P

P-30 Antigen

► Prostate-Specific Antigen (PSA)

Pain

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Synonyms

Pain management/control; Pain: psychosocial aspects; Pain threshold

Definition

Pain is a noxious sensory phenomenon that provides information to organisms about the occurrence or threat of injury. Pain is also a multidimensional experience that results from a complex interaction between biological and psychological components and is further influenced by behavioral and social factors. The temporal course of pain can range from acute, or time-limited states in response to injury, to chronic states in which pain persists beyond the point of tissue repair or healing. Although the Gate Control Theory (Melzack & Wall, 1967) provides a unified model of pain, a variety of pain subtypes exist that have different underlying mechanisms.

Description

Neurobiology of Pain

A primary function of the nervous system is to communicate information to alert organisms to the experience or threat of injury. Therefore, the noxious qualities of pain function to capture our attention and motivate action to minimize the risk of harm. Nociceptors are a specialized class of primary afferent nerves. Myelinated nociceptors signal sharp pain from heat and pressure stimuli on skin with hair. Unmyelinated nociceptors signal burning and pressure-induced pain on hairless skin. Both unmyleinated and myelinated nociceptors signal pain from chemical stimuli. Injury leads to increased pain sensitivity or hyperalgesia caused by inflammation.

CNS Mechanisms of Pain Modulation

At the level of the spinal cord, pain modulation occurs in the substantia gelatinosa (SG) of the dorsal horn. The SG serves an inhibitory or gating function that modulates pain signal transduction. Pain modulation also occurs in the periaqueductal gray (PAG) and rostral ventromedial medulla (RVM) of the midbrain, which

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function as a bidirectional relay station. The system is involved in the suppression of ascending responses to harmful stimuli and enhances nociceptive responses. The PAG-RVM system has connections to the hypothalamus and limbic forebrain structures including the amygdala, anterior cingulate cortex, and anterior insula. Consequently, fear, attention, and pain expectancies exert top-down processes that influence pain perception.

Clinical Classifications of Pain

Postoperative Pain and its Management

Acute postoperative pain is a product of a range of physiological mechanisms. It comprises a constellation of sensory, emotional, and psychological experiences that follow surgery and is associated with autonomic, endocrine-metabolic, physiological, and behavioral responses. Considerable progress has been made to understand the functions of the peripheral and central nervous systems, mechanisms of acute postoperative pain, side effects of analgesic drugs, and techniques and interventions in surgical patients. However, improvements in the management of acute postoperative pain are needed. Specifically, the use of acute pain management services may help to ensure that evidence-based analgesic techniques are implemented. Furthermore, improved collaboration would be useful between interdisciplinary care teams including anesthesiologists, surgeons, nurses, and mental health professionals to optimize postoperative pain management.

Deep Somatic Tissue Pain Deep tissue pain encompasses pain from the joints and muscles. The pain is often diffuse and characterized by dull and aching sensations. Major sources of deep somatic tissue pain are inflammatory diseases, trauma, overload, and degenerative diseases. Under normal conditions, these nociceptors are activated by stimuli that can lead to structural damage including overload, twisting, pressure, and ischemic contraction. Under conditions of inflammation or trauma, nociceptors of joint and muscle become increasingly sensitized, particularly to mechanical stimuli.

Two types of spinal cord neurons process nociceptive input from joint and muscle. These neurons show two distinct properties: (1) They converge inputs from the skin and deep tissue, and (2) they are activated by mechanical stimuli. Neurons in the thalamus and cortex process inputs from deep tissue.

Arthritis Osteoarthritis (OA) is a degenerative joint disease that results in pain localized to the joint cartilage and subchondral bone. It affects approximately 30% of adults 75 years and older. OA is classified by the location of the affected joints (e.g., hip or knee) and whether the pain is primary or secondary to other conditions or disease processes. OA pain may occur in response to mechanical stimuli but may be chemically mediated when joint tissues fail to adequately repair. Consequences of OA include loss of articular cartilage, new bone formation in the subchondral region, and formation of new cartilage and bone in the joints and are characterized by pain, stiffness, functional limitations, and impaired quality of life.

Rheumatoid arthritis (RA) is an autoimmune disease that results in significant joint inflammation and pain. It affects nearly 1% of the adult population. RA involves both the small and large joints and is distributed symmetrically. RA may eventually progress to joint failure, which can result in secondary OA. Age, sex, family history, and tobacco use are significant risk factors for RA.

Treatment for arthritis is multidimensional. Components may include education about the disease process, weight loss to minimize joint stress, increased physical activity and/or physical therapy, analgesics, anti-inflammatory drugs, and local steroid or hyaluronic acid injections. Specific to RA, antirheumatic drugs (DMARDs) may be used to reduce inflammation and slow the disease progression. In severe or advanced cases, surgical intervention including joint replacement may be indicated.

Fibromyalgia Syndrome Fibryomyalgia syndrome (FMS) is a persistent pain condition involving the soft tissues. It affects approximately 2% in

the general population and is significantly more prevalent among women than men. Although its etiology is unknown, significant advances have been made in understanding its clinical presentation. Pain is believed to result from central sensitization of somatosensory pathways that induce enhanced pain perception. This includes persistent, diffuse pain to touch at localized areas in soft tissues. Other systemic symptoms include recurrent headaches, dizziness, fatigue, morning stiffness, irritable bowel syndrome, irritable bladder syndrome, insomnia, cognitive dysfunction, depression, and anxiety.

Treatment for FMS is similar to that of other persistent pain conditions and includes education, physical activity and/or physical therapy, cognitive-behavioral therapy, and pharmacological interventions that act on central neural pathways.

Low Back Pain Low back pain (LBP) is defined as pain, muscle tension, or stiffness that is localized between the costal margin and inferior gluteal folds. It also presents with or without radiating leg pain. It can also be classified as specific, or in response to a known pathology (e.g., hernia, fracture), or nonspecific or idiopathic. Nonspecific LBP accounts for 90% of all cases. Physical exercises are currently the only empirically supported intervention to prevent LBP. Many randomized controlled trials and systematic reviews have been published that examine its treatment. Physical activity, nonsteroidal anti-inflammatory drugs (NSAIDs), and muscle relaxants are effective treatments for acute LBP. Physical therapy and CB therapy in the context of interdisciplinary pain treatment programs are recommended for persistent LBP.

Visceral Pain Visceral pain is diffuse. It results in referred pain (pain perceived in sites other than the site of injury or pain stimuli). Unlike somatic nociceptors, the activation of visceral nociceptors does not require tissue damage. Rather, it can be caused by the distension of hollow organs, traction on the mesentery, ischemia, and endogenous chemicals associated with inflammatory processes.

Thorax Pain Angina pectoris is the most frequently occurring form of thorax pain. It is caused by myocardial ischemia but often produces chest pain that is distal to the ischemic event. Cardiac pain is mediated by interplay between autonomic reflexes and peripheral cardiac nerves. The thalamus and hypothalamus transmit cardiac pain to the prefrontal cortex. The occurrence of pain is slow and lacks spatial localization. The clinical presentation of myocardial ischemia can be different in men and women. Pharmacotherapy is the primary intervention for angina pectoris and acute myocardial infarction (MI) including beta-blockers, nitroglycerin, morphine, and antithrombotic agents. Percutaneous transluminal coronary intervention (PCI) and coronary artery bypass graft surgery (CAGB) are surgical interventions that improve coronary blood flow. Other forms of thorax pain include esophageal chest pain, aortic aneurysms, and pulmonary events including embolism.

Abdominal Pain Abdominal pain can be caused by chronic functional disorders or acute life-threatening conditions. Chronic disorders, such as irritable bowel syndrome, account for the majority of diagnoses that account for abdominal pain. Most chronic disorders result in enhanced pain perception in response to visceral stimuli, which results from central pain modulation mechanisms. In contrast, acute abdominal pain is caused by an identifiable stimulus or pathology (e.g., gastric ulcer). Although interventions for acute abdominal pain are highly effective, the development of efficacious treatments for chronic conditions is needed.

Orofacial Pain Orofacial pain is defined as pain experienced in the motor or sensory aspects of the trigeminal nerve system. Pain signals are transmitted to the nucleus caudalis in the medulla and project onward to the thalamus and cortex via the trigeminothalamic tract. Orofacial pain is exacerbated by central convergence, inflammation of the oral mucosa, and central sensitization to pain (increased spontaneous firing of nerves). Prevention strategies include preoperative administration of NSAIDs to block inflammatory

processes and local anesthetics to reduce central sensitization. However, due to common adverse events when using systemic opioids, their outpatient use is limited. The etiology of persistent (unremitting or recurrent) orofacial pain is poorly understood. Consequently, pain management is imprecise, and the majority of therapies are not validated.

Neuropathic Pain Neuropathic pain occurs in response to injury (lesion or dysfunction) of the nervous system. Numerous animal models have been proposed to account for the underlying mechanisms. One of the earliest models originated from the observation that animals attack a limb in which the axons of neurons have been severed following injury. This model suggests that a central sensitization process occurs, such that severed nerves exhibit greater spontaneous firing frequencies than healthy intact nerves. Individuals experiencing neuropathic pain describe their pain as "electric shocks, burning, tingling, itching, and prickling." Examples of neuropathic pain conditions include neuropathies (e.g., peripheral, autonomic) and neuralgias (e.g., trigeminal). Pharmacological treatments may include topical analgesics, tricyclic antidepressants, anticonvulsants, and opioids.

Phantom Limb Pain This is a form of neuropathic pain and refers to perceived pain sensations in the anatomical space of a limb that has been amputated. Although the majority of individuals experience sensations related to the shape, posture, or movement of the missing limb, 60–80% of individuals experience intermittent or persistent pain. Although the specific mechanisms underlying phantom limb pain are not entirely understood, both the peripheral and central nervous systems are involved. Additional treatments may include sodium channel blockers, physical therapy, and transcutaneous electrical nerve stimulation.

Cancer Pain The neurobiology of cancer pain is poorly understood. However, new models have identified mechanisms that both produce and maintain cancer pain. Tumor cells and tumor-associated cells (macrophages, neutrophils, T-lymphocytes) are believed to sensitize primary afferent neurons in the periphery. Findings from these studies may lead to the development of novel therapies that act on these peripheral mechanisms and could improve the quality of life of individuals living with cancer.

Pain Assessment and Intervention Pain is a complex and subjective experience characterized by sensory-discriminative, motivational-affective, and cognitive-evaluative dimensions. Pain can be evaluated using a variety of tools including verbal and numerical self-report scales, visual analogue scales (VAS), self-report measures, behavioral observation, and physiological markers. A combination of these measures is recommended to yield the most valid information about this phenomenon.

Within clinical and research settings, the VAS, the McGill Pain Questionnaire (MPQ), and the Multidimensional Pain Inventory (MPI) are examples of commonly used instruments. Using a VAS, individuals are asked to rate their current pain intensity on a numeric scale that is anchored by 0 (no pain at all) and 10 (the most pain you could imagine experiencing). The McGill Pain Questionnaire was developed Melzack and Wall (Melzack, 1975). It evaluates the specific location(s), intensity, and qualities of pain that individuals currently experience. It contains four domains including sensory, affective, evaluative, and miscellaneous. It can either be clinician-administered or completed independently by patients in a self-report manner. The McGill Pain Questionnaire is a reliable and valid tool to assess the multidimensional nature of pain experience. For research applications where time is limited to obtain information, a short-form McGill Pain Questionnaire (SF-MPQ) is also available. The MPI is a comprehensive self-report instrument designed to evaluate a full range of experiences with persistent pain conditions. It includes dimensions of pain intensity, emotional distress, cognitive and functional adaptation, and social support. It has also been shown to have solid psychometric properties.

Cognitive-Behavioral Approaches to Pain Management In the context of persistent pain conditions, cognitive-behavioral (CB) interventions focus on developing adaptive pain coping skills. These skills are intended to minimize the experience of pain, prevent or minimize pain exacerbations, and limit pain-related disability. A CB intervention addresses the subjective and contextual aspects of pain. First, patients receive education about theories of pain (e.g., Gate Control Theory) to foster an understanding of why pain persists beyond the point of tissue repair. Understanding this conceptual framework provides the foundation for deploying a series of related cognitive and behavioral interventions. Cognitive interventions may include cognitive restructuring to minimize pain catastrophizing, attention diversion and distraction techniques, and problem solving exercises. Behavioral interventions may include relaxation, paced diaphragmatic breathing, goal setting, behavioral activation, and graded exposure to feared physical activities. In the management of persistent pain, CB interventions are often most effective when implemented in the context of interdisciplinary care teams and can be used as an adjuvant to other physical, pharmacological, or surgical therapies.

Cross-References

- ▶ Gate Control Theory of Pain
- ▶ Pain Anxiety
- ▶ Pain Management/Control
- ▶ Pain Threshold
- ▶ Pain: Psychosocial Aspects
- ▶ Pain-Related Fear

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Pain Anxiety

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Synonyms

Pain-related fear

Definition

Pain anxiety is a future-oriented state of autonomic arousal that is triggered by the anticipation of pain. Similar to the tripartite model of anxiety, it is comprised of cognitive, physiological, and behavioral components. Pain anxiety is an affective manifestation of the autonomic nervous system that occurs in response to the anticipation of pain. Albeit to a lesser degree than that triggered by fear, the sympathetic nervous system becomes activated by the septo-hippocampal brain regions. Pain anxiety is characterized by cognitive, physiological, and behavioral symptoms. Cognitively, individuals become hypervigilant for pain-related cues by internally scanning their body (for internal signs and symptoms of pain) and the environment (for pain-inducing contexts or stimuli). They also anticipate experiencing pain in the future and may often expect their pain to be catastrophic (e.g., "Having to get my tooth fixed at the dentist will be excruciating"). In turn, individuals become motivated to engage in avoidance behaviors to minimize the likelihood of experiencing future pain. According to fear-avoidance models of pain, behavioral avoidance (typically of situations involving physical activity or movement) leads to physical deconditioning and muscle atrophy, which in turn, may result in greater pain intensity. Pain anxiety and related avoidance behavior greatly contributes to the progression of acute to persistent pain.

The most common mode of assessment of pain anxiety involves the administration of well-validated self-report instruments. Several published scales are available that assess the nature and extent of pain-related cognitions (e.g., "When I hurt, I think about pain constantly"), pain-related avoidance (e.g., "I try to avoid activities that cause pain"), and physiological symptoms (e.g., "When I sense pain, I feel dizzy or faint"). Examples of self-report instruments include the Pain Anxiety Symptom Scale (PASS) and the Burn-Specific Pain Anxiety Scale. Alternative modes of assessing pain-related fear include semi-structured clinical interviews and the direct observation of patient behavior.

Cognitive behavior therapy (CBT) is the most well-validated intervention for pain anxiety. Treatment components include psychoeducation and introduction, demonstration, and practice of a variety of adaptive coping skills (i.e., progressive muscle relaxation, diaphragmatic breathing, mental imagery, behavioral activation and pleasant activity scheduling, activity-rest cycling, physical therapy/exercise, problem-solving, cognitive restructuring, and calming self-statements). In treating pain-related fear, special emphasis is placed on graded in vivo exposure with behavioral experiments. These latter components allow individuals to identify situations through which they can gather information to test and challenge their distorted pain-related cognitions.

Cross-References

▶ Pain, Psychosocial Aspects
▶ Pain-Related Fear

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Pain Anxiety Symptoms Scale (PASS) and Short Version PASS-20

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Definition

Short self-report questionnaires designed to measure aspects of pain-related anxiety and avoidance for use in clinical assessment and research.

Description

The 40-item Pain Anxiety Symptoms Scale (PASS) (McCracken, Zayfert, & Gross, 1992) and a shorter 20-item version of the same assessment instrument (PASS-20) (McCracken & Dhingra, 2002) measure pain-related anxiety, fear, and avoidance. They were designed for clinical and research purposes and mostly for use with adults with recurrent or chronic pain conditions. However, they have been validated and used in people without identified pain conditions, such as university students and people recruited from community settings (Abrams, Carleton, & Asmundson, 2007). The original PASS was developed at a time during the late 1980s and early 1990s when clinicians and researchers were beginning to focus greater attention on processes of fear and avoidance in relation to chronic pain. Since that time a model of chronic pain referred to as the "fear-avoidance" model has become a popular organizing framework guiding research and treatment development (Vlaeyen & Linton, 2000). The PASS and PASS-20 have been used in research investigating models and mechanisms of pain-related disability, and in treatment process and outcome research (McCracken & Gross, 1998; Vowles & McCracken, 2008). They are also routinely used in clinical practice for analyzing and conceptualizing cases and in treatment-related decision making.

Both versions of the PASS include four subscales that reflect aspects of avoidance behavior (e.g., I will stop any activity as soon as I sense pain coming on), cognitive anxiety (e.g., During painful episodes it is difficult for me to think of anything else besides the pain), fear (e.g., When I feel pain I am afraid that something terrible will happen), and physiological anxiety (e.g., I find it hard to calm my body down after periods of pain). The four subscales are equal length in each version of the measure. All items are rated on a scale from 0 (never) to 5 (always). In the 40-item version five items are reverse-keyed and must be recoded before calculating summary scores. Summary scores for both versions are calculated by summing assigned items and then by summing the subscales to derive an overall score. There are no set cutoffs for interpreting scores from the instruments. One method to facilitate interpretation is to convert raw scores to standard scores or percentile ranks. As an example, a table of raw scores and percentile rank equivalents has been constructed from a large consecutive sample of patients seen at a tertiary care center in the UK ($N = 339$). From this raw scores of 15.0, 33.0, 60.0, and 78.0 from the PASS-20 correspond to the 5th, 25th, 75th, and 95th percentile, respectively.

The PASS and PASS-20 have been extensively validated. They both show very good

internal consistency and temporal consistency (McCracken & Dhingra, 2002; Roelofs et al., 2004) and a factor structure that generally matches the a priori subscale structure (Abrams et al., 2007; Larsen, Taylor, & Asmundson, 1997; Roelofs et al., 2004). Both versions of the instrument demonstrate adequate construct validity in relation to variables such as general anxiety and depression (e.g., Roelofs et al., 2004) and show mostly moderate to large correlations with important criterion variables, such as measures of physical and psychosocial disability (e.g., McCracken & Dhingra, 2002). The original PASS (McCracken & Gross, 1998) and the 20-item version (Vowles & McCracken, 2008) both appear sensitive to the effects of multidisciplinary treatment for chronic pain.

For most uses currently the PASS-20 is preferred as it appears equivalent to the longer version in most important respects. The PASS-20 has been translated into Chinese, Dutch, French, Icelandic, Iranian, Polish, and Spanish, among other languages.

The fear-avoidance model of chronic pain has been a very useful model for understanding pain-related disability and for guiding the current generation of treatment developments for chronic pain. At the same there are other theoretical and treatment developments that appear wider in scope and possibly more progressive than the fear-avoidance model. These developments include contextual approaches within cognitive behavior therapy, approaches such as Acceptance and Commitment Therapy (ACT) (Hayes, Strosahl, & Wilson, 1999) and mindfulness-based approaches. In this work measures such as the PASS-20 remain useful. Other variables that are known to have strong relations with pain-related fear and avoidance are also now frequently studied, such as acceptance of pain and values-based action, among others, and a wider process called psychological flexibility (e.g., Vowles & McCracken, 2008). The point is that the PASS-20 and its focus on fear and avoidance remains relevant and the field is also evolving so that these process are being examined in a broader and well-integrated cognitive behavioral framework. These theoretical and treatment developments may be important to those who are hoping to assess pain-related fear and avoidance and may be seeking to use an instrument such as the PASS-20.

Cross-References

- Chronic Pain
- Cognitive Behavior Therapy

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Pain Management/Control

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Synonyms

Pain: psychosocial aspects

Definition

Pain is a multidimensional phenomenon. Pain management refers to the physiological (i.e., pharmacological, surgical), psychological, and behavioral interventions that are aimed at minimizing pain perception and alleviating pain-related interference and disability.

Description

Historically, pain was conceptualized using a disease model and was considered to be a purely sensory experience resulting from injury, inflammation, or tissue damage. However, limitations to this model became evident after observing diverse responses to pain across individuals despite objectively similar physical stimuli or trauma. In 1965, Melzack and Wall published a seminal paper in *Science* that outlined a revolutionary theory of pain (Melzack & Wall, 1965).

Gate Control Theory

The Gate Control Theory emphasized central neural mechanisms at the level of the spinal cord that modulate afferent signals from peripheral nerves en route to the brain. This sensory modulation and subsequent pain perception is influenced by sensory input, cognitive processing, affective states, neural inhibitory capacities, activities of the stress-regulation system, and subsequent behavioral responses. Therefore, interventions targeting these multiple mechanisms provide opportunity to achieve effective pain management.

Pharmacological and Surgical Interventions

Pharmacological interventions are often the first-line treatments for pain. Systemic analgesics are the focus of both acute and persistent pain management and include nonsteroidal anti-inflammatory drugs (NSAIDs), including acetaminophen (ASA), and opioid analgesics (pure or in combination with NSAIDs). Combination opioid analgesics are typically administered orally; however, other routes of administration include rectal and sublingual. Pure opioids can be administered through the skin (with a transdermal patch), subcutaneously, or intravenously. These latter routes of administration are typically used when adequate pain relief is not achieved with the use of NSAIDs or combination opioids. In cases of neuropathic pain (i.e., pain due to dysfunction of the nervous system, in the absence of tissue damage), antiepileptic medications are often used (e.g., pregabalin). In light of their misuse and abuse potential of opioids, individuals with persistent pain should be evaluated to determine if chronic opioid management is clinically appropriate. Individuals with a history of medical non-adherence or individuals with severe axis I or axis II pathology may require close monitoring if opioid medications are prescribed.

Surgical procedures for pain management range in their degree of invasiveness. Minimally invasive procedures include steroidal injections and nerve blocks (of the peripheral and sympathetic nerves). Maximally invasive procedures include radiofrequency ablations (for the local destruction of nervous tissue), spinal cord stimulator implantation (for the neuromodulation of afferent pain signals), and intrathecal pump implantations (for the direct administration of opioids and other analgesics into the cerebral spinal fluid when pain relief using other modalities has been unsuccessful). Particularly with these more invasive surgical interventions, individuals must adhere to medical recommendations to avoid potentially life-threatening adverse

medical events. Consequently, candidates for these procedures also require careful evaluation and selection by qualified professionals to ensure patient safety.

Cognitive Behavioral Interventions

Cognitive behavioral interventions focus on developing adaptive pain coping skills to minimize the experience of pain, prevent long-term exacerbations in pain, and minimize pain-related disability. For individuals with persistent pain (either intermittent-recurrent pain or unremitting pain), they often become anxious and fearful of the pain experience and avoid engaging in physical activity to minimize the experience of pain. However, over time, this behavioral avoidance contributes to the loss of physical strength, physical deconditioning, and muscular atrophy (i.e., loss of muscle mass) that exacerbates pain perception. In essence, the avoidance of physical activity *because* of pain results in pain intensification. This behavioral avoidance reinforces the fear of pain, resulting in greater anxiety and propensity to avoid physical activity. Furthermore, avoidance of pain often leads to avoidance of activities through which individual's derive meaning and value (e.g., participation in one's profession, spending time with family/friends). Over time, avoidance may contribute to a sense of isolation, undermine one's confidence in their ability to manage their pain, and increase the focus of their attention to the perception of pain. This process contributes the development or exacerbation of depression, the intensification of pain, and pain-related interference and disability.

Components of cognitive behavioral interventions for persistent pain include psychoeducation and introduction, demonstration, and practice of a variety of adaptive coping skills (i.e., progressive muscle relaxation, diaphragmatic breathing, mental imagery, behavioral activation and pleasant activity scheduling, activity-rest cycling, physical therapy/exercise, problem-solving, cognitive restructuring, and calming self-statements). Within a CBT protocol, the relaxation procedures reduce sympathetic arousal to both "close the gate" to minimize the transmission of afferent pain signals to the brain and reduce muscle tension associated with pain. The attention procedures (i.e., mental imagery, pleasant activity scheduling) function to distract individuals from their pain experience and facilitate positive experiences and positive affect. The behavioral interventions (i.e., activity-rest cycling, behavioral activation, physical therapy/exercise) are intended to help individuals learn how to engage in activities despite experiencing pain and to both minimize pain-related interference and maintain their physical conditioning. While initial behavioral engagement often results in pain exacerbations, and over time, it is associated with reductions in pain intensity. In cases where individuals experience high degrees of pain-related fear and anxiety, graded exposure in vivo to physical movement may be required to minimize their affective response. Cognitive interventions (i.e., cognitive restructuring, calming self-statements, problem-solving) are intended to address pain catastrophizing (e.g., "This pain is so horrible I *cannot* do anything"), maladaptive pain beliefs (e.g., "Walking *should not* be painful"), and enable adaptive problem-solving skills. These cognitive behavioral interventions can be effectively delivered in individual or group formats, can be modified for family or system-based interventions, and can be augmented with the use of biofeedback equipment (e.g., superficial electromyography and monitoring of heart rate, respiration rate, peripheral temperature, and skin conductance). These applications are intended to provide individuals with physiological data that is used to help modulate sympathetic nervous system arousal using the coping skills outlined above.

Pain is a complex and multidimensional experience. In cases of persistent pain, individuals may benefit from clinical management by interdisciplinary teams. Although in some cases complete pain relief is not feasible, a combination of the approaches described above can minimize pain-related interference, disability, and the impact and potential for comorbid psychiatric conditions to maximize the quality of life experienced by individuals.

Cross-References

- ▶ Pain
- ▶ Pain Anxiety
- ▶ Pain, Psychosocial Aspects
- ▶ Pain: Psychosocial Aspects
- ▶ Pain-Related Fear

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Pain Perception

- ▶ Gate Control Theory of Pain

Pain Sensitivity

- ▶ Gate Control Theory of Pain

Pain Threshold

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Definition

Pain threshold is defined as the minimum intensity of a stimulus that is perceived to be painful. Previously, this threshold was believed to be uniform across individuals, such that given intensity of a stimulus was thought to produce a given pain

response. However, it is now understood that the experience of pain is a subjective phenomenon, which is influenced by a complex interaction of biopsychosocial factors.

Historically, Specificity Theory and Pattern Theory posit that pain results from the direct transmission of peripheral stimuli to the brain, and stimulus response occurs in a reproducible relationship. However, limitations to these theories became evident after observing divergent responses to pain across individuals despite objectively similar physical stimuli or trauma. Consequently, Melzack and Wall proposed the Gate Control Theory of pain, which revolutionized our understanding of this phenomenon.

According to this theory, peripheral small diameter nerve fibers (i.e., pain receptors) and peripheral large diameter nerve fibers (i.e., normal receptors) project to the substantia gelatinosa (SG) in the dorsal horn of the spinal cord. The SG serves an inhibitory or gating function that modulates signal transduction. The SG also projects afferent fibers to the first transmission (T) cells. Activation of the T cells "activates the neural system" via the spinothalamic tract to facilitate pain perception.

In part, pain perception is determined by this bottom-up process. In the absence of sensory input, inhibitory neurons in the SG prevent projection neurons from transducing signals to the brain (i.e., maintaining a closed gate). When there is a preponderance of stimulation of pain receptors, the inhibitory neurons in the SG becomes inactivated (opening the gate), permitting the afferent projection neurons to transduce pain signals to the T cells and to the brain. However, pain perception is also influenced by top-down processes that include cognitive processes (e.g., attention), neural inhibitory capacities, affective states, and activities of the stress-regulation system. These processes transduce efferent signals to the dorsal horn in the spinal cord that further modulate the spinal gate and subsequent pain perception. Pain threshold is determined by variation in spinal gate modulation from both bottom-up and top-down processes that facilitate pain perception.

Cross-References

- ▶ Pain
- ▶ Pain Management/Control
- ▶ Pain: Psychosocial Aspects

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Pain, Psychosocial Aspects

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Synonyms

Pain anxiety; Pain management/control; Pain-related fear

Definition

Researchers and clinicians have begun to map the trajectory of pain from acute to persistent states. These outcomes are influenced by a complex interaction of biological, psychological, behavioral, and social components, which can be clustered into intrapersonal factors (factors affecting the level of the individual) and interpersonal factors (factors affecting the interaction between the individual and their environment). These factors influence both pain perception and responses to treatment.

Description

Pain is a universal phenomenon experienced by most individuals. However, pain sometimes

persists beyond a reasonable time during which tissue typically heals following injury. Several researchers have developed and articulated conceptual models to understand how and why for some individuals pain transitions from acute to persistent states.

Fear-Avoidance Models of Pain

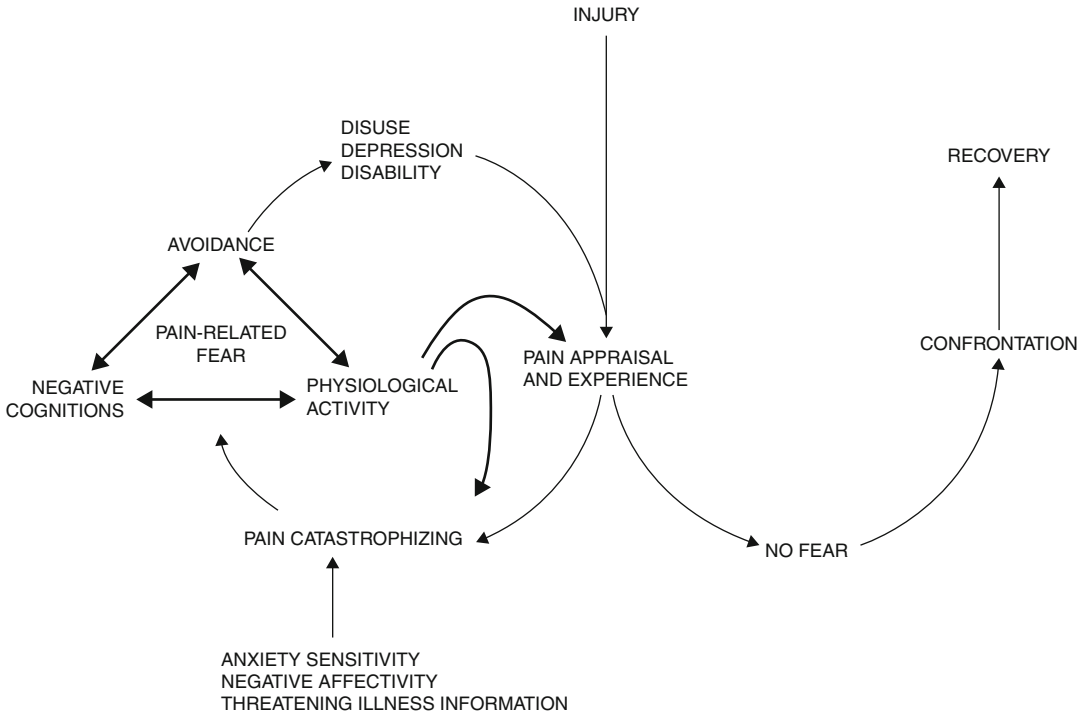
Fear-Avoidance Models posit that following the onset of pain (from injury or disease process), individuals appraise and evaluate their experience (see Fig. 1 Norton & Asmundson, 2003). For those who perceive their pain in a realistic manner, they do not experience excessive fear of pain, are able to engage in activities following a reasonable healing period, and subsequently recover from their experience. However, for others, a more complicated course of recovery ensues triggering a variety of cognitive, physiological, and behavioral symptoms. For those that progress to develop persistent pain (either recurrent intermittent pain or unremitting pain), they interpret their pain to be catastrophic in nature (e.g., "This pain is so excruciating I cannot function"). This overinterpretation triggers a state of autonomic arousal and pain-related fear. This fear is accompanied by a variety of somatic symptoms and negative cognitions about pain that motivates are variety of escape-avoidance behaviors (e.g., prolonged periods of rest, avoidance of physical activity). Over time, the anticipation of experiencing pain in the future motivates continued avoidance of activity, which in turn, leads to loss of physical strength, physical deconditioning, and muscle atrophy. These consequences result in increases in pain intensity, which continues to fuel this fear-avoidance cycle. Several individual difference variables have been identified that seem to place individuals at risk for developing persistent pain and include negative affectivity (i.e., trait experiences of negative emotions) and anxiety sensitivity (i.e., the propensity to experience fear of somatic sensations). Individuals that experience higher levels of these traits have been shown to be at greater risk for developing persistent pain conditions.

Intrapersonal Factors in Persistent Pain

Regardless of the nature of the pain experience (i.e., headache pain; orofacial pain), psychosocial factors have been shown to moderate pain intensity and progression. Specifically, depression, anxiety disorders (e.g., post-traumatic stress disorder, panic disorder, generalized anxiety disorder), substance use disorders, and somatoform pain disorders commonly co-occur with persistent pain conditions and are significantly higher than rates found in the general population. Furthermore, personality disorders also appear to occur more frequently among patients with persistent pain than among the general population; however, precise estimates in the general population are not available. These psychiatric phenomenon may share similar underlying processes to pain (that may account for their co-occurrence), are associated with more negative perceptions of pain, and influence individual's behavioral responses (e.g., are associated with greater pain-related avoidance). It has also been shown that heightened emotional reactivity, particularly when coupled with concurrent psychosocial stressors, further exacerbates negative perceptions of pain and predisposes individuals to pain-related disability. Furthermore, active coping skills (e.g., continuing to engage in activities, distraction from pain) are associated with lower pain intensity and minimize the risk of pain persistence. In contrast, passive coping skills (e.g., pain-related avoidance behavior, reliance on others) are associated with higher pain intensity and increase the risk of pain persistence.

Interpersonal Factors in Persistent Pain

Beyond the individual, several interpersonal factors are associated with pain severity, persistence, and pain-related disability. Within the context of intimate relationships, displays of pain-related behavior solicit responses from others that become reinforced over time and may perpetuate negative outcomes. For instance, an individual with persistent low back pain may display grimacing and guarding behaviors in response to pain experienced while attempting to dress them self. However, their partner may respond by providing physical assistance to help this



Pain, Psychosocial Aspects, Fig. 1 Amended fear-avoidance model of chronic pain (Copyright (2011) by the Association for Behavioral and Cognitive Therapies. Reprinted by permission of the publisher)

individual put on their clothes. Although this physical assistance helps to minimize the pain experienced, and facilitates the timely completion of this task, it reinforces the need for assistance contributing to more significant pain-related disability. Over time, such pain-related behaviors become negatively reinforced (since the assistance provided minimizes the experience of pain), which increases the likelihood of similar future behavioral responses. Furthermore, the need for assistance may undermine an individual's self-efficacy (i.e., their confidence in their ability to manage pain) and contribute to greater pain intensity, more frequent pain-related behavior, physical inactivity, and pain-related disability.

Psychosocial Factors and Treatment Response

Following the progression from acute to persistent pain, psychosocial factors have also been shown to influence responses to a variety of treatments. Across different categorical subtypes (i.e., low back pain; headache pain), the presence of axis I pathology (e.g., depression, anxiety, somatization) is associated with lower response to treatment (i.e., greater frequency and intensity of pain reports, greater perceived functional impairment), and may interfere with individual's ability to engage in the treatment process (e.g., depression interferes with treatment attendance and adherence to interventions). Furthermore, it has been shown that the continued use of maladaptive coping skills (i.e., pain-related avoidance behaviors), positive attitudes and expectations about pain and disability (i.e., pain facilitates the maintenance of supportive relationships; pain prevents the return to unsatisfactory employment), and unresolved worker's compensation/personal injury cases are further associated with lower treatment response. Therefore, a comprehensive assessment of these psychosocial factors is imperative at the outset of any pain-related intervention. This can be accomplished by obtaining a detailed medical and

psychosocial history, conducting semi-structured clinical and diagnostic interviews with both patients and their caregivers, the administration of self-report instruments, and consultation with current and past health-care providers.

Considered together, persistent pain conditions arise from a complex interaction of biological, psychological, social, and environmental factors. Understanding these relationships will help to identify factors that maintain and reinforce persistent pain across time and will provide insight into the development of effective pain management interventions.

Cross-References

- ▶ Pain Anxiety
- ▶ Pain-Related Fear

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Pain: Psychosocial Aspects

- ▶ Pain
- ▶ Pain Management/Control

Pain-Related Fear

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Synonyms

Pain anxiety; Pain, psychosocial aspects

Definition

It is an affective manifestation of the fight-or-flight system in response to pain perception. The sympathetic nervous system becomes activated by the amygdala, resulting in cognitive, physiological, and behavioral symptoms. Following pain perception subsequent to injury or pain-inducing stimuli, pain is interpreted catastrophically by inferring more harmful or

life-threatening outcomes to its underlying cause. For instance, when an individual experiences acute pain after rolling over on their ankle, they might infer that the pain is caused by a broken bone, rather than by a sprain. This negative cognitive bias is predisposed by trait-like factors including anxiety sensitivity (i.e., fear of interoceptive experiences) and negative affectivity (i.e., the propensity toward experiencing negative emotions). This cognitive process prompts hypervigilance toward interoceptive cues (e.g., pain or muscle tension consequent to their injury) and illness information in the internal of external environment (continued or exacerbated pain). This motivates a constellation of defensive behaviors (e.g., guarding, rest) that are intended to provide relief or escape from the pain-inducing state. Fear-avoidance models of pain, and the empirical evidence supporting such models, suggest that pain-related fear is a predisposing factor to the development of persistent pain conditions.

Assessment of Pain-Related Fear

The most common mode of assessment of pain-related fear involves the administration of well-validated self-report instruments. Several published scales are available including the Fear of Pain Questionnaire-III (FPQ-III) and the Fear-Avoidance Beliefs Questionnaire (FABQ). These measures assess the nature and extent of pain-related fear by asking individuals to rate how much they fear the pain associated with a variety of situations (e.g., "having someone slam a heavy car door on your hand," "biting your tongue while eating") or the nature and extent of a variety of pain-related beliefs (e.g., "Physical activity might harm my back," "I should not do physical activities that (might) make my pain worse"). Alternative modes of assessing pain-related fear include semi-structured clinical interviews and the direct observation of patient behavior.

Treatment of Pain-Related Fear

Cognitive behavior therapy (CBT) is a mainstay in the treatment of pain-related fear. Treatment components include psychoeducation, and introduction, demonstration, and practice of a variety of adaptive coping skills (i.e., progressive muscle relaxation, diaphragmatic breathing, mental imagery, behavioral activation and pleasant activity scheduling, activity-rest cycling, physical therapy/exercise, problem-solving, cognitive restructuring, and calming self-statements). In treating pain-related fear, special emphasis is placed on graded in vivo exposure with behavioral experiments. These latter components allow individuals to construct situations in which they collect information to test and challenge their distorted pain-related cognitions.

Cross-References

▶ Pain Anxiety
▶ Pain: Psychosocial Aspects

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Palliative Care

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Synonyms

Hospices; Palliative medicine; Supportive care; Terminal care

Definition

The World Health Organization (WHO) defines palliative care as "an approach that improves the quality of life of patients and their families facing the problems associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychological and spiritual" (World Health Organization, 2002).

Description

The goal of palliative care is to achieve the best possible quality of life for both the patients and their families.

Palliative care:

- Is a multidisciplinary task and uses a team approach by physicians, nurses, psychologists, social workers, and other health professionals to address the needs of patients and their families
- Offers a support system to help patients and their families in the community
- Is applicable at any age and at any stage in the course of illness, in conjunction with other therapies such as chemotherapy or radiation therapy which may prolong life
- Provides relief from distressing symptoms such as pain, shortness of breath, depression, drowsiness, and nausea
- Alleviates the adverse side effects, such as relieving the nausea related to chemotherapy
- Influences positively in the course of illness (Temel et al., 2010)

Dying is a normal event; however, many people feel uncomfortable discussing their own death as well as the death of someone close. A book "Hagakure," written by a samurai warrior, who was keenly aware of the events of the day, teaches us how to cope with spiritual pain within the framework of our own insight. "There is something to be learned from a rainstorm. When meeting with a sudden shower, you try not to wet and run quickly along the road. But doing such things as passing under the eaves of houses, you still get wet. When you are resolved from the beginning, you will not be perplexed, though you still get the same soaking. This understanding extends to everything" (Yamamoto, 2005).

Perception of physical, psychological, and spiritual pain may differ in various countries with different cultures and religions; nonetheless, we all aim for the same goal in palliative care.

Cross-References

▶ Religion/Spirituality
▶ World Health Organization (WHO)

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Palliative Medicine

▶ Palliative Care

Panic Attack

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Synonyms

Panic disorder

Definition

Panic attacks are a state of sympathetic nervous system arousal that results in a discrete episode of intense fear or discomfort in the absence of objective danger. This fear is accompanied by a host of somatic and cognitive symptoms. Symptoms include tachycardia (i.e., racing heart), sweating, palpitations, trembling, dyspnea (i.e., shortness of breath), feelings of being smothered or feelings of choking, nausea, chest pain, abdominal distress, dizziness, light headedness, derealization or depersonalization, numbness or tingling in the face or extremities, chills or hot flushes, fear of "going crazy," fear of losing control, or fear of death from such an episode. Individuals must report experiencing at least 4 of the 13 possible somatic and cognitive symptoms. These aforementioned symptoms typically peak in intensity over a short period of time (i.e., 10 min or less). If individuals report experiencing excessive fear but manifest fewer than four symptoms, it is considered to be a limited-symptom panic attack. Panic attacks are classified into three main subtypes: cued panic attacks (i.e., panic attacks can occur in response to a specific situation or event), uncued panic attacks (i.e., panic attacks that occur "out of the blue" in the absence of a discernable trigger), or situationally predisposed panic attacks (i.e., panic attacks that occur immediately on exposure to or in anticipation of a specific situational cue or trigger). The experience of at least two *uncued* panic attacks is a prerequisite for the diagnosis of panic disorder. However, panic attacks can occur in the context of any other anxiety disorder (e.g., generalized anxiety disorder, social anxiety disorder) when cued by situational events or triggers (e.g., in response to excessive worry; during a social interaction). The possible consequences of such episodes make panic attacks of interest to behavioral medicine.

Cross-References

► Panic Disorder

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Panic Disorder

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Synonyms

Panic attack

Definition

According to the Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV-TR), panic disorder (PD) is an anxiety disorder that is defined by the experience of recurrent (two or more) uncured panic attacks. Following these attacks and for a period of at least 1 month, individuals must report experiencing concern about either having additional attacks, concern about the potential implications of having panic attacks (e.g., death), or significantly change their behavior because of the experience of panic attacks (e.g., avoidance of certain situations). In this context, panic attacks cannot occur in response to the physiological effects of a substance (e.g., caffeine, marijuana), cannot be due to a general medical condition, and cannot be better accounted for by another mental disorder

(e.g., generalized anxiety disorder). PD can occur in isolation, or in the presence of agoraphobia (i.e., anxiety about particular places or situations in which individuals fear experiencing a panic attack). According to the DSM-IV-TR, PD occurs in approximately 1–2% of the general population. The onset of PD typically occurs between late adolescence and mid-30s. Researchers have shown that anxiety sensitivity (i.e., an individual difference variable involving the fear of anxiety-related somatic symptoms) is a robust predictor of the development of PD. However, PD (with or without agoraphobia) is diagnosed more commonly among women than among men.

Cognitive Behavioral Models

Theoretical models of PD suggest that among individuals who are predisposed to being fearful of somatic cues (i.e., having high levels of anxiety sensitivity), they catastrophically misinterpret physiological sensations when they occur (e.g., "my heart is racing, I *must* be having a heart attack"). Such distorted cognitions motivate a series of maladaptive behaviors (e.g., escaping the current situation to prevent the catastrophic outcome, avoiding situations because of the fear of experiencing a future panic attack, not leaving the house alone in the event of a panic attack). Over time and across situations, these escape-, avoidance-, and safety-seeking behaviors become negatively reinforced, resulting in a reliance on engaging in these behaviors to either prevent a panic attack from occurring, or in minimizing the potential (perceived) negative and catastrophic outcome(s). Together, these maladaptive cognitions and behaviors contribute to greater sympathetic arousal that results in a host of somatic symptoms (e.g., racing heart, dyspnea, nausea, shaking/trembling), which perpetuates the cycle of panic.

Assessment

Prior to commencing any pharmacological or psychological intervention, it is essential to establish a differential diagnosis to determine if PD is the most appropriate diagnosis. This can be accomplished through the administration of structured clinical interviews, the completion of various self-report instruments, and if necessary, a thorough medical evaluation. The Structured Clinical Interview for DSM-IV (SCID-IV) and the Anxiety Disorders Interview Schedule IV (ADIS-IV) are the two "gold standard" clinical interviews for the anxiety disorders. These interviews are modeled after diagnostic criteria from the DSM-IV and assess the presence of all anxiety disorders, along with a variety of potentially comorbid axis I conditions (e.g., mood disorders, substance use disorders, somatoform disorders, psychotic disorders, and adjustment disorders). In conjunction with structured clinical interviews, a variety of well-validated self-report instruments are available to assess the nature, extent, and risk for PD symptoms. These include the Anxiety Sensitivity Index, Revised (ASI-R), the Panic Disorder Severity Scale (PDSS), and the Agoraphobic Cognitions Questionnaire (ACQ). If there is potential for a patient's panic symptoms to be caused by an underlying medical condition (e.g., atrial fibrillation), a thorough medical evaluation is required before a diagnosis of PD can be established.

Treatment of PD

Efficacious treatments for PD include both pharmacological and psychological interventions. Both selective serotonin reuptake inhibitors (SSRIs) and benzodiazepines are used in the treatment of PD. However, it is recommended that benzodiazepines be prescribed using a scheduled dose, as opposed to an "as needed" basis (i.e., PRN). This helps to minimize the risk of the benzodiazepine use becoming a maladaptive safety behavior that may exacerbate PD-related cognitive distortions. Cognitive behavior therapy (CBT) remains as the front-line psychological intervention for PD. Treatment components include psychoeducation (around the fight-or-flight system, CBT model of panic), identification and restructuring of cognitive distortions, and graded exposure (cognitive, in vivo, and interoceptive). Recent technological advancements permit the augmentation of exposure-based interventions with virtual reality equipment.

Cross-References

▶ Panic Attack

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Paradoxal Sleep

▶ REM Sleep

Parallel Group Design

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Synonyms

Independent treatments group design

Definition

A parallel group design is an experimental study design in which each subject is randomized to one of two or more distinct treatment/intervention groups. Those who are assigned to the same treatment are referred to as a treatment group.

While the treatments that these groups receive differ, all groups are treated as equally as possible in all other regards, and they complete the same procedures during the study. This parallel activity on the part of the groups of individuals is captured in the term "parallel group design."

The term controlled study is often heard in this context. One group will receive the treatment of interest and another group a control treatment, against which responses during and at the end of the treatment intervention are compared. Going one step further, the term concurrently controlled study makes clear that the different groups take part in their respective treatment arms at the same time. If all of the subjects in one treatment group completed their participation first, and then all of the other subjects completed their participation at some later time, it is quite possible that other factors could confound the results.

Cross-References

▶ Crossover Design
▶ Randomization

Parasympathetic

▶ Autonomic Balance
▶ Heart Rate Variability

Parasympathetic Nervous System (PNS)

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Definition

The parasympathetic nervous system (PNS) is one of two main branches or subsystems of the autonomic nervous system (ANS). It originates in

the brain stem and sacral spinal cord and commonly – but not always – yields peripheral adjustments that are complementary to those produced by its counterpart, the sympathetic nervous system (SNS).

Description

The parasympathetic nervous system is one of two main branches or subsystems of the autonomic nervous system, the physical system responsible for nonconsciously maintaining bodily homeostasis and coordinating bodily responses. Working with the second main branch, the sympathetic nervous system, the parasympathetic nervous system regulates a wide range of functions such as blood circulation, body temperature, respiration, and digestion. Parasympathetic activation commonly leads to adjustments on organs and glands that are complementary to those produced by sympathetic activation and suitable for low activity and bodily restoration ("rest and digest" as opposed to "fight and flight"). Examples of low activity and restorative adjustments are constriction of blood vessels in the lungs, increased gastric secretion, and decreased heart rate and contraction force. Although parasympathetic adjustments tend to complement sympathetic adjustments, they do not always. For example, both parasympathetic nervous system arousal and sympathetic nervous system arousal increase salivary flow, although to different degrees and yielding different compositions of saliva.

Basic functional units of the parasympathetic nervous system are preganglionic and postganglionic neurons. Preganglionic neurons have cell bodies in the brainstem or sacral spinal cord and axons that extend to cell bodies of postganglionic neurons. Postganglionic neurons have cell bodies that are clustered in so-called ganglia and relatively short axons that innervate target organs and glands.

The major neurotransmitter of the parasympathetic nervous system is acetylcholine. It is the neurotransmitter of all preganglionic and postganglionic neurons. Stimulation of the cholinergic receptors of the nicotinergic subtype located on the cell bodies of the postganglionic neurons by acetylcholine leads to an opening of nonspecific ion channels. This opening permits the transfer of potassium and sodium ions, which depolarizes the postganglionic cell and initiates an action potential in the postganglionic cells. Muscarinic cholinergic receptors are located on target organs and glands. Stimulation of muscarinic receptors by acetylcholine activates G-proteins, which trigger the effector response via a second-messenger pathway. Specific effects depend on the innervated visceral structure. For instance, activation of the muscarinic receptors of the heart muscle leads to reduced heart rate and heart contraction force. Stimulation of muscarinic receptors of the salivary glands increases salivary flow.

In working jointly with the sympathetic nervous system, the parasympathetic nervous system does not function in an all-or-none fashion, but rather activates to different degrees. Depending on the affected visceral structure and situation, it may be more or less active than the sympathetic nervous system. Shifts in the magnitude of sympathetic and parasympathetic influence can occur locally within a single visceral structure (e.g., the eye) or across visceral structures, with local shifts occurring to meet highly specialized demands (e.g., a change in ambient light) and global shifts adapting the body to large-scale environmental changes (e.g., the appearance of a substantial physical threat). Autonomic control is maintained by structures in the central nervous system that receive visceral information from an afferent (incoming) nervous system. A key central nervous system structure is the hypothalamus, which integrates autonomic, somatic, and endocrine responses that accompany different organism states.

Cross-References

- ▶ Acetylcholine
- ▶ Adrenaline
- ▶ Autonomic Activation
- ▶ Autonomic Balance

- ▶ Autonomic Nervous System (ANS)
- ▶ Epinephrine
- ▶ Sympathetic Nervous System (SNS)

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Paraventricular Nucleus

- ▶ Hypothalamus

Parent-Child Concordance

- ▶ Family Aggregation

Parent-Rated Life Orientation Test of Children (P-LOT)

- ▶ Optimism and Pessimism: Measurement

Parietal

- ▶ Brain, Cortex

Parkinson's Disease

- ▶ Parkinson's Disease: Psychosocial Aspects

Parkinson's Disease: Psychosocial Aspects

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Synonyms

Degenerative parkinsonism; Parkinsonism; Parkinson's disease; PD; Secondary parkinsonism

Definition

Parkinson's disease (PD) is the second most common neurodegenerative disorder and is characterized by motoric symptoms of resting tremor, rigidity, bradykinesia, and gait disturbance. The psychosocial aspects of PD involve the interaction of PD symptomatology, psychological development and function, personal relationships, and environmental factors.

