding of the internal lives of men and women. Men and women are more emotionally similar than different, and those differences that do exist are usually quite small. There are a few meaningful gender differences in emotions, but we would be more accurate in treating the opposite gender as a group of distinct individuals rather than as a homogenous group that is fundamentally different from our own gender.
However, it may not always seem that way as men and women sometimes act emotionally different as a result of conforming to a social stereotype. The gender stereotype believed by much of the public is that women express their emotions more openly than do men (Whittle, Yücel, Yap, & Allen, 2011), that women are more expressive, excitable, relationship oriented, and more likely to be emotionally hurt than are men (Fischer, 1993). The more they agreed with traditional gender stereotypes, the more females reported more intense emotions and the more males reported less intense emotions (Grossman & Wood, 1993). When people's expectations of how emotional they should be are appropriately manipulated, gender differences in emotional intensity become essentially equivalent (Grossman & Wood, 1993). The public face is sometimes chosen to match social/cultural expectations and this public face can be different than, or exaggerated from, an individual’s personal self. Indeed, even when men and women act the same way they are frequently perceived differently (Hess, 2015) because of our social expectations.

"True” gender differences in emotions start with the ability to read people’s emotions. Women are slightly better than men at reading subtle emotional cues from faces, but there is no gender difference when the faces are highly expressive (Hoffmann, Kessler, Eppel, Rukavina, & Traue, 2010). Women are also slightly better at recognizing auditory cues for emotions (Lambrecht, Kreifelts, & Wildgruber, 2014). Men are slightly biased to view the emotional expression of a woman as “alluring,” which fits with men’s higher sex drive.

The gender differences in reading facial expressions might relate to differences in the cognitive processing in which men and women engage when evaluating facial expressions. There is some evidence that men are more likely to process emotional stimuli in a fast, unconscious process that provides only a rough analysis, while women engage in a slower (hundreds of milliseconds), conscious process that provides more detailed information (Knyazev, Slobodskoj-Plusnin, & Bocharov, 2010). It appears that when reading facial expressions women engage in more limbic, inferior frontal, and temporal cortical processing while men engage in more prefrontal and parietal cortical processing (Whittle et al., 2011). This may suggest that women are engaging in more processing in areas associated with specific emotions (Whittle et al., 2011).
While women, on average, tend to outperform men in reading emotions, only 4% of differences in reading emotional facial expressions relate to gender (Hall, 1978). This is a small effect, with individual differences playing a much, much larger role than does the slight gender difference.

**Gender and emotional feelings**

There are a number of adult gender differences in emotional feelings, with at least some of these appearing to be socially/culturally determined. A meta-analysis (Else-Quest, Higgins, Allison, & Morton, 2012) of 382 studies determined that women are slightly more likely to feel guilt (d = .27) and shame (d = .29). Guilt involves a negative appraisal about our own, controllable, behaviour while shame involves a negative appraisal about our personality. Gender difference in guilt most often concern food (d = .38), sex (d = .21), and ethnicity/nationality (d = .23), while gender differences about shame are most often about body/appearance (d = .50) (Else-Quest et al., 2012). Women are more likely to experience emotional jealousy (a response to perceived emotional infidelity by their partner), but there is no gender difference in the experience of sexual jealousy (Zandbergen & Brown, 2015).
In the United States, men more frequently experience positive emotions (i.e., happiness, excitement, and calm) and less frequently experience negative emotions (i.e., sadness, anxiety, and anger) than do women, due to socialization and cultural norms favouring men (Simon, 2014). Similarly, men in both France and Belgium generally experience fewer different types (diversity) of negative emotions, and experience them less frequently, than do women (Quaidbach et al., 2014). When viewing positive visual emotional stimuli, men have shown greater brain activity than did women in the frontal cortex and the amygdala (Whittle et al., 2011). Men also show greater brain activity to facial expressions of contempt, perhaps because this may be a cue to dominance, something that may be more salient for them (Whittle et al, 2011). Women are more reactive to threatening stimuli, both cardiovascularly (Lysenko & Davydov, 2012) and in brain reactivity in a variety of regions, including the amygdala (Whittle et al, 2011).

In a review article (Fischer, 1993) of older studies that used participant self-reports, it was found that men and women differed in the frequency with which they experienced shame and guilt (women experienced more), love and contempt (men experience more), but not anger or joy. The self-report data also indicated that women experienced more intense feelings of anger, joy, sadness, fear, and love (Fischer, 1993). Grossman and Wood (1993) reported EMG (facial muscle) data that was consistent with much of the self-report data.

Regarding love specifically, more recent findings suggest that although women and men generally seek the same psychological traits in partners, more women have a pragmatic attitude towards love while more men have a romantic and erotic orientation toward love. For example,
women who are dating online are more likely to show interest in men who are not physically attractive if those men report having a very, very high annual income (Miller, 2012), although women also tend to report more relationship satisfaction when they report their partner to be passionate and loving (Aumer, 2014). Men tend to report moderately more relationship satisfaction when they report their partner to be romantic and passionate about sex, and report less relationship satisfaction when their sexual partner is shy or embarrassed about sex (Aumer, 2014).

While gender differences in experienced emotions generally tend to be small, gender differences in anxiety and depression appear to be greater and of considerable importance. In Canada and the United States, women appear to be moderately (d = .27 - .40) more anxious than are men (Hyde, 2014), and more women than men are likely to be diagnosed with anxiety disorders (Chaplin, 2015; Simon, 2014). However, note that there are no gender differences in anxiety in Japan, among Black South Africans (Hyde, 2014), or among rural Iranians (Khodarahimi, Dehghani, & Nikpourian, 2014).

