FACULTY GUIDE

to accompany

The Mind

Teaching Modules

SECOND EDITION

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WORTH PUBLISHERS
FACULTY GUIDE

to accompany Teaching Modules from The Mind series

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## Contents

### The Brain and the Mind

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Time</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10:45</td>
<td>Unraveling the Mysteries of the Mind</td>
</tr>
<tr>
<td>2</td>
<td>3:03</td>
<td>Hypnotic Dissociation and Pain Relief</td>
</tr>
<tr>
<td>3</td>
<td>9:14</td>
<td>The Placebo Effect: Mind-Body Relationship</td>
</tr>
<tr>
<td>4</td>
<td>10:20</td>
<td>Cognition and the Immune System: Mind/Body Interaction</td>
</tr>
</tbody>
</table>

### Neurobehavioral Aspects of the Mind

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Time</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5:01</td>
<td>Endorphins: The Brain's Natural Morphine</td>
</tr>
<tr>
<td>6</td>
<td>6:51</td>
<td>Brain Mechanisms of Pleasure and Addiction</td>
</tr>
<tr>
<td>7</td>
<td>9:05</td>
<td>The Frontal Lobes: Cognition and Awareness</td>
</tr>
<tr>
<td>8</td>
<td>6:19</td>
<td>Language Processing in the Brain</td>
</tr>
<tr>
<td>9</td>
<td>4:46</td>
<td>Studying the Effects of Subliminal Stimulation on the Mind</td>
</tr>
<tr>
<td>10</td>
<td>12:35</td>
<td>Life Without Memory: The Case of Clive Wearing</td>
</tr>
<tr>
<td>11</td>
<td>32:35</td>
<td>Clive Wearing, Part 2: Living Without Memory</td>
</tr>
</tbody>
</table>

### Development Through the Life Span

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Time</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12:44</td>
<td>Teratogens and Their Effects on the Developing Brain and Mind</td>
</tr>
<tr>
<td>13</td>
<td>3:59</td>
<td>Capabilities of the Newborn</td>
</tr>
<tr>
<td>14</td>
<td>7:34</td>
<td>Infant Cognitive Development</td>
</tr>
<tr>
<td>15</td>
<td>6:44</td>
<td>Social Development in Infancy</td>
</tr>
<tr>
<td>16</td>
<td>10:09</td>
<td>The Effect of Aging on Cognitive Function: Nature/Nurture</td>
</tr>
<tr>
<td>17</td>
<td>11:16</td>
<td>Aging and Memory</td>
</tr>
<tr>
<td>18</td>
<td>9:27</td>
<td>Effects of Mental and Physical Activity on Brain/Mind</td>
</tr>
<tr>
<td>19</td>
<td>11:40</td>
<td>Understanding Alzheimer's Disease</td>
</tr>
</tbody>
</table>

### Pain and Its Treatment

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Time</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>4:29</td>
<td>Phantom Limb Pain</td>
</tr>
<tr>
<td>21</td>
<td>14:23</td>
<td>Treating Chronic Pain</td>
</tr>
<tr>
<td>22</td>
<td>4:24</td>
<td>Depressants and Their Addictive Effect on the Brain</td>
</tr>
</tbody>
</table>

### Language and Communication

<table>
<thead>
<tr>
<th>Module Number</th>
<th>Time</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>4:03</td>
<td>Infant Speech Sound Discrimination</td>
</tr>
<tr>
<td>24</td>
<td>3:44</td>
<td>Language Predisposition</td>
</tr>
<tr>
<td>25</td>
<td>6:08</td>
<td>Human Language: Signed and Spoken</td>
</tr>
<tr>
<td>26</td>
<td>7:29</td>
<td>The Bilingual Brain</td>
</tr>
<tr>
<td>27</td>
<td>14:39</td>
<td>Animal Language</td>
</tr>
<tr>
<td>28</td>
<td>4:42</td>
<td>Language and Culture</td>
</tr>
</tbody>
</table>
Drugs and the Mind
29  11:40  Alcohol Addiction: Hereditary Factors
30  19:40  Treating Drug Addiction: A Behavioral Approach