Description

Parkinson's disease (PD) is a common neurodegenerative disorder that affects approximately between 500,000 and a million Americans of all races and ethnic groups, and 0.3% (5 million) of the world's population. Pathologically, PD is an inexorably progressive disorder of unknown cause in which neurons of the substantia nigra progressively degenerate resulting in greater degrees of brain dopamine deficiency. In addition, a number of other neuronal pathways degenerate including cholinergic, noradrenergic, and serotonergic pathways. Primary motor manifestations of PD include resting tremor, bradykinesia (e.g., slowed motor ability), rigidity, and gait disturbance. Important clinical features to establish the diagnosis of PD include

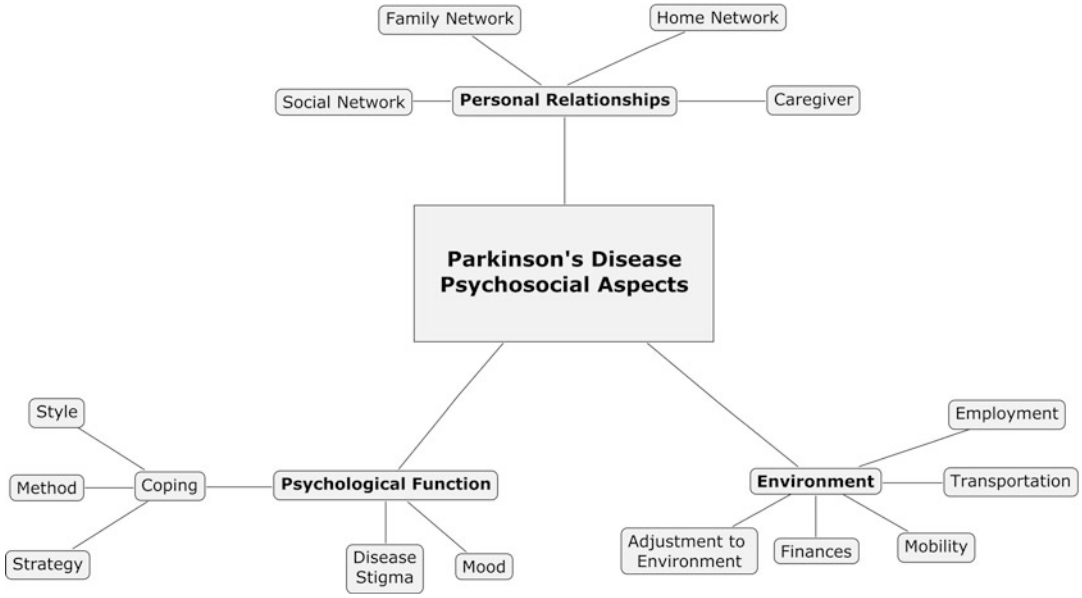
asymmetric symptom onset and responsiveness to levodopa, a commonly used medication to treat PD symptoms. Due to a combination of endogenous and exogenous factors, a significant proportion of patients with PD also suffer from comorbid medical and psychiatric illnesses. This can include pain, insomnia, autonomic dysfunction, as well as sensory and cognitive difficulties.

There has been a primary use of a biomedical approach to inform PD that has focused on the physical, neurological, and medical PD symptoms. A biopsychosocial approach may inform other domains, particularly psychosocial function. Psychosocial aspects of PD revolve around three broad domains including (1) personal relationships, (2) psychological function, and (3) environmental factors (see Fig. 1). These domains are all impacted by the progression and severity of PD symptomatology and age. As patients progress through different disease stages, psychosocial aspects will be relatively affected. There are approximately five stages of PD. In stage 1, the PD symptoms are minimal and may have some impact on activities of daily living, though by stage 2, the PD symptoms are more noticeable and begin to interfere with routine physical tasks. At stage 3, the PD symptoms may be more severe and impede most physical activities. At stages 4 and 5, the PD symptoms may be of such severity that the person is unable to live independently. Thus, greater PD disease severity is associated with greater adverse impact on psychosocial functions. For instance, late-stage PD decreases mobility and communication, thus limiting patients' ability to care for themselves and resulting in greater reliance upon others for activities of daily living. Decreased processing speed, medical problems, and other normal effects of aging exacerbated by PD factors limit self-care behaviors, which further impact psychosocial functioning.

Personal relationships are a tremendous resource for patients with PD. These relationships include many integrated networks of family and friends, and most importantly, caregivers. The size and quality of the social network as well as the subjective viewpoint of the patient all determine a social network's ability to assist patients with PD. A larger and higher quality network may be able to provide more resources than one that is small and of poor quality. The network's quality can be determined by its ability to provide resources for the PD patient in terms of physical and emotional support. Adequate relationship networks are essential to patient well-being, and patients should be encouraged to engage in activities that foster and enhance supportive relational networks. Importantly, should a professional caregiver be unavailable, family and friends may serve dual roles as caregivers, which can complicate the interpersonal relationship. The role of the caregiver may be minimal at the early stages of PD, but increases proportionately to the disease stage, as does stress and strain. Thus, it is important for caregivers to practice healthy stress management techniques.

The psychological functions domain includes mood and affect, personal view of self, and coping. There is a complex interaction between PD and psychological functions. For example, intact psychological functions before the onset of PD can help mitigate the onset of psychiatric illnesses such as depression and decreased self-worth. On the other hand, PD has been associated with an increase in depression and decrease quality of life. Regarding personal perception, patients may be burdened by disease stigma and see themselves as impaired, incapable to care for themselves, and less worthy than others. These negative personal perceptions can be changed with therapeutic management, which can then have positive impacts on overall health. Coping functions can be subdivided into coping style (active, passive), coping method (problem-solving, emotional focused), and coping strategies (cognitive, behavioral, cognitive-behavioral). Adaptive coping functions can help minimize the impact of PD symptoms, decrease poor health burden, and increase psychosocial function. Patients and caregivers should work together when implementing coping strategies in order to ensure that they are in sync and achieve maximal benefit.

The environmental domain includes areas that involve patients with PD to interact with others. This includes such areas as finances, employment and occupational performance, and



Parkinson's Disease: Psychosocial Aspects, Fig. 1 Figure 1 shows three global domains of psychosocial aspects relevant to persons with Parkinson's disease (PD) including psychological function, personal relationships, and the environment. These three domains, independently or collectively, may be impacted by the progression and severity of PD symptomatology

transportation and mobility. Physical PD symptoms (e.g., tremor, postural instability) can affect safety as well as employment and occupational performance. Patients may be unable to perform certain job duties due to PD symptoms or may be embarrassed by some symptoms such as tremors. This can impede work performance for those who are employed or limit others from seeking employment. Mobility and transportation difficulties can decrease self-reliance and increase dependency on others, which can then impact psychological functions. The adverse impact on environmental factors is related to the age of PD onset. Early PD onset tends to have a more marked adverse impact on multiple domains including employment, marital status, and quality of life. Some patients may view early PD onset as premature aging, with profound negative psychosocial consequences.

Parkinson's disease impacts not only motoric function but also psychosocial function. Given its progressive, degenerative nature, it can negatively affect psychosocial domains of personal relationships, psychological function, and environmental factors. These domains are interrelated and are further associated with PD disease severity, age, and age of illness onset. A biopsychosocial approach to therapeutic management will help to inform these domains.

Cross-References

▶ Coping
▶ Family Social Support

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Parkinsonism

► Parkinson's Disease: Psychosocial Aspects

Paroxetine

► Selective Serotonin Reuptake Inhibitors (SSRIs)

Partial Sleep Deprivation

► Sleep Restriction

Participation

► Occupational Therapy

Participation Bias

► Bias

Participation Restrictions

► Disability

Participatory Research

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Synonyms

Community-based participatory research

Definition

Participatory research is an approach to research that emphasizes equitable involvement and shared decision making of community members, organizational representatives, and researchers in all aspects of the research process, ranging from the choice of research question through the interpretation, dissemination, and application of results (Israel, Eng, Schulz, & Parker, 2005). While there has been longstanding recognition that meaningful, ongoing collaboration between communities and researchers is essential to the design and conduct of research that will ethically address community concerns and translate research findings into sustainable public health gains, there has been a resurgence of interest in the participatory approach to health research due to the confluence of two trends. First, researchers have faced the disconcerting fact that many promising findings published in the academic literature are never translated into behavior change by the target populations and therefore do not result in health improvement. Second, potential participants have grown tired of being viewed as the "subjects" of research, and some feel that there has been little benefit to their communities in return for their participation even while they recognize the need for information-gathering. This convergence has led to a restriking of the power balance between the observers and the observed, and the promotion of participatory research.

Cross-References

► Community-Based Participatory Research

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Passive Coping Strategies

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Synonyms

Avoidance; Helplessness

Definition

Coping is the set of intentional, goal-directed efforts people engage in to minimize the physical, psychological, or social harm of an event or situation (Lazarus & Folkman, 1984; Lazarus, 1999). There are many different theoretical and empirical frameworks for understanding coping and many different ways of classifying coping strategies, but one such classification is "passive coping." Passive coping refers to feeling of helplessness to deal with the stressor and relying on others to resolve the stressful event or situation (Zeidner & Endler, 1996). Those engaging in passive coping relinquish to others the control of the stressful situation and of their reaction to that situation, or allow other areas of their lives to be adversely affected by the stressful event or situation (Field, McCabe, & Schneiderman, 1985). This reliance on external resources is contrasted with "active coping," in which the individual is relying upon their own resources to cope with the stressor. Passive coping is associated with depression and poor psychological adjustment, as well as a poor outcome.

Passive coping generally involves avoidance, withdrawal, and wishful thinking. Examples of passive coping strategies are such cognitions as "it's awful and I feel that it overwhelms me," "I pray to God it won't last long," and "I know someday someone will be here to help me and it will go away for awhile." Behavioral examples of passive coping strategies include talking (complaining) to others about the situation either to ventilate feelings, get sympathy or elicit their help, withdrawing from social and other activities, or relying on medication to cope with the situation. Catastrophization (e.g., thinking "it's terrible and I think it's never going to get better") is sometimes considered a passive coping strategy.

Cross-References

- ▶ Active Coping
- ▶ Coping

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Passive Smoking

- ▶ Secondhand Smoke

Past Smokers

- ▶ Ex-Smokers

Pastors

- ▶ Williams LifeSkills Program

Pathophysiology

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Definition

Pathophysiology (consisting of the Greek origin words "pathos" = suffering; "physis" = nature, origin; and "logos" = "the study of") refers to the study of abnormal changes in body functions that are the causes, consequences, or concomitants of disease processes. Studies of pathophysiology are concerned with the investigation of *biological* processes that are directly related to disease processes of physical, mental, or psychophysiological conditions and disorders (e.g., alterations in the endocrine system, in certain neurotransmitters, or inflammatory parameters related to the activity of the immune system). Thus, pathophysiological research aims at identifying biological markers and mechanisms for predicting and explaining disease processes in terms of *etiology* and *pathogenesis*. Pathophysiology is formally considered as a subdiscipline within physiology.

Description

The fundamental aim of the domain of pathophysiology is to unravel the altered biological (i.e., physical and chemical) processes in our organism that precede, accompany, or follow certain disorders or diseases. In this regard, pathophysiological research aims at identifying factors and mechanisms that are relevant for answering questions of *why* and *how* certain disorders and diseases develop (i.e., questions about *etiology* and *pathogenesis*). Pathophysiological mechanisms of mental, physical, and psychophysiological disorders are rather complex. Yet, many pathophysiological findings and models are incomplete, preliminary, and speculative. However, research into the biological mechanisms of conditions in behavioral medicine is growing rapidly.

Methods and Designs in Pathophysiology Research

Since *pathophysiology* is mainly concerned with indentifying objective, biological factors that are relevant for certain disease processes, *quantitative methods* and *experimental* research designs are typically used. Current examples of research methods used in *pathophysiological* research in behavioral medicine are brain imaging techniques (i.e., (functional) magnetic resonance or positron emission tomography) to explore altered patterns of brain morphology and neural activity associated with certain disorders. Another example of pathophysiological research represents studies that aim at quantifying the amount of stress hormones (e.g., corticosteroids) in the blood and saliva (either in a resting state or after acute stress induction). In addition, *electroencephalography* and *electrocardiography* are typical diagnostic tools in pathophysiology research. In addition to studies with human patients and control participants, animal models (e.g., mouse and rat models) are also routinely used to test predictions of *pathophysiological* hypotheses relevant for our understanding of complex medical, psychological, and psychophysiological conditions in humans (e.g., stroke, schizophrenia).

Examples of Pathophysiological Research

As examples of *pathophysiological* investigations and findings relevant to the field or *behavioral medicine*, three examples from the realm of *obesity*, *chronic pain*, and *stress-related disorders* will be outlined briefly.

Pathophysiology of Obesity: The Metabolic Syndrome

Obesity is associated with an increased risk to develop numerous chronic and life-threatening diseases (e.g., cardiovascular diseases, type-2 diabetes, stroke). Several *pathophysiological* factors have been identified that frequently co-occur with obesity and that are suspected to mediate between *obesity* and severe medical diseases. In this regard, the following physiological

abnormalities have been identified and termed "the metabolic syndrome" (Cornier et al., 2008): abdominal obesity, insulin resistance, dyslipidemia (i.e., abnormal amount of lipids in the blood), and hypertension. Among these four defining features, abdominal obesity and insulin resistance appear as the core factors in the *pathophysiology* of the *metabolic syndrome*. The *etiology* of the *metabolic syndrome* has to be considered as complex and multifactorial and is still widely unknown. As interventions aiming at treating and preventing the *metabolic syndrome*, lifestyle modifications and weight loss (e.g., via increased physical activity) are recommended.

Pathophysiology of Chronic Pain

Pain is considered as a highly adaptive sensation that effectively signals dangers in terms of threats to our body integrity and helps to avoid injuries. *Pain* is the result of a complex interplay between neurobiological and psychological processes, both in the peripheral and central nervous system. Although acute *pain* is highly adaptive, *chronic pain* typically lacks this adaptive purpose. Regarding chronic pain conditions, the mechanism of "central sensitization" (Woolf, 2011) has been proposed to account for the phenomenon of ongoing pain in the absence of sufficient "objective" *nociceptive* stimulation. Accordingly, changes in the excitability of spinal cord neurons are responsible for reductions in pain thresholds, and prolonged neuronal responses to certain stimuli explain why stimuli that are generally considered as non-noxious and non-painful become pain-eliciting stimuli in patients with *chronic pain*. The concept of *central sensitization* rests on the principle of *neural plasticity* of the nociceptive system and a cascade of molecular and biochemical processes has been observed to be involved in *central sensitization* (e.g., Latremoliere & Woolf, 2009).

Pathophysiology of Stress Related Disorders

Ongoing and severe stress represents a threat to one's mental and physical well-being. Regarding the *pathophysiology* of the stress response, a chronic state of uncontrollable, stressful life circumstances has been linked to alterations in the function of the hormonal stress system. Qualitatively different alterations are thereby observed in certain mental and psychophysiological disorders: In the *pathophysiology* of depressive disorders, the hormonal stress system (in terms o the *hypothalamic-pituitary-adrenocortical* system; *HPA*) has been observed to be hyperactive which is reflected in increased *cortisol* secretion of the adrenal glands (e.g., Müller & Holsboer, 2004). This *hypercortisolism* is the direct consequence of increased secretion of the corticotrophin releasing hormone (CRH) (from the paraventricular nucleus of the hypothalamus) and the release of the adrenocorticotropic hormone (ACTH) via stimulation of the anterior pituitary gland (Ehlert, Gaab, & Heinrichs, 2001). The *hypercortisolism* observed in depression is most likely attributable to dysfunctions in HPA-axis feedback mechanisms that are responsible for the downregulation of the cortisol release (via CRH and ACTH). It has to be acknowledged that the phenomenon of *hypercortisolism* only occurs in certain subtypes of depression (e.g., melancholic depression).

Interestingly, the opposite phenomenon of a reduced activity of the *HPA* system resulting in a state of *hypocortisolism* is observed in patients with atypical depression, and patients with complex stress-related disorders. Regarding the latter group of disorders, reduced levels of cortisol indicative of lower HPA-axis reactivity have been observed in patients with *posttraumatic stress disorder*, *chronic fatigue syndrome*, *chronic pain disorders*, *fibromyalgia*, *irritable bowel syndrome* and other *functional somatic syndromes* and *somatoform disorders*. Childhood traumas have also been linked to *hypocortisolism* as evidence for early life stress-induced dysregulation of the *HPA* axis (Heim et al., 2009). Moreover, *hypocortisolism* was detected in people with rheumatoid arthritis and asthma.

Cross-References

- ▶ Functional Magnetic Resonance Imaging (FMRI)
- ▶ Functional Somatic Syndromes
- ▶ Homeostasis

- ▶ Inflammation
- ▶ Psychopathology
- ▶ Somatoform Disorders

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Patient Adherence

- ▶ Adherence

Patient Care

- ▶ Patient-Centered Care

Patient Compliance

- ▶ Adherence

Patient Control

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Definition

This is a central issue in behavior medicine, since it relates to models of stress, to patient behaviors and outcomes, and has vast clinical implications. Patient control (PC) can reflect both subjective or perceived control, as well as objective control. The perceived control can be understood as one's subjective appraisal of the ability to influence outcomes in a situation. Perceived control reflects a secondary appraisal process in general stress models (Lazarus & Folkman, 1984; Taylor, 1995). In contrast, objective control reflects the externally determined and externally validated level of control over a situation. Thus, objective PC is accurate, while subjective PC refers to subjective levels of control, and thus, could also be inaccurate. Subjective PC is a crucial predictor of health behaviors in the theory of planned behavior, showing a relation to behavior either directly or via intentions. For example, subjective PC has been shown to be important in choice over food types (Lawrence & Barker, 2009), of relevance to overweight. Subjective PC is strongly related to the broader concept of self-efficacy, the belief that one can carry out a certain behavior despite the existence of barriers. Subjective PC could be affected by objective control, but also by past experiences with similar or different stressful situations. Overgeneralizing lack of control from an uncontrollable to a controllable situation reflects the core of "learned helplessness," which has vast implications for multiple outcomes including depression (Abramson et al., 1989) and possibly even acceleration of tumors (Palermo-Neto, de Oliveira Massoco, & Robespierre de Souza, 2003). In pain patients, subjective PC is positively correlated with engagement in activity, of clinical relevance to daily functioning (Chiros & O'Brien, 2011). Subjective PC can

also be an important moderating variable in the detrimental effect of various factors on health or well-being. For example, Tovbin, Jean, Schnieder, Granovsky, and Gidron (2003) found that low albumin was related to poorer quality of life in dialysis patients, but only in those with low, but not high, subjective control. Objective PC is important in "patient-controlled analgesia" (PCA), where patients control the amount and timing of receiving analgesics during treatment for pain. A meta-analysis of 55 studies found that PCA led to less pain and greater patient satisfaction than did conventional analgesic regiments given by a health professional (Hudcova, McNicol, Quah, Lau, & Carr, 2006). Importantly, the subjective and objective aspects of PC are interrelated: In patients receiving PCA, those with an external locus of control had more pain and less satisfaction with this treatment, while an internal locus of control (which also reflects greater perceived control) was predictive of lower pain and greater satisfaction from PCA (Johnson, Magnani, Chan, & Ferrante 1989). Taken together, PC is an important predictor of patient outcomes, and can be a moderator of the effects of other factors on health outcomes. It is thus of great importance to assess and consider PC in behavior medicine research and clinical practice.

Cross-References

- ▶ Perceived Control
- ▶ Theory of Planned Behavior

References and Readings

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Patient Education

- ▶ Diabetes Education
- ▶ Health Education

Patient Privacy

- ▶ Confidentiality

Patient Protection

- ▶ Health Insurance Portability and Accountability Act (HIPAA)

Patient-Centered Care

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Definition

Patient-centered care is a term that is becoming widely used in medical practice. It is typically

described in the context of patient-practitioner communication. In contrast to provider-centered care, which places control and decision-making power almost solely in the hands of the health-care provider, is patient-centered. Patient-centered care promotes active participation on the part of the patient decisions regarding their health and health care. Moreover, patient-centered care requires practitioners to provide care concordant with the patient's values as well as account for the patient's desire for information provision and for shared decision-making responsibilities. Patient-centered care has been shown to be associated with increased patient satisfaction and adherence and may also enhance the relationship between the patient and the health-care provider.

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Patient-Reported Outcome

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Definition

Patient-reported outcomes (PROs) are responses to questions or statements about their perceptions or activities, such as symptoms, capabilities, or performance of roles or responsibilities (Revicki, Hays, Cella, & Sloan, 2008). These responses are typically measured by self-completed questionnaires and combined in some way to create summary scores that can be used to measure concepts such as physical, psychological, or social functioning and well-being, or symptom burden or severity. Symptoms can be rated based on frequency, severity, duration, degree of bother, or impact on patient activities. PROs are increasingly accompanying the traditional clinical ways of measuring health and the effects of treatment on the patient, both nationally and internationally, in order to make a more comprehensive evaluation. According to this context, The Patient-Reported Outcome Information System (PROMIS®) initiative, funded by National Institutes of Health (NIH), began in 2004 with six primary research sites and a statistical coordinating center in the USA. The aims of PROMIS® is to use measurement science to create a state-of-the-art assessment system for self-reported health and to provide clinicians and researchers access to a national resource for precise and efficient measurement of patient-reported symptoms, functioning, and health-related quality of life, appropriate for patients with a wide variety of chronic disease conditions (Cella et al., 2010). In 2010, a second round of PROMIS® funding was provided by the NIH, expanding the network to 13 researchers at 12 research sites. In addition, the US Food and Drug Administration (FDA) 2006 draft guidance on "Patient-Reported Outcome Measures: Use in Medical Product Development to Support Labeling Claims" has engendered wide discussion about PRO domains that should be endpoints in clinical trials (Cleeland, Sloan, & ASCPRO Organizing Group, 2010). In the guidance, reducing the severity and impact of symptoms is considered as a natural intervention endpoint for cancer, a condition associated with considerable symptom burden. Because symptoms are best described by patients who have them, PROs as measures of treatment effectiveness or the differences among treatments provide essential information about the efficacy and toxicity of a treatment and its effects on function. The FDA guidance provides a framework for addressing such issues as clinical significance, study design, and statistical methods. However, there are some problems to be solved. In the guidance, no set of recommended approaches for assessing specific symptoms by patient report in clinical trials exists, other than for pain. Recommendations

about the best approach for evaluating responsiveness and determining minimally important differences for PRO instruments are still needed (Revicki et al., 2008). With regard to PROMIS®, there is also criticism that PROMIS® appears to ignore the International Classification of Function (ICF) sponsored by the World Health Organization (WHO). ICF certainly does not represent the gold standard, but it is a system that, through the weight of WHO endorsement, will be used for a long time to come (Boers, 2010).

Cross-References

- ▶ Cancer, Types of
- ▶ National Institutes of Health
- ▶ Pain

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Patients

- ▶ Care Recipients

Pavlovian Conditioning

- ▶ Classical Conditioning

Paxil®

- ▶ Selective Serotonin Reuptake Inhibitors (SSRIs)

PCP

- ▶ Primary Care Physicians

PD

- ▶ Parkinson's Disease: Psychosocial Aspects

Pediatric Psychology

- ▶ Child Development

Pediatric Quality of Life Inventory (PedsQL)

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Synonyms

PedsQL 4.0

Definition

The Pediatric Quality of Life Inventory or PedsQL™, now in its fourth version, is a series of assessment instruments designed to measure the health-related quality of life of children.

The authors of the measure conceptualize health-related quality of life as the physical, psychological, and social functioning of the child. The PedsQL 4.0 provides an opportunity for the assessment of both overall (generic) quality of life as well as disease-specific quality of life.

The PedsQL 4.0 Generic Core Scales are appropriate for assessing health-related quality of life in both healthy and chronically ill children. The four scales making up this generic battery include Physical Functioning (8 items), Emotional Functioning (5 items), Social Functioning (5 items), and School Functioning (5 items). From these four core scales, three standardized summary scores can be calculated: a Total Quality of Life Score, a Physical Health Summary Score (based on the physical functioning items), and a Psychosocial Health Summary Score (combining emotional, social, and school items). In addition to these generic core scales, condition-specific modules have been developed for children with arthritis, asthma, brain tumors, cancer, cardiac conditions, cerebral palsy, diabetes, end-stage renal disease, neuromuscular disorders, and rheumatological diseases.

On each of the PedsQL 4.0 scales, the respondent is asked to indicate how much of a problem each item has been in the past month with response options of: 0 = never; 1 = almost never; 2 = sometimes; 3 = often; and, 4 = almost always. Item scores are reverse coded, linearly converted to a 100-point scale, and averaged to form scale and summary scores with higher scores indicating better quality of life. Parent completed versions of the scales, reporting on their child's health-related quality of life, are available for toddlers (aged 2–4), young children (aged 5–7), children (aged 8–12), and adolescents (aged 13–18). Parallel, developmentally appropriate, child self-report versions of the scales are available for young children, children, and adolescents. Parent-report infant scales and self-report young-adult and adult scales are also available. The PedsQL 4.0 is available in many languages including Spanish, French, German, Italian, Hebrew, Portuguese, and Russian.

The psychometric properties of the PedsQL 4.0 are generally good. Adequate internal consistency has been demonstrated for the scales with most researchers reporting coefficient alphas greater than.70. As evidence of validity, scores on the scales have been shown to correlate with other measures of health-related quality of life and to functional indices of health such as the number of days the child was ill, the number of school days missed by the child, the number of work days missed by the parent, and objective measures of disease severity. The generic core scales have also been found to distinguish between children with chronic health conditions and those who are healthy.

Further information regarding the PedsQL™ 4.0 including access to the measures can be obtained at www.pedsql.org.

Cross-References

▶ Quality of Life
▶ Quality of Life: Measurement

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PedsQL 4.0

▶ Pediatric Quality of Life Inventory (PedsQL)

Peer Coaches

► Promotoras

Peer Health Educators

► Promotoras

Peer Health Promoters

► Promotoras

Penetrance

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Definition

Penetrance in genetics is the proportion of individuals carrying a particular gene variant (allele or genotype) that also possess an associated trait (phenotype). If penetrance of a disease allele is 100%, then all individuals carrying that allele will have the associated disease. Penetrance only considers whether individuals express the trait or not. This differs from expressivity, which characterizes qualitatively or quantitatively the extent of phenotypic variation given a particular genotype. Penetrance is age related (Bessett et al., 1998) and is affected by environmental and behavioral factors such as diet and smoking. It is also modified by other genes and epigenetic regulation.

Cross-References

► Allele
► Epigenetics
► Genotype
► Phenotype

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Pepper

► Capsaicin

Peptic Ulcer

► Gastric Ulcers and Stress

Peptide

► Leptin

Perceived Behavioral Control

► Perceived Control

Perceived Benefits

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Synonyms

Benefit finding; Flourishing; Positive by-products; Positive changes; Positive meaning; Posttraumatic growth; Stress-related growth; Thriving

Definition

Perceived benefit refers to the perception of the positive consequences that are caused by a specific action. In behavioral medicine, the term perceived benefit is frequently used to explain an individual's motives of performing a behavior and adopting an intervention or treatment. Researchers and theorists attempt to measure positive perceptions because they believe that a behavior is driven by an individual's cognition in terms of acceptability, motives, and attitudes toward such behavior, especially if positive.

In psychology, five models may explain the performance of health behavior related to the construct of perceived benefit. First, the Health Belief Model (Becker, 1974) describes that the perceived benefit is one of the four major predictors of health-related behavior. Second, the Transtheoretical Model (Prochaska & DiClemente, 1986) posits that the progress of change depends upon the decisional balance weighting between perceived benefits and barriers. Third, the Protection Motivation Theory (Rogers, 1983) puts forward that the intention to protect oneself depends upon four cognitions among which is the perceived efficacy (inlcuding benefits) of the recommended preventive behavior. Finally, the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and its extension the Theory of Planned Behavior (Ajzen, 1985) both suggest that a person's behavior is driven by the persons' attitude about the behavior, which consists of beliefs about the consequences of performing the behavior multiplied by his or her valuation of these consequences.

In trauma literature, perceived benefits essentially mean the perceptions of positive psychological changes as a result of coping with a trauma or a highly stressful event (McMillen & Fisher, 1998). For example, after struggling with a highly stressful event, an individual may experience increases in personal strength, relatedness to others, and one's appreciation of life. In particular, McMiller and Fisher have developed the Perceived Benefit Scales (PBS) to assess several commonly reported positive by-products of adversity. On the PBS, respondents rate 30 positive by-product items on how similar they were to their own experiences by using a 5-point scale. The PBS has eight subscales: increased self-efficacy, increased faith in people, increased compassion, increased spirituality, increased community closeness, increased family closeness, lifestyle changes, and material gain. This concept is a form of cognitive coping strategy often associated with improved outcomes including participation in cancer screening tests.

Cross-References

- Benefit Finding
- Coping Strategies
- Positive Psychology
- Posttraumatic Growth

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Perceived Control

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Synonyms

Perceived behavioral control

Definition

Perceived behavioral control is the extent to which an individual perceives that they are in control of a particular behavior (Ajzen, 2002).

Description

Perceived behavioral control (PBC) was included in the Theory of Planned Behavior (TPB; Ajzen, 1991) in order to predict/explain behaviors that are not entirely under the volitional control of the individual. According to the TPB, PBC is determined by beliefs regarding factors that may act to facilitate or inhibit successful behavioral performance (Ajzen, 1991; Conner & Armitage, 1998). For example, a belief that exercising after work is associated with many barriers (i.e., cold weather, icy sidewalks, limited schedule) may lead to low perceived behavioral control over exercise, in turn leading to less frequent exercise during winter months. However, a belief that there are few barriers to exercising (i.e., favorable weather, few other time commitments) may result in greater perceived behavioral control over exercise, which in turn may lead to more frequent exercising during summer months. Importantly, control beliefs may concern factors external to the individual (e.g., weather conditions), or internal (e.g., innate ability; Conner & Armitage, 1998).

In the context of the TPB, PBC is thought to influence behavioral performance in two ways. First, PBC affects behavioral performance indirectly by influencing behavioral intentions to perform a particular behavior (Armitage & Connor, 2001). Those who perceive that they are in greater control of a given behavior may have stronger intentions to act compared to those who perceive less control over the behavior. That is, the influence of PBC on behavior is mediated through intentions.

PBC can also affect behavioral performance directly (Armitage & Connor, 2001). Given that perceptions of behavioral control may reflect actual behavioral control, PBC may influence behavioral performance as an immediate antecedent under conditions where there is little volitional control (Ajzen, 1991). For example, if an individual does not have access to a fitness facility or equipment, low PBC for engaging in resistance training would accurately reflect the individual's actual (low) control over the behavior.

Cross-References

▶ Theory of Planned Behavior

References and Readings

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Perceived Risk

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Definition

This term refers to an individual's subjective evaluation of his or her risk of an illness or an adverse outcome, often in relation to performing a certain risky behavior. This term maps onto the Health Belief Model (Rosenstock, 1966), which tries to model why people use health services or adhere to medically advocated healthy behaviors. Perceived risk, for example, can be in relation to having a myocardial infarction due to smoking or having skin cancer due to sun exposure or having an accident due to risk taking on the road. Relevant to perceived risk, Weinstein (1982) coined the terms "unrealistic optimism" and "unrealistic pessimism," where people are asked to estimate their risk of having a disease or an adverse outcome, compared to people of their age and sex. Answers are rated on a Likert scale ranging, for example, from −5 (far below others' risk) through 0 (same as others' risk) to +5 (far above others' risk). Levels of perceived risk could be related to prior exposure to a condition, one's knowledge of such a condition, exposure to one of a condition's risk factors, and to personality aspects. For example, in a recent review of 53 studies on risk perception among people at high risk for cancer, Tilburt et al. (2011) found that family cancer history, previous tests and treatments, younger age, believing in cancer's preventability and severity, monitoring coping style, distress, and the ability to process numbers all correlated with cancer risk perceptions. Concerning prediction, many studies have shown that perceived risk is related to various behavioral and health outcomes. For example, Mann, Allegrante, Natarajan, Halm, & Charlson (2007) found that level of perceived risk was one of several predictors of adherence to prescribed statins, which are used to treat hypercholesterolemia and prevent cardiac events. Knowing one's levels of perceived risk can help predicting his or her adherence to an advocated health behavior or to stopping an unhealthy behavior. Furthermore, perceived risk, if unrealistic, can be a target of brief cognitive restructuring, in the service of healthier behaviors, disease prevention, and treatment.

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Perceived Stress

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Synonyms

Stress

Definition

Perceived stress is the feelings or thoughts that an individual has about how much stress they are under at a given point in time or over a given time period.

Perceived stress incorporates feelings about the uncontrollability and unpredictability of one's life, how often one has to deal with irritating hassles, how much change is occurring in one's life, and confidence in one's ability to

deal with problems or difficulties. It is not measuring the types or frequencies of stressful events which have happened to a person, but rather how an individual feels about the general stressfulness of their life and their ability to handle such stress. Individuals may suffer similar negative life events but appraise the impact or severity of these to different extents as a result of factors such as personality, coping resources, and support. In this way, perceived stress reflects the interaction between an individual and their environment which they appraise as threatening or overwhelming their resources in a way which will affect their well-being (Lazarus & Folkman, 1984). Perceived stress is commonly measured as the frequency of such feelings via a questionnaire such as the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983). Perceived stress measures are often used to examine relationships between stress and health within behavioral medicine research.

Cross-References

- ▶ Life Events
- ▶ Negative Thoughts
- ▶ Stress

References and Readings

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385–396.

Lazarus, R. S., & Folkman, S. (1984). *Stress, coping and adaptation*. New York: Springer.

Perceived Stress Scale (PSS)

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Definition

The Perceived Stress Scale (PSS) is a 14-item self-report measure designed to assess "the degree to which situations in one's life are appraised as stressful" (Cohen, Kamarck, & Mermelstein, 1983, p. 385). Specifically, items are designed to measure the extent to which one's life is perceived as "unpredictable, uncontrollable, and overloading" (Cohen et al., 1983, p. 387). The measure was intended for use with community samples of adolescents or adults with an educational level of junior high school or more. Sample items include the following: "In the last month. . .how often have you been upset because of something that happened unexpectedly?," ". . .how often have you felt that you were unable to control the important things in your life?," and ". . .how often have you felt confident about your ability to handle your personal problems?" (Cohen et al., 1983). Half of the questions are positively stated and reverse coded. Each item is rated on a 5-point scale (0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly Often, 4 = Very Often) and summed to create a total score. Ten-item (PSS-10) and four-item (PSS-4) versions of this measure have also been developed (Cohen & Williamson, 1988; Cohen et al., 1983).

The PSS is one of the most widely used instruments used to measure stress perceptions; both the 14- and 10-item versions have good psychometric properties. In studies of adults, the PSS-14 has strong internal consistency ($\alpha = .84$ to .86) and good test-retest reliability ($r = .85$ over a 2-day period, $r = .55$ over a 6-week period; Cohen et al., 1983). In terms of concurrent validity, the PSS-14 is positively related to the number and perceived impact of life stressors ($r = .17$ to .35; Cohen et al., 1983). In terms of predictive validity, PSS scores predict depressive symptoms ($r = .65$ to .76), various health-related outcomes ($r = .52$ to .65), and social anxiety ($r = .37$ to .48) (Cohen et al., 1983). Factor analyses conducted with psychiatric inpatients revealed two factors: perceived distress and perceived coping (Hewitt, Flett, & Mosher, 1992; Martin, Kazarian, & Brieter, 1995).

Psychometric data also support the reliability and validity of the PSS-10 (Roberti, Harrington, & Storch, 2006), and an exploratory factor analysis revealed two factors: perceived helplessness and perceived self-efficacy (Roberti et al., 2006).

Overall, no significant gender differences have been found with either version of the PSS (Cohen et al., 1983; Roberti et al., 2006). The PSS-4 can be a useful measure when an abridged version is needed; however, its internal reliability ($\alpha = .72$) and test-retest reliability ($r = .55$) are lower than that for the longer versions (Cohen et al., 1983). The PSS-14 and PSS-10 have been translated into many different languages, including Hungarian, Turkish, Spanish, Portuguese, Japanese, and Thai, with good reliability and validity.

The PSS can be used to examine the role of appraised stress in physiological and behavioral disorders and can also be employed in research and clinical settings as an outcome variable (Cohen et al., 1983). Furthermore, it can be used as a screening device to identify individuals at risk for certain psychiatric disorders such as depression (Cohen et al., 1983) and may be a valuable tool for use within clinical settings to aid treatment planning and monitor treatment response (Roberti et al., 2006).

Cross-References

- ▶ Mental Stress
- ▶ Perceived Stress
- ▶ Perceptions of Stress
- ▶ Stress
- ▶ Stress Responses

References and Readings

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385–396.

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Perception of Internal Noise (False)

▶ Tinnitus and Cognitive Behavior Therapy

Perceptions of Stress

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Synonyms

Stress appraisals

Definition

The construals or appraisals of an event that result in the experience of stress. Major theoretical definitions of stress emphasize perception as an important component responsible for the experience of stress. According to Lazarus and Folkman (1984), events are perceived as stressful if they are perceived as (1) relevant to one's well-being and (2) having the potential for harm or loss. Primary appraisals of demand, difficulty, and/or uncertainty when weighed against secondary appraisals of coping resources and abilities may result in further perceptions of stress as a challenge to be met and overcome (resources outweigh demands) or as a threat to be endured (demands outweigh resources). These resultant perceptions can

influence the psychological and physiological responses to the stressor (Tomaka, Blascovich, Kelsey, & Leitten, 1993). Perceptions of a stressful event's duration (chronic vs. acute), severity, controllability, and predictability can also influence responses to the stressor. According to Hobfoll (1989), stress results from the perceived potential loss of resources. As a result, perceptions of current resources and the potential to gain resources are involved in perceiving an event as stressful.

Cross-References

- ▶ Mental Stress
- ▶ Stress
- ▶ Stress Responses

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Performance Anxiety

- ▶ Anxiety

Peripheral Arterial Disease (PAD)/ Vascular Disease

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Synonyms

Complications of atherosclerosis; Intermittent claudication; Rest pain

Definition

Peripheral arterial disease is the mismatch of blood flow supply and demand in the distal arteries.

Description

Peripheral arterial disease (PAD) is a common manifestation of atherosclerosis and is often a complication of hypertension and/or diabetes. It is estimated that PAD affects more than eight million Americans. PAD, or the accumulation of atherosclerotic plaques leading to narrowing in noncardiac vasculature, can affect renal arteries, carotid arteries, or any other branch vessels from the aorta like the subclavian artery or iliacs. When patients with PAD become symptomatic, there is a mismatch between the metabolic supply and demand of a tissue. When an upper or lower extremity is involved, PAD may starve the affected muscle of oxygenated blood flow and causes discomfort or pain, usually exacerbated by increased activity of the affected limb. In the lower extremity, this mismatch generally presents as intermittent claudication, commonly referred to as "walking pain," where patients develop lower extremity discomfort while ambulating. While there are anatomical entrapment syndromes, deep venous thromboses, and other neurological entities that must be ruled out, PAD is a significant cause of morbidity and mortality (American Heart Association, 2011).

PAD may present before arteriosclerotic disease of the great vessels, or heart becomes clinically relevant. Signs of lower extremity PAD on physical exam include shiny, tight, and hairless skin on the lower leg. Other signs of PAD include ischemic nonhealing leg ulcers and gangrene. The limb temperature often feels cool to the touch and has decreased sensation on examination. Most patients do not perceive the rest pain of intermittent claudication. In fact, only approximately 10% of patients with measurable PAD present to physicians complaining of the typical activity-related symptoms of PAD. Early signs of PAD include erectile dysfunction, leg cramps, or muscle fatigue that exceeds the expected effects of normal exertion.

The ankle-brachial index (ABI) is an excellent screening test for PAD of the distal extremity, although direct arteriography is the gold standard. Measuring a patient's ABI is a relatively low-cost, noninvasive diagnostic test that uses the systolic blood pressure readings of the brachial, posterior tibial, and dorsalis pedis arteries. Each lower extremity is examined separately. The formula involves by dividing the maximal ankle pressure in each lower extremity by the higher of the two brachial artery pressures.

The symptoms of PAD may be modifiable through lipid management and behavioral change. While not life threatening, moderate-to-severe PAD and claudication can have a serious impact on a patient's quality of life. Treatment for PAD may be behavioral (i.e., physical activity, smoking cessation), medication-based (statins and antiplatelet agents), or interventional (angioplasty, stent implantation, or bypass surgery).

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Perseverative Cognition

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Synonyms

Intrusive thoughts; Repetitive thinking; Rumination; Worry

Definition

Perseverative cognition is defined as "the repeated or chronic activation of the cognitive representation of one or more psychological stressors" (Brosschot, Gerin, & Thayer, 2006). Stressful events, or stressors, can make people "linger on" mentally. Humans, unlike animals, can make mental representations of stressors, long before and long after these events occur or are believed to occur. This continued cognitive representation of stressful events, before or after their occurrence, and even regardless of their actual occurrence, is called perseverative cognition. It can take the form of worry, rumination, angry brooding, etc., but also, for example, as mind wandering about negative topics. Perseverative cognition appears to play a causal or sustaining role in several major psychopathologies (anxiety disorders, depression, post-traumatic disorder) (Watkins, 2008) – indeed, worry is the hallmark of general anxiety disorder – as well as in somatic disease, including subjective bodily complaints as well as cardiovascular disease (Verkuil, Brosschot, Gebhardt, & Thayer, 2010).

During perseverative cognition, physiological activity can be increased. The "perseverative cognition hypothesis" (Brosschot et al., 2006) holds that the health damage due to stress is actually caused ("mediated") by perseverative cognition, because the latter prolongs the physiological responses to stressors. It has been suggested that perseverative cognition may partly be unconscious, while it still has physiological effects (Brosschot, Verkuil, & Thayer, 2010). This possibility, or the more general possibility of unconscious stress having health impacts, has the potential to open a new area in stress research.

There are several ways to reduce perseverative cognition. The most direct way is "postponing" or "scheduling" worrying or rumination, that is, limiting it to small daily time periods to obtain control over it. More indirect interventions are mediation mindfulness and computer-based attentional training techniques (Verkuil et al., 2010).

Cross-References

▶ Intrusive Thoughts
▶ Worry

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Persistent Pain

► Chronic Pain Patients

Personal Growth

► Resilience

Personal Health Record

► Electronic Health Record

Personality

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Synonyms

Disposition; Individual Difference Factors; Traits

Definition

Although definitions may vary across the theoretical and methodological approaches, the term *personality* generally refers to stable patterns in how people think, act, and feel that make them unique.

Description

The study of personality has been guided by two major themes: (a) the study of individual dimensions along which people differ (i.e., nomothetic approaches) and (b) the study of individuals as unique and integrated people (i.e., idiographic approaches). Diverse theoretical and methodological approaches that have guided research in these two major domains have also contributed to controversies that have waxed and waned throughout the history of this discipline. In addition, research focused on explicating the relative role of the person versus the situation, as well as biology versus environment has been central to this area of psychology; however, in recent years, the focus on such false dichotomies has yielded to more integrated theoretical perspectives on personality. Emerging personality research ranges from the study of genetics and biological systems to the influence of culture on personality development and expression. An overview of the prominent theoretical approaches to the study of personality is provided below, including psychoanalytic, trait, social-cognitive, and interpersonal approaches.

Psychoanalytic Approaches to the Study of Personality

Although less prominent in current personality research, it is important to describe the psychoanalytic perspective on the development and manifestation of personality. Specifically, psychoanalytic approaches assert that stable personality patterns develop in childhood. According to this perspective, early childhood experiences are important, because they shape how individuals relate to others as adults. As individuals develop into mature adults, mental

processes not only guide interpersonal interactions, but may also operate in parallel so that people can feel conflicted about the same person or situation. According to this perspective and start the sentence with Personality develops as individuals learn to relate to others by regulating tension associated with sexual and aggressive drives. Finally, psychoanalytic theory emphasizes the role of mental representations of the self, others, and relationships as a framework for how people interact with one another. Psychoanalytic approaches have emphasized that behavior arises from thoughts, feelings, and motives that are outside of awareness. This reliance on unconscious mental processes separates psychoanalytic approaches from other perspectives on personality development.

Early psychoanalytic writing placed motivation at the center of theories of personality. According to this perspective, human motives could be grouped into two broad classes: life instincts (that include self-preservation and sexual motives) and death instincts or aggressive motives. This dualistic approach to personality was criticized for being overly simplistic. Subsequent research efforts expanded upon these two instincts by creating a more extensive catalog of "needs" or motives. These attempts to reformulate the psychoanalytic concept of instincts and motives stimulated a great deal of empirical research. Despite stark criticism, research on unconscious motives on adult behavior has provided the foundation for several important developments in the study of personality. For example, empirical work on unconscious motives has stimulated the fields of cognitive information processing, including research on implicit psychological mechanisms that have made the study of the unconscious more scientifically acceptable.

An important criticism of the psychoanalytic approach to personality is that the operationalization of key theoretical constructs has proven difficult. Assessments of unconscious motives and thoughts through the traditional psychoanalytic methods of free association, the unpacking of defense mechanisms, the analysis of transference processes, and dream interpretation have generally failed to hold up to minimal standards of reliability and validity necessary for empirical investigation.

Among the many attempts to operationalize psychoanalytic constructs for empirical investigation of personality, the Thematic Apperception Test (TAT) is perhaps the most well known and widely used. The popularity of the TAT as a measure of unconscious motives greatly diminished due to early criticisms of low internal consistency, temporal reliability, and a lack of correlation with self-reported measures of motives.

Trait Approaches to the Study of Personality

Trait theories of personality have typically used three different strategies to study the number, nature, and organization of dimensions along which people differ. One trait approach uses statistical techniques, such as factor analysis, to identify underlying personality dimensions applicable to all people. Another approach is to construct typologies based on a priori theories that are applicable to subgroups of people. Finally, idiographic approaches to the study of personality reject the search for basic traits common to all people, and instead focus on patterns of behavior that are unique to an individual.

The *lexical hypothesis* has been central to trait approaches to personality. The *lexical hypothesis* states that most of the descriptors that distinguish one individual from another have become embedded in our natural language. If the *lexical hypothesis* is correct, the basic dimensions of personality can be discovered, because all important individual differences will be spoken and eventually encoded into trait descriptors. Early work guided by the *lexical hypothesis* provided some initial structure, but did not provide a framework for distinguishing, naming, and ordering individual differences in behavior and experience. Early taxonomic efforts paired down initial attempts to derive personality traits from large lists of terms, but were limited by data-analytic techniques that were not sophisticated enough to handle large and complex data sets. With statistical advancements, research focused on examining the factor structure of

personality descriptors in the lexicon grew considerably. Proponents of this approach debated about the number of factors sufficient to describe personality (with 16, 5, and 3 being the predominant models) and the applicability of applying a group of factors to all people. Critics of the trait approach argued that these individual difference factors lacked consistency across situations and were poor at actually predicting specific behavior.

Following a brief period of relative dormancy in the 1970s and 1980s, due in part to the above-stated criticisms, research on the trait structure of personality increased dramatically during the mid-1980s. By the early 1990s, many personality psychologists reached a general (though still not unanimous) consensus that the trait domains could be described most broadly by five orthogonal factors, or clusters of traits. This five-factor trait model has been typically measured with self-report questionnaires and includes the following factors: neuroticism – hostility, depression, and anxiety; extraversion – warm, active, and assertive; openness to experience – open to ideas, values, and fantasy; agreeableness – modest, straightforward, and altruistic; and conscientiousness–dutiful, self-disciplined, and ordered. Yet, some psychologists have maintained that three factors, not five, characterized as neuroticism, extraversion, and psychoticism – a dimension characterized by low agreeableness and low conscientiousness – account for a majority of the variance. Despite criticism regarding the underlying assumptions of factor-analytic techniques, the five-factor model approach to the study of personality has proven to be a useful model for predicting outcomes at the individual, interpersonal, and social levels of analysis.

Beyond factor-analytic approaches, some trait theorists propose that personality is based on bundles of trait-like characteristics that can be classified as types or typologies presumed to cover all people. Recent statistical advancements (e.g., multilevel modeling techniques) have greatly increased our understanding of individual differences by allowing for the examination of the trajectory and rate at which people change. These approaches tend to focus on limited subgroups by examining combinations of personality variables as well as other variables such as intelligence, conduct, and externalizing behavior. These statistical and methodological advances have allowed researchers to examine more variables and the ability to account for interactions among those variables when describing what constitutes personality. Whereas these approaches to the study of personality are innovative, they are not without flaw. Specifically, critics have noted that this approach dissembles people into component parts that results in "types" that account for a limited amount of the variance in whatever outcome is under investigation.

Finally, the idiographic approach to the study of personality rejects the search for underlying personality traits common to all people, and instead focuses on identifying central themes in an individual's life. The idiographic approach is also concerned with describing the patterning of traits within an individual and using that pattern to predict future behavior. Research advocating for an idiographic approach claims that factor-analytic approaches might not account for the full range of personality characteristics within a person.

Social-Cognitive Approaches to the Study of Personality

Personality psychology was greatly influenced by the cognitive revolution in psychology that occurred during the late 1950s and early 1960s. This early research rejected the construct of motivation and focused on the complexity of cognitive processes. Importantly, the cognitive revolution in psychology spurred interest in the importance of "the self," leading to the examination of constructs such as self-esteem, self-schema, self-monitoring, and self-regulation. Research on the self broadened the view of personality by considering not only conceptions of what constitutes "the self," but also the ways in which our self-concept reflects our perceptions of how others view and respond to us.

More broadly, the concept of self-identity has spawned research endeavors aimed at creating a

conceptual bridge between the self and the role that social variables such as gender, race, class, and nationality play in the development of personality. Recent theoretical models of self-identity emphasize a "life story" approach to the study of personality. According to this perspective, personality is constructed by an individual through self-defining life narratives. These life narratives are created with the intent of describing individuals as integrated, whole people.

During the late 1960s and early 1970s, critiques of personality psychology produced a major crisis within the field, and led to an in-depth examination of many of the fundamental theories and methods used by personality psychologists. This perspective placed emphasis on situations, claiming that the examination of broad dispositional personality variables was unnecessarily overemphasized.

This approach advocated the notion that it is difficult to demonstrate the consistency of individual difference factors from one situation to the next and that individual difference factors rarely predict specific behaviors. This assertion not only challenged the basic premise of personality psychology, but also generated a paradigmatic crisis, resulting in an ideological split between those who study individual difference factors and those who examine the effect of situations on people. Those psychologists who advocate for a situationist approach construe personality as an organized system of goals, motives, and expectancies that mediate psychological processes that occur across situations. Proponents of this approach maintain that this characterization of personality accounts for both stability within the person as well as adaptive behavior across situations.

The response to this critique was to improve measurement techniques and to conduct studies demonstrating the consistency of personality over time. Yet, other researchers responded by examining how moderator variables, such as gender, interact with situational factors and with traditional trait descriptors. Those who emphasize the importance of context or situation maintain that dispositional traits are manifest as affective and cognitive processes that become activated during a distinct situation. Over time, these situation-by-behavior profiles are thought to shape who we are as individuals, leading to "dispositional signatures" that distinguish us as unique individuals.

Interpersonal Approaches to the Study of Personality

From an interpersonal perspective, personality is considered to be expressed in interactions with other people. Interpersonal theories of personality development do not merely emphasize observable behavior between individuals. Instead, interpersonal theories extend beyond personality development to include personality structure, function, and even pathology. According this perspective, interpersonal interactions support the development and maintenance of personality as patterns of interpersonal interactions give rise to lasting concepts of the self and others.

There have been two distinct empirical traditions to describe interpersonal functioning – the individual differences approach and the dyadic approach. The individual differences approach focuses on the qualities of an individual that are assumed to give rise to behavior that is consistent over time. This perspective led to various formulations of a structural model of interpersonal traits, actions, and problems often referred to as the interpersonal circle or circumplex. Circumplex models of behavior are used to anchor descriptions of theoretical concepts. Circumplex models of personality maintain that individual differences can be described as combinations of the circle's two underlying dimensions of dominance/submission and warmth/hostility. Interpersonal qualities close to one another on the perimeter of the circle are conceptually and statistically similar, qualities 90° apart are conceptually independent, but related, whereas qualities located 180° apart on the circle are considered conceptual and statistical opposites. This model of interpersonal functioning is not typically tied to interactions with a specific person or context, but rather is most often used to describe qualities of an individual interacting with a generalized other person.

In contrast, the dyadic approach assumes that two people comprise a basic unit of analysis for understanding personality. Accordingly, the interpersonal learning of social behaviors and self-concept is based on a variety of interpersonal situations. Interpersonal learning occurs across situations when interactions with others shape, refine, and maintain lasting conceptions of the self and others in relation to the self. In addition, this perspective on personality emphasizes that interpersonal behavior does not occur at random; instead, reciprocal relational patterns between two or more people help to define an interpersonal field. Within this interpersonal field, behavior from one individual pulls for responses from another, creating a dynamic, transactional process that leads to a conceptualization of the self. Interpersonal theories also include aspects of other theories of personality, but uniquely contribute to personality psychology by combining structural models that describe behavior with an examination of interpersonal situations.

