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USING THE CONSTRUCTIVIST APPROACH
TO INTEGRATE THE BIOPSYCHOLOGY OF
EMOTIONS, STRESS, AND MENTAL HEALTH

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USING THE CONSTRUCTIVIST APPROACH TO INTEGRATE THE BIOPSYCHOLOGY OF EMOTIONS, STRESS, AND MENTAL HEALTH

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ABSTRACT

USING THE CONSTRUCTIVIST APPROACH
TO INTEGRATE THE BIOPSYCHOLOGY OF
EMOTIONS,STRESS, AND MENTAL HEALTH

The purpose of this study is to integrate the sciences of biology and psychology into to the study of emotions, stress, and mental health. The constructivist approach to teaching science was applied to assist students in their synthesis of knowledge. This unit was taught to an Advanced Psychology and Advanced Placement Psychology class. Student pretest and post test scores were compared. The results showed a significant difference, $p < .0001$, between the pretest and post test scores. Individual activities were also assessed for their effectiveness by comparing pretest and post test answers. It was concluded that using science as a basis for studying emotions was very effective.

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RATIONALE FOR THE STUDY

We all have heard the slang terms used to describe individuals who do not fit the norms of predictable emotional behavior. These terms include; psycho, freak, insane, crazy, nuts, weird, mental, lunatic, "bats in his belfry", "off her rocker", etc. The usage of these labels demonstrates our lack, as a society, for understanding of emotions and psychological disorders. This lack of understanding has not gone unnoticed by Project 2061. Project 2061 is a vision for the direction of science literacy in America that is published by the American Association for the Advacement of Science in two books, Science for All Americans (1990) and Benchmarks for Science Literacy (1993). Project 2061 suggests benchmarks that are statements of what all students should know or be able to do in science by the end of grade 2, 5, 8, and 12. In the area of mental health, Benchmarks for Science Literacy (1993) recommends that by fifth grade students should know that "different individuals handle their feelings differently, and sometimes they have different feelings in the same situation." Benchmarks for Science Literacy (1993) also recommends that eighth graders recognize that individuals differ greatly in their ability to cope with stressful situations. By the end of the 12th grade students should know that humans differ greatly in how they cope with emotions and that biological abnormalities can cause or increase susceptibility to psychological disorders (Benchmarks for Science Literacy, 1993). Are these topics and the other mental health issues recommended by Project 2061 required learning for all students? Although national standards emphasize these issues, they are not required curriculum at the high school where I teach.

The field of Psychology was one of the last empirical sciences to develop.

The scientific community requires that newly claimed knowledge must be publicly verifiable. Researchers are constantly building on previous knowledge in order to expand on what is already known. Science also deals with solvable problems using empirical techniques. The field of emotions appears difficult to study empirically, but new advances in technology and research methods have made scientific study possible. President George Bush declared the 1980's as the decade of the brain. The study of the brain was hailed as the "New Last Frontier." New technology and research techniques have opened a window in that "black box", our brain, to scientifically gain a better understanding of its processes. Studying the science of emotions, stress, and mental health will increase students awareness of their behaviors and the behavior of others. It also enables students to understand the biological basis of emotional expression and how they can influence their own physiological reactions to emotional situations.

As a Psychology instructor, at the high school level, I introduce these topics to my students but all too often psychology is not perceived as a science. Psychology at my high school is classified as a social studies course. Social studies includes history, economics, and sociology.

Psychology has many schools of thought in its approaches to study the mind. Psychodynamic theorists explain behavior in terms of unconscious motives and conflicts. Behaviorists feel that the theories set forth by psychodynamics are too vague and unscientific. Behaviorists concentrate on the role of consequences from the environment in shaping behavior. Due to my training in biology, my theoretical bias lie in the role of the chemistry and physiology of the brain and nervous system when attempting to explain the behaviors of organisms. Through this thesis project, I want to develop activities that illustrate

the underlying biological principles of psychology. The activities designed for this project will go beyond simple people watching; the students will be encouraged to explain the scientific principles driving human emotional behavior.

Comparing the New Approach to the Old Approach

Emotions are not as mystical as once thought. Emotions are defined as a response of the whole organism, involving physiological arousal, expressive behaviors, and conscious experience (Myers, 1998). It is very true that there is still much to be learned about the mysteries of the brain and mind but new technology, such as Positive Emission Tomograph (PET) scans and Magnetic Resonance Imaging (MRI) are getting us closer to understanding this complex structure. Integration of the natural and social sciences is also key to better understanding of emotions and mental health. Science for All Americans (1990) states that "good mental health involves the interaction of psychological, biological, physiological, social, and cultural systems." Our own ability to cope with the ordinary circumstances in life is the major influence on our mental health. It is this integration of many factors including psychological, physiological, and cultural, that I intend to provide my students. This will give them a better understanding of emotions, the influences of stress and coping, and mental health. In accomplishing this goal, students need to experience this area of psychology as a serious topic of scientific study. Psychology has only recently emerged as a science, dating its empiricism to Wilhelm Wundt's laboratory in 1879. Wilhelm Wundt is considered the father of modern psychology because he established the first psychological laboratory, testing

reaction times and sensations.

This unit weaves together fundamental principles of biology and psychology through experiences to give students a better understanding of the biological bases of emotions, stress, and mental illness. The unit also applies the psychology of learning in its pedagogy. The basis for this pedagogy revolves around the learning concepts of assimilation and accommodation. These two concepts highlight the adaptive role of the learner in building internal representations. This theoretical perspective of teaching is labeled "constructivism."

Jean Piaget, a Swiss biologist, was one of this century's most influential observers of children. According to Piaget, learning is a dynamic process that requires the individual to use two basic biological processes: organization and adaptation (Wade & Tavris, 1993). As we all learn new information, we assimilate or fit the new information into our present system of knowledge and beliefs. We construct mental representations or schemas with this new information. New information does not always fit nicely into our existing cognitive schemas and as a result we must modify our existing beliefs or schemas. Accommodation is the process of modifying existing cognitive structures in response to experience and new information (Wade & Tavris, 1993). For instance, a young child learns that the four legged creature in his house is a cat. This child assimilates this information into his mental representation. One day he sees a four legged creature with fur and pointed ears run through his yard and he calls it a kitty cat. His parents tell him "no, that's a Terrier dog." The child now must modify the old mental constructs to accommodate new information. This reorganization of mental schemas is the basis of the Constructivist Model. The Constructivist Model requires the learner

to experience new phenomena rather than simply being told to accept a new idea.

Students have already experienced their own emotional behaviors and the emotional behaviors of others from which they have formed mental representations of those behaviors. Behaviors are usually predictable but can be unpredictable. As a species, humans act similarly but different environmental experiences and biological differences can cause unpredictable responses. Human beings like the predictable. We attempt to form cognitive schemas from experiences with behaviors to create predictability. It is through this unit's activities that the student's existing cognitive schema's about emotions, stress, mental illness, and their biological processes will be confirmed or misconceptions changed. In this constructivist teaching, the learner takes on a very significant role in building the internal representations of new experiences. The role of the teacher is to guide the exploration that will invent new concepts and to assist in the application of the new concepts to help students generalize these ideas (Holliday, Yore, Alvermann, 1994). The teacher must engage the students in experiences that challenge previous conceptions of their existing knowledge. This method of teaching reflects the true meaning of education: "The word education is derived from the Latin root educere, meaning to draw forth from within" (Anderson, 1992). This unit will encourage students to make predictions based on their prior knowledge, explore their ideas empirically, make observations, and actively construct interpretations for their observations. This is an active process done by the learners to adapt their new knowledge into an appropriate cognitive schema.

Some very wise person posted the following Ancient Chinese Proverb in the hall of North Kedzie:

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Tell me and I forget

Show me and I remember

Involve me and I learn

Hands on experiences are very necessary for the learners but we also need minds-on learning to complete the "learning cycle." Scientific Writing on the part of the students can take the hands-on experiences one step farther to activate the necessary internal mental processing (Holliday, Yore, & Alvermann, 1994). Santa and Havens(1991) suggest that meaningful writing should bridge new information with old knowledge structures, encouraging minds-on learning, facilitate conceptual organization and restructuring (Holliday, Yore, & Alvermann, 1994). This promotes metacognition or the awareness of one's own thinking process. It is through scientific writing that the final piece of the formation of new cognitive structures is brought to completion. When the learning cycle model is employed students will engage and access prior knowledge, explore relevant, thought-provoking problems through hands-on investigations, develop, clarify, and construct meaningful explanations, extend, enrich, and apply these new understandings to the everyday lives of students, and utilize a variety of assessment strategies where the thought processes enhance construction of student understanding (Holliday, Yore, & Alvermann, 1994). Scientific writing should be used as a tool for construction of student understanding as well as communication . It allows the learner to express the accommodation and/or assimilation process of new information by reflecting on their prior beliefs suggested in their hypothesis, communicating the exploration and problem solving process, and interpreting the new knowledge that will be the foundation of their new cognitive schemas from which new knowledge will be built.

This unit is designed to give students a better understanding of emotions, stress, and mental illness through scientific exploration. They will apply this material to their daily lives. Knowledge will be constructed and integrated into cognitive schemas through exploration and scientific writing.

Class Demographics and Curriculum

The sample group for the analysis of this unit was drawn from a community in northern Michigan. The entire county has a population of 30, 605 (census). The high school contains grades, nine, ten, eleven, and twelve. During the 1996-97 and 1997-98 school years an average of 1934 students were enrolled. The 1997-98 Racial-Ethnic Headcount showed that 97.6% of the student population is caucasian or white.

The courses in which this unit was tested were Advanced Psychology and Advanced Placement (A.P.) Psychology. Introductory Psychology is a prerequisite for both classes. Introductory Psychology is an elective class for tenth through twelveth grade to fulfill students requirements for a behavior science credit. Advanced Psychology is a one semester elective course for tenth through twelveth grade students who are interested in learning more about psychology but are not interested in the rigors of A.P. Psychology. A.P. Psychology is a full year course for seniors. After completion of this course students may elect to take the A.P. college examination to receive college credit. The curriculum for Introductory Psychology does not include emotions or stress but does include an introduction to mental illness. Advanced and A.P. Psychology do provide the opportunity to study units in emotions, stress, and mental illness.

Scientific Principles Taught in the Unit

"Sound mental health involves the interaction of psychology, physiological, and cultural systems. It is generally regarded as the ability to cope with the circumstances people encounter in their personal, professional, and social lives" (Benchmarks for Scientific Literacy,1993). We feel or encounter emotions on a daily basis. Strong emotions accompany people in the death of a loved one, a wedding, car accidents, our first date, or a relationship breakup. These are usually emotions we believe we understand, but some emotions do not have predictable patterns. Emotions are marked by a set of processes. Every individual appraises their environment to stimulate emotions. Memory traces and learned associations also play a role in the feeling of an emotion. Our internal physiology including endocrinology, create changes to elicit emotions (Baum, Grunberg, & Singer,1992). All people feel emotions. We are accustomed to their daily expression, so why do we need to understand emotions? A better understanding of emotions can tell a doctor or nurse how people experience fear and the role of stress in illness. A lawyer or personnel manager can learn if you can trust the words of someone. Teachers can tell if a student understands. Everyone can gain a better understanding of the feelings of friends and family.

There are three major communication systems mediated by the brain that regulate emotional responses. The first is the voluntary nervous system. This system sends messages to the muscles to act appropriately in a given situation. We run in times of fear or smile in times of happiness. The second communication system is the autonomic nervous system. This system combines the efforts of the sympathetic and parasympathetic nervous systems.

In times of arousal, the sympathetic nervous system mobilizes the body to quickly react. The parasympathetic nervous system calms us to restore our systems to normal. The neuroendocrine system is the third system. This system also attempts to maintain the body's internal functions through the use of hormones. Understanding these three complex communication systems helps to shed light on the biopsychological functions of our emotions.

The face broadcasts messages about emotions (Ekman & Friesen, 1975). Charles Darwin recognized that facial expressions are universal. He proposed that the expression of emotions is biologically determined and the product of man's evolution (Ekman & Friesen, 1975). A blind person as well as a child will cover his face with his hands when he is embarrassed. This example supports Darwin's theory of biology rather than learned sources of facial expression.

There are three main physiological theories of emotion. Since the theories debate the physiological order of events occurring with an emotion, the differences between the theories are similar to the old saying; "What came first, the chicken or the egg?" The first theory was proposed independently by James and Lange in 1884 (Pinel, 1997). Have you ever found yourself blushing in response to some embarrassing remark? According to the James-Lange theory, emotions result from the interpretation of one's own bodily reactions. In other words, an event triggers specific physiological changes. The emotion follows from the feedback of physiological information to your awareness. For example, you perceive a dog growling at you. This causes physiological reactions such as rapid heart rate and running away. Your brain interprets your body's reaction as the feeling of fear.

In the early 1900's Cannon proposed an alternative theory of emotion which was elaborated on by Bard (Pinel, 1997). According to the Cannon-Bard

theory, emotional stimuli have two independent reactions, the feeling of fear and physiological reactions (Pinel, 1997). "When a person faces an emotion-provoking event, nerve impulses pass through the thalamus. Some of these go to the cortex, leading to the sensation of fear, anger or happiness, whilst others go to the hypothalamus and structures in the midbrain, which command physiological changes" (Temple, 1993). The Cannon-Bard theory views emotional experiences and emotional expression as a parallel process rather than feedback of an emotional experience from autonomic nervous system activity. The Schachter-Singer Theory is similar to the James-Lange theory but also takes into account interpretations of arousal in the context of the event. This theory helps to explain why we can interpret an increase in heart rate as fear if a car just swerved in our path or love if we are staring into the eyes of a loved one.

Although both the James-Lange and Cannon-Bard theories of emotions differ in their views of the specificity of the autonomic nervous system both recognize the autonomic nervous system's role in emotion. During states of emotional arousal, patterns of sympathetic activation occur preparing the body for action. Arousal will cause increased heart rate, increased blood pressure, sweating, pupil dilation, increased flow of blood to muscles, increased respiration, and increased release of epinephrine and norepinephrine from the adrenal medulla (Pinel, 1997).

Use of a polygraph test utilizes the responses of the autonomic nervous system to states of emotional reactions. The lie detection used in criminal investigations records physiological reactions associated with peoples emotional reactions such as heart rate, blood pressure, respiration, and electrodermal responses. The skin conductance or electrodermal responses

test is based on the principle that lies cause tension and anxiety which alter sweating. Although the polygraph test is commonly used by law enforcement, it is not reliable. An artificial base-line of electrodermal response can be created by other behaviors such as clenching the fingers when questions are asked (Temple, 1993). Psychopaths maybe able to answer without arousal or subjects maybe aware of critical questions also causing an emotional response.

In 1937, Papez proposed that emotional expression is controlled by several interconnected neural structures including: the hypothalamus, cingulate cortex, and the hippocampus (Davidson,1992). McLean (1949) later confirmed the theory that emotions are controlled subcortically by the limbic system. The limbic system is a collection of brain structures bordering the thalamus. These structures include the amygdala, hippocampus, cingulate cortex, olfactory bulb, and hypothalamus. "This view of the anatomical bases of emotion has had an enormous impact in guiding research on the biology of emotion" (Davidson, 1992).

The brain is divided into two cerebral hemispheres. Research has shown that the two cerebral hemispheres have different cognitive capacities. The right hemisphere has a bias toward emotional processing (Dopson , et. al, 1984). Since the brain-body connection crosses over, the right hemisphere bias creates a greater intensity of emotion in the left field of vision. The bias of the right hemisphere towards emotional processing can be shown using chimeric stimuli. Chimeric faces are odd illustrations of faces that are constructed so one half of the mouth appears to smile and the other appears to look sad. People are asked to rate faces of this sort, whether they look happy or sad. Right handed people will typically say a chimeric face with the smile in their left field of vision looks happier. They show a bias in favor of judging the emotion of the

face on the basis of the emotion that is shown on the left-hand side of the chimeric face (Temple, 1993).

Damage to the brain can cause a condition of blindness for recognition of familiar faces. Prosopagnosia is a disease where people lose the ability to recognize all faces, including their own. Although they can not recognize familiar people they can recognize facial expressions. This suggests that different parts of the brain are involved in recognition and expression.

In many studies since the 1960's, Paul Ekman and his colleagues have analyzed hundreds of people experiencing various emotions. They have studied Darwin's theory of the universality of facial expression and found convincing evidence to support the biological theory. "The most convincing support for Darwin's universal theory resulted from a study of the members of a New Guinea tribe who had had little or no contact with the outside world" (Ekman & Friesen, 1971; Pinel, 1997). People in this visually isolated culture were able to correctly identify facial expression similar to the identification of other people in the world (Ekman, 1992). Ekman also discovered that culture plays a role in the display of emotions. Every society has display rules that govern how and when emotions may be expressed (Wade & Tavris, 1993). Work done by Ekman and Friesen identified six primary facial expressions.

Have you ever been told to put on your happy face and you will feel better? This old saying may have some truth to it. Recent research by Adelman & Zajonc (1989) suggest that our facial expressions do influence our emotional experiences (Pinel, 1997). Called the facial feedback hypothesis, Rutledge and Hupka (1985) instructed subjects to assume one of two patterns of facial contractions while they viewed a series of slides (Pinel, 1997). The subjects who had patterns of facial expressions similar to a happy face reported that the

pictures made them feel more happy. The subjects who had patterns of facial expressions similar to an angry face reported that the pictures made them feel more angry. Studies done by Ekman, Levenson, and Friesen found that voluntarily performing muscular actions generates involuntary changes in autonomic nervous system activation (Ekman, 1992). An "angry" face will increase your heart rate faster than if you put on a "happy" face. Facial expressions are believed to change the pattern of blood flow to the brain, altering temperature in certain parts of the brain, which in turn affects the release of neurotransmitters (Zojonc & McIntosh, 1992)

Judging a person's facial expressions is not always an easy task. However, for the trained eye, a person's facial expression can tell much more about a person's true emotions than the person thinks. Paul Ekman and associates have developed a way to unmask true emotional expression. Many times we smile when we really were not happy, but these expressions are less convincing than emotions produced by genuine emotion. The Facial Action Coding System, developed by Ekman, allows researchers to analyze and identify the 80 facial muscles involved in facial expressions. Genuine emotions use many more muscles than false emotions. In 1862, the French anatomist Duchenne first described the differences between genuine and false facial expressions. Duchenne said that the smile of enjoyment could be distinguished from deliberately produced smiles by examining two facial muscles: the zygomatices, which is the major muscle that pulls the lip corners up, and the orbicularis oculi which orbits the eye (Ekman, 1992). Fake joy cannot produce the contraction of the orbicularis oculi (Ekman, 1992).

Although the ability to feel and express emotions is innate to human beings, some emotions can be learned. Classical conditioning involves involuntary

bodily responses, and many of these responses are reactions of human emotions. John B. Watson was one of the first psychologists to recognize that this type of learning may explain how we acquire emotional responses to particular objects and events. Watson set out to demonstrate how fears and phobias may be acquired through classical conditioning experiences. With the assistance of Rosalie Rayner, Watson deliberately conditioned the fear of rats in a toddler they called "Little Albert". Conditioning fear involves establishing fear of a neutral conditioned stimulus through repeatedly pairing it with an averse unconditioned stimuli. Watson and Rayner paired a loud sound of which "Little Albert" was afraid, with the appearance of a white rat. Originally "Little Albert" was not fearful of the white rat, but with repeated pairings he development a conditioned fear of the white rat. Brain research can help explain the phenomenon of conditioned fear. With auditory stimuli, the neural pathway of fear begins at the thalamus which passes the message on to the auditory cortex and the amygdala. The amygdala receives input from all sensory systems, and it is believed to be the part of the brain in which the emotional sensory signals are learned and retained (Pinel, 1997). Excessive conditioned fear is thought to contribute to a variety of psychological disorders including phobias, panic attacks, and posttraumatic stress (Pinel, 1997). Therefore the extinction of these fears are the target of behavioral psychotherapy.

Aggressive behavior can be a survival response or a serious problem in human society. What is aggression? As with many emotional responses, not all scientists agree. The biology of aggressive behavior has its roots in genetic influences, neural influences, and biochemical influences. Some people are born with low tolerances and react with aggression. Hormones, such as testosterone, heighten dominance and aggressiveness (Meyer, 1996).

Aggression can also be learned. Television watching has been for a long time blamed for the rising levels of violent behavior in children.