In childhood in the Canada and the United States, boys show more symptoms of depression than do girls, but in adolescence girls show slightly higher depression scores than do boys (Hyde, 2014). This change appears in adolescence at least partly because girls are faced with more stressors imposed by society (e.g., physical appearance and conformity to gender roles) and ruminate more over these stressors (Lyubomirsky, Layous, Chancellor, & Nelson, 2015). As adults, women are more likely to feel depressed (Quaidbach et al., 2014) and are approximately twice as likely as men to become clinically depressed (Hyde, 2014). Some (e.g., Hyde, 2014; Zahn-Waxler, Shirtcliff, & Marceau, 2008) have suggested that the reasons for this are a combination of genetic predisposition, the occurrence of negative emotions, and maladaptive thinking. Women tend to learn through socialization that they often have little control over many situations (Lyubomirsky et al., 2015). Women are more likely than men to overanalyse the causes and possible outcomes of stressors, while more men than women use problem-solving and positive thinking strategies (Whittle et al., 2011) or distract themselves from stressors. However, note that gender differences in depression (as with anxiety) were not found among rural Iranians (Khodarahimi et al., 2014).
Gender and emotional expressions

Women are slightly more emotionally expressive for both positive emotions (Chaplin, 2015) and negative emotions (Simon, 2014). More specifically, women are slightly more animated for expressions of happiness, sadness, and anxiety, while men are slightly more animated for expressions of anger and aggression (Chaplin, 2015). These do not appear to be differences in intensity, but rather men are somewhat more likely to control and mask their emotions while women are more likely to share their emotions with their friends and family, and women are more likely to mask their feelings of anger. The finding that women are more expressive certainly correlates with the public’s stereotype of women being more emotional than men.

Gender differences in emotional expressions show developmental differences. Girls show more inhibitory control than do boys (Chaplin & Aldo, 2013). A meta-analysis (Chaplin & Aldo, 2013) of 166 objective studies of emotional expression of children/adolescents below the age of 18 years found that girls express slightly more of (unspecified) positive emotions ($g = .20$ in childhood, $g = .28$ in adolescence; $g$ is interpreted similar to $d$), fear ($g = .10$), sympathy ($g = .13$), and contempt ($g = .26$) than do boys. Girls also express moderately more shame ($g = .56$) than do boys. Boys were found to express slightly more anger ($g = .10$) and schadenfreude ($g = .29$), and moderately more pride ($g = .42$) than did girls.

Girls are slightly more likely that are boys to engage in verbal aggression intended to damage peer relations (Hyde, 2014). Boys are moderately more likely ($d = .55$) to engage in more physical aggression (Hyde, 2014). With adolescence, girls displayed moderately more ($g = .35$) negative emotions than did boys, and girls also displayed slightly more ($g = .27$) externalizing emotions (e.g., anger, contempt) than did boys. Adolescent girls showing more anger appears to signal a significant change from previous generations (Chaplin & Aldo, 2013). Although it has been suggested that gender differences in aggression are hormonally determined, this generational change is more consistent with the hypothesis that females used to be more socialized to inhibit their aggressive impulses while males were more socialized to act...
upon their aggressive impulses.

Note that context plays a role in gender differences in emotional expression. Children’s gender differences in emotional expression were only evident when the children were in the presence of peers or an unfamiliar adult, but not when a parent was present (Chaplin & Aldo, 2013).

Gender and coping strategies

The gender differences in actual emotional feelings appear to be directly related to gender differences in the coping strategies used when dealing with an emotional experience. Not surprisingly, gender differences in coping strategies are also cultural determined.

For example, among adolescent and adult Germans, although there are no gender differences in the use of adaptive regulation (e.g., constructively addressing the problem or using reappraisal) or dysregulation (e.g., blaming others), there are small ($\eta^2 = .12$) differences in other coping strategies with women more likely to use social support seeking and rumination, and men more likely to use passivity (e.g., wait and see), avoidance (e.g., leave), and suppression (Zimmerman & Iwanski, 2014). Within a combined Australian and United Kingdom sample, women were very slightly more likely to use reappraisal while men were slightly more likely to use suppression (partial $\eta^2 < .01$) as coping strategies (Spaapen, Waters, Brummer, Stopa, & Bucks, 2014). However, a study (Monteiro, Balogun, & Oratile, 2014) of university students in Botswana suggests no gender differences in coping strategies.

In Canada and the United States, women are more likely than men to use an avoidance strategy (i.e., avoiding confrontation and avoiding thinking about the conflict) to deal with relationship conflict in the workplace, but men experience less emotional exhaustion when using this strategy than do women (Bear, Weingart, & Todorova, 2014). In the United States, more men than women try to cope with their problems through alcohol or other substance abuse (Simon, 2014). Women are more likely to use rumination while men are more likely to use suppression or distraction. Interestingly, for middle-aged women, risk of cardiovascular disease was reduced by 8% for women who used reappraisal, while increased by 12% for women who used suppression (Appleton, Loucks, Buka, & Kubzansky, 2014). For middle-aged men, risk
cardiovascular disease was unaffected by the use of reappraisal or suppression (Appleton et al., 2014).

Among older (65+ years) Americans, gender differences in coping strategies sometimes depend on ethnicity. For example, older Caucasian American women are more likely than their male counterparts to attempt to change the stressor, to think about the stressor in a more positive way, to plan, to seek emotional support, and to use religion as strategies for dealing with stressors (Lee & Mason, 2014). On the other hand, older Caucasian American men are more likely than their female counterparts to use humour as a strategy for dealing with stressors. However, older Korean American women are more likely than their male counterparts to use denial and religion as strategies for dealing with stressors, while older Korean American men are more likely than their female counterparts to use substance abuse as a strategy for dealing with stressors.

How exactly do gender differences in emotional feelings, expression and coping get socialized within the family? In Spain, both well-educated mothers and fathers use slightly more emotional words (proportionally) during play with 4-year-old daughters than with 4-year-old sons, with the daughters using more emotional words while speaking to their father (Aznar & Tenenbaum, 2015). Gender differences in verbal emotional expression appear at about 6-years of age when girls use more positive emotional words and boys use more negative emotional words (Aznar & Tenenbaum, 2015).