Emerging Approaches to the Study of Personality

In recent years, the study of personality has benefited from advances in molecular genetics and functional imaging techniques. Within the domain of molecular genetics, research has focused on identifying specific biological pathways that contribute to complex cognitive and emotional behaviors. Advancements in the field of behavioral genetics may increase our understanding of the biological underpinnings of how individual differences in personality emerge and how those individual differences confer risk or resilience for mental and physical health. Other approaches that apply molecular genetic techniques to the study of personality involve examining the association between a particular phenotype and a specific allele of a gene.

Functional neuroimaging techniques hold promise for understanding personality by examining brain activity among individuals with varying levels of individual difference factors. Emerging advances in neuroimaging techniques may also help to further refine our understanding of how people process emotional information, including social connections. Yet, examining a single variation in alleles or the functional contributions of one brain region will not hold much explanatory value for our understanding of individual differences in thought, behavior, and emotions. With advancing techniques, future research should involve the careful application of methods and concepts learned from decades of investigation in order to refine our understanding of personality.

Personality and Health: Implications for Behavioral Medicine

Theory and research examining the influence of personality on health and disease has been an influential force for the development of the fields of health psychology and behavioral medicine. Research in this domain has been concerned with understanding the effects of personality on both the development and trajectory of health and disease. Possible mechanisms linking personality and health include the psychophysiological effects of stress and the extent to which personality traits are related to specific behaviors that may either promote or compromise health. Of particular interest to behavioral medicine is research that examines how certain personality characteristics confer differential risk toward negative affective states and behavioral dysregulation that often accompanies the diagnosis of and adjustment to chronic illness. Evidence that personality is a powerful predictor of health and illness has not only contributed to the development of behavioral medicine and health psychology, but has also helped revitalize personality research by challenging the critique of personality traits as having limited predictive utility.

Cross-References

- ▶ Behavioral Medicine
- ▶ Character Traits
- ▶ Health Psychology
- ▶ Phenotype
- ▶ Trait Anger
- ▶ Trait Anxiety

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Personality Hardiness

▶ Hardiness and Health

Pessimism

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Synonyms

Dispositional pessimism

Definition

Pessimism is a personality variable that reflects the generalized tendency for an individual to have negative expectations about the future. Its development emerged along with that of dispositional optimism from models of self-regulation and goal achievement. Originally, pessimism was construed to reflect low levels of optimism, but it has emerged as an independent construct as the field of research has developed and grown. It is associated with a coping style characterized by problem and emotion avoidance coping (Solberg Nes & Segerstrom, 2006). Research suggests a pessimistic orientation places one at increased risk for depression and anxiety. Pessimism has also been associated with several different adverse health outcomes across a variety of settings, ranging from HIV + populations to increased mortality rates in individuals with cancer. The following terms are related to pessimism: defensive pessimism, unrealistic pessimism, and self-handicapping; however, these terms are not identical to pessimism, and have different associations with other variables.

Cross-References

▶ Attribution Theory
▶ Avoidance
▶ Coping Styles
▶ Dispositional Optimism
▶ Explanatory Style
▶ Life Orientation Test (LOT)
▶ Negative Thoughts
▶ Optimism and Pessimism: Measurement
▶ Optimism, Pessimism, and Health
▶ Self-Regulation Model

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Pew Internet and American Life Project

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Definition

The Pew Internet and American Life Project is part of the Pew Research Center and is a nonpartisan and nonprofit organization that conducts research in order to provide information on the issues, attitudes, and trends that influence America and the world. According to their website, The Pew Internet and American Life Project examines "the impact of the internet on families, communities, work and home, daily life, education, health care, and civic and political life" (Pew Internet and American Life Project website). Each year, The Pew Internet and American Life Project releases 15–20 reports of research that address "how Americans use the internet and how their online activities affect their lives" (Pew Internet and American Life Project website). Data collection methods typically involve nationwide random phone surveys, online surveys, and qualitative research. In addition, data collection efforts are often augmented by research conducted by government agencies, technology firms, academia, and by various other expert researchers. Pew Internet and American Life Project aims to provide authoritative reports while maintaining neutral positions on policy issues and abstaining from providing endorsements of specific technologies, industries, organizations, companies, and individuals.

Description

The website for the Pew Internet and American Life Project provides a brief summary of highlights from their research related to health and health care (Fox, 2011). Such highlights include the following findings from recent surveys. Seventy-eight percent of adults in the USA use the internet and 83% own a cell phone. Eighty percent of internet users, or 59% of all US adults, use the internet to search for health or medical information. Seventeen percent of cell phone owners, or 15% of all US adults, have used their cell phones to look up health or medical information. Fox notes that since young people, Latinos, and African Americans are more likely than other groups to access the internet through their cell phones, this finding is of particular interest for studies targeting trends in these groups. Internet users most commonly search for health and medical information related to specific diseases or conditions, treatments or procedures, and doctors or other health professionals.

Another line of research has been examining the trends in how the internet influences people's relationships with health and medical information and with each other. As summarized by Fox (2011), many people use the internet to search for health information from other people's personal health-related experiences or to connect with others with similar conditions. Thirty-four percent of internet users, 25% of adults in the USA, have read about another person's experience with health or medical related issues by visiting an online news group, a website, or a blog. Twenty-four percent of internet users, or 18% of adults in the USA, have read online reviews of particular drugs or medical treatments. Eighteen percent of internet users, or 13% of adults in the USA, have used the internet to

connect with other people who share similar health concerns. People with rare or chronic conditions are especially likely to attempt to connect with others through the internet. Twenty-seven percent of internet users, or 20% of adults in the USA, have used online applications to monitor their weight, diet, exercise routine, or some other health indicators or symptoms. Six percent of internet users, or 4% of adults in the USA, have visited one or more websites in order to post comments or questions concerning health or medical issues. Four percent of internet users, 3% of adults in the USA, have posted comments or discussions about their experiences with a particular drug or treatment.

In addition to such highlighted findings, the website of the Pew Internet and American Life Project provides links to relevant study reports. The Pew Internet and American Life Project collects a variety of data that could be relevant to the field of behavioral medicine. The Project's website provides access to various studies and raw data sets dating back to 2000.

Cross-References

- ▶ eHealth and Behavioral Intervention Technologies
- ▶ Health Care
- ▶ Health Care Access
- ▶ Health Care Utilization
- ▶ Home Health Care
- ▶ Internet-Based Interventions
- ▶ Internet-Based Studies
- ▶ Public Health
- ▶ Social Capital and Health
- ▶ Telehealth
- ▶ Telemedicine

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PGD

▶ In Vitro Fertilization, Assisted Reproductive Technology

Pharmaceutical Industry: Research and Development

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Synonyms

Drug development; New drug development

Definition

Contemporary research and development within the pharmaceutical industry is best described employing a lifecycle perspective. Four components of this are: drug discovery and drug design; nonclinical development; clinical development; and postmarketing surveillance (Turner, 2010).

Description

Drug Discovery and Drug Design

Drug discovery can be thought of as the work done from the time of the identification of a therapeutic need in a particular disease area to the time the drug candidate deemed most likely to safely affect the desired therapeutic benefit is identified. This drug candidate may be a small molecule or a biological macromolecule such as a protein or nucleic acid. The traditional mode of drug discovery is a long iterative process in which each molecule more closely approximates the ideal drug candidate. The modern discipline of drug design is much quicker. Computer simulation modeling

examines the "docking" of the drug molecule with the drug receptor and identifies the most likely chemical structure that will best dock with the receptor. The science of molecular engineering is then used to create the molecule suggested by the computer simulation.

Nonclinical Development

Nonhuman animal research is currently necessary before regulatory permission will be given to test a new drug in humans. Since part of the overall nonhuman animal testing is done before the drug is first given to humans, the term "preclinical" has a certain appeal and is used by many authors in place of nonclinical. However, a significant amount of nonhuman animal testing is typically conducted after the first administration of the drug to humans. Some of the more lengthy, more complex, and more expensive nonhuman animal testing is typically not started until initial human testing reveals that the drug has a good safety profile in humans and therefore has a reasonable chance of being approved for marketing if it also proves to be effective in later clinical trials. In this entry, therefore, the term "nonclinical" has been adopted for research involving nonhuman animals.

While human pharmacological therapy is the ultimate goal, understanding nonclinical drug safety and efficacy is critical to subsequent rationally designed, ethical human trials. Nonclinical research gathers critical information concerning safety, drug dose, and route and frequency of administration. It involves in vitro, ex vivo, and in vivo testing. For example, when investigating the cardiac safety of noncardiac drugs (drugs for noncardiac indications are not supposed to influence the heart's activity, and if they do it is likely to be in a deleterious manner), the following progression of levels of testing occurs: subcellular (investigation of individual ion channels within cardiac cell muscles or cardiomyocytes); cellular; isolated cardiac tissue; isolated heart; anesthetized intact animal; and conscious animal.

Preapproval Clinical Development and Postmarketing Trials and Surveillance

Pharmaceutical clinical trials are often categorized into various phases, with any given trial being identified as belonging to one of them. These categories traditionally include Phase I, Phase II, Phase III, and Phase IV, described as follows:

- Phase I. Pharmacologically oriented studies that typically look for the best dose to employ. Comparison to other treatments is not typically built into the study design.
- Phase II. Trials that look for evidence of activity, efficacy, and safety at a fixed dose. Again, comparison to other treatments is not typically built into the study design.
- Phase III. Trials in which comparison with another treatment (e.g., placebo, an active control) is a fundamental component of the design. These trials are undertaken if Phase I and Phase II studies have provided preliminary evidence that the investigational drug is safe and effective.
- Phase IV. These are postmarketing trials, conducted once the drug has been approved and in therapeutic use. There are various sorts of Phase IV trials. Some can be quite similar in design and conduct to preapproval therapeutic confirmatory trials. Other kinds include open-label trials, when both investigators and subjects know what treatment subjects are receiving, and large simple trials.

However, while commonly employed, these designations are not always used consistently. Accordingly, two studies with the same aims may be classified into different phases, and two studies classified into the same phase may have different aims. This nomenclature, therefore, can be confusing, and alternate systems of categorization are arguably more informative. One such system is presented in Table 1. The four categories correspond closely to Phase I to Phase IV, respectfully, but are more descriptive.

Among the goals of clinical development are:

- Estimation of the investigational drug's safety and tolerance in healthy adults.

Pharmaceutical Industry: Research and Development, Table 1 Classifying clinical studies according to their objectives (Based on ICH E8: General considerations for clinical trials)

Objective of trials	Study examples
Human pharmacology • Assess tolerance • Describe or define pharmacokinetics (PK) and pharmacodynamics (PD) • Explore drug metabolism and drug interactions • Estimate (biological) activity	• Dose-tolerance studies • Single- and multiple-dose PK and/or PD studies • Drug interaction studies
Therapeutic exploratory • Explore use for the targeted indication • Estimate dosage for subsequent studies • Provide basis for confirmatory study design, endpoints, methodologies	• Earliest trials of relatively short duration in well-defined narrow populations with the disease or condition of clinical concern, using surrogate of pharmacological endpoints or clinical measures • Dose-response exploration studies
Therapeutic confirmatory • Demonstrate/confirm efficacy • Establish safety profile • Provide an adequate basis for assessing benefit/risk relationship to support licensing (market approval) • Establish dose-response relationship	• Adequate and well-controlled studies to establish efficacy • Randomized parallel dose-response studies • Clinical safety studies • Studies of mortality/morbidity outcomes • Large simple trials • Comparative studies
Therapeutic use • Refine understanding of benefit-risk relationship in general or special populations and/or environments • Identify less common adverse drug reactions • Refine dosing recommendations	• Comparative effectiveness studies • Studies of mortality/morbidity outcomes • Studies of additional endpoints • Large simple trials • Pharmacoeconomic studies

- Determination of a safe and effective dose range, safe dosing levels, and the preferred route of administration.
- Investigation of pharmacokinetics and pharmacodynamics following a single dose and a multiple-dose schedule.
- Establishment and validation of biochemical markers in accessible body fluids that may permit the assessment of the desired pharmacological activity.
- Identification of metabolic pathways.
- Evaluation of the drug's safety and efficacy in a relatively small group of subjects with the disease or condition of clinical concern (the targeted therapeutic indication).
- Selection and optimization of final formulations, doses, regimens, and efficacy endpoints for larger scale, multicenter studies. Efficacy endpoints should be able to be measured reliably and should quantitatively reflect clinically relevant changes in the disease or condition of clinical concern.
- Evaluation of the drug's comparative efficacy (measured against placebo or an active comparator) in larger scale, multicenter studies, and collection of additional safety data.

Cross-References

▶ Comparative Effectiveness Research
▶ Efficacy
▶ Metabolism
▶ Placebo and Placebo Effect

References and Readings

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Pharmacological Challenge Tests

▶ Pharmacological Stress Tests

Pharmacological Stress Tests

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Synonyms

HPA axis stimulation tests; Pharmacological challenge tests

Definition

The Hypothalamic-Pituitary-Adrenal (HPA) axis is the major neuroendocrine stress system in humans. Appropriate functioning of this highly dynamic multilevel system and its feedback mechanisms are assumed to modulate psycho-physiological adaptation to all major and minor challenges in life. In line with this, profound HPA axis alterations have been found in psychiatric disorders (most prominently affective disorders), in chronic medical disorders (e.g., cardiovascular disease), and in unexplained medical symptoms (e.g., chronic fatigue, Nater et al., 2008). Furthermore, it has been suggested that restoration of glucocorticoid receptor functioning and thereby improvement of HPA axis integrity might mediate treatment outcome in some disorders (such as depression) (Holsboer, 2000).

In order to assess the functional integrity of the HPA axis and its feedback mechanisms, standard pharmacological challenge tests have been developed. Targeting different levels of the axis, these tests meet two main goals: (a) to stimulate the HPA axis in order to assess its top-down reactivity, and (b) to stimulate negative feedback mechanisms of the HPA axis in order to test its feedback sensitivity.

Description

In general, HPA axis functioning can be assessed with repeated measures of its unstimulated effector steroids, that is, corticotropin-releasing hormone (CRH), adrenocorticotropic hormone (ACTH), and cortisol.

CRH is best measured in the cerebrospinal fluid (CSF). Plasma levels do not seem to reflect hypothalamic CRH secretion because (1) in addition to the CNS, many tissues in the periphery (such as the placenta) produce CRH and (2) the relatively high concentrations of CRH from the hypothalamic-hypophyseal portal venous blood are bound by CRH-binding protein until they reach the peripheral veins (Cunnah, Jessop, Besser, & Rees, 1987).

ACTH can be assessed in blood. Because the analysis of ACTH concentrations from blood plasma is relatively expensive, the number of repeated measures is usually limited. With a short plasma half-life and episodic secretion, ACTH levels in plasma have shown wide fluctuations and should be assessed in combination with repeated cortisol measures in order to increase reliability.

Cortisol can be measured in plasma (unbound and bound cortisol fraction), in saliva (unbound cortisol fraction), and in urine (unbound fraction).

Note that single measures of CRH, ACTH, or cortisol do not give a valid picture of HPA axis integrity, and more information is obtained by repeated testing.

Besides psychological challenge tests of HPA axis activity (Dickerson & Kemeny, 2004), highly standardized pharmacological challenge tests have also been developed. Among others, the administration of Insulin, Naloxone, Fenfluramine, Alprazolam, synthetic CRH, synthetic ACTH, Metyrapone, and Dexamethasone have been used to provoke changes in HPA axis activity. In the following, the most widely used HPA axis challenge tests will be briefly characterized.

Note that all challenge tests need to be employed under standardized conditions in a clinical setting.

CRH Stimulation Test

CRH stimulates ACTH secretion. Accordingly, administration of CRH is used to assess information about HPA axis dysregulation occurring down from the level of the pituitary (ACTH and cortisol).

Following one or two blood draws in order to assess ACTH and cortisol baseline levels, an IV bolus of 1 μg/kg of body weight CRH is administered. Repeated blood sampling at min 15, 30, 60, 90, and 120 will show a rapid rise and subsequent gradual decline in ACTH and cortisol following CRH administration.

In healthy subjects, the cortisol response in plasma after 30–60 min following injection is higher than 10 μg/dL (276 nmol/L). Usually, the test is well tolerated, with transient facial flushing in about 20% of the participants, occasional shortness of breath, or rare tachycardia, and hypotension.

ACTH Stimulation Test

With the ACTH stimulation test, the acute adrenal response to ACTH can be assessed. Before and following administration of 0.25 mg synthetic human α1-24-ACTH (tetracosactrin, cosyntropin, or "Synacthen") intramuscularly or intravenously, cortisol levels are measured repeatedly (e.g., baseline, 30, 45, and 60 min after injection). Due to ACTH administration, plasma cortisol rapidly increases within 30 min to at least 18–20 μg/dL (496–552 nmol/L), with peak responses at 30–60 min. Interestingly, substantially lower doses of ACTH were associated with the same endocrine response as the above-described high dosage. Consequently, the so-called low-dose ACTH test (1 μg) is gaining greater importance in endocrine research (Dickstein et al., 1991). Possible adverse side effects of this test include bradycardia, tachycardia, hypertension, peripheral edema, and rash. These side effects should disappear within a few hours after testing.

Dexamethasone Suppression Test

The synthetic corticosteroid Dexamethasone (Dex) binds to glucocorticoid receptors and thereby mimics the effects of cortisol. Consequently, researchers employ the Dexamethasone Suppression Test (DST) in order to assess HPA axis feedback sensitivity with an expected reduction in cortisol secretion following the administration of Dex.

In the standard DST procedure, 1 mg Dex is administered orally at 11:00 p.m. The following morning (8:00 a.m.), cortisol levels are determined in blood, saliva, or urine and may be again measured at 4:00 p.m. In healthy subjects, the standard DST will minimize cortisol secretion with plasma cortisol levels less than 2 μg/dL (50 nmol/L) at both measure time points. In depressed patients, the DST is thought to show non-suppression of cortisol due to *reduced* feedback sensitivity. However, studies on this test in depression have not shown high sensitivity and specificity (APA Task Force on Laboratory Tests in Psychiatry, 1987), with only about 40–60% of patients demonstrating a failure to suppress cortisol in response to the standard DST (Yehuda, 2006). In disorders characterized by *increased* HPA axis feedback sensitivity (such as Posttraumatic Stress Disorder, PTSD), the low-dose DST (0.5 mg or 0.25 mg) is preferably used. Following this test, normal cortisol suppression results in values around 5 μg/dL. The low-dose DST has been widely used in PTSD research, with PTSD subjects having been exposed to traumas (e.g., childhood abuse, combat, or Holocaust exposure) showing hyperresponsiveness (= lower post-DST cortisol) in this test (Yehuda, 2006). No adverse side effects have been reported for the DST.

Dex-CRH Test

In order to more precisely characterize underlying mechanisms of non-suppression in the Dex test, the combined Dex-CRH test has been developed, and improved sensitivity of this test compared to the Dex test has been shown in depression (Heuser, Yassouridis, & Holsboer, 1994). With the Dex-CRH test, the oral administration of Dexamethasone (1.5 mg) at 11:00 p.m. is combined with the intravenous administration of 100 μg CRH the following day in the afternoon (between 2:00 p.m. and 3:00 p.m.). Blood

samples will be repeatedly collected before CRH administration, and again at 15, 30, 60, 90, and 120 min after administration.

In healthy individuals, ACTH and cortisol will be suppressed prior to CRH administration. After CRH injection, ACTH and cortisol levels are first increasing and then decreasing (Carroll et al., 1981). Patients suffering from current major depression, but also from other psychiatric and medical conditions, show increased sensitivity, with markedly elevated ACTH and cortisol levels following the Dex-CRH test (Ising et al., 2005). Particularly in depression, repeated Dex-CRH testing has been discussed as a surrogate marker for drug efficacy (Ising et al., 2007). Adverse side effects following the combined Dex-CRH test are identical to those following CRH administration alone.

Metyrapone Test

Metyrapone is a method for assessing ACTH secretory reserve via the interruption of the negative feedback on the HPA axis. The drug inhibits P450c11 (11β-hydroxylase), the enzyme that catalyzes the final step in cortisol biosynthesis. The inhibition of cortisol secretion interrupts negative feedback of the HPA axis, which results in a compensatory increase in ACTH. This increase in ACTH secretion then stimulates biosynthesis in the cortisol precursor steroid (11-deoxycortisol) in plasma.

The overnight metyrapone test is used in order to test whether altered cortisol secretion is a function of increased/decreased ACTH drive from the pituitary or a result of adrenal alterations. A quantity of 30 mg/kg of metyrapone is administered orally, preferably at midnight. Plasma 11-deoxycortisol is then determined the following morning at 8 a.m. In healthy subjects, 11-deoxycortisol levels in plasma rise to more than 7 μg/dL (0.2 μmol/L) and plasma ACTH levels rise to greater than 100 pg/mL (22 pmol/L) the following morning. The test has been used in PTSD research (for a review see Yehuda, 2006) as well as in depression research (Young, Ribeiro, & Ye, 2007). Possible adverse side effects include gastrointestinal symptoms, headaches, dizziness, hypotension, and allergic skin reactions.

Summary and Outlook

The investigation of neuroendocrine alterations in psychiatric and medical disorders has largely improved our knowledge of the pathophysiology of these disorders. The next steps will be to further improve the sensitivity, specificity, and thereby validity of HPA axis challenge tests. Note that so far, reliable results can only be obtained with repeated application of challenge tests and repeated HPA axis assessment. Confounding factors, such as eating disorders, restrictive dieting, diabetes, gender, and alcohol consumption have been discussed in the literature with mixed results (e.g., APA Task Force on Laboratory Tests in Psychiatry, 1987; Ising et al., 2005; Young, Ribeiro, & Ye, 2007). This is particularly relevant, as oftentimes these factors might be substantially altered in psychiatric and medical conditions.

A variety of CNS processes can trigger or dampen HPA activation. Among others, these mechanisms may include alterations in levels vasopressin, serotonin, endorphins, oxytocin, neuropeptide Y, substance P, and cytokines. So far, on the level of HPA axis dynamics alone, we are not able to trace back specifically involved CNS mechanisms; in other words, the specificity of HPA axis challenge tests cannot exceed the specificity of the HPA axis itself. Future studies should combine imaging data, administration of centrally active substances (e.g., intranasal administration of vasopressin and oxytocin), in combination with HPA axis challenge tests, thus providing further insights into the specificity of the involved mechanisms in healthy as well as in pathological endocrine functioning.

Cross-References

- ▶ Adrenal Glands
- ▶ Hypothalamic-Pituitary-Adrenal Axis
- ▶ Pituitary-Adrenal Axis

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Pharmacotherapy for Depression

▶ Depression: Treatment

Phasic REM

▶ REM Sleep

Phenotype

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Definition

The term phenotype refers to an organism's outward appearance and characteristics. This contrasts with the individual's genotype, the set of alleles that an offspring inherits from both parents. In the behavioral sciences, including Behavioral Medicine, the fundamental issue of heredity is the extent to which differences in genotype account for differences in phenotype, i.e., observed differences among individuals (Plomin, DeFries, McClearn, & Rutter, 1997).

In contrast to single-gene disorders such as Huntington's disease and phenylketonuria (PKU), complex dimensions, disorders, and conditions of clinical concern in Behavioral Medicine are influenced by heredity, but not by one gene alone. Multiple genes are typically involved, and so too are multiple environmental influences, and phenotypes are often the result of the combined effects of both genotype and environmental factors.

Cross-References

▶ Allele
▶ Genotype

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Physical Ability/Disability

▶ Activities of Daily Living (ADL)

Physical Activity

▶ Benefits of Exercise
▶ Exercise

Physical Activity and Cancer

▶ Cancer and Physical Activity

Physical Activity and Health

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Synonyms

Assessment; Exercise

Definition

Physical activity (PA) is any body movement that leads to skeletal muscle contraction and noticeable increases in energy expenditure (US Department of Health and Human Services [USDHHS], 2008). Such activities can be walking, washing windows, or gardening.

Description

Introduction

There is strong evidence that there are greater physical, physiological, and possibly mental health benefits from a lifestyle that includes more occupational and leisure-time physical activity (PA) than a predominantly sedentary (inactive or underactive) lifestyle (USDHHS, 2008). These benefits include a risk reduction for type 2 diabetes, overweight/obesity, cardiovascular disease, stroke, high blood pressure, an adverse lipid profile, osteoporosis, sarcopenia, and loss of function and autonomy in older age. There is also a great interest in the benefits of PA for mitigating and possibly preventing cancer and its significant morbidity and mortality rates: the evidence is strongest for the prevention of colon and breast cancer. Regular PA can also help in weight loss (when combined with reduced calorie intake) and is associated with reduced depression and better cognitive functioning (among older adults) (USDHHS).

On the negative end, there is low risk of adverse events such as injuries, when generally healthy people engaged in moderate-intensity activity. However, when performing the same activity, people who are less fit are more likely to be injured than those who are fitter. The risk of cardiac events such as heart attacks during PA is rare. But there is a risk of such events when an individual suddenly becomes much more active than usual (e.g., shoveling snow). When both the benefits and risks of PA are considered, it is clear that the health benefits of PA far outweigh the risks of adverse events for a majority of people.

Given the overwhelming evidence for substantial benefits from PA, *physical inactivity* is a national public health problem. Recent data from the 2009 National Health Interview Survey (NHIS) indicates that 35% of US adults report engaging in regular leisure-time PA, 33% reported some leisure-time PA, and 33% report no participation in leisure-time PA (http://www.cdc.gov/nchs/fastats/exercise.htm.) NHIS data for 2005–2007 showed that 30.7% of US adults engaged in PA sufficient in frequency and duration to be classified as regular and 39.7% report

no leisure-time PA (Schoenborn & Adams, 2010). Men (61.9%) were more likely than women (58.9%) to engage in at least some leisure-time activity. The percentage of adults who engage in at least some leisure PA increased with education and with family income but decreased with increasing age. Married adults were more likely than those in other marital status groups to engage in at least some leisure-time PA. White adults (61.9%) and Asian adults (60.3%) were more likely than black adults (48.8%) to engage in at least some leisure-time PA. Finally, adults living in the US South (27.4%) were least likely to engage in regular leisure-time PA compared with adults living in any other region.

What Is Physical Activity?

Body movement for the purposes of health benefits can be defined by multiple constructs. Some of these constructs are similar but are still distinct. *PA* is any body movement that leads to skeletal muscle contraction and noticeable increases in energy expenditure (USDHHS, 2008). Such activities can be walking, washing windows, or gardening. To assess how much PA someone has to engage in for a specific health outcome, the term "dose response" is used (USDHHS). Dose response refers to the frequency, intensity, duration, and type of PA needed for a certain health outcome (i.e., fitness). Typically, PA is measured in kilocalorie (kcal), metabolic equivalent (MET), minutes, or MET-minutes per day or week (USDHHS). Such measurements occur through various assessment methods that will be addressed below.

A construct that can be seen as interchangeable with PA is exercise, but these terms are not identical. *Exercise*, a subset of PA, is planned, structured, and repetitive bodily movement (such as participating in an aerobics class) with the goal of improving or maintaining physical fitness (USDHHS, 2008). *Physical fitness* primarily consists of aerobic power or cardiorespiratory fitness measured by maximal and submaximal stress testing or a field test (USDHHS). PA is something an individual does which can help to achieve greater physical fitness. In addition to PA, various factors such as age, sex, health status, and genetics can also affect physical fitness. In *aerobic activity* or endurance activity, the body's large muscles move in a rhythmic manner for a sustained period of time as in brisk walking, biking, or swimming. *Resistance training* (or strength training) consists of repetitive movements geared toward greater skeletal muscle strength, power, endurance, and mass (USDHHS). *Flexibility training* refers to repetitive activities to improve the movement of joints through their full range of motion (USDHHS).

Assessment of Physical Activity

Reliable and valid measures of PA are essential to understand energy expenditure in various populations. There are three common ways to assess PA: (1) criterion methods, (2) objective measures, and (3) subjective/self-reports. The selection of any of these three methods can be based on feasibility, cost, the specific research or clinical setting, and type of population.

Criterion methods such as doubly labeled water and indirect calorimetry are the gold standards for measuring PA (Vanhees et al., 2005). Doubly labeled water (DWL) measures total energy expenditure and does not require individuals to log their daily activity because it uses the body's water to record metabolic rates. Thus, this technique is objective and requires little participant burden. Even with these advantages, various factors that lead to changes in energy expenditure such as PA, basal metabolic rate, and diet-induced energy expenditure cannot be teased apart from each other (Vanhees et al.). Another important criterion method is indirect calorimetry. Energy expenditure is measured by oxygen consumption and carbon dioxide production through collected respiratory gases or in a respiration chamber (Vanhees et al.). Both DWL and indirect calorimetry are expensive and have limited usability. They are less feasible in studies where participants have to monitor their daily PA in the community or home setting or over multiple assessments or over extended periods.

The objective measures of PA include fitness testing, accelerometers, and pedometers. As mentioned earlier, aerobic capacity is measured through fitness testing conducted on a treadmill,

stationary bike, or a field test. These tests yield levels of peak oxygen consumption (VO_2 peak) which is an index of cardiorespiratory capacity (Gelieber et al., 1997). These treadmill or bike tests must be overseen by a physician and are expensive but are used to assess fitness in clinical and research studies.

Accelerometers and pedometers are more commonly seen in the literature because they are relatively inexpensive ($10–$450 and above) and participants can be taught how to use them without extensive training. Accelerometers and pedometers are motion sensors but with different purposes. Accelerometers measure all body movement and physical activities and can yield the dose of PA (e.g., Fogelholm et al., 1998). Thus, accelerometers are significantly more expensive than pedometers due to their use of technology (Vanhees et al., 2005).

Pedometers are battery-operated step counters that are worn on the waist and measure steps when engaging in PA (Vanhees et al., 2005). They are efficient in monitoring steps but may produce inaccurate readings due to inadvertent body movements. Activities such as biking and other activities where the body torso is stationary are not suitable for pedometers as are water activities. The reliability and validity of pedometers have been addressed in the literature (e.g., Vanhees et al.). It is anticipated that the next generation of pedometers will yield information on the "dose" of PA (i.e., intensity, frequency, and duration).

The third category of assessments is the subjective, self-report measures which include diaries, interviews, and questionnaires (e.g., von Poppel, Chinapaw, Mokkink, van Mechelen & Terwee, 2010). These subjective methods are inexpensive and generally do not take significant time. The measures are commonly used when assessing PA of large numbers of individuals. As with all self-report measures, problems with recall, over-estimation, and interviewer skill limit the validity of these instruments.

Physical Activity Guidelines

There are various PA guidelines for public health benefits, weight loss, or weight management and for patients treated for diseases such as cancer (Schmitz et al., 2010; USDHHS, 2008). For the purposes of this chapter, PA guidelines for improving general health for adults will be discussed.

In the 1960s and 1970s, the PA literature provided information that many health benefits could be achieved through vigorous intensity or high levels of PA. Since then, a large research base led to the first public health and PA guidelines issued in 1995 by the American College of Sports Medicine (ACSM) and Centers for Disease Control and Prevention (CDC) (Pate et al., 1995). These guidelines recommended that "every US adult should accumulate 30 min or more of moderate-intensity PA on most, preferably all, days of the week." The guidelines were based on evidence that moderate-intensity PA accumulated in short bouts could lead to improved health outcomes.

Due to further advances in understanding the health benefits of PA, misunderstanding of the prior 1995 ACSM and CDC PA guidelines, and continued physical inactivity of many Americans, a new set of PA guidelines were issued in 2007 by the ACSM and American Heart Association (AHA) (Haskell et al., 2007). These 2007 guidelines were tailored for children, healthy adults between the ages of 18–65, and older adults over age 65. For healthy adults, the guidelines recommend moderate-intensity aerobic PA for at least 30 min on 5 days each week or vigorous-intensity aerobic activity for at least 20 min on 3 days each week (Haskell et al.). These guidelines also clarified that (a) 30 min of aerobic or endurance activity can be achieved in at least 10-min bouts, (b) resistance training should be performed at least twice a week, and (c) individuals who wish to engage in more activity to improve health or reduce risk of disease could surpass the minimum recommendations (Haskell et al.).

In 2008, the US Department of Human and Health Services (USDHHS) released PA guidelines for health benefits and recommended a minimum of 150 min of moderate-intensity PA, 75 min of vigorous-intensity PA, or 500–1,000 MET min of PA per week. A combination of moderate- and vigorous-intensity activity

could be used to achieve these recommendations. These guidelines did not provide an empirically supported dose response prescription that included frequency of PA (i.e., number of days a week) because of insufficient evidence. On the other hand, the guidelines did clarify that the upper limit of MET values for moderate activity is 5.9 and the lower limits of vigorous activity are 6 METs. In the past, 6 METs overlapped as the highest and lowest values for moderate and vigorous PA, respectively (USDHHS, 2008).

Finally, there are other PA guidelines such as those related to the number of steps per day needed to achieve health benefits. It is commonly known that 2,000 steps equal 1 mile. Current PA guidelines suggest that accumulating at least 10,000 steps and greater per day indicates that one is active, and accumulating at least 12,500 steps per day indicates that an individual is very active (e.g., Tudor-Locke & Bassett, 2004).

Theories and Interventions

To respond to the challenge of reducing sedentary behavior, numerous interventions have been developed and tested for specific patient populations (e.g., individuals with diabetes, cardiovascular disease, osteoarthritis, cancer), individuals with specific risk factors (high cholesterol, hypertension), and the general population at various phases of the lifespan (young children, school-aged, college-level, middle-aged, and older adults). The interventions have been offered at schools, work sites, and in communities. PA has also been targeted to reduce other risk behaviors (e.g., smoking, alcohol, and other drug addiction). More recently, PA has been emphasized as part of the initiatives to combat the obesity epidemic in the USA. The interventions have yielded varying degrees of success. The Task Force on Community Preventive Services (Kahn et al., 2002) concluded that there are six types of interventions that have been shown to increase PA and cardiorespiratory fitness: point-of-decision prompts, community-wide education, school physical education and community social support, individual health behavior, and enhanced access to places for PA combined with informational outreach activities. Interventions have been offered using various modalities (in-person, by telephone, web-based, and more recently, using mobile technology such as palmtop computers and mobile phones) with varying degrees of "reach" to modify sedentary behavior.

In developing interventions, there is growing interest in *community-based participatory research* especially to reach subgroups that are more challenging to reach but are characterized by sedentary lifestyles. This type of research addresses predictors of health at the community and individual levels and includes the community of interest in the whole research enterprise. Thus, the participants or community are commonly involved with all areas of research conceptualization, development, and data collection. Furthermore, culturally relevant strategies and theories and social marketing principles are integrated a priori in the study to enhance recruitment and retention efforts. Community-based participatory research is gaining popularity given the public health epidemic of obesity and physical inactivity in diverse populations (Yancey et al., 2004).

PA interventions have been based on theories of behavior change. One of the more commonly used theories is *Social Cognitive Theory* (SCT) (Bandura, 1986) which posits that behavior, environmental factors, and personal factors of the individual, such as cognitions, emotions, and physical characteristics, are mutually influential. Interventions based on SCT focus on the importance of individuals' ability to control their behavior and how changes in the individual or the environment can produce changes in behavior. Success in being able to initiate and maintain the behavior change is determined by an individual's ability to regulate his or her own behavior through personal strategies (e.g., setting PA goals, monitoring progress toward goals), as well as environmental approaches (e.g., using social support or environmental prompts).

The *Theory of Planned Behavior* (Tpb) (Ajzen, 1991) is another widely used theory that proposes that behavior is directly predicted by

intention, which in turn, is directly predicted by attitude, subjective norm, and perceived control. Perceived control is the belief that a behavior can be performed with ease or difficulty and it may directly predict the behavior, attitude is the personal evaluation of performing the behavior, and subjective norm is the perceived normative beliefs of relevant others regarding the behavior. Thus, according to the theory, individuals will intend, and be motivated to, perform a behavior such as PA when they view it favorably, believe that important others think they should be physically active, and believe that PA is under their control and can be carried out.

The *Transtheoretical Model* (TTM) of health behavior change (Prochaska & DiClemente, 1983) postulates that individuals move through a series of six stages of motivational readiness while making a behavior change (i.e., precontemplation, contemplation, preparation, action, maintenance, and termination), and this approach has been applied to PA (Marcus & Simkin, 1993). While progressing through these stages, the individual engages in ten different cognitive and behavioral processes of change that are important in the adoption and maintenance of a new behavior. For example, research suggests that cognitive processes of change (e.g., setting realistic goals) should be encouraged among those in precontemplation and contemplation, while behavioral processes (e.g., placing reminders to exercise at work or home) should be promoted among those in the more advanced stages of motivational readiness. TTM-based interventions attempt to tailor PA programs to a participant's motivational readiness to change and utilize the processes of change to encourage progression in motivational readiness for PA.

The *Self-Determination Theory* (SDT) posits that behaviors are regulated by motives that range on a continuum from highly controlled (extrinsically motivated) to fully autonomous (intrinsically motivated). Extrinsically motivated behaviors arise to avoid negative emotions, a threat or a demand. Extrinsic motivation is also involved when an individual performs a behavior that he or she feels is valuable (but not necessarily inherently enjoyable; Ryan & Deci, 2000). Intrinsically motivated behaviors are those that are done to provide the individual inherent enjoyment, satisfaction, or pleasure. It is thought that intrinsic motivation for behaviors such as PA leads to greater interest, more confidence, and longer persistence of the behavior.

The *Protection Motivation* Theory (Rogers, 1983) emphasizes threat and coping appraisal. Threat appraisal consists of perceived severity (estimated threat of disease) and perceived vulnerability (estimate of chance of developing the disease), and coping appraisal consists of response efficacy (expectancy that the recommended behavior, i.e., PA, can remove the threat) and self-efficacy (belief that one can carry out the recommended behavior successfully, i.e., adopt and maintain PA). Both threat and coping appraisal affect intention to be physically active and PA behavior.

Theories that focus on the individual (e.g., beliefs, attitudes) have led to the development of various interventions to promote PA. However, variables based on these theories do not explain more than a relatively small percentage of the variance in PA levels. *Ecological models* have become increasingly popular in acknowledging multiple levels of influence on PA: individual, social/cultural, organizational, community, physical environment, and policy. They are "macro" in the sense that they go beyond the individual-level choices and decisions to become active in an effort to reduce sedentary lifestyles (King, Stokols, Talen, Brassington & Killingsworth, 2002). Such models focus on the environmental variables, the related type of PA (e.g., transit vs. recreational), and the extent to which specific environmental conditions (e.g., built environment) can facilitate or constrain recreational activity, transit activities, or both. For example, availability of playgrounds, sidewalks, biking, or walking trails is likely to facilitate PA. Conversely, unsafe neighborhoods and lack of sidewalks are likely to hinder PA.

To achieve widespread adoption of physically active lifestyles, much needs to be done to determine what models will facilitate dissemination of PA interventions and which approaches will

help adapt interventions for culturally diverse subgroups. The costs and benefits of such interventions also require attention. Finally, sustaining PA over time will require change at the policy and legislative levels as has been the case with smoking cessation.

Conclusions

PA has an important role to play in the prevention and management of many chronic diseases. Although there has been improvement in the overall prevalence of regular PA in the USA, a large subgroup does not engage in regular PA. Efforts to promote PA have focused on individual-level factors and, to a lesser extent, factors at the community and population level. New technologies can help extend the reach of interventions. However, addressing the barriers to adopting and maintaining PA in the twenty-first century will require efforts at the individual, community, population, and policy levels.

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Physical Activity Interventions

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Definition

Physical activity interventions primarily aim to encourage sedentary individuals or those at risk for chronic diseases to initiate and maintain healthy levels of activity. Secondary goals of interventions may include improved weight or disease management, enhanced psychological well-being and stress reduction, and better quality of life. There has been a recent concerted effort to examine changing multiple health behaviors (e.g., dietary, tobacco cessation) in combination with sedentary behaviors. Interventions are often evaluated in the context of a randomized clinical trial (efficacy trials) or quasi-experimental designs (effectiveness trials).

Description

Recently, the US government released its first formal set of recommendations on physical activity (PA), the *Physical Activity Guidelines for Americans* (United States Department of Health and Human Services [USDHHS], 2008), thereby establishing increasing PA as a significant health goal for the twenty-first century. In addition to making clear the health benefits of PA, these guidelines emphasize accumulating targeted doses of moderate to vigorous-intensity forms of PA across the week (rather than on a daily basis) as well as provide specific guidelines for particular groups of people (e.g., youth, adults, older adults, pregnant women, adults with disabilities). However, because of the many benefits of PA and relatively low rates of individuals who engage in routine leisure-time PA, public health professionals have for some time developed strategies and interventions to increase PA (Buckworth & Dishman, 2002). Typically, PA interventions target a goal of consistently achieving at least 30 min of moderate intensity activity on 5 or more days per week. However, some interventions have focused on increasing low-intensity PA, such as walking or stair usage, which may be engaged in more often and in various settings. Duration and intensity of PA interventions have varied greatly from brief, single contacts to multiple contacts extending over 2 years. Efforts to promote PA involvement have, in general, fallen into one or a combination of the following levels of intervening: Individual, group, and community context.

Individual level interventions attempt to promote the adoption and maintenance of active lifestyles by targeting attitudes, beliefs, and behaviors of particular individuals who are not meeting PA guidelines. The most common theoretical paradigms guiding these interventions include social learning theory/social cognitive theory, theory of planned behavior, health belief model, and transtheoretical model (e.g., Marcus & Forsyth, 2009). Interventions have employed several strategies and techniques either successively or concurrently, often in a home-based context, to affect behavioral initiation and/or maintenance of change. The following strategies have been commonly used in interventions: health education, health-risk appraisal, motivational interviewing, written exercise prescriptions, mastery experience/self-efficacy enhancements, goal setting, incentives, contingency contracts, self-monitoring, self-reinforcement, and stimulus control. Delivery of individual interventions has often been via face-to-face or telephone interactions and print materials, though text message/e-mail and web-based programs with expert system algorithms for interactive and tailored feedback have become increasingly popular and considered a viable mode that may be appealing to some individuals (Marcus et al., 2006; Vandelanotte, Spathonis, Eakin, & Owen, 2007).

In contrast to individual level programs, group-based interventions occur in the context of small group settings (e.g., structured classes) and utilize this social environment to encourage PA. Although group interventions often also make use of the theoretical paradigms and strategies discussed within individual approaches, the group structure (e.g., group norms) and processes (e.g., interactions

and communications) that facilitate group cohesion and support for changing sedentary behaviors are emphasized. Group-based specific strategies include developing a distinct group identity (along with group name/clothing), establishing shared goals, mentoring by more experienced members, and encouragement of "fitness friends" and additional support.

Community-level interventions emphasize prevention and risk reduction that affects large segments of a particular population or community. Such PA interventions may include a combination of site-based (e.g., schools, health care, work, church), mass media (e.g., print media campaigns), built environments (e.g., constructing multiuse paths and trails), or policy/legislative (e.g., time allotted for PA at worksite, insurance premium reductions for engaging in PA) strategies and target system changes rather than behavior change of individuals. Thus, a fundamental assumption of community-level PA interventions is that large numbers of individuals will be accessed that may not have been identified otherwise and that the systemic change will yield behavior change in many more individuals.

Numerous reviews and reviews of reviews of PA intervention studies have been conducted (e.g., Foster, Hillsdon, & Thorogood, 2005). Reviews focusing exclusively upon intervention modalities/settings and subpopulations are also available. Overall, the data have suggested that PA interventions (compared to no-intervention or minimal-intervention controls) have garnered modest gains (Muller-Riemenschneider, Reinhold, Nocon, & Willich, 2008), with behavior modification strategies yielding the largest effects. However, behavior modification approaches have been criticized for lacking sustained effects once the intervention is completed as well as potentially compromising more autonomous motivation to engage in PA. A recent meta-analytic review indicated that the strategy of self-monitoring accounted for the most behavioral change of intervention participants, whereas the delivery context (e.g., individual vs. group), number of sessions, target population, and setting were not significant in determining intervention effectiveness (Michie, Abraham, Whittington, McAteer, & Gupta, 2009). Data also suggest that interventions targeting lower intensity and more active leisure time (e.g., walking) appear more successful in affecting change in PA behavior than those advocating more vigorous intensities and structured activities (Williams, Matthews, Rutt, Napolitano, & Marcus, 2008). Although the findings are inconsistent on the effectiveness of worksite interventions for promoting PA, a recent review of randomized clinical trials indicated such interventions may achieve modest effects with promoting healthy weight among employees (Anderson et al., 2009). Worksite settings are thought to offer valuable opportunities for PA interventions because of the potential for high exposure and reach, with promising strategies that include an increased emphasis on social networks (e.g., "buddy system") and built environments (e.g., stairwell enhancements, bike racks) as well as communication change strategies (e.g., persuasive point-of-decision prompts for increased PA or stairwell use). Although environmental strategies that create or improve access to PA for leisure or transportation purposes appear promising, at present, solid empirical evidence for such interventions is lacking. Community-level interventions involving large-scale multicomponent strategies, as well as targeting a combination of health behaviors (e.g., dietary), have demonstrated some initial effectiveness for increasing the percentage of active people across a variety of communities and populations, provided materials and messages are culturally adapted to the needs of the particular community and/or populations (Zaza, Briss, & Harris, 2005). While school-based physical education programs also appear effective in increasing PA levels, generalizability outside of the school setting has been limited (Marcus et al., 2006; Zaza, Briss, & Harris, 2005). On balance, family-based PA intervention have yielded mixed results, whereas classroom-based health education and single-component mass media campaigns have not been found to be effective for increasing PA (Marcus et al.; Zaza, Briss, & Harris).

Unfortunately, maintenance of behavioral change beyond 3 months is not often reported in PA interventions. The data and reviews that are available suggest that determinants of PA initiation

and maintenance may be different. A recent review found that maintenance was more likely for PA interventions that involved more than six behavioral change strategies, occurred for more than 24 weeks, and included face-to-face contacts as well as follow-up prompts to reinforce intervention content (Fjeldsoe, Neuhaus, Winkler, & Eakin, 2011). Notably, assessment of long-term sustainability of PA improvements did not extend beyond 24 months post-intervention for any of the studies examined. Increased assessments of PA maintenance and intervention sustainability appear to be a much needed emphasis in future research. Although cost-effectiveness analyses are also underreported in the literature and in need of greater prioritization (Hagberg & Lindholm, 2006; Muller-Riemenschneider, Reinhold, & Willich, 2009), some data suggest that both behavioral and environmental focused PA interventions may be cost-effective with the latter appearing to have potentially greater cost-effectiveness. In a similar vein, determining the public health impact of PA interventions has become increasingly important and emphasized, with the RE-AIM (Reach, Efficacy, Adoption, Implementation, and Maintenance) framework (Glasgow et al., 2010) serving as a useful model for evaluating and comparing any given intervention across the various levels (i.e., individual to community). Finally, because poor fidelity and adherence to treatment protocols and theoretical frameworks has limited conclusions from the data, there has been a recent effort to systematically create a taxonomy of behavior change techniques to more clearly map intervention components reported in studies (Abraham & Michie, 2008).

Cross-References

- ▶ Benefits of Exercise
- ▶ Physical Activity and Health

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Physical Activity, Psychosocial Aspects, Benefits

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Definition

Numerous aspects of psychological well-being related to physical activity have been examined using epidemiological, cross-sectional, and experimental research strategies, including depression, anxiety, mood/affect, self-perception, cognitive performance, and quality of life. Moreover, these aspects have been considered in terms of acute bouts of exercise and chronic exercise/physical activity as well as potential underlying mechanisms.

Description

It is well accepted that physical activity (PA) has important and far-reaching benefits for enhanced physical health and reduced risk of premature mortality. However, notable psychological benefits have also been documented in the literature (Buckworth & Dishman, 2002). Recently, increased attention has been drawn to examining the impact of PA on serious mental illnesses (e.g., schizophrenia, substance abuse/dependence, eating disorders) and a call to consider integrating PA programs into mental health services as a means to improve psychological well-being and reduce risk for comorbid physical health problems (Holley, Crone, Tyson, & Lovell, 2011; Richardson et al., 2005). Although additional randomized clinical trials are needed to evaluate PA interventions for treating psychological disorders, some data exist supporting the psychosocial benefits in terms of alleviating both primary and secondary symptoms of psychological disorders, including reduced cravings and body dissatisfaction and improved mood and social functioning.

Depression

The most cited and striking evidence in support of the beneficial associations between psychosocial functioning and physical activity comes from studies examining depression. Prospective epidemiological studies have found depression to be associated with low levels of PA, whereas maintaining a moderately active lifestyle has been related to lower risk of developing depression (Biddle, Fox, & Boutcher, 2000). These data are suggestive of both a dose–response relationship and protective effect of PA. Both narrative reviews and meta-analyses of exercise interventions have reported moderate-to-large effects for individuals with clinical depression with the reduction in depression appearing for both aerobic and non-aerobic forms of exercise (Clark & Williams, 2011; Stathopoulou, Powers, Berry, Smits, & Otto, 2006). Importantly, the effect was more pronounced for individuals diagnosed with moderate-to-severe levels of depression than mild-to-moderate levels. These post-intervention effects have been demonstrated in older populations (>60 years) as well, though long-term intervention outcomes and follow-up appear to be lacking with most of the trials (Blake, Mo, Malik, & Thomas, 2009). Some data also point to PA yielding effects comparable to antidepressant medications. The effects for exercise may appear less immediate than medications, but exercise seems to offer a reduced risk for relapse with depression (Barbour, Edenfield, & Blumenthal, 2007). A recent meta-analysis of PA interventions and depressive symptoms (i.e., nonclinical depression) has reinforced the previous findings of somewhat smaller moderate effects with less depressive symptomatology for both men and women; however, the effect was strengthened when aerobic forms of exercise were combined

with non-aerobic exercise (i.e., resistance, flexibility) (Conn, 2010a). Supervised low-intensity PA interventions were shown to yield larger effect sizes than moderate- or high-intensity exercise, suggesting that increased aerobic fitness is not a primary mechanism responsible for antidepressive effects of PA.

Anxiety

Another central area of inquiry regarding the salutary effects of PA has involved investigating anxiety reductions in both clinical and nonclinical samples. Reviews of intervention studies using individuals with elevated levels of anxiety or diagnosed anxiety disorders have generally reported small-to-medium effect sizes with somewhat better effects demonstrated with aerobic forms of exercise and longer intervention programs (Biddle, Fox, & Boutcher, 2000). Some comparative studies have shown PA to provide similar results to pharmacological and other therapeutic techniques (e.g., relaxation) in anxiety reductions and related symptoms. However, similar to the findings with depressive disorders, the impact of PA on anxiety reduction generally appears to be more delayed but stable. A recent meta-analysis of anxiety outcomes of PA interventions with nonclinical samples found similar benefits of PA on reduced anxiety levels, though observed slightly more modest effects than seen with clinical samples (Conn, 2010b). Although no differential effect was found for aerobic versus non-aerobic forms of PA, greater anxiety reduction was observed with moderate-to-high intensity levels of exercise. In addition to chronic exercise (i.e., PA interventions), studies focusing on single bouts of exercise have examined changes in state anxiety with similar size effects. Larger reductions in anxiety appear for within-group than between-group comparisons and aerobic forms of exercise (rather than non-aerobic/resistance forms) appear most beneficial with reducing state anxiety. Single-session bouts of exercise have also been found to provide beneficial attenuated physiological reactivity and improved recovery from psychosocial stressors (Buckworth & Dishman, 2002).