Feelings that we are being subjected to physical or psychological threats create the physiological response in our bodies called stress. The urge to act in the presence of stress has been part of our nature since our early ancestors (Carey,ed., 1991). The "fight or flight" response has allowed for our survival. Today, the threat of survival has changed from the "fight" with the cave bear to the internalized threat of all of life's pressures bombarding our brains. "Nearly two-thirds of ailments seen in doctors' offices are commonly thought to be stress-induced or related to stress in some way" (Carey ed., 1991). Early research by Dr. Hans Selye called stress "the rate of wear and tear in the body" (Carey, ed., 1991). In the 1930's Dr. Selye proved that under stress the interconnected systems of the hypothalamus, the pituitary gland, and adrenal glands, and the sympathetic nervous system primed the heart and muscles for action (Maranto, 1984). We now refer to stress as any external stimulus that causes changes in our stable state of equilibrium, or homeostasis. Negative psychological states brought on by stressors in our environment can cause the immune system to falter thus making us susceptible to illness. Stress directly interferes with the body's defenses by crippling lymphocytes and other white blood cells, leaving a person vulnerable to disease (Maranto, 1984).

Some stress, called Eustress, can actually benefit us. The stress of exercise is good for our body. Exercise can cause the release of endogenous pain killers call endorphines. No one is going to avoid stress, but we can learn to try to change the physiological responses associated with stress.The application of coping techniques can help us to deal with stress, lowering our physiological responses, and limiting our body's suppression of the immune system. It has

been found that merely adopting a positive attitude toward problems or difficulties may prevent the negative tilt in body chemistry (Maranto, 1984).

Stress can make us susceptible to infectious disease as well as be a factor in mental illnesses. Recent studies have linked mental illness such as schizophrenia and depression to genetic factors. The current view is that some people inherit a potential for schizophrenia, which may or may not be activated by experience (Pinel, 1997). Recent evidence has implicated exposure to stress as the major factor in activating schizophrenic symptoms. Schizophrenia is characterized by the recurrence of the following symptoms: odd behaviors, incoherent thought, bizarre delusions, and hallucinations. The neurotransmitter dopamine has been implicated as a possible cause of schizophrenia. Since researchers believe that too much dopamine causes schizophrenia, antischizophrenic drugs such as chlorpromazine have been produced to block dopamine receptor sites (Pinel, 1991).

We have all felt depressed at some time. Depression is a normal emotional reaction to loss. However, some people suffer from a debilitating form of depression. These people fall into deep despair with no apparent cause. Their sleep pattern is altered, they have low self esteem, lack interest in normal activities, and have low energy levels.

As with schizophrenia, genetic factors in combination with stress contribute to depressive disorders. Research by Anisman and Zacharko have suggested that the depletion of certain neurotransmitters (dopamine, serotonin, and norepinephrine) that are associated with stress, may leave an individual who is sensitive to stress less able to cope (Pinel, 1997). Antidepressant drugs such as monoamine oxidase inhibitors, tricyclic antidepressants, and Prozac all are effective because they increase levels of the implicated neurotransmitters.

IMPLEMENTATION OF UNIT

There are three dimensions to the implementation of this unit. The curriculum, part of an Advanced and A.P. Psychology course, weaves together the sciences of biology, physiology, and psychology to build better understanding of emotions, stress and health. Detailed explanations of the impact that the brain and nervous system plays on emotions as well as the role of each individual's unique interpretations of the environment will build a better understanding of emotion. The second dimension engages students in experiences that will challenge previous conceptions of their existing knowledge so that they can construct new knowledge. This is accomplished by presenting students with experiences in which the teacher will lead discussion through open-ended questions. From the discussion of these experiences, the students build their own knowledge about the concepts being taught. This unit is designed to provide the class with experiences from which they will make observations. Whenever possible, the class will compile raw data for analysis. The teacher leads the students in interpretation and analysis of their observations or data through questioning. As a result, knowledge is constructed by the students before the teacher presents the information in the form of lecture notes. Old methods of presenting observational experiences were done after the note-taking process and used only as a form of assessment for the understanding of the notes presented by the teacher. The new method of teaching uses demonstrations and activities to construct knowledge which is later reconfirmed with lecture notes. To eliminate the tendency by the teacher to use teacher led experiences as an assessment, the final dimension of this unit will suggest a more metacognitve alternative.

The final dimension of this unit is to bring the learning full circle by asking

students to express their understanding through scientific writing. Through scientific writing students can address their misconceptions and reinterpret the subject of emotions, stress and health. Writing to learn serves a dual purpose. It is used as an additional assessment tool where students communicate what they have learned. It also helps complete the "learning cycle". Students use hands-on experiences; construct an introduction, in which the teacher assists students with inventing a concept label; and concept application, in which students are helped to generalize the ideas(Holliday, Yore, & Alvermann, 1994). The writing process also encourages students to make written predictions, observations, and explanations about the concept investigated. Scientific writing is more time consuming for students rather than simply answering questions or engaging in discussion. Two investigations were chosen for scientific writing. Although scientific writing to learn seems to benefit the students, it is very time consuming as extra time must be budgeted by the teacher to read the student papers. Thus many science teachers shy away from using this method as a tool for learning. To help with this perceived problem, I constructed rubrics to assess student work. The Advanced Placement class recorded all of their observations and prepared their scientific writing in a lab book to mimic the procedures of a career in investigative science. The two topics that were reported through scientific writing investigated the facial feedback hypothesis and stress and coping. The three dimensions incorporated into this unit will increase the role of the learner in building the concepts of emotions, stress and health.

The information and procedures used to present this unit to the Advanced and A.P. Psychology classes were generally identical for both groups. There were differences with testing. A greater depth of knowledge was expected from

the A.P. Psychology students for recall on their post test. The Advanced Psychology course was administered two tests. The first test covered the material on emotions. This post test also included questions about motivation, since motivation and emotions are combined within the same chapter in their text book. The second post test, entitled Mental Health Test, included information about stress, coping, and mental illnesses. All post tests were composed of multiple choice and free response questions.

This unit begins by introducing the biopsychology of emotions. Activities designed to construct student knowledge about the biopsychology of emotions include: "What are Your Eyes Saying" (Appendix C, II), "Do You Have a Happier Side" (Appendix C, IV), " Emotional Perception and Our Left Field of Vision" (Appendix C, V), "Familiarity of Faces" (Appendix C, VI), "Becoming a Margaret Thatcher Illusion" (Appendix C, VII), "Put on a Happy Face!" (Appendix C, IX), "The Genuine Smile" (Appendix C, X), and "Conditioned Fear"(Appendix C, XI). The duration of this portion of the unit lasts approximately eight days. The next seven days of the unit are spent learning about the biopsychology of stress and coping. Activities designed to construct knowledge about the biopsychology of stress and coping include: "Health, Stress, and Coping" (Appendix C, XIV) and "Psychoneuroimmunology: Constructing a Rube Goldberg Device" (Appendix C, XV). The final two days of this unit teach the relationship between stress and mental illness. The complete outline for this unit (Appendix A) and the procedures for student activities (Appendix C) are included in the Appendix. The descriptions of all activities used in this unit are described on the following pages.

Student Activities

The following section summarizes each student activity and describes the rationale for each. Student evaluation or assessment is also included. New activities designed for this unit are designated with an asterisk after the title.

1. Experiment on Smiling (APPENDIX C, I)

The task for the students in this experiment is to record people's(subjects') responses to them depending on whether they are smiling or not smiling at them. The variables of this investigation include: experimenter smiling at a male subject, experimenter smiling at a female subject, experimenter not smiling at a male subject, and experimenter not smiling at a female subject. This observational investigation is an introduction to the expression of emotions, but it also served as a discussion topic later in the unit. This exercise has many purposes for the exploration of the expression of emotion. It served as a focus of discussion later when introducing gender differences in the expression of emotion. This exercise also helps to develop students' skills as experimenters. It requires them to make observations and record data. They must consider the influences of other experimental variables in their research findings. Students will be evaluated on the completion of a data table that compiles the entire class results and the writing of a discussion paragraph.

2. What are Your Eyes Saying *(APPENDIX C, II)

Are you aware that you communicate information to other people with your eyes? This investigation makes students aware of this fact. Students are asked to look at four transparencies bearing two sets of eyes. They are asked to choose the set of eyes that look more attractive, warm, or friendly. This

activity was developed by taking photos scanned into a computer and altering the size of the pupils. After the observations are made and the class results are tallied on the board, the teacher leads a discussion so the students can explain why they made their selection. The teacher guides the students explaining why the pupils will change in size based on the actions of the autonomic nervous system. Student understanding will be assessed by their ability to explain the relationship between the eyes and the nervous system. They will also be evaluated on tests and quizzes.

3. Can You Pass a Polygraph Test (APPENDIX C, III)

Polygraph tests claim the ability to detect honest or dishonest answers to posed questions. This investigation examines the physiological changes in the body during telling the truth or not. Due to mechanical limitation of the high school classroom, only a few physiological measurements are taken and compared. The objective of this activity is for students to gain more insights into workings of the highly publicized polygraph test. Students monitor changes in pulse and skin temperature. This activity also readdresses the physiological changes that accompany emotions.

4. Emotional Expression*(APPENDIX C, IV)

This student activity was designed to demonstrate emotional expression and brain hemisphere specialization. It is also used to reinforce the concept of corpus callosum cross-over regulating brain body processes. Students are shown transparencies of faces that have been altered by taping together two of the same side of face to make a complete face. Students are asked which side of the face looks emotionally happier. Class results are compiled. The teacher

leads the students in constructing knowledge about the specialized functions of the brain in relation to emotional functioning. Understanding will be assessed by the student's ability to discuss in class why the face with the two left sides appears happier by hypothesizing that the right hemisphere of the brain specializes in emotional expression. Knowledge of hemispheric specialization will also be evaluated on a quiz and test.

5. Emotional Perception and Our Left Field of Vision * (APPENDIX C, V)

This student exercise also is used to construct knowledge about the specialization of the right hemisphere and corpus callosum brain/body crossover. It also allows for the construction of knowledge about emotional recognition. This activity uses the chimeric faces produced for the previous exercise and a transparency of the original, intact photograph of the person's face. The students will examine the original transparency. Next the teacher will instruct the students to choose which of the next two transparencies(the R/R and L/L) look the most like the first picture of the intact face on the transparency. Students most commonly choose the R/R transparency since it is in their left field of vision. The teacher will lead the class with questions to make them aware of the fact that facial recognition is stronger in their left field of vision since it is a right hemisphere function. Students will be assessed through discussion and their ability to respond correctly on a post test question.

6. Familiarity of Faces * (APPENDIX C, VI)

Have you ever felt uncomfortable talking to someone who was wearing sunglasses? Few people are aware that the eyes convey much of the information necessary to recognize a familiar face. "What are Your Eyes

Saying" (student activity 2) demonstrates that the eyes convey nonverbal expressions. This exercise shows students that the eyes are the most recognizable feature identifying a familiar person. To prepare this activity the teacher should take pictures of familiar people around their school. Cut out the mouth, nose, and eyes. Ask students if they can identify the people by their nose. Next, reveal only the mouth and ask the students to attempt identification of the person. Finally show the students the eyes. Students can usually identify the people by their eyes. This activity makes students aware of our not so conscious tendency to focus on people's eyes when we look at them.

7. Becoming a Margaret Thatcher Illusion * (APPENDIX C, VII)

If the eyes and mouth are the most recognizable feature of our face, what will happen if the eyes and mouth are turned upside-down? Students will observe that it is more difficult to interpret the emotional content of a facial expression if the mouth and eyes are turned upside-down in a face. This is called the Margaret Thatcher illusion. Researchers believe that this phenomenon may be due to the registry of predictable emotional expression that is registered in our brain due to experience with daily observations. This activity will reemphasize the fact that we perceive most of our facial recognition from observations of the eyes in predictable patterns.

8. Flashing Faces(APPENDIX C, VIII)

Darwin believed that facial expressions have a biological basis, thus they are universally expressed and recognized. This exercise requires students to observe facial expressions and interpret the emotional content. Students and teacher discussion helps construct knowledge about the biological and

universal qualities of emotional expression and recognition. Students are assessed by their ability to answer oral discussion questions and a multiple choice question on a post test.

9. Put on a Happy Face * (APPENDIX C, IX)

This exercise was designed to allow students to scientifically investigate the concept of the facial-feedback hypothesis. The facial-feedback hypothesis suggests that our facial expressions can influence how we feel. This hypothesis contends that facial muscles send messages to the brain to identify the emotion that a person is feeling and expressing. Students are asked to collect data on people's ratings of a comic. People in the two experimental groups are instructed to either turn the corners of their mouth up or down when they view the comic. The control group has no additional instruction other than simply rating the comic from 1-10. When the class returns with their data and compiles the results they find that the ratings of the comic, when the person was asked to turn the corners of their mouth up, are statistically higher than when they are asked to turn the corners of their mouth down. This exercise also requires the students to report their results in the form of a scientific research paper. A rubric is included to increase student knowledge of expectations and to assist in grading of the scientific report.

10. The Genuine Smile * (APPENDIX C, X)

Parents are always trying to distinguish between a truthful story that their teenager is telling and an untrue story. Did you know that truth is written across your face? This activity will make students aware of the genuine emotion versus the false emotion. Students will make observations of photographs.

They will describe the differences between sets of photographs and construct knowledge about the different muscles used for a genuine emotion.

11. Conditioned Fear * (APPENDIX C, XI)

Are you afraid of spiders or snakes? Where did your phobia of creepy crawling things originate? Near the end of the semester, while I was taking a very difficult cell biology course in college, I discovered that my stomach was upset every time I entered the cell biology lab. I traced this fearful response to the fact that most course meetings in this classroom began with a very difficult quiz. John B. Watson would say all of these examples of fears developed through classical conditioning. Conditioning extreme fear in high school students is probably unethical. To demonstrate this concept, at the beginning of the school year, I hung a brightly colored piece of cloth on the blackboard every time I gave a test or quiz. When we came to the conditioned fear section of the emotion lesson, the students were given a survey to complete regarding five pieces of cloth (one being the test cloth). The surveys were also administered to the Introductory Psychology Classes (control group) who had seen the cloth on different occasions but never paired with taking a test or quiz. The A.P. Psychology students were consciously unaware that the cloth was hung on the board on test days. The results were compared and the students were lead in discussion to construct knowledge about their conditioned fear. Assessment was done through class discussion.

12. Defining Aggression (APPENDIX C, XII)

What is the definition for aggression? This activity provides the opportunity for students to construct knowledge about aggressive behaviors and how

people differ in their interpretations of aggressive acts. Students are instructed to decide whether situations listed on a questionnaire are aggressive acts. Once individual students have assessed the situations, students are put in groups to debate their evaluation of each situation as aggressive or nonaggressive acts. This activity exposes students to numerous issues involved in defining aggression.

13. To Tell the Truth (APPENDIX C, XIII)

Nonverbal communication is usually more truthful then verbal communication. To demonstrate this, the teacher asks four students to wait in the hall. They are told that the teacher will ask them questions when they are brought into the classroom. Two of these students are asked to lie in response to every question asked. Meanwhile the rest of the class is told to guess which two students are the liars. Student understanding will be assessed by their ability to correctly chose the liars and discuss how they detected the liars. Knowledge about nonverbal emotion will also be evaluated on the post test.

14. Health, Stress and Coping * (APPENDIX C, XIV)

All teenagers believe that they are under a great deal of stress because of high school experiences. But stress does not end with high school. All individuals need to be aware that stress is inevitable. However, we can learn to identify stressful situations and cope with stress. Through this investigation, students will collect physiological data to interpret where stress arises in their lives.

My initial research for this thesis project included investigating the relationship between skin temperature, blood pressure and pulse.

Collaboration with Dr. Tom Adams (Department of Physiology, MSU) yielded a formula to calculate a cardiovascular index which divides measurements of blood pressure by pulse. Comparisons of skin temperature measurements and the cardiovascular formula measurements, using a double Y graph, yielded a negative correlation between the two. These two measurements alone or together can be used to demonstrate stress responses. When stressed, finger tip skin temperature decreases while the cardiovascular index increases.

The investigation done by the students in this activity involves three phases. The first phase is collection of initial data of physiological measurements, such as blood pressure, pulse, and skin temperature, during a 24-48 hour time period. Phase two is the analysis of data to recognize where and why stress may be occurring. Phase three is the application of coping techniques to lower physiological responses to perceived stressful experiences. Students record all of their hypothesis and data in their lab books. Upon completion of the data collection the students communicate what they have learned through scientific writing. Post test questions also evaluate student learning.

15. Psychoneuroimmunology: Constructing a Rube Goldberg Device * (APPENDIX C, XV)

Understanding the cascading effects of stress on the immune system was a difficult concept for students to learn and remember. To better conceptualize the whole schema of events that take place during the breakdown of our immune system when stress is added to our lives, groups of students are instructed to make a Rube Goldberg device illustrating the steps of the faltering immune system. Students are assessed on their groups presentation of their Rube Goldberg illustration. They are also evaluated by an answer on a post test.

16. Peanut Butter, Jelly and the Diathesis-Stress Model (APPENDIX C, XVI)

"Humpty Dumpty had a fragile shell, but he didn't break until he fell" (Wade & Tavris). This quote, as well as this activity, helps students become aware of the fact that schizophrenia is a mental illness that is predisposed at birth but may not surface unless stressful experiences activate the illness. Four student volunteers are asked to make peanut butter and jelly sandwiches. Although this appears to be an easy task, each volunteer must follow different rules when making the sandwich. The first student is allowed to take as much time as necessary to make their P-B and J sandwich. The next student is only allowed 30 seconds(stress) to complete their sandwich. Student three is allowed all the time necessary, except the bread they receive has been torn into pieces(genetic predisposition). The final student is only allowed 30 seconds and has the genetic predisposition or the torn bread. Student learning is assessed through class discussion that constructs knowledge about the vulnerability-stress model. Students are also evaluated by successful completion of an essay question on the post test.

EVALUATION

The evaluation processes for this thesis employ a variety of assessment tools. The assessments include: pretest versus post test answers to multiple choice questions, written free response type answers to pretest and post test questions, informal responses from students during class discussions, initial responses from students in regard to demonstrations versus their answers to post test questions, and creating illustrations to demonstrate knowledge. Each student activity designed for this unit, including the use of rubrics, is evaluated using these assessment tools on the following pages.

The primary evaluation assessment for the entire unit is the comparison of multiple choice pretest and post test scores. A ten point pretest was given to nineteen Advanced Placement Psychology students. The mean for the A.P. Psychology class on the pretest was 5.58. Calculating a measure of variability produced a standard deviation of 1.71 from the mean score.

Student post test scores for the same ten questions as given on the pretest were then compared. Twenty-three students were assessed on a multiple choice post test. The mean score for the post test was 8.17. Calculations of variability produced a standard deviation of 1.61 points from the mean.

The null hypothesis for this thesis would suggest that there will be no difference between pre- and post test scores. Calculations supported otherwise. The two sample T-test resulted in a T=5.05. The P - value was $p<.0000005$. This indicates that the probability of a T-value as great as 5.05 is less than 5 out of ten million when the pre and post test results would be equal. This shows strong evidence that the pre- and post-test results are significantly different.

Table 1

Unmatched Pretest and Post Test Data for Ten Questions

Pretest	Post Test
6	8
9	10
8	9
3	9
5	9
5	8
7	10
6	9
4	9
6	5
7	8
5	9
7	7
5	4
7	10
5	7
4	9
2	9
5	8
	8
	9
	9
	5

$n_1 = 19$ $n_2 = 23$

$x_1 = 5.58$ $x_2 = 8.17$

$s_1 = 1.71$ $s_2 = 1.61$

$t = 5.05$

$p = .0000005$

$S_{px} = 1.66$

$d.f. = 40$

Evaluation of Student Activities

This section evaluates the activities that were developed specifically for this thesis project. Quantitative results, written verbal responses, and informal discussions with students are described. The success of the activity, as well as its influence on student learning is discussed. A.P. and Advanced Psychology student test scores were used for the evaluation of the activities.

2. What are Your Eyes Saying?

Prior research for this demonstration, at MSU during the summer of 1997, suggested that students would be more likely to choose the eyes with the dilated pupils as the more attractive, friendly, or aroused person. When administering this demonstration to my students, the results did not agree with the original experimental results at MSU. During the demonstration in class, students chose the constricted pupils 53% (n=63) of the times tested. The dilated pupils were chosen only 47% of the time. In the process of guiding students in their construction of knowledge regarding their choice in preference versus what was expected, they revealed a possible error in my experimental methods. When performing the demonstration I asked students to choose the eyes that looked more attractive, friendly, or aroused. The students expressed to me that when they used the criteria of "aroused" to choose eyes, the dilated pupils looked sleepier thus less aroused. Future use of this demonstration will not include the word "aroused."

Regardless of the less than desirable results from the demonstration, students were able to construct knowledge about pupils without the teacher "spoon feeding" the facts to them. On a free response pretest question asking

students to name the responses of the body to emotions, no students named the reaction of the pupils. The students demonstrated successful acquisition of knowledge by later assessing an illustration on the post test, which showed two pictures of women that looked identical. However, one of the women had dilated pupils and the other had constricted pupils. The question that accompanied the illustration was; "Which woman do more men chose as the more attractive or friendly person? How do you explain their choice?" Thirty-three out of thirty-nine (85%) Advanced and A.P. Psychology students correctly chose the picture of the woman with the dilated pupils. Thirty out of the thirty-nine (77%) students could explain their answer by responding that the pupils were dilated or the eyes darker.