Family

Our emotional experiences, both positive and negative ones, within the family context tend to play key roles in our life experiences and in our overall quality of life. Hopefully, we have some happy memories of our family life. We also probably have some unhappy memories of experiences within our family. However, families play an even more important role than providing emotional experiences. This is because families play a major role in teaching family members, particularly children, how to interact with others outside of the family. Specifically, within families we learn what we should and should not emotionally react to, what emotions and what intensity levels are appropriate in given situations, and we learn when to mask our
emotions. We learn [at least most of us learn!] to regulate our emotions and to control our impulsive outbursts. Within the family we are taught these things both directly (through emotional coaching) and indirectly (through observational learning and cognitive priming) by other family members, and what we are taught might influence us for a lifetime.

Psychologists should have a particular interest in how families emotionally respond to adversity. Part of this interest is that when looking at how families deal with stress we see more clearly how families teach appropriate emotional responses. Almost all families have to deal with adversity at some point, but some families have to face a host of adversities. Examples of adversities include: a single parent, family violence, addiction, separation (e.g., military deployment), prejudice (e.g., racial, ethnic, or sexual orientation), economic stress (e.g., unemployment), psychological problems (e.g., depression and anxiety), or health crises (e.g., cancer). What can make some adversities even more challenging is that their origins may not be readily apparent. For example, mothers who were unusually stressed during pregnancy tend to give birth to infants who have increased sympathetic nervous system activity, even in childhood (Proper & Holochwost, 2013). Likewise, infants born by caesarean operation are more likely at 5-years of age to be rated (by their mother) higher in anxiety\depression (Kelmanson, 2013). This is the case even when the caesarean was not a medical necessity, but only the mother’s preference.

How families deal with their adversities depends on the family. Some families are quite resilient when dealing with adversity (they fair very well) while other families are quite non-resilient (they fare very poorly), with most families probably falling in between. In either case, the emotional makeup of the family will affect how they deal with stress and whether or not there will be long-term consequences.

Resilient families tend to remain emotionally mature despite adversities. They appear to do this because of the particular characteristics that they possess (Henry, Morris, & Harrist, 2015). These characteristics include set routines and a cherishing of family times (e.g., family meals together); they show trust and loyalty towards each other, and they share similar values and meaning (e.g., identity, spirituality, and recreation); they tend to have a positive outlook (e.g., optimism and hope), have an internal locus of control (i.e., primarily see themselves as
responsible for their fate) and share a commitment to the family (Henry et al., 2015). These characteristics help these families to adapt to a crisis through the positive use of emotional regulation, communication, control (i.e., family routines, reasonable rules that are consistently enforced), maintenance (i.e., interactions that provide the basic needs), monitoring, and stress response systems (MacPhee, Lunkenheimer, & Riggs, 2015).

Some of the specific behaviours seen in these families include sharing emotions that they are experiencing, and socializing emotions so that family members can regulate their own emotional responses (Henry et al., 2015; MacPhee et al., 2015). They socialize emotions through their showing appropriate sensitivity, support, and commitment to each other, and through emotional coaching – including the teaching of cognitive reappraisal and conflict resolution skills. In addition, these families generally have a positive emotional atmosphere. The expression of positive emotions within American families correlates moderately (r = .46) with emotional regulation in the children (Suveg et al., 2014). Loving and supportive parents not only have children who tend to be happy, but these children become biologically resistant to the negative effects of later stress (Bai & Repetti, 2015).

Resilient families tend to have open communications, they collectively problem-solve, and are flexible when dealing with changing circumstances (Henry et al., 2015). This flexibility is sometimes manifest in terms of the roles that family members play (“you mean that Dad can actually cook?!”) or in their coping strategies (MacPhee et al., 2015).

Needless to say (perhaps?), resilient families often differ in their combination of these protective characteristics, processes, and specific behaviours (MacPhee et al., 2015). Presumably, the more of these factors that are present in a family, the more likely it is that the family will be resilient.

When non-resilient families face adversity it can disrupt parent-child interactions. In these cases, parenting can go wrong in several ways. One way it can go wrong is when parents emotionally manipulate their children. They can do this by threatening to, or actually, withdrawing their love to get their child to do something. They may also make their child feel guilty or shameful over something simply to exercise control over their child. The outcome in these cases is likely to be an increase in child anxiety.
Another way that parenting can go wrong is when young children are exposed to high levels of negative emotions in the family. Generally, the level of negative emotions expressed in families is moderately correlated ($r = .46$) with difficulty in child emotional regulation (Suveg et al., 2014). Family chaos is also related to lower child emotional regulation and is predictive of later aggression (MacPhee et al., 2015). Early exposure to high levels of parental conflict leads to both (a) poor development of emotional regulation and (b) later elevated levels of anxiety, depression, and aggression (Propper & Holochwost, 2013).

Adolescents who are exposed to marked different level of control from their parents also tend to do worse at emotional regulation, which in turn results in their experiencing higher levels of anxiety (Luebbe, Bump, Fussner, & Rulon, 2014). A longitudinal study (Kim & Cicchette, 2010) found that lower-class children who experienced abuse or neglect are somewhat poorer at emotional regulation, leading to moderately more externalizing behaviours (e.g., aggression and delinquent-type behaviors), which then leads to a slightly increased chance of later peer rejection.

**Infant/Childhood attachment**

Expectations can play an important role in how we interact with others. These expectations are often closely tied to our emotions and both often have a bidirectional association with our social interactions. That is, what we expect from and feel about someone will influence how we interact with that person, and the interaction may cause us to refine our expectations and feelings.