Affective Response

Although some researchers have used mood and affect interchangeably, there has been considerable attention in the PA/exercise literature directed toward providing clarification of these constructs (e.g., Ekkekakis & Petruzzello, 2000). Overall, moods are emotion-related expressions (e.g., anxious mood, depressed mood) that are considered more complex and multifaceted, lasting only brief moments to days, and may develop without an identifiable event. While affect is also considered an emotion-related expression, it is thought to be more basic and vary along the orthogonal dimensions of valence (unpleasant/avoidance vs. pleasant/approach) and level of activation (calm vs. aroused). Thus, an affective response may entail unpleasant and low activation (e.g., fatigue, boredom), unpleasant and high activation (e.g., tension, distress), pleasant and low activation (e.g., relaxation, tranquility), and pleasant and high activation (e.g., vigor, excitement). A meta-analysis examining changes in pleasant high activation affect observed medium-sized effects shortly after a bout of aerobic exercise with larger effects noted for lower-intensity exercise (Reed & Ones, 2006). Other studies have also indicated that exercise may result in reports of increased vigor, relaxation, and tranquility and decreased tension, irritability, and fatigue (Biddle, Fox, & Boutcher, 2000). Additionally, high-intensity (or even moderate-intensity) exercise may result in increased negative/unpleasant affect, though there appears to be a great deal of variability in affective responses among moderate-intensity PA. More recent efforts to clarify the relationship between affect and exercise intensity have investigated affective responses that occur while physically active. This line of research has indicated that the ventilatory/lactate threshold (i.e., near maximal level of intensity and transition from aerobic to anaerobic metabolic supplementation) appears to be the point at which pleasant affective responses diminish while exercising and that postexercise affect may reflect a rebound from this decline or a continuation of pleasant affect if this level of intensity is not exceeded (Ekkekakis & Acevedo, 2006).

Cognitive variables (e.g., attentional focus, self-efficacy, attributions) appear to influence affective responses with intensities below or near the threshold; however, physiological/interoceptive variables (e.g., muscular or respiratory cues) come to play a more dominant role in influencing the affective response as the threshold is approached or exceeded. An important implication of this line of investigation lies in the potential to improve adherence to a PA program for novice exercisers by developing self-monitoring skills and cognitive strategies (e.g., attentional dissociation/association) while exercising and self-selecting intensity to maximize reinforcing positive affective responses.

Self-Perception

A related and equally important area, though considerably less studied, is the relationship between self-perception and PA. Self-perception is conceptualized as a multifaceted construct within which lie several related subjective attitudes and beliefs about one's self (e.g., self-esteem, self-concept) that may be organized in hierarchical levels (e.g., global self-esteem, physical self-esteem domain, situation-specific efficacy). Overall, cross-sectional studies have shown that engaging in PA appears weakly associated with higher global self-esteem, though a moderate relationship between better physical self-esteem and body image exists beginning in adolescence and extending into adulthood (Ekelund, Heian, & Hagen, 2005; Fox, 2000; Spence, McGannon, & Poon, 2005). Reviews of PA interventions reinforce this pattern of improved self-perceptions with the greatest improvements occurring for individuals with lower self-esteem. Some data also suggest that females may benefit more from participation in an exercise program than their male counterparts in terms of increased body image, physical self-esteem, and self-efficacy for exercise (Hausenblas & Fallon, 2006). Although both aerobic forms of PA and weight/resistance training seem beneficial, the combination of the two appears to offer greater improvements in body image and physical self-esteem.

Cognitive Performance

A growing body of evidence supports the beneficial effect of PA on cognitive functioning in both children and adults (Clark & Williams, 2011; Etnier, Nowell, Landers, & Sibley, 2006). Although cross-sectional design studies have suggested moderate-sized effects favoring fitter participants, most randomized exercise interventions indicate a more modest effect on improved cognitive processes. Studies with older adults have provided somewhat mixed results, with improved cognitive performance being most pronounced with simple reaction time-/speed-based tasks in some studies and executive-control tasks (e.g., planning, response inhibition, task choice/switching) showing greater benefits from PA in other studies. Some evidence indicates that regular participation in moderate PA during midlife may confer a reduced risk of later cognitive impairment/dementia (Colcombe & Kramer, 2003). With regard to children, benefits associated with PA have been observed in several cognitive domains (e.g., verbal abilities, attention and concentration, executive functioning) as well as improved academic performance. For both children and adults, such improved cognitive processing has been seen with acute bouts of exercise and longer term PA programs (Biddle, Fox, & Boutcher, 2000). Generally, acute bouts of exercise have demonstrated larger effects when lasting 30–60 min; PA programs exceeding 6 months have shown greater improvements than briefer interventions. Although the emphasis within the literature is usually on aerobic forms of PA, combining aerobic and resistive/weight training forms of exercise has demonstrated somewhat larger cognitive performance gains.

Quality of Life

A final area of consideration with regard to PA benefits involves the emerging concept of perceived quality of life, sometimes referred to as health-related quality of life. Quality of life is a multifaceted construct often encompassing physical (e.g., physical functioning, bodily pain), mental (e.g., vitality), and social components (e.g., role limitations, social functioning) or overall satisfaction with life and psychological

well-being. In terms of PA, the construct has been predominantly examined with older populations and those managing a chronic health diagnosis with exercise appearing to have a positive impact for several of these conditions (e.g., cancer, diabetes). A meta-analysis of older adults without clinical disorders found small-to-medium effects for PA on various aspects of quality of life/well-being, with aerobic forms of exercise and moderate intensity providing the greatest benefits (Netz, Wu, Becker, & Tenenbaum, 2005). Another more recent review examined the quality of life outcomes in the general adult population and reported consistently moderate-to-strong positive effects of PA in cross-sectional studies (Bize, Johnson, & Plotnikoff, 2007). However, few randomized clinical exercise trials have examined quality of life in healthy samples which limits the potential strength of the conclusions and generalizability to the general population.

Compulsive Physical Activity

Although the emphasis within the literature on psychosocial aspects of PA has been overwhelming on the beneficial effects, reports suggest potentially deleterious effects for some individuals. For instance, some investigations have documented compulsive/obligatory patterns of exercise engagement that may pose an increased risk for overuse injuries or reduced psychological well-being (e.g., increased self-criticism and body dissatisfaction despite improved fitness or some weight loss success) (Biddle, Fox, & Boutcher, 2000). The diagnostic validity of "exercise addiction" has been questioned by some investigators, and the incidence of such patterns is thought to be rare, though excessive PA/exercise has been more frequently reported as a secondary feature of some preexisting clinical disorders (e.g., body/muscle dysmorphia). Notably, some data exist supporting the use of PA/exercise as an adjunctive treatment for eating disorders with improvements in reduced drive for thinness and binge eating (Stathopoulou, Powers, Berry, Smits, & Otto, 2006).

Conclusions and Summary

Despite the large literature that exists on the psychosocial benefits of PA, a clear understanding of the underlying mechanisms is less evident. Numerous mechanisms have been proposed in the literature, including psychological/cognitive (e.g., sense of mastery, autonomy and personal control, distraction) and physiological/biochemical changes (e.g., thermogenic, cerebral adaptations, monoamine and endorphin levels) (Buckworth & Dishman, 2002). In summary, PA appears to have a sizeable antidepressant effect, with several other psychosocial benefits documented such as reduced anxiety, improved body image and physical self-esteem, enhanced cognitive performance, and perceptions of greater quality of life. A person's affect while being active, as well as following a bout of exercise, may fluctuate as a product of the level of intensity with higher levels potentially resulting in a diminished positive and increased negative affective response. Helping beginning exercisers self-identify and regulate this potential affect-intensity relationship may prove useful in maximizing the reinforcing positive affective responses and improving longer-term adherence to a healthier physically active lifestyle. Although PA may be associated with some reductions in psychological well-being for select individuals engaging in compulsive behavioral patterns, on balance, it appears that the benefits of PA exceed the risks of misuse.

Cross-References

- ▶ Benefits of Exercise
- ▶ Physical Activity and Health
- ▶ Physical Activity Interventions
- ▶ Stress, Exercise

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Physical Capacity

▶ Physical Fitness

Physical Condition

▶ Physical Fitness

Physical Environment

▶ Built Environment

Physical Exam

▶ Physical Examination

Physical Examination

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Synonyms

Health assessment; Physical exam

Definition

Physical examination, assessment, is the systematic process of collecting data about a patient or client using the techniques of inspection, palpation, percussion, and auscultation to guide a clinician in the process of diagnosis of pathological states as well as developing a plan of care (Fennessey & Wittmann-Price, 2011). Physical assessment is an ongoing process that enables the clinician to continuously evaluate a patient's signs and symptoms, to monitor effectiveness of treatment, and to make adjustments in the plan of care as required (Zambas, 2010). This physical assessment is conducted in a systematic manner that is comfortable to both the patient and clinician; typically this is done using a head-to-toe approach.

Physical assessment is done for one of two reasons. The first reason is to conduct a complete physical exam of the entire body in order to screen the patient for potential health problems that have not yet manifested symptoms (Bickley & Szilagy, 2008) and monitor chronic health concerns. This exam is traditionally categorized based on body system (e.g., cardiovascular, respiratory, gastrointestinal). Each body system has its own set of unique advanced assessment procedures that allow the clinician to make a judgment about physical function based on what he or she sees, hears, and feels.

The second reason is to investigate a patient's chief complaint or follow-up on a current health problem such as hypertension or diabetes (Stern, Cifu, & Altkorn, 2009). For this more focused exam the clinician makes a determination of what body systems and exam components need to be conducted based on the differential diagnosis and/or the pathophysiology of the current health problem. This more focused exam typically utilizes more advanced techniques to obtain a deeper understanding of the physical changes that may be occurring due to disease process (Bickley & Szilagy, 2008).

Physical assessment, along with health history, is the first and most vital step in diagnosing and planning care for patients. A skilled clinician will be able to utilize findings from the physical exam to both support and rule out diagnoses.

Cross-References

- ▶ Clinical Settings
- ▶ Diabetes
- ▶ Hypertension
- ▶ Primary Care
- ▶ Primary Care Physicians

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Physical Fitness

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Synonyms

Functional health; Habitual performance; Physical capacity; Physical condition

Definition

Physical fitness is one's ability to execute daily activities with optimal performance, endurance, and strength with the management of disease, fatigue, and stress and reduced sedentary behavior.

Description

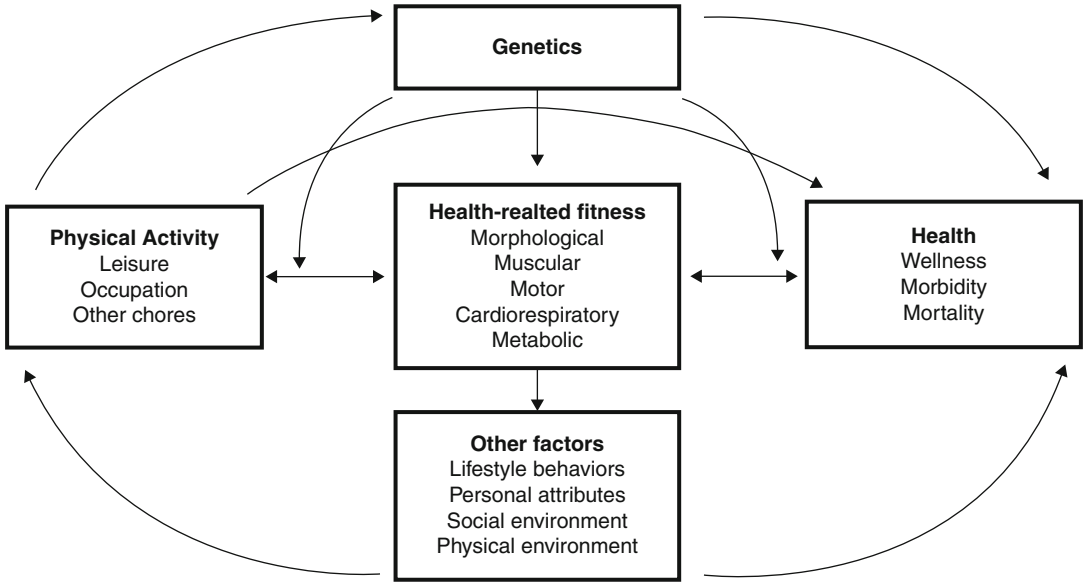
Physical fitness has multiple components and is conceptualized as either performance- or health-related. The specificity of performance-related fitness regarding one's athletic skill best relates to an individual's athletic performance. Conversely, health-related fitness is generalized to health status and is affected positively or negatively by one's habitual physical activity habits. Given the complexity of physical fitness and the epidemiological analysis taken presently, health-related fitness will be the focus of this discussion.

There are five major components of health-related fitness: morphological, muscular, motor, cardiorespiratory, and metabolic (see below), with muscular and cardiorespiratory fitness being the two primary facets assessed in research. As outlined in Fig. 1, a complex relationship exists among the five biological traits, physical activity level, and health outcome.

There are numerous methods to assess the different components of health-related physical fitness, ranging in feasibility and utility for a laboratory versus field-based testing. Morphology is typically assessed using body mass index (BMI, expressed as kg/m^2), a crude measure of body composition. More objective measures of body composition include skinfold technique, bioelectrical impedance, and dual-energy x-ray absorptiometry. Muscular strength can be evaluated by tensiometers, handgrip dynamometers, and strength gauges. Conversely, muscular endurance is measured by performing the maximum number of repetitions of common body movements, such as sit-ups or push-ups. Motor skills involve fine and gross motor skills and are most commonly assessed by a battery of tests that target balance, speed, control precision, reaction time, aim, and coordination. Cardiorespiratory fitness is the ability of the cardiovascular and respiratory systems to deliver oxygen to working muscles, in addition to the ability of those tissues to utilize that oxygen to produce energy. Peak VO_2, a reflection of cardiorespiratory fitness, is the highest rate of oxygen consumption by muscles during exercise and can be directly assessed by a maximal exercise test. Alternatively, peak VO_2 can be measured indirectly using a submaximal exercise test or timed distance run/walk protocol. Finally, to determine metabolic health, blood pressure and biochemical analyses of blood triglycerides and fasting plasma glucose are examined.

Natural differences exist in health-related physical fitness across the life span and by sex and ethnicity. The extent of the difference is dependent on the specific component of fitness. In general, level of physical fitness declines with age. Age-related decreases in peak VO_2 and muscular strength make even the simplest tasks physically demanding for the elderly compared to younger people. Sex differences in physical fitness are primarily attributed to differences in absolute muscle mass and morphology between males and females. Males generally tend to have higher levels of cardiorespiratory fitness and strength and decreased flexibility compared to females. Similarly, differences in cardiorespiratory fitness have been found between white and black individuals. On average, white males and females are found to have higher maximal VO_2 values compared to black males and females. It is important to keep in mind that depending on the population of interest, different approaches may be needed in order to appropriately assess physical fitness. For example, a maximal VO_2 exercise test may be appropriate for healthy adults or the fit elderly, whereas a different approach for assessing VO_2 in obese individuals or frail older persons may be required.

A multidisciplinary approach is necessary to achieve and maintain physical fitness. Specifically, meeting recommended physical activity and nutrition guidelines as well as acquiring



Physical Fitness, Fig. 1 Bouchard, Blair & Haskell (2006), p. 17

adequate rest are each important components to overall functional health. Not surprisingly, cardiovascular disease, diabetes, cancer, obesity, depression, osteoporosis, and premature death are associated with inadequate physical activity and hence poor physical fitness.

Health-Related Fitness Components and Traits

Morphological component	Body mass for height
	Body composition
	Subcutaneous fat distribution
	Abdominal visceral fat
	Bone density
	Flexibility
Cardiorespiratory component	Submaximal exercise capacity
	Maximal aerobic power
	Heart functions
	Lung functions
	Blood pressure
Muscular component	Power
	Strength
	Endurance
Motor component	Agility
	Balance
	Coordination
	Speed of movement
Metabolic component	Glucose tolerance
	Insulin sensitivity
	Lipid and lipoprotein metabolism
	Substrate oxidation characteristics

Bouchard, Blair, & Haskell (2006), p. 17

Cross-References

- Body Composition
- Body Mass Index
- Exercise Testing
- Handgrip Strength
- Maximal Exercise Stress Test
- Physical Activity and Health

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Physical Fitness Testing

► Exercise Testing

Physical Fitness: Health-Related Fitness Components and Traits

► Physical Fitness

Physical Functioning

► Physical Therapy

Physical Health

► Therapy, Physical

Physical Illness

► Psychosocial Work Environment

Physical Inactivity

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Definition

Physical inactivity is the failure to meet the minimum recommended physical activity guidelines (i.e., 30-min moderate-intensity exercise on at least 5, although preferably all, days of the week or 75-min vigorous-intensity exercise to be undertaken in no less than 20-min increments thrice a week). Physical inactivity is one of the World Health Organization's (WHO) 12 leading risks to health. Physical inactivity is widespread and associated with increases in all causes of mortality and is an independent risk factor for chronic diseases.

Physical inactivity differs from sedentary behavior (e.g., sitting and not moving); physical inactivity refers to not meeting the aforementioned guidelines.

Description

Prevalence

The American Heart Association estimates that 60% of the world population does not meet recommended physical activity guidelines (American Heart Association, 2001). The American Centre for Disease Control (CDC) estimates 25% of adults are not active at all.

Risk Factors

Physical inactivity increases with age. While physical activity typically peaks in early adolescence, it then begins to decline, regardless of gender (World Health Organization, 2011a). Other demographic risk factors include low income and less education.

Behavioral correlates of physical inactivity include a reduction in leisure-time physical activity and the inclusion of more sedentary occupational and domestic activities (Healey, 2007).

Other environmental correlates of physical activity include population overcrowding, increased levels of crime, high-density traffic, low air quality, and a lack of parks, sidewalks, and sports/recreation facilities (WHO, 2011a).

Health Risks

Physical inactivity increases all cause mortality (World Health Organization, 2011b). The WHO estimates as many as two million deaths worldwide as attributable to physical inactivity. It is also an independent risk factor for chronic diseases such as ischemic heart disease, stroke, type 2 diabetes, breast cancer, colon cancer, and depression. Physical inactivity is also a leading cause of falls and fall-related injuries, particularly in older populations.

Physical inactivity has indirect health burdens as well, which include pain, disability, anxiety, and increased suffering due to medical conditions. These indirect burdens often lead to a reduction in an individual's quality of life, as well as shorter life expectancy, less workforce participation, decreased bone and functional health, and weight gain (Taylor, 2009).

Cross-References

- ▶ Chronic Disease or Illness
- ▶ Lifestyle, Sedentary
- ▶ Physical Activity
- ▶ Quality of Life
- ▶ Risk Factors and Their Management
- ▶ Sedentary Behaviors

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Physical Therapy

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Synonyms

Kinesiotherapy; Physiotherapy; Therapy, Physical

Definition

Physical therapy is a health service concerned with identifying and maximizing quality of life and movement potential within the spheres of promotion, prevention, intervention/treatment, habilitation, and rehabilitation. The spheres of practice are aimed at physical, psychological, emotional, and social well-being of a patient/client or population group. Physical therapy involves the interaction between physical therapists and patients/clients, other health professionals, families, caregivers, and communities in a process where movement potential is assessed, goals are agreed upon, and interventions carried out using knowledge and skills unique to physical therapists (World Confederation for Physical Therapy [WCPT], 2011a, b).

Description

Physical therapy is the service provided only by, or under the direction and supervision of physical therapists, to people and populations to develop, maintain, and restore maximum movement and

functional ability throughout the life span. Physical therapist practice includes the provision of services in circumstances where movement and function are threatened by the process of aging or by injury, diseases, disorders, or other conditions of health. Functional movement is central to physical therapist practice since it is at the core of what it means to be healthy. Physical therapists are guided in their practice by the professional behaviors of accountability, altruism, compassion/caring, cultural competence, ethical behavior, integrity, personal/professional development, professional duty, and social responsibility and advocacy. Physical therapist education consists of university-based education leading to entry-level qualifications that range internationally from bachelors, to masters or doctorate entry qualifications.

Physical therapist practice follows a patient/client management model that includes examination/assessment, evaluation, diagnosis, prognosis, plan of care, intervention/treatment, and reexamination (World Confederation for Physical Therapy, 2011a, b).

Examination by the physical therapist involves history taking, screening of the patient's/client's systems (cardiovascular/pulmonary, musculoskeletal, neuromuscular, and integumentary) and the use of specific tests and measures, the results of which are evaluated within a process of evidence-based clinical reasoning to determine the facilitators and barriers to optimal human functioning. The tests and measures used by physical therapists include any of the following: aerobic capacity/endurance; anthropometric characteristics; arousal, attention, and cognition; assistive and adaptive devices; balance; circulation (arterial, venous, lymphatic); cranial and peripheral nerve integrity; environmental, home, and work access and barriers/facilitators; ergonomics and body mechanics; gait and locomotion; integumentary integrity; joint integrity and mobility; motor function (motor control and motor learning); muscle performance; neuromotor development and sensory integration; orthotic, protective, and supportive devices; pain; posture; prosthetic requirements; range of motion; reflex integrity; self-care and home management; sensory and proprioceptive integrity; ventilation and respiration/gas exchange; and work, education, community, and leisure integration or reintegration.

Based upon the examination results, physical therapists evaluate the findings from the examination (history, systems review, tests and measures, environmental facilitators/barriers) to make clinical judgments regarding patients/clients. Physical therapists formulate the diagnosis that results in the identification of existing or potential impairments, activity limitations, and participation restrictions and then determine patient/client prognoses and identify the most appropriate intervention/treatment strategies to optimize patient/client functioning. The plan of care is developed that is consistent with legal, ethical, and professional obligations and administrative policies and procedures of the practice environment. Specific interventions/treatments are determined with measurable outcomes and goals associated with the plan of care and with the involvement of the person and their care providers, both professional and personal. Plans may include referral to other agencies and service delivery providers.

Physical therapists provide, whenever possible, evidence-based physical therapy interventions to achieve patient/client goals and outcomes. These interventions/treatments encompass three major areas: (1) coordination, communication, and documentation; (2) patient/client-related instruction; and (3) procedural interventions.

The procedural interventions include:

1. Therapeutic exercise (including aerobic capacity/endurance conditioning or reconditioning; balance, coordination, and agility training; body mechanics and postural stabilization; flexibility exercises; gait and locomotion training; neuromotor development training; relaxation; and strength, power, and endurance training for head, neck, limb, pelvic-floor, trunk, and ventilatory muscles)
2. Functional training in self-care and home management (including activities of daily living training; barrier accommodations or modifications; device and equipment use and training; functional training programs;

instrumental activities of daily living training; and injury prevention or reduction)
3. Functional training in work, community and leisure integration or reintegration (including barrier accommodations or modifications; device and equipment use and training; functional training programs; instrumental activities of daily living training; injury prevention or reduction; and leisure and play activities and training)
4. Manual therapy techniques (including acupressure; manual lymphatic drainage; manual traction; massage; mobilization/manipulation; and passive range of motion)
5. Prescription, application, and, as appropriate, fabrication of devices and equipment (including adaptive, assistive, orthotic, prosthetic, protective, and supportive devices)
6. Airway clearance techniques (including breathing strategies; manual/mechanical techniques; and positioning)
7. Integumentary repair and protection techniques (including selective and nonselective wound debridement; dressings; oxygen therapy; and topical agents)
8. Electrotherapeutic modalities (including biofeedback; electrotherapeutic delivery of medications; and electrical stimulation)
9. Physical agents (including athermal agents; cryotherapy; hydrotherapy; light agents; sound agents; and thermotherapy) and mechanical modalities (including acupuncture, dry needling; compression therapies; gravity-assisted compression devices; mechanical motion devices; and traction devices)

Interventions/treatments are aimed at prevention of impairments, activity limitations, participation restrictions, and injury. Interventions provided by physical therapists also include prevention, health promotion, and fitness for individuals of all ages and for groups and communities.

Reexamination by physical therapists occurs throughout the episode of service delivery to evaluate the effectiveness of interventions/treatments and outcomes and to adjust the plan of care in response to findings. Outcomes monitoring is part of building the evidence base for modifying the patient/client plan, as well as for the research underpinning professional physical therapy practice.

Physical therapy is an essential part of the health and community/welfare services delivery systems. Professional education prepares physical therapists to practice independently of other health service delivery providers as autonomous practitioners and also within interdisciplinary rehabilitation/habilitation programs. Physical therapists may act as first contact practitioners, and patients/clients may seek direct services without referral from another health care professional. Physical therapists provide consultation within their expertise and determine when patients/clients need to be referred to an other professional provider.

The professional names of physical therapy or physiotherapy, the titles physical therapist or physiotherapist and appropriate abbreviations (e.g., PT, FT, physio) as such or in any translation, are the sole preserve of persons who hold qualifications approved by national professional associations. Members of the public wishing to access the services of a physical therapist are entitled to know that recognized qualifications are held and that professional behavior is governed by ethical codes (World Confederation for Physical Therapy, 2007).

Physical therapists, guided by their own code of ethical principles, are concerned with the following purposes:

- Promoting the health and well-being of individuals and the general public/society, emphasizing the importance of physical activity and exercise
- Preventing impairments, activity limitations, participatory restrictions, and disabilities in individuals at risk of altered movement behaviors due to health or medically related factors, socioeconomic stressors, environmental factors, and lifestyle factors
- Providing interventions/treatments to restore integrity of body systems essential to movement, maximize function and recovery, minimize disability, and enhance the quality of life and inclusion, independent living and workability in individuals and groups of individuals with altered movement behaviors resulting

from impairments, activity limitations, participatory restrictions, and associated environmental factors (disabilities)
- Modifying environmental, home, and work access and barriers to ensure full participation in one's normal and expected societal roles

Physical therapists contribute to the development of local, national, and international health policies and public health strategies. Physical therapists may have roles in management, administration, supervision of personnel, education, research, and consultation to businesses, schools, government agencies, other organizations, or individuals.

Physical therapy services may be provided to individuals or populations and in a wide range of service settings, including but not limited to community-based rehabilitation programs; community settings including primary health care centers; individual homes; field settings (including in response to disasters); educational and research centers; fitness centers; health clubs; gymnasia and spas; hospices; hospitals; nursing homes; occupational health centers; outpatient clinics; physical therapist private offices and clinics; prisons; public settings (e.g., shopping centers) for health screening and promotion; rehabilitation centers; residential homes; schools including preschools and special schools; senior citizen centers; sports centers/clubs; and workplaces/companies.

Cross-References

- ▶ Activities of Daily Living (ADL)
- ▶ Activity Level
- ▶ Aerobic Exercise
- ▶ Back Pain
- ▶ Cancer and Physical Activity
- ▶ Cardiac Rehabilitation
- ▶ Cardiovascular Disease Prevention
- ▶ Chronic Disease Management
- ▶ Exercise
- ▶ Exercise Testing
- ▶ Exercise, Benefits of
- ▶ Functional Versus Vocational Assessment
- ▶ Lifestyle, Active
- ▶ Lifestyle, Healthy
- ▶ Massage Therapy
- ▶ Physical Activity and Health
- ▶ Physical Activity Interventions
- ▶ Physical Fitness
- ▶ Physical Health

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Physical Well-Being

- ▶ Happiness and Health

Physician-Assisted Suicide

- ▶ Euthanasia

Physiological Reactivity

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Synonyms

Stress reactivity; Stress responses

Definition

Physiological reactivity involves bodily changes in response to stressful stimuli or events.

The classic features of physiological reactivity are increases in sympathetic nervous system and hypothalamic-pituitary-adrenal axis (HPA) activity, often referred to as the "fight-or-flight" response (Cannon, 1932). These responses include increases in heart rate, blood pressure, cardiac contractility, and cortisol. Changes in parasympathetic nervous system activity, immune function (Cacioppo, 1994), and non-HPA endocrine function (Taylor et al., 2000) can also occur. For reactivity to serve as a meaningful metric, stress responses must be compared to an unstressed resting state, or baseline, to control for wide individual differences in resting levels (Jennings et al., 1992). Physiological reactivity is most often assessed in response to acute stressors on the order of minutes (Steptoe & Vögele, 1991).

Cross-References

- ▶ Mental Stress
- ▶ Perceptions of Stress
- ▶ Stress
- ▶ Stress Responses

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Physiotherapy

▶ Physical Therapy

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Biographical Information

Dr. Thomas George Pickering

Thomas George Pickering was born in the United Kingdom in 1940. He was educated at Bryanston School in Blandford, England, and went on to study medicine at Trinity College, Cambridge,

Editors' Note: Dr. Pickering passed away in 2009. The American Society of Hypertension has established the Thomas Pickering Memorial Lecture, the first of which was delivered at the Scientific Meeting in May 2012.

and the Middlesex Hospital Medical School, London, where he graduated in 1966.

Pickering's early postgraduate years were spent at the Middlesex and the Radcliffe Infirmary. He became a member of the Royal College of Physicians of London in 1968, becoming a fellow in 1980. He received a Ph.D. degree from Oxford University in 1970. In 1972, he went to New York to take up appointments as Associate Physician at the Rockefeller University Hospital and Assistant Professor at Cornell University. He spent 2 years as Assistant Professor at the Rockefeller University working with Neal Miller on biofeedback mechanisms. He was appointed Assistant Physician to the New York Hospital in 1974. He returned to theRadcliffe Infirmary in 1974 to work with Peter Sleight.

Pickering's earliest hypertension research at Oxford focused on baroreceptor function, the autonomic nervous system, and the emerging class of cardiovascular medications known as the adrenoreceptor blockers. Although he remained in Oxford from 1974 to 1976, the possibility of being able to work as both a practicing physician and a clinical investigator drew him back to New York City and Cornell University Medical College, where he spent more than 20 years in a productive career in cardiovascular behavioral medicine, clinical hypertension, and blood pressure measurement research. In 2000, he became Director of Behavioral Cardiovascular Health and the Hypertension Program at the Cardiovascular Institute of Mount Sinai Medical Center, and in 2003 he moved to Columbia University Medical College as Professor of Medicine and Director of the Behavioral Cardiovascular Health and Hypertension Program.

Major Accomplishments

Pickering practiced "translational research" long before the term became fashionable, translating his clinical observations in medical practice to research endeavors throughout his career. He made important observations on the relationship between renovascular disease and cardiovascular complications, and the impact of renal revascularization. He also observed that anxiety, perceived stress, job strain, and the medical care environment itself induced hypertension in some individuals who otherwise would not have been classified as hypertensive. He had a deep belief that psychosocial mechanisms played an important role in the pathogenesis of cardiovascular disorders.

Pickering's research interests also focused on new methods of blood pressure measurement, particularly the use of 24-h ambulatory monitoring and self monitoring. His identification of the importance of the circadian variability of blood pressure led to the study of the psychological influences of work and stress in hypertension and heart disease, a field in which he was regarded as the world authority. At a clinical level he studied the influence of sleep in hypertension and methods of improving adherence to medication in order to obtain better control of elevated blood pressure. Pickering also studied the application of non-pharmacological approaches to the management of hypertension, publishing prolifically in these areas. He published a total of almost 500 original research articles in a clear and concise manner. Several highly acknowledged experts acknowledge his leadership in coining the terms "white-coat hypertension" and "masked hypertension," conditions which he not only described, but did much to explain with well-designed studies. This work systematically investigated whether white-coat hypertension was benign, and whether masked hypertension enhanced risk.

Pickering served on many governmental and academic bodies including the American Society of Hypertension; the National Heart, Lung, and Blood Institute; the International Society of Hypertension; the American Heart Association; the US Cardiorenal Advisory Committee; the US Food and Drug Administration; and the Committee on Gulf War and Stress of the Institute of Medicine. As a senior editor of the Journal of Clinical Hypertension he wrote numerous editorials. In his later years he came to feel strongly that self-monitoring of blood pressure, as well as ambulatory blood pressure monitoring, should be covered by third-party insurance companies for patient hypertension care. In 2002, after 19 years

of lobbying, a scientific meeting of the Center for Medicare and Medicaid Services was established to develop a national policy for coverage of ambulatory blood pressure monitoring for patients with white-coat hypertension. At Pickering's suggestion, not only was evidence of the benefits of ambulatory monitoring presented at this meeting but the patients who had benefited gave testimony. The patients' stories had a substantial impact, and the meeting voted unanimously to approve national coverage for ambulatory monitoring.

Cross-References

- ▶ Adherence
- ▶ Hypertension

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Pitocin

- ▶ Oxytocin

Pituitary-Adrenal Axis

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Synonyms

Hypothalamic-pituitary-adrenal axis

Definition

The pituitary-adrenal axis comprises the pituitary and adrenal glands. The main interactions that take place between these two endocrine glands are as part of the hypothalamic-pituitary-adrenal axis (HPA axis). Corticotrophin-releasing hormone (CRH) stimulates the secretion of adrenocorticotropic hormone (ACTH) from the anterior pituitary; this in turn stimulates the release of cortisol from the adrenal cortex (Martin, Reichlin, & Brown, 1997). More detail on the pituitary-adrenal axis and its function in the HPA axis can be found in Widmaier, Raff, and Strang (2004), O'Riordan, Malan, and Gould (1988), and Greenspan and Forsham (1983).

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Placebo and Placebo Effect

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Synonyms

Conditioned response; Context effect; Expectancy effect

Definition

A placebo is any inert substance, procedure, apparatus, or similar, that alone has no effect in the body. The placebo effect is the psychological and/or physiological response to the placebo when it is administrated with a suggestion that the substance, procedure, apparatus, or similar will have an effect in the individual.

Description

Placebo comes from the Latin word "placere" which means "I shall please" and has been used in medicine to describe treatments that pleases the patient, but that has no specific effect on the symptom.

A placebo effect may occur when a substance, procedure, or other stimulus is administrated to a person, together with a suggestion that this will reduce or heal a symptom. The placebo effect may occur whether the substance or procedure is effective in reducing the symptom or not, as effective treatments may also induce placebo effects. Both the substance or procedure and the suggestion are necessary to produce a placebo effect. Administration of a pill without the suggestion, or the suggestion without the pill, will not generate a placebo effect. Thus, a placebo alone is not sufficient to generate a placebo effect, as it must be accompanied by a suggestion. The suggestion can be in the form of verbal information, e.g., "this capsule may contain a painkiller," that induces an expectation that the treatment will reduce the symptom. The expectation has been found to be correlated to the actual placebo response. Thus, it could be argued that the term "expectancy effect" should replace the vague and often misinterpreted term "placebo effect." Placebo effects may also be implicit and communicated through contextual factors. For example, a "pill" provided by a physician may have a stronger "placebo" effect than a pill provided by a nonmedical professional.

Placebo effects may also occur as a result of a conditioning process. For example, after the individual has been subject to effective treatment,

an association between treatment and its outcome may develop. The shape or color of tablets the patient has taken in the past to reduce pain or other problems may be associated with the drug effect, since the shape or color of the tablet (the conditioned stimulus) is reliably followed by reduction in the symptom (the unconditioned response). The features of the tablet can be associated with the effect of the drug in the central nervous system (the unconditioned stimulus) and come to elicit conditioned decreases in the symptom. Placebo effects induced by actual experience with the drug effect are stronger than placebo effects induced by verbal information alone (Flaten et al., 1999). For some symptoms, the conditioned stimulus exerts its effect by inducing an expectation, for other symptoms unconscious, automatic processes seem to be responsible for the placebo effect (Benedetti et al., 2003).

The placebo effect is observed as a reduction in a symptom in a group that receives placebo treatment with suggestion, compared to a natural history control group that receives no treatment and no suggestion. The natural history group controls for normal variations in the symptom due to normal healing processes or other changes that are not due to expectations of treatment effects. Response bias is serious problem, as subjects may feel obliged or may have a tendency to report on the symptom in accordance with the suggestion provided by the experimenter, without there being any improvement in the symptom, and studies must control for demand characteristics. Placebo analgesia, a reduction in pain due to expectations of having received a painkiller, is the most studied form of placebo effect. Pain is accompanied by changes in autonomic function, by well-defined changes in the event-related potential to painful stimulation, and by a cerebral response reliably involving the somatosensory cortex, the anterior cingulate cortex, and the insula. Placebo analgesia is accompanied by reduction in these correlates to the reported pain, indicating that the placebo effect is due to changes in the brain's response to the pain signal and not solely to a response bias, although this may contribute.

Multiple neurobiological pathways are thought to be involved in mediating effects of placebo, including those related to the endogenous opioid system and stress response systems. Placebo analgesia has been found to be reversible or partly reversible by the opioid antagonist naloxone. This is further evidence that the placebo effect is not due to a response bias, and indicates that expectations of pain relief activate the mid-brain descending pain inhibitory system. Wager et al. (2004) found that expectations of pain relief were associated with increased activity in the periaqueductal gray in the midbrain, a nucleus that controls pathways descending to the rostral ventral medulla and the dorsal horn. There, this pathway inhibits pain transmission, resulting in a reduced pain signal to the brain areas mentioned above, with a consequent reduction in pain sensation. Injections of opioids into the periaqueductal gray and the ventral medulla reduce pain, suggesting that endogenous opioids reduce pain via the same descending system. Eippert, Finsterbusch, Bingel, and Buchel (2009) furthermore showed that placebo analgesia involved dorsal horn activity, indicating that placebo analgesia is due to expectation of pain relief that in turn activates the descending endorphin-mediated pain inhibitory system.

In addition to pain, placebo effects are documented in, e.g., Parkinson's disease, depression, cardiac heart disease, sexual function, and airway resistance in asthmatic patients. This implies that there are several placebo effects with different underlying mechanisms. In Parkinson's disease, placebo treatment has been found to increase dopamine release in the basal ganglia, thereby improving motor function. Increased dopamine release has also been implicated in placebo analgesia. Most studies have found only a partial reversal of placebo analgesia by naloxone, whereas some studies have found no effect of naloxone on the placebo analgesic response. Thus, non-opioid mechanisms play a role in placebo analgesia. It has been hypothesized that placebo treatment leads to reduced anxiety or negative emotions, that could be a common factor across

placebo effects, and that different placebo treatments could activate additional disease-specific mechanisms.

Placebo effects can also be observed in the response to drugs of habitual use or abuse. Caffeine, e.g., increases arousal and decreases reaction time and fatigue, and habitual coffee drinkers who believe they receive caffeine but get a placebo, respond with caffeine-like reactions of increased alertness and faster reaction times, and increased dopamine release in areas associated with reinforcement. Subjects who believe they drink alcohol but receive placebo drinks report symptoms of intoxication and display deteriorated performance on cognitive and motor tasks. Likewise, subjects who believe they receive amphetamine but receive a placebo still report amphetamine-like effects.

Placebos are used as controls in randomized clinical trials, where the effect of the intervention is defined as the improvement over placebo. Since the participant does not know to which arm of the trial he or she has been randomized to, expectations of drug effects are the same in both arms, and expectations of receiving effective treatment are lower than in ordinary clinical practice or in experimental studies on the placebo effect. Thus, placebo effects are smaller or absent in clinical trials (Hróbjartsson & Gøtzscke, 2001). Drugs or other treatments may have noticeable subjective effects like drowsiness or nausea that may inform the participant that he or she has received active medication, thereby unblinding the trial for the participants in the active arm. To solve this problem active placebos are used, i.e., drugs that have similar subjective effects to the tested drug, but that have no effect on the symptom, instead of inactive placebos.

Cross-References

- ▶ Functional Magnetic Resonance Imaging (fMRI)
- ▶ Pain
- ▶ Randomized Controlled Trial

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Plasma Lipid

- ▶ Lipid

Plasminogen Activator Inhibitor (PAI-1)

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Definition

The rupture of an atherosclerotic plaque is a recognized key event in acute ischemic syndromes, such as myocardial infarctions. The intravascular thrombotic response to a ruptured plaque is a complex cascade of thrombogenic (clot-forming) and thrombolytic (clot-dissolving) mechanisms. A key component of the thrombotic cascade is plasminogen activator inhibitor type 1 (PAI-1). PAI-1 inhibits the activation of plasminogen by tissue plasminogen activator (tPA) and urokinase (uPA) and, hence, inhibits clot lysis.

PAI-1 is a single-chain glycoprotein composed of nearly 380 amino acids. It is a member of

the serine proteases family and is synthesized by vascular endothelium and smooth muscle cells in both normal and atherosclerotic arteries. By synthesizing molecules like PAI-1, arterial smooth muscle cells can prevent bleeding from small vascular injuries; congenital deficiencies of PAI-1 are a rare cause of abnormal bleeding.

Associations between PAI-1 and incident or recurrent coronary heart disease (CHD) have been demonstrated, but not definitively proven. While circadian variation in PAI-1 levels (highest in the morning) may correlate to circadian patterns of myocardial infarction (highest in the morning), the relationship of PAI-1 to CHD, independent of other prothrombotic risk factors for coronary heart disease, such as diabetes or insulin resistance, has not been clearly shown. Additionally, individuals with specific genetic variations leading to increased PAI-1 production have not been clearly shown to have an increased risk of CHD. Lastly, while important in constitutive pathways of fibrinolysis, it is not clearly known whether the increased PAI-1 expression seen following plaque rupture and thrombosis is a causal pathway or an effect of the inciting event.

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Platelet Plug

► Fibrinogen

Pleasant Affect

► Positive Affectivity

PMD

► Primary Care Physicians

Point of Care Testing

► Glucose Meters and Strips

Polymorphism

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Definition

The term “polymorphism” refers to a locus with two or more alleles. The translation from Latin is “multiple forms.” It is therefore a difference in DNA sequence at a particular locus.

Cross-References

► Allele
► DNA
► Locus
► Single Nucleotide Polymorphism (SNP)

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Polysomnogram

► Polysomnography

Polysomnography

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Synonyms

Polysomnogram; Sleep study

Definition

Polysomnography is the simultaneous recording of numerous physiological signals during attempted sleep, including activity of the brain, heart, eyes, and muscles. Polysomnography is considered the gold standard for the objective assessment of sleep and diagnosis of many clinical sleep disorders.

Description

Polysomnography (PSG), termed as such because of the multiple physiological signals that are recorded, has been employed for the characterization of sleep/wake status since the early 1900s. Measurement of the brain's electrical activity, or electroencephalography (EEG), is the primary physiological signal assessed during PSG. Concurrent measurement of eye movement (electrooculography, or EOG), submentalis muscle activity (electromyography, or EMG), and cardiac activity (electrocardiography, or ECG) are essential for the discrimination of specific stages of sleep. Besides the basic recording montage of EEG, EOG, EMG, and ECG, supplemental measures can be added to PSG for the assessment of respiratory and limb movement activity during sleep. See Fig. 1 for an example of a standard polysomnogram.

Polysomnography is most commonly performed in a sleep laboratory. However, due to digitization of sleep signals, portability of data collection units, and increased data storage capacities, full-scale polysomnography is now able to be performed in the home. Home-based PSG allows for a more ecological assessment of sleep, since patients often report altered sleep due to the artificial sleep laboratory environment (Edinger et al., 2001).

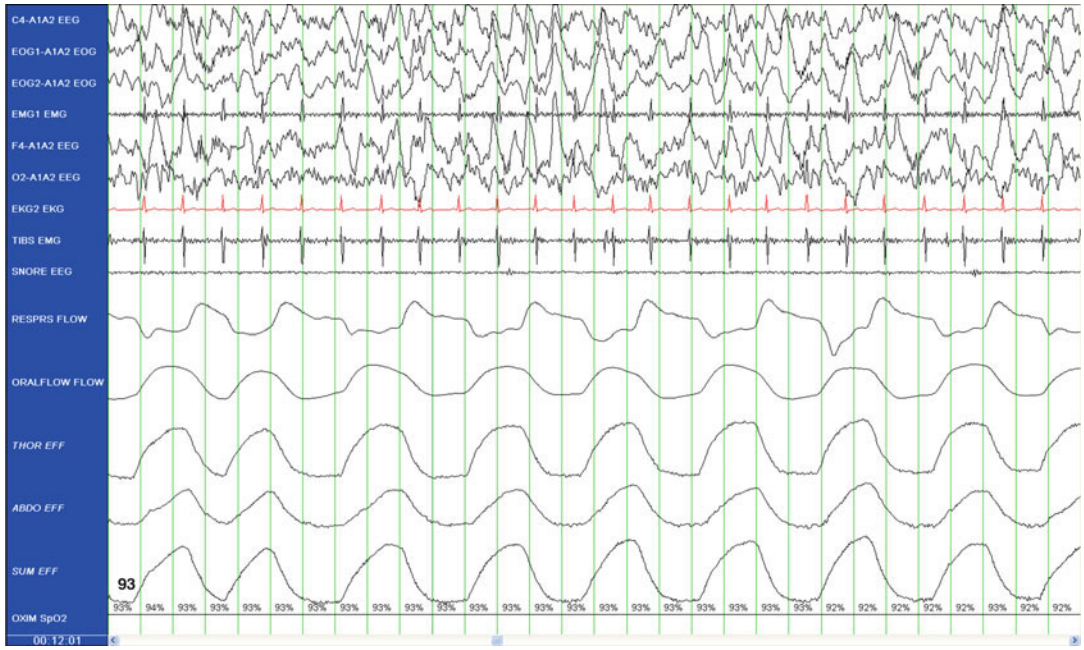
Indications

Polysomnography can be conducted for the objective assessment of sleep for any individual, regardless of whether a sleep disorder is suspected. However, PSG is indicated for the diagnosis of sleep-disordered breathing, narcolepsy, certain types of parasomnias (e.g., seizure disorders) and periodic limb movement disorder (Kushida et al., 2005).

Preparation

Prior to electrode placement, sites should be briefly cleaned with alcohol and an abrasive skin preparation to minimize impedance levels. Electrode cups are then filled with conducting paste and affixed to the proper site with medical tape or electrode paste backed by gauze. Alternatively, some sleep laboratories attach scalp electrodes with collodion glue. Electrode position for the electroencephalogram follows the International 10–20 system (Harner & Sannitt, 1974). A typical EEG montage for sleep includes bilateral electrodes in the occipital, central, and frontal regions, with bilateral mastoid process electrodes as reference electrodes (Iber, Ancoli-Israel, Chesson, & Quan, 2007).

For the electrooculogram, electrodes should be placed 1 cm lateral to and above the outer canthus of the right eye, and 1 cm lateral to and below the outer canthus of the left eye. For the electromyogram, electrodes are placed to assess the activity of the submentalis muscle of the chin; when limb movements need to be assessed, EMG activity of the anterior tibialis is measured with two electrodes on each leg.



Polysomnography, Fig. 1 A 30-s epoch of a standard clinical polysomnogram. Channels are listed on the left column. Electroencephalographic (C4-A1A2, F4-A1A2, O2-A1A2), electrooculographic (EOG1-A1A2, EOG2-A1A2), and electromyographic (EMG1) channels are shown here and are needed for the identification of sleep stages. Additional channels are included here for monitoring leg movements (TIBS; anterior tibialis EMG activity), cardiac activity (EKG2), snoring (SNORE), breathing patterns (RESPRS: nasal pressure; ORALFLOW: oronasal thermistor), respiratory effort (THOR EFF: thoracic effort; ABDO EFF: abdominal effort; SUM EFF: sum of thoracic and abdominal effort channels), and oxyhemoglobin saturation (OXIM SpO2)

A basic electrocardiogram lead, with torso electrodes corresponding to right arm and left leg placement, provides an assessment of cardiac activity. When sleep-disordered breathing is suspected, an oronasal thermal sensor and nasal cannula pressure transducer are used to detect airflow, respiratory effort is assessed with either esophageal manometry or (more commonly) inductance plethysmography belts around the thorax and abdomen, and measurement of oxyhemoglobin saturation is obtained with finger pulse oximetry. Sensors that measure snoring intensity and track body position through the night are commonly added to the recording montage.

Recording and Analysis

Following patient preparation, impedance checks and biocalibrations are performed to assure signal quality. Ideally, the electrode impedance for facial and scalp electrodes should not exceed 5 kΩ (Iber et al., 2007). Moreover, biocalibrations are a set of instructions delivered to the patient to verify signal quality. Recording system calibration is also undertaken before commencement of the sleep study.

With EEG, EOG, EMG, and ECG, changes in electrical potential are detected from electrodes at the skin surface, with the electrical potential at one site measured in relation to its referent electrode. Physiological signals are amplified, digitized, and then displayed for inspection and analysis. During digitization, signals are sampled at a specific rate (a minimum of 200 Hz is recommended for the recording of EOG, EEG, EMG, and ECG), with low- and high-frequency filter settings used to reduce signal artifact. For EOG, EEG, and EMG, signals are measured and displayed in microvolts, whereas ECG signals are displayed in millivolts.

Standardized scoring guidelines for sleep were first established in 1968 (Rechstschaffen & Kales, 1968) and updated in 2007 (Iber et al., 2007). Separate guidelines for scoring pediatric sleep were included in the 2007 update (Grigg-Damberger et al., 2007; Iber et al., 2007). Scoring of sleep stages occurs in 30-s epochs, with each epoch assigned a specific sleep stage that occupies the majority of the epoch.

Electroencephalographic activity is the primary characteristic that distinguishes sleep stages, with EOG and EMG being essential for the detection of rapid eye movement (REM) sleep. In adults, five distinct stages can be scored: wakefulness (W), stage 1 non-REM sleep (N1), stage 2 non-REM sleep (N2), stage 3 non-REM sleep (N3), and REM sleep (R). Stage W is characterized by a predominance of low-voltage, high-frequency EEG (most often alpha and beta frequency) and eye blinks, with elevated chin EMG activity. In stage N1 sleep, alpha EEG activity transitions to a slightly lower-frequency EEG (typically theta frequency), often accompanied by slow rolling eye movements, vertex sharp waves (sharply negative, transient waveforms distinguishable from background activity), and an attenuation of chin EMG from stage W. Stage N2 sleep is characterized by the presence of K complexes (high-amplitude biphasic waveforms typically $\geq$0.5 s in duration) or sleep spindles (rhythmic bursts of sigma-frequency EEG for $\geq$0.5 s) over a background of low-voltage, high-frequency EEG, along with a lack of EOG activity and further attenuation of chin EMG activity. Sleep is considered to be stage N3 sleep, also known as slow-wave sleep, when $\geq$20% of an epoch contains slow wave activity (delta EEG frequency with amplitude $>$75 μV). Finally, stage R sleep is characterized by low-amplitude, high-frequency EEG activity similar to wakefulness and N1 sleep, but with irregular rapid eye movements and minimal chin EMG activity (Iber et al., 2007).

The duration, percentage of total sleep time, and distribution of sleep stages across the night are typically retained for analysis. In addition, typical parameters measured from PSG-scored sleep include sleep onset latency (i.e., the length of time it takes to fall asleep), wakefulness after sleep onset (i.e., the amount of wakefulness that occurs after initially falling asleep), total sleep time (i.e., the total amount of sleep obtained), and sleep efficiency (i.e., the ratio of time spent asleep to the total duration of attempted sleep). In addition to these traditional measures of sleep, quantitative assessment of the sleep EEG is possible, in which the spectral content of the sleep EEG is decomposed to reveal the power of specific EEG frequency bands.

Additional guidelines are present when assessing respiratory events and periodic limb movements (Iber et al., 2007). An apnea is characterized by a $\geq$90% reduction in airflow for at least 10 s, whereas a hypopnea is defined by a $\geq$30% reduction in airflow for $\geq$10 s with a $\geq$4% decrease in oxyhemoglobin saturation. An apnea that is accompanied by inspiratory effort (as assessed by esophageal manometry or inductive plethysmography) is considered to be obstructive, whereas an apnea without inspiratory effort is classified as a central apnea. An apnea that is without inspiratory effort initially but resumes in the latter portion of the event is considered a mixed apnea. Significant leg movements during sleep are characterized by elevated tibialis anterior EMG activity that lasts for 0.5–10 s that is not immediately preceded or followed by a respiratory event.

Limitations

Despite its recognition as the gold standard for the objective assessment of sleep, there are many situations in which PSG might not be desirable and/or feasible. These include assessment of sleep across multiple nights, 24-h recording of sleep/wake activity, and assessment of a large cohort of patients. Under these conditions, the use of PSG may be excessive in cost, labor, or patient burden. Wrist actigraphy may be an acceptable alternative in these situations.

In addition, the "first night effect" is a well-documented phenomenon in which disturbed sleep is reported when assessed by PSG, presumably due to the discomfort and burden imposed by the numerous wires and electrodes and unfamiliar sleep environment (if conducted in the

laboratory). Although in some research studies this sleep disturbance has been shown to take multiple nights of PSG recording before resolution, most studies address the first night effect by conducting at least two consecutive nights of PSG recording and discarding the data from the first night in subsequent analyses.

Although considered an objective measure of sleep, the scoring of PSG is subject to human influence and therefore some degree of subjectivity. Although most sleep laboratories employ trained polysomnographic technicians to evaluate sleep studies, significant between-technician variation is possible. For that reason, quantitative EEG, an automated procedure in which the spectral content of the sleep EEG is analyzed across multiple frequency bandwidths, may provide unique information.