5. Emotional Perception and Our Left Field of Vision

Pretest scores showed that twenty out of thirty-five (53%) of the Advanced and A.P. Psychology students correctly chose the right hemisphere of the brain when asked which hemisphere of the brain specializes in emotional perception. When doing this activity in class, more students chose the left/left face overhead as the face that looked more like the original photograph. The L/L overhead was hypothesized to be the preferred choice. Combining the discussion of this activity with the activity on emotional expression, students were able to tell me that the right hemisphere of the brain specializes in emotional perception and that information from of the right hemisphere crosses over to the left side. They were then able to deduce that they chose the L/L face because they were better at interpreting the left side of the face.

Students were given the post test free response question: "Which face, statistically, appears happier to people? Explain why." They were instructed to

evaluate a chimeric illustration and respond to the question. Thirty-three out of thirty-nine students (84.6%) responded that the face with the left side smiling would be chosen by most people as the happier face. Sixty-seven percent of the students were able to elaborate that the reason why most people chose that face was because the right hemisphere of the brain, which receives information from the left visual field, was theorized to specialize in emotions. Most students who did not discuss the right hemisphere of the brain in their justification, discussed that people read from left to right. This was an alternative theory to the Right Hemisphere Dominance theory that we had suggested in class and is postulated by other researchers as well.

In addition to my own experimentation of this topic, our class had the privilege to be participants in a similar study conducted by researchers at Michigan State University. Tim Carbary, an MSU researcher, was kind enough to graph and statistically analyze data collected from my students for his study of emotional perception and share it with my classes. This study was extremely valuable since it taught many lessons including: research design, controls, statistical analysis, and interpretation of data. The most valuable lesson learned during this unit was that a research investigation often inspires more inquiry instead of providing definite, singular answers and many times generates more questions. Our class was able to discuss the results of the MSU study and postulate our own theories. The students enthusiastically designed our own investigation about emotional perception and baby cradling to test the Right Hemisphere Dominance theory. We canvassed the school to ask people to hold grocery bags and also to pretend they were cradling a baby. Our objective was to observe whether people would hold the grocery bag in their dominant arm or leave their dominant arm free for other activities. We

were attempting to test the theory suggesting a left arm preference for baby cradling due to handedness rather than emotional perception. The Right Hemisphere Dominance theory postulates that people chose their left arm due to specialized emotional perception in the right hemisphere of our brain. We analyzed our data and the students made many suggestions about the controls and experimental design of our study. This demonstrated to me a clear understanding of the hemispheric dominance question since students could take the theories one step further to conduct new investigations and analyze confounding variables in the design of our investigation.

4. Do You Have a Happier Side? Emotional Expression

The discussion of this activity was combined with the Emotional Perception activity. Students were able to construct knowledge that the reason the majority of students(78%) chose the L/L face as the happier face has roots in the fact that the right hemisphere of the brain is more specialized in evaluating and expressing emotions.

6. Familiarity of Faces

The goal of this activity was to show students that the facial feature we use most to identify a person is their eyes. First, I presented noses on an overhead. None of the students could identify any of the school personnel by their nose. Next, I presented only mouths. Again, no students could identify any of the school personal by their mouth. Then I presented eyes. Students could identify an average, four out of seven eyes correctly.

The next day I presented a follow up activity in the A.P. class where I showed the students a magazine picture of a woman who had her eyes covered with a

blackened rectangle. When students were asked why her eyes were covered, they could respond that it was because her eyes were the recognizable facial feature. In the Advanced Psychology class I used the same illustration and question on their post test. Fifteen out of sixteen (94%) of the students responded that the woman's eyes were the part of her face that most people used to recognize her.

7. Becoming a Margaret Thatcher Illusion

Students were asked to observe this demonstration transparency and evaluate the emotion of the face that was projected upside down. Students indicated whether the face was happy, sad, etc. As I slowly turned the overhead transparency around students began to gasp until I had the picture turned completely right side up. At this point I heard both gasps and laughter. Students were able to see that they perceived an emotion from the correctly positioned mouth and eyes. When these normally consistent variables are reversed, our brains tell us there is something incorrect and confusing.

7. Put on a Happy Face! Testing the Facial Feedback Hypothesis

This investigation had two main purposes. The first purpose was to construct knowledge of the facial feedback hypothesis and relate it to the James-Lange theory of emotions. The second purpose was to engage students in an activity where they collect data and analyze the data, reporting in using scientific writing. Both of these purposes are goals in the Constructivist Model of teaching. The pretest results showed 66% of the Advanced and A.P. Psychology students chose the correct answer (facial-feedback). Post test scores showed 74% of the students chose the correct answer. Upon further

analysis, six out of ten of the students who had incorrect answers on the post test, chose the James-Lange theory as their answer. This answer is partially correct, but not the best answer. A second post-test question did not include the James-Lange theory as an answer choice. This question resulted in 92% (36/39) of the students choosing the correct answer (facial-feedback).

The results of the scientific writing proved very interesting to me. The A.P. students were not given the grading rubric prior to submitting their report. Seventy-four percent of 23 students tested received A's. The Advanced Psychology students, who are not usually as proficient at writing, were given the rubric prior to submitting their report. Eighty-six percent of 16 Advanced Psychology students received A's. The students did an excellent job with their discussions. They were able to apply their results to real life. Some students suggested that the straws in drinks at comedy clubs could have an impact on humor.

Occasionally in the past, I have given students a rubric to structure their scientific writing. Through serendipity, an accidental discovery was made. The class that mistakenly did not receive a rubric to structure their scientific writing was not as successful as the students who did receive the rubric. This experience with rubrics has lead me to conclude that providing students with rubrics, that outline what is expected in their scientific writing, does lead to the expected outcomes.

10. <u>The Genuine Smile</u>

The students were able to discuss their observations of two sets of photographs. One set of photographs was taken of people who were displaying genuine emotion. The other set was taken when these same people were

faking their emotion. Students were successfully able to deduce that one set showed "real" emotions and the other "fake" emotions. The students were pressed for reasons why they knew that one was a genuine smile. The students were able to construct knowledge that something was different about the eyes and mouth. From there they were able to point out that different muscle groups where involved in a genuine smile versus non genuine smile.

11. Conditioned Fear

Since the beginning of the school year, a piece of fabric had been hung on the black board during test days. The goal was to condition an anxiety response using this piece of cloth. Initially, when the cloth was displayed, student comments were favorable. The students remarked how they liked my material and inquired about the reason it was displayed on the blackboard. The reason was not revealed to the students. The final evaluation involved a survey about the test cloth and four others. This survey was distributed to the Introductory Psychology students who served as the control group. The control group had not been exposed to the cloth on their test days. The classes were asked to rate the pieces of cloth from 1 to 10 for a variety of descriptors (see Appendix C, figure 11). They were also asked to name their favorite pattern. The A.P. students rated the test cloth as slightly more "desperate." They also rated it more "exciting" versus "fearful" than the control group of students. The A.P. students also rated the test cloth slightly more "stressed" versus "relaxed" than the control group. The control group was more likely to choose the test cloth as their favorite pattern. Twenty-seven percent of the control group chose the test cloth as their favorite pattern versus 23% of the experimental group who chose the test cloth. My original hypothesis was that a cloth hung on the

blackboard during tests would classically condition fear. Due to the fact that the results did not show significant differences, I do not accept my hypothesis. I do intend to retest this hypothesis next year. I plan to change the material pattern used for this experiment.

14. Health, Stress, and Coping

The responses of the autonomic nervous system to emotions and stressful situations were discussed in relationship to many activities. Students' application of this knowledge was evaluated by their ability to collect physiological data and evaluate their own state of stressfulness. They were also evaluated on pretest and post test questions. In a free response pretest question, students were asked to name three or more physiological responses to stress. These responses could have included dilated pupils, slowed digestion, increased blood flow to the muscles, decreased skin temperature, increased pulse, increased blood pressure, increased perspiration, increased respiration, or decrease blood flow to the kidneys. The mean out of three requested responses for the pretest was 0.85. The post-test scores showed greater understanding with a mean of 2.87 examples of physiological responses of the autonomic nervous system to stressful situations. The students were able to express their learning in the form of a scientific research paper. The vast majority of the students were able to construct an introduction that included background information about stress, physiological responses, and coping. They were able to analyze their data, identify their sources of stress, and discuss their methods of coping with stressors to reduce the physiological responses that accompanied their stressors.

15. Psychoneuroimmunology: Constructing a Rube Goldberg Device

This activity not only proved to be engaging but also showed dramatic improvements in knowledge about the relationship between stress and the immune system. On a pretest question, asking whether stress decreased the efficiency of the immune system, 16 out of 20 students (80%) responded "yes." On the post test 100% of the students answered that stress decreased the efficiency of the immune system. On a free response question about the actions of stress on the body and the immune system, no students in the pretest included the brain, hypothalamus, CRF, ACTH, adrenal gland, cortisol, or T-cells in their answer. A similar post-test free response question resulted in 13 out of 23 students including all of the six previously mentioned steps of psychoneuroimmunology in their answer. Two students responded that prolonged stress caused problems for the T-cells and B-cells. The other eight students discussed other physiological responses to stress or Hans Selye's General Adaption Syndrome.

DISCUSSION AND CONCLUSION

Weaving together biology and psychology provided more meaning to my students in the study of emotion, stress, and mental health. For instance, everyone has experienced stress. However, very few people practice strategies that will help reduce their stress responses. Animal studies show, which have been confirmed in human studies, that the feeling of losing control produces stress hormones. It is a valuable experience for students to learn about these physiological responses that occur when we feel stressed and perceive a lack of control. Informal student discussion indicated that they liked learning about the body's responses to stress and how to cope. Learning to gain control of their mind helped them to gain control of their body. A Chinese proverb says, "When the heart is at ease, the body is healthy." Given today's stressful lifestyles, all people need to learn how to control their mind and body in stressful situations. Stress contributes to two-thirds of all visits to the doctor (Carey (ed.), 1991). Learning about stress is important to make my students healthier individuals.

Having students construct knowledge rather than me presenting them with lecture notes was exciting for me as an instructor. By using leading questions, students were capable of recalling prior learning to analyze the observations made during the demonstrations. One of the goals of teaching is to give students the confidence to analyze situations, ask questions, use prior knowledge, and to solve problems during their lifetime. Constructing knowledge gave students experience with analyzing and solving problems, prior to someone "spoon feeding" them the answers during a lecture. Engaging

students in the construction of knowledge also exposed students to complex processing of information rather than shallow processing that usually occurs with note-taking alone.

Scientific writing provided an assessment tool for the teacher and a learning experience for the students. When relating the process of scientific writing to Bloom's taxonomy, learning takes place on all six levels. The students convey their knowledge and comprehension about the topic in the introduction, they report what they discovered during the investigation, and interpret the meaning of their findings. They were able to evaluate nuisance variables in experimental design and synthesize suggested revisions to the experiment or further studies. They were able to describe applications of their experimental findings to real life. Even though scientific writing is nothing new in my class, this thesis project shed light on an improvement. Our school has been emphasizing writing across the curriculum. This new wave has brought inservice training to all teachers for cooperative teaching of writing and the concept of Focus Correction Areas. The concept of Focus Correction Areas emphasizes providing students with the criteria for grading the writing assignment prior to beginning the assignment. Through serendipity I found this was beneficial with scientific writing as well. The Advanced Placement Students are normally much more proficient in their ability to write scientifically than the Advanced Psychology students. When correcting the A.P. Psychology write-ups for the Facial-Feedback hypothesis paper I was disappointed. The correction key for this assignment was prepared prior to grading these papers. The students were not as complete with the information they presented in their papers as I had hoped. A week later the Advanced Psychology students were preparing this scientific assignment. This class was given an outline of the criteria which was expected

to be discussed in their scientific papers. This class as a whole did an outstanding job discussing the background information, analyzing their data, making interpretations, and suggesting applications.

In conclusion, this experience enlightened me to improved ways of providing students with experiences that strengthen the cognitive structures that are molded during the learning process. It also gave me the confidence to present leading questions and demonstrations to the students that will encourage the students to drive their own learning rather than lecture to them and then use the activities to evaluate their learning. Future units that I teach will be designed for constructing knowledge rather than rote memorization. One of my students gave me a little book for Christmas entitled, Teachers: A Tribute. A quote from this book embodies what I have learned by teaching this unit.

> "The teacher's task is not to implant facts but to place the subject to be learned in front of the learner and, through sympathy, emotion, imagination, and patience, to awaken in the learner the restless drive for answers and insights which enlarge the personal life and give it meaning.
>
> -Nathan M. Pusey

APPENDIX A

I

Outline of the Unit

Refer to Appendix A, II for Teacher Notes and Appendix 3 for Student Activities.

Activities developed for this unit are designated with an asterisk (*)

Day 1

a. Administer the pretest.

b. Brainstorm a list of how people respond with emotions.

c. Give notes on "All Emotional Responses Contain Three Components"

d. Assign the data collection for "Experiment on Smiling"

Day 2

a. Construct knowledge about how emotions may have evolved by discussing the overhead of "Darwin's Dogs."

b. Notes: "Early Progress in the Biopsychological Study of Emotions"

Day 3

* a. Construct knowledge about the eyes and other bodily responses to emotions with the teacher lead demonstration "What are Your Eyes Saying."

b. Notes : "Emotions and the Autonomic Nervous System"

c. Polygraph Experiment

d. Discuss the results of the polygraph and construct reliability knowledge about lie detection.

Day 4

a. Notes about "Emotions and the Brain: the Limbic System"

* b. Construct knowledge about the role of the brain's hemispheres with "Do you have a Happier Side" and "Emotional Perception and Our

Left Field of Vision."

* c. Construct knowledge about about "Familiarity of Faces"

* d. Construct knowledge about emotional recognition with "Becoming a Margaret Thatcher Illusion."

e. Notes on Emotions and the Brain: Hemisphere specialization and Prosopagnosis.

* f. Assign the collection of data first in class and than additional data due for the next day for the student activity "Put on a Happy Face."

Day 5

a. Construct knowledge about the universality of facial recognition with "Flashing Faces."

b. Notes about "The Face of Emotion: Universal Recognition."

c. Compile class data collected from "Put on a Happy Face."

d. Construct knowledge about the facial-feedback hypothesis.

e. Notes about "Facial-Feedback Hypothesis."

f. Assign a scientifically written paper for the facial-feedback investigation.

Day 6

* a. Construct knowledge about Ekman's Facial Action Coding System with the student activity: "The Genuine Smile."

b. Notes about "Paul Ekman's Facial Action Coding System."

c. Provide time for students to work on their facial-feedback scientific write-up.

Day 7

a. Construct knowledge about aggression through the student activity called "Defining Aggression."

b. Notes about "The Culture of Emotion"

c. Construct knowledge about the bodies expression of emotion through the student activity, "To Tell the Truth."

d. Notes about "The Communication of Emotion."

Day 8

a. Emotion Quiz

b. Compile the classes data for the "Experiment on Smiling."

c. Construct knowledge about the role of gender on emotion.

d. Assign scientific writing of the results and discussion for "Experiment on Smiling.

Day 9

a. Stress prequiz

b. Construct knowledge about the connection between the mind and the body with the "Mind-Body Connection" student activity.

c. Discuss the nature and source of stress.

Day 10

a. Demonstrate biofeedback with "Physiological Effects of Trying to Relax."

b. Discuss the Stress and the Brain.

* c. Assign " Health, Stress, and Coping."

Day 11

a. Brainstorm about the relationship between stress and illness.

b. Discuss Psychoneuroimmunology.

* c. Assign "Constructing a Rube Goldberg Device."

Day 12

a. Brainstorm how people can be affected by stress differently.


Day
Day
Day 15
Day 16
Day 17

b. Discuss the individual side of health and well-being.

c. Administer the A/B Personality test.

d. Discuss the question of control.

Day 13

a. Discuss coping with stress

b. Describe the application of coping to the previously assigned investigation.

c. View "Discovering Psychology: Health Psychology."

Day 14

a. Collect initial physiological data (pulse, blood pressure, skin temperature at the beginning of class.

b. Take students outside for a brisk, ten minute walk. Upon returning to class, discuss the benefits of coping through exercise.

c. Turn out the lights and meditate for 5-15 minutes.

d. Collect final physiological data to observe whether these two coping techniques were effective.

e. Discuss the role of humor in coping. Watch "America's Funniest Home Videos."

Day 15

a. Stress Quiz

b. Allow time for students to graph and analyze data for the investigation; "Health, Stress, and Coping."

Day 16

a. Discuss Schizophrenia and causes

Day 17

a. Discuss Affective Disorders and causes.

b. Demonstration; "Peanut Butter, Jelly, and the Diathesis-Stress Model."

Day 18

a. Test "Emotions, Stress, and Mental Health."

APPENDIX A
II

THE BIOPSYCHOLOGY OF EMOTIONS
TEACHER NOTES

"The ultimate reason for the existence of emotions is to provide patterns of behavior appropriate to particular situations." (Pinel, 1997)

I. All Emotional Responses Contain Three Components
1. Behavioral: muscular movements that are appropriate to the situation
   example: a dog defending its territory with a growl
2. Autonomic: Changes in the autonomic nervous system-facilitates these behaviors and provide quick mobilization of energy
3. Hormonal: reinforce the autonomic responses- Hormones secreted by the adrenal glands further increase heart rate and blood flow to the muscles and also make more glucose available to them.

II. Early Progress in the Biopsychological Study of Emotions

A. Charles Darwin

Darwin suggested a biological connection between emotions and facial expressions in human beings and other animals.
Charles Darwin wrote that facial expressions - the smile, the frown, the grimace, the glare - are biologically wired in human beings and other animals. Emotion in not learned. Expressions may have evolved because they allowed animals and our human forebears to tell the difference immediately between a stranger who was friend and one who was about to attack.
(Darwin, 1872; Pinel, 1997))

B. Mid 19th Century: Phineas Gage

Phineas Gage had an injury to the orbitofrontal cortex. Doctors found that damage to the orbitofrontal cortex caused lower inhibitions and self concern and the indifference to the consequences of their actions. The orbitofrontal cortex translates judgments into appropriate feelings and behaviors.

C. James-Lange Theory of Emotions (1884)

Emotions result from perceiving ones own bodily reactions
Emotion-prevoking situations cause an appropriate set of physiological responses.

*Assumption: 1) something happened
2) you feel an emotion
3) you respond or produce a behavior

D. The Cannon-Bard Theory (1871-1945)

The Cannon-Bard Theory argued that the physiological changes in many emotional states were identical. They reasoned as follows:

> "If increases in blood pressure and heart rate accompany feelings of both anger and joy, how can people determine their emotional state simply from their physiological State?" (Lefton, 1997)

Cannon argued that when a person is emotional, two areas of the brain, the thalamus and the cerebral cortex , are stimulated simultaneously.

Cortex: produces emotional components

Thalamus: produces physiological changes of the sympathetic nervous system.

E. Schachter-Singer Approach

The Schachter-Singer Approach is a cognitive approach, focusing on emotional activation that incorporates elements of both the James-Lange and the Cannon-Bard Theories.

This approach believes that people do interpret their emotions but not solely from bodily changes.

III. Emotions and the Autonomic Nervous System

A. Epinephrine and norepinephrine from the adrenal glands produce states of arousal (pupils dilate- widening to allow in more light, the heart beats faster, breathing speeds up, blood sugar rises- providing the body with more energy to act, digestion slows)

B. Measuring Emotional Responses: Lie Detection in Criminal Investigation

A polygraph records physiological reactions associated with peoples emotional reactions such as: heart rate, blood pressure, breathing, and skin conductance.

IV. Emotion and the Brain

A. The hypothalamus and amygdala, which are part of the limbic system, are involved in emotion.

B. The left cerebral hemisphere seems to be specialized for processing positive emotions such as happiness, the right for processing negative emotions, such as disgust, fear, depression.

The right hemisphere specializes in recognition and expression of emotion.

C. Prosopagnosis is a disease where people lose the ability to recognize all faces (including their own) but they can recognize facial expressions This suggests that different parts of the brain are involved in each process.

V. The Face of Emotion

A. Emotions are registered on the face and are recognized all over the world. Even in remote tribes who never watch movies.
Seven basic emotions on the basis of facial expression include: anger, happiness, fear, surprise, disgust, sadness, and contempt.

B. Facial-Feedback Hypothesis
The facial muscles send messages to the brain , identifying each basic emotion. Facial expressions change the pattern of blood flow to the brain thereby altering temperature in certain parts of the brain, which in turn affect the release of neurotransmitters.
When people are told to contract their facial muscles involved in smiling, though not actually instructed to smile, and then look at cartoons they find the cartoons funniest then if they are contracting their muscles in a way that is incompatible with smiling (Strack, Martin, & Stepper, 1988).