A particularly significant expectation that is initially learned in infancy is the expected quality of interactions one will have with others in the family. These expectations are tied to the quality of our emotional attachment to family members. These expectations (referred to as internal working models) and emotional attachments, although relatively stable and long-lasting, can be malleable (Stievenart, Roskam, Meunier, & Van de Moortele, 2014); can generalize to others; and operate at both unconscious and conscious levels. The expectations and emotional attachment with our primary caregiver (usually mom) can be influential on our later childhood and adolescent interactions with others.
Despite what parents usually think, Infants are actually not born with an emotional attachment to their mother or father. Rather, the quality of the infant’s attachment develops in response to the quality of that parent’s interactions with the infant. Infant\child attachments can be either positive (secure) or negative (insecure), or mixed, or neutral. Securely attached infants have a positive emotional bond with their caregiver, seek their caregiver out when needing comfort, and because of this emotional security these infants can better explore their environment (Breinholet, Esbjørn, & Reinholdt-Dunne, 2015). For children to develop a secure emotional attachment to their primary caregiver (usually mom), that caregiver must consistently show a variety of positive behaviours towards her infant. These behaviours include (a) being sensitive to her infant’s needs and being good as interpreting her infant’s behaviours that signal these needs, (b) responding promptly to her infant’s need for attention, (c) expressing warmth and affection towards her infant, (d) promoting her child’s overall development, and (e) providing a high quality of physical care for her infant. Secure attachment will continue during childhood and adolescence if the caregiver continues to show these behaviours along with (f) consistent discipline (but not physical discipline) of children\adolescents for the breech of reasonable and explicit rules, (g) good communication, and (h) fostering a moderate amount of independence. Infants\children will develop an insecure attachment to their caregiver to the extent that these caregiver behaviors are not shown or are inconsistently shown towards the infant\child\adolescent. Note that attachment type need not be a fixed trait but rather can change when the caregiver’s behaviours change. Infants\children\adolescents can also have different attachment types towards different parents to the extent that each parent behaves differently towards the infant\child\adolescent.

There are three different types of insecure attachment: (a) insecure (anxious/resistant), (b) insecure (anxious/avoidant), and (c) insecure (disorganized/disoriented). Insecure (anxious/resistant) children tend to be very anxious, clingy, cry more than other children when their primary caregiver (usually mom) leaves their presence, and have difficulty in calming themselves and settling down. Insecure (anxious/resistant) children have often received inconsistent and less sensitive care when they were young infants (Isabella, 1993). Insecure (anxious/avoidant) children tend to avoid their caregiver and do not show that they are upset.
when their caregiver leaves their presence. Insecure (anxious/avoidant) children have often, as older infants, been exposed to rejecting behaviour (e.g., anger, controlling, physical interference) from their caregiver (Isabella, 1993). Insecure (disorganized/disoriented) children are more aggressive and are more likely to have later behaviour problems. Insecure (disorganized/disoriented) children tend to have been frightened by the behaviour of their troubled (e.g., dysfunctional marriage, depressed) caregiver, including the caregiver emotionally withdrawing from them (Miljkovitch et al., 2013).

There are host of consequences of particular attachment types. Children’s physiological reactions to stressful or traumatic events are influenced by the quality of their attachment to their parents (Gunnar & Quevedo, 2007). Children who have a secure attachment to their parents have a more moderate physiological reaction to stress than do children who have an insecure attachment to their parents (Gunnar & Quevedo, 2007). When mothers are less responsive to their children these children become more vulnerable to the stressful effects of family turmoil, poverty, crowding, and substandard housing (Evans, Kim, Ting, Tesher, & Shannis, 2007). Interestingly, maternal overprotection and lack of maternal care are both associated with alexithymia (Thorberg, 2011).

Securely attached infants develop a better sense of being competent and develop more trust in others. Securely attached infants tend (R2 = .08) to develop into kindergarteners who, independent of their general cognitive functioning and family socioeconomic status, have better executive functioning (e.g., attention, working memory, and planning) (Bernier, Beauchamp, Carlson, & Lalonde, 2015). Securely attached 15-month-old infants develop into elementary children who are slightly better (d = .20) at social self-control (Drake, Belsky, & Fearon, 2014). Securely attached infants are more likely to become children who have better leadership, self-esteem, social interaction skills, and higher school achievement (Sroufe, Coffino, & Carlson, 2010), although these effects tend to be small in magnitude (Sroufe et al., 2010).

Adolescents who are securely attached in how they viewed their childhood interactions with parents are more popular with peers, have better peer relationships, and experience less peer pressure (R = .33) (Allen, Porter, McFarland, McElhaney, & Marsh, 2007).

In contrast, children from insecure relationships with their mother are more likely to
have higher anxiety (Breinholst et al., 2015), develop a poor self-esteem, experience later depression, drug use, aggression (Michiels, Grietens, Onghena, & Kuppens, 2008) and delinquency. The relationship between insecure attachment and internalizing behaviours (i.e., anxiety, depression, and social withdrawal) is small to moderate (d = .37) in size, with a larger effect for males (d = .71) than for females (d = .26) (Madigan, Atkinson, Laurin, & Benoit, 2013). Disorganized attachment in infancy is moderately related to psychopathology in adolescence and adulthood (Sroufe et al, 2010). Finally, in what is both sad and scary for society, an insecure infant who is separated from his/her parents for an extended period of time may emotionally withdraw from people in general.

Although it is difficult to disentangle the long-term effects of attachment from other aspects of parenting and from socioeconomic status, it appears that a parent’s warmth, love and attention to her or his child can have a wide-ranging effect on that child’s life. In fact, institutionalized infants who are cared for physically, but who are not allowed to form an emotional bond with their caregiver, are at higher risk of infant death.

Friends\peers

A considerable part of our life revolves around interactions with our friends and this frequently (hopefully!) makes our life emotionally richer. During childhood and adolescence we tend to experience more positive emotions with friends than with non-friends (Ramsey & Gentzler, 2015). Friends give our life more meaning and flavour (usually sweet, sometimes spicy, perhaps occasionally sour or bitter).

