Charmaine Jens

***“Directional Fractionation”***

Directional fractionation is an area of study within the field of psychophysiology. Psychophysiology connects the psychological and physiological processes related to human emotion and the corresponding physical changes. Directional fractionation is the phenomena of two separate systems – the mind or emotion and the body or physical responses responding in opposite directions to the same stimuli than what’s typically expected. The study of directional fractionation attempts to discover whether distinct emotional sates produce dissimilar patterns of physiological change.

**Psychophysiology and Biofeedback**

Psychophysiology is the study of the relationship between psychological events and resulting biological processes in humans. Psychophysiologists primarily use the electrocardiogram (ECG) and heart rate (HR) in developmental research to measure different emotional responses and physical functions to stimuli from baseline norms. Psychophysiology is occasionally referred to as “cognitive neuroscience" in medical literature. Biofeedback is a clinical application technique which measures, monitors and demonstrates physiological patterns that enable the researcher to alter a patient’s physiological responses to produce desired health effects.

**Sympathetic and Parasympathetic Nervous Systems**

Psychophysiology and biofeedback tools measure and monitor the autonomic nervous system, which consists of the sympathetic and parasympathetic nervous systems. Sympathetic nervous systems include increases in heart rate, breathing and muscle strength; the inhibition of the salivary glands, kidneys, gall bladder and digestion; dilation of pupils and stimulation of the sweat glands. The parasympathetic nervous system stimulates digestion and contracts the pupils, as well as slows heart rate, breathing, the liver, bladder and kidneys. Autonomic responses refer to parasympathetic or automatic body functions that aren’t controlled voluntarily and include heart rate, digestion, breathing, perspiration, salivation, pupils, urination and arousal.

**Directional Fractionation**

Directional fractionation is an autonomic reaction in which heart rate and other parasympathetic functions decrease while the sympathetic nervous system, such as galvanic skin response (GSR) or other internal body organs respond in the opposite direction. The sympathetic nervous system mobilizes the fight-or-flight response by producing a stress reaction in response to the stimuli. In a typical sympathetic arousal state, the heart rate and GSR increases. However, in studies that illustrate directional fractionation, the patient doesn’t actively react to stimuli that normally elicit a corresponding increase in the sympathetic nervous system. When a patient reacts mentally and physically to solve a problem, a normal arousal state is indicated. This is generally produced when the patient watches a tape recording of an actor depicting a man dying of injuries. A patient that exhibits directional fractionation, however, doesn’t react to the stimuli through variations of arousal, emotion, mood or physiological changes.

**The Role of Emotion**

According to the James-Lange theory on the relationship of emotion and bodily states, “The individual’s perception of his physical reaction is the basis of his emotional experience.” The emotional experience occurs as a result of the physical reaction of the body. William James theorizes that there is a distinctive series of events that produce an individual’s emotions as they relate to stimulation, mood and corresponding motivations.

Resources and References

“The Psychology Problem Solver: A Complete Solution Guide to Any Textbook”; Max Fogiel; 1980; pg 382

<http://books.google.com/books?id=c-pgGnPEUwMC&pg=PA382&lpg=PA382&dq=definition+of+directional+fractionation&source=bl&ots=9GkphvvjMG&sig=KJZnKqb_LI9jt0ctTCpCOu4iGRU&hl=en&ei=r9GZTp6zFqqpsQLkrZHsBA&sa=X&oi=book_result&ct=result&resnum=3&ved=0CDEQ6AEwAg#v=onepage&q&f=false>

Elmhurst College Virtual Chembook: Nervous System-Overview

<http://www.elmhurst.edu/~chm/vchembook/661nervoussys.html>

“Media Effects: Advances in Theory and Research”; Jennings Bryant; 2009; pg 194

<http://books.google.com/books?id=oC7eRTMmo3YC&pg=PA194&lpg=PA194&dq=definition+of+directional+fractionation&source=bl&ots=xmKuVO9ATH&sig=ZO30B-dcLnA9fsdxqrY5iDgmlCY&hl=en&ei=cNSZTszmMNKqsAKYooHWBA&sa=X&oi=book_result&ct=result&resnum=10&ved=0CG4Q6AEwCTgK#v=onepage&q=definition%20of%20directional%20fractionation&f=false>

New York University Center for Neural Science; Emotion and Motivation; Margaret M. Bradley

<http://www.cns.nyu.edu/~vessel/courses/NeuralAesthetics/Readings/09_Mar_29/Bradley.pdf>

Allied Psychophysiology: Psychophysiology

<http://alliedpsych.health.officelive.com/Psychophysiology.aspx>

Ammons Scientific; Psychophysiological Patterning to Psychological Processes; David C. Edwards

<http://www.amsciepub.com/doi/pdf/10.2466/pms.1968.26.2.405>

Florida International University, Infant Development Laboratory; Infant Heart Rate: A Developmental Psychophysiological Perspective; Greg D. Reynolds et al

<http://infantlab.fiu.edu/Articles/Reynolds+RichardsECG-DevPsychophys04.pdf>