C. Paul Ekman's Facial Action Coding System
There are 80 facial muscles. Certain muscle changes are associated with real emotions, different from those associated with hidden or disguised emotion.

D. Conditioned Fear

E. Aggression

VI. The Culture of Emotion

The expression and causes of emotion are influenced by the culture.

A. The Varieties of Emotion
1. Primary emotions, such as fear, anger, happiness, sadness, surprise, and disgust, seem to be universal.
Plutchik identified eight universal emotions.
2. Culture determines what individuals get emotional about.
Display rules govern how and when emotions may be expressed. (Ekman & Friesen) People learn display rules.

B. The Communication of Emotion
1. Body Language is nonverbal signals of body movement, posture, gesture, and gaze that are associated with emotion.
a. The smile is universally recognized as a sign of friendliness, however, culture determines its prevalence and shapes its functions.

C. The Case of Emotion and Gender

1. In Western Societies, women are more likely to talk about feelings of fear, sadness, and loneliness than are men.
2. Men are more likely to deny they have such feelings or to reveal them in aggressive acts. Women are more likely to feel depressed and are more emotionally expressive.

Resources:

Carlson, N. (1997), Psychology: The Science of Behavior(5th ed.). Boston: Allyn and Bacon Pub.

Darwin, C. (1872), The Expression of Emotions in Man and Animals. New York: Philosophical Library.

Lefton, L. (1997), Psychology(6th ed.). Boston: Allyn and Bacon Pub.

Pinel, John P.J. (1997), Biopsychology (3rd. ed.). Boston: Allyn and Bacon Pub.

Wade, C. & Tavris, C. (1993). Psychology(3rd ed) New Your: Harper Collins Pub.

APPENDIX A
III

THE BIOPSYCHOLOGY OF STRESS AND COPING
TEACHER NOTES

Rule No. 1 is, don't sweat the small stuff.
Rule No. 2 is, it's all small stuff.
And if you can't fight and you
can't flee, flow.
Eliot

I. Health psychology is a field within psychology that studies psychological aspects of health and illness. This subfield of psychology studies the interactions of biological, psychological, and social systems. Behavioral medicine is an interdisciplinary field of behavioral and medical sciences that studies behaviors related to the maintenance of health, the onset of illness, and the prevention of disease.

A. Nearly two-thirds of ailments seen in doctors' offices are thought to be stress-induced or stress related.

I. Sources of Stress

A person must appraise a situation as stressful to be stressful.

A. Daily Hassles. Everyday irritations and frustrations predict psychological and physical symptoms.

"It's not the large things that send a man to the
madhouse...no, it's the continuing series of
small tragedies...not the death of his love
but the shoelace that snaps with no time left."
Charles Bukowski, 1983

1. Frustrations: The emotional state that results when a goal (work, family, personal) is blocked.
2. Conflict: The emotional state in which a person has to make difficult decisions about two or more competing motives or behaviors.

Three types of Conflict

a. approach-approach conflict: choosing between equally appealing situations
b. avoidance-avoidance conflict: choosing between equally distasteful situations
c. approach-avoidance conflict: a conflict where people are faced with a single alternative that is both appealing and distasteful

B

C

III.

IV. St

A.

B.

B. Continuing Problems. Prolonged, repetitious stress is associated with psychosomatic disorders; feelings of control and predictability are important.

C. Life Events. Holmes and Rahe identified and ranked 43 "life-change events" in order of their disruptive impact.

III. The Nature of Stress

A. Alarms and Adaption. Hans Selye popularized the study of stress.

1. General Adaption Syndrome: The bodies response to stress has three phases
   a. Alarm Phase: the organism mobilizes to meet the "threat" (heart rate and respiration increases, blood flow to the muscles increases, pupils dilate, epinephrine released, etc.)
   b. Resistance Phase: the organism attempts to resist or cope with a threat that cannot be avoided
   c. Exhaustion Phase: depleted energy due to persistent stressor, becomes vulnerable to fatigue, physical problems, and eventually illness.

Stressor ----> Stress (GAS) ----> Healthy adaption or illness

2. Eustress is positive and beneficial.
3. Stressors include anything that requires the body to mobilize its resources and can be physical or psychological.
4. Seyle focused on biological responses to stress. Others have noted that qualities of the individual and how we cope with stress affect how we react to stressors

IV. Stress and the Brain There are three major communication systems in the body that regulate our reactions to stressors.

A. Voluntary Nervous System: This communication system sends messages to muscles so that we may respond to sensory information.

B. Autonomic Nervous System: It combines the sympathetic (emergency branch of the nervous system) with the parasympathetic (calming branch) which keeps the body's maintenance systems.

1. Sympathetic: increases blood supplies to the muscles and reduces blood flow to the skin, kidney and digestive tracts
2. Parasympathetic: tries to reduce the harmful effects of the emergency branches response to stress

C. Neuroendocrine system: maintains the bodies internal functioning
   1. Stress hormones
      a. epinephrine (adrenaline): prepares the body for immediate responses by producing a state of arousal
      b. cortisol (glucocorticoid) helps counteract the primary response to stress to re-establish homeostasis. Effects the metabolism of glucose by mobilizing energy and enhancing feeding.

V. Illness and Immunology. Physical and psychological factors interact to determine health.

A. Psychosomatic disorders involve the interaction of psychological and physical factors.

B. Psychoneuroimmunology studies the complexities of the mind-body relationships among psychological processes, the nervous system, and the immune system.

1. The immune system is designed to do two things:
   a. recognize foreign substances (called antigens)
   b. destroy or deactivate foreign substances (antigens)
2. Two types of white blood cells
   a. lymphocytes: recognized and destroy
      - Natural Killer cells: important in tumor detection and rejection
      - B cells: (released from bone marrow) produce antibodies
      - T cells: (made in the thymus) Helper T cells enhance the immune system and Killer T cells destroy antigens
   b. Phagocytes: ingest and eliminate
3. The Neuroendocrine system's response to stress
   a. Cortisol is produced
   b. Cortisol increases blood flow to the thymus which influences the lymphocytes and the immune system
4. The Sympathetic Nervous Systems response to chronic stress
   a. The hypothalamus with helps to maintain homeostasis, signals the release of norepinephrine. In increased amounts norepinephrine inhibits the immune system.

VI. The Individual Side of Health and Well-Being
People vary in their ability to cope with stress

A. Negative Emotions
   1. Type A people are intense, impatient, and achievement-oriented. Type B people are calmer and less intense.
   2. Anger, anxiety,and depression are the hazardous Type A personality traits. Antagonistic hostility found in Type A personality traits has been linked to heart disease.

B. Explanatory Style: An optimistic explanatory style may promote well-being.

C. Healthy Habits
   1. Avoid fatty food, sugar and salt. Eat fresh fruits and vegetables.
   2. Avoid all drugs including tobacco, alcohol (except for occasional social use), tranquilizers, and sleeping pills.
   3. Exercise. Physical exercise is good stress that helps tone the body.
   4. Get enough rest. Adults need 8 hours sleep, children 10-12 hours.
   5. Tight cloths can make you feel uptight.
   6. Avoid hazardous situations where you may be at risk from chemical, biological or physical assault.

D. The Question of Control: In general, well-being is promoted by the feeling of being in control.
   1. Animal studies show, and human studies confirm, that losing control provokes an outpouring of stress hormones. When rats cannot control shock or when humans feel unable to control their environment, stress hormone levels rise and immune responses drop (Rodin, 1983 and Meyers, 1997)
   2. Locus of Control. There are systematic differences in the extent to which people believe that they are in control of the things that happen to them.
   3. The Benefits of Control. The sense of control enhances your ability to cope with stress and recover from some diseases and directly affects the immune system.

E. Coping with Stress
   1. Coping: Cognitive and behavioral efforts to manage demands in the environment or oneself that one feels to be stressful.
   2. Coping Strategies
      a. Define the problem: define the correct problem
      b. Rethink the problem: interpret the events
      c. Reappraisal: "Its not so bad."
      d. Social Comparisons: "I'm better off than they are."
      e. Avoidance: "It's not important. Lets go to the movies."
      f. Humor
      g. Exercise
      h. Relaxation
      i. Looking Outward

Resources:

Carey, J. (Ed.). (1991). Stress and the Brain. Washington D.C.: Society for Neuroscience.

Meyers, D.G. (1997). Exploring Psychology. New York: Worth Publishers.

Wade, C.,& Tavris, C. (1993). Psychology(3rd Ed.) New York: HarperCollins.

APPENDIX A
IV

THE BIOPSYCHOLOGY OF STRESS AND MENTAL ILLNESS TEACHER NOTES

I. Schizophrenia

A. Symptoms include:

1. Bizarre delusions. Delusions of being controlled
2. Inappropriate affect. Failure to react with appropriate emotions.
3. Hallucinations. Hearing imaginary voices
4. Incoherent thought. Illogical thinking, peculiar associations among ideas
5. Odd behavior. Long periods with no movement, a lack of personal hygiene, talking in rhymes, avoiding social interaction.

B. Causes of Schizophrenia

1. Some people inherit a potential for schizophrenia, which may or may not be activated by experiences.
   - identical twin studies
2. possible link to viral infection during fetal development

C. The Biochemistry of Schizophrenia

1. During the 1950s the first antischizophrenic drug was accidentally discovered.
   a. Chlorpromazine, developed as an antihistamine, was discovered to have a calming effect on some patients when giving before surgery. Later it was found to alleviate schizophrenic symptoms.
   b. Research with Parkinson's disease, which has similar symptoms as the onset of the antischizophrenic effect of medication, suggested a link to dopamine.
   c. The dopamine theory of schizophrenia - the theory that schizophrenia is caused by too much dopamine. Antischizophrenic drugs decrease the levels of dopamine.
   d. Chlorpromazine is a false transmitter (receptor blocker) at dopamine synapses.
2. The parts of the brain involved in schizophrenia include; the prefrontal cortex, the temporal cortex, the basal ganglia, the thalamus, and the hippocampus.

D. Vulnerability-Stress Model

1. A combination of genetic factors and stress produce schizophrenia. As David Holmes (1991) puts it;

"Humpty Dumpty had a fragile shell, but he didn't break until he fell"

II. Affective Disorders: Depression and Mania

A. Symptoms of Depression;
Gloominess, hopelessness, negative self-image, fatigue, obsessive worrying about death, difficulty sleeping

B. Causes of Affective Disorders
1. Genetic factors
-twin studies
2. Stress.
a. Studies by Brown (1993) found that 84% of a large sample of depressed patients had experienced severe stress in the preceding year, in comparison to 32% of a group of control subjects.
b. Anisman and Zacharko (1982) have suggested that the depletion of certain neurotransmitters (dopamine, serotonin, and norepinephrine) that is associated with stress may leave an individual sensitive to stress and less able to cope.

C. Discovery of Antidepressant Drugs
1. Monoamine oxidase inhibitors.
a. Iproniazid, the first antidepressant drug, was originally developed for the treatment of tuberculosis. It was found to be more affective in treating depression.
b. Monoamine agonists increase the levels of monoamines by inhibiting the activity of MAO, the enzyme that breaks down monoamine neurotransmitters.
2. Tricyclic Antidepressants block the reuptake of both serotonin and norepinephrine, thus increasing their levels.
3. Lithium.
a. Discovered by accident by John Cade; he mixed the urine of manic patients with lithium to form a soluble salt, then he injected the salt into a group of guinea pigs to see if it would induce mania. Instead of producing mania it seemed to calm the guinea pigs.
b. Today lithium is the treatment of choice for bipolar affective disorder, but the effects of lithium on the brain are still a mystery.
4. Selective serotonin-reuptake inhibitors
a. Prozac selectively blocks serotonin reuptake.

Resource for Teacher Notes

Pinel, J.P. (1997). Biopsychology (3rd Ed.). Boston: Allyn and Bacon

APPENDIX B

I

THE BIOPSYCHOLOGY OF EMOTIONS, STRESS, AND MENTAL ILLNESS

Pretest

1. You are having a meeting with your co-workers to make some important decisions. To learn how the group members really feel, you should pay most attention to their
   a) faces. b) words. c) hands. d) feet.
2. Darwin believed that the expression of emotion on the face is
   a) biologically determined.
   b) culturally determined.
   c) learned through experience and imitation.
   d) variable from individual to individual.
3. Robert feels very tense and anxious before an important job interview. He looks in the mirror and tries to practice looking relaxed and enthusiastic. He finds he begins to feel less tense. This supports the
   a) Ekman-Friesen theory.
   b) Darwinian theory of universal facial expressions.
   c) facial-feedback hypothesis.
   d) James-Lange theory of emotion.
4. A long-time patient at the Neurological Institute cannot recognize the faces of the staff members and shows surprise whenever he looks in the mirror. Most likely this patient is suffering from
   a) prosopagnosia. c) damage to the left hemisphere.
   b) bilousness. d) schadenfreude.
5. According to recent research all of the following brain structures are involved in strong emotions <u>except</u> for the
   a) amygdala. c) hypothalamus.
   b) limbic system d) cerebellum.
6. As you hurry down a dark, deserted road, you see a car overturned on the side of the road. Your body will do all of the following <u>except</u>
   a) speed up respiration. c) perspire.
   b) speed up digestion. d) speed up heart rate.
7. Maya works on the Emergency Rescue Unit. Which hormones are involved in arousal as she rescues a child from a burning building?
   a) melatonin and norepinephrine c) androgen and progesterone
   b) seratonin and dopamine d) epinephrine and norepinephrine
8. Which of the following is NOT an anxiety disorder?
   a) phobia c) obsessive-compulsive disorder
   b) schizophrenia d) posttraumatic stress

9. The biological theory of depression would attribute the causes to
   a) imbalances in serotonin c) lack of reinforcement.
   b) imbalances in acetylcholine d) anger turned inward.
10. The psychological factor MOST directly related to physical illness is____
   a) sexuality b) stress c) aggression d) friendliness
11. Which hemisphere of the brain is most associated with the expression of emotion?
   a) left b) right
12. Which hemisphere of the brain is most associated with interpreting emotions?
   a) left b) right

APPENDIX B
II

THE BIOPSYCHOLOGY OF EMOTIONS, STRESS, AND MENTAL ILLNESS
Prequestions

1. What is an emotion?

2. What causes us to feel emotions?

3. Describe each of the following components of emotions.
   a. Behavioral responses (behaviors associated with emotions)

   b. Our bodies automatic responses to emotion

   c. Hormonal responses to emotion

4. You believe your best friend is lying to you. Describe how you can tell if your friend is lying.

5. What is a conditioned emotional response? (also give an example)

6. You feel stressed!! ... What is stress?

7. What does your body do in stressful situations?

8. What are some abnormal emotional responses or behaviors?
(Psychological Disorders)

9. What is the source of a person's abnormal psychological response when they have a psychological disorder?

10. Describe some ways to measure physiological changes in the autonomic nervous system during an emotional response.

APPENDIX C

EXPERIMENT ON SMILING

Joan W. Walls

Activities Handbook for Teaching Psychology Vol. 1

Concept The purposes of this exercise are to explore the expression of emotions, including individual and sex differences in such expression; to demonstrate the power of nonverbal communication; to increase awareness of how self-image is affected by the responses of others; to develop student's skills as experimenters; and to study the influences of experimental variables.

Instructions Have each of the students in the class participate as an experimenter in collecting data on subjects outside of class. Instruct the student experimenters as follows:

"You are going to be an experimenter and perform an experiment on smiling. Your task is to record people's (subjects') responses to you depending on whether you are smiling or not smiling at them. There are a few rules to follow:

1. Your subject should be a stranger to you.
2. You must gain eye contact with the subject to be sure she or he has seen you. Maintain eye contact for a second or two while you either smile or don't smile at the subject.
3. Decide if you are going to smile or not smile before approaching a subject, and then stick to your decision.
4. Whenever possible, pick a subject who is alone. It may affect the results if a subject is with other people.
5. You may wish to record additional data such as the date, the time of day, or the location of the experiment."

"The following chart is an example of how to record responses. Carry such a recording sheet with you and record the responses after each subject responds."

Recording Sheet

Date: _____ Time: _____	*Experimenter smiling*		*Experimenter not smiling*	
Response	Male	Female	Male	Female
Smile				
No smile				
Acknowledgement without smile				
Avoidance				
Other				

Description of response categories:
Smile--subject clearly initiates a smile or responds to your smile.
No smile--subject clearly does not initiate a smile or does not respond to your smile.
Acknowledgement without smile--subject nods head, raises a hand, or shows some other form of greeting without smiling.
Avoidance--subject quickly looks away and avoids a further response.
Other--any other response.

"After completing the experiment, add the total responses for each category. You may then wish to go a step further and determine the percentage of total responses in each category. It is desirable to have at least 4 males and 4 females in each condition (smiling or not smiling), for a total of 16 subjects."

Discussion It is most effective to total the results for all of the student experimenters in the class or group. The data can be collected and presented to the class later or summarized in class. You may want to use the summary process to demonstrate simple statistical analyses of data. Discussion questions relevant to this experiment include the following:

1. How did it feel not to smile? Was it easy or hard not to smile when a person initiated a smile?
2. How did it feel to smile if your subject did not smile back?
3. What differences did you find between male and female responses? Why?
4. For males and females separately: What differences do you think your sex as experimenter made on the results you found?

5. What do you think smiling really means? What "message" is being communicated?

6. What circumstances might have changed your results? Time of day? Season? Area of country? Population setting (city or rural area)?

7. Why do you think some people smile more than others?

The following table of percentages represents the results of a smile experiment conducted at the University of North Carolina at Chapel Hill in 1966. I used a total of 278 subjects. It might be interesting to compare your results with these.

Some Actual Results

	Experimenter smiling			*Experimenter not smiling*		
Response	Male (N = 120)	Female (N = 30)	Total	Male (N = 44)	Female (N = 34)	Total
Smile	31.7	63.3	38.	5.3	17.6	8.7
No smile	35.8	23.3	33.3	80.8	47.1	72.
Acknowledgement without smile	18.3	3.3	15.3	0	2.9	.8
Avoidance	14.2	10.	13.3	14.2	32.4	18.

APPENDIX C

II

What are Your Eyes Saying?

Teacher's Guide

Objectives:

To overtly experience innate recognition of nonverbal emotional expression.
To identify one of the sympathetic nervous systems responses of fear and arousal.

Prequestions:

What characteristics makes a person more attractive or friendly looking?
How do we know if someone is attracted to us?
What do we do to make ourselves look more attractive or friendly?

Background Information:

The person of your dreams strolls in front of you. Your hearts starts pounding, breathing increases, palms become sweaty. You must be in love because your sympathetic nervous system is telling you so. The sympathetic nervous system prepares an organism for action. The physiological changes the SNS produces include; increase blood pressure, pupil dilation, increase blood flow to the muscles, increase respiration, increase release of epinephrine and norepinephrine(previously called adrenaline and noradrenaline) from the adrenal medulla (Coon,1995).

You are aware of your pounding heart but we are not always aware of all of the emotional responses we experience. Our eyes have been considered the "windows to our soul". Eyes can be good indicators of emotion. Poker players watch our unconscious body language to tell if we have a good hand. Your face can give you away if you are lying. Psychologist Eckhard Hess believes the size of a person's pupils are our unconscious focal points. Pupil size can actually be a very primitive form of communication (Van de Meer, 1995). Epinephrine released during arousal, fright, or attention can activate the sympathetic nervous system to cause pupils to dilate. This happens for pleasant or unpleasant emotions. Hess(1975) showed two photos of an attractive young women to a group of men. In one photo, the woman's pupils were large. In the other they were small. Consistently the subjects reported that the photo of the large pupil woman looked "feminine", "soft", or "pretty." The woman with the small pupils was described as "hard", "selfish", and "cold" (Coon, 1995).

Material Preparation:

Part A

Option 1

1. Obtain two color copies of a person's face. Use photos, pictures from magazines, or newspapers.

2. Cut out a rectangular section encompassing the eyes.
3. Carefully enlarge the pupils of one of the sets of eyes. Use a black pen or pencil. AVOID darkening the white "twinkle" in their eye or the eyes do not appear real.
4. Make several sets of different eyes.

Option 2

1. Scan a photo or magazine picture of a person's face into a computer.
2. Using a print shop or equivalent program, cut a rectangular section encompassing the eyes.
3. Make a second copy of the eyes but enlarge the pupil size of the second copy. AVOID darkening the white "twinkle" in their eye or the eyes do not appear real.
4. Make several sets of different eyes.

Part B

1. Go to your local Kinkos or print store and make a color transparency containing both sets of eyes.
2. Repeat this preparation procedure for one to three more sets of eyes if possible.