Cross-References

- ▶ Brain Wave
- ▶ Non-REM Sleep
- ▶ REM Sleep
- ▶ Sleep
- ▶ Sleep and Health
- ▶ Sleep Apnea
- ▶ Sleep Architecture

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Polyunsaturated Fats

▶ Fat, Dietary Intake

Polyunsaturated Fatty Acids

▶ Fat: Saturated, Unsaturated

Population Health

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Definition

Population health is a general approach to assessing and managing health at the level of the whole population. Reduction of health-care inequities, prevention of illness, and contextual improvement are all central objectives of the population health approach.

Description

Population health is an approach that aims to improve the health of entire population with an emphasis on understanding and decreasing health inequities among groups of people within the population (Hertzman, Frank, & Evans, 1994). This approach deviates from a traditional biomedical approach that focuses treatment at an individual level and instead targets group-level phenomena through the implementation of broad-based and widely diffusible health interventions (Jeffery, 1989; Rose, 1985). Rather than focusing on treating illnesses after they emerge, population health interventions are characterized by a strong emphasis on primary prevention, or preventing illness before it develops. As such, modifiable risk factors for illness are a common focus of population health intervention such as smoking, obesity, high blood pressure, physical inactivity, and unhealthy diet as well as preventable disease such as heart disease, stroke, certain cancers, and diabetes (Wanless, 2003).

A defining feature of population health is an emphasis on upstream determinants of illness rather than proximal causes (Hawe, 2007; Link & Phelan, 1995). For example, it has been established that cigarette smoking is associated with myriad negative health consequences. A population health approach would seek to elucidate the conditions and factors upstream that put individuals at greater risk of smoking (e.g., low education levels, low income levels, peer group influence). By identifying upstream determinants of illness, population health interventions are developed that can target these more distal factors.

The population health approach considers health status as a product of a diverse range of factors that include, but are not limited to, individual behavior and life-style; biological and genetic factors; early development; the physical, social, and economic environment; and the health-care system itself (Evans & Stoddart, 1990; Kindig & Stoddart, 2003). Rather than viewing these influences as distinct and individual causes of illness and/or health, these and any other health-determining factors are viewed to interact with each other to determine health.

Population health research has highlighted social conditions as a particularly important determinant of health (Link & Phelan, 1995; Marmot, 2003). Socioeconomic status (SES), a measure of income and social position, has received a significant amount of attention. A robust association exists that suggests that those relatively higher on the socioeconomic gradient tend to experience better health and a longer life expectancy than those lower on the gradient (Hertzman et al., 1994; Lynch, Smith, Kaplan, & House, 2000). Due to the emphasis on minimizing inequities in health, a central focus of population has been to determine the nature of the SES-longevity relationship and how to mitigate it.

Because population health research seeks to impact the greatest number of people possible, interventions based on population health research are often implemented through policy, but also include media campaigns that serve to educate and make individuals aware of certain health-protective behaviors while warning of health-risk behaviors (Hawe, 2007). Population health interventions can also be delivered as programming in settings such as schools, churches, and workplaces. Moreover, when considering the diverse array of determinants of health, population health interventions have the potential to span different sectors not traditionally associated with health intervention (i.e., public transportation, education, agriculture, urban planning) to address a particular health issue.

A criticism of the population health approach is that while biomedical approaches to health care provide tailored treatment for individuals with specific health conditions, population health interventions generally work in a broad stroke manner targeting groups of individuals for whom intervention may not be necessary or beneficial. For example, using data from the Framingham Heart Study, Rose (1985) calculated that even a 10 mmHg lowering of the blood pressure distribution of a population could result in 30% reduction in mortality attributed to blood pressure. Though this may be potentially beneficial for the overall health of a population, this may provide little personal benefit to each individual. This has been termed the "prevention paradox" (Rose).

Despite this, Rose (1985) notes that population strategies can be powerful in their influence. Given that population health approaches are concerned with affecting large groups of people, they have the capacity to change social norms so that a health-risk behavior becomes less socially acceptable, or alternatively, that a health-protective behavior becomes more accepted.

Cross-References

- ▶ Health Promotion
- ▶ Public Health

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Population Health Monitoring or Tracking

- ▶ Mental Health Surveillance

Population Stratification

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Definition

Often an apparently homogenous population group contains subgroups that are genetically distinct. These subgroups may have allele frequency differences due to systematic ancestry differences. Such population structure is known as population stratification.

Description

The mixture of groups of individuals with different allele frequency, i.e., heterogeneous genetic backgrounds, undermines the reliability of

association testing results. The assumption of population homogeneity in association studies may not always be true, and violation of the assumption can result in statistical errors. Genetically distinct population subgroups, possibly resulted from interbreeding of two different population groups, can exhibit disequilibrium between pairs of unlinked loci which may create confounding or spurious associations. Therefore, it becomes important to find and quantify genetically distinct subgroups within a population group. Various techniques including principal component analysis have been successfully used to quantify population stratification.

Cross-References

- ▶ Allele
- ▶ Gene
- ▶ Genetics
- ▶ Genome-Wide Association Study (GWAS)

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Population-Based Study

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Definition

Population-based studies aim to answer research questions for defined populations. Answers should be generalizable to the whole population addressed in the study hypothesis, not only to the individuals included in the study. This point addresses the point of external validity of the findings. Therefore, the valid definition as well as the reliable and valid identification of populations in which research questions for specific populations can be studied is the most important issue in population-based studies.

Population-based studies may include a variety of study types. They may include case–control studies, cross-sectional studies, twin studies, or prospective and retrospective cohort studies. The important issue is the selection of the individuals that are included into the study – they should be representative of all individuals in the a priori defined specific population.

For example, in a population-based prospective cohort study, in which an association between a specific exposure and a specific outcome (i.e., the onset of a certain disease) is studied, all individuals sampled for the study should be representative for the addressed population. This means that the individuals under exposure and non-exposure should be identified within the same population. They should differ only on the exposition factor. Likewise, in a population-based case–control study, cases and controls should be also identified in the same population.

Otherwise, differences between cases and controls can be attributed to different population characteristics.

Cross-References

- ▶ Cohort Study
- ▶ Follow-Up Study

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Positive Affect

- ▶ Happiness and Health

Positive Affect Negative Affect Scale (PANAS)

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Synonyms

Positive and negative affect schedule

Definition

The Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988) is one of the most widely used scales to measure mood or emotion. This brief scale is comprised of 20 items, with 10 items measuring positive affect (e.g., excited, inspired) and 10 items measuring negative affect (e.g., upset, afraid). Each item is rated on a five-point Likert Scale, ranging from $1 =$ *Very Slightly or Not at all* to $5 =$ *Extremely,* to measure the extent to which the affect has been experienced in a specified time frame. The PANAS was designed to measure affect in various contexts such as at the present moment, the past day, week, or year, or in general (on average). Thus, the scale can be used to measure state affect, dispositional or trait affect, emotional fluctuations throughout a specific period of time, or emotional responses to events.

The PANAS is based on a two-dimensional conceptual model of mood, where the full range of affective experiences are reflected along two broad dimensions of positive mood (i.e., extent to which one is experiencing a positive mood such as feelings of joy, interest, and enthusiasm) and negative mood (i.e., extent to which one is generally experiencing a negative mood such as feelings of nervousness, sadness, and irritation). Importantly, the PANAS was developed to provide a brief scale that measures positive and negative affect as separate and largely uncorrelated constructs, such that one can experience both positive and negative emotions simultaneously. Both the positive and negative affect scales have good internal consistency, with Chronbach's alpha $\geq .84$ for each scale across multiple time frames. The scales also demonstrate good convergent and discriminant validity. The two-factor structure of the PANAS has been examined extensively and appears to be robust across different populations and temporal instructions.

Other versions of the PANAS have been developed. The PANAS-X is an extended version of the PANAS that may be used when more discrete measures of specific affective experiences are necessary. The PANAS-X includes 60 items that measure not only the two higher order scales (positive affect and negative affect), but also specific affects (joviality, self-assurance, attentiveness, fear, hostility, guilt, sadness, shyness, fatigue, serenity, and surprise). The I-PANAS-SF (International-PANAS-Short Form)

contains 10 items to measure positive and negative affect, and was developed to reduce redundancy or eliminate ambiguous meanings of some of the original PANAS terms. The PANAS-C is a child version of the PANAS; emotion terms were altered and instructions were simplified for use in childhood populations. Finally, the PANAS has also been translated into other languages, such as Japanese and Spanish.

Cross-References

- ▶ Affect
- ▶ Emotions: Positive and Negative
- ▶ Mood

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Positive Affectivity

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Synonyms

Pleasant affect; Positive emotion

Definition

Positive affect can be described as the experience of a set of emotions reflecting pleasurable engagement with the environment. Positive affect reflects neither a lack of negative affect, nor the opposite of negative affect, but is a separate, independent dimension of emotion (Watson & Tellegen, 1985). It may be exhibited as either a trait-like variable, typically referred to as *positive affectivity*, or as a state-like variable (Watson, 2002). Research on positive affectivity has focused on associations with beneficial coping mechanisms, increased cognitive flexibility, and certain health benefits and improved outcomes.

Description

Watson and Tellegen (1985) presented a two-factor model of mood and affect, in which high levels of positive affect reflect enthusiastic, active, and alert mood states. They contrast this to negative affect, which includes aversive mood states, such as anger, guilt, nervousness, and fear. They suggest that a lack of positive affect reflects sadness and lethargy, whereas a lack of negative affect reflects calmness and serenity. Alternately, positive affect has been conceptualized as including positive emotions that reflect both high and low levels of energy and activation, including

joy, interest, contentment, and love (Fredrickson, 1998). Positive affectivity (i.e., the trait-like disposition to experience positive affect) has been found to relate to the personality variable of extraversion (Lucas & Fujita, 2000), which is one broad factor in the Five Factor Model of personality. This trait is most frequently measured via the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Lack of positive affect is considered central in the development and maintenance of depressive disorders (Watson et al., 1995); in fact, a highly effective treatment for depression utilizes behavioral activation to target anhedonia and induce positive experiences, which in turn increases positive affect (Jacobson et al., 1996).

Fredrickson's (1998) Broaden and Build Model of positive affect posits that positive emotion broadens individuals' awareness, encouraging creative, flexible, and exploratory thoughts and actions. She suggests that positive emotions serve an evolutionary function by expanding physical, intellectual, and social resources, enhancing overall well-being and health. Empirical research finds that individuals with induced positive, but not negative, affect experienced broader scope of attention and more a varied repertoire of potential action (Fredrickson & Branigan, 2005). Neuropsychological research has supported positive affect's beneficial influence on cognition. Specifically, positive affect enhances consolidation of long-term memory, working memory, and creative problem solving, potentially via an increase in brain dopamine levels (Ashby, Isen, & Turken, 1999).

The influence of positive affectivity on health and health processes has been extensively examined (see Pressman & Cohen, 2005). Positive affectivity is consistently and prospectively linked to lower reports of pain, fewer symptoms, and better self-rated heath. Positive affectivity is also associated with reduced morbidity from illness, including reduced risk of stroke incidence (Ostir, Markides, Peek, & Goodwin, 2001), and reduced risk of infection in healthy adults (Cohen, Doyle, Turner, Alper, & Skoner, 2003); however, less consistent evidence has been found in mortality and survival studies. Positive affectivity is thought to influence health either through a main effect model, in which positive affect directly affects physiological processes and/or coping behavior, or through a stress-buffering model, in which positive affectivity influences health by ameliorating potentially harmful influences of stressful life events on health.

The recent increase in research on positive affectivity can be associated with the rise of interest in Positive Psychology, which examines the science of positive human functioning (see Seligman & Csikszentmihalyi, 2000).

Cross-References

- ▶ Emotions: Positive and Negative
- ▶ Negative Affectivity
- ▶ Positive Affect Negative Affect Scale (PANAS)
- ▶ Positive Psychology

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Positive and Negative Affect

▶ Emotions: Positive and Negative

Positive and Negative Affect Schedule

▶ Positive Affect Negative Affect Scale (PANAS)

Positive By-Products

▶ Perceived Benefits

Positive Changes

▶ Perceived Benefits

Positive Emotion

▶ Positive Affectivity
▶ Happiness and Health

Positive Emotions

▶ Well-Being: Physical, Psychological, Social

Positive Meaning

▶ Perceived Benefits

Positive Psychology

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Definition

Positive psychology, the scientific study of positive phenomena from the neurobiology of positive emotions to application in the clinic and in everyday life, encompasses multiple efforts to understand and promote well-being and health (Aspinwall & Staudinger, 2003; Aspinwall & Tedeschi, 2010; Lopez & Snyder, 2009; Ryff & Singer, 1998; Seligman & Csikszentmihalyi, 2000). Key elements include (a) the identification of human strengths (qualities and processes that allow people to navigate adversity, pursue their goals, and make the most of life) and (b) empirical research directed toward understanding the diverse conditions that create and sustain such strengths. These processes have been investigated in a wide variety of domains, including education, social development, close relationships, aging, work, and health.

Description

Core Concerns of Positive Psychology and Health

Positive psychology is an active and growing field, with thousands of published articles in the

last decade, two major handbooks, a new *Encyclopedia of Positive Psychology*, a specialized journal (the *Journal of Positive Psychology*), and several edited volumes, journal special issues, and international conferences devoted to this topic. Within this voluminous literature, there are three main areas that examine the relationship of positive phenomena to physical health: (a) psychological adaptation to illness, (b) the impact of positive phenomena, such as positive mood, optimism, and hope, on physical health, and (c) interventions that use insights from this research to improve well-being in general and among people managing serious illness.

Understanding Psychological Adaptation to Illness

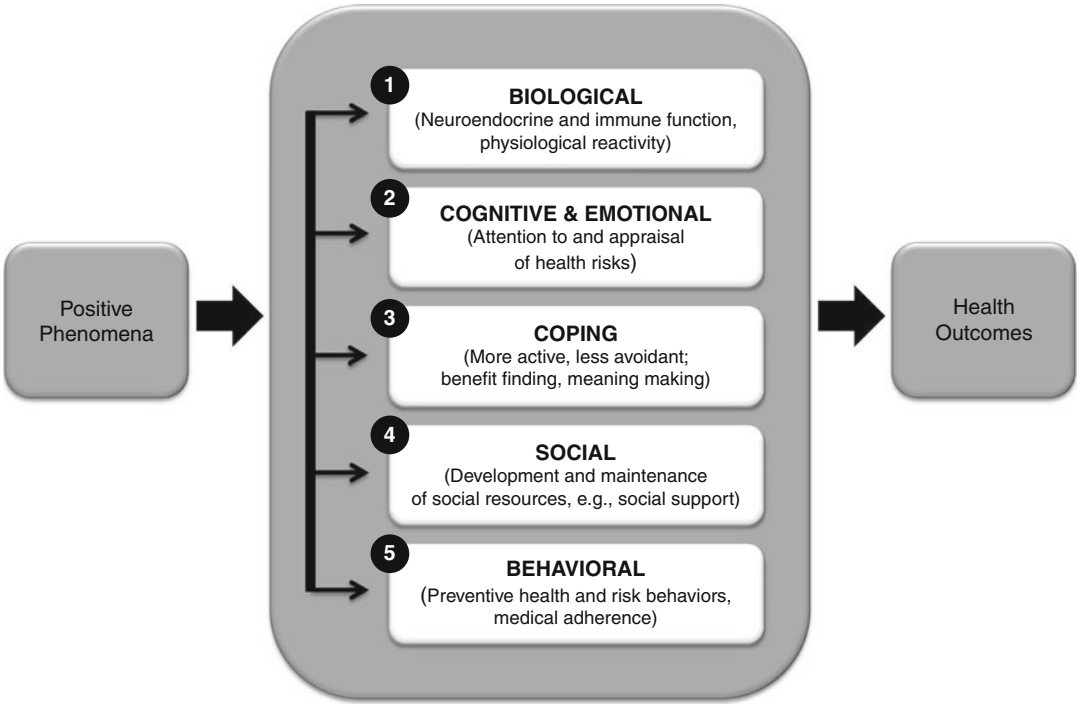
Multiple lines of research have examined the impact of negative life events, including serious illness, on people's beliefs about themselves, the benevolence of others, personal control, and views of the future. In general, research suggests that people who have experienced serious illness or other forms of adversity frequently report *both* positive and negative life changes. Frequently reported positive changes include a better sense of one's values and priorities, stronger social relationships, and an enhanced appreciation for life. Negative changes include fears for the future and feelings of personal vulnerability. Such changes are understood by many researchers to be the product of active efforts to manage and derive meaning and/or benefit from one's circumstances (Folkman, 2011; Taylor, 1983). Exciting developments in this line of research have related finding meaning and/or benefit to subsequent physical health outcomes, such as immune function (Park, Lechner, Antoni, & Stanton, 2009; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000).

As exciting as these findings are, it is important to understand their boundary conditions. In particular, not all events produce benefits or growth or do so for all people. Some particularly challenging events (severe interpersonal stressors, wartime experiences) seem to defy meaning-making coping. Further, large-scale longitudinal panel studies of life satisfaction following long-term unemployment and divorce suggest that people may not, on average, fully adjust to these events. Finally, there appear to be multiple "normal" responses to adversity. A recent advance in this area – made possible by rigorous prospective longitudinal studies of bereavement (Bonanno, 2004) – is the recognition that there may be multiple trajectories of mental health outcomes following adversity, with many respondents reporting stable good or even improving outcomes and a subset of respondents reporting either enduring preexisting distress or new elevations in distress. These different patterns of adjustment over time highlight the need to understand the antecedents and processes that account for them. The finding that there is considerable variation in response to adversity also suggests that global positive outcomes (e.g., "Cancer was the best thing that ever happened to me") may be true for some people, but may grossly misrepresent the experiences of others.

Understanding the Relation of Positive Phenomena to Physical Health

Although most research in positive psychology focuses on psychological well-being, there is increasing interest in the relation of such concepts as optimism, hope, positive affect, gratitude, benefit finding, and growth to physical health. Several recent meta-analyses suggest that positive phenomena show a reliable prospective beneficial relationship to multiple health outcomes, including longevity, in both healthy and ill samples (Diener & Chan, 2011; Howell, Kern, & Lyubomirsky, 2007; Pressman & Cohen, 2005; Rasmussen, Scheier, & Greenhouse, 2009). Importantly, this relationship is (a) not explained by the detrimental effects of either negative emotions or pessimistic expectations and (b) comparable in magnitude to that of these more widely studied negative phenomena. At present, the findings seem to be stronger for healthy samples than among people managing illness, and the strength of the findings varies by disease, with stronger and more encouraging findings for cardiovascular disease and HIV than for cancer mortality.

Researchers have examined multiple complementary pathways through which positive phenomena are related to health outcomes



Positive Psychology, Fig. 1 Five mutually interactive and complementary sets of pathways through which positive phenomena, such as positive mood and optimism, may influence human health

(Aspinwall & Tedeschi, 2010). Five sets of pathways are shown in Fig. 1. The first set of pathways involves direct relations to neuroendocrine and immune functions implicated in the etiology and progression of disease, as well as physiological reactivity to laboratory stressors. A second and third set of pathways involve the relation of positive phenomena to multiple aspects of attending to, appraising, and coping with health-risk information and the demands of serious illness, including the benefit-finding and meaning-making processes described earlier. A fourth set of pathways involves the relationship between positive phenomena and the development and maintenance of supportive social ties, especially during times of illness or other adversity. The fifth pathway represents the relationship of positive phenomena to the practice of preventive health behaviors, such as good nutrition, exercise, and sleep; the decreased practice of risk behaviors, such as substance abuse; and improved medical adherence.

Recent findings from the Women's Health Initiative illustrate the multiple pathways through which positive phenomena may influence health outcomes. In an 8-year prospective study of coronary heart disease in a sample of more than 97,000 US women, ages 50–79 (Tindle et al., 2009), dispositional optimism was found to prospectively predict decreased risk for coronary heart disease and all-cause mortality in the overall sample. Optimism also predicted lower cancer-related mortality for African-American women, but not Caucasian women. Compared to pessimists, optimists were less likely to have diabetes, hypertension, high cholesterol, or depressive symptoms; they were less likely to smoke, be sedentary, or be overweight; and they reported higher education and income, greater employment and health insurance, and greater religious attendance. However, the real kicker is that controlling for *all* of the above factors, optimism still predicted better health outcomes. These findings suggest that there is much that

remains to be understood about the relationship of positive beliefs to important health outcomes and that the multiple pathways outlined in Fig. 1 and described in the following sections may be implicated in such findings.

1. *Biological pathways*. At present, more is known about the prospective relationship of positive phenomena to diverse health outcomes than about the specific pathways through which these outcomes are realized. Most studies have focused on cardiovascular, neuroendocrine, and immune function. Both experimental laboratory studies and field experiments link the induction of positive self-beliefs to reduce cardiovascular and neuroendocrine reactivity to evaluative stressors and to more rapid recovery from induced negative states among healthy young adults. Recent reviews link optimism to improved immune function, both among healthy people managing naturalistic stressors such as law school entry and among people managing HIV infection. These lines of research have also identified some potential short-term physiological costs associated either with optimists' active coping efforts or with the relatively intense positive affect inductions used to study physiological outcomes in laboratory settings (Pressman & Cohen, 2005). However, these authors also noted that these costs were not seen in naturalistic ambulatory studies where positive affect was associated with health-protective responses. Many researchers have attributed the health-protective findings of optimism and positive mood to reductions in perceived stress, highlighting the importance of such appraisals in understanding how positive phenomena are related to health outcomes.
2. *Attention to and appraisal of threatening health information*. In contrast to the idea that being happy or optimistic reduces awareness of negative realities (e.g., seeing one's world through "rose-colored glasses"), several experiments have demonstrated that induced positive affect or positive self-beliefs (e.g., through self-affirmation or success manipulations) promote constructive attention to negative information about health risks and personal weaknesses when the information is relevant to the self and said to be useful (Aspinwall & Tedeschi, 2010). Similar findings have been obtained for dispositional optimism. Interestingly, this greater attention to negative information does not appear to be in the service of downplaying its negativity or relevance to the self, but instead appears to be strongly responsive to its potential value in warding off or managing future negative events. The ability to adaptively confront, manage, and remember such information may have beneficial links to both coping and health behavior.
3. *Coping with serious illness*. A large literature suggests that positive affect and optimism promote constructive methods of coping with adversity, involving planning, information-seeking, suppression of competing activities, and seeking both instrumental and emotional social support (Aspinwall & Tedeschi, 2010). Notably, positive beliefs are consistently inversely associated with deleterious forms of avoidant coping, such as denial, mental and behavioral disengagement, and substance use. Researchers have argued that the tendency toward active, engaged forms of coping with adversity shown in pathway #3 and the ability to attend to negative information shown in pathway #2 may work together to promote a more informed understanding of actual or potential stressors. The term "upward spiral" has been used to characterize such processes.
4. *Development and maintenance of social resources*. Recent meta-analytic evidence suggests that positive affect plays a major role in the maintenance of satisfying social relationships (Lyubomirsky, King, & Diener, 2005). Specifically, people who report frequent positive affect also report a greater number of – and more satisfying – social relationships. Similarly, college students who reported greater optimism on arrival to college reported both greater initial friendship network size and greater increases in perceived social support over the course of their first semester, and

these social ties buffered distress at the end of the semester. Existing evidence suggests that there may be more at work in such findings than the idea that it is pleasant to be around people in a good mood. People in a good mood seem better able to understand the goals and priorities of their interaction partners, to express more gratitude, and to be more likely to help others than people in a neutral mood. These particular processes suggest that an important direction for future research and intervention might be to examine these processes among people managing illnesses and other demands such as caregiving that are known to tax social resources over time.

5. *Health behaviors and medical adherence*. An emerging literature suggests that positive beliefs and states are robust prospective predictors of better health behavior, including diet, exercise, and sleep, and lower practice of risk behaviors, such as substance abuse (Aspinwall & Tedeschi, 2010). These findings have been obtained both in healthy community samples, including large samples of older adults, and among people managing serious illnesses, such as HIV infection. In contrast, prospective studies link negative beliefs, such as pessimism and fatalism, to the practice of a wide range of health-risk behaviors, including substance abuse and high-risk sexual behavior. Understanding how positive beliefs like hope and optimism are related to the practice of inherently forward-looking behaviors, like preventive health behavior, remains an important research question. Researchers are also starting to examine how positive phenomena may be related to behavior change and medical adherence. Although it is well known that negative affect and interpersonal stressors contribute to relapse from behavior change efforts in multiple domains, the question of whether and how positive phenomena may have facilitative effects needs further investigation. With respect to medical adherence, randomized controlled trials of interventions in hospital settings demonstrate that increasing patients' optimism about the success of cardiac rehabilitation improves outcomes like angina symptoms and return to work.

Summary and Remaining Conceptual Questions. This section outlined five sets of pathways through which positive feelings and beliefs may influence physical health. These multiple pathways are complementary, rather than competing, and are likely to work in concert (Aspinwall & Tedeschi, 2010). Specifically, the ability to maintain attention to negative information about health risks may work in tandem with more active forms of coping that are more likely to elicit information about one's situation and support for managing it. Similarly, finding benefits and growth in one's experience and maintaining supportive social ties may each be related to subsequent health behaviors in important ways. Research that examines the interplay of these different pathways will likely yield not only a more complex account of the ways in which positive phenomena may be linked to human health but also an understanding of some of the cumulative benefits that may result.

Interventions to Promote Health and Well-Being

Interventions derived from the principles and pathways reviewed here have been employed to promote well-being in healthy samples, as well as psychosocial adjustment to chronic illness (Folkman, 2011; Park et al., 2009). For example, a burgeoning literature on the kinds of experiences that make people happy and the processes that contribute to hedonic adaptation both to positive and negative events have been usefully employed in interventions to improve daily positive affect, primarily in healthy samples. For people living with chronic illnesses like diabetes, various interventions ranging from writing about one's positive experiences to multiple-component programs have proved effective in enhancing positive affect, at least in laboratory settings. Experimental interventions to increase hope and gratitude have also been shown to improve reported pain tolerance and physical symptoms, respectively. Finally, although they were not conducted under the rubric of positive psychology, psychosocial interventions to provide social support and reduce stress among

people managing serious illness suggest that such interventions reliably reduce pain and anxiety and improve quality of life (Aspinwall & Tedeschi, 2010; Park et al., 2009). Understanding how the various pathways suggested here may be implicated in such effects – and used to enhance them – among people managing serious illness remains an important goal for future research.

Controversies with Respect to Both Theory and Application

The study of how positive phenomena – especially positive thinking – are related to health has generated both academic and cultural controversies (Aspinwall & Staudinger, 2003; Aspinwall & Tedeschi, 2010; Becker & Marecek, 2008; Lazarus, 2003). Researchers have questioned whether the focus on positive or optimal human functioning is new or sufficiently distinctive or developed to merit a special name as a new field; whether separating positive phenomena from negative phenomena is practicable, desirable, or meaningful (e.g., coping with adversity may inherently involve both); and whether the field focuses too much on the individual as the unit of analysis at the neglect of important social, cultural, economic, structural, and environmental determinants of health and well-being. With respect to positive psychology and health, critics have questioned (a) whether the field is too narrowly focused on individual positive feelings and self-beliefs as the primary outcomes of optimal human functioning; (b) whether the promotion of positive thinking among those managing serious illness may be trivial, distracting, and ultimately useless; and (c) whether positive thinking might actually be actively harmful if it impairs attention to negative aspects of experience or contributes to a culture of blame for individual misfortune.

Several critics (as well as the present authors) have traced the history of these ideas to the New Thought movement and subsequent popular efforts to promote health, well-being, and financial success through positive thinking (e.g., *The Power of Positive Thinking, The Secret*; see Aspinwall & Tedeschi, 2010, for discussion). With respect to the application of positive psychology to understanding health and illness, a primary concern – reflected more in critiques of the popular self-help literature on positive thinking than in scientific discourse on these issues – is the potential misuse of findings suggesting that positive emotions and beliefs may predict physical health and recovery from illness. Specifically, the demonstration that a positive attitude (e.g., optimism or hope) is linked to better health outcomes for some people in some situations may create, or be used to promote, unrealistic expectations about the ability to cure disease through positive thinking. Similarly, the demonstration that some people with serious illness report benefits and growth can be misconstrued to suggest that all people should do so, all of the time and regardless of circumstance. These pressures to maintain uniformly positive thoughts and feelings and to ascribe deteriorating health to failures of positive attitude have been described as "saccharine terrorism" and the "tyranny of optimism." While researchers have in general been quite careful not to mandate positive feelings among people dealing with adversity (and in fact have documented the presence of both positive and negative life changes and multiple trajectories of adjustment), various popular treatments have promoted the notion that an exclusive focus on positive thoughts and feelings will cure illness. Some critics aptly note that this approach is particularly prevalent – and pernicious – in popular treatments of cancer survivorship (Aspinwall & Tedeschi, 2010).

Conclusion

As scientific research on the relationship of positive phenomena to health proceeds, rigorous process-oriented research should dispel the notion that there is some kind of magic bullet to be found in positive thinking. Continued examination of the multiple biological, cognitive, emotional, social, and behavioral pathways linking positive phenomena to health is essential. Further, researchers interested in a balanced understanding of the link between positive phenomena and health outcomes should continue to design studies that are sensitive to both potential benefits and liabilities of

particular kinds of positive (and negative) thoughts and feelings in different situations (Aspinwall & Staudinger, 2003; Aspinwall & Tedeschi, 2010). Indeed, what the study of health and illness has to offer positive psychology is the opportunity to examine the multiple ways in which positive and negative phenomena may go hand in hand as people manage serious illness and its treatment.

Cross-References

- ▶ Adherence
- ▶ Aging
- ▶ Behavior Change
- ▶ Benefit Finding
- ▶ Bereavement
- ▶ Cancer Survivorship
- ▶ Cardiac Rehabilitation
- ▶ Cardiovascular Disease
- ▶ Coping
- ▶ Coronary Heart Disease
- ▶ Denial
- ▶ Diabetes
- ▶ Exercise
- ▶ Fatalism
- ▶ Hypertension
- ▶ Immune Function
- ▶ Longevity
- ▶ Meta-Analysis
- ▶ Mortality
- ▶ Nutrition
- ▶ Optimism
- ▶ Overweight
- ▶ Perceived Benefits
- ▶ Pessimism
- ▶ Physiological Reactivity
- ▶ Sexual Risk Behavior
- ▶ Sleep
- ▶ Stressor
- ▶ Substance Abuse
- ▶ Well-Being

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Positron Emission Tomography (PET)

▶ Brain, Imaging
▶ Neuroimaging

Posterior Hypothalamic Area

▶ Hypothalamus

Postpartum Blues

▶ Postpartum Depression

Postpartum Depression

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Synonyms

Major depressive disorder; Postpartum blues

Definition

Postpartum depression is moderate to severe depression in a woman after she has given birth. It may occur soon after delivery or up to a year later. Most of the time, it occurs within the first 3 months after delivery.

Description

Major depressive disorder with a postpartum onset (PPD) is a prevalent and serious disorder. Postpartum major depression (PPMD) is moderate to severe depression in a woman after she has given birth, clinically resembling major depression as described in DSM-IV. Feelings of anxiety, irritation, tearfulness, and restlessness are common in the week or two after pregnancy. These feelings are often called the postpartum blues or "baby blues." These symptoms almost remit without the need for treatment. Postpartum depression may occur when the baby blues do not fade away or when signs of depression start 1 or more months after childbirth. Up to 20% of women will have an initial major depressive episode within the first 3 month postpartum (Gavin et al., 2005), with the risk of suffering recurrent postpartum major depression (PPMD) at about 25% (Wisner, Perel, Peindl, & Hanusa, 2004). Women are at the highest risk during their lifetimes for depressive episodes during the childbearing years (O'Hara, Zekoski, Philipps, & Wright, 1990).

PPMD is considered a serious public health concern (Gaynes et al., 2005; Wisner, Chambers, & Sit, 2006). The maternal role, which is vital to the infant's safety, survival, and well-being (Logsdon, Wisner, & Pinto-Foltz, 2006), can be compromised by PPMD. Children of mothers with PPMD are at an increased risk of impaired mental and motor development, poor self-regulation, and behavior problems (Moehler, Brunner, Wiebel, Reck, & Resch, 2006). Postpartum depression and its consequences can persist from months to years after childbirth, with lingering limitations in physical and psychological functioning after recovery from depressive episodes (Burt & Stein, 2002; Marcus & Heringhausen, 2009; McCarter-Spaulding & Horowitz, 2007).

A myriad of factors contribute to the etiology of both incident and recurrent PPMD (Beck, 2001; Bloch, Daly, & Rubinow, 2003; Gaynes et al., 2005). Among the established risk factors, previous episodes of depression, family history of depression, and depressive symptomatology during pregnancy (O'Hara, Schlechte, Lewis, & Varner, 1991; O'Hara, Schlechte, Lewis, & Wright, 1991) are the strongest predictors for both incident and recurrent episodes. Demographic variables, including marital status, race, age, and socioeconomic status, have also been

implicated as risk factors (Beck, 2001; Ross, Campbell, Dennis, & Blackmore, 2006). Unfortunately, these recognized risk factors have proven inadequate at predicting which women will have a recurrent episode. Other risk factors that have been identified include the following: (1) age below 20 years; (2) currently abusing alcohol, taking illegal substances, or smoking (these also cause serious medical health risks for the baby); (3) having an unplanned pregnancy, or have mixed feelings about the pregnancy; (4) a stressful event during the pregnancy or delivery, including personal illness, death or illness of a loved one, a difficult or emergency delivery, premature delivery, or illness or birth defect in the baby; (5) little support from family, friends, or the significant other.

Disturbed sleep during late pregnancy represents another potential risk factor for PPMD. Several investigators report that disturbed sleep is a prodromal symptom of both first onset and recurrent depressive symptoms and/or episodes outside of the postpartum (Ford & Kamerow, 1989) as well as during the postpartum (Coble et al., 1994; Wolfson, Crowley, Anwer, & Bassett, 2003). Recently, Okun and colleagues showed that poor sleep quality in late pregnancy (Okun, Hanusa, Hall, & Wisner, 2009) as well as in the first 8 weeks postpartum (Okun et al., 2011) significantly contributed to recurrent PPMD. Wolfson and colleagues noted that women reporting more sleep disturbances in late pregnancy are more likely to have clinically significant depressive symptomatology at 2–4 weeks postpartum than those with few sleep disturbances (Wolfson et al., 2003). Coble and colleagues found that women with a history of depression had more sleep disturbances throughout pregnancy and into the postpartum than women without a history of depression (Coble et al., 1994). Taken together, these findings suggest that sleep disturbances in late pregnancy increase vulnerability to PPMD, particularly in women who are susceptible, such as those with a history of PPMD (Wisner, Parry, & Piontek, 2002).

There are two identified biological systems attributed to have an effect on the risk of developing PPMD. First are endocrine factors. Hormones such as progesterone, estradiol, prolactin, and cortisol peak during the last few weeks of pregnancy, followed by a drastic drop in their levels following delivery and into the early postpartum period (Abou-Saleh, Ghubash, Karim, Krymski, & Bhai, 1998). Dramatic drops in hormone concentrations, especially progesterone and the estrogens, likely contribute to postpartum depression (Abou-Saleh et al., 1998; Bloch et al., 2003); however, their specific role is unclear. Administration of estrogens to postpartum women appears to reduce depressive symptoms (Dennis, 2004). However, the dramatic reduction in concentrations of gonadal steroids after delivery does not lead to PPMD in all women (Bloch et al., 2003).

The second pathway involves alterations in the cytokine milieu (Bloch et al., 2003; Maes et al., 2000). The "cytokine hypothesis of depression" states that both the etiology and pathophysiology of depression are linked to dysregulation of inflammatory cytokines (Maes, 1994). Puerperal women may be particularly vulnerable because inflammatory cytokines increase significantly during the last trimester of pregnancy in preparation for delivery (Romero et al., 2006). Women who report increased depressive symptoms in the postpartum have corresponding higher levels of pro-inflammatory cytokines (Maes et al., 2000).

PPMD is a significant health concern. While there is no single test to diagnose PPMD, it is imperative for a woman to be evaluated if there is any indication that she has signs of depression or risk for depression. This will buttress not only her own mental and physical health, but the health of her baby.

Cross-References

- ▶ Antidepressant Medications
- ▶ Women's Health

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Posttraumatic Growth

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Synonyms

Adversarial growth; Benefit finding; PTG; Stress-related growth; Transformational coping

Definition

Posttraumatic growth is the experience of positive change after a traumatic or negative life

event. It is theorized to be the positive or adaptive outcome of a meaning-making process in which individuals are forced into a reevaluation process of their worldviews after experiencing a negative or life-changing event. Through this reevaluation process, some individuals may develop a more coherent understanding of themselves and the world. Common examples of growth after trauma include changes in life values, improved relationships with family and/or friends, growth in spiritual beliefs, and increased personal strength, empathy, or patience.

Description

The concept of growth from adversity is an ancient concept based in many religions and philosophical systems. However, it has been a formal focus of investigation in psychology only in the past few decades, coinciding with the development of psychometrically sound measures and the rise of positive psychology. The fields of health psychology and behavioral medicine, in particular, have latched onto the notion that one may experience positive change in response to adversity, including the adversity of coping with serious health threats and illnesses. For example, research on posttraumatic growth has been carried out in chronic illness populations such as patients with heart disease, cancer, rheumatoid arthritis, HIV/AIDS, and multiple sclerosis. It has also been studied in the context of veterans of war, victims of violence, bereavement, and family members/caregivers of those experiencing a negative life event.

Posttraumatic growth is conceptually very similar to benefit finding and stress-related growth, and these terms are often used interchangeably in the research literature. Multiple measures have been developed, which have facilitated the rigorous study of posttraumatic growth and related constructs. These scales include: benefit finding (Mohr et al., 1999; Tomich & Helgeson, 2004); Stress-Related Growth Scale (Park et al., 1996); and the Posttraumatic Growth Inventory (Tedeschi & Calhoun, 1996). Posttraumatic growth is differentiated from concepts such as resilience and hardiness, in which one may cope or adjust well in response to stress rather than experience positive transformation and an *improvement* in functioning, quality of life, or worldview. Posttraumatic growth is also conceptually differentiated from optimism because it reflects a change in experience rather than a dispositional trait, although the two constructs have been shown to be correlated.

Posttraumatic growth has been associated with adaptive coping processes including heightened problem-focused coping, social-support seeking, acceptance and positive reinterpretation, optimism, religion, cognitive processing, and positive affect. It has often been associated with better illness adjustment and health outcomes, less depression, and more positive well-being in chronic illness populations. Although the prevalence of posttraumatic growth varies widely from study to study, numerous studies suggest a majority of research participants endorse some type of growth from a negative or traumatic event.

Although research suggests that posttraumatic growth is associated with improved functioning and quality of life, there have been conflicting reports. Some studies report nonsignificant or even negative correlations between posttraumatic growth and well-being. These inconsistencies have driven researchers to more rigorously test proposed theories of posttraumatic growth and better clarify the processes by which posttraumatic growth occurs. More meticulous study has led to investigation of non-transformational change, mediators, moderators, and study of curvilinear associations between posttraumatic growth and well-being. Further elaboration on the theory of posttraumatic growth has led to studies on whether posttraumatic growth is the outcome of a series of life changes that have occurred or whether it is a cognitive process of reevaluation and understanding that unfolds over time. Researchers are also investigating whether posttraumatic growth reflects genuine changes in one's life (veridical growth) or whether it reflects perceptions of change or growth (non-veridical growth). Some have suggested that non-veridical growth may even reflect a maladaptive, defensive denial process,

although others claim that perceptions of growth that do not reflect true life changes may promote well-being in response to a traumatic event.

Cross-References

- ▶ Benefit Finding
- ▶ Coping
- ▶ Defensiveness
- ▶ Hardiness
- ▶ Optimism
- ▶ Positive Psychology
- ▶ Perceived Benefits
- ▶ Resilience

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Posttraumatic Stress Disorder

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Definition

By age 16 years, approximately two thirds of youth report having experienced at least one traumatic event (Costello, Erkanli, Fairbank, & Angold, 2002; Copeland, Keeler, Angold, & Costello, 2007). This is distressing in that exposure to a traumatic event can lead to the development of posttraumatic stress disorder (PTSD), which is a debilitating condition that is associated with several poor mental and physical health outcomes. As such, it is imperative to understand the development and course of PTSD, including its prevalence, comorbid conditions, assessment, treatment, and prognosis.

Diagnostic Criteria

PTSD is an anxiety disorder. Criteria for diagnosis include (a) exposure to a traumatic event that resulted in actual or threatened death or serious injury, or a threat to the physical integrity of the self or others, and also that the person's response involved intense fear, helplessness, or horror (American Psychiatric Association [APA], 2000, DSM-IV-TR, p. 467).

Further, an individual must meet criteria for three symptom clusters, each with more than 1 month duration: (b) one symptom of *reexperiencing* (e.g., recurrent distressing dreams of the event), (c) three or more symptoms of *avoidance* of stimuli associated with the trauma and *numbing* (e.g., efforts to avoid thoughts, feelings, or conversations associated with the trauma), and (d) two symptoms of increased *arousal* (e.g., difficulty falling or staying asleep). These symptoms must cause clinically significant distress or impaired functioning in the individual and cannot be accounted for by another disorder.

Proposed changes for DSM-V involve further explanation and expansion of the criteria. For example, criterion (a) may be expanded to include one or more of (1) experiencing the event, (2) witnessing the event, (3) learning the event occurred to someone close, or (4) experiencing repeated or extreme exposure to aversive details of the event. Also, the remaining criteria may be expanded to include the following: (b) one or more symptoms of *intrusion*, (c) one or more symptoms of *avoidance* of stimuli, (d) three or more *negative alterations in cognitions or mood* associated with the traumatic event, and (e) three or more symptoms of *alterations in arousal or reactivity* associated with the traumatic event (APA, 2010).

Further, there are differences in symptom presentation between children and adults who experience PTSD, which may be considered in DSM-V (APA, 2010). For example, within category B regarding intrusion, the DSM-V notes that children may have repetitive play reflecting the traumatic event, or trauma-specific reenactment during play, whereas adults may have recurrent, involuntary, or intrusive memories of the event. The DSM-V also specifies a different number of symptoms required to meet criteria for children than for adults. For example, adults are required to exhibit three or more symptoms, while children are only required to have two or more symptoms for both criterion D which are negative alterations in cognition and mood and criterion E alterations in arousal and reactivity, respectively.

Prevalence

Prevalence rates for PTSD vary greatly depending on the severity and type of traumatic event, as well as demographic factors. Prevalence rates of PTSD in youth range from 0.5% in typical community samples to 90% among sexually abused children (La Greca et al., 2012); the lifetime prevalence rate in adults is approximately 8% (APA, 2000, DSM-IV-TR, p. 466). Also, rates of PTSD are typically highest with events that involve violence, such as sexual abuse, terrorism, war, or the violent death of a loved one (Copeland et al., 2007). Women are twice as likely as men to evidence PTSD at some point in their lives (Foa, Keane, Friedman, & Cohen, 2008). The role of ethnicity is still unclear and evidence is mixed; some studies support an ethnic difference in rates of PTSD, while others suggest there are moderating factors such as differences in levels of exposure or socioeconomic status (Hamblen, 2007). Individuals from lower SES backgrounds have higher rates of PTSD than those with higher SES, and this may be due to the greater exposure to domestic violence or community violence among low SES individuals, which is associated with higher levels of PTSD.

Course of Disorder Over Time

Individuals who experience PTSD symptoms less than 1 month from the traumatic event may meet criteria for a diagnosis of acute stress disorder; if symptoms persist for more than 1 month, then the diagnosis is changed to PTSD. Individuals who present with PTSD for less than 3 months duration are considered to have the PTSD; if symptoms persist for more than 3 months, the diagnosis is *chronic* PTSD. Child physical or sexual abuse is often associated with a more chronic course of PTSD from childhood through adulthood. Finally, individuals who initially present with subsyndromal PTSD, but meet the full criteria at 6 months or more posttrauma, are considered to have *delayed-onset* PTSD. Some resilient individuals present with only a few symptoms of traumatic stress that never reach clinical thresholds and remit over time.

Common Comorbidities

PTSD is frequently comorbid with several other psychological disorders, including grief/bereavement, depression, anxiety, substance use and abuse, and health problems (Bonanno et al., 2010). Further, in children, PTSD is also commonly associated with behavioral concerns, such as acting out and disruptive behaviors (Cohen, Berliner, & Mannarino, 2010).

It is unclear whether PTSD plays a casual role in the development of additional comorbid conditions, or whether preexisting psychological conditions predispose a person to develop PTSD following a trauma (Perrin, Smith, & Yule, 2000). It is also possible that a broader underlying factor leads to the development of both PTSD and other conditions, which would account for the high rate of comorbidity (Perrin et al., 2000). Additional research is necessary to better understand the directionality of these comorbid relationships, which would also advance the conceptualization and treatment of PTSD.

Measures

There are several measures used in the assessment and diagnosis of PTSD in children and adults. The type of measure chosen depends on many factors, including the availability of a trained clinician, the individual's time and presenting condition(s), and the cost of the measure.

Clinician-administered interviews are the most thorough tools available and include (1) the Structured Clinical Interview for DSM-IV Axis I Disorders, used with adolescents and adults (SCID-I; First, Spitzer, Gibbon, & Williams, 1996); (2) the Kiddie-Schedule for Affective Disorders and Schizophrenia, used with children and adolescents (K-SADS-PL; Kaufman et al., 1997); and (3) the Diagnostic Interview for Children and Adolescents, used with children and adolescents (DICA-IV; Reich, Welner, & Herjanic, & MHS Staff, 1997). Each of these interviews includes a PTSD-specific module for assessing the presence of a traumatic event and any resulting symptoms required for diagnosis (APA, 2000). Although clinician-administered interviews are the most thorough diagnostic tool, they are also the most time consuming as well as the most expensive option.

Self-report measures of PTSD include the PTSD Checklist (PCL; Weathers et al., 1993) for adults, the Posttraumatic Stress Disorder Reaction Index (Steinberg, Brymer, Decker, & Pynoos, 2004), and the Trauma Symptom Checklist for Children (Briere, 1996). To assess a person's subjective response to trauma and/or stressful events more broadly, the Impact of Events Scale – Revised (IES-R; Weiss & Marmar, 1996) is often used with adolescents and adults. Although these measures are easy to administer and do not require a trained clinician, these measures provide significantly less detail and may require follow-up inquiry.

Treatment and Prognosis

Several treatment options are available for individuals with PTSD. Trauma-focused cognitive behavioral therapy (TFCBT) for children and adults and eye movement desensitization and reprocessing (EMDR) with adults have been indicated as effective treatments for individuals with PTSD (Foa et al., 2008; Bisson & Andrew, 2007). Another treatment option, sometimes utilized in conjunction with psychotherapy, is medication. Specifically, SSRIs and SNRIs are seen as first-line medication treatments for PTSD (Foa, et al., 2008).

Typically, PTSD symptoms decline drastically over the first-year posttrauma (Bonanno et al., 2010), while any further declines are more gradual (e.g., La Greca et al., 2010; Shaw et al., 1996). The prognosis for individuals with PTSD varies greatly depending on whether the individual has any comorbid conditions, their level of social support, and whether they have received treatment. Individuals with comorbid conditions, poor social support, and/or do not seek treatment will have a poorer prognosis than those who do not have these concerns. For individuals who do receive treatment, some evidence a decrease in symptoms after only four sessions of CBT, while others may require a longer course of treatment (Foa et al., 2008).

Cross-References

► Stress

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Potential Years of Life Lost (PYLL)

► Life Years Lost

Power Spectral Analysis

► Quantitative EEG Including the Five Common Bandwidths (Delta, Theta, Alpha, Sigma, and Beta)

Practice Guideline

► Clinical Practice Guidelines

Praise

► Prayer

Prayer

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Synonyms

Meditation; Praise; Supplication; Thanksgiving; Worship

Definition

Prayer in all of its variations can be defined by two fundamental principles: (1) prayer is a form of communication and (2) the exchange of communication takes place between the self and the transcendent, immanent, and numinous forces that represent human notions of the sacred. Defining prayer in this way broadens William James' classic conceptualization of prayer as "every kind of inward communion or conversation with the power recognized as divine" to include not only that which comes from God but everything that is imbued with the power of sacredness.

Description

Throughout history, humankind has manifested a yearning to communicate with the sacred through prayer. Expressed in vastly different cultures and religious traditions, prayer constitutes a universal phenomenon that plays a crucial role in humanity's religious experience. In fact, for many individuals, prayer is their primary religious practice.

Prayer, in the theocentric Judaic, Christian, and Islamic religious traditions, represents a way to express thanks to God, participate in God's will, and move closer to God. From a theocentric perspective, prayer is, simply put, communication with God. Prayer, however, is not limited to God-centered religions; it also features prominently in the practices of nontheistic religious traditions such as Zen and Theravada Buddhism, Jainism, and Taoism as well as animistic and pantheistic belief systems such as Shinto and the indigenous religions that feature the worship of nontheistic spiritual entities. Secular individuals without religious affiliations or theistic beliefs also pray regularly in a variety of ways.

Types of Prayer

Scholars have devised a number of classification schemes in an attempt to impose some order on the extraordinarily diverse modes of prayer expression. Traditional descriptive typologies have focused on the reasons people pray as well as on the content of prayers. Gill (1994) classified prayers according to their intent: petition, invocation, thanksgiving, dedication, supplication, intercession, confession, penitence, and benediction prayers. Heiler (1932) proposed a rich typology to capture the "astonishing multiplicity" of the forms of prayer: primitive; ritual; Hellenistic; philosophical; personal; mystical; prophetic; the prayers of great religious personalities; the prayers of great men, poets, and artists; prayer in public worship; and prayer as a law of duty and good works.

More recently, researchers have developed typologies by asking people what they pray about, when they pray, why they pray, and to whom or what they pray. Ladd and Spilka (2002) proposed a threefold scheme which distinguishes among recipients of prayer. Inward prayer is directed toward one's inner self, outward prayer represents a connection with another human, and upward prayer signifies sacred communication with the divine. Poloma and Pendleton (1991) classified prayer in terms of four concise categories. Petitionary prayer involves requests to fulfill one's own spiritual or material needs or those of others by asking for guidance, forgiveness, and physical well-being. Meditative prayer involves thinking about the

divine, communicating with the sacred, or merely being in the presence of the sacred. Ritual prayer involves silent or verbal recitation of specific religious texts or mantras from memory or by reading scripture. Colloquial prayer, which takes the form of a conversation between individuals and their God or divine figure, may blend aspects of petitionary and meditative prayer. Poloma and Gallup (1991) found that while Americans most widely practice colloquial prayer, meditative prayer was associated with a closer relationship with God and higher levels of well-being.

Most prayer typologies have been created out of research involving individuals from predominantly Western cultures in which prayer is typically experienced in the context of organized, theistic religion. However, Banzinger, Janssen and Scheepers (2008) found that the prayer experiences of individuals from the Netherlands, a highly secularized society, also could be categorized using a typology similar to Poloma and Pendleton's scheme. While Banzinger et al. argued for the creation of a secular prayer type, their findings support the notion that some types of prayer experiences may be common to both secular and nonsecular individuals.

Prayer and Well-Being

The way that people communicate with the sacred can influence their physical and psychological health. Studies have linked prayer to better medical outcomes among patients dealing with cardiovascular disease, cancer, migraines, chronic pain post surgical recovery, and HIV.

Research studies have also shown that people who pray more frequently report a greater sense of well-being. More specifically, prayer has been associated with higher levels of overall mental health, lower levels of depression and anxiety, higher levels of self-esteem, and more positive mood among individuals with post-traumatic stress disorder ("PTSD"). How well prayer works may depend at least in part on how people perceive God. Bradshaw, Ellison and Flannelly (2008) found that frequency of prayer was positively correlated with higher rates of psychopathology among individuals who perceived God as remote or not loving. In contrast, among individuals who viewed God as close and loving, more prayer was tied to lower psychopathology. Other factors may also affect the relationship between prayer and well-being, including the content and intent of prayers, an individual's level of spiritual maturity, and the availability of additional coping resources.