Personality and friendship

Young children’s personality is predictive of the quality of their interactions with peers. High surgency (active and extroverted) and low negative emotions are associated with more positive peer interactions (Endedijk, Cillessen, Cox, Bekkering, & Hunnius, 2015). More specifically, friendship satisfaction is associated with: (a) being more extraverted, agreeable, and conscientious, (b) being less neurotic, and (c) having more interactions and deeper conversations (Wilson, Harris, & Vazire, 2015). Success in social relations also relates to
empathy (Fink, Begeer, Hunt, & de Rosnay, 2014). Children who have positive social interactions with peers tend to be friendly and sensitive and not argumentative or aggressive (Barbarin, 2013).

In addition, a child’s success in social relations with peers is influenced by that child’s understanding of his or her own emotions and the emotions of others, effortful control of his or her emotions (i.e., emotional regulation; Endedijk et al., 2015), and ability to display and to read facial and body expressions. Not surprisingly, six-year-olds in Italy who are high in emotional understanding are more likely to have reciprocal, as opposed to unidirectional, friendships (Laghi et al., 2014). Eight grade (13-year-olds) Australian girls who have a better understanding of their own emotions tend to have slightly more female friends and slightly less male friends in grade twelve (Rowsell, Ciarrochi, Heaven, & Deane, 2014). However, the same is not true for 13-year-olds Australian boys. This difference may be due to girls’ friendships being more intimate, involving both more emotional content and self-disclosure (Rowsell et al., 2014). For young German adolescents, the number of reciprocal friendships is predicted by ability to self-disclose (von Salisch et al., 2014). Self-disclosure may be difficult for anxious individuals.

**Emotional control and peers**

Being able to regulate one’s emotions ensures that there will be more episodes of positive emotions (e.g., fun and excitement) that foster peer relations and fewer episodes of negative emotions that hinder peer relations. From preschool through adulthood, emotional regulation is important for social competence and successful peer relations. Better emotional regulation by preschoolers predicts slightly lower chances of peer rejection or physical victimization several months later (Godleski, Kamper, Ostrov, Hart, & Blakely-McClure, 2015). Those 5-year-olds with better emotional regulation have better than average social skills as 7-year-olds, which in turn predicts higher peer acceptance and better quality friendships as 10-year-olds (Blair et al., 2015).

Shyness at age 2-3 slightly predicts less emotional regulation as 5-year-olds (Penela et al., 2015). Problems with emotional regulation in kindergarten and grade 1 predicts peer
rejection and victimization later in elementary school (r = .08-.31) (Bierman, Kalvin, & Heinrichs, 2015). This elementary school peer rejection in turn predicts early adolescent social problems, while elementary school victimization predicts early adolescent school difficulties and delinquency (Bierman et al., 2015).

One positive approach to coping with stress in peer relationships is to try to identify and implement a solution that will solve the problem in a positive way. This can both make the individual feel better and strengthen relationships with others. For example, one study (Abraham & Kerns, 2013) conducted in a summer camp setting found that 8- to 12-year-old girls who used positive problem-solving coping strategies were somewhat less likely (r = -.25) to experience negative emotions and moderately more likely (r = .44) to experience positive emotions, while the experience of positive emotions was positively associated (r = .38) with the quality of the relationship with their best friend at camp.

Peer influence on emotions

Emotions in children’s friendships can be constrained, or changed, by the behaviour of peers. For example, in one small sample (Kyratzis, 2001) of American preschool boys, the boys told each other that it was inappropriate to express being afraid, thereby signifying that being unafraid was the social norm for boys. This is one of the ways that boys in our culture learn to act as if they are unafraid, even if they may indeed be afraid.

Adolescents use a variety of strategies to socialize emotional expressions: rewarding, overriding (suggesting a different emotional response), magnifying, neglecting (ignore the emotional response), or punishing an individual for his or her emotional (or lack thereof) behaviour. American and Canadian girls are more likely to use reward, override, and magnify strategies to influence their friends’ behaviour while boys are more likely to use neglect and punishment (insults, physical threats, or gossip) to influence their friends’ behaviour (Klimes-Dougan et al., 2014). These strategies can be effective as seen, for example, that when friends reward a young adolescent’s emotional talk by being supportive, that friend is more likely to disclose emotions to them at a later time (Legerski, Biggs, Greenhout, & Sampilo, 2015).

Social experiences with peers affect the quality of friendships while, in turn, having
close friendships can improve social understanding and skills. There appears to be a bidirectional relationship between positive close relationships and positive emotions that continues over the life span (Ramsey & Gentzler, 2015). Thus, positive close relationships create positive emotions which increase the chances of positive close relationships which...

Interactions with peers help young adults to successfully transition to adulthood. Being intimate, humorous and sharing emotion with each other are some of the emotional skills that aid in this transition (Young et al., 2015).

Peers and problematic emotional health

Emotional problems may both cause and result from not having friends or from having very negative peer interactions. There are several emotion related factors within the individual that may trigger poor peer relations. For example, social skills deficits in adolescents predict degree of loneliness 10 months later (Wols, Scholte, & Qualter, 2015). In turn, being lonely slightly impairs the ability to regulate emotions (Wols et al., 2015) which itself predicts quality of peer interactions. A second example is that children with an anxiety disorder who also have poor social functioning are more likely to exhibit: (a) frequent negative emotions, (b) a suboptimal balance between negative and positive emotions, and (c) an unwillingness to share their emotions with peers (Jacob, Suveg, & Whitehead, 2014). A final example is that callous, unemotional, and uncaring older children and young adults are poor at emotional regulation and experience high levels of anger (Ciucci, Baroncelli, Golmaryami, & Frick, 2015).