Procedure:

1. Instruct the students that they will be making observations and writing down their responses. "Please choose the eyes that look more attractive, warm, or friendly. Go with your gut feeling."
2. Cover one set of eyes with an index card.
3. Present the transparency on an overhead projector.
4. Show one set of eyes for a few seconds. Shift the index card to cover the first set of eyes, presenting the second set of eyes. Repeat a few times as necessary.
5. Repeat these procedures if you have more than one transparency of eyes.
6. Compile class tallies on the board of which eyes were more attractive.
7. Re-present the sets of eyes. Allow students to make observations of the eyes to see that the only difference is the pupil size.

Questions for Constructing Knowledge:

1. Did you recognize why you chose the larger pupil size as more attractive or friendly? (innate, unconscious focus of our attention)
2. What causes the pupils to get larger?
3. What part of the nervous system gets us going when we are scared or excited?
4. What are some of the other responses of the sympathetic nervous system when you are "in love", scared, etc?

Application:

*Bad guys in movies often have beady eyes.

*Extract from the plant Belladonna was put in the eyes of ancient Egyptians to make their pupils dilate, making them more attractive.

*Photographers and advertisers retouch photos of model's eyes. They produce a picture in which the models have larger eyes and pupils to make them look more appealing to us.

Extension:

Examine cosmetic models in magazines.

References:

Adams, Thomas (1997). Professor of Physiology, Michigan State University. personal interview.

Coon, Dennis (1995). Introduction to Psychology: Exploration & Application (7th ed.) New York: West Publishing Co.

Van der Meer, R. & Dudink, D. (1996). The Brain Pack: An Interactive, Three-dimensional Experience of the Mysteries of the Mind. England: Van der Meer Publishing Co.

Acknowledgements:

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APPENDIX C

III

Can You Pass a Polygraph Test?

* The procedures for this activity were originally developed by Mandy West. This activity was modified due to the differences in the equipment available.

Objectives:

To investigate the relationship between emotional thoughts and physiological responses.

Background Information:

For centuries, Asia has used the "rice" method to detect if a person suspected of a crime was not being truthful (Wade & Tavris, 1993). The suspect had to chew on a handful of dry rice and spit it out. If the person was innocent they would easily spit out the rice. If the person was guilty they would have grains of rice stuck to the roof of their mouth and to their tongue.

Even though this rice method sounds like an "old wives tale" it is not much removed from our "modern" method of lie detection. In theory, polygraph machine measures lies by monitoring changes in the body's physiology. This is based on the responses of the autonomic nervous system in times of emotional responsiveness. The autonomic nervous system attempts to maintain the body's homeostasis during times of emotional responsiveness. There are two branches of the autonomic nervous system; the sympathetic and the parasympathetic systems. The sympathetic nervous system initiates stress and emotional responses. The parasympathetic nervous system attempts to restore the body back to normal.

The rice test is based on the same premise as the polygraph test. The guilty person would have lower levels of saliva thus causing the rice to stick to the mouth cavity and tongue. The modern polygraph test monitors sympathetic nervous system activity such as pulse, respiration, perspiration, and blood pressure. Finger tip skin temperature can also indicate stressfulness.

The American Psychological Association has stated that there is no basis to assume that polygraph tests are accurate. The U.S. Congress agrees thus making their test results inadmissible in a court of law.

Materials:

Multimeter set on ohms of resistance
Leads hooked to a thermistor
Finger tip pulse monitor

Procedure:

1. Form groups of four students.
2. Choose one student in each group to take the polygraph test.

3. Turn this student so they are facing a wall.
4. Place the pulse monitor on the subjects finger. The subject should hold the thermistor with the fingers of the other hand.
5. One student in the group will be assigned the task of monitoring temperature, while another monitors pulse.
6. The fourth student will ask the questions for the polygraph test.
7. The two students collecting and recording data need to allow adequate time for the equipment to stabilize, and then record the initial temperature and pulse.
8. The person questioning will ask the "subject" taking the polygraph to choose a number between 1 and 10, without revealing it to the others. After the "subject" has a number in mind, they are told that they are going to be asked what the number is, starting with the number 1 and going in order to the number 10. The "subject" is instructed that they are to respond NO to every question.
9. Make sure the data collectors have an initial reading.
10. The person questioning will ask if the number they selected was one? The data collectors will take the pulse and temperature measurements. Wait five seconds. The person questioning will ask if the number they selected was two? The data collectors will take the pulse and temperature measurements. Wait five seconds. Continue this procedure until the number 10 is questioned.
11. Wait for the pulse and temperature to stabilize after the completion of the number questioning. The person questioning will then ask the subject the month of their birthday. Again the subject will "lie," responding NO to every month. The months will be asked in order. After each question the data collectors will take the pulse and temperature measurements. Remember to wait five seconds before asking the next month.
12. Again allow the pulse and temperature to stabilize, the questioner will ask the subject to tell them if they were born on an even or odd day of the month. After they respond even or odd, ask them to think about their birthday, and respond NO to every question. Ask them either the odd or the even days in the month, ask them in order, give five seconds in between each question, and make sure the data for each day is recorded.
13. The "subject" should not disclose any of their answers to these questions until all of the data is analyzed.
14. The "lie detectors" should hypothesize the number between 1-10, the month of the birthday, and the specific day of birth, by analyzing the data.

Discussion Questions

1. How did you determine the "subjects" number, month of birth, and day?
2. In general how do you determine if someone is lying? Describe the physiological responses to lying.
3. How much confidence to do you have in a polygraph test?
4. How could someone cheat on a polygraph test?

APPENDIX C, figure 4

Teacher's Guide to:
Do You Have a Happier Side?
Emotional Expression

Objectives:

To demonstrate emotional expression and brain specialization as support for the Right Hemisphere Dominance theory of emotion.

To demonstrate corpus callosum cross-over.

Background Information:

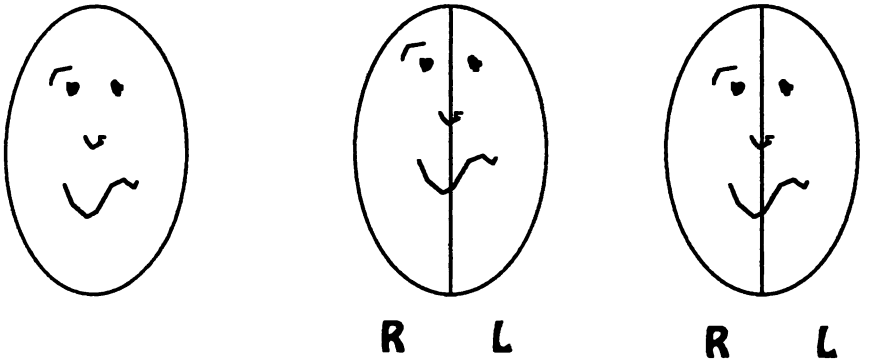
New technology is increasing our knowledge of the functions of areas of the brain by leaps and bounds. The earliest knowledge of brain specialization came from brain lesioning. Early connections between frontal lobes and personality were discovered by "accident." In 1848 a young railroad worker by the name of Phineas Gage blew a thick rod through the front of his brain. He survived but his personality changed from friendly and hardworking to ill-tempered and lazy. Early observations by his physician linked the destroyed area of his brain to personality controls. At the end of the 19th century, Paul Broca observed a patient who had lost his ability for producing speech. Broca discovered stroke damage to the left frontal lobe of the left hemisphere. Stroke victims also show us that if they have brain damage in their right hemisphere of their brain, they may exhibit paralysis on the left side of their body. Left hemisphere strokes can cause the paralysis of muscles on the right side of the face, resulting in facial drooping. This indicates a crossing over of brain/body functioning. Additional patient research has found that the brain has specialized areas for many functions. The right hemisphere tends to specialize in nonverbal skills, perceptual skills, recognition of faces and patterns, recognition and expression of emotion, and spatial skills. The left hemisphere specializes in language, speech, writing, calculations, rhythm, ordering, and complex movements.

Can we observe these hemispherical specializations written on our face? Studies by Campbell (1978) found that right hemispheric involvement in emotion produced a greater intensity of emotional expression on the left side of the face (Dopson, 1984). Studies found that damage to the right hemisphere could impair ability for normal emotional communication (Dopson, 1984).

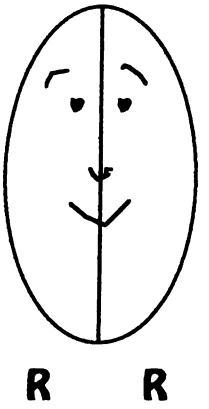
Material Preparation:

1. Take photographs of happy, smiling people. Ask your subjects if it is ok to use their face for science. Another option is to use magazine or newspaper pictures.
2. Make three transparencies of the photo(s).

3. Cut two of the three transparencies directly down the center of the face. Keep one transparency as your original with the original photograph.



4. Tape the two left side transparencies of the face together to make a complete face. Repeat with the two right sides.



5. If possible, repeat this material preparation procedure for one or two more faces.

Procedures:

1. Instruct the students to write down their responses to their observations. "Decide which face looks emotionally happier."
2. Place one of your same side faces(R/R or L/L) on the overhead projector. Leave it there for a couple of seconds. Remove it and place the other sided face on the overhead.
3. Repeat a few times until students have written down their choices.
4. Repeat with another face if you have more.
5. Collect student data on the blackboard for analysis.
6. You may want to present the original at the conclusion.

Questions for Constructing Knowledge:

1. Why did more people chose one transparency over the other?(Show them the original)

2. Why do you believe more people chose the left sided face? [When asked to choose a side of the face that looks happier 70% of people choose the left sided face (Carbary, 1997)]

3. Where do your emotions originate?

4. What are emotions?

5. What part(s) of your brain express or are involved in emotions?

6. What happens to someone who has a stroke?

7. What happened to Phineas Gage as a result of his accident?

8. What does our data suggest about expressions of emotions? brain hemispheres?

9. If the right hemisphere specializes in emotions, why did more of the students in this class choose the left side of the face as happier?

Application:

Discuss split brain patient research.

Some models only allow one side of their face to be photographed. Our faces are not asymmetrical. People with more symmetrical faces are more likely to be models.

Extension:

Use the same materials as above to demonstrate how right brain hemispheric dominance is present in emotional perception (See"Emotional Perception and Our Left Field of Vision"). Another extension activity could be to test infants expression of emotions vs adults. Some research shows that hemispheric dominance for expression of emotion does not develop until children are three years old. To do more demonstrations of other hemispheric dominant traits, try "Cerebral Lateralization" by Ernest D. Kemble. This activity can be found in Activities Handbook for Teaching of Psychology,Vol. 2. This activity examines hemispheric interference between a verbal and manual task.

References:

Dopson, W.G., Beckwith, B.E., Tucker, D.M., & Bullard-Bates, C. (1984). Asymmetry of Facial Expression in Spontaneous Emotion, Cortex 20, 243-251.

Carbary, T. (1997). Doctorial Candidate, Department of Psychology, Michigan State University.

APPENDIX C
V

Teacher's Guide to:

Emotion Perception and Our Left Field of Vision

Objectives:

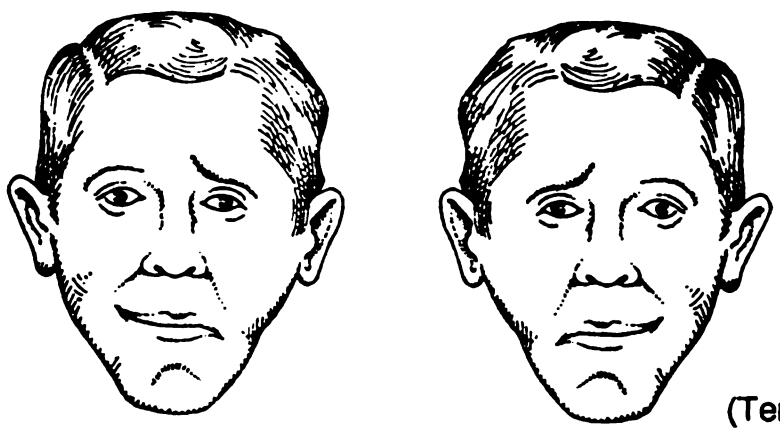
To demonstrate emotional perceptual specialization in the right hemisphere of the brain.

To demonstrate corpus callosum, brain/body crossover.

Background Information:

Emotional perception tends to be specialized in the right hemisphere of the brain. This can be shown using odd pictorial images of faces referred to as chimeric stimuli (Temple, 1993). Chimeric faces are constructed with one half of the mouth appearing to smile and the other appearing sad or glum (see figure 1). Subjects are asked to report whether each face looks happy or sad.

figure 1



(Temple, 1993)

Typically a right handed person will say the face in his left field of vision (on his left side) appears happier. Remember, our eyes are wired so the information coming from our left side is projected to our right brain hemisphere. Further evidence comes from stroke victims. Right hemisphere damage in neurological patients can interfere with their ability to make judgments about emotional expressions and to make facial expressions (Temple, 1997). All of this evidence tends to support the Right Hemisphere Dominance theory. The Right Hemisphere Dominance theory suggests that the right hemisphere of the brain is mostly responsible for all emotional processing.

The other predominate theory of localization of emotional functioning is the Valence theory. The valence theory suggests that the right and the left hemisphere each have responsibilities for processing information about different emotions. The right hemisphere is believed to be responsible for negative emotions, such as sadness and the left hemisphere is responsible for

positive emotions. The evidence for this theory comes from observations of people with brain damage. People with right hemisphere brain damage sometimes lack negative emotions and people with left brain damage seem to lack positive emotions. This investigation will test the Right Hemisphere Dominance theory and open many questions.

Material Preparation:

Use the materials prepared in the previous activity("Do You Have a Happier Side? Emotional Expression).

- 1 original transparency of a happy face
- 1 right/right face transparency of the happy face
- 1 left/left face transparency of the happy face

Procedure:

1. Place the original transparency on an overhead projector.
2. Instruct students to write down which of the next two faces look most like the 1st picture on the overhead(the original).
3. Present one of the other transparencies (either the R/R or L/L), then present the other transparency.
4. Compile the class data on the black board.
5. Discuss with the students, the source of their preference for one picture. Typically the R/R is chosen as the match for the original transparency since it matches the side of the face of the original in their left field of vision.
6. To reinforce this phenomena, turn the original transparency over on the overhead projector so you view the face in reverse. Now, subjects typically choose the L/L face as the face that most closely resemble the reversed original.

Questions for Constructing Knowledge:

Ask leading questions regarding the crossover of brain/body functions and brain specialization similar to "Do you have a happier side?".

Application:

Recent research has shown that mothers usually cradle their babies in their left arm. Scientists suggest that this behavior lends evidence to the fact that the mother's left field of vision is better able to judge the infant's emotional communication. Researchers have also found that schizophrenic mothers cradle their infants in their right arm (Harris,1997). People suffering from schizophrenia often lack emotional judgment. Data was collected from my classes by Michigan State University researcher Timothy Carbary to investigate whether there is any correlation between a bias for left field of vision for emotional perception and left side baby cradling. From a sample size of 121 students, 76% said their degree of handedness was strong right, 19 %

moderate right, 2.5% strong left, and 1.7% moderate left. There was significantly more left-attention biased subjects for the emotional judgment of faces when the question posed was, "Which face is happier?($p<.05$)." There was also a significantly more left cradlers than right cradlers ($p<.05$). Unfortunately there was not a correlation between the two. So what could this mean? This would lead to a good discussion with your students for other possible explanations rather than right hemispheric dominance for emotional perception. Scientists are still researching this question. Possible questions to consider may include: the role of handedness, is learning and experience influencing cradling, or does learning to read from left to right influence left field of vision emotional perception. Future tests for scientists could include testing very young children prior to learning to read. Some people argue that we cradle a baby in our left arm to keep our dominant hand free. Again, we could test young children before they find comfort in their dominant hand. Another investigation could be devised to test adults by asking them to hold a grocery bag of equal weight of a baby in their arm to see if they hold it in their dominant arm or leave their dominant arm free for other activities. Students can benefit by posing possible questions, suggesting solutions to experimental problems, and proposing further research in an area of science that has a vast amount of information yet to discover.

Extension:

Are males or females better at perception of emotions? Set up an experiment to test this question.

Reference:

Harris, Lauren (1997) Michigan State University Professor of Psychology. personal interview.

Temple, Christine (1993) The Brain. England: Penguin Books.

APPENDIX C, figure 6

Teachers Guide to:
Familiarity of Faces

Objectives:

To investigate our innate focal points of facial recognition.

PreQuestion:

How do you recognize who your best friend is when you arrive at school?
What are some facial characteristics that you identify?

Background Information:

When we recognize an old friend in a photo, what facial characteristics do we identify? Research by Roberts and Bruce (1988) found that obscurring the eye region does the most to hinder the recognition of the person. Recognition of a familiar face and access to semantic information about a person is held in different locations of the brain. Brain damaged patients provide evidence for the differences in housing of facial recognition. Cases of the Prosopagnosis, visual agnosia for faces, experience difficulty identifing the face of people, including their own face in a mirror. However they do not have difficulty pointing out the components of a face (for example the eyes or nose) or facial expressions.

Material Preparation:

Take photographs of 2-4 staff members in your school. Another option is to use magazine pictures of famous people. Make double prints when you develop your film or go to your local Kinkos or print shop to make color copies. The color copies work better than the double prints. Leave one copy intact. Using the second copy, cut out the mouth, nose, and eyes (see below). Repeat this procedure for a second person. Glue three or four people per sheet. Return to a print shop and make a color transparency.

Color Transparency

Eyes	Eyes	Eyes
Nose	Nose	Nose
Mouth	Mouth	Mouth
Full Face	Full Face	Full Face

Procedure:

Cover each part of the cut out face and the full faces with a post-it-note. Start the demonstration by uncovering the people's noses. Instruct the students to write the person's name on a sheet of paper if they recognize them. Recover the noses and uncover the mouths. Instruct the students to attempt to identify the people. Repeat procedures with the eyes. Finally uncover the complete face.

Questions For Constructing Knowledge:

When did you recognize the people?

What does this demonstration show you about the focus of our attention when we look at someone's face?

What facial feature do we most commonly use to identify a person?

Application:

News interviews often cover (or blackout) the eyes of witnesses they interview on TV so people won't identify them. An example of this is the "Do's and Don'ts of fashion featured in Mademoiselle Magazine.

Police officers wear sunglasses. The glasses enable them not to be identified and make them more intimidating because we can't read their eyes. Its difficult to look at someone who is wearing dark glasses.

Extensions:

Teach class one day while wearing sunglasses. Note your students reactions.

Do an investigation of aging. Match the eyes of young pictures with the adult pictures. Repeat with noses and mouths to see if people have an increase accuracy for matching eyes.

References:

Adams, Tom (1997). Professor of Physiology at Michigan State University, verbal conversation.

Carbary, Tim (1997). Doctorial Candidate, Department of Psychology at Michigan State University, personal interview.

Roberts, Tony and Vicki Bruce (1988). Feature Saliency in Judging the Sex and Familiarity of Faces. Perception, 17.

Teacher's Guide To:
Becoming a Margaret Thatcher Illusion

Background Information:

We look at a person's face to perceive their mood. Researchers have found that our eyes and mouth convey the most information about emotions (Thompson, 1980). Our eyes are the most recognizable features identifying a familiar person (Roberts & Bruce,1988). Kohler believed that an upside-down face is harder to recognize because its difficult to interpret facial expression. What happens if we turn a face upside down but leave the eyes and mouth right side up? Thompson (1980) reported a new illusionary effect based on this question. The illusion is called the Margaret Thatcher.

Material Preparation:

1. Enlarge a photo of yourself, making two copies. Use a copy machine set on photo such as you may find at a print shop.
2. Cut out your eyes and mouth.
3. Glue the eyes and mouth over the other copy of your face but inverse them.
4. Make a transparency of your new "Thatcher Face".

Materials:

your "Thatcher Face" photo

Procedure:

1. Place your "Thatcher Face" on an overhead projector upside down.
2. Ask your students to interpret your photo's (Thatcher Face) emotion.
3. Slowly rotate your "Thatcher Face" 180 degrees.
4. Discuss your student reaction to the grotesque appearance of your photo that was not apparent when upside down.

Extension:

Test the recognition time for photographs that are presented upside-down vs right-side up.

References:

Carbary, Timothy (1997). Psychology Doctorial Candidate, Michigan State University, personal interview.

Thompson, P. (1980). Margaret Thatcher: a new illusion, Perception vol. 9, pg 483.

APPENDIX C

VIII

FLASHING FACES

Linda Winchell

Activities Handbook for

Teaching Psychology Vol. 1

Concept One phase of the study of emotions of interest to students and teachers alike is the expression of emotions. Whenever psychologists have studied emotional expression, some have maintained that the expression of emotions is learned and is therefore unique to each culture. Others agree with Charles Darwin, who maintained that because facial expressions are biologically based, one can find universality in expression.