Although studies have consistently demonstrated significant correlations between prayer and well-being, researchers have not yet identified the underlying psychological mechanisms that account for this relationship. Prayer may affect well-being indirectly by strengthening the relationships between individuals, God, and their faith community which may buffer the negative impact of stressors on health and well-being. Prayer may also manifest its effects through other psychological factors, such as increasing feelings of gratitude. Researchers have shown that greater frequency of prayer is associated with increased feelings of gratitude which are, in turn, correlated with lower rates of depression as well as higher levels of optimism and fewer negative health symptoms.

Prayer for one's own health and for the health of others represent the two most frequently used alternative health treatments in the United States. The proportion of Americans who pray to alleviate health problems increased from 43% in 2002 to 49% in 2007. This number may grow even further as the number of individuals who live with chronic physical or psychological illnesses rises. Many individuals who pray have also expressed a desire to integrate prayer practices into their medical treatment. In one study, 79% of critical care providers were asked by patients or their families to pray for them. In another survey, 48% of American patients indicated that they would like their doctor to pray for them. Over 90% of these patients felt that their doctor's prayers on their behalf had enhanced their health and aided in their recovery.

Some clinicians have begun to respond to the promising research findings and to the desires of many of their patients by considering how to incorporate prayer into specific treatments. Seventy-three percent of critical care nurses surveyed by Tracy et al. (2005) prayed while treating clients,

and 81% of these nurses had recommended the use of prayer to their patients. Pargament, Smith, Koenig, and Perez (1998) suggested that positive forms of religious coping such as seeking spiritual support through prayer could be successfully integrated into psychotherapy. The appropriateness of integrating spiritual practices such as prayer into treatment, however, remains a highly divisive topic within the health-care community.

Cross-References

- ▶ Meditation
- ▶ Religion
- ▶ Religious Ritual
- ▶ Spirituality

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Prediabetes

- ▶ Hyperinsulinemia
- ▶ Impaired Glucose Tolerance

Pregnancy

- ▶ Coffee Drinking, Effects of Caffeine
- ▶ Gestation

Pregnancy Complications

- ▶ Pregnancy Outcomes: Psychosocial Aspect

Pregnancy Outcomes: Psychosocial Aspect

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Synonyms

Depression; Pregnancy complications

Definition

For most women, pregnancy is viewed as a natural and joyful event. In more than 80% of pregnancies, the delivery process is unremarkable, with no physiological or psychological complications. Indeed, the most notable changes associated with pregnancy often occur in social and partner relations, as well as changes to one's lifestyle. For instance, sleep deprivation and disturbance are the most frequently reported pregnancy-related disturbances. Pregnancy-related sleep disturbances, in turn, impact numerous facets of life including mood, cognition, social functioning, and memory (Harding, 1975).

For a small percentage of women, pregnancy and delivery are complicated by a variety of adverse outcomes. Preeclampsia, intrauterine growth restriction (IUGR), or preterm delivery can significantly affect the psychological health of women. Psychosocial aspects of pregnancy outcomes range along a continuum and are multidimensional. Psychosocial functioning in association with pregnancy complications may be a function of coping strategies, social support, and the overall emotional health of the mother and father. Sociodemographic factors, including parental age, socioeconomic status, and relationship quality also influence parental response to pregnancy complications. In the wake of adverse outcomes, parents may feel guilt, depression, anger, resentment, or withdrawal. Parents of infants transferred to the neonatal intensive care unit (NICU) may experience additional psychological burden, sometimes altering relationship dynamics (Zager, 2009) or mother-child bonding. Links between psychosocial factors and adverse pregnancy outcomes are currently underrecognized by health-care providers, which suggest that systematic prospective research is needed to more convincingly establish the significance of psychosocial factors and their potential for prevention.

Cross-References

► Psychosocial Factors

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Pregnancy Spacing

► Family Planning

Prehypertension

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Description

In 2003, the seventh report of the Joint National Committee guidelines (JNC 7) proposed a classification for normal blood pressure (BP) and prehypertension based on the average of two more properly measured readings:

Normal blood pressure: systolic $<$ 120 mmHg and diastolic $<$ 80 mmHg

Prehypertension: systolic 120–139 mmHg or diastolic 80–89 mmHg

Compared to individuals with normal BP, prehypertensive individuals have a greater number of traditional cardiovascular disease (CVD) risk factors and have a greater risk of developing CVD independent of other CVD risk factors than individuals with BP $<$ 120/80. Prehypertensive individuals also have a greater risk of developing hypertension than normotensive individuals. Therefore, prehypertension can be conceptualized as an intermediate phenotype at elevated risk of developing traditional risk factors for CVD (such as hypertension) and at independent risk of developing CVD itself.

However, the ideal surveillance and management strategies for patients with prehypertension have not been well defined. Due to the associations between prehypertension and the development of overt hypertension and CVD, in 2007, the United States Preventive Services Task Force (USPSTF) recommended yearly BP screening for prehypertensive individuals and every other year screening for those with normotension. It remains unclear, however, how much of the excess CVD risk associated with prehypertension is due to the BP itself and how much is related to associated CVD risk factors: some analyses have shown that the excess CVD risk associated with prehypertension is attenuated after controlling for concomitant CVD risk factors. A more concrete problem with the diagnosis of prehypertension, however, may be the number of people affected: a recent analysis of the US population found that 39% of adults were normotensive, 31% prehypertensive, and 29% hypertensive. This suggests only a minority of Americans have normal blood pressure and raises the question of whether prehypertension should be defined as a "disease" state.

While there is limited evidence to suggest that treatment of prehypertension may prevent the development of hypertension, JNC 7 recommends careful follow-up for the development of hypertension or signs of end-organ damage (e.g., renal dysfunction or left-ventricular hypertrophy). Without the presence of CVD or other CVD risk factors (such as diabetes), prehypertension is generally treated with nonpharmacologic therapies such as weight loss, sodium restriction, dietary modification, and exercise.

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Preimplantation Genetic Diagnosis

► In Vitro Fertilization, Assisted Reproductive Technology

Prejudice

► Stigma

Premenstrual Headache

► Migraine Headache

Pressure

► Stress

Prevalence

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Synonyms

Prevalence number; Prevalence rate

Definition

Prevalence is a measure of frequency of an illness, disease, or health conditions. Unlike incidence, which reflects new occurrences or changes in health states, prevalence is concerned with already existing health conditions, regardless of whether that health condition is of recent onset or is long-standing. Thus, prevalence of a particular condition refers to the proportion of the population which has that condition at a specified time. It is usually presented as x cases per 1,000 (or 10,000 or 100,000) people in the population. There are two types of prevalence: point prevalence (the type of prevalence most commonly reported) and period prevalence. Consider the example of the common cold. The "point prevalence" of the common cold in New York City means the proportion of people in New York City with a cold at a given point in time, i.e., the number of New York City residents with a cold on a specific day divided by the total number of New York City residents on that day. It is like a "prevalence snapshot." A 1-month "period prevalence" means the proportion of people in New York City who have had a cold at any point within the past month. It is analogous to time-lapse photography, reflecting the health state that has existed over a set period of time. A variation is lifetime prevalence or the proportion of people who have had the condition at any point during their lifetime.

Prevalence is usually measured in surveys or cross-sectional studies and reflects the burden of disease, rather than risk (incidence) of disease, which must be measured in longitudinal studies. Because prevalence is a measure of existing health conditions, it is affected by both incidence of that health state (the rate at which new cases develop) and the duration of that health state. A health condition might have a short duration because it is rapidly fatal, for example, rabies or Ebola, or because recovery is rapid, such as the case in the "24-h flu." Prevalence of a particular health condition can increase because there is an increase in incidence (e.g., during an influenza epidemic) or because people with that health condition are living longer with that condition (e.g., treatments may have extended the lives of those who suffer from that health condition). Alternatively, more effective treatments may shorten the recovery time.

Because prevalence is affected by recovery or death, it is an unreliable estimate of disease risk. This can be illustrated in the following example. The Framingham Heart Study reported equal prevalence of coronary heart disease in men and women. This could lead to the mistaken conclusion that men and women are at equal risk of developing coronary heart disease. However, the follow-up studies demonstrated that men were at greater risk of developing coronary heart disease and also had a higher fatality rate; while women were less likely to develop heart disease, but when they did, it was also less likely to be fatal. Thus, the prevalence in men and women was roughly equal because a lower risk was coupled with a longer duration of disease in women.

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Prevalence Number

► Prevalence

Prevalence Rate

► Prevalence

Prevention: Primary, Secondary, Tertiary

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Synonyms

Levels of prevention

Definition

The natural history of disease is the course from onset to resolution (Last, 2000). The goal of epidemiology is to identify and understand causal factors of disease, disability, and injury so that effective interventions can be implemented to prevent the occurrence of adverse processes before they begin or progress (Stanhope & Lancaster, 2008). The definitions used in public health distinguish between primary prevention, secondary prevention, and tertiary prevention (Commission on Chronic Illness, 1957).

Description

The term "primary prevention" refers to intervention measures to prevent the occurrence (incidence) of new disease, disability, or injury (Leavell & Clark, 1965). This intervention must be implemented prepathogenesis and directed at individuals or groups at risk. Primary prevention efforts include health promotion and specific protection and are generally aimed at populations, not individuals (see Fig. 1). The application of primary prevention extends beyond medical problems and includes the prevention of other concerns that impact health and well-being, such as violence to environmental degradation. Education and public policy are major strategies for primary prevention.

Two other levels of prevention are termed secondary and tertiary prevention. Secondary prevention is a set of measures used for early detection and prompt intervention to control a problem or disease (prevalence) and minimize the consequences. Secondary prevention encompasses interventions that increase the probability that a person with a condition will have it diagnosed at a stage that treatment is likely to result in cure or reduction in the severity of a condition. Health screening is a major strategy of secondary prevention. Tertiary prevention focuses on the reduction of further complications of an existing disease, disability, or injury, through treatment and rehabilitation.

A landmark report published by the Institute of Medicine entitled: *Reducing Risks for Mental Disorders* (IOM, 1994) evaluated the body of research on the prevention of mental disorders. This report offered new definitions of prevention and provided recommendations on federal policies and programs. Levels of prevention across the natural disease history (Fig. 1) were defined as "prevention, treatment, and rehabilitation." Prevention, according to the IOM report (1994), is similar to the concept of primary prevention and refers to interventions to delay or avoid the initial onset of a disorder. Further, prevention has three types: universal, selective, and indicated, to reduce new cases. Universal efforts are directed to the entire population; selective prevention is for those at significant risk of a disorder due to biological, social, or psychological risk factors; and indicated prevention is for those with a mild disorder that has the potential to become more severe if not addressed in a timely manner.

Treatment refers to the identification of individuals with a disorder and providing treatment for those disorders, which includes interventions to reduce the likelihood of future co-occurring disorders. Maintenance refers to interventions that are oriented to reduce relapse and recurrence and to provide rehabilitation. Maintenance incorporates what public health defines as some forms of secondary and all forms of tertiary prevention.

THE NATURAL HISTORY OF ANY DISEASE OF MAN				
Interrelations of Agent, Host, and Environmental Factors Production of STIMULUS	Reaction of the HOST to the STIMULUS Early pathogenesis	Discemible Early Lesions	Advanced Disease	Convalescence
Prepathogenesis period	**Period of Pathogenesis**			

HEALTH PROMOTION	SPECIFIC PROTECTION	EARLY DIAGNOSIS and PROMPT TREATMENT	DISABILITY LIMITATION	REHABILITATION
Health education Good standard of nutrition adjusted to developmental phases of life Attention to personality development Provision of adequate housing, recreation and agreeable working conditions Marriage counseling and sex education Genetics Periodic selective examinations	Use of specific immunizations Attention to personal hygiene Use of environmental sanitation Protection against occupational hazards Protection from accidents Use of specific nutrients Protection from carcinogens Avoidance of allergens	Case-finding measures, individual and mass Screening surveys Selective examinations Objectives: To cure and prevent disease processes To prevent the spread of communicable diseases To prevent complications and sequelae To shorten period of disability	Adequate treatment to arrest the disease process and to prevent further complications and sequelae Provision of facilities to limit disability and to prevent death	Provision of hospital and community facilities for retraining and education for maximum use of remaining capacities Education of the public and industry to utilize the rehabilitated As full employment as possible Selective placement Work therapy in hospitals Use of sheltered colony
Primary Prevention		**Secondary Prevention**		**Tertiary Prevention**
LEVELS of APPLICATION of PREVENTIVE MEASURES				

Prevention: Primary, Secondary, Tertiary, Fig. 1 Levels of application of preventive measures in the natural history of disease

The concepts of risk and protective factors, risk reduction, and enhancement of protective factors (also referred to as fostering resilience) are central to most evidence-based prevention programs. Risk factors are those characteristics, variables, or hazards, that if present for a given individual, make it more likely that this individual, rather than someone selected at random from the general population, will develop a disorder. Protective factors improve a person's response to an environmental hazard resulting in an adaptive outcome.

The Agency for Health Research and Quality (AHRQ) provides ongoing administrative, research, technical, and dissemination support to the US Preventive Services Task Force (USPSTF). http://www.USPreventiveServicesTaskForce.org. The USPSTF is an independent panel of non-federal experts in prevention and evidence-based medicine, and is composed of an interdisciplinary mix of primary care providers (physicians, nurses, and health behavior specialists). The USPSTF conducts scientific evidence reviews of a broad range of clinical preventive health care services (such as screening, counseling, and preventive medications) and develops recommendations for primary care clinicians and health systems. These recommendations are published in the form of "Recommendation Statements."

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Preventive Care

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Definition

Preventive care is the branch of health care that strives to prevent mental and physical illnesses. Many members of the health care team must partner together to achieve proper preventive care. Preventive care is divided into three levels of care: primary prevention, secondary prevention, and tertiary prevention.

Primary preventive care is the prevention of disease in a susceptible population through health promotion, education, and protective efforts. Ensuring adequate nutrition, advising patients about skin protection from ultraviolet radiation, educating about seat belt use, promoting safe home and work environments, prescribing oral fluoride supplementation in children with fluoride-deficient water, and administrating immunizations are all examples of primary preventive care.

Secondary preventive care is the prevention of disease through screening and early detection. Early recognition of disease through health care screening allows treatment to occur early in the course of the disease and may decrease complications. Examples of screening procedures that lead to the prevention of disease include fecal occult blood testing for detecting colon cancer, Pap smear for detecting early cervical cancer, routine mammography for early breast cancer, blood pressure and blood cholesterol measurement, oral examinations for early dental caries, and use of screening tools for depression.

Tertiary preventive care is the prevention of disease progression and disease sequelae after a chronic or irreversible disease diagnosis has been made. Limiting disability and promoting rehabilitation is important in tertiary prevention. Examples of tertiary prevention efforts include prescribing anticlotting agents such as aspirin in

patients who have cardiovascular disease, physical rehabilitation in patients who have suffered a stroke, and endodontic therapy in patients with severe dental decay.

Cross-References

► Prevention: Primary, Secondary, Tertiary

References and Readings

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Preventive Medicine Research Institute (Ornish)

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Synonyms

Dean Ornish

Definition

Preventive Medicine Research Institute (PMRI) is a nonprofit research institute located in Sausalito, California, and founded by Dr. Dean Ornish. The mission of PMRI is to conduct scientific research examining the effects of diet and lifestyle choices on health outcomes.

Description

PMRI is a nonprofit research institute that is involved with scientific research studying the effects of diet and lifestyle choices on health and diseases. PMRI was founded by Dr. Dean Ornish, a leading researcher and physician advocating this type of prevention. The mission of PMRI is to conduct scientific research examining the effects of diet and lifestyle choices on health outcomes. In addition to research, another emphasis of PMRI is to educate health professionals and the lay public about the importance of preventive medicine and the benefits of lifestyle changes including diet, exercise, and stress management.

Cross-References

► Coronary Artery Disease

References and Readings

http://www.pmri.org/

Previous Smokers

► Ex-Smokers

Pride

► Self-Esteem

Primary Care

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Definition

Primary care is a component of integrated health care in which comprehensive and accessible care

is provided to a defined population. It is not disease- or organ-specific, but rather examines a person's overall state of health and well-being. Primary care is often the first point of contact into a health system for persons with a health concern including those with acute and chronic physical, mental, and social health issues. Primary care is a longitudinal and continuous approach to health maintenance including health promotion, disease prevention, health education, and counseling and includes diagnosis, treatment, and management of acute and chronic conditions. Primary care focuses on the provision of primary, secondary, and tertiary prevention measures, such as screenings, immunizations, and prevention of disease progression or sequelae. In primary care, the patient is seen as a partner in their health and health decisions. The primary care provider partners with the patient to coordinate other health services which includes a collaboration with and referral to other members of the health care team. Continuity in primary care is essential to develop and establish a patient-provider relationship. Primary care is not setting-specific and can be provided across a continuum of health settings such as the patient's private residence, provider office, hospital, or long-term care facility.

Cross-References

- ▶ Clinical Settings
- ▶ Family Practice/Medicine
- ▶ Primary Care
- ▶ Primary Care Physicians
- ▶ Primary Care Provider

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Primary Care Physicians

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Synonyms

Family physician; General internist; PCP; PMD; Primary care provider; Primary medical doctor

Definition

A primary care physician is the physician who provides primary care, the physician selected to be the first doctor contacted for any medical condition. The physician acts as the patient's "gatekeeper," providing ongoing medical care, preventive services, medical counseling, and referrals to specialists as needed. Examples of physicians who may be considered to be primary care physicians include family medicine physicians, internal medicine physicians, OB/GYN physicians, pediatricians, and at times emergency medicine physicians. The number of primary care physicians has been declining in recent years with more physicians seeking careers as subspecialists or pursuing specialty care with financial rewards and increasing demands on time being major reasons for this change (Bodenheimer, 2006).

Cross-References

- ▶ Primary Care Providers

References and Readings

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Primary Care Provider

- ▶ Primary Care Physicians
- ▶ Primary Care Providers

Primary Care Providers

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Synonyms

Family physician; General internist; Primary care provider; Primary medical doctor

Definition

Primary care provider is a generalist clinician who provides integrated accessible health care to a defined population. Nurse practitioners, physicians, and physicians' assistants who provide primary care are specially trained to provide primary care services. The primary care provider develops a sustained relationship with the patient and oversees all aspects of the patient's health. The primary care provider partners with the patient to coordinate other health services which includes a collaboration with and referral to other members of the health care team. Primary care providers are advocates for the patient throughout the entire health care system.

Cross-References

- ▶ Primary Care
- ▶ Primary Care Physicians
- ▶ Primary Care Provider

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Primary Medical Doctor

- ▶ Primary Care Physicians
- ▶ Primary Care Providers

Primary Raynaud's Phenomenon

- ▶ Raynaud's Disease and Stress
- ▶ Raynaud's Disease: Behavioral Treatment

Principle of Equipoise

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Synonyms

Clinical equipoise; Equipoise

Definition

Clinical equipoise exists when all of the available evidence about a new intervention/treatment does not show that it is more beneficial than an alternative and, equally, does not show that it is less beneficial than the alternative. For example, to be able to conduct a clinical trial that involves administering an investigational treatment that may confer therapeutic benefit to subjects for whom such benefit is desirable to some individuals, and to administer a control intervention treatment that is not capable of conferring therapeutic benefit to others, there cannot be any evidence that suggests that the investigational intervention shows greater efficacy than the control treatment or that it leads to greater side effects than the control treatment.

When individuals agree to participate in a clinical study, they do so with the understanding that all of the treatments are assumed to be of equal value. By the end of the trial, there may be compelling evidence that the investigational intervention is acceptably safe and statistically significantly more effective than the control intervention, but the study must be started with a good faith belief that the two treatments are of equal merit.

Treating subjects in clinical studies (trials) in an ethical manner is of paramount importance. Clinical equipoise is a cornerstone of such ethical conduct. Other fundamental ethical principles include respect for persons, beneficence, and justice (see Turner, 2010).

Derenzo and Moss (2006) commented as follows:

> Each study component has an ethical aspect. The ethical aspects of a clinical trial cannot be separated from the scientific objectives. Segregation of ethical issues from the full range of study design components demonstrates a flaw in understanding the fundamental nature of research involving human subjects. Compartmentalization of ethical issues is inconsistent with a well-run trial. Ethical and scientific considerations are intertwined.

Cross-References

- ▶ Clinical Trial
- ▶ Randomized Clinical Trial

References and Readings

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Privacy

- ▶ Confidentiality

Probability

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Definition

In situations where certainty is not possible, it can be helpful to assess how likely it is that something will occur. Quantification of this likelihood is particularly helpful in statistical analysis. The concept of probability is used in everyday language, but more loosely than in statistics. The statement "I'll probably be there on Saturday" involves a probabilistic statement, but there is no precise degree of quantification. If you know the individual making this statement, past experience may lead you to an informed judgment concerning the relative meaning of probably, but this is still a subjective judgment, not a quantitative statement.

In statistics, a probability is a numerical quantity between zero (represented here as 0.00) and one (1.00) that expresses the likely occurrence of a future event. Past events cannot be associated with a probability of occurrence, since it is known in absolute terms whether they occurred or not. A probability of zero denotes that the event will not (cannot) occur. A probability of one denotes certainty that the event will occur. Any numerical value between zero and one expresses a relative likelihood of an event occurring. Additionally, the decimal expression of a probability value can be multiplied by 100 to create a percentage statement of likelihood. A probability of 0.50 would thus be expressed as a 50% chance that an event would occur. Similarly, and more relevantly to inferential hypothesis testing, probabilities of 0.05 and 0.01 would be expressed as a 5% chance and a 1% chance, respectively, that an event would occur.

Cross-References

- ▶ Hypothesis Testing
- ▶ Null Hypothesis
- ▶ Statistics

Problem Drinking

- ▶ Binge Drinking

Problem Solving

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Synonyms

Problem-solving skills training (PSST); Problem-solving therapy – primary care (PST-PC); Problem-solving therapy – SO (PST-SO); Social problem-solving therapy (SPST)

Definition

Problem-solving therapy (PST) is a brief, empirically supported, cognitive-behavioral intervention aimed at training clients to identify, evaluate, and resolve everyday problems through the methodical application of problem-solving skills. In addition to teaching specific coping skills, PST emphasizes the importance of maintaining a positive *problem-solving orientation* and a rational *problem-solving style* (D'Zurilla & Nezu, 2010).

An individual's *problem-solving orientation* encompasses how one perceives problems, to what/whom they attribute these problems, how they appraise problematic situations, and the degree to which they view their problems as under their control. A major goal of PST is to help clients view problems as solvable challenges instead of insurmountable impasses.

A person's *problem-solving style* addresses the characteristic way in which he or she attempts to manage problems in living. PST advocates a rational approach. This form of problem solving is taught through the use of four essential skills: defining the problem in precise and objective terms (i.e., problem definition and formulation), brainstorming potential solutions (i.e., generation of alternatives), weighing the pros and cons of each alternative and creating a plan of action (i.e., decision making), and implementing the most appropriate solution and evaluating the outcome (i.e., implementation and verification). In combination, these skills are meant to help individuals manage their problems in an organized and systematic manner.

Problem solving serves a critical function in the successful management of chronic medical conditions. PST has, therefore, been adapted for individuals affected by cancer, obesity, diabetes, cardiovascular disease, traumatic brain injury, stroke, as well as older adults, caregivers, and to promote treatment adherence.

PST has been successfully delivered in individual, group, and family formats by psychologists, psychiatrists, social workers, nurses, and graduate-level trainees. Most forms of PST are manual based and all make use of homework assignments. PST therapists tend to balance directive and collaborative treatment styles.

PST interventions have been implemented in primary care settings (Catalan et al., 1991; Mynors-Wallis & Gath, 1997; Oxman, Hegel, Hull, & Dietrich, 2008; Areán et al., 2010), via telephone and in the home (Grant, Elliott, Weaver, Bartolucci, & Ginger, 2002), within community clinics and online (Wade, Wolfe, Brown, & Pestian, 2005; Wade, Walz, Carey, & William, 2008).

Even though PST has been provided as both a stand-alone treatment and as a component of multifaceted interventions, more research is

needed to adequately compare the two. Although some studies have addressed PST's applicability to minority groups (Sahler et al., 2005) and different age ranges (Areán et al., 2010), supplementary research is needed in these areas. Finally, given the evidence that PST can be a successful intervention for behavioral medicine settings, it would behoove future investigators to attempt to extend findings to other chronic health conditions.

Cross-References

- ▶ Cognitive Behavioral Therapy (CBT)
- ▶ Stroop Color-Word Test

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Problem-Focused Coping

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Synonyms

Active coping

Definition

Coping refers to the intentional efforts we engage in to minimize the physical, psychological, or social harm of an event or situation. There are many different frameworks for understanding coping and many different ways of classifying coping strategies, but one such classification is problem-focused coping vs. emotion-focused coping. Problem-focused coping is that kind of coping aimed at resolving the stressful situation or event or altering the source of the stress. Coping strategies that can be considered to be problem-focused include (but are not limited to) taking control of the stress (e.g., problem solving or removing the source of the stress), seeking information or assistance in handling the situation, and removing oneself from the stressful situation.

Problem-focused coping is distinguished from emotion-focused coping, which is aimed at managing the emotions associated with the situation, rather than changing the situation itself. For example, when anxious about an upcoming exam, use of problem-focused coping strategies might involve checking with the teacher about material one is unsure of, or increasing the time spent studying, or even deciding not to take the exam (although removing oneself from the stressor might have other negative consequences in this particular example). In contrast, emotion-focused coping strategies might involve self-talk to increase one's confidence in one's test taking ability or using relaxation techniques to decrease fear and anxiety. Problem-focused coping works best when the source of the stress is potentially under an individual's control; however, when the source of the stress is beyond the individual's control, such strategies are not usually helpful. Examples are dealing with bereavement. In situations like this, problem-focused coping is less likely to be helpful than emotion-focused coping, for example, processing one's feelings or releasing one's feelings. Problem- and emotion-focused coping are not mutually exclusive, and individuals frequently use both problem- and emotion-focused coping strategies to deal with stress. For example, when feeling threatened, initial use of emotion-focused coping to gain control over the fear can facilitate the subsequent use of problem-focused coping. Problem- and emotion-focused coping are the two subscales that comprise the Ways of Coping Checklist.

Cross-References

- ▶ Active Coping
- ▶ Coping

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Problem-Solving Skills Training (PSST)

- ▶ Problem Solving

Problem-Solving Therapy – Primary Care (PST-PC)

- ▶ Problem Solving

Problem-Solving Therapy – SO (PST-SO)

- ▶ Problem Solving

Productivity

► Job Performance

Progress

► Aging

Promotoras

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Synonyms

Community health advisors; Community health representatives; Community health workers (CHW); Health navigators; Lay health advisors; Lay health advocates; Outreach educators; Peer coaches; Peer health educators; Peer health promoters

Definition

Promotoras (or *promotoras de salud*) are female community health workers who provide a variety of services in their role as liaison between underserved Hispanics and traditional health care services. Their male counterparts are *promotores*, although it is less common to have men serve in this role. These terms translate to "promoters" of health, in this case among Hispanics who have historically experienced challenges accessing health care services and deficiencies in outcomes of care. These individuals are either volunteers or employees of the local health care system or other entities administering community interventions. They typically live in the community or neighborhood that they serve and thus can better communicate and relate to their clients because of their shared community experiences.

Description

Essentially, the *promotora* concept is a form of community-based peer support: nonprofessionals helping others with various health needs. These needs include: culturally appropriate education, informal advice and counsel, social support and encouragement, interpretation and translation, advocacy for health needs, disease management and prevention, health care system navigation, and community resource guidance. Depending upon the community health priorities and the specific goals and objectives of particular programs, *promotoras* may provide one or a combination of these services.

Historically, *promotoras* are part of a long tradition of lay health workers who serve critical health care and disease prevention roles in cultures around the world. For example, in eighteenth century Russia, *feldshers* began providing medical assistance in urban hospitals and the army. In China, during the 1960s, farmworkers were trained as "barefoot doctors" to give first aid, immunizations, and health education in rural areas. In Haiti, village health workers known as *accompagnateurs* attended individuals suffering from tuberculosis and HIV/AIDS. In Africa, health care workers provide the main form of health care delivery and especially have served as the linchpin for HIV prevention and treatment. Origins of the *promotoras* can also be found in Latin American countries, where laymen and laywomen were trained by church groups and other organizations to give community health assistance.

Efforts to establish formal community health worker programs in this country can be traced back over a half-century. Such outreach was subsequently included in the federal Migrant Health Act of 1962 and the Economic Opportunity Act of 1964, mandating utilization of

community health aides in many neighborhoods and migrant worker camps (Hill, Bone, & Butz, 1996). The Affordable Care Act of 2010 provided a more recent endorsement of the concept, specifying community health workers as an integral component of the nation's health care workforce (Affordable Care Act of 2010). With the rise in health care costs in recent times and increased awareness of the scope and cost of health disparities in this country, the peer-support approach has gained increasing support as a viable and potentially cost-effective means of helping fill gaps in the health care system. However, the evidence so far is conflicting and comes from less than optimally designed studies.

In the USA today, the nomenclature for peer health promotion personnel is diverse, including: community health workers (CHW), community health advisors, lay health advisors, lay health advocates, peer coaches, outreach educators, health navigators, peer health promoters, peer health educators, community health representatives, and, in Hispanic communities, *promotoras*. Often, some of these terms, including CHW and *promotoras*, are used interchangeably or in combination.

Surveys have found that these community health workers operate in all 50 states (U.S. Department of Health and Human Services Health Resources and Services Administration, 2007). Programs utilizing *promotoras* have flourished especially in states with large Hispanic populations such as California and along the USA-Mexico border. In 2009, Hispanics represented 16% of the US population (U.S. Census Bureau News, 2010) and this proportion is expected to rise dramatically in the coming decades. With the growing number of Hispanics, the peer-assistance concept has been incorporated into health programs and interventions across the country. This model has been evaluated in large cities, mid-size and smaller communities, as well as agricultural areas (working with farmworkers and their families), with favorable results in many studies.

Promotora involvement has been found to be useful in a broad range of needs, such as management of diabetes and other health conditions prevalent among Hispanics, screening for cancer and other diseases, and access to health care overall. They also can focus on addressing specific needs such as prenatal care, or healthy lifestyle behaviors in general (e.g., proper diet and exercise). In addition to working with diabetes and cancer patients, survivors, and at-risk individuals, *promotoras*/CHW have been involved in interventions targeting cardiovascular disease, HIV/AIDS, high blood pressure, asthma, mental illness, and other diseases.

Firsthand knowledge of the local Hispanic community and the personal and institutional barriers that residents of the community face in attaining adequate health care uniquely prepares *promotoras* for their liaison role. As Spanish speakers and residents of the neighborhoods they serve, *promotoras* offer assistance to reduce or remove linguistic and cultural barriers for segments of the population that have historically been difficult to reach for local health care agencies and services. At the same time, *promotoras* can provide assistance to professional health care personnel by educating providers and their staff about sociocultural factors that influence the health knowledge, beliefs, and attitudes, as well as the values and behaviors, of their Hispanic patients.

Among the strengths of the *promotora*/CHW models employed in various community health programs is the broad diversity of services peer health workers have been able to deliver. For example, as liaisons between health providers and underserved Hispanics, *promotoras* sometimes serve as interpreters as well as health system navigators, assisting in identification of benefits that clients are eligible to receive, and helping them complete necessary applications and forms. As case managers, *promotoras* typically facilitate contacts of health care providers with community members by maintaining accurate contact information and a record of interactions. As community organizers, *promotoras* have been called upon to motivate and encourage members of the community to participate actively in efforts to improve neighborhood living conditions. And as health educators, *promotoras* distribute and explain print and

other informative materials aimed at promoting screening, preventing disease, discouraging smoking, managing chronic diseases, and other health promotion purposes. In addition, interventions have utilized *promotoras* in various other roles, including as group presentation leaders; role models; and guides to community social, transportation, childcare, and other services and resources.

Promotoras are typically respected and trusted members of the community they serve. Due to their familiarity with their community and neighborhood, *promotora*s can move freely within the community and engage with various sectors. They provide their services in convenient locations, including homes, schools, churches, clinics, hospitals, community centers, job sites, and other locales. In many programs, they also participate in community events, such as health fairs.

In the past, *promotoras* and other community health workers have typically been trained on the job. With the increased utilization of peer-support models over the years, concerns about the quality of this training and the need for more standard certification of these workers have been increasingly raised. However, as of 2010, only a handful of states had taken steps to address these issues. In 1999, Texas was the first state to legislate voluntary training and certification for *promotoras* and community health workers (Nichols, Berrios, & Samar, 2005). In Minnesota, select community colleges offer a standardized curriculum for community health worker certification, with completion required for a worker to be eligible as a Medicaid provider (Rosenthal et al., 2010). In numerous states, certificates are being awarded, typically by community colleges and other programs, for completion of a course of community health worker studies. Proponents of required certification or credentialing note potential benefits, including offering assurance that workers possess basic competencies and promoting perceived legitimacy within health/human services fields. Others, however, contend that requiring certification may have a detrimental effect on the number of peer health workers from poor, minority neighborhoods and communities that most need to be served (Family Strengthening Policy Center, 2006).

From the substantial experience with *promotora*/CHW program implementation and research, the evidence is growing that peer support offers unique benefits to improve health care delivery and outcomes. This is particularly relevant, given rapidly expanding lower-socio economic status (SES) racial/ethnic segments of the population (particularly Hispanics), growing numbers of patients with chronic diseases, and spiraling health care costs. Systematic reviews of the benefit of peer support currently find that the evidence lacks sufficient rigor. Consequently, much more research needs to be conducted to define roles and scope of activities, determine effectiveness, develop consistent and adequate training, provide fair compensation, and, via certification and/or similar means, define a universally accepted and respected niche for *promotoras* among the nation's health care workforce.

Cross-References

- Health Disparities
- Health Education
- Health Literacy

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Prophylactic Use

► Condom Use

Prospective Cohort Study

► Cohort Study

Prospective Study

► Follow-up Study

Prostate

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Synonyms

Prostate gland

Definition

Prostate Anatomy

The prostate is a walnut-sized gland that functions in the male reproductive system. It is positioned in front of the rectum and directly below the bladder, which stores urine. The prostate also encircles the proximal urethra, the canal which carries urine from the bladder and through the penis.

Three distinct zones of glandular tissue make up the prostate: the peripheral zone, central zone, and transition zone. Additionally, there is an area of fibromuscular tissue on the anterior surface. Each anatomic zone is uniquely affected by different disease processes. The majority of

prostate cancers develop in the peripheral zone, the largest zone by volume, while benign prostatic hyperplasia originates in the transition zone.

Description

Prostate Function

The prostate produces the thick, milky-white alkaline fluid that forms part of semen. The fluid provides nourishment to sperm and, along with fluid from the bulbourethral (Cowper's) glands, helps to neutralize the acidity of the urine residue in the male urethra and of the female vaginal canal, increasing the life span of sperm. During ejaculation, contraction of smooth muscles moves the fluid from the prostate into the urethral tract where it mixes with the sperm produced by the testicles and additional fluid from the bulbourethral glands and seminal vesicles. The resulting mixture, semen, passes from the urethra and out through the penis.

Common Disorders of the Prostate

There are three common conditions of the prostate: prostatitis, benign prostatic hyperplasia, and prostate cancer. Generally, older men are more susceptible to prostate disease. However, prostatitis can affect men at any age. Prostatitis is a benign infection of prostatic tissue, usually caused by bacteria. Inflammation can result in urine retention in the bladder, resulting in bladder distention (i.e., enlargement) and exposing the bladder to additional risk for infection. Additionally, prostatitis can trigger several urinary problems (e.g., pain or burning upon urination, urgency, and trouble voiding). Benign prostatic hyperplasia, or BPH, is another common prostatic condition caused by the noncancerous enlargement of the prostate gland in aging men. As the prostate enlarges, it compresses the urethra and irritates the bladder. Obstruction of the urethra, as well as gradually diminishing bladder function, results in the symptoms of BPH including dribbling after urination or a need to urinate often, especially at night. Some men also experience urinary incontinence, the involuntary discharge of urine. BPH symptoms can severely affect a man's, as well as his partner's, quality of life and can be further compounded by psychological factors (e.g., depression and anxiety) associated with BPH symptoms. Prostate cancer is the most common malignancy and the second most common cause of cancer death among men in the United States. Response to treatment is best when the disease is caught early. However, prostate cancer is generally asymptomatic when the disease is localized to the prostate. Screening for prostate cancer includes serum prostate-specific antigen (PSA) testing and digital rectal examination. There are many treatment options available to men diagnosed with prostate cancer (e.g., active surveillance, radiotherapy, and surgery). However, there is currently no consensus regarding the optimal treatment.

Cross-References

▶ Prostate-Specific Antigen (PSA)

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Prostate Gland

▶ Prostate

Prostatectomy

► Radical Prostatectomy, Psychological Impact

Prostate-Specific Antigen (PSA)

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Synonyms

Kallikrein-3; P-30 antigen; Semenogelase; Seminin

Definition

Prostate-specific antigen (PSA) is a protein produced by cells of the prostate gland. PSA functions in male fertility, and most of it gets expelled from the body in semen. However, low levels circulate in the blood. Elevated serum PSA levels often indicate the presence of prostate cancer and other prostate disorders.

Description

Measuring PSA

The PSA screening test measures the total level of PSA circulating in the blood serum. PSA levels above 4 ng per milliliter are considered above normal. However, total PSA does not offer a definitive diagnosis for cancer or other prostate disease. Therefore, additional measures of PSA have been integrated to depict a more comprehensive profile of prostate disease characteristics. For example, PSA velocity measures the rate of increase in PSA over time. Generally, larger PSA velocity is associated with prostate cancer. Free PSA is the percentage of circulating PSA that is not bound to other proteins. On average, men with a low percentage of free PSA are more likely to have cancer. PSA density is the PSA level divided by prostate volume. The likelihood of cancer is increased when PSA density is high.

PSA Testing and Current Guidelines

PSA testing has become increasingly popular because it allows detection of prostate cancer at early stages, before palpable detection during digital rectal examination. However, PSA testing also presents a high rate of false-positive and false-negative results, which has generated substantial controversy with regard to whether or not PSA screening is effective at reducing cancer deaths. Two large, randomized clinical trials are currently evaluating the efficacy of PSA screening. Preliminary findings indicate modest reductions in cancer deaths in the screening group but also note over-detection and potential overtreatment of clinically insignificant cancers in the same group. Accounting for these complex issues, the American Cancer Society (ACS) has revised its recommendations regarding routine PSA screening. The revised guidelines now recommend that doctors initiate comprehensive discussions with patients about their options for screening and that men use decision-making tools to make an informed choice about testing. The ACS suggests these guidelines are appropriate for patients over age 50 who are in good health with greater than 10 years of life expectancy. For men at higher risk (e.g., African American men and men with a positive family history), ACS guidelines suggest that discussions about screening begin earlier. The ACS does not endorse screening for men with several comorbid conditions or for men with less than 10 years of life expectancy. In response to the preliminary findings from the previously mentioned studies, the American Urological Association (AUA) also revised its screening recommendations, which

suggest extending screening to younger men. The AUA advises that PSA screening should be offered to well-informed men aged 40 years or older who have a life expectancy of at least 10 years. Additionally, AUA guidelines emphasize a shift away from using a single PSA threshold to determine whether to proceed to additional diagnostics. Instead, the combination of many factors (e.g., PSA profile over time, family history, race, age) should be considered.

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Prostatic Adenocarcinoma

► Cancer, Prostate

Protected Sex

► Condom Use

Protection of Human Subjects

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Synonyms

Human subjects protections

Definition

The organized oversight of research to ensure the rights and well-being of participants.

Description

The protection of human subjects in clinical research evolved in response to conditions surrounding medical research that were deemed unacceptable in the early to mid-twentieth century. In December 1946, an American military tribunal opened criminal proceedings against 23 German physicians who conducted medical experiments on thousands of concentration camp prisoners without their consent. Most of the subjects of these experiments died or were permanently disabled as a result. The Nuremberg Code of 1948 resulted, stating that "voluntary consent of a human subject is absolutely essential" and that "the benefits of research must outweigh the risks" (NIH). In 1964, the World Medical Association published recommendations for research involving human subjects, and the Declaration of Helsinki governs international research ethics and defines rules for "research combined with clinical care" and

"non-therapeutic research." This declaration was revised in 1975, 1983, 1989, and 1996 and remains the basis for Good Clinical practices used today (WMA).

In the United States, the Tuskeegee Syphilis Study (1932–1972) described the natural history of syphilis in 600 low-income African American males, 400 of whom were infected. Over 40 years, researchers provided medical examinations, but infected subjects were never told of their disease nor offered treatment, even after a known cure became available in 1947. Many of the subjects died from syphilis-related causes during the study. The study was stopped in 1973 by the U.S. Department of Health, Education and Welfare after its existence was publicized (CDC). The publicity generated by the Nuremberg trials, the Tuskeegee study, and other studies created a mistrust of medical researchers and a demand for a standards and guidelines for the ethical conduct of research. On July 12, 1974, the National Research Act (Pub. L. 93–348) was signed into law, creating the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. This commission generated the Belmont Report in 1976, a summary of the ethical principles identified by the Commission that should be used to guide human subjects research. These principles include (1) respect for persons, (2) beneficence, and (3) justice. The application of these general principles is further described in specific guidance for obtaining informed consent, complete assessment of risks, and benefits and selection of research subjects.

Medical research is conducted in a variety of academic and corporate settings, but all human subjects research studies should be evaluated by an Institutional Review Board or similar research oversight committee prior to initiation. This is a requirement for all federally funded research in the United States. These oversight boards are responsible for the review of each proposed study to ensure that the principles of the Belmont Report are applied and that the rights of potential and actual participants are respected. The Association for the Accreditation of Human Research Protection Programs (AAHRPP) reviews the processes established by these research oversight bodies and grants accreditation for such programs that meet general requirements and demonstrate processes geared toward continual improvement of research and the protection of human subjects.

Cross-References

▶ Research Participation, Risks and Benefits of

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Protective Factors

▶ Cardiovascular Risk Factors

Protein Methylation

▶ Methylation

Proteomics

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Definition

Proteomics is the study of all of a genome's putative proteins and involves the systematic analysis of proteins to determine their identity, quantity, and function (Soloviev, Barry, & Terrett, 2004).

Description

The Human Genome Project and related work have focused considerable attention on sequencing aspects of genomic research. However, as Holmes, Ramkissoon, & Giddings (2005) noted, "The eventual goal of these projects is actually to determine how the genome builds life through proteins. DNA has been the focus of attention because the tools for studying it are more advanced and because it is at the heart of the cell, carrying all the information – the blueprint – for life. However, a blueprint without a builder is not very useful, and the proteins are the primary builders within the cell."

It is of interest to characterize the complement of expressed proteins from a single genome. Monitoring the expression and properties of a large number of proteins provides important information about the physiological state of a cell and, by extension, an organism. Cells can express very large numbers of different proteins, and the "expression profile" (the number of proteins expressed and the expression level of each of them) can vary in different cell types. Given that each cell contains all genomic material and hence information, this differential expression of proteins explains why cells perform different functions (Soloviev et al., 2004).

The 20,000–25,000 genes in the human genome actually generate many more than the commensurate number of proteins, with estimates as high as one million appearing in the literature (Augen, 2005). This huge number results from the observation that multiple, distinct proteins can result from a single gene. Consider the following steps in the journey from the genome to the proteome (Holmes et al., 2005):

- DNA replication results in many gene forms.
- Ribonucleic acid (RNA) transcription leads to pre-messenger RNA.
- RNA maturation results in mature messenger RNA.
- Protein translation results in an immature protein.
- Protein maturation results in a mature protein in the proteome (posttranslational modifications are possible here).

The tremendous diversity of proteins in the proteome is facilitated by multiple possible means of protein expression. At each stage of the multistep process just described, alternate mechanisms produce variants of the "standard" protein, resulting in a proteome that is far greater than the genome that generates it. Posttranslational modifications play a considerable part in this creation of diversity. These modifications include, for example, the process of glycosylation in which proteins are glycosylated and hence become glycoproteins, which act as receptors and enzymes.

Nobel Laureate James Watson commented as follows with regard to the fields of proteomics and transcriptomics (Watson, 2004): "In the wake of the Human Genome Project, two new postgenomic fields have duly emerged, both of them burdened with unimaginative names incorporating the '-omic' of their ancestor: proteomics and transcriptomics. Proteomics is the study of the proteins encoded by genes. Transcriptomics is devoted to determining where and when genes are expressed – that is, which genes are transcriptionally active in a given cell."

Cross-References

▶ DNA
▶ Genomics
▶ Human Genome Project

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Proxy

► Surrogate Decision Making

Prozac®

► Selective Serotonin Reuptake Inhibitors (SSRIs)

Psychiatric Diagnosis

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Synonyms

Diagnostic criteria; Psychiatric disorder

Definition

Psychiatric diagnosis defines a psychiatric disorder which causes subjective distress and disability and can be conceptualized based on symptomatology, epidemiology, and pathophysiology. The primary purpose of the psychiatric diagnosis is to distinguish a certain condition from non-disease conditions or other disease conditions and to make health providers communicate better with each other by using shared concepts and languages. Psychiatric diagnosis facilitates researches by maintaining the internal validity of each psychiatric disease and is important for examining the external validity of findings when applying research evidences into individual patients.

Description

The top two most important and frequently used psychiatric diagnoses classification systems are the International Classification of Disease (ICD) by World Health Organization (WHO) and the Diagnostic and Statistical Manual of Mental Disorders (DSM) edited by the American Psychiatric Association.

The ICD is the international standard diagnostic classification of physical and psychiatric diseases and other health conditions, defined by WHO. It has been developed for the purpose of international use since the beginning, and WHO Member States compile national mortality and morbidity statistics based on this diagnostic system. The tenth revision was published in 1992. The classification of mental and behavioral disorders is included in Chap. F. ICD-10 consists of Clinical Descriptions and Diagnostic Guidelines and Diagnostic Criteria for Research. The former provides clinical descriptions detailing the principal signs and symptoms of each disorder. The latter is intended to help those researching specific disorders to maximize the homogeneity of study groups.

The latest version of DSM is the fourth edition text revision published in 2000 (DSM-IV-TR), in which several important features are included. First, it adopts the descriptive approach: the diagnoses criteria are defined based on the symptomatology, rather than the underlying causes. Secondly, clearly defined diagnostic criteria are provided for each specific disorder. These criteria include lists of features that must be present for diagnoses to be made. Thirdly, DSM-IV-TR is

a multidimensional evaluation system (Axis I: clinical disorders and other conditions that may be a focus of clinical attention, Axis II: personality disorders and mental retardation, Axis III: any physical disorder or general medical condition, Axis IV: the psychosocial and environmental problems that contribute significantly to the development or exacerbation of the current disorder, Axis V: a global assessment of functioning). The codes and terms used in the DSM-IV are designed to correspond with the codes used in the ICD-10.

It is also important how to apply these diagnostic criteria into each actual patient, in order to maximize the reliability of psychiatric diagnosis. Structured interviews were developed for this purpose. In structured interviews, the procedures for interviews including how to ask about the presence or absence of certain symptom and how to categorize patients' responses are strictly defined so that high inter-rater reliability of the diagnosis can be achieved. Since currently there are no gold standard objective diagnostic tests for psychiatric diagnosis, structured interviews are considered to be gold standard.

A clinical diagnosis includes the whole process of diagnostic formulation in addition to a psychiatric diagnosis based on the diagnostic criteria. A diagnostic formulation is an attempt to understand each patient comprehensively and individually by describing what has been influencing the feeling and behavior of the patient and what relationship might exist between the patient's life situation/background and the psychiatric illness.

Cross-References

▶ Diagnostic Interview Schedule

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Psychiatric Disorder

▶ Psychiatric Diagnosis
▶ Psychological Disorder
▶ Psychiatric Illness

Psychiatric Illness

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Synonyms

Mental illness; Psychiatric disorder; Psychological disorder

Definition

A condition or syndrome with distinctive cognitive, affective, and/or behavioral symptoms, arising from underlying psychobiological dysfunction and causing significant distress, impairment, or an increased risk of death, pain, disability, or an important loss of freedom (American Psychiatric Association [APA], 2000).

Description

Psychiatry is a branch of medicine that focuses on the diagnosis and treatment of mental illness. It did not emerge as an independent discipline until the late 1800s; however, the roots of psychiatric assessment and treatment extend back to the ancient

Greeks and Egyptians (for a comprehensive overview of the history of psychiatry, see Wallace & Gach, 2008). Psychiatric illnesses are currently diagnosed with reference to either the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; APA, 2000) or the International Classification of Disease, 10th revision (ICD-10; for more information on these systems, see *Psychological Disorders*, this volume). Psychiatric diagnoses are descriptive, and with few exceptions, they convey very little about etiology. McHugh and Slavney (1998) identify different perspectives that psychiatrists use to conceptualize cases and plan interventions. Disease reasoning presupposes that a patients' condition is the result of changes or defects in brain functioning. In contrast to this, behavioral reasoning presupposes that a patient's condition is the result of dysfunctional behavior. These two perspectives suggest different interventions; where the presumed cause is pathology of the brain, it follows that the appropriate treatment would likely involve medical intervention (e.g., pharmaceutical drugs, surgery, transcranial magnetic stimulation), while a behavioral disorder would respond best to behavioral treatment (e.g., attention to antecedents and consequences, behavior modification, exposure therapy). The use of the word "illness" in the term "psychiatric illness" implies that disease reasoning is being used; an illness is something a patient *has* rather than something that they are *doing* (McHugh & Slavney, 1998). Therefore, this term may be more commonly used to refer to psychoses and disorders with known biological pathophysiology (e.g., Huntington's disease) and less commonly used to refer to conditions where symptoms are primarily behavioral or appear more voluntary (e.g., gambling, anorexia nervosa).

Regardless of their presumed origin, psychiatric illnesses such as depression and post-traumatic stress disorder are risk factors for the onset of complex medical conditions like coronary heart disease. Furthermore, psychiatric illnesses may develop as a consequence of disease processes, and can be significant independent predictors of poor prognosis in several conditions, including heart disease and end-stage renal disease.

Cross-References

- ▶ Psychiatric Diagnosis
- ▶ Psychiatric Disorder
- ▶ Psychological Disorder

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Psychiatric Surgery

▶ Psychosurgery

Psychoeducation

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Definition

Psychoeducation is a method of providing patients/clients and their families a theoretical and practical

approach to understanding and coping with the consequences of their psychological disorders/problems or physical illnesses/responses.

The main goals of psychoeducation are the enhancement of adherence; improvement of illness management or stress control skills, such as early recognition of episode recurrence and development of strategies for effective coping with symptoms; improvement of social and occupational functions; and quality of life.

The role of psychoeducation encompasses not only imparting knowledge and information regarding treatment/psychological support through media such as leaflets or information web sites or feedback to individuals based on test results, but it is also characterized by active cooperation such as intervention exercises with patients and their families.

Psychoeducation may be conducted in a group including individuals with similar problems (e.g., chronic diseases such as diabetes, HIV/AIDS, and PTSD) and individual therapy sessions. Group therapy is also expected to foster support among patients/clients. Thus, the psychoeducational approach has a lot in common with general psychosocial support for schizophrenia, mood disorders, eating disorders, and drug addiction, but it can also be applied to further the field of education.

Particularly, in the context of a medical setting, the therapists will try to explain the normal reactions of symptoms related to each psychological disorder or physical illness at the beginning. This will prevent any misinformation from being circulated among the patients and expand their understanding of the intervention, and it will lead to an improvement in the interactions of patients/clients in the treatment. Evidence from systematic reviews has reinforced the effect of these treatments stating that psychoeducational interventions for unipolar depression are effective, can prevent the worsening of depression, and be used as a preventive instrument (e.g., Cuijpers, 1997).

As mentioned above, psychoeducation is a treatment that is routinely practiced in a number of fields, and it will continue to be considered essential in terms of the treatment and prevention of relapses.

Cross-References

▶ Health Education

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Psychological and Social Conditions People Experience in the Workplace

▶ Psychosocial Work Environment

Psychological and Social Effects

▶ Psychosocial Impact

Psychological Disorder

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Synonyms

Behavioral disorder; Emotional disorder; Mental disorder; Psychiatric disorder; Psychiatric illness

Definition

A distinctive pattern of cognitive, and/or behavioral symptoms in an individual, arising from underlying psychobiological dysfunction and causing significant distress, impairment, or an increased risk of death, pain, disability, or an important loss of freedom (American Psychiatric Association, 2000). Psychological disorders do not include culturally sanctioned responses to life events (e.g., feeling sad after a significant loss).