The quality of peer interactions can partially determine one’s psychological health. Children who are rejected by peers are more likely to feel anxious, embarrassed, and lonely (Morrow, Hubbard, Barhight, & Thomson, 2014). Children who experience peer victimization or exclusion are more likely to subsequently feel depressed and/or angry, although they will feel these emotions to a slightly lesser extent if they are supported by a friend (Reavis, Donohue, & Upchurch, 2015). Among 5th graders, peer victimization is associated with increased feelings of sadness, anger, embarrassment, and anxiety (Morrow et al., 2014). More specifically, being physically victimized was associated with feeling sad, anger, embarrassed, and nervous; being verbally victimized was associated with feeling angry and embarrassed; while being socially
rebuffed was associated with feeling anxious. However, boys were sensitive to peer victimization only if they are also rejected by their peers, while girls were sensitive to peer victimization regardless of whether they had been accepted or rejected by their peers (Morrow et al., 2014).

In summary, our emotions influence our interactions with peers while at the same time peers influence our emotional reactions. Our personality along with our ability to regulate our own emotional reactions, together determine a considerable part of our social success. Peers can use direct instruction, reward, punishment, and focusing of attention (i.e., magnifying) to influence our emotions and, thusly, our psychological health.

Current technology: Social network sites & mobile phones

A significant portion of contemporary social interactions is mediated through technology, especially through social network sites (e.g., Facebook) and mobile phones. In general, our experience with technology makes us feel good if it helps us feel popular, connected with others, competent, and if it is stimulating (Hassenzahl, Diefenbach, & Goritz, 2010). Both Facebook messaging and mobile phone texting are often used to convey emotional information that can deepen personal relationships. However, because Facebook messaging and mobile phone texting generally lack non-verbal facial, body, and vocal cues (Kato & Kato, 2015), they may increase the chance of a misunderstanding between individuals.

Currently, most adolescents, young adults and a fair number of middle-aged adults spend some time every day on Facebook or other social networking sites. Facebook is a major tool that people use to express themselves, to socialize with others, and to fulfill a sense of belonging. It is frequently used for a public depiction of self and for self-disclosure of emotions. It allows people to easily and frequently connect with a large network of friends and is a platform for social support.

Several aspects of people’s personality relate to Facebook usage. Australian Facebook users tend to be more extraverted, less conscientious (combined $\eta^2 = .24$), and just a touch more self-centered ($\eta^2 = .01$) than are nonusers of Facebook (Ryan & Xenos, 2011). Time spent on
Facebook correlates somewhat with neuroticism (r = .20) and loneliness (r = .15) (Ryan & Xenos, 2011). People high in attachment anxiety are slightly more frequent (partial r = .15) Facebook users, especially when they are feeling negative emotions (Oldmeadow, Quinn, & Kowert, 2013). Those high in attachment anxiety appear to use Facebook as a means of comfort (Oldmeadow et al., 2013). Individuals who are shy or have low self-esteem also tend to spend more time on Facebook (Oldmeadow et al., 2013).

Facebook conversations and posts evoke a variety of emotions. Facebook conversations generally involve positive emotions (about 37% of the time) or mixed (bittersweet) emotions (40%), but occasionally involve only negative emotions (6%) (Davalos et al., 2015). A sample (Davalos et al., 2015) of 207 Americans after they read Facebook posts found: 64% felt pleasant, 66% felt connected, 64% felt informed, 54% felt entertained, 12% felt envious, 11% felt jealous, 10% felt annoyed, and 10% felt frustrated. Nostalgic (e.g., “My life was better when ...”) Facebook posts often involve themes of family, life events, spirituality, or romanticism (Davalos et al., 2015).

The emotions experienced sometimes correlate with characteristics of the user’s network. Facebook users are most likely to feel happy when reading someone’s post on Facebook if they have a strong personal tie to that person (R. Lin & Utz, 2015). Those Facebook users with larger networks are slightly more likely (r = .29) to communicate positive emotions (Lin, Tov, & Qiu, 2014). Facebook users with more close friends are slightly more likely (r = .22) to disclose negative emotions (Lin et al., 2014).

Experimental evidence suggests that emotions expressed in text can spread from one user to others over Facebook (Kramer, Guillery, & Hancock, 2014). These shared emotions may even last for several days (Kramer et al., 2014). However, it is possible it may have been conformity that was partly measured rather than only emotions that involved autonomic nervous system reactions. In either case, it should be noted that the observed effect of emotional contagion via Facebook was very weak (d = .02).

For many people, impression management is easier to accomplish on Facebook than in face-to-face interactions. Many Facebook users seem to have a bias to display fewer negative emotions in status updates than in less public facets of Facebook (Bazarova, Taft, Choi, &
Cosley, 2013). However, users were less concerned with their self-presentation the more (r = - .31) familiar they were with the people who were likely to see the message (Bazarova et al., 2013).

Stressors that can arise from Facebook usage include: pressure from social comparisons, dealing with unwanted content, feeling the need to constantly check Facebook, and online relationship tension or conflict (Fox & Moreland, 2015). Some individuals may feel stressed about their public (self-presentation) image. These various stressors might cause individuals to feel anxiety, jealousy, or disgust (Fox & Moreland, 2015). Some individuals experience jealousy if their partner communicates with specific others over social media (Zandbergen & Brown, 2015) or spends “too much time” on social media. “Unfriending” someone on Facebook also can be a major stressor.

Other behaviors on Facebook that are linked with negative emotions include being cyberbullied, harassed, or stalked online. Common emotional reactions to online relational bullying include embarrassment, anger, sadness, fear, lowered self-esteem, and loneliness (Horner, Asher, & Fireman, 2015). Individuals who accept an ex-partner as a friend on Facebook tend to be more anxious and much more depressed (particularly men) than those who did not accept such invitations (Tsai, Shen, & Chiang, 2015). However, Facebook generally contributes to depression only if Facebook causes feelings of envy (Tandoc, Ferrucci, & Duffy, 2015), with Facebook envy accounting for approximately 28% of depression variance.

Cell phone users prefer texting somewhat more when sharing positive events whereas they prefer phone calling (audio) slightly more when sharing negative events, with in both cases a concurrent heightening their emotional experience from this social sharing (Choi & Toma, 2014). However, face-to-face interaction is still generally preferred over cell phone use if sharing positive or negative events (Choi & Toma, 2014).