Whichever position is true, it is generally agreed that the face provides the most signals for expression of emotions. The forehead, eyebrows, eyelids, cheeks, nose, lips, and chin all serve to give clues to the feelings one is experiencing. There appear to be "rules" individuals use to "read" faces, but seldom can they verbalize those rules. These have not been learned in a systematic way; instead, they are picked up by chance from one's family.

The purpose of this demonstration is to help students evaluate how well they are able to identify what emotion is being expressed in a facial expression. If time allows, students could try to list the "rules" they used to determine what emotion was being expressed.

Materials Teachers should obtain a copy of Ekman and Friesen's *Unmasking the Face*. On pages 175-201, Ekman has compiled a set of practice faces that express one or more of the following six emotions: surprise, fear,disgust, anger, happiness, and sadness. Cut out the pictures (anywhere from 20 to 40 of the pictures) and paste them on index cards, as suggested by the author. Be certain to write the correct number on the answers listed on pages 130-134. Judgment sheets (see next page) are to be duplicated and distributed to the students.

Instructions One of the "judgment sheets" should be given to each student. At this time it might be helpful to define the terms *contempt* and *disgust* on the judgment sheets, as many students have difficulty with the differences in these terms. Shuffle the cards and show them one at a time to the class. Ask your students to make a quick judgment in each case as to which emotion listed on the

judgment sheet is express in the face.

When you are finished with all the cards, refer to page 130 of *Unmasking the Face* and slowly read the correct answer for each of the faces. Students are to circle each judgment they have correct. Count totals and record that number on the judgment sheet. Count the number of each of the emotions labeled correctly by the whole class and record that number in the blank next to the emotion.

Judgment Sheet

Total Correct

Anger	_____	Happiness	_____
Contempt	_____	Sadness	_____
Disgust	_____	Surprise	_____
Fear	_____	Neutral	_____

1.	11.	21.	31.
2.	12.	22.	32.
3.	13.	23.	33.
4.	14.	24.	34.
5.	15.	25.	35.
6.	16.	26.	36.
7.	17.	27.	37.
8.	18.	28.	38.
9.	19.	29.	39.
10.	20.	30.	40.

Total Correct_____

Name_____ Period_____

Discussion 1. Make a distribution chart showing the total number of correct judgments for each card. Discuss how well or poorly the students were able to identify emotions being expressed. What do these results say about their abilities to "read" faces? Were some of the expressions easier than others? Photos were shuffled and arranged randomly to provide a variety of the eight labels; did placement make some emotions easier to read? Ask each student which emotion he or she identified correctly most often. Make a

distribution chart and then note trends with possible explanations.

2. Ask students which emotion they correctly identified least often; note trends with possible explanations.

3. If there is time, students can analyze the pictures displaying certain emotions to see if they can list the "rules" they used to "read" the faces.

4. Those showing more adeptness at "reading" faces may with to try Set C, which is a group of 10 faces which reflect a blend of two emotions.

5. The teacher may wish to describe the cross-cultural research Ekman has done to support his thesis of universality of interpretation.

APPENDIX C

IX

Put on a Happy Face!
Testing the Facial Feedback Hypothesis

Objectives:

To test whether facial muscles can influence emotional perception.
To investigate the facial feedback hypothesis.
To practice scientific data collection and analysis of data for significant differences.

Background Information:

There are many theories about how we feel emotions. The James-Lange theory states that emotional experiences are a result of our brain's perception of the reactions of the autonomic and somatic nervous system response to a stimuli we just experienced. In other words, we see a bear and our heart starts racing. We run as fast as we can, so our brain tells us that we are afraid. Some researchers have suggested that we can apply our brain's emotional interpretation to improving our happiness.

Can putting on a happy face really make you feel better? The **Facial Feedback Hypothesis** suggests that our facial expressions can influence how we feel. The facial feedback hypothesis is the notion that the facial muscles send messages to the brain, identifying the emotion felt by the person (Wade & Tavris, 1993).

While retreating to a bathroom to hide teary emotions, have you ever smiled to yourself in the mirror in order to compose yourself to face the people in the adjacent room? The James-Lange theory says that feedback from physiological changes in the body produce feelings or emotion. Specific facial movements create a change in blood flow, changing the temperature message sent to the brain. A smile may release the appropriate emotion-linked neurotransmitter for a pleasant emotion (Zajonc, 1992). Ekman suggests that voluntarily performing certain facial muscle actions generates changes in nervous system activity (Ekman, 1992).

Methods and Materials

Class copies of a comic strip

1. Distribute the comic strip to students. Choose a comic strip with at least five frames that include word captions.
2. Instruct students to construct a data table similar to the one below:

Rating a comic
from 1 (not funny) to 10 (very funny)

Subject	Rating for comic when pencil is held by lips.	Subject	Rating for comic when pencil is held by teeth.	Subject	Control group
1.		4.		7.	
2.		5.		8.	
3.		6.		9.	
Averages					

3. The students will be asking subjects to rate the comic(from 1-10, 1=not funny, 10=very funny). Each student should collect data on 9 subjects. Three of the subjects will be asked to hold a pencil by their lips, not allowing their teeth to touch the pencil, while rating the comic. Three of the subjects will be asked to hold the pencil by their teeth, not allowing their lips to touch the pencil. A final three subjects will act as a control. These subjects will not be asked to hold a pencil in their mouth. The subjects should hold the pencil in their mouth for 1-2 minutes before rating the comic, otherwise humor of the situation will be a nuisance variable. It is also beneficial if students to not do ask their subjects to do the ratings while in a group of people where they will feel uncomfortable holding a pencil in their mouth.
4. When the students report back to class with their average data for each variable, a class total can be compiled.
5. Students can do a t-test to calculate for statistical significance of the data.
6. Discuss the results with students, allowing the students to construct their own knowledge of the concepts of the facial feedback hypothesis. Instruct the students to report their findings in the form of a scientific write-up.

Discussion

Class averages should show the subjects holding the pencil by their teeth rate the comic as more funny than those who held the pencil by their lips. Analysis of my class data showed: $n=48$, mean rating with the lips = 3.7, mean rating with the teeth = 6.4, $p<.001$). After analyzing the class results, discuss the facial feedback hypothesis. The pencil in the mouth technique sometimes causes teens to laugh at the goofy pencil holding rather that concentrating on rating the comic. Emphasize to the students to wait a minute or two after the subject has put the pencil in their mouth before they rate the comic. It is beneficial if the students have been exposed to the rubric, or focus correction areas of the scientific write-up before they complete their report.

Rubric (FCA) for the Facial Feedback Investigation

Introduction

- Introduce background information about the physiological and biological theories on emotions including:
  - James-Lange Theory
  - Facial Feedback Hypothesis
- Purpose
- Null hypothesis

Methods

- Describe the three variables.
- Describe the rating scale.
- Include the instructions to the subjects.

Results

- Individual researchers data table
- Class means
- Calculations of statistical differences using a t-test

Discussion

- Restate the purpose
- Accept or reject the null hypothesis
- Interpret the results
- Compare class results to the facial feedback hypothesis
- Report any nuisance or confounding variables
- Suggest applications of the new knowledge to real life.

APPENDIX C

X

Teacher's Guide To:
The Genuine Smile

Objectives:

To identify the two facial muscles involved in smiling.

To differentiate between genuine and nongenuine smiles.

Background Information:

Charles Darwin (1872) theorized that our emotions are biological in origin. In his book (1872), Darwin described the work of a French neuroanatamist named Duchenne. Duchenne felt that the smile of enjoyment can be distinguished from deliberately produced smiles by observing the muscles in the face that are involved (Ekman, 1992). Duchenne described two facial muscles involved in smiling. The *zygomaticus major* pulls the lip corners up when we smile. The *orbuiculari oculi* orbits the eye, pulling the skin from the cheeks and forehead toward the eyeball. According to Duchenne, the *zygomaticus major* can be controlled voluntarily but the *orbicularis oculi* is contracted only by genuine pleasure (Pinel, 1997). Social smiles and masking smiles do not involve the *orbicularis oculi.* Ekman has since named the genuine smile the Duchenne smile in honor of its original discoverer (Ekman, 1992).

Material Preparation:

1. Take photographs of truly happy people smiling. Ask these people to return on a day when they are not so joyful to take a second smiling photo.
2. Label the two photos as A and B. If you have more than one example of the two smiles, randomize the labeling.
3. Make a transparency or make copies for students to pass around the classroom.

Procedures:

1. Present the photos.
2. Ask students to describe their emotions, describe the differences.

Questions for Constructing Knowledge:

1. What are the differences between the two photos of each person.
   Usually students can recognize one photo looks happier than the other.
2. How do you know one photo looks happier?
   Students can recognize that something looks different in their eyes.
3. What would cause these differences in the eyes? When we move part of our face, how does it move?
4. What controls the movement of facial muscles expressing emotion?

5. Do we learn how to move our muscles when we are happy? Lead students to Darwin's theory on the biological aspect of our emotions.

References:

Ekman, P. (1992). FACIAL EXPRESSIONS OF EMOTIONS: New findings New Questions. Psychological Science. 3(1).

Pinel, J.P. (1997).Biopsychology(3rd ed.) Boston: Allyn and Bacon.

APPENDIX C
XI

Conditioned Fear
Material Survey

Examine the pieces of material on the board.

Part I
Rank the five pieces of material based on the following scales.

A	B	C	D	E		
_____					Desperate	1 2 3 4 5 6 7 8 9 10 Hopeful
_____					Exciting	1 2 3 4 5 6 7 8 9 10 Fear
_____					Sad	1 2 3 4 5 6 7 8 9 10 Happy
_____					Calm	1 2 3 4 5 6 7 8 9 10 Anxious
_____					Loving	1 2 3 4 5 6 7 8 9 10 Hateful
_____					Stressed	1 2 3 4 5 6 7 8 9 10 Relaxed

Part II
Which is your favorite piece of material and why?

Which is your 2nd favorite material and Why?

Which is your least favorite material and why?

APPENDIX C

XII

DEFINING AGGRESSION: AN EXERCISE FOR CLASSROOM DISCUSSION

Ludy T. Benjamin, Jr.

Teaching of Psychology(1985) Vol. 12

This activity is designed to generate class discussion on the definition of aggression and related issues of causation and control. It exposes students to a large number of issues in defining aggression and helps them to understand the complexity of such a construct and thus the reasons why their classmates and psychologists are in disagreement about its meaning

Aggression is a topic included in virtually every textbook on introductory psychology. Some books place aggression in the section on motivation and emotion while others cover it as part of social psychology. Most include it in reference to research on humans but discussion of some animal studies of aggression is also common. Treatment of related concepts such as violence, anger, frustration, and assertiveness are also common topics.

Whereas textbook coverage of aggression is almost guaranteed, a definition of the term is not. In a nonrandom sample of 10 introductory psychology books (selected from the author's bookcase), 5 provided an explicit definition of aggression but the others left the meaning embedded in a series of paragraphs and so required the reader to serve as lexicographer. Considering the complexity of the term aggression, it is not surprising that these authors might choose to avoid expousing a particular definition.

The exercise described in this paper uses aggression as an example of a typical construct in psychology, permeated with a host of subtle meanings and not so subtle disagreements that make it difficult to reach a consensual definition. One could use other constructs such as intelligence or self-esteem, but aggression was chosen because it generates considerable discussion among students. Anecdotal evidence for the fascination with this topic can be drawn from the prevalence of aggression as a theme in movies and television, the popularity of sports, and the interest many people show in reports of violent crime.

The activity described here can be used in a number of classes, including the course in introductory psychology and, in fact, anywhere you treat the topic of aggression. It should be used prior to any lecture on aggression and before the students have read their textbook coverage of the subject. This exercise works best in a class of 50 students or less, but by altering the data reporting procedures it can be used in much larger classes, although discussion obviously will suffer in large classes. The activity requires about 50 minutes but could be made shorter or longer depending on the preferences of the instructor. The instructor's role in this exercise is to serve as a tabulator of the data and as moderator of the discussion.

PROCEDURE

At the beginning of class, give each student a copy of a questionnaire containing the 25 numbered statements shown in Table 1. Instruct the students to "read each statement and decide whether or not you believe the situation described is one of aggression." Wording of this instruction is critical so as not to bias the responses. Avoid using phrases like "aggressive act" or "aggressive behavior" because one of the issues to be discussed is whether some overt behavior needs to occur in aggression. Ask the students to circle the number of each statement that describes aggression. Tell them they should respond according to their own beliefs and not how they think they should respond or how they think most people would respond. Compliance with this request can be enhanced by telling the students not to put their names on the questionnaires. Indeed, there is no reason in this exercise to knowhow a particular person responded. You may want to have the students indicate their sex on the questionnaire if you would be interested in looking at potential sex differences in the definition of aggression. Such differences, if obtained, would undoubtedly add to the interest in the discussion.

Allow the students about 5 minutes to complete the questionnaire. Most, if not all, of the students will finish before that time, so you should be ready to proceed when the last person has finished. Collect the questionnaires, shuffle, and redistribute them to the class so that each student gets a copy. Most student will be given a questionnaire other than their own, but it is unimportant if they get their own copy back. This procedure allows students to report on the responses that may or may not be their own, thus eliminating a potential source of embarrassment.

Record the data on the board by asking students for a show of hands on each numbered item, with hands being raised if the item is circled on the questionnaire they are holding. It is important to know the exact size of the class in this exercise to know when you have unanimity. For example, with a class size of 34, total agreement would come from a score of 34, in which case every student agreed that the item described aggression. A score of zero would mean that no one thought the item described aggression. Such unanimity is rare and typically occurs only on those items in which there seems to be no intent to harm. Tabulating the data on the chalkboard can be accomplished quickly, usually in less than 5 minutes, so that the bulk of the class time can be devoted to discussion.

CLASS DISCUSSION

Use the questionnaire results to get the students talking about how aggression is defined. You might begin with those items for which there is greatest agreement and proceed to those on which the class is evenly divided. Note that the 25 statements are quite diverse and are intended to span the gamut of issues relevant to consideration of aggression: ham to living versus

nonliving things (9 and 23), accident versus intention (8 and 21), actual damage versus no physical damage (10, 13, and 18), self-defense (3, 13, and 14), duty or job responsibility (3, 4, 19, 20, and 22), predation and instinctual behavior (1, 2, and 25), survival (1, 6, and 16), acts involving animals other than humans (7, 16, 17, and 18), covert acts (11 and 14), inaction (12 and 15), self-injury (24), and killing for sport (17 and 25).

Attempt to get students to make these points by grouping the related items in the discussion. For example, items 16 and 17 make an interesting comparison. The later is more often viewed as aggressive, and a similar pattern emerges in items 1 and 25. In both pairs, students distinguish between killing for food and killing for sport. Many will argue that food-seeking justifies the act and would not label it aggression. Debate on these items and many others is typically lively and opposing view points are common. Should alternate views not be forthcoming on some issues, the instructor may wish to play the role of devil's advocate.

If there is time, or in a separate lecture in the next class period, you can present some of the definitions of aggression proposed by psychologists. Consider the following examples:

1. "Behavior intended to hurt another person"(Freedman, 1982, p. 259)
2. "Any behavior whose intent is to inflict harm or injury on another living being" (McGee & Wilson, 1984, p. 503).
3. "Hostile or forceful action intended to dominate or violate" (Lefrancois, 1982, p. 596).
4. "Behavior that is intended to injure another person (physically or verbally) or to destroy property" (Atkinson, Atkinson, & Hilgard, 1983, p. 321).
5. "A response that delivers noxious stimuli to another organism" (Buss, 1961, p. 3)

Table 1

AGGRESSION QUESTIONNAIRE

_____ 1. A spider eats a fly.
_____ 2. Two wolves fight for the leadership of the pack.
_____ 3. A soldier shoots an enemy at the front line.
_____ 4. The warden of a prison executes a convicted criminal.
_____ 5. A juvenile gang attacks members of another gang.
_____ 6. Two men fight for a piece of bread.
_____ 7. A man viciously kicks a cat.
_____ 8. A man, while cleaning a window, knocks over a flowerpot, which, in falling, injures a pedestrian.
_____ 9. A girl kicks a wastebasket.
_____ 10. Mr. X, a notorious gossip, speaks disparagingly of many people of his acquaintance.
_____ 11. A man mentally rehearses a murder he is about to commit.
_____ 12. An angry son purposely fails to write to his mother, who is expecting a letter and will be hurt if none arrives.
_____ 13. An enraged boy tries with all his might to inflict injury on his antagonist, a bigger boy, but is not successful in doing so. His efforts simply amuse the bigger boy.
_____ 14. A man daydreams of harming his antagonist, but has no hope of doing so.
_____ 15. A senator does not protest the escalation of bombing to which he is morally opposed.
_____ 16. A farmer beheads a chicken and prepares it for supper.
_____ 17. A hunter kills an animal and mounts it as a trophy.
_____ 18. A dog snarls at a mail carrier, but does not bite.
_____ 19. A physician gives a flu shot to a screaming child.
_____ 20. A boxer gives his opponent a bloody nose.
_____ 21. A Girl Scout tries to assist an elderly woman, but trips her by accident.
_____ 22. A bank robber is shot in the back while trying to escape.
_____ 23. A tennis player smashes his racket after missing a volley.
_____ 24. A person commits suicide.
_____ 25. A cat kills a mouse, parades around with it, and then discards it.

APPENDIX C
XIII

TO TELL THE TRUTH

At least one person in the "To Tell the Truth" line will lie. It is your job to detect who is not telling the truth. Some of you will know what to look for with regard to nonverbal cues of deception, others will not.

1. In what month is your birthday?

2. How many siblings do you have?

3. What is the last digit of your student I.D. number?

4. What is your middle name?

5. What is your favorite color?

6. What is your father's first name?

7. To which political party do you subscribe?

8. Where were you born?

9. What is your shoe size?

10. How old are you?

11. Have you ever been given a speeding ticket?

12. How well do you play tennis?

TO TELL THE TRUTH

What to look for in detecting deception:

1. Hand gestures decrease.

2. More hand to face gestures.
   * mouth guard
   * nose touching
   * rubbing eye
   * neck scratch
   * ear rub

3. Body shifts increase.

4. Less eye contact.

5. More foot movements.

6. More speech errors.

7. Pitch of voice increases.

Increase:

Hand to face gestures
Shifts in body posture
Foot/leg movements
Speech errors
Voice pitch

Decrease:

Hand gestures
Eye contact

APPENDIX C

XIV

Teacher's Guide to:

Health, Stress, and Coping

Objectives:

To apply the knowledge of the physiological changes that take place in our bodies during stress.

To become aware of situations that make each individual stressed.

To make students aware that they may take control of stressful situations applying coping techniques.

Prequestions:

What happens to our bodies when we are stressed?

What is stress?

Why is a situation stressful to one individual but not stressful for another?

How can we lower our stress levels?

Background Information:

The mind and the body are very interconnected. Our thoughts can influence the reactions in our body. A stressful situation activates three major communication systems in the brain that regulate bodily functions (Carey, J. (ed.), 1991). The first system is the voluntary nervous system. The second communication system is the autonomic nervous system. This system combines the reactions of the sympathetic nervous system (such as increasing the heart rate, decreasing digestion, decreasing blood flow to the skin of the hands) with the calming or homeostatic influences of the parasympathetic nervous system. The third major communication system is the neuroendocrine system. The brain signals for the release of to main stress hormones, epinephrine or adrenaline and cortisol.

But not everyone reacts to situations in the same manner. What is nothing to get "worked up about" to one person is a major catastrophe to another. Why does this happen? The issues of control and coping play a principle role in the development of a stressor. Coping is the cognitive and behavioral efforts to manage demands in the environment or oneself that one feels to be stressful. To cope a person must first define the real problem. Next, rethink the problem and interpret the events. Some stressors are really not important and should just be put out of mind, for instance; "Cleaning the house is really not that important right now. Let's just go to the movies." Some other tactics for coping include laughter, exercise, relaxation, or looking outward beyond the stressors of today (Wade & Tavris, 1993).

Our personality type can cause negative emotions and vary our ability to cope with stress. Type A personalities are intense, impatient, and achievement-oriented. Type B people are calmer and less intense. But can our personality really cause poor health? Research as shown that there is a link between Type

A personality traits and heart disease.

Not all stress is bad for our health. Eustress is positive and benificial. The stress of exercise is good for our health. The stress of exercise can stimulate the release of endogenous pain killers called endorphins. A small amount of stress can motivate us to perform better. But too much stress can have the opposite affect.