Description

The term "psychological disorder" is often used interchangeably with similar terms, including "mental disorder" and "psychiatric illness." It may be a preferable term to "mental disorder," which evokes a mind/body dualism that is inconsistent with modern theories that emphasize the biopsychosocial origins of disease (Fulford, Thornton, & Graham 2006). The term "psychological disorder" is broad, encompassing both disorders that manifest primarily with dysfunctional behaviors (e.g., anorexia nervosa, alcohol dependence) and disorders that manifest primarily with involuntary symptoms (e.g., schizophrenia, depression; McHugh & Slavney, 1998). In contrast, the term "psychiatric illness" more typically refers to the latter category, assuming that these disorders are more rooted in brain dysfunction (see *Psychiatric Illness*, this volume). To date, genetic studies have not supported this distinction (e.g., Bienvenu, Davydow, & Kendler 2011).

Historical Background

Psychological disorders are cultural constructs, created through a variety of social processes, including debate, voting, and expert consensus (Raskin & Lewandowski, 2000). Classifying psychological symptoms into disorders allows service providers to communicate with one another and for evidence-based knowledge to be accumulated and shared. It can enhance treatment planning and is critical for health care management (e.g., allowing governments to monitor the incidence and prevalence of various conditions in the population and allocate resources appropriately). While modern classification systems are empirically informed, current diagnostic categories are heavily influenced by historical forces (Kendler, 2009). Today, the two most common classification systems for psychological disorders are the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV), and the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10). Both the DSM-IV and the ICD-10 are categorical systems that enable the user to record the presence or absence of a condition or disease according to certain standardized rules; in contrast to this, dimensional systems of classification are quantitative and are more likely to utilize psychometric measures and statistical procedures. In addition to more closely mirroring theoretical models of psychological pathology that characterize symptoms on a continuum with normal functioning (see "▶ Psychological Pathology", this volume), these systems can be helpful in providing additional information that is likely to be important clinically. The importance of dimensional assessment to treatment planning and monitoring in particular has also been highlighted, and several proposed dimensional assessments are being evaluated for feasibility during the upcoming DSM-V field trials (Stein et al. 2010).

The Diagnostic and Statistical Manual of Mental Disorders (DSM)

The DSM is published by the American Psychiatric Association (APA). Its aim is to provide common language and standard criteria for the classification of mental disorders, and it is the primary system used in North America. There have been five revisions since the DSM was first published in 1952 (APA, 2000). The current edition is the 4th edition, text revision (DSM-IV-TR); the fifth edition (DSM-V) is due to be published in May 2013 (American Psychiatric Association, 2011). The DSM describes how qualified individuals can assign diagnoses based on predetermined criteria. Diagnoses are recorded using a multiaxial system, with different disorder subtypes coded on different axes. While efforts have been made to keep the diagnostic codes in the DSM consistent with the ICD, this has not always been possible due to the differing revision cycles. Primary goals for the DSM-V include improving diagnostic validity and reliability and enhancing clinical utility.

International Statistical Classification of Diseases and Related Health Problems (ICD)

The ICD originated in the 1850s, when medical statisticians identified the need for a standard nomenclature to record cause of death and other

important health statistics. Originally published as the International List of Causes of Death by the International Statistical Institute in 1893, responsibility for the ICD was taken over by the World Health Organization (WHO) when it was created in 1948 (World Health Organization, 2007). Currently, the ICD is the international standard diagnostic classification system for epidemiological reporting and research among WHO member states (e.g., monitoring the incidence and prevalence of diseases in a population, recording national mortality and morbidity statistics); it also aims to provide useful information for health management and clinical purposes. The scope of the ICD has increased with each revision and update. In the early 1960s, a series of meetings were held with the aim of improving the diagnosis and classification of mental health disorders. The current edition, the ICD-10, was completed in 2007 and contains a comprehensive listing of "mental and behavioral disorders," which are coded on axis V (F00-F99).

As with psychiatric illnesses, psychological disorders can often predict the risk of developing complex medical conditions (e.g. heart disease); the reverse is also true. Furthermore, psychological disorders have prognostic value in some illnesses, including cancer, heart disease and renal failure.

Cross-References

- ▶ Mental Illness
- ▶ Psychiatric Disorder
- ▶ Psychiatric Illness
- ▶ Psychological Pathology

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Psychological Factors

- ▶ Psychosocial Factors

Psychological Factors and Health

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Synonyms

Psychological variables; Psychosocial factors

Definition

Thoughts, feelings, and attitudes that influence behavior

Description

Behavioral medicine incorporates not only the effect of individual's actions on their health but also how psychological factors affect the physical body. This is a progression from traditional biomedicine, which conceptualizes the mind and the body as separate entities. Behavioral medicine has started to break down this artificial boundary, illuminating the close relationship between mind and body, and therefore the role that psychological factors play in disease.

A key psychological factor is stress, which is known to affect many systems of the body. This summary will focus on the immune system, a system once thought to be independent of psychological factors. Research investigating the effect of stress on vaccinations generally indicates that chronic psychological stress impacts on the immune response. In a study conducted by Cohen and colleagues, 394 healthy individuals completed a questionnaire to assess degree of psychological stress and were then given nasal drops containing a respiratory virus (Cohen, Tyrrell, & Smith, 1991). The rates of respiratory infection increased in a dose-response manner with increases in psychological stress. This relationship was not altered when the researchers controlled for variables that might affect this relationship (e.g., the infectious status of subjects in close vicinity to each other). The level of psychological stress reported by the individuals prior to exposure to the virus was therefore directly related to the level of infection. This relationship has been consistently duplicated; for example, Phillips and colleagues found that the stress of bereavement in the year prior to influenza vaccination was associated with a poorer antibody response (Phillips et al., 2006).

However, it is too simplistic to conclude that stress suppresses the immune system. Different types of psychological stress have different effects on the immune system. It is therefore important to differentiate between acute, short-term stress and long-term chronic stress. It has generally been found that long-term stress suppresses the immune system (Bauer et al., 2000), whereas acute stress potentiates it (Herbert et al., 1994).

It is important to note though that the effect of psychologically stressful events varies between individuals based on how they evaluate the event and their coping strategies (Lazarus & Folkman, 1984). Pettingale and colleagues investigated the effect of coping strategy on recovery from cancer (Pettingale, Morris, Greer, & Haybittle, 1985). Fifty-seven women who had recently undergone mastectomy were interviewed 4 months after their operation. They were categorized in to four groups dependent on coping strategy: stoic acceptance, denial, fighting spirit, and helplessness/hopelessness. They found that coping strategy was related to 10-year disease-free survival; those women who adopted denial or fighting spirit coping strategies tended to survive longer.

The level of chronic stress and coping styles may interact to affect the immune system. Stowell and colleagues found that under conditions of high chronic stress, people who had active coping styles had higher proliferation of leukocytes to stimulation by mitogens than people who had avoidance coping mechanisms (Stowell, Kiecolt-glaser, & Glaser, 2001). However, they also found that when experiencing low levels of chronic stress, people that used avoidance mechanisms to cope had higher proliferation levels of leukocytes than those that used more active mechanisms to cope. The relationships between certain coping methods and immune function may therefore depend on perceived stress levels.

Immune response may also be affected by personality traits such as neuroticism (Phillips, Carroll, Burns, & Drayson, 2005), internalization in adolescents (Morag, Morag, Reichenberg, Lerer, & Yirmiya, 1999), and trait negative affect (Marsland, Cohen, Rabin, & Manuck, 2001). More widely, it has been suggested that a constellation of personality traits such as high levels of anxiety, neuroticism, depression, anger, and hostility may be linked with a range of

diseases (Friedman & Booth-Kewley, 1987). However, prospective studies are required to confirm that these traits contribute to the etiology and progression of disease.

Schnurr and colleagues investigated the effect of posttraumatic stress disorder (PTSD) in 605 veterans of World War II and the Korean conflict (Schnurr & Avion, 2000). They controlled for age, smoking, alcohol use, and body weight at study entry. They found that PTSD symptoms were associated with increased onset of arterial lower gastrointestinal dermatologic and musculoskeletal disorders. The authors state that it is premature to draw firm conclusions from their study about the relationship of PTSD to these disorders. However, their findings were very similar to those reported by Boscarino and colleagues in their study of Vietnam War veterans (Boscarino, 1997)

Less dramatically, it has also been found that daily hassles affect the physical body. In a study of 48 undergraduate students, levels of daily hassles correlated with the General Health Questionnaire somatic symptoms scale (Sheffield, McVey, & Carroll, 1996). Daily hassles have also been linked with fluctuations in blood pressure. Steptoe and colleagues (1996) recorded the blood pressure (BP) hourly from 49 male firefighters on work and nonwork days (Steptoe, Roy, & Evans, 1996). They found that systolic BP readings accompanied by feelings of anger and stress were significantly greater than those without negative moods in both work and nonwork settings. They concluded that the raised systolic BP during working hours observed was affected both by physical activity and concurrent mood and that stress and anger were particularly influential.

Cross-References

- ▶ Psychosocial Predictors
- ▶ Psychosocial Variables

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Psychological Pathology

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Synonyms

Abnormal psychology; Psychopathology

Definition

The scientific study of psychological disorders and their causes.

Description

Psychological pathology is the study of the causes, components, course, and consequences of psychological disorders. These are characterized by *abnormality* and *dysfunction*.

Abnormality

Psychological disorders are defined by diagnostic criteria, like those outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association [APA], 2000) or the International Statistical Classification of Diseases and Related Health Conditions (ICD; World Health Organization, 2007). These criteria are composed of "marker symptoms," or thoughts, feelings, and/or behaviors identified as abnormal for a variety of reasons (e.g., because they cause distress, disadvantage, or disability or are highly inflexible or irrational; Stein et al., 2010). Symptoms can be understood as qualitatively different from normal or as extreme variants of common traits. Some symptoms are abnormal because they deviate significantly from a statistical mean. The notion of deviance from the mean is the underlying rationale for many commonly used psychometric tests, but is perhaps most clearly illustrated using the concept of intelligence. It is assumed that intelligence is normally distributed in the population; thus, individuals whose scores on a standardized test of intelligence fall below a specific cutoff may be diagnosed with mental retardation. It is important to note that even in this circumstance, meeting this cutoff is not sufficient for a diagnosis; there must be additional evidence of dysfunction (e.g., deficits in self-care and academic performance; APA, 2000). Thus, a trait or behavior is not necessarily "pathological" simply because it is highly unusual – high intelligence may be equally rare, but is not usually debilitating. Similarly, some characteristics that are presumed to be dysfunctional may be quite common (e.g., depressive thoughts, binge drinking). Importantly, abnormality can only be defined in reference to a given population; thus, the boundaries between normal and abnormal will shift over time and across cultures.

Dysfunction

Symptoms that cause significant impairment in important life domains may also be considered "pathological." Accordingly, dysfunction is often assessed with reference to the consequences of the symptom or disorder. Increasingly, psychological research is providing evidence of dysfunction by showing that certain psychological traits or behavioral patterns (e.g., perfectionism, type "A" personality, avoidance of feared stimuli) are reliably associated with undesirable physiological, social, and occupational outcomes (e.g., procrastination, chronic hypertension, strengthening of a phobic response). Dysfunction is also sometimes assessed in evolutionary terms, with symptoms referred to as "maladaptive," suggesting that they deviate from functioning that would have led to survival and reproductive success in the past.

Cross-References

- ▶ Psychiatric Disorder
- ▶ Psychiatric Illness
- ▶ Psychological Disorder

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Psychological Predictors

► Psychosocial Predictors

Psychological Researcher

► Psychologist

Psychological Science

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Synonyms

Scientific psychology

Definition

The term *psychological science* refers to the accumulated body of psychological knowledge (i.e., pertaining to brain, behavior, social, or mental processes) that has been generated through the systematic application of the scientific method. The term *psychological science* may also refer to the process of conducting psychological research through the use of the scientific method.

The scientific approach to studying social, mental, and behavioral phenomena has existed for the full history of the field of psychology. Though some have questioned the applicability of scientific methods to researching mental phenomena for at least as long as its existence, psychological science has always been at the core of psychology as a field, and scientific rigor has been an aspiration even within the applied subdisciplines of psychology, including clinical and health psychology. Psychology as a discipline has more strict adherence to the scientific method than most social sciences, and so the nature of accumulated knowledge within psychology in the first century of its existence would be largely considered scientific in nature.

Commitment to the scientific method in psychological research is traceable back to William James (1842–1910) in North America and Wilhelm Wundt (1832–1920) in Europe, though its roots likely extend even earlier than these two individuals. Notably, both James and Wundt were trained initially as physicians, highlighting the long-standing interconnectedness of psychological science and health science from the time that psychology emerged as a legitimate area of scientific inquiry. Psychological knowledge aims to be scientifically based by following basic scientific criteria of empiricism, replicability of a method, and the testing of generalizable hypotheses and models which eventually explain psychological phenomena.

In 1989, the inaugural issue of *Psychological Science* was published by the Association for Psychological Science (formerly named the American Psychological Society). This flagship journal was intended to be a showcase for leading psychological research conducted with rigorous adherence to the scientific method. The prominence of *Psychological Science* has grown steadily from its inception to present, and it is currently among the highest ranking empirical journals in the field of psychology (Association for Psychological Science, 2012).

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Psychological Scientist

▶ Psychologist

Psychological Stress

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Synonyms

Distress; Strain; Stress; Stressor

Definition

H. Selye (1936) defined stress as "non-specific responses that be resulted from a variety of different kinds of stimuli." However, Selye's stress theory has only focused on physiological stress, and psychological factors have not been considered. Research on life stress examined the relationship between diseases and life events. Many studies were conducted for clarifying the psychological factors related to stress, and the results revealed that psychological factors play a significant role in the occurrence of physiological and psychological stress responses. Lazarus and Folkman (1984) proposed that stress occurs when people perceived that the demands from external situations were beyond their coping capacity. Today, the definition "stress is the process of interaction from resolution requests from the environment (known as the *transactional* model)" is widely accepted.

From the perspective of psychological stress research, the ambiguous elements related to stress have distinguished two aspects of stress. One is called "stressors," which cause stress (e.g., interpersonal problem, hard work, noise, and trauma). Another is called "stress responses," which are nonspecific physical and mental changes induced by stressors (e.g., frustration, depression, anxiety, and stomachache). Psychological stress responses that caused by various daily experiences are emotional, cognitive, and behavioral changes; their degrees have also become main factors affecting physical and mental health. However, as mentioned in the definition of Lazarus and Folkman (1984), psychological stressors are related to one's cognition and coping process rather than induced stress responses directly. Therefore, an effective approach for reducing psychological stress responses should include not only the removal of stressors but also enhancing the cognitive and behavioral coping capability.

Cross-References

▶ Cognitive Appraisal
▶ Coping
▶ Mental Stress
▶ Stress, Emotional
▶ Stress Responses
▶ Stressor

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Psychological Stress Task

▶ Stress Test

Psychological Stressor

► Stress Test

Psychological Testing

► Assessment

Psychological Thriving

► Resilience

Psychological Variables

► Psychological Factors and Health
► Psychosocial Variables

Psychologist

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Synonyms

Mental health professional; Psychological researcher; Psychological scientist

Definition

A psychologist is a professional who has earned a doctoral degree in psychology at a regionally accredited university or professional school. Some psychologists are primarily involved in conducting research and contributing to the scientific body of knowledge in psychology, while others use this scientific knowledge in applied settings. Psychologists work in several different work sectors, including clinical practice settings, academic and research settings, and consultation to apply psychological principles in private or public industries. Major settings in which psychologists work include universities and medical schools, private practice, clinics and counseling centers, industry and government, hospitals, and school districts. In recent decades, psychologists have increasingly focused their work on health-related research and with patients in medical settings. This is evidenced in the rapid growth of the membership in the Health Psychology Division of the American Psychological Association (Division 38), and in the fact that psychologists comprise 73% of the interdisciplinary membership of the Society of Behavioral Medicine.

Although psychologists often enjoy a variety of professional roles, some psychologists (e.g., clinical and counseling psychologists) are primarily involved in the practice of psychology. Applied psychologists focus on the identification, assessment, treatment, and/or consultation related to psychological issues impacting human behavior in applied settings. Interventions may include individual, group, or family psychotherapy, as well as consultation with community and private organizations. In order to regulate the practice of psychology and to ensure mental and behavioral health services are provided by qualified professionals, psychologists must obtain a professional license. Each state has its own requirements for licensure; in addition to the doctoral degree, states commonly require additional postdoctoral training and passing scores on national and state licensure exams.

Other psychologists primarily conduct basic or applied research and/or teach in academic or university settings. Psychological science uses statistical and empirical methods of measurement to understand mental processes and behavior, which can be at the social, cognitive, biological, and/or emotional level. Major specialty areas studied in psychology include clinical, counseling, educational, experimental, industrial/organizational, developmental, social, personality, physiological, and quantitative psychology. The American Psychological Association, an organization representing psychologists in the United States,

has 54 divisions and interest groups, demonstrating the range and variety of subdisciplines or specialty interest areas of psychologists. The Association for Psychological Science is an organization dedicated to promoting scientifically oriented psychologists and psychology as a scientific discipline.

Cross-References

- Health Psychology
- Medical Psychology
- Psychological Science

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Psychometric Properties

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Synonyms

Psychometrics

Definition

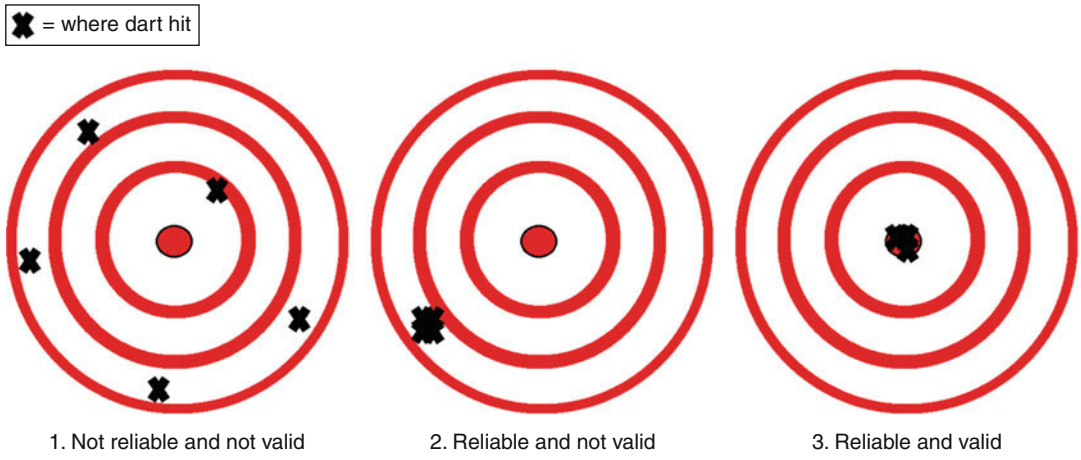
Psychometrics is the construction and validation of measurement instruments and assessing if these instruments are reliable and valid forms of measurement. In behavioral medicine, psychometrics is usually concerned with measuring individual's knowledge, ability, personality, and types of behaviors. Measurement usually takes place in the form of a questionnaire, and questionnaires must be evaluated extensively before being able to state that they have excellent psychometric properties, meaning a scale is both reliable and valid.

Description

A reliable scale consistently measures the same construct. This can occur across testing sessions, individuals, and settings. A valid measure measures what it says it is going to measure. If something is valid, it is always reliable. However, something can be reliable without being valid.

For example (see Fig. 1), if someone has five darts and is told to hit the bull's eye every time, their ideal aim is to be both reliable (consistent) and valid (accurate) with their throws. In part 1, the throws are neither reliable nor valid because their efforts are scattered across the board. In part 2, the throws were reliable, hitting the same spot every time. However, they did not hit the targeted spot of the bull's eye so they were not valid. Part 3 shows the perfect example of being both reliable and valid. The throws hit the spot they intended to hit and did so consistently. This same concept is applied to questionnaire measurements.

If a researcher is trying to create a new scale to measure depression, they want to make sure the scale reliably measures depression in someone with depression. For example, if the same individual filled out the questionnaire three times in the same day, they would produce the same score each time. The researcher also wants to make sure the scale is valid, which means that the scale is actually measuring depressive symptoms and not some other mood or behavior.



Psychometric Properties, Fig. 1 An example of reliability and validity

Cross-References

- ▶ Construct validity
- ▶ Validity

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Psychometric Theory

- ▶ Psychometrics

Psychometrics

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Synonyms

Psychometric theory

Definition

Psychometric theory is a well-recognized approach for developing psychological measurement and standardized education tests (Kim-O & Embretson, 2010). It can be divided into two categories: classical test theory (CTT) and item response theory (IRT). CTT was pioneered a century ago by Spearman, while IRT developed in the 1950s and 1960s.

Kim-O and Embretson (2010) provided a thorough discussion of IRT and why it has become the preferred approach. In the CTT model, estimates of examinees' true test scores are often linear transformations of the raw test score, and are related to relevant normative populations by the transformation. Alternative test forms can be used to estimate true scores if the forms are parallel tests with the same expected true scores and error distributions. Psychometric indices for items in CTT are related to the properties of the test scores, particularly reliability and variance. In other words, item difficulty is defined as the proportion of persons passing or endorsing an item, while item discrimination is defined as the correlation of the item with the total test score.

The CTT approach, however, has several limitations. An examinee's true score depends on the difficulty level of a test, i.e., it is test-dependent: Scores will not be comparable between easy and hard tests. Second, the item characteristics

depend on the ability of examinees, i.e., they are sample-dependent. Item difficulty, for example, will vary substantially if the true score distributions vary between populations. Third, one of the key assumptions, that two true test scores and two error variances are identical in the two tests (the parallel test assumption), is never fully met in practice. Therefore, it becomes difficult to compare examinees who take different tests, and to contrast items whose characteristic indices are computed using different groups of examinees.

In contrast, in the IRT approach the examinee's true score is not test-dependent, the item parameters are not sample-dependent, and the parallel test assumption is not needed. See Kim-O and Embretson (2010) for further discussion of this approach.

Psychometric theory is used extensively in behavioral medicine research. As two examples, Kiernan, Moore, and Schoffman (2011) assessed the psychometric properties, initial levels, and predictive validity of a measure of perceived social support and sabotage from friends and family for healthy eating and physical activity. Second, Lo et al. (2011) introduced the Death and Dying Distress Scale (DADDS), a new, brief measure developed to assess death-related anxiety in advanced cancer and other palliative populations. Their paper described its preliminary psychometrics based on a sample of 33 patients with advanced or metastatic cancer. Additional examples are provided in the "References and Readings" section of this entry.

Cross-References

- ▶ Psychometric Properties
- ▶ Validity
- ▶ Variance

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Psychoneuroendocrinology

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Synonyms

Behavioral endocrinology

Definition

Psychoneuroendocrinology (PNE) is an interdisciplinary field of research integrating psychology, endocrinology, and neuroscience to study the interactions between mind, brain, and hormonal function (Dantzer, 2010).

More specifically, PNE focuses on the way psychological factors influence neuroendocrine functions and, conversely, the way hormones influence higher brain functions. As such, PNE is not only interested in hormone synthesis, release, transport, breakdown, and feedback control but in

the interaction of hormones with their target tissues (e.g., the immune system), including the molecular mechanisms of their action.

PNE research is often concerned with health implications associated with even subtle chronic changes in hormonal patterns. While sex is one of the biggest factors influencing the body's neuroendocrine state, other factors of interest include health effects of age-related changes and changes observed in the context of diseases such as the metabolic syndrome or mood and anxiety disorders. By far, the most intensely studied area, however, is PNE of stress, which aims at describing and understanding neuroendocrine changes associated with acute as well as chronic physiological and especially psychological stress and how stress-related changes in turn impact behavior, cognition, affect, and health (for a review, see Dantzer, 2010).

Cross-References

- ▶ Behavioral Immunology
- ▶ Behavioral Medicine
- ▶ Psychoneuroimmunology
- ▶ Stress
- ▶ Sympathetic Nervous System (SNS)
- ▶ Sympatho-Adrenergic Stimulation

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Psychoneuroimmunology

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Synonyms

Behavioral immunology

Definition

Psychoneuroimmunology (PNI) is the study of the functional relationships between central nervous system, behavior, and immune system.

These relationships have been documented to be multidirectional. For example, while behavior can influence immune processes through changes in nervous system signals, immune signals have been shown to alter the function of the central nervous system, thereby influencing behavior. Further, all systems exert regulatory control over each other, forming a complex communication network.

PNI research aims at describing this network and thus to contribute to the understanding of the behavioral and biological mechanisms underlying the links between psychosocial factors and health as well as disease development and progression. Psychosocial factors studied in PNI thereby range from negative psychological states such as depression and anxiety, to social support, interpersonal relationships, and personality factors. Disease-related processes investigated include cancer, susceptibility to infection, wound healing, HIV/AIDS, autoimmune diseases, and cardiovascular diseases. One important PNI branch focuses on how stress and stress-related neuroendocrine processes (see ▶ Psychoneuroendocrinology) affect health as well as disease development and progression.

As such, PNI is truly interdisciplinary, integrating not only knowledge from immunology, neuroscience, and psychology, but also from areas such as psychiatry, endocrinology, physiology, and pharmacology.

Cross-References

- ▶ Behavioral Immunology
- ▶ Behavioral Medicine
- ▶ Cytokines
- ▶ Immune Responses to Stress
- ▶ Inflammation
- ▶ Psychoneuroendocrinology
- ▶ Sickness Behavior
- ▶ Wound Healing

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Psycho-oncology

► Cancer: Psychosocial Treatment

Psychopathology

► Psychological Pathology

Psychophysiologic Disorders

► Psychosomatic Disorder

Psychophysiologic Reactivity

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Synonyms

Stress response

Definition

Psychophysiologic reactivity refers to cardiovascular and biological responses to situations that are perceived as stressful, threatening, and/or physically harmful. Reactivity is defined as the response with respect to resting values. Some of the stressors that are commonly used in laboratory-based psychophysiological studies are designed to replicate real life, such as problem solving and public speaking tasks (Kamarck & Lovallo, 2003). It is, however, often advantageous to use novel stressors, such as the Stroop word-color conflict task and mirror tracing, in order to remove the potential confounding influences of education and work experience. Psychophysiologic stress testing allows individual differences in responses to standardized stress to be evaluated and related to psychosocial factors and health outcomes (Chida & Hamer, 2008). Behaviorally evoked psychophysiological responses are a relatively stable individual trait, consistent across time and stressor type. The magnitude or pattern of an individual's stress response is largely augmented by the immediate actions of the autonomic nervous system and delayed response of the hypothalamic-pituitary-adrenal axis, which releases various hormones (i.e., catecholamines, cortisol, etc.) into the circulation. These systems drive specific responses that include an increase in blood pressure and heart rate, changes in cardiac sympatho-vagal balance, skeletal muscle vasodilatation, the release of hemostatic and inflammatory markers, and activation of various immune cells. Although psychophysiologic reactivity is beneficial for maximizing performance, excessive and enduring responses are also relevant to health and well-being and are thought to contribute to underlying disease pathology.

Cross-References

► Blood Pressure Reactivity or Responses
► Heart Disease and Cardiovascular Reactivity
► Psychophysiologic Recovery
► Stroop Color-Word Test

References and Readings

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Psychophysiologic Recovery

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Synonyms

Relaxation; Return to baseline; Rumination

Definition

Psychophysiologic recovery is defined as the rate at which a cardiovascular or biological variable returns to resting levels following a stressor. It is not uncommon to observe prolonged elevation in blood pressure following induction of mental stress, and this might last for up to an hour or so following the cessation of the stressor. This has also been observed in naturalistic settings, for example, in teachers, blood pressure has been shown to remain elevated throughout the evening following a stressful working day at school. A slower rate of psychophysiologic recovery has been linked to several risk factors and poorer health outcomes (Brosschot, 2010). One difficulty with isolating the predictive value of recovery is that those taking the longest time to return to baseline are likely to be those who showed the greatest reactivity. Nevertheless, recent evidence suggests that poor recovery and heightened reactivity are in fact independent predictors of health outcomes. The mechanisms underlying poorer psychophysiologic recovery are incompletely understood, although various psychological factors such as rumination and coping strategies have been implicated.

Cross-References

▶ Cardiovascular Recovery
▶ Psychophysiologic Reactivity

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Psychophysiological

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Definition

Psychophysiology is an interdisciplinary science concerned with the impact of psychological exposures and behavioral challenges on physiological systems. The adjective "psychophysiological" describes this impact. For example, the effect on blood pressure of exposure to a mental stress task would be described as a psychophysiological effect.

Cross-References

▶ Psychophysiology: Theory and Methods

Psychophysiology: Theory and Methods

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Synonyms

Psychophysiological

Definition

How does mental and emotional life tie in with the workings of the body? Psychophysiology is the branch of psychology that studies the behavior of the individual in a biological context. It is an attempt to chart the mutual interactions between psychological processes and the workings of the body, giving equal emphasis to both.

Description

A fundamental principle of psychophysiology is that thoughts and feelings cannot exist apart from the body. It follows that a full understanding of psychological processes depends on understanding the biological context from which they proceed. Due to its emphasis on integrating our understanding of mental and physiological processes, psychophysiology has contributed to research methods and theory building in behavioral medicine and to the neurosciences of cognition and emotion. Psychophysiology does this by providing a theoretical basis and a set of measurement methods that help to disentangle relationships between psychology and biology and between our thoughts and emotional experience in relation to good and poor health. From this perspective, psychophysiologists bring a physiological emphasis to the study of behavior and mental processes, and one expression of this emphasis is the contributions psychophysiology has made is to the understanding of emotions and their impact on good and poor health. Although it is accepted in psychophysiology that thoughts and feelings do not exist without the brain and the body, it is necessary to emphasize that the thoughts and feelings of interest are not equivalent to or directly reducible to these physiological processes.

The emphasis of psychophysiology, like that of behavioral medicine itself, is primarily on the whole person. However, it is necessary to measure the functions of specific systems, such as the cardiovascular system, endocrine system, or immune system in the course of psychophysiological investigations. This calls for a methodology that allows emotional experience to be studied simultaneously with physiological functioning in ways that are unobtrusive and minimally invasive. This ensures that the person being studied is behaving in a normal manner, as in everyday life, and is not reacting unduly to the apparatus or laboratory setting. Psychophysiological principles have been used to study responses to stress in the laboratory, responses to stressors in daily life, and individual differences in such responses.

Behavioral medicine is both a science and an approach to clinical practice. These two parts are concerned with the influence of behavioral factors on health and disease. Behavioral medicine holds that states of health can be influenced by overt behaviors, such as dietary habits, and by covert behaviors, such as emotional states and stress responses. This perspective leads behavioral medicine researchers to ask questions about the ways that emotional states and stress responses can affect health through their influence on physiology. The goal is to bring to light how our behaviors and our ways of perceiving and reacting to the world may affect our well-being for better or worse. Such research addresses questions in several major areas, including (1) how the body responds during positive and negative emotion states, (2) how a given person may differ from one time to the next in stress

reactivity, (3) the ways in which persons differ from one another in their stress responses, and (4) on the positive side, to establish the effects of behavior on good health and longevity. To carry out such research, behavioral medicine draws in part on the theory and methods developed in the field of psychophysiology.

In laboratory studies, persons are often exposed to stressors to determine how they react to such challenges both emotionally and physiologically. The results are thought to indicate how emotionally relevant events and behavioral stressors can affect physiology in daily life and therefore whether they may contribute to disease. As one example, a commonly used stressor is public speaking. This challenges the subject to make up a short speech and deliver it without notes and to do so in a fluent and convincing manner. Public speaking is stressful because most persons wish to avoid the embarrassment of doing poorly and to be seen as masterful and competent by observers in the laboratory. Using this method, the social world can be modeled in a small way in the laboratory, and the participant's disposition is invoked to produce a stress response. During public speaking, this process of social evaluation, along with the resulting fear and anxiety, produces substantial increases in heart rate and blood pressure and stress hormones, including catecholamines and cortisol. The person's mood states usually are assessed at rest before the task begins and again at the end using paper-and-pencil measures or brief interviews. Similarly, autonomic reactions are often measured at rest and during stress using automated blood pressure monitors and impedance cardiographs, and endocrine responses may be observed using saliva or blood sampling. In this manner, the person's psychological, cardiovascular, and endocrine reactions may be measured to provide a picture of how physiological reactions are set off by psychologically meaningful events.

This research strategy can then be extended to compare different kinds of people for potential differences in their physiological reactivity to stress. One common example is for the researcher to identify young, healthy individuals who have a family history of high blood pressure and also to find those with no such history. These family history groups can then be compared in the laboratory for differences their stress responses, perhaps using the public speaking stressor or some other method. This allows potential differences in stress reactivity to be assessed in relation to a family history of this prevalent cardiovascular disease. It is then possible to follow such persons for a period of years to establish which persons become hypertensive and which retain a normal blood pressure. Do persons from the family history group have a greater likelihood of becoming hypertensive in middle age? Are persons with greater reactions to stress more likely to become hypertensive, regardless of family history? Such studies therefore allow potential interactions between family history and stress reactivity to be studied. If persons with a family history of hypertension who are also highly reactive to social stress are much more likely to become hypertensive, then we would conclude that the family history created a biologically based risk factor that was enhanced by an elevated level of stress responsivity. In contrast, should risk of hypertension be increased equally by high reactivity in persons with and without a family history of hypertension, we would conclude that family history and reactivity tendencies contribute to hypertension risk in an additive manner.

Although the laboratory provides a well-controlled environment with an extensive range of measurement techniques, ambulatory methods have been used with increasing frequency outside the laboratory to document how challenges in persons' daily lives can affect cardiovascular, endocrine, or immune systems. Such methods measure the person's responses to naturalistic stressors, such as work stress, or challenges in the home, such as family conflict or the stress of caring for a chronically ill spouse. Such studies rely on small, lightweight monitors that can be worn comfortably as persons go about their daily routines. These monitors can make reliable measurements in a wide range of circumstances. Such systems are able to track heart rate, blood pressure, and physical activity. In addition, the person usually reports on their subjective state using brief paper diaries or personal digital assistants.

As in laboratory studies, this ambulatory method may be used to estimate the interaction of stress responses and disease risk. Persons with and without a family history of hypertension may be compared as they go about their daily lives. As in the laboratory, persons with the largest or most prolonged reactions to stress at home or at work are suspected of having greater risk of future disease, and again, they may be followed up for actual occurrence of hypertension in future years. Ambulatory systems currently in use include traditional Holter electrocardiographs, blood pressure monitors, and impedance cardiographs. The success of these systems has led several commercial companies to develop reliable products for research and clinical use.

Although some research focuses on family history, other work seeks to connect psychological dispositions, such as hopelessness, depression, or hostile style to disease risk. Studies using this strategy may compare highly hostile persons with nonhostile individuals with a specific hostility provoking interaction, such as harassing comments during work on a difficult task. By measuring physiological reactions to such specific challenges in persons with different psychological characteristics, a clearer picture may be developed of the psychological and physiological interplay that is suspected of contributing to disease.

While much of this research focuses on negative emotion states, stress responses, and risk of disease, there is a growing interest in positive emotional states and in studying persons who tend frequently to experience the positive emotions of joy and happiness. As in the above examples such persons can be selected for their emotion traits using a combination of self-report techniques and in laboratory tests of brain function. Persons high in typical positive affect can then be compared to those with less positive affective states in their resistance to the effects of stress and in their long-term states of health.

The research examples listed above all depend on testing persons while they are relaxed and resting, as well as when they are under stress or perhaps in a pleasurable mood. For these reasons, it is desirable to use measurement methods that do not cause discomfort or distress. Behavioral medicine research has therefore relied on methods of psychophysiological measurement that are noninvasive or minimally invasive and cause the volunteer no discomfort. The examples above focused on the cardiovascular system which can be studied using methods such as the electrocardiogram, blood pressure monitoring, and impedance cardiography to measure pumping action of the heart and constriction of the blood vessels, and, occasionally, fluid output to assess kidney function. Stress research often uses additional methods to track responses of the endocrine system, involving collection of urine, blood, or saliva for measurement of stress hormones and other substances associated with stress and pain responses. Still, other studies examine the immune system here using minimally invasive techniques in the collection of blood for later measurement of the numbers of immune system cells and their biological activity. Closely related to these physiological measurements is the need to classify persons as to personality and temperament characteristics to establish relationships between acute stress responses or chronic allostatic responses in the lab or in daily life. These considerations call for use of interviews or paper-and-pencil measures of personality and mood states. Finally, the application of such psychophysiological techniques calls for appropriate selection of tasks and ways to analyze the data.

Cross-References

- ▶ Ambulatory Blood Pressure
- ▶ Ambulatory Monitoring
- ▶ Blood Pressure
- ▶ Blood Pressure Reactivity or Responses
- ▶ Heart Rate
- ▶ Hypertension
- ▶ Psychophysiological
- ▶ Psychosocial Factors
- ▶ Psychosocial Predictors
- ▶ Psychosocial Variables
- ▶ Stress Test
- ▶ Systolic Blood Pressure (SBP)

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Psychosocial Adaptation

► Psychosocial Adjustment

Psychosocial Adjustment

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Synonyms

Psychosocial adaptation; Rehabilitation psychology; Response to disability

Definition

Chronic illness and disability profoundly impacts the lives of many individuals. For example, approximately one in five Americans has physical, sensory, psychiatric, or cognitive impairments that affect their daily activities. Psychosocial adaptation entails the integration of illness or disability into the individual's life, identity, self-concept, and body image. Psychosocial adaptation is defined as the process in which a person with a disability moves from a state of disablement to a state of enablement and is characterized by the transformation from negative to positive well-being (Livneh & Antonak, 2005). Observed across disability groups, psychosocial adaptation occurs as the individual moves toward a state of optimal person-environment congruence. The final stage of psychosocial adaptation, known as adjustment, represents maximum congruence between the individual's subjective experience and his or her external environment.

Description

Introduction

Psychosocial adjustment to chronic illness and disability (CID) is a long-term, dynamic process influenced by intrinsic and extrinsic variables within a specific context (Chan, Cardoso, & Chronister, 2009; Livneh & Antonak, 2005). There are several terms used to describe the adjustment to disability process. Specifically, *adjustment, adaptation*, and *acceptance* of disability are concepts commonly used to describe the process and outcome of coping with CID. *Adaptation* has been defined as the dynamic process a person with CID experiences in order to achieve the final state of optimal person-environment congruence known as *adjustment* (Smedema, Bakken-Gillen, & Dalton, 2009). The term *acceptance* was coined by Beatrice Wright (1983) who defined *disability acceptance* as an outcome in which the disability is incorporated as part of the individual's self-concept and is accepted as non-devaluing.

Today, *response to disability* is a widely accepted terminology considered to most accurately describe the adjustment process, because it fully conveys response to disability as a subjective experience that is not necessarily negative. Furthermore, response to disability involves a dynamic process as opposed to a one-time event (Smart, 2009). The response to disability process reaches beyond psychological aspects of adjustment to include a complex and dynamic interaction of a wide variety of psychological, societal, environmental, and personal factors. This entry will provide readers with a review of the prominent psychological, social, environmental, and personal factors that interact to influence the individual process.

Psychological Factors

Somatopsychology. Psychological aspects of CID have been most broadly explored in the context of *somatopsychology*, the study of the physique's influence on behavior and how that relationship is mediated by the effectiveness of the body as a tool for actions. The emphasis of somatopsychology is on the meaning of disability that is unique to the individual, as well as the value the disability holds for other individuals in a person's life (Smedema et al., 2009). The theory considers self-concept, body image, and coping to be psychological schemas and functions crucial to successful adaptation. Specifically, *self-concept* and *body image* represent mental schemas by which humans perceive and identify themselves. An individual with CID must alter one's body image and self-concept to incorporate the physical changes into one's daily life. Therefore, reorganization of these mental schemas is critical to successful adaptation (Livneh & Antonak, 2005).

Coping. *Coping* strategies also affect the response to disability process. Coping requires the individual draw on some personal or environmental resource to reduce the negative impact of a stressor (Chronister, Johnson, & Lin, 2009), including both adaptive and maladaptive strategies. In the context of disability adjustment, coping generally refers to cognitions, emotions, or behaviors that mediate the relationship between disability-related stressors (i.e., nature, type, duration, prognosis, perception, and severity) and the response to disability. Coping strategies associated with response to disability can be divided into three psychological categories: cognitive, behavioral, and affective (Smart, 2009). *Cognitive* response refers to how an individual chooses to think about or view the disability. *Behavioral* response refers to actions taken to manage the disability, including compliance to treatment recommendations, seeking social support, returning to work, and using self-advocacy strategies to manage the impact of stigma and prejudice. *Affective* response refers to how the individual feels about the disability and how he or she manages the emotions associated with the disability (Smart, 2009). A positive coping strategy within the context of disability may include having a realistic view of the disability and awareness of limitations without exaggerating them. Conversely, a negative coping strategy may involve substance use or self-blame. The coping strategies employed strongly influence the response to disability. For example, healthy coping strategies, such as seeking out social support or redefining life goals, may improve body image and quality of life while decreasing social isolation and feelings of helplessness.

Based upon the disability acceptance theory (Wright, 1983), Wright developed a cognitive restructuring framework known as the *coping* versus *succumbing* model. In this model, a person said to be *succumbing* to disability overemphasizes negative effects of impairment and neglects the challenge for change and meaningful adaptation. Conversely, a person said to be *coping* with disability is able to focus on personal assets and is oriented to activities that are within the individual's physical capabilities (Smedema et al., 2009). Wright (1983) proposed four primary value changes that reflect the *coping* perspective including (a) *Enlargement of the scope of values*, which requires the individual recognize that values beyond those presumed lost can be achieved despite limitations of CID; (b) *Subordination of the physique* occurs when

the individual changes the cognitive belief that physical is a true representation of one's worth, desirability, or competency; (c) *Containment of disability effects* occurs when the individual recognizes disability as limited to the impact of the actual impairment, rather than being globally debilitating; and (d) *Transformation from comparative status to asset values*, which occurs when the individual avoids comparing oneself to a nondisabled standard and focuses attention on his or her assets (Smart, 2009). The four primary value changes challenge each of the previously held beliefs, resulting in acceptance of disability (Wright, 1983). Conversely, signs of the *succumbing* perspective include (a) denial or acting as if the disability does not exist; (b) idolizing normal standards or applying old values to the new situation; (c) failure to modify previous aspirations within the context new situations; (d) eclipsing behavioral possibilities and limiting one's opportunity to learn new skills to address the new situations more effectively; and (e) overcompensation of perceived deficiencies in one area by exaggerated striving in another area (Wright, 1983).

Stage model. The response to disability process has also been conceptualized as a sequence of psychological stages, similar to those experienced during grief (Smedema et al., 2009). Stage models typically describe the process of adjustment as a linear series of psychological stages, requiring the completion of previous stages before the final stage of adjustment. Many stage models have been proposed to describe stages of adjustment. Livneh and Antonak (2005) concluded that the numerous stage models may be described within these five broad categories: (a) initial impact, which includes shock and anxiety; (b) defense mobilization, which includes bargaining and denial; (c) initial realization, which includes mourning, depression, and internalized anger; (d) retaliation, which includes externalized anger or aggression; and (e) reintegration or reorganization, which includes acknowledgment, acceptance, and final adjustment. The stage models provide a structure for understanding and predicting the course and outcome of an individual's response process (Smart, 2009). Nonetheless, the applicability of the stage theory to persons with CID has been criticized for the following three reasons: (a) "stages" are not universally experienced; (b) a state of final adjustment (e.g., resolution, acceptance, assimilation) is not always achieved; and (c) psychological recovery does not follow an orderly sequence of reaction phases (Livneh & Antonak, 2005). Finally, the existence of a universal, progressive, phase-like, orderly sequence of predetermined psychosocial reactions to disability has not been adequately supported by empirical research (Livneh & Antonak).

Ecological model. The most contemporary approach to conceptualizing and understanding the response to disability process is the *ecological* approach. Considered atheoretical, this approach incorporates components of somatopsychology and stage theory, while emphasizing the interaction of personal *and* contextual variables (social/environmental and personal factors) on psychosocial adaptation (Smedema et al., 2009). This approach also adopts a comprehensive and holistic approach to outcome measurement beyond that of acceptance or adjustment to CID, encompassing a person's overarching quality of life (Livneh & Antonak, 2005). As such, understanding response to disability beyond the psychological processes described above is critical in developing a full perspective of an individual's response to disability. Below is a review of key contextual variables important to consider in the response process.

Societal Factors

Societal definitions of disability. The manner in which society defines CID influences the adjustment to process. Definitions of disability help to identify the location of the problem and who is held responsible for the solution (Smart, 2009). Four of the most popular models of disability include the (a) biomedical model; (b) environmental model; (c) functional model; and (d) sociopolitical model. The biomedical model has the longest history. This model defines disability as pathology located within the individual and represents a deviation from the norm.

Therefore, treatment is focused solely on "fixing" the individual. The environmental model suggests that the individual's environment may cause, define, or exaggerate the disability. For example, if a person with paraplegia does not have a wheelchair, then the impairment is worsened. The functional model posits that the functions of the individual influence the definition of the disability. For example, an individual who is physically active would be much more affected by mobility impairments. Finally, the sociopolitical model, also known as the Minority Group Model or the Independent Living Model, proposes that disability is not a personal attribute, but caused by society, and thus society should bear the responsibility for dealing with disability (Smart, 2009). *Self-advocacy* is a critical component of the sociopolitical model of disability. Self-advocacy is rooted in the American ideals of autonomy and self-determination. In contrast to consequences of the medical model, including dependency, marginality, and social exclusion, self-advocacy refers to persons with disabilities taking control of their own lives, speaking up for themselves, being in control of their own resources, and having the right to make life decisions without undue influence or control from others.

The World Health Organization International Classification of Functioning, Disability and Health (WHO, 2001) is a contemporary, biopsychosocial approach to defining disability that considers the biomedical, environmental, functional, and social models in its explanation of disability. This model conceptualizes disability along five major domains: (a) body functions and structures; (b) activities; (c) participation; (d) personal factors; and (e) environmental factors (Chan, Gelman, Ditchman, Kim, & Chiu, 2009). The ICF recognizes disability as an interaction between all of these factors and cannot be defined apart from the individual's context.

Societal attitudes. Negative attitudes toward persons with disabilities are well documented in the literature (Chan, Livneh, Pruett, Wang, & Zheng, 2009). Negative attitudes or unfavorable evaluative statements related to a person, object, or event are considered *invisible barriers* that arise from the environment and impact the response process by limiting opportunities, access, and help-seeking behaviors, as well as reducing overall quality of life (Chan, Livneh et al., 2009). Related concepts include *prejudice, discrimination*, and *stigma*. *Prejudice* is a negative generalization toward a group of people and the assumption that an individual belonging to that group has the characteristics based on the generalization. For example, "all persons with CID are intellectually inferior." *Discrimination* is the action carried out based upon prejudice. For example, an employer who does not hire a person with CID because he or she believes persons with CID are "unsafe." Finally, *stigma* is a term that encompasses the problems associated with stereotyping, prejudice, and discrimination; it is the chain of events resulting from negative attitudes and beliefs, resulting in discrimination. Persons with disabilities often have limited access to work, housing, and other community resources because of stigmatizing attitudes that have led to discriminatory behavior (Chan, Livneh et al.).

Commonly cited sources of negative attitudes and stereotypical views regarding persons with CID include the *safety threat*, the *ambiguity of disability*, the *salience of the disability, spread or overgeneralization*, *moral accountability for the cause and management of the disability*, *inferred emotional consequences of the disability*, and the *fear of acquiring a disability* (Smart, 2009). Cook (1998) indicated that the general public also exhibits a "hierarchy of preferences" for specific groups of persons with CID; for example, people hold more favorable attitudes toward persons with physical disabilities than individuals with mental disabilities and persons tend to have more positive attitudes toward persons with intellectual disabilities than those with psychiatric disabilities.

Environmental Factors

A large majority of persons with CID live at or below the poverty level (Smart, 2009). Although most persons with CID report they want to work (Louis Harris Associate Inc. Polls, 1994), and despite protections afforded by the Americans with Disabilities Act, persons with CID have

greater difficulty finding or maintaining work, and unemployment and underemployment rates of persons with disabilities are high (Smart, 2009). This is due in part to prejudice and discrimination, worksite inaccessibility, and financial disincentives built into many disability benefits programs (e.g., SSI/SSDI). Other environmental factors that influence the response process include limited mobility and access to transportation, architectural barriers, frequency and duration of hospitalizations, lack of institutional support (medical services, educational programs and technological supports; political and religious groups), poor living conditions, limited availability of job opportunities, and inadequate accessibility of worksites (Livneh & Antonak, 2005).

Personal Factors

Age and developmental status. Age and developmental stage, such as those identified by Erikson (1968), interact with CID to influence the response process. For example, the process of adaptation differs significantly between individuals born with CID and those who acquire CID later in life. Developmentally speaking, for an *infant* with a congenital disability, the primary task of establishing trust in the world through the relationship with mother or primary caregiver may be compromised if the infant is hospitalized for long periods and is cared for by multiple health professionals (Smart, 2009), whereas during *early adulthood*, the tasks of establishing a family and beginning a career are important and may be impacted by CID. For *older adults*, the resulting impact of CID on independence and functioning is variable, ranging from minimal impact to substantial lifestyle change. While functional loss and disability may be a normal part of aging for some, social isolation, dependence, restricted activities and participation, and the loss of loved ones surrounding the individual can impact quality of life. Indeed, with disability, older adults face multiple life transitions in later years of life.

Gender. Gender is important to consider in the response process. Patterson, DeLaGarza, and Schaller (2005) suggest that men and women respond differently to various CIDs. For example, in the area of spinal cord injury, men experience greater difficulties related to sexual functioning than women, resulting in feelings of loss of "manhood" or "masculinity." With respect HIV/AIDS, women are more socially isolated than men because of cultural backgrounds commonly associated with females with HIV/AIDS, and because rates of transmission are lower and occur through a different mode. Furthermore, a woman with HIV/AIDS experiences issues related to pregnancy, including potential transmission from mother to infant. Women and men also respond differently following myocardial infarction, such that men return to work sooner and are more likely to participate in physical activity to cope with stressors related to the condition.

Culture. *Culture* involves the beliefs, customs, practices, social behaviors, and set of attitudes of a particular nation or group of people (Chronister & Johnson, 2009), and *worldview* is the framework of ideas and beliefs through which an individual interprets the world and interacts with it according to their philosophy, values, emotions, and ethics. Culture and worldview inform how disability is defined and experienced, and both aspects contribute to the response to disability process. For example, in contrast to the explanation of disability perpetuated by the medical model, some cultures perceive the origin of disability to be of the metaphysical-spiritual realm. For other cultures, disability is a condition that should not be altered, because it is considered to be predetermined by fate and not amenable to adaptive intervention. For example, the deaf culture rejects the notion that group members have a disability and identify as individuals with a different communication modality that live in a hearing world. Furthermore, the number of persons from culturally diverse backgrounds in the USA with CID is disproportionate, and these individuals are often at risk for experiencing multiple negative experiences or "double" discrimination and stigmatization, barriers that are likely to influence response to CID (Chronister & Johnson, 2009).

Disability. Disability characteristics are also important to consider in the adjustment process and vary significantly across and within

conditions. According to Smart (2009), there are ten disability factors that influence response to disability including time of onset (congenital, acquired), type of onset (insidious versus acute), course of disability (direction, pace of movement, degree of predictability), functions impaired (meaning of functioning, degree of intrusiveness, residual functioning and assistive technology), severity of the disability (number of disabilities experienced and areas of functioning affected, treatment necessary, and degree of stigma directed at the individual), visibility of the disability, degree of disfigurement, and prognosis (what is expected for the future).

Sexual orientation/identity. Sexual orientation is an important factor to consider in the response to disability process. Persons with CID that are identified with sexual orientations, such as lesbian, gay, bisexual, transgender, queer, questioning, intersex, and asexual (LGBTQQIA), are vulnerable to stereotypes, bigotry, abuse, bullying, and violence. They are subject to a complex array of prejudices by the mainstream population, including double prejudice for equal rights, higher rates of marginalization and discrimination, confusion in navigating identity development, and the prevailing view that persons with disability are asexual or unsuitable sexual partners (Miville, Romero, & Corpus, 2009).