Personality is related to what people text about. Women higher on neuroticism text a few (r = .18) more negative emotion words while people higher on agreeableness text a few (r = -.25) less negative emotional words (Holtgraves, 2011). Those higher in extraversion or agreeableness text slightly fewer words denoting anxiety or anger (Holtgraves, 2011). Finally, extraverts text a little more (r =.14) about sex (Holtgraves, 2011).
There appear to be three types of people regarding their expectation for speed of response to different emotional content (Kato & Kato, 2015). One group expects a quick response to a positive emotional message and a slow response to a negative emotional message. Another group (high neurotic?) was the opposite: they expect a slow response to a positive emotional message and a quick response to a negative emotional message. A third group expects a quick response to an apology whereas the other two groups did not.

Cell phone use does come with some potential serious problems. For instance, many people experience anxiety if they are without their cell phone. More seriously, if people sext (send someone a racy picture of themselves), that picture may be forwarded (either immediately or at some later time) to others without the knowledge or consent of the original person. This could potentially lead to harassment, or if the original sender was underage, to criminal charges for anyone who forwarded the picture. A second serious problem is that people sometimes text while driving in an attempt (r = .35) to regulate their negative emotions (Feldman, Greeson, Renna, & Robbins-Monteith, 2011). However, using a cell phone while driving increases the risk of an accident by 40% (Nurullah, Thomas, & Vakilian, 2013). [Don’t do it!!] A third problem is that texting in class can seriously hurt one’s chance of doing well in the class. One experiment (McDonald, 2013) found that, after controlling for GPA, in-class texting led to a lower final course grade. Note that in-class texting had a moderately negative effect on grade (r = -.47).

Adult Attachment

For a large number of older adolescents and adults, the social relationship that carries the biggest emotional impact is the relationship with their romantic partner(s). Although most of us do not realize it, the quality of our adult romantic relationships may be influenced by our (subjectively perceived) attachment to our parents. Attachment Theory (see Hazan & Shaver, 1987) suggests that our early infant\childhood attachment to our mother (or whoever was our primary caregiver) became represented in a “mental model” and that this mental model later directly affects our romantic attachment in adulthood (Fraley, 2002).

According to Attachment Theory, the mental model of attachment is an unconscious
understanding of how close social relations work, based on the infant’s experiences with his or her mother. In other words, the mental model is a type (e.g., script/scheme) of representation in memory that includes expectations of the other’s (i.e., mother’s) responses in situations that are stressful for the child. The mental model further includes the child’s emotional responses to these stressful situations. One variant of Attachment Theory sees attachment type as being consistent from infancy through to adulthood. This “trait” approach leads to three hypotheses. First, infants who have a stable attachment will have healthy romantic relationships as adults. Second, children with an insecure (anxious/resistant) attachment are more likely to be “addicted” to love as an adult. These would be clingy adults who cannot break off a relationship even though all of their friends are saying “For heaven’s sake, get out of that toxic relationship!!! He/she is no good for you!!” A third prediction of the trait approach to Attachment Theory is that children with an insecure (anxious/avoidant) attachment are more likely to be afraid to commit to a relationship as an adult. These would be adults who bail out of relationships when the relationships start to become serious.

A second variant of Attachment Theory is that it is only how adults interpret their childhood attachments that affect their current adult relationships (Fraley, 2002). This is more a “state” approach than a “trait” approach. It assumes that the mental model of attachment can be altered with different experiences in intimate relationships. Support for this position comes from the finding (Overbeek, Stattin, Vermulst, Ha, & Engels, 2007) of no significant bivariate correlation of the quality mother-child relationship (measured during childhood) with the quality of later romantic partner relationship at age 25 and age 35. Furthermore, we know that infant attachment type can change when the quality of the maternal interactions with her infant change. Thus, insecure attachments can become secure attachments when the attachment figure becomes more sensitive, attentive, and consistent in expressing her affection. Likewise, secure attachments can become insecure when the attachment figure becomes less sensitive, attentive, and consistent in expressing her affection.

Nonetheless, the trait approach to understanding attachment may be particularly useful when describing specific groups of people or specific adult behaviors. For example, one
longitudinal study (Zayas, Mischel, Shoda, & Aber, 2011) reported that the quality of interactions with one’s mother at 18 months of age predicts one’s later anxiety and avoidance in romantic relationships as an adult (but note that the study consisted of only 15 individuals). This study did not measure infant attachment directly, but measured maternal control, sensitivity and unresponsiveness in a play setting, and later adult attachment was measured via a questionnaire. Those whose mothers had been less sensitive and more controlling were more likely to be anxious and avoidant with their romantic partners. These findings were of moderate to strong magnitude ($r = .5 - .7$). A separate longitudinal study (Moutsiana, 2014) found that attachment type at 18-months of age predicted ability to enhance a positive emotion 20 years later. Yet another longitudinal study (Pascuzza, Cyr, & Moss, 2013) found that parental rated attachment with their son/daughter at age 14, moderately predicted ($r = -.49$) a higher level of their son’s/daughter’s anxiety in romantic attachments at age 22. However, attachment at age 14 did not predict avoidant romantic attachment at age 22 (Pascuzza et al., 2013).

Adult attachment type has been measured in a number of ways (for a review see Sochos, 2013). One way is how people describe in a narrative their current view of their childhood interactions with their caretakers. Another way is through a questionnaire that measures their anxiety and their avoidant tendencies in adult intimate relationships. The results of both of these kinds of measurement can be described as categories while the results of adult questionnaires can also be described as dimensions. Both approaches have provided informative findings about adult attachment.