Material Preparation:

Digital multimeter
Leads with banana and alligator clip ends
Thermistor
1.5" x 1.5", 1/4" thick, pieces of styrofoam to insert the thermistor
Biodots or Stress tester
Electronic blood pressure and pulse monitor

A. Skin Temperature Measurements: As we get stressed, the blood vessels in the skin of the hands and feet constrict allowing less blood flow. As a result, the temperature of our hands and feet decrease with stress. The temperature of the hands can be compared to the forehead temperature. The forehead temperature is not effected by stress but will change slightly depending on circadian rhythms.
   1. Digital Multimeter, Alligator Clip Cords, and Thermistors.
      Put a small strip of electric tape around the legs of the thermistor, right below the blue tip of the thermistor. This extends the life of the thermistor because the legs will pull apart.
      Bend the legs at an angle outward so the alligator clips can be attached. Stick the thermistor through a small piece of styrofoam to give more consistent measurements. The multimeter is set on ohms of resistance.
      I purchase thermistors from Radio Shack for $1.99. I also purchased the digital multimeters from Radio Shack for approximately $25. Check your local electric company for used digital multimeters.
   2. Biodots.
      Biodots can be ordered from Biodot International, Inc., P.O. Box 2246, Indianapolis, Indiana, 46206
B. Blood Pressure and Pulse: The release of the hormone epinephrine from the adrenal gland puts the body in the state of arousal. The heart responds by increasing blood pressure and pulse.
   1. Automatic Blood Pressure and Pulse Monitor.
      These monitors can be purchased from Walmart, K-Mart, or a Drug store.

Procedures:

This investigation has three parts. Part one is the initial stage of data collection. Part two is analyzing the data and identifying the top ten stressful experiences. Part three is collecting more data but using coping strategies to try to lower stress responses.

1. Instruct students to collect data every hour or two for at least one entire day. It is best if they can collect temperature and blood flow data for a week if enough equipment is available.
   A. To collect data:
      a. sit for two minutes before you begin to take measurements.
      b. try not to talk to anyone during the measurements.
      c. avoid looking at the instruments while waiting to take the final measurements.
      d. keep as many variables consistent during the measurements.
   B. Construct a data table for the following measurements

Date/time	Systolic	Diastolic	Pulse	blood index	Skin temp.	Forehead temp.	Temp. differ.	Recent Experiences

2. Calculations
   A. Dr. Tom Adams, Michigan State University, and I developed the following blood index to use as a comparison of experiences for stressfulness.

$$\frac{\text{systolic-diastolic}}{\text{pulse}} = \text{Blood Flow Index}$$

   B. Use the following formula to calculate the difference between your body temperature and your finger tip skin temperature.

forehead temperature - finger tip temperature = temperature difference

* Remember that your finger tip skin temperature is influenced by the stress you are experiencing. Forehead temperature is not influenced by stress but is influenced by circadian rhythms.

3. Produce a double Y axis graph of the blood formula x 10 and temperature difference.

4. Interpret the data and graph to construct a list identifying the stressors in your students lives.

5. Collect more data for a week but this time add a column identifying the coping techniques applied to reduce stress responses.

6. Instruct students to write a scientific paper to report the results of their investigation.

Discussion: During my research I found that the graphs of Blood Index versus the inverse of finger tip temperature were very closely related. When comparing recent experiences with the measurements at that time, stressors were easily identifiable. However, I was surprised at some of the data. There were recent experiences that I thought I was mentally in control of but the data showed that my body was reacting with stressful responses. Discuss with the students the direct relationship between the mind and the body. Also discuss the fact that we are not always consciously aware of the experiences that bother us but our body is aware of our stressors.

Extensions:

1. Exercise: Instruct your students to take physiological measurements. Then take them on a brisk ten minute walk around your school campus. When you return to the classroom, sit for two minutes before taking new measurements.
2. Meditation: After you return from your walk, but before you take your measurements, do a 5-10 minute meditation. To meditate, turn off the lights. ask students to close their eyes and take long deep breaths as they count to ten and repeat. They should clear all thoughts from their minds, concentrating only on counting to ten.
3. Eating Carbohydrates: Take measurements before and after students eat some bread or baked potatoes. Do not put butter on the bread or potato because fat slows digestion.

4. Take a Personality Test: Have students take a A/B Personality Trait test. Discuss the link between personality traits and heart disease.

Resources:

Carey, J. (Ed.). (1991). Stress and the Brain. Washington D.C.: Society for Neurosciences.

Wade, C., and Tavris, C. (1993). Psychology (3rd ed.) New York: HarperCollins College Publishers.

HEALTH, STRESS, COPING
Student Guide

Introduction:

Today is a "bad hair" day! To make matters worse, your car won't start. You finally get to psychology class and you realize you forgot that there is a test today. You feel like hurling your psychology notebook at your psycho-teacher. Your mind and body are informing you that you are stressed. Are you listening? Luckily you are a psychology scholar so you have learned to identify your sources of stress and cope!

Materials:

blood pressure and pulse monitor
multimeter with a thermistor, leads and styrofoam to insert the thermistor
biodot or stress tester(optional)

Procedure:

1. Collect data at various times during the day and during various experiences for one week. The data you will be collecting includes blood pressure, pulse, finger tip temperature, and forehead temperature)
   a. To collect data:
      - sit for two minutes before you begin to collect measurements
      - try not to talk to anyone during the measurements
      - avoid looking at the instruments while waiting to take the final measurements
      - keep as many variables consistent during all measurements.
   b. Construct a data table for the following measurements and calculations.

Date/time	Systolic	Diastolic	Pulse	Blood index	Skin temp.	Forehead temp.	Temp. differ.	Recent Experiences

2. Use the following formula for blood pressure and pulse:

$$\frac{\text{systolic - diastolic}}{\text{pulse}} = \text{Blood Flow Index}$$

   Use the following formula to calculate the difference between your body temperature and your finger tip skin temperature

   forehead temperature - finger tip temperature = temperature difference

   * Remember that your finger tip skin temperature is influenced by the actions of the sympathetic nervous system. Forehead temperature is not influenced by the stress but is influenced by circadian rhythms.

3. Produce a double Y axis graph of the blood formula and temperature difference.

4. Interpret the data and graph to construct a list identifying the top ten stressors in your life.

5. Collect more data for a week but this time add another column to your data table identifying the coping techniques applied to reduce stress responses.

6. Write a scientific paper to report the results of your investigation.

Rubric for the Scientific Report of Your Investigation

Introduction

Background Information:

Introduce background information about the physiological responses to stressful conditions.

Introduce Eustress.

How does your personality type (A or B) play a role?

Introduce the factors of control and coping.

Purpose

Null Hypothesis

Methods

Describe the participant, the materials and procedure.

Results

Three tables: initial data table
identification of top stressful events/experiences
measurements with coping techniques applied

Graph: Graph double Y axis graph

Discussion

Restate the purpose.

Accept or reject the null hypothesis.

Interpret your results. Discuss the effectiveness of some of the coping techniques you tried. Which coping techniques worked best?

Generalize your findings to real life.

APPENDIX C

XV

Psychoneuroimmunology
Constructing a Rube Goldberg Device
Teacher Guide

Objective:

To improve student understanding of the effects of stress on the immune system by explaining the cascade of events with a Rube Goldberg device.

Background Information:

You are camping in the woods and all of the sudden a wolf crosses the path ahead of you. Your heart is pounding so hard that it sounds like bass drums. This reaction to the wolf is a result of the sympathetic nervous system sending messages for the release of hormones that makes you alert and ready to spring into action. Your parasympathetic nervous system will restore your body back to normal quickly when you realize that the wolf kept running.

Every night for a week while camping, you hear a pack of wolves howling. This type of chronic stress causes a cascade of effects beginning with the brain. The brain's hypothalamus releases corticotrophin releasing factor (CRF) which signals the pituitary gland to release ACTH, which travels through the bloodstream to the adrenal gland. The adrenal medulla releases epinephrine which prepares the body for action. The adrenal cortex produces cortisol which re-establishes homeostasis. But over-exposure of cortisol, like in the case of the continuous threat of howling wolves, also has some negative impacts on the body. Long term cortisol exposure can lead to weakened muscles and suppresses other major bodily systems(Carey, J.(ed.), 1991). Digestion is affected, reproductive systems do not work properly, aging occurs, and the immune system is affected.

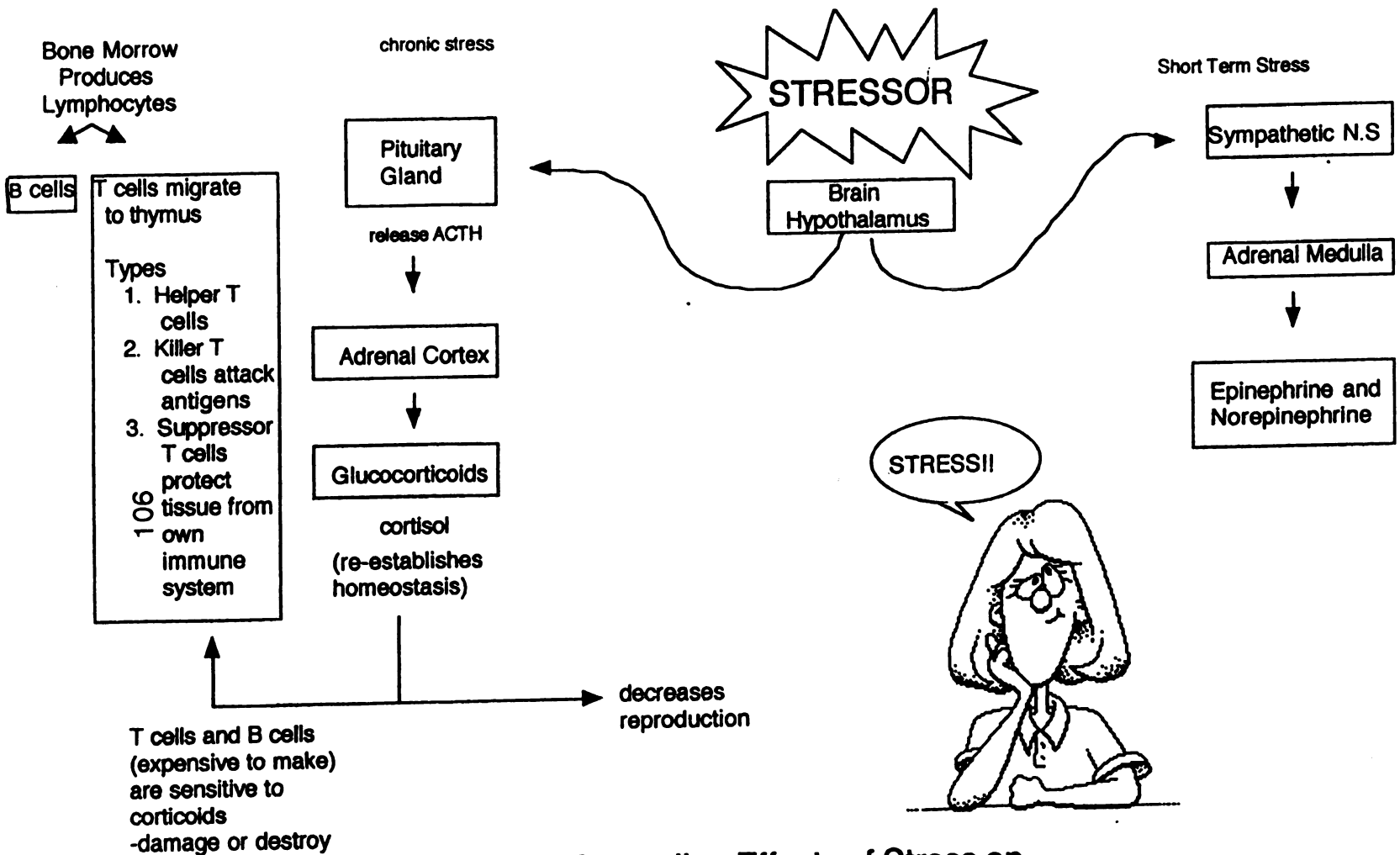
The cascading events of the neuroendocrine system affecting the immune system may have a familiar ring. Have you ever played the Milton Bradley game called Mouse Trap? Mouse Trap was designed based on the cartoons created by Rube Goldberg. Rube Goldberg, a Pulitzer Prize winning political cartoonist, is best known for his invention cartoons. His wacky cartoons depicted the most elaborative devices doing a simple task. Although the consequences of stress on the neuroendocrine system and immune system is no simple task, students can improve their knowledge of this cascading procedure by turning it into a Rube Goldberg device.

Procedure:

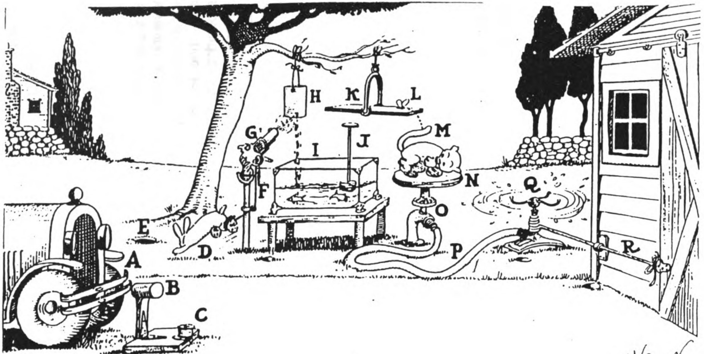
After discussing Psychoneuroimmunology with the students (see "Stressor" chart) introduce them to a Rube Goldberg device cartoon. Instruct them to make their own cartoon depicting the actions of chronic stress on the T-cells of the immune system. Make a key indicating which parts of the cartoom represent each step of the neuroendocrines cascade to the immune system. Steps you may want your students to include: Stressor, CRF, pituitary gland, ACTH, adrenal gland, cortisol, T-cells, etc. When the cartoons are completed have each group of students present their Rube Goldberg cartoon.

Resources:

Carey, J. (ed.) (1991). Stress and the Brain.Washington D.C.: Society for Neurosciences.



The Cascading Effects of Stress on the Nervous System, Endocrine System and Immune System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APPENDIX C

XVI

PEANUT BUTTER, JELLY AND THE DIATHESIS-STRESS MODEL

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Covering abnormal psychology and a variety of disorders in Introductory Psychology may be interesting and exciting to students, however explaining the probable causes of disorders can be a challenge. Instructors speak of genetic predispositions and the effects of the environment. Students seem to understand these concepts independently, but when combined as an interrelated idea, as in the Diathesis-Stress Model, confusion and doubt sometimes arise. Graphs and charts can be used alone, but blank stares still persist. For this reason, the following demonstration has been created to explain the concept of the Diathesis-Stress Model in a "hands-on" experience. The demonstration is easy to prepare and to execute.

Materials Needed

8 slices of bread (4 slices cut up into 3 pieces each)
Creamy peanut butter
Jelly
8 baking cups
4 butter knives
Stopwatch

Demonstration. After explaining the Diathesis-Stress Model, four students are chosen to represent the four levels of functioning on the graph:

a) Low Predisposition-Low Stress,
b) High Predisposition-Low Stress,
c) Low Predisposition-High Stress, and
d) High Predisposition-High Stress.

In the demonstration, each student, one at a time, will be given 2 slices of bread, a baking cup full of peanut butter, a baking cup full of jelly, and a butter knife. Each student will be assigned to his/her level of the Diathesis-Stress Model and be instructed to make the best possible peanut butter and jelly sandwich possible. The resulting sandwich should be representative of the condition of the person functioning at each level of the model. In other words, the student will see what possibly caused the development of a disorderly sandwich, i.e., a mental disorder.

Additionally, to facilitate the low or high predisposition or the low or high stress, these conditions should be followed. A person with a low predisposition will be given perfect ingredients for his/her sandwich. A student given the high predisposition category will be given perfect jelly and peanut butter, but each slice of his/her bread will be cut into three pieces. Those in the low stress level will be given all the time they need to make a sandwich. Those in the high stress level however, will only be given 25 seconds to make their sandwich. Therefore, the conditions for making the sandwiches and the hopeful results at the four levels are as follows:

a) Low Predisposition-Low Stress: The ingredients are perfect and the student has as much time as needed. This should result in a perfectly normal sandwich.
b) High Predisposition-Low Stress: The student has perfect ingredients except for the cut-up bread. He/she has ample time to make the sandwich. Though the bread is cut up, the result should resemble a common sandwich.
c) Low Predisposition-High Stress: The ingredients are perfect, but the student only has 25 seconds to make the sandwich. While the sandwich may not be flawless, it is near normal.
d) High Predisposition-High Stress: The student has perfect ingredients except for the cut-up bread, but he/she only has 25 seconds to put all the ingredients together. The result should not be normal. The The result should be pieces of what could be a typical sandwich, if the high predisposition and high stress were not there. (Hint: Do not give the student the ingredients until his/her turn. This forfeits any opportunity for prior planning or strategy in making the sandwich.)

Thus one can see the resulting sandwiches tend to illustrate the degree of disorderliness possible, in other words, the degree and development of mental disorders due to predisposition and stress. The students can easily digest the results.

APPENDIX C
XVII

TYPE A-B BEHAVIOR DEMONSTRATION TEST

For each statement indicate whether it is T (true) or F (false) for you. There are no right or wrong answers.

____1. I don't let people know when I am angry.
____2. I usually can trust the people I work with.
____3. Most people are generally selfish and self-centered.
____4. Other people consider me a relaxed person.
____5. I feel anxious whenever I am idle.
____6. I think people are basically good.
____7. I become irritated when I must wait for something.
____8. I stay calm in emergency situations.
____9. I tend to keep my feelings to myself.
____10. I am usually patient while waiting for someone.
____11. I enjoy working against deadlines.
____12. It is important to take vacations regularly.
____13. I really can't trust other people.
____14. I tend to concentrate on one problem at a time.
____15. Other people have mentioned my hostility.
____16. I listen to the ideas of other people.
____17. I often feel suspicious toward others.
____18. I do not work well under deadlines.
____19. I often race against time even when there is no reason to.
____20. I try to relax when things slow down.

APPENDIX D

Emotions, Stress, and Mental Illness
A.P. Psychology Test

____1. The James-Lange Theory of emotions states that
  a) if a person is having a bad day, he or she must be sad.
  b) perceiving something sad leads us to cry
  c) feeling sad leads us to cry
  d) crying leads us to feeling sad.

____2. You are having a meeting with your co-workers to make some important decisions. To learn how the group members really feel, you should pay most attention to their
  a) faces. b) words. c) hands d) hair

____3. After your plane crashes in a remote jungle, your group climbs out of the wreckage and observes a previously unknown tribe coming towards the plane, spears in hand. Your best advice to your group is
  a) "grimace and shake your fist, that might be a friendly greeting here."
  b) "Smile, so they'll know you're friendly."
  c) "Keep a straight face and show no emotions."
  d) "Don't look directly at them. Look over their heads."

____4. Darwin believed that the expression of emotion on the face is
  a) biologically determined.
  b) culturally determined.
  c) learned through experience and imitation.
  d) variable from individual to individual.

____5. Two thousand years ago, a Chinese emperor had a tomb built, surrounded by hundreds of carved statues of warriors. American archeologists state they can read the emotions expressed on the faces of these statues. Is this possible?
  a) Yes, because most human facial expressions are universal.
  b) Yes, only four basic emotions can be expressed on the face.
  c) No, Orientals and Westerners use different facial expressions to express emotions.
  d) No, contemporary human beings have different facial expressions than those who lived years ago.

____6. Robert feels very tense and anxious before an important job interview. He looks in the mirror and tries to practice looking relaxed and enthusiastic. He finds he begins to feel less tense. This supports the
  a) Ekman-Friesen theory.
  b) Darwinian theory of universal facial expressions.
  c) facial-feedback hypothesis.
  d) James-Lange theory of emotion.

____7. A long-time patient at the Neurological Institute cannot recognize the faces of the staff members and shows surprise whenever he looks in the mirror. Most likely this patient is suffering from
a) prosopagnosia. c) damage to the left hemisphere.
b) bilousness. d) schadenfreude

____8. According to recent research all of the following brain structures are involved in strong emotions except for the
a) amygdala. c) hypothalamus.
b) limbic system. d) cerebellum.

_____9. As you hurry down a dark, deserted road, you see a car overturned on the side of the road. Your body will do all of the following except
a) speed up respiration. c) perspire.
b) speed up digestion. d) speed up heart rate.

____10. Maya works on the Emergency Rescue Unit. Which hormones are involved in arousal as she rescues a child from a burning building?
a) melatonin and norepinephrine c) androgen and progesterone.
b) seratonin and dopamine d) epinephrine and norepinephrine

____11. While serving as a subject in an experiment, Maria is instructed to contract the facial muscles involved in smiling and then rate how funny cartoons are. She is participating in research related to the
a) universal facial expressions of emotion.
b) relationship between thought and emotion.
c) two-factor theory
d) facial-feedback hypothesis.