Conclusion

Response to CID involves a complex and dynamic interaction of psychological, social, environmental, and personal variables. Somatopsychology and stage models provide a foundation for understanding the psychological processes of disability adjustment. The ecological approach builds upon this work to facilitate a broader conceptualization of psychosocial adjustment to address the importance of additional personal and contextual variables. Indeed, response to CID is a unique, personal experience that must be considered within the individual's context, including the sociocultural influences that contribute to how society defines and responds to CID. Contemporary definitions of disability conceptualize disability from a biopsychosocial perspective (i.e., WHO ICF model), recognizing body functioning and contextual factors as critical to disability determination and intervention planning. This framework, coupled with the ecological approach to adjustment to disability, replaces traditional approaches to yield a more holistic picture of adaptation.

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Cross-References

▶ Attitudes
▶ Chronic Disease or Illness
▶ Coping
▶ Depression
▶ Disability
▶ Health Disparities

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Psychosocial Aspects

► Psychosocial Characteristics

Psychosocial Characteristics

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Synonyms

Psychosocial aspects; Psychosocial factors

Definition

Psychosocial characteristics is a term used to describe the influences of social factors on an individual's mental health and behavior.

Description

A psychosocial approach to human behavior involves the relation between intrapersonal psychological and environmental aspects. Psychosocial characteristics is commonly described as an individual's psychological development in relation to his/her social and cultural

environment. "Psychosocial" means "pertaining to the influence of social factors on an individual's mind or behavior, and to the interrelation of behavioral and social factors" (Oxford English Dictionary, 2012). Psychosocial factors, at least in the context of health research, can be defined as the mediation of the effects of social structural factors on individual health, conditioned and modified by the social structures contexts in which they exist (Martikainen, Bartley, & Lahelma, 2002). These statements raise the question of what the relevant broader social structural forces are, and how such forces might influence health through their effects on individual features.

Individual psychological and social aspects are related to individual's social conditions, mental and emotional health. For example, the main factors that influence children's mental health are the social and psychological environment (Halpen & Figueiras, 2004).

Environmental factors play an important role in the etiology of emotional problems in childhood. The cumulative risk effects from a "vulnerable environment," e.g., negligence, poverty, drug abuse, are more important in determining emotional problems in children than the presence of one single stressor, regardless of its magnitude. According to Barylnik (2003), the analysis of the characteristics of a juvenile delinquent's sample showed a high rate of psychiatric disorder and social phobia, alcoholism, organic brain dysfunctions, low intelligence quotients, and behavior problems.

The term "psychosocial" is widely used for determining an individual's health outcome. Psychological and social factors expressed as thoughts, expressive emotions, and behaviors are significant for human functioning and the occurrence of disease. Mentally healthy people tend to react in positive ways to negative situations, compared to emotional unstable people, who react negatively to similar situations. Hence, irrational thoughts may be a sign of bad psychosocial health. Therefore, for psychosocial instable people it is preferable to have special social bonds with and social support from other people. On the other hand, prejudice from others is often a result of poor psychosocial health that causes poor social relations.

Hence it is understood that health is better understood in terms of a combination of biological, psychological, and social factors rather than only in biological terms (Santrock, 2007). This is in contrast to the traditional and reductionist biomedical model of medicine which suggests that every disease process can be explained in terms of an underlying deviation from normal function such as a pathogen, genetic or developmental abnormality or injury (Engel, 1977).

The World Health Organization's (WHO, 2001) definition of health is "a state of complete physical mental and social well-being, and not merely the absence of disease and infirmity." This WHO definition has been criticized because cause and effect is mixed. The concept of "psychosocial health," in some cases, may combine traditional medical definitions of disease and infirmity with measures that reflect individual responses to disease and even in some cases indicators of the social context itself. However, such measures have merit in recognizing individuals' experiences and quality of life, meaning an important outcome of individual's psychosocial condition (Martikainen et al., 2002).

Cross-References

▶ Psychosocial Impact

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Psychosocial Factors

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Synonyms

Psychological factors; Psychosocial variables

Definition

Social factors include general factors at the level of human society concerned with social structure and social processes that impinge on the individual. Psychological factors include individual-level processes and meanings that influence mental states. Sometimes, these words are combined as "psychosocial." This is shorthand term for the combination of psychological and social, but it also implies that the effect of social processes are sometimes mediated through psychological understanding (Stansfeld & Rasul, 2007).

Description

The relationship between psychological factors and the physical body can be influenced by social factors, the effects of which are mediated through psychological understanding. Examples of psychosocial factors include social support, loneliness, marriage status, social disruption, bereavement, work environment, social status, and social integration. To illustrate that the role psychosocial factors can play in physical disease, this entry will focus on the relationship between social support and mortality.

In 1979, Berkman and Syme conducted a prospective study to investigate the relationship between social support and mortality (Berkman & Syme, 1979). The study included 6,928 adults from the general population of Alameda County, California. They recorded four sources of social contact: marriage, contacts with close friends and relatives, church membership, and informal and formal group associations; mortality was followed-up 9 years later. They found that respondents with each type of social tie had lower mortality rates than respondents lacking such connections. From these four variables, they then constructed a Social Network Index, which weighted intimate contacts more heavily than more superficial ones. Using this index, they found a consistent pattern of increased mortality rates with each decrease in social connection. Men who were the most isolated had an age-adjusted mortality rate 2.3 times higher than men with the most connections. This relationship was independent of self reported physical health status, year of death, socioeconomic status, and such health behaviors as smoking, alcohol ingestion, physical inactivity, obesity, and low utilization of preventive health services or health practices.

The effects of level of social support on mortality rates were investigated by Rosengren and colleages (Rosengren, Orth-Gomer, Wedel, & Wilhelmsen, 1993). They invited half of all men in Gothenburg who were born in 1933 (then 50 years old) to have a health examination and complete a measures of emotional support and social integration. Seventy-six percent responded. These men were then followed-up after 7 years, and mortality ascertained. Their data indicated that emotional support may attenuate the impact of adverse life events, possibly by strengthening the psychobiological resistance to stress.

Frasure-Smith and colleagues found in their study of 887 post-myocardial infarction (MI)

patients that depression, but not social support, was directly related to mortality (Frasure-Smith et al., 2000). However, very high levels of support protected patients from the negative prognostic consequences of depression. They found that three different measures of social support independently improved depression: higher scores on a measure of perceived social support, a greater number of close friends and relatives, and living with other people. They suggest that clinicians should ascertain patient's views of their social support in their assessments of post-MI depression.

Differences in health status between people with differing levels of social integration cannot simply be attributed to differences in health behaviors between the two groups. In two parallel studies, Cacioppo and colleagues investigated four mechanisms by which loneliness (a discrepancy between their desired and actual relationships) may negatively impact on morbidity and mortality (Cacioppo et al., 2002): (1) poorer health behaviors than nonlonely individuals, (2) altered cardiovascular activation, (3) elevated levels of hypothalamic pituitary adrenocortical activation, and (4) poorer sleep quality. Participants were 89 undergraduate students, and in a second study, 25 older adults (age range 53–78 years). They found that the health behaviors of lonely and nonlonely participants were similar. However, cardiovascular function differed between these groups in both the younger and older participants. They speculated that the differences they found in the hemodynamic function observed in the younger subjects may contribute to elevated blood pressure in lonely older adults. They also found that younger and older lonely adults suffered lower quality sleep, possibly leading to diminished health and well-being.

The plethora of research in this area, measuring different aspects of social relationships, led to uncertainty as to which aspect increased the risk of mortality. A recent meta-analytic review of 148 studies has revealed that stronger social relationships increased the likelihood of survival by 50% (Holt-Lunstad, Smith, & Layton, 2010). They found that complex measures of social integration were better predictors of mortality than binary indicators of residential status (e.g., living alone or with others). This is partly because living in a negative social relationship can increase risk of mortality. However, they also caution against assuming causation, due to the difficulty of conducting randomized controlled trials to investigate this topic. They conclude that the data they present makes a compelling case for social relationship factors to be viewed as an important risk factor alongside factors such as smoking, diet, and exercise.

Cross-References

- ▶ Acute Myocardial Infarction
- ▶ Bereavement
- ▶ Cardiovascular Risk Factors
- ▶ Daily Stress
- ▶ Loneliness
- ▶ Psychological Factors and Health
- ▶ Psychosocial Characteristics
- ▶ Social Support

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Psychosocial Factors and Traumatic Events

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Synonyms

Interpersonal relationships; Psychosocial stress; Stressful life event

Definition

Psychosocial factors are influences that affect a person psychologically or socially. There are multidimensional constructs encompassing several domains such as mood status (anxiety, depression, distress, and positive affect), cognitive behavioral responses (satisfaction, self-efficacy, self-esteem, and locus of control), and social factors (socioeconomic status, education, employment, religion, ethnicity, family, physical attributes, locality, relationships with others, changes in personal roles, and status).

Description

Psychosocial Factors in Everyday Life

Psychosocial factors and influences differ across individuals and may contribute to the development or aggravation of mental and physical disorders. Previous studies have indicated that depression, social isolation, and behavioral escape-avoidance coping were associated with the risk of mortality for cancer patients (Falagas et al., 2007) and patients with cardiac disease (Rozanski, Blumenthal, & Kaplan, 1999). A serious loss (bereavement, divorce, and disability), relationship problems, work stress, family crisis, financial setback, or any unwelcome life change can trigger depressive disorders (Meltzer, Gill, & Petticrew, 1995). Furthermore, those disorders may negatively impact some psychosocial factors. For example, depressive disorders substantially reduce a person's ability to work effectively and personal and family income and increase the probability of unemployment (Ormel et al., 1999).

Psychosocial Factors in Natural and Technological Disasters

Repeated disasters in Japan such as the Great Hanshin Earthquake and the Great East Japan Earthquake showed us the importance of these psychosocial factors in life events. Furthermore, the Great East Japan Earthquake caused not only death and destruction but also secondary disasters such as the Fukushima nuclear accident. The severity of these natural and technological disasters (e.g., the extent of death and destruction, the length of exposure, evacuation, proximity to the epicenter, and contradictory media reports about the health effects of radiation) are likely to have an adverse impact on victims' mental health (Bromet, Havenaar, & Guey, 2011).

In contrast, positive psychosocial factors in life events such as connectedness to others, the spirit of patience, politeness, and mutual aid may contribute to prevent an aggravation of the situation and change things for the better. In The Great Hanshin Earthquake and The Great East Japan Earthquake, Japanese people have handled their grief and loss and overcome numerous difficulties with mutual cooperation and the spirit of patience. These psychosocial factors provide us the energy to recover from severe life events.

Cross-References

▶ Cardiovascular Disease
▶ Depression: Symptoms
▶ Life Events
▶ Religion/Spirituality
▶ Self-esteem
▶ Socioeconomic Status (SES)

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Psychosocial Impact

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Synonyms

Psychological and social effects

Definition

Psychosocial impact is defined as the effect caused by environmental and/or biological factors on individual's social and/or psychological aspects.

Several psychiatric disorders may affect psychological and social aspects of individual's lives. Examples are (a) obsessive-compulsive disorder (OCD), whereas these patients might present social marital disabilities, problems related to occupations and low income (Vikas, Avasthi, & Sharan, 2011), (b) people with cancer, who experienced negative psychological effect such as bad feelings and fears, as well as moderate to high levels of anxiety and psychological distress (Primo et al., 2000), (c) traumatic events such disasters, urban violence, and expose of terrorism may also impact on present psychosocial status (Eisenman et al., 2009). Natural disasters, like flooding, have been reported to cause a wide range of psychosocial impacts, leading the victims to present psychiatric symptoms (Paranjothy et al., 2011). For example, after the tsunami in Southern Thailand and Hurricane Katrina in the USA caused high levels of posttraumatic stress disorder (PTSD) among the victims. The prevalence of mental health disorders has been significantly higher among individuals who experienced floodwater in their houses compared to individuals who did not face this type of personal experience (Paranjothyet al., 2011). Individuals who are victims of these environmental phenomena might need more substantial and sometimes sustained intervention (de Zulueta, 2007).

Cross-References

▶ Psychosocial Characteristics

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Psychosocial Implications

▶ Genetic Testing, Psychological Implications

Psychosocial Intervention

▶ Cancer: Psychosocial Treatment

Psychosocial Oncology

▶ Cancer: Psychosocial Treatment

Psychosocial Predictors

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Synonyms

Health behavior predictors; Psychological predictors

Definition

Psychosocial variables which act as predictors either of other psychosocial variables or behaviors, cognitions, risk, severity, mortality, or a number of other factors which may relate to behavioral medicine research, such as health outcomes.

Description

Psychosocial variables encompass both the social and psychological aspects of someone's life and cover a broad range of both positive and negative factors often measured in behavioral medicine research. Social factors include quality of life, health behaviors (alcohol consumption, smoking status, drug use), physical activity level, and socioeconomic status, whereas personal factors include depressive symptoms, perceived stress levels, anxiety, and mood (see ▶ Psychosocial Variables). Psychosocial variables often interrelate and can be used to predict behavioral and/or health outcomes. These variables also act as risk factors for mental health and chronic conditions, such as rheumatoid arthritis, HIV, gastrointestinal disorders, and Parkinson's disease, among many others. For these reasons, psychosocial predictors are important to assess when investigating cofactors of disease and targeting interventions within a population.

Within cross-sectional research, psychosocial predictors may correlate with other psychosocial variables or the behavior and health outcomes investigated. Examples of cross-sectional studies using psychosocial predictors within behavioral medicine research includes Ng and Jeffery (2003) who found an inverse relationship between perceived stress and exercise, and Blair and Church (2004) who investigated the link between physical activity status with obesity and health behaviors, such as smoking and diet. Although this design provides immediate research, it is limited to a particular time point for assessing relationships that may vary over time. Alternatively, longitudinal designs are used to study

psychosocial predictors in a group of individuals over a period of time, perhaps for many years. This may permit researchers to predict future behaviors, risk, and health outcomes in research. For example, Leserman et al. (1999) investigated the relationship between perceived stress and AIDS diagnosis in HIV patients over 5.5 years. Also, Whooley et al. (2008) investigated the relationship between depressive symptoms and health behaviors such as physical activity levels, smoking status, and alcohol consumption with risk of cardiovascular events over 5 years in patients with existing coronary heart disease. Taking assessments at multiple time points permits researchers to examine whether changes in psychosocial factors relate to long-term disease or condition changes. Compared to cross-sectional research, a longitudinal study also provides a more accurate idea of the direction of the predictor's relationship. However, cross-sectional and longitudinal studies cannot infer causation or show the direction of the relationship.

Cross-References

▶ Psychosocial Variables

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Psychosocial Stress

▶ Psychosocial Factors and Traumatic Events
▶ Trier Social Stress Test

Psychosocial Traits

▶ Character Traits

Psychosocial Variables

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Synonyms

Health behavior variables; Psychological variables

Definition

Variables encompassing psychological and social factors.

Description

The term "psychosocial" has a broad meaning when considering health research and social epidemiology. It is formed from two words: psychological and social. Psychological factors can be positive, such as happiness, affect, and vitality, or negative, such as anxiety, perceived stress, and depressive symptoms. These can also be split to distinguish between trait and state aspects. Personality traits, depressive factors, well-being, quality of life, and the impact of

significant life events and trauma are less likely to fluctuate on a day to day basis (i.e., more trait-like or stable variables), whereas anxiety, perceived stress, mood, affect, happiness, and vitality are more unstable (i.e., more state-like). Furthermore, cognitive, behavioral, and affective facets within psychosocial factors can be identified. For example, someone may think about taking up smoking, and subsequently begin smoking, which in turn may lower perceived stress levels.

Social factors involve the relationship a person has with their environment, such as their age, sex, ethnicity, level and perception of social support, socioeconomic status, neighborhood factors, family history, and health behaviors. The environment can also promote or hinder whether individuals engage in positive or negative health behavior. For example, certain behavioral factors, such as the likelihood of exercise participation, smoking, alcohol intake, and drug abuse may be influenced by the physical environment. If an individual lives within a community that is safe and accessible, for example, they may be more likely to engage in high levels of outdoor physical activity, such as walking around the neighborhood.

Psychosocial variables therefore encompass a large range of factors relating to an individual's psychological state and social environment and potentially have either positive and negative consequences for health and behavioral outcomes (see ▶ Psychosocial Predictors). These variables are also important to consider when investigating either the risk, or progression, of an illness or disease. For example, high perceived stress levels, anxiety, and depression may accelerate progression of HIV or coronary heart disease (Barefoot et al., 1996; Leserman, 2008). Similarly, understanding of these variables allows researchers to examine developmental processes, such as healthy aging or the effects of a long-term intervention within the population.

There are two main ways of measuring psychosocial variables. Administering questionnaires is the most common method used in research. For example, the Perceived Stress Scale (PSS) (Cohen et al., 1983) assesses the degree to which situations in one's life are perceived as stressful, whereas the Centre for Epidemiological Studies Depression Scale (CES-D) (Kohout et al., 1993) measures current level of depressive symptomatology. The items making up the questionnaire are often summed together to create an overall score for the variable being measured (e.g., depression) and can be compared to norms generated for clinical and general populations. For example, the CES-D questionnaire has a range between 0 and 30, with a score of 10 or more indicating possible clinical depression. It is important that the questionnaires used are reliable, valid, and specific to the population which is being studied. Alternatively, researchers may choose to use structured or semi-structured interviews to assess psychosocial variables. A structured interview involves asking respondents a predetermined and limited number of questions about a specific topic, whereas a semi-structured interview is more flexible and allows new questions to be brought up or emerging topics to be explored. Interviews provide a qualitative aspect to the research, which is often used to complement the quantitative data provided by questionnaires when taking a mixed-methods approach.

Cross-References

▶ Psychosocial Factors
▶ Psychosocial Predictors

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Psychosocial Work Environment

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Synonyms

Mental strain; Physical illness; Psychological and social conditions people experience in the workplace; Stress and occupational health

Definition

Psychosocial work environment pertains to interpersonal and social interactions that influence behavior and development in the workplace. Research has been conducted to determine the effects of the psychosocial work environment on stress levels and overall health. One study in particular found that low levels of support and control at work leads to increased rates of sickness absence (North, Syme, Feeney, Shipley, & Marmot, 1996). In other words, a positive and supportive psychosocial work environment is beneficial to employees in an occupational organization.

Cross-References

- ▶ Job Demand/Control/Strain
- ▶ Positive Affectivity
- ▶ Positive Psychology
- ▶ Psychological Factors
- ▶ Psychosocial Characteristics
- ▶ Psychosocial Impact

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Psychosomatic

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Definition

Psychosomatic is defined as one involving or depending on both the mind and the body as mutually dependent entities.

The term has been used to refer to the following:

1. Physical disorders, those caused or aggravated by psychological factors and, less often, to mental disorders caused or aggravated by physical factors
2. The branch of medicine concerned with the mind-body relations
3. The field of study, one sometimes designated "psychosomatics," concerned with the relationship between mind and body

Description

It is said that the foundation for psychosomatic movement was laid 2,500 years ago in ancient Greece.

In the fifth century BC, Hippocratic principles emphasized what we consider to be some of the basic tenets of psychosomatic medicine: concern about the relationship between the physician and

the patient and about importance of the environment and of the adaptive factors in health and disease.

Francis Bacon advocated investigation of the mental faculties and of the interaction of body and mind by case studies and by study of the relationships between the individual and society. A passage written by Bacon in 1605 is the first explicit scientific statement about psychosomatic medicine in English.

Psychiatry and psychosomatic medicine owe an immense debt to Johann Reli, who was the first use the word psychiatry.

Another pioneer in German psychiatry was Johann Heinroth, who was the first to use the word psychosomatic in 1818. He insisted that the mind in health and disease was essential to the treatment of illness.

The significance of Freud's dynamic principles of psychological causality and of the unconscious is enhanced.

In the 1920s and 1930s, psychosomatic concepts were supported by two major advances in physiology as well as by psychoanalytic findings. Pavlov's discovery of the conditioned reflex furnished a tool for measuring emotional correlates of stress, and Cannon's work on adrenaline, the endocrine glands, and on the autonomic nervous system stimulated the development of research in psychophysiology.

Resurgent interest in psychosomatic medicine in the 1920s and the 1930s started with clinical work, initially case histories that described psychosomatic phenomena. Within a few years, Alexander and Dunbar proposed theories of psychosomatic illness.

In 1950s, Hans Selye advocated a concept that an external stressor had an influence on physical health, which is called "general adaptation syndrome." The theory of Selye contributed to mind and body medical advance greatly.

George L. Engel proposed that health is affected by a biological factor, a psychological factor, and the social support.

After that, including a famous Framingham study, a way of thinking that an unhealthy habit and action had an influence on health directly came to attract attention worldwide. Health and a complicated biological, psychological, and sociological health model about the disease came to be recognized in the medicine, and a field called the behavior medicine was born in this way. The current psychosomatic medicine regards this behavior medicine as the one of the important theoretical bases, but aims at the promotion of the medical care of all people while not only it but also psychology takes in various study.

Cross-References

▶ Psychosomatic Disorder

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Psychosomatic Diseases

▶ Psychosomatic Disorder

Psychosomatic Disorder

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Synonyms

Psychophysiologic disorders; Psychosomatic diseases; Psychosomatic illness

Definition

1. Somatic diseases or disorders characterized by objective organic changes and/or functional changes that could be induced, progressed, aggravated, or exacerbated by psychological, social, and/or behavioral factors.
2. Physical illness or symptom believed to be caused by psychological factors.

Description

The term "psychosomatic" carries two connotations having an ancient tradition in Western thinking and medicine: psychogenesis of disease and holism. Psychogenesis is an etiologic hypothesis about the role of psychological factors in human disease. The core notion of holism is that mind and body is inseparable and mutually dependent aspects of man, and it implies a view of the human being as a whole.

The idea of psychogenesis resulted in the concept of psychosomatic disorder, a physical illness or symptoms believed to be caused by psychological factors. Notion of psychogenesis has been criticized because it is incompatible with current multifactorial view of diseases, and the term "psychosomatic disorder" is misleading since it implies a special class of disorders of psychogenic etiology and absence of psychosomatic interface in other diseases.

Holistic concept resulted in multifactorial model of illness called "biopsychosocial" model by Engel. In this model, illness is a result of interacting mechanisms at the cellular, tissue, organic, interpersonal, and environmental level. Biopsychosocial approach to illness and health covers the psychosomatic medicine, behavioral science, social science, neuroscience, stress physiology and epidemiology, psychoneuroendocrinology/immunology, psycho-oncology, and so on.

Psychosomatic medicine has focused on the study of the interaction of psychosocial and biological factors in health and disease. Psychosocial factors may induce, sustain, or modify the course of virtually all kind of diseases including infections and cancer, though their relative weight may vary from disease to disease and from patient to patient suffering from the same disease. Japanese Society of Psychosomatic Medicine defined psychosomatic disorders as somatic diseases "characterized by objective organic changes and/or functional changes that could be induced, progressed, aggravated, or exacerbated by psychological, social, and/or behavioral factors."

Psychosocial factors possibly affecting individual vulnerability, onset, course, and outcome of diseases are early and recent life events, chronic stress, personality variables, coping ability, social support, psychological state such as depression, anxiety, anger, hostility, irritability, psychological well-being, and abnormal illness behavior. Mechanisms through which psychosocial factors could influence health and disease are mediated by central and autonomic nervous systems, neuroendocrine systems, and immune systems. Psychosocial stressors may also affect health and disease through changes in health-related habits and behaviors, such as smoking, eating, drinking, exercise, and drug use. Psychological factors may also play role in adjustment to disease, attitude to medical care, doctor-patient relationship, adherence to treatment, impairment in social functioning, and quality of life of patients.

For example, high levels of stress, low levels of social support or social isolation, low socioeconomic status, personality factors, and negative emotions such as anger or hostility, depression, and anxiety are associated with increased cardiovascular disease morbidity and mortality. These psychosocial factors have been associated with enhanced sympathetic nervous system activation, impaired parasympathetic activity, increased circulating levels of catecholamines and corticosteroid, enhanced blood coagulation and fibrinolysis, endothelial dysfunction, coronary vasospasm, and various inflammatory markers. Lifestyle modification (e.g., smoking cessation, diet, exercise) improves cardiovascular health. Psychological interventions, such as relaxation, stress management, cognitive, and behavior therapies may improve psychological distress and psychological functioning in cardiovascular patients.

As a summary, the term "psychosomatic disorders" is misleading and discouraged to be used at least in the sense of psychogenic disease. Holistic concept, another major connotation of "psychosomatic," resulted in biopsychosocial model of illness. Irrespective of whether the term "psychosomatic disorder" is used or not, it is important to perform research and medical practice of a disease from a multifactorial perspective.

Cross-References

► Psychoneuroendocrinology

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Psychosomatic Illness

► Psychosomatic Disorder

Psychosomatic Medicine

► Health Psychology

Psychosurgery

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Synonyms

Psychiatric surgery

Definition

Psychosurgery is brain surgery conducted explicitly to amend aspects of human behavior. As such, it can be distinguished from neurosurgery, where the aim is to address some specific and identifiable brain pathology such as a tumor. Although there are noticeable gray areas such as brain surgery for intractable pain or to halt the spread of epileptic seizures from one brain hemisphere to the other, the above distinction is important in differentiating between the primarily behavioral aims of psychosurgery and the primary aims of treating physical pathology that characterize neurosurgery.

Description

The first psychosurgical operation was undertaken on November 12, 1935 by Egas Moniz at the Neurological Institute of the University of Lisbon, Portugal. Moniz's surgery was conducted on severely disturbed psychiatric patients who had proved resistant to other forms of treatment. He called his operation the prefrontal leucotomy; a wire garrote inserted via a cannula or "leucotome" was used to severe connections between the prefrontal cortex and more posterior parts of the brain. In 1949, Moniz was awarded the Nobel Prize in Medicine "for his discovery of the therapeutic value of prefrontal leucotomy in certain psychoses." Moniz's activities in the field of psychosurgery were curtailed, though, when he was shot by one of his psychosurgical patients; the bullet lodged in his spine and he retired, a hemiplegic, in 1944.

However, Moniz's initiative was enthusiastically transported to the USA and UK, where the operation was re-branded: the frontal lobotomy was born. As indicated, the target patient group were psychiatric patients suffering from severe and intransigent psychoses. The Second World War through up a great number of such patients; the late 1940s and early 1950s were to prove the heyday of the frontal lobotomy. It has been estimated that between 40,000 and 50,000 operations were conducted in the USA during

that period with a further 12,000 undertaken in the UK. From its outset, psychosurgery was subject to fierce controversy. Its opponents regarded it as a grievous, unjustified, and irreversible assault on the human personality. Its proponents, on the other hand, confidently testified that it was a valid and efficacious treatment for many seemingly intractable psychiatric disorders. Sober and objective assessment was difficult since the vast majority of psychosurgical data stem from uncontrolled observations where even the minimal attributes of good experimental design are absent: control groups, independent evaluation of treatment effects, lengthy follow-ups, etc. Accordingly, claims of efficacy based on data of such dubious scientific status can command little confidence.

By the late 1950s, psychosurgery was on the wane; the newly introduced major tranquilizers offered a seemingly easier and decidedly less contentious way of managing the behavior of severely disturbed psychiatric patients. Nevertheless, just as it seemed safe to go back into mental hospital, psychosurgery began to re-brand itself once more. By the late 1960s and early 1970s, psychosurgery was enjoying a modest renaissance. This time around, the operations were technically more sophisticated. The main differences, though, were the neural and behavioral targets. No longer was the prefrontal cortex the focus but rather structures that lay deep within the brain: components of the limbic system such as the amygdala, which is implicated in emotion and motivation. No longer was severe psychosis the sole or even main target; instead, the focus had shifted to vaguer and more diagnostically problematic behaviors such as aggression and hyperactivity. Deviance had replaced psychiatric disturbance. As before, the battle between opponents and proponents was enjoined, and as before, the available data did not afford anything like a proper scientific assessment. Again, its day in the sun was short-lived; psychosurgery had all but disappeared by the 1980s. This time, though, it was regulation and legislation that did the trick.

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Psychotherapy for Depression

▶ Depression: Treatment

Psychotherapy for IBS

▶ Irritable Bowel Syndrome (IBS): Psychological Treatment

PTG

▶ Posttraumatic Growth

PTS

▶ Stress, Posttraumatic

Puberty

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Synonyms

Menarche; Sexual maturation

Definition

Puberty is the transition from being sexually immature to sexual maturity and attainment of

reproductive capacity. Complex interactions of hypothalamic-pituitary hormones and neuroendocrine factors take place to initiate puberty. Recent research indicates kisspeptin and its receptor GPR54 to play a key part in the initiation of puberty. Kisspeptin and GPR54 increase at the onset of puberty. Kisspeptin neurons innervate and stimulate hypothalamic gonadotropin releasing hormone (GNRH) neurons. In addition, kisspeptin neurons express estrogen and androgen receptors which may be important for the onset and tempo of puberty. The onset of puberty is also marked by increasing pulse and frequency of GNRH from the hypothalamus. GNRH then stimulates the pituitary to secrete gonadotropins (luteinizing hormone (LH) and follicle stimulating hormone (FSH)) which directly stimulates the ovaries or testes to produce sex steroids. The increase of sex steroids induces the physical changes of puberty. The progressive physical changes during puberty are described by the Tanner staging system. Both boys and girls have five stages. The first Tanner stage (Tanner stage I) is prepubertal or sexual immaturity and the fifth Tanner stage describes a sexually mature adult. Tanner stage II marks the beginning of sexual maturation (Lifshitz, 2007; Oakley, Clifton, & Steiner, 2009).

Puberty begins earlier in girls than boys. The normal range for the onset of puberty in females is 8–13 years of age. The first sign of puberty in girls is breast development at an average age of 10.4 years in Caucasian girls. African American girls begin puberty earlier at a mean age of 9.5 years. Tanner stages follow progress through puberty with changing contour of the breast. The development of pubic hair is not under the same control as the ovaries. Adrenarche is a result of increased adrenal androgens and occurs before breast development in 10% of girls. Pubic hair is also described by Tanner stages. Puberty is also marked by an increase in percent body fat, maturation of the vaginal mucosa, and uterine and endometrial growth. Accelerated growth begins early in puberty for girls with peak growth velocity during Tanner stage II– III. The average age of menarche for Caucasian girls is 12.5 years and 12 years for African American girls. Menarche is associated with a deceleration in growth and typically occurs during Tanner stage IV. Menarche occurs approximately 2 years after Tanner stage II breast development in normally maturing girls. Early menstrual cycles may be anovulatory and irregular with subsequent ovulation and development of regular cycles. Adult contour breast and adult pubic hair distribution marks Tanner stage V and the completion of puberty.

The normal age range for the onset of puberty in boys is 9–14 years. The average age for the development of Tanner stage II for Caucasian males is 12 years and 11.2 years for African American males. The first sign of puberty in boys is increased testicular volume. Puberty progresses with continued testicular enlargement and penile enlargement as described by the Tanner stages. Mid-puberty axillary hair and androgen sensitive hair on the face, chest and back begins. Also in mid-puberty, males have peak linear growth, voice change, and acne. There is a progressive increase in total bone mineral content and lean body mass and a decline in body fat. Spermarche is attained at Tanner stage III. Peak growth velocity occurs during Tanner stage IV in males. Puberty is complete at Tanner stage V with adult genitalia and adult distribution of pubic hair.

Deviations from normal in the onset of puberty and progression through puberty may represent normal variation or pathological disease. Normal variations include premature adrenarche, gynecomastia during male puberty, and premature thelarche in females. Precocious puberty or delayed puberty may represent abnormal pubertal development. It is important to recognize abnormal variations in puberty that may require intervention.

Premature adrenarche is the early development of pubic hair, typically after 6 years of age for males and females. It is more common in females and is usually benign. Females with a history of premature adrenarche have an increased risk of polycystic ovarian syndrome and insulin resistance. A bone age radiograph can be used to determine effects of sex steroids on skeletal maturation. The bone age in

premature adrenarche is normal. In addition, gonadotropin hormones are normal and there is no breast development in females or testicular enlargement in males.

Gynecomastia is usually a self-limiting development of palpable breast tissue in 40% of males during puberty. It usually begins in early puberty and resolves within 2 years. It is typically minimal and does not require treatment. Some conditions are associated with excessive or prolonged gynecomastia including Klinefelter syndrome and other causes of decreased testosterone production. Other pathological causes of gynecomastia are some testicular tumors, liver failure, ketaconazole, spirinolactone, marijuana, and other medications.

In females, early benign breast development is called premature thelarche. It is usually present at birth and increases in size over the first 2 years of life. It may also occur around 6 years of age. It is nonprogressive and is not associated with accelerated growth, elevated pubertal hormones, or other changes associated with puberty. As with premature adrenarche, this is not associated with accelerated growth, normal bone age, or elevated pubertal hormones.

Precocious puberty is the abnormal development of secondary sexual characteristics before 7 years of age in Caucasian females, 6 years of age in African American females, and before 9 years of age in males. Precocious puberty in females is most commonly idiopathic premature activation of the hypothalamic-pituitary-gonadal axis, termed idiopathic central precocious puberty. Other causes of central precocious puberty include abnormalities of the central nervous system (CNS) such as brain tumors, intracranial irradiation, infections, or congenital malformations. CNS pathology is more common in males than in females. Outside of the CNS, estrogen or testosterone production may occur independent of gonadotropin secretion from the pituitary gland. In females, estrogen from ovarian cysts, ovarian tumors, or exogenous estrogen exposure may stimulate the onset of puberty. Rarely, genetic mutations can stimulate ovarian estrogen production. McCune Albright syndrome is due to an activating mutation of a signaling protein that results in café au lait spots, fibrous dysplasia, and precocious puberty in females. In males, androgen production stimulating penile growth and pubic hair can come from adrenal or testicular tumors. Congenital adrenal hyperplasia is due to a genetic mutation that leads to the overproduction of adrenal androgens that causes precocious puberty in males and virilization in females. Virilization in females includes clitoromegaly, hirsutism, and acne.

If puberty does not occur spontaneously prior to 14 years in males and 13 years in females it is considered delayed. In addition, puberty in males should be completed within 4.5 years after its onset. If a female has not menstruated by 16 years of age or 5 years after the onset of puberty it is termed primary amenorrhea. The most common reason for delayed puberty is constitutional delay of growth and puberty. Constitutional delay is characterized by a decline in growth velocity during early childhood followed by a normal growth velocity with a delayed bone age. Puberty occurs late and final height is normal. There is typically a family history of late puberty.

Pathologic causes of delayed puberty can be divided into those due to failure of the hypothalamus or pituitary to secrete gonadotropins and those due to failure of gonads to respond to gonadotropins. Delayed puberty with low gonadotropins can be secondary to chronic disease, genetic syndromes, gene mutations, or CNS pathology. Syndromes that are associated with low gonadotropins are Prader-Willi, Lawrence Moon, and Kallman syndromes. Anorexia, malnutrition, HIV, Crohn's disease and hemoglobinopathies are some of the chronic conditions that may cause delayed puberty. Endocrine disorders associated with delayed puberty are hypothyroidism and hyperprolactinemia. Tumors, radiation, infection, or congenital malformation can affect the production and secretion of gonadotropins.

Delayed puberty due to gonadal failure is most commonly due to sex chromosome abnormalities. Klinefelter syndrome males carry two X chromosomes and one Y chromosome. Klinefelter syndrome is characterized by testicular failure, disproportionate long limbs, poor

musculature, and gynecomastia. In females, Turner syndrome is due to loss of genetic material from one X chromosome. Females with turners have ovarian failure, short stature, and a spectrum of other dysmorphisms. Gonadal failure can also be due to gonadal dysgenesis or direct damage to the gonads such as trauma, medication, radiation or infection (Lifshitz, 2007; Sperling, 2008).

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Public Health

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Definition

Public health refers to those activities by which a society attempts to increase life expectancy, decrease morbidity, and help improve health-related quality of life.

Description

There has often been a widespread misconception that public health is limited to "health care for low-income families." The Centers for Disease Control and Prevention created a list of the ten Great Public Health Achievements in the twentieth century that remind us of how far we have come, how we got here, and exactly what public health is: the active protection of a nation's health and safety, credible information to enhance health decisions, and partnerships with local minorities and organizations to promote good health. The choices of topics for this list were based on the opportunity for prevention and the impact on death, illness, and disability: they are not ranked by order of importance. The list includes the following: vaccination, motor-vehicle safety, safer workplaces, control of infectious diseases, decline in deaths from coronary heart disease (CHD) and stroke, safer and healthier foods, healthier mothers and babies, family planning, fluoridation of drinking water, and last but not least, the recognition of tobacco use as a health hazard.

During this period, the health and life expectancy of persons residing in the United States improved dramatically. Since 1900, the average lifespan of persons in the United States has lengthened by greater than 30 years, of which 25 years of this gain are attributable to advances in public health. The unprecedented increase in longevity seen during the first half of the twentieth century was also seen in other countries, primarily in economically advanced countries. The decrease in mortality rate was largely due to a decline in infectious diseases related to vaccination, decreased exposure to infection because of improved hygiene, improved nutrition, and the development of antibiotics to cope with bacterial infections. However, as infectious diseases declined as the leading cause of mortality in economically advanced countries, they were eclipsed by chronic diseases. By the middle of the twentieth century, CHD, cancer, and stroke accounted for more than 60% of the death rate in the United States.

Public health efforts to eradicate infectious diseases have been successful in an increase in longevity in economically developed and even many less developed countries. Similarly, improvements in healthy lifestyle have led to decreases in morbidity and increases in longevity in these countries during the second half of the twentieth century. At the same time, the HIV/AIDS pandemic in sub-Saharan Africa has led to an even steeper decline in life expectancy. The growing spread of HIV/AIDS across the Asian continent is of considerable concern.

At this point, early in the twenty-first century, the major causes of death in the United States

included (1) heart disease, (2) cancer, (3) stroke, (4) unintentional injuries, (5) chronic obstructive pulmonary disorder, (6) pneumonia and influenza, (7) diabetes, (8) suicide, (9) liver disease, (10) HIV/AIDS, and (11) homicide. Behavioral psychosocial, and sociocultural factors associated with lifestyle contribute to virtually all of these causes of mortality. Even in the case of infectious disease such as pneumonia, risk factors can be related to disruptions of natural pulmonary host mechanisms related to lifestyle factors such as smoking and alcohol abuse. Similarly, infection from HIV is primarily spread through high-risk sexual practices and the sharing of contaminated drug paraphernalia.

As scientists attempted to find specific causal agents in the pathogenesis of cancer and CVD throughout most of the twentieth century, a new approach emerged. Unable to find single causes of diseases, attention shifted to the role of environment and host in the pathogenesis of chronic diseases. Whereas single cause-and-effect models proved successful in studying the genesis of infectious diseases, an understanding of the basis of chronic diseases turned to models based on the presence of risk factors. The identification of risk factors makes prediction of chronic diseases more likely, but individual risk factors cannot be identified as necessary and sufficient causes for many diseases. In this respect, interactions among agent, host, and the environment have now taken center stage.

At the beginning of the risk-factor revolution, it was widely believed that the causes of chronic diseases such as CHD could be explained in terms of a few biological (e.g., high cholesterol, high blood pressure) and lifestyle (e.g., smoking) risk factors; this turned out not to be the case. Other variables contributing to CHD turned out to include physical inactivity, excess consumption of alcohol, and obesity. Still other factors under investigation include individual difference variables such as depression and hostility and sociocultural variables including low socioeconomic status, ethnic minority status, lack of social support, and occupational stress.

To achieve public health objectives, it is sometimes useful to deal with unyielding problems at multiple levels. Although behavioral interventions administered at the individual level tend to produce successful weight loss in the short term, few people maintain their weight loss over the long term. In order for individual-based interventions to succeed on a population basis, such interventions should take place in a sociocultural environment that is conducive to healthful eating and exercise. Improving the availability of healthy food choices, providing economic incentives for healthy eating by selective taxation, ensuring through the schools that children and adolescents get adequate exercise, enhancing accessibility of physical activity for the general public by providing bicycle paths and highway lanes, and initiating mass media campaigns supporting a healthy lifestyle could be useful for maintaining weight loss.

The recent successes in tobacco control in the United States provide a heartening example of how multilevel approaches to a major public health problem can lead to a decline in disease. In this case, the improvements have occurred in cardiovascular disease (CVD), some cancers including lung and esophageal cancer, and respiratory diseases. At the interpersonal level, smoking cessation interventions, sometimes in conjunction with pharmacologic treatment, have been effective. At the organizational level, smoking cessation support groups, school campaigns against smoking, restrictions on smoking in restaurants and work sites, and reductions in health insurance premiums for nonsmokers have been established. Finally, at the societal level, laws against juvenile smoking, taxation of cigarettes, and governmental sponsored antismoking campaigns have all been realized. These measures have led to a marked improvement in the nation's health. Unfortunately, the export of tobacco products outside of the USA to other countries remains a threat to improvements in global public health.

A distinction is sometimes made between clinical or high-risk approaches to disease treatment and prevention versus population-based strategies. Although there is some value in differentiating between these approaches, they should be seen as complementary because neither strategy

is effective for all behaviors or all target groups. Thus, an important public health task is to identify which risk behaviors are open to individual-based versus population-based interventions and how to make these interventions synergistic with one another. Application of the social and behavioral sciences to improve health and combat disease occurs at multiple levels and requires putting into practice different skills both within and across levels. Genetic counseling for those at familial risk of disease, family counseling to reduce substance abuse, and interfamilial violence and group counseling to help those living with HIV/AIDS are examples of interpersonal interventions at the individual level. At the organizational level, interpersonal interventions such as blood pressure screenings and smoking cessation programs, the provision of physical fitness facilities, and media communication have been used in schools, work sites, and community centers. Finally, societal-type interventions involving media and policy actions can occur at the community, state, or federal level. Seat-belt laws, public service announcements about drunk driving, and taxation of cigarettes are examples of interventions at this level.

An important cornerstone of public health is prevention. Primary prevention refers to measures taken to reduce the incidence of disease. In the case of CVD, for example, people may be encouraged to quit smoking, decrease intake of dietary fat, and increase physical activity before diseases become evident. In contrast, secondary prevention involves reducing the prevalence of disease by shortening its duration. Mortality from certain cancers, for example, prostate cancer, is decreased by early detection of the cancers when they are still treatable. Still another form of prevention is tertiary prevention. This involves reducing the complications associated with chronic diseases reducing the complications associated with chronic diseases and minimizing disability and suffering. Medication adherence training in HIV/AIDS patients is a form of tertiary prevention.

Widespread social disorganization and the growing disparity in income within and between nations also pose a global threat to public health. Because public health is a global matter that is closely tied to international policies, hope for future improvements in public health will largely depend on global improvements in public policy.

Cross-References

- ▶ Cancer Prevention
- ▶ Cardiovascular Disease Prevention
- ▶ Cardiovascular Risk Factors
- ▶ Centers for Disease Control and Prevention
- ▶ HIV Prevention
- ▶ Multiple Risk Factors
- ▶ Prevention: Primary, Secondary, Tertiary
- ▶ Smoking Prevention Policies and Programs

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Public Health Education

- ▶ MPH (Masters of Public Health)

Public Interest Advertising

► Social Marketing

Public Service Advertising

► Social Marketing

Pulmonary Disorders, COPD: Psychosocial Aspects

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Synonyms

Chronic obstructive pulmonary disease

Definition

Patients with COPD often suffer from anxiety and depression. These psychological distresses cause low quality of life, social isolation, increased hospitalization rates, and might increase mortality. Treatments include pharmacotherapy, psychotherapy, and pulmonary rehabilitation.

Description

Patients pulmonary disorders are more likely to be of lower self-esteem and downgrade the significance of life in their depression, and chronic obstructive pulmonary disease (COPD) is no exception. However, in spite of the high prevalence of the disease, psychosocial aspects of COPD and other pulmonary diseases have not been fully investigated, compared to cancers or cardiovascular diseases (Hill & Geist, 2008; Hynninen & Breitve, 2005; Kaptein & Scharloo, 2008; Kaptein & Scharloo, 2009; Maurer & Rebbapragada, 2008; von Leupoldt & Dahme, 2007).

(COPD) is a disease characterized by airflow obstruction. The respiratory symptoms are dyspnea, chronic cough, and sputum production. The treatments of COPD include medications focusing on bronchodilators, pulmonary rehabilitation, and oxygen administration.

Psychiatric disorders often appear in patients with COPD. Among them, anxiety and depression are most frequent, but the accurate prevalence is hard to say. In previous reports, the prevalence of anxiety ranges between 10% and 100% and the prevalence of depression, between 10% and 80%. However, it is an indisputable fact that anxiety and depression are often underdiagnosed and/or undertreated. Other disorders include panic disorder, hypochondriasis, and hysteria.

Variables, such as physical disability, smoking, long-term oxygen therapy (LTOT), low body mass index, and severe dyspnea, are associated with anxiety and depression.

As for anxiety, major presumed underlying mechanisms are smoking and dyspnea. Smoking is the most important environmental risk factor for the development of COPD. Adolescents with high levels of anxiety tend to have smoking habits, and smokers with a history of an anxiety-related disorder also experience more symptoms of nicotine withdrawal on cessation of smoking, resulting in tendency to nicotine addiction. Therefore, patients with COPD caused by smoking are likely to show higher levels of anxiety than the general population. Dyspnea is the most common symptom of COPD. The severity of dyspnea changes in response to air temperature or exercise and notably increases during acute exacerbations. For the patients, such episodes of increased dyspnea during exacerbations are associated with anxious feelings, although dyspnea at rest or on exertion does not correlate so much with anxiety. Furthermore, anxiety, in turn, increases the sensation of dyspnea. These bidirectional relationships between dyspnea and anxiety contribute to the increased prevalence of

anxiety-related disorders in COPD (Kaptein & Scharloo, 2008).

Depression in COPD could be caused by various factors such as low body mass index. However, some of them are confounders, making the analysis difficult. The lack of social support for elderly people, their past medical history, and their low socioeconomic status are mixed as risk factors for depression. The use of systemic corticosteroids for treatment, although the long-term use of it is not a standard medication, might cause depression. In addition, there is a relationship between smoking and depression, but little is known about it. Cigarette smoking might prompt a feeling of relaxation for some patients, and smoking cessation could be associated with an increased rate of depression. Chronic hypoxemia and LTOT are also closely related to symptoms of depression, although the underlying mechanisms remain unclear. It is true that LTOT improves survival and exercise capacity, but it may, at the same time, reduce social interactions because the use of oxygen therapy makes the patients lose in several areas of their lives.

Psychological stress typically plays a considerable role in the life of COPD patients because of the interaction of somatic and psychological factors. The emotional response to chronic pulmonary disorders results in further inactivity and social isolation. The patient may feel useless and lose interest in future project. In addition, COPD patients with psychological disorder tend to feel fatigue and short of breath more than patients without such a distress, although psychological distress has not been proved to worsen objective measures of functional exercise capacity. Inadequate perception of dyspnea contributes to a progressive avoidance of activities, resulting in a vicious circle where a physical deconditioning leads to more dyspnea.

As a result, anxiety in COPD patients lowers quality of life and increases hospitalization rates and the economic burden. Intensities of anxiety are correlated with measures of social isolation, suggesting that COPD patients with anxiety have impaired social interactions. The impact of anxiety on the physical disability and mortality of COPD patients is less clear. Depression also causes low quality of life, decreased adherence to treatment, increased frequency of hospital admissions, and prolonged length of stay, resulting in higher medical cost. In addition, depression negatively affects physical function in COPD patients, and the mortality rate among depressed patients is increased. Furthermore, depressed patients tend to make a preference for "do not resuscitate" decisions.

Treatments of psychological distress in COPD patients consist of pharmacotherapy, psychotherapy, and pulmonary rehabilitation.

In pharmacological therapy, antidepressants are commonly used, although evidence for their use in COPD patients is inadequate. Still, they might benefit COPD patients with symptom of anxiety and depression. Selective serotonin reuptake inhibitors (SSRIs) are regarded as first-line therapy. Tricyclic antidepressants and low-dose benzodiazepines could be effective. Administration of benzodiazepines to COPD patients with hypercapnia demands extreme caution because of their respiratory depressant effect; needless to add, each drug has its own side effects and must be used carefully.

Many psychological aspects are relevant to a variety of treatments of COPD. One of the most recent focuses within behavioral treatment on COPD is on self-management. Self-management education is likely to be associated with a reduction in hospital admissions without any detrimental effects in other parameters. Other methods, such as relaxation and biofeedback training, also might have some good effect, although many questions are still not answered.

COPD patients with respiratory symptom should receive comprehensive pulmonary rehabilitation with or without psychological distress. There is growing evidence that it does improve depressive symptoms. However, there remain some questions to be solved. Further research should focus on finding effective and acceptable maintenance strategies. It also remains to be solved whether pulmonary rehabilitation is as effective in COPD patients with severe anxiety and depression. Above all, it is not clear which elements confer psychosocial benefits for COPD patients. Only improvements in exercise capacity

may be associated with improvements in anxiety and depression, or it would be better to add a specific psychological component to pulmonary rehabilitation. At present, it is considered reasonable that a comprehensive pulmonary rehabilitation programs should include at least disease education or psychosocial components as the most effective formats.

Cross-References

► Chronic Obstructive Pulmonary Disease

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Pulmonary Function

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Synonyms

Lung function

Definition

Pulmonary function testing (PFT) is a process for assessing functional status of the lungs, for obstructive and restrictive lung disease screening, and for evaluating treatment response (e.g., medications, chest physical therapy). Spirometry, using a spirometer, is the most common of the pulmonary function tests and measures the amount (volume) and the speed (flow) of air that can be inhaled and exhaled. It is designed to measure changes in lung volume and can only measure lung volume compartments that exchange gas with the atmosphere. Graphical measurement of gas movement (in and out of the chest) is referred to as a spirograph, and the tracing is called a spirogram. Spirogram tracings typically include both predicted and observed values to aid in clinical diagnostic evaluation.

The spirometry procedure is highly dependent on individual effort and cooperation and to ensure reproducibility, is generally repeated three times. Typically, individuals are asked to take the deepest breath they can and then exhale into the sensor as hard as possible, for as long as possible (preferably at least 6 s). It is sometimes directly followed by a rapid inhalation (inspiration) to evaluate for upper airway obstruction. The most common parameters measured in spirometry are vital capacity (VC); forced vital capacity (FVC); forced expiratory volume (FEV) at timed intervals of 0.5, 1.0 (FEV1), 2.0, and 3.0 s; forced expiratory flow 25–75% (FEF 25–75); and maximal voluntary ventilation (MVV). Airflow patency is estimated by measuring the flow of air an individual can exhale as hard and as fast as possible. Reduced airflow or obstruction can be a result of narrowed airways (e.g., asthma, bronchial inflammation, emphysema, tumor external compression). Airflow restriction is a decrease in lung volumes and is a measure of both FVC and residual volume. There are a variety of causes of restrictive lung disorders and include pneumonia, scoliosis, kyphosis, pleural effusion, obesity, tumors, and neuromuscular diseases.

As a person ages, the natural elasticity of the lungs decreases, and this translates into smaller

lung volumes and capacities. Males typically have larger lung volumes and capacities than females. Subsequently, PFT interpretation should be based on results of a normal person of the same age and gender. Body height and size also have an impact of PFT results. As an individual ages, their body mass may increase as a result of increased body fat to lean body mass ratio changes. For example, if an individual becomes obese, the abdominal mass prevents the diaphragm from descending as far as it could, and PFT observed (measured) results will be less than predicted (from preestablished normal data tables). Ethnicity may also impact PFT results, and interpretation of observed data should be compared to normal data of similar ethnic groups. Results are usually given in both raw data (liters per second) and percent predicted (i.e., the test result as a percent of the predicted values for the patients of similar characteristics). Generally, results nearest to 100% of the predicted value are the most normal, and results over 80% are often considered normal.

Cross-References

- ▶ Bronchitis
- ▶ Chronic Obstructive Pulmonary Disease
- ▶ Emphysema

Pulse Rate

- ▶ Heart Rate

Purpose

- ▶ Meaning (Purpose)