Findings from the categorical approach to adult attachment

Adults can be classified as having secure, dismissing, preoccupied, or fearful avoidant attachment types. Dismissing adults distance themselves from attachment needs, preferring independence and self-sufficiency, and either idealize or forget their childhood experiences (Haydon, Roisman, Marks, & Fraley, 2011). This bears some resemblance to the infant anxious/avoidant attachment type. Preoccupied adults become emotional when discussing their childhood experiences (Haydon et al., 2011). This bears some resemblance to an infant anxious/resistant attachment type.
Adults who are classified as securely attached (regarding their childhood experiences) tend to have better quality interactions with their lovers (Roisman, 2007). Securely attached adults have lower levels of physiological reaction when in disagreement with their spouse (Roisman, 2007). In other words, they get less upset with their partners when disagreeing with them, compared with insecurely attached adults.

Preoccupied adults score higher on neuroticism than do secure adults, who in turn score higher than do dismissing adults (Reiner & Spangler, 2013). Preoccupied adults appear to express more anxiety, more anger, and need more reassurance in their romantic relationships. They also report more guilt and sadness. They tend to exaggerate threats, are pessimistic, and have difficulty in regulating their negative emotions. Preoccupied and fearful avoidant (those high on both anxiety and avoidance) individuals are more likely to display symptoms of generalized anxiety disorder and depression than do securely attached individuals, likely due to poor emotional regulation strategies (Marganska, Gallagher, & Miranda, 2013). Preoccupied adults, because of fear of losing their partners, are more likely to engage in “sexting” in an attempt to keep their partners interested (Weisskirch & Delevi, 2011).

Dismissing adults distance themselves in romantic relationships and although they generally express less emotions than do others (Fortuna, Roisman, Haydon, Groh, & Holland, 2011), dismissing adults are more likely to express disgust and contempt. Dismissing adults fear rejection and so are not particularly interested in their partner’s thoughts. When stressed, dismissing adults are less likely than others to seek support from their partner (Holmberg, Lomore, Takacs, & Price, 2011).

Women’s childhood home situation and their later adult attachment interact to partly predict women’s romantic/sexual self-concept and behaviors (Herzog & Hill-Chapman, 2013). Specifically, for women who come from families with a variety of adversities (e.g., family instability, abuse, crime, etc.) their adult attachment type predicts their romantic/sexual self-concept and behavior: (a) those with a secure adult attachment are moderately likely to prefer exclusive romantic relationships. (b) Those with a preoccupied adult attachment are moderately likely to have a sexual and emotionally invested romantic attitude and are slightly more likely to have casual relationships that are longer term. Perhaps not surprising, women who combine
coming from families with a variety of adversities and having a mainly sexual romantic attitude are moderately more likely to have a higher number of casual relationships. In contrast, for men, childhood home situation did not interact with adult attachment to predict romantic\sexual self-concepts and behaviors (Herzog & Hill-Chapman, 2013).

It should be noted that the effects of attachment type may differ for older adults. Adults aged 50-70 are more likely to be happier, and older adult women are much more likely (80%) to have a dismissive attachment type, than are younger adults (Consedine, Fiori, & Magai, 2012). Older preoccupied women feel and express more anxiety and anger (Consedine et al., 2012).

**Findings from the dimensional approach to adult attachment**

Currently, researchers tend to conceptualize adult attachment as consisting of two continuous dimensions: (a) avoidance of intimacy, and (b) anxiety about abandonment. Being low on both dimensions suggests a secure attachment.

In their dating relationships, securely attached individuals are more likely to feel satisfied, be in love, and feel committed. Securely attached individuals are more likely to trust the person they are dating. Securely attached individuals communicate more effectively with their partner and use constructive, positive strategies in dealing with a conflict with their partner. They tend to do better at emotional regulation (Morel & Papouchis, 2015), are more likely to cope directly with the event, to access social support, and so are less disturbed by stressful events.

Insecurely attached individuals, whether high in avoidance of intimacy or anxiety about abandonment, have more conflicts and problems in dealing with their partner. Insecurely attached individuals are more likely to feel negative emotions in their romantic relationships. They are less likely to use effective emotion regulation strategies (Marganska et al., 2013) and are more likely (r = .48) to use emotion focused coping strategies (Pascuzza et al., 2013) such as rumination (r = .33) (Lanciano et al., 2012), wishful thinking, or self-blame, when stressed. Consistent with this general finding, insecurely attached women are less aware (r = -.27 to -.33) than other women of how to manage their own emotions (Lanciano, Curci, Kafetsios, Elia, & Zammuner, 2012). Adults who are high in anxiety about abandonment or avoidance are slightly
more \((r = .12 - .16)\) likely to engage in antisocial behaviour (Oshri et al., 2015).

Insecurely attached individuals who are specifically high on the dimension of avoidance are uncomfortable with intimacy (Marganska et al., 2013) and prefer their own independence. They are less likely to communicate with their partner. Avoidant individuals may be less able than others to activate or enhance their experience of positive emotions and they have a slight tendency to fail to perceive positive facial expressions (Kafetsios, Andriopoulos, & Papachiou, 2014).

Insecurely attached individuals who are specifically high in anxiety about abandonment are more likely to cling in a romantic relationship. There is a moderate correlation \((r = .36)\) between adult attachment anxiety and neuroticism (Fraley, Heffernan, Brumbaugh, & Vicary, 2011). Their anxiety makes them more likely to see threats and danger where none exist. They are moderately more likely to have problems with emotional regulation (Oshri, Sutton, Clay-Warner, & Miller, 2015), having problems containing their negative emotions. Those high on attachment anxiety experience greater sympathetic nervous system arousal to mild stress (Monti & Rudolph, 2014) and ruminate over their stressors. Their anxiety may end up creating tension and conflicts with their partner.

Those women with insecure adult attachment are at higher risk of depression (Monti & Rudolph, 2014). Being high on attachment anxiety is directly related \((r = .48)\) to later risk of depression (Monti & Rudolph, 2014). Those who are high on attachment avoidance do not understand their own emotions well nor do they express their own emotions well, with these difficulties being linked to later depression (Monti & Rudolph, 2014).