____12. The police detective has narrowed down the list of suspects to two people. It is known that one is innocent and one is guilty. Both are given a lie detector test. The assumption is that
a) the threat of detection will cause the guilty party to confess.
b) the responses of the guilty person can be compared to the responses of the innocent person, who acts as a kind of standard.
c) the presence of right-hemisphere activity will reveal the guilty person.
d) a person who is guilty will show increased activity in heart rate, skin conduction, and blood pressure.

____13. Even though primary emotions are universal, every society has display rules that
a) govern how and when emotions may be expressed.
b) determine all basic signals of body language, like the body movements for pleasure, liking, tension, and high status.
c) distinguish pleasant emotions from unpleasant ones.
d) people in the society are fully aware of.

_____14. One of the following people are telling a lie. You observe their nonverbal leakage. Which person is the liar?
a) the person who has a calm face without a smile
b) the person who sifts their body weight many times and does not keep eye contact.
c) the person with the low pitched voice who stands close to you.
d) the person who keeps eye contact and leans forward.

_____15. If we feel we have control over something that happens, in general that makes it
a) our responsibility, so it is more stressful.
b) less interesting and challenging to us.
c) more predictable and less stressful.
d) harder to ignore and harder to deal with.

_____16. The idea of stress was popularized by
a) Hans Selye
b) B.F. Skinner
c) Nancy Schlossberg
d) S. Freud

_____17. You are "totally stressed out." According to Hans Selye, what is the correct order of phases your body has gone through in its r response to stressors?
a) alarm, exhaustion, resistance.
b) exhaustion, resistance, alarm
c) alarm, resistance, exhaustion
d) resistance, exhaustion, alarm

_____18. When the body is able to successfully recognize and destroy or deactivate antigens, this means that
a) an illness is psychosomatic
b) the immune system is functioning normally.
c) the body is in a state of prolongs stress.

_____19. Which item is out of place in this list?
a) Natural killer cells
b) Killer T cells
c) Life-change units
d) immune system

_____20. Dr. Carson believes that all diseases are caused by interactions among the endocrine, nervous and immune systems as well as behavior and emotions. He is involved in the field of
a) behavior genetics
b) behavioral medicine.
c) psychoneuroimmunology.
d) psychosomatic medicine.

_____21. Daryl is always struggling to achieve in his business. He is always pressed for time and usually irritable. Researchers would classify him as a
a) Type A person b) Type B person c) antisocial person

_____22. All of the following coping techniques are ways of living with a stressful situation EXCEPT
a) exercise b) humor c) defining the problem d) distraction

_____23. A personality profile of Russell would include the traits of being aggressive, confronting, rude, cynical, and uncooperative. Research has suggested that Russell has an increased likelihood of
a) being a Type B person. c) developing heart disease.
b) developing AIDS d) being happily married for 25 years.

_____24. Theorists have found that the use of humor can be an effective coping strategy. Humor is thought to work for all of the following reasons EXCEPT because it
a) allows people to express hostility and take advantage of others.
b) reduces tension.
c) may stimulate the flow of endorphins in the brain.
d) supply more oxygen.

_____25. The psychological factor MOST directly related to physical illness is___
a) sexuality b) aggression c) stress d) friendliness

_____26. The biological theory of depression would attribute the causes to
a) imbalances in serotonin c) lack of reinforcement.
b) imbalances in acetylcholine d) anger turned inward.

_____27. The scientific definition of an emotion includes
a) only our internal, subjective feelings.
b) only our physiological responses.
c) only our external, observable behaviors.
d) internal states, biological responses, and behaviors.

_____28. One theory of emotion, suggested by Robert Plutchik, is based on the notion of
a) three basic categories of emotions that everyone shares.
b) different physiological patterns for different individuals.
c) emotions as conditioned behaviors learned in childhood.
d) eight primary emotions that can be mixed to create others.

_____29. According to the Schacter-Singer theory of emotion, the major factor that determines a person's emotional feelings is
a) the person's internal emotional state.
b) the body's level of physiological arousal.
c) the person's interpretation of the arousal.
d) how long the physiological arousal persists.

_____30. For most people, particularly adults, which part of the face is the most expressive?
a) the mouth c) the right side
b) the nose d) the left side

_____31. Stress is produced when
a) there is some threat in the environment.
b) any aspect of our lives changes suddenly.
c) we are under pressure to perform.
d) we interpret a situation as stressful.

_____32. Nancy is trying to decide which of her two favorite dresses to wear to a party. She is experiencing an
a) approach-approach conflict
b) avoidance-avoidance conflict.
c) approach-avoidance conflict.
d) avoidance-approach conflict.

_____33. Maggie is considering leaving her abusive husband. Leaving would bring her physical security, but she has no job skills to support herself. Maggie is faced with a(n) _____conflict.
a) approach-approach
b) avoidance-approach
c) approach-avoidance
d) double approach-avoidance

_____34. The defense mechanisms that are part of Freud's psychoanalytic theory of personality are examples of _____coping strategies.
a) task-oriented
b) sexually-oriented
c) defense-oriented
d. unconsciously-oriented

_____35. An important first step in most stress-management therapy is to
a) identify the coping strategies you are most comfortable with.
b) recognize that stress is due to our unconscious conflicts.
c) understand the body's physiological reactions to stress.
d) identify the stressor or stressors you are dealing with.

ESSAY

36-38 Which face, statistically, appears happier to people? Explain why.

39-42 Describe the symptoms of schizophrenia, the typical age of onset, and how it all is affected by the vulnerability stress model.

43-47 Does stress increase or decrease the efficiency of the immune system? Explain the cascade of events that occur under stress and how it interacts with the immune system?

48-50 Which woman do more men chose as the more attractive or friendly person? How do you explain their choice? (describe the physiological changes that take place)

APPENDIX D

II

Motivations and Emotions
Adv. Psychology Test

____1. The James-Lange Theory of emotions states that
  a) if a person is having a bad day, he or she must be sad.
  b) perceiving something sad leads us to cry
  c) feeling sad leads us to cry
  d) crying leads us to feeling sad.

____2. You are having a meeting with your co-workers to make some important decisions. To learn how the group members really feel, you should pay most attention to their
  a) faces. b) words. c) hands d) hair

____3. After your plane crashes in a remote jungle, your group climbs out of the wreckage and observes a previously unknown tribe coming towards the plane, spears in hand. Your best advice to your group is
  a) "grimace and shake your fist, that might be a friendly greeting here."
  b) "Smile, so they'll know you're friendly."
  c) "Keep a straight face and show no emotions."
  d) "Don't look directly at them. Look over their heads."

____4. Darwin believed that the expression of emotion on the face is
  a) biologically determined.
  b) culturally determined.
  c) learned through experience and imitation.
  d) variable from individual to individual.

____5. Two thousand years ago, a Chinese emperor had a tomb built, surrounded by hundreds of carved statues of warriors. American archeologists state they can read the emotions expressed on the faces of these statues. Is this possible?
  a) Yes, because most human facial expressions are universal.
  b) Yes, only four basic emotions can be expressed on the face.
  c) No, Orientals and Westerners use different facial expressions to express emotions.
  d) No, contemporary human beings have different facial expressions than those who lived years ago.

____6. Robert feels very tense and anxious before an important job interview. He looks in the mirror and tries to practice looking relaxed and enthusiastic. He finds he begins to feel less tense. This supports the
  a) Ekman-Friesen theory.
  b) Darwinian theory of universal facial expressions.
  c) facial-feedback hypothesis.
  d) James-Lange theory of emotion.

____7. A long-time patient at the Neurological Institute cannot recognize the faces of the staff members and shows surprise whenever he looks in the mirror. Most likely this patient is suffering from
a) prosopagnosia. c) damage to the left hemisphere.
b) bilousness. d) schadenfreude

____8. According to recent research all of the following brain structures are involved in strong emotions <u>except</u> for the
a) amygdala. c) hypothalamus.
b) limbic system. d) cerebellum.

_____9. As you hurry down a dark, deserted road, you see a car overturned on the side of the road. Your body will do all of the following <u>except</u>
a) speed up respiration. c) perspire.
b) speed up digestion. d) speed up heart rate.

____10. Maya works on the Emergency Rescue Unit. Which hormones are involved in arousal as she rescues a child from a burning building?
a) melatonin and norepinephrine c) androgen and progesterone.
b) seratonin and dopamine d) epinephrine and norepinephrine

____11. While serving as a subject in an experiment, Maria is instructed to contract the facial muscles involved in smiling and then rate how funny cartoons are. She is participating in research related to the
a) universal facial expressions of emotion.
b) relationship between thought and emotion.
c) two-factor theory
d) facial-feedback hypothesis.

____12. The police detective has narrowed down the list of suspects to two people. It is known that one is innocent and one is guilty. Both are given a lie detector test. The assumption is that
a) the threat of detection will cause the guilty party to confess.
b) the responses of the guilty person can be compared to the responses of the innocent person, who acts as a kind of standard.
c) the presence of right-hemisphere activity will reveal the guilty person.
d) a person who is guilty will show increased activity in heart rate, skin conduction, and blood pressure.

____13. Even though primary emotions are universal, every society has display rules that
a) govern how and when emotions may be expressed.
b) determine all basic signals of body language, like the body movements for pleasure, liking, tension, and high status.
c) distinguish pleasant emotions from unpleasant ones.
d) people in the society are fully aware of.

____14. The hypothetical process that moves an organism toward a goal is called
a) motivation. b) emotion. c) cognition. d) physiology.

____15. You registered for this Advanced Psychology class because of your interest in the subject. Marty registered for it because it is during a convenient hour. Sue registered to be in the same class as her boyfriend. This illustrates that
a) various people resolve conflicts in different ways.
b) there are many ways to restore homeostasis.
c) many different motives may lead people to behave the same way.

____16. Which concept is most strongly associated with drive theory?
a) homeostasis
b) conflict
c) instinct
d) emotion

____17. Jane seldom pays attention to her caloric intake. She has weighed about 130 pounds since she became an adult. Some researchers would refer to this level of weight as her.
a) homeostatic equilibrium.
b) set point.
c) basal metabolism rate.
d) optimal arousal level.

____18. In order to change your set point, you would have to
a) go on a strict diet.
b) find ways to keep yourself anxious and tense.
c) increase your level of exercise.
d) take amphetamines to alter your metabolic rate.

____19. The temperature drops in your room. You feel cold, put on a sweater, and are then comfortable. The room temperature rises, you feel warm and you remove your sweater. You are comfortable again. This sequence illustrates how
a) instincts motivate behavior.
b) drives cause us to respond to incentives.
c) the body maintains homeostasis.
d) powerful social motives are.

____20. Stanley believes that men and women should have equal rights and power in dating relationships, but he feels uncomfortable when his girlfriend wants to pay her half of restaurant checks and other costs. Stanley is experiencing
a) justification of effort.
b) emotional imbalance.
c) cognitive disequilibrium.
d) cognitive dissonance.

____21. A major premise of Maslow's hierarchy of motives theory is that
a) lower-level needs must be met before higher-level needs.
b) your place on the hierarchy is very much age related.
c) people can experience needs at several different levels simultaneously.
d) only some people aspire to the highest levels of the hierarchy.

____22. According to Maslow, the highest level of motivation is
a) cognitive
b) self-actualization
c) belongingness
d) biological

____23. One of the following people are telling a lie. You observe their nonverbal leakage. Which person is the liar?

a) the person who has a calm face without a smile
b) the person who sifts their body weight many times and does not keep eye contact.
c) the person with the low pitched voice who stands close to you
d) the person who keeps eye contact and leans forward.

Essay

24-26 Which face, statistically, appears happier to people? Explain why.

27-29 Which woman do more men chose as the more attractive or friendly person? How do your explain their choice? (describe the physiological changes that take place)

APPENDIX D

III

MENTAL HEALTH TEST

Advanced Psychology

Chapter 15 and 16

1. If we feel we have control over something that happens, in general that makes it
   a) our responsibility, so it is more stressful.
   b) less interesting and challenging to us.
   c) more predictable and less stressful.
   d) harder to ignore and harder to deal with.

2. The idea of stress was popularized by
   a) Hans Selye b) B.F. Skinner c) Nancy Schlossberg d) S. Freud

3. You are "totally stressed out." According to Hans Selye, what is the correct order of phases your body has gone through in its response to stressors?
   a) alarm, exhaustion, resistance.
   b) exhaustion, resistance, alarm
   c) alarm, resistance, exhaustion
   d) resistance, exhaustion, alarm

4. When the body is able to successfully recognize and destroy or deactivate antigens, this means that
   a) an illness is psychosomatic
   b) the immune system is functioning normally.
   c) the body is in a state of prolongs stress.

5. Which item is out of place in this list?
   a) Natural killer cells c) Life-change units
   b) Killer T cells d) immune system

6. Dr. Carson believes that all diseases are caused by interactions among the endocrine, nervous and immune systems as well as behavior and emotions. He is involved in the field of
   a) behavior genetics c) psychoneuroimmunology.
   b) behavioral medicine. d) psychosomatic medicine.

7. Daryl is always struggling to achieve in his business. He is always pressed for time and usually irritable. Researchers would classify him as a
   a) Type A person b) Type B person c) antisocial person

8. All of the following coping techniques are ways of living with a stressful problem EXCEPT
   a) exercise b) humor c) defining the problem d) distraction

9. A personality profile of Russell would include the traits of being aggressive, confronting, rude, cynical, and uncooperative. Research has suggested that Russell has an increased likelihood of
   a) being a Type B person.
   b) developing AIDS
   c) developing heart disease.
   d) being happily married for 25 years.

10. Theorists have found that the use of humor can be an effective coping strategy. Humor is thought to work for all of the following reasons EXCEPT because it
   a) allows people to express hostility and take advantage of others.
   b) reduces tension.
   c) may stimulate the flow of endorphins in the brain.
   d) supply more oxygen.

True and False

____11. Stress decreases acid production in your stomach.
____12. Muscles tense and the body braces itself for action when you are in stressful situations.
____13. The immune system is more effective when you are stressed.
____14. More blood flows to your muscles when a stressful situation arises.
____15. Skin conductance increases as cognitive stress increases.
____16. Eat more fatty foods and avoid sugar as a strategy to reduce stress.
____17. Exercise releases endorphines which help you cope with stress.
____18. Tight clothes can make you fell uptight.
____19. When you cannot eliminate a stressor, rethink its implications and consequences.
____20. You should avoid all stress in your life to remain a health individual.
____21. The common cold of Mental Illness is schizophrenia.
____22. Schizophrenia is when you have a split personality.

23. Ralph considers himself to be a moderate drinker, yet he has been fired from two jobs for alcohol-related absences and mistakes. Ralph's behavior is abnormal based on the criterion of
   a) statistical deviation
   b) impaired judgment.
   c) emotional distress
   d) maladaptive behavior.

24. Psychologists and psychiatrists do not apply the terms "sane" and "insane" to behavior because
    a) these are legal terms that relate to a person's ability to stand trial.
    b) the terms relate to how statistically deviant a behavior is.
    c) they disagree about which abnormal behaviors make a person insane

25. Which of the following is NOT an anxiety disorder?
    a) phobia
    b) schizophrenia
    c) obsessive-compulsive disorder
    d) posttraumatic stress

26. The view that abnormal behavior is the result of unconscious conflicts is known as the _____ model.
    a) biological b) cognitive c) psycholanalytic d) biological

27. The most widely accepted explanation for multiple personality is that it is a response to _____.
    a) neurotransmitter imbalances
    b) childhood abuse
    c) role confusion
    d) extreme loneliness

28. The biological theory of depression would attribute the causes to
    a) imbalances in serotonin
    b) imbalances in acetylcholine
    c) lack of reinforcement.
    d) anger turned inward.

29. The opposite of depression is _____.
    a.) anxiety b) neurosis c) mania d) fugue

30. An mood disorder that includes both depression and mania is is known as _____ disorder
    a) histrionic b) bipolar c) obsessive-compulsive

31. _____ disorders are marked by disordered communication and thoughts, hallucinations, and bizarre behaviors.
    a) substance abuse b) somatoform c) schizophrenic

32. The psychological factor MOST directly related to physical illness is___
    a.) sexuality b) stress c) aggression d) friendliness

33-36 Essay
Explain physiological responses to stress, how we measured your bodies responses, and why.

37-40. Describe the symptoms of schizophrenia, the typical age of onset, the rule of thirds, and how it all is affected by the vulnerability(Diathesis)-stress model.

41-43. Does stress increase or decrease the efficiency of the immune system? Explain the cascade of events that occur under stress and how it interacts with the immune system?

APPENDIX E

Sept. 10, 1997

Dear Parents and Students
of Mrs. Doubek's
Psychology classes,

I am conducting thesis research to complete my Masters Certification. I have been working at Michigan State University with many different professors in the field of psychobiology and neurosciences. The purpose of my thesis is to create new experiments, investigations, and activities that will improve student learning in the field of psychobiology. I will be compiling data of student test scores before I implement new teaching techniques and test scores after I have implemented the program, to verify if the new activities were beneficial for student learning. Analysis of test scores to verify student progress is a routine practice. The only difference with this unit, is that the analysis of the test scores will be used to conduct my thesis project through MSU.

I am writing this letter to you because MSU requires that all thesis projects allow for the people involved to decline participation in the project. The test scores used will be averaged together. Student participation and the use of their test scores is confidential. Your participation is greatly appreciated. The purpose of the thesis is to improve student learning.

If you are not interested in your test scores being averaged in with the rest of the students, sign the bottom portion of this sheet and check the blank that indicates your intentions not to participate. If you have no objections to the test scores being used in the thesis project you do not need to respond.

Thank-you,

Melissa Doubek

_____ I do not wish to participate in the thesis project done by Melissa Doubek.

Signed_____

REFERENCE LIST

Anderson, O. Roger (1992). Some Interrelationships between Constuctivist Models of Learning and Current Neurobiological Theory, with Implications for Science Education. Journal of Research in Science Teaching. John Wiley & Sons, Inc. 29(10), 1037-1058.

Baum, Andrew, Grunberg, Neil E., & Singer J. (1992). Biochemical Measurements in the Study of Emotion, Psychological Sciences, 3(1).

Benchmarks For Science Literacy (1993). American Association for the Advancement of Science, Oxford University Press, N.Y.

Benjamin, L.T. Jr. & Lowman, K.D. (Eds.).(1993). Activities Handbook for theTeaching of Psychology. Washington, D.C.: American Psychological Association.

Carlson, Neil R. & Buskist, William (1997). Psychology: The Science of Behavior (5th ed.)Boston: Allyn and Bacon.

Carey, J. (Ed.). (1991). Stress and the Brain. Washington D.C.: Society for Neurosciences.

Davidson, Richard(1992). Emotion and Affective Style: Hemispheric Substrates. Psychological Science. American Psychological Society, 3(1), 39-41.

Dopson, W.G., Beckwith, B.E., Tucker, D.M., & Bullard-Bates, C. (1984). Asymmetry of Facial Expression in Spontaneous Emotion, Cortex 20, 243-251.

Ekman, Paul & Friesen, W.V. (1975). Unmasking the Face: A guide to Recognizing Emotions From Facial Clues. Englewood Cliffs. NJ: Prentice-Hall.

Ekman, Paul. (1992). Facial Expressions of Emotion: New Findings, New Questions. Psychological Science, American Psychological Society, 3(1).

Holliday, William G., Yore, Larry D., and Alvermann, Donna. (1994). The Reading-Science Learning-Writing Connection: Breakthroughs, Barriers, and Promises.

Linn, Marcia C. (1992). Science Education Reform: Building on the Research Base, John Wiley & Sons, Inc.

Lefton, L.A. (1997). Psychology(6th ed.) Boston: Allyn and Bacon

Maranto, Gina. (1984) Emotions: How They Affect Your Body. Discover, 35-38.

Pinel, John P.J. (1997). Biopsychology(3rd ed.)Boston: Allyn and Bacon.

O'Loughlin, Michael (1992). Rethinking Science Educatino: Beyond Piagetian Constructivism Toward a Sociocultural Model of Teaching and Learning, Journal of Research in Science Teaching, 29(8), 791-820.

Roberts, T. & Bruce, V. (1988). Feature Saliency in Judging the Sex and Familiarity of Faces. Perception, 17.

Rutherford, F.J. & Ahlgren, A. (1990). Science for All Americans. New York: Oxford University Press.

Temple, Christine. (1993).The Brain: An Introduction to the Psychology of Human Brain and Behavior. London: Penguin Group.

United States Census Bureau, Census 1990.

Van der Meer, R., & Dudink, D. (1996). The Brain Pack: An Interactive, Three-dimensional Experience of the Mysteries of the Mind. England: Van der Meer Publishing Co.

Wade, C & Tavris, C. (1993). Psychology(3rd ed.) New York: HarperCollins College Publishers.

Wertz, S. (1974). Nonverbal Communication Readings with Commentary. New York: Oxford University Press.

Zajonc, R.B. & McIntosh, D. (1992). Some Promising Questions and Some Questionable Promises. Psychological Science. American Psycholological
Society, 3(1)