Mood Disorders
31  7:34  Mood Disorders: Mania and Depression
32  6:11  Mood Disorders: Hereditary Factors
33  12:29  Mood Disorders: Medication and Talk Therapy
34  5:45  Treating Depression: Electroconvulsive Therapy (ECT)

Personality Disorders
35  18:39  The Mind of the Psychopath
Introduction

*The Mind* Teaching Modules, Second Edition, has been designed to enhance the teaching of general psychology and related courses. It contains thirty-five modules, averaging nine minutes each. The brevity of the modules provides instructors with the flexibility to incorporate them easily into their courses.

Originally edited from the PBS series *The Mind*—nine one-hour programs that first aired in 1988—this series of modules was first produced in cooperation with WNET, New York, with funding from Worth Publishers and distributed as part of the Annenberg/CPB Multimedia Collection.

The modules were revised with the following in mind:

- To maintain the integrity of the contents of the larger programs from which they were derived while capturing significant principles, facts, and/or theories into a meaningful, short-segment video.
- To keep the individual modules as short and comprehensive as possible.
- To identify all participants, including their institutional affiliations.
- To illustrate commonly presented topics in college-level general psychology textbooks and in more advanced college course work.
- To design modules that afford maximum user flexibility, keeping in mind individual preferences.
- To expand their usefulness beyond the general psychology course to courses in related areas.

**New to the Second Edition**
The second edition of *The Mind* Teaching Modules consists of thirty-five programs, ranging in length from approximately three and a half to thirty-two minutes (average nine minutes). There are six new modules, along with changes made to the existing first edition modules.

**Use of This Faculty Guide**
This Faculty Guide is intended to facilitate your use of *The Mind* Teaching Modules. For each module, it provides a description and interpretive comments that explain the purpose of the module and indicate the topics for which the module might be used, along with notes regarding how it differs from the first edition.
MODULE 1

Unraveling the Mysteries of the Mind
(time: 10:45 minutes)

DESCRIPTION

This module opens on a graphic of the human brain with the narrator pondering the question of the relationship between brain and mind. Are they different, or are they one and the same? Dr. Wayne Viney of Colorado State University is introduced as he contemplates the question, taking the viewer on a walking tour of a college campus where he pauses and poses questions of what goes on in the minds of chemists, musicians, and mathematicians. Then he poses the question once again, “What is the mind?”

Viney takes us on a brief tour of the mind as seen through the seventeenth- and eighteenth-century writings of Descartes and La Mettrie. Dr. Eric Kandell of Columbia University, using visual examples and illustrations, reviews the thinking of the nineteenth-century anatomist, Franz Gall, and his once popular theory of phrenology. Dr. Patricia Churchland of the University of San Diego addresses the issue from a scientist/philosopher perspective. Viney then summarizes the various historical views on the brain/mind connection.

The narrator ends the program, stating that rather than forming conclusions about what constitutes the mind, the module sets the stage for the rest of the series, which is directed toward unraveling the nature of mind.

INTERPRETIVE COMMENTS

This module sets the stage for what is to follow in the remaining thirty-four modules. Many other views could have been presented, but it is the intention of this, the first module, to get the student thinking about what it is we do when we use the mind. The modules that follow all speak to this question in some way or another. Through the research presented in the programs to come, students will have a wealth of information from which to discern the answer to the mind/brain question.
Hypnotic Dissociation and Pain Relief
(time: 3:03 minutes)

DESCRIPTION

This module shows hypnosis being used as a technique to deal with pain. The program opens with a chronic pain patient, Patsy Frazier, who suffers from arthritis and is undergoing a demonstration of hypnosis. Dr. David Spiegel of Stanford University School of Medicine is directing the session and talking to Patsy about her feelings and perceptions.

Spiegel is then shown outside of his laboratory, where he talks about the hypnosis process. He says that individuals can reassign their priorities regarding perception of pain and, as a result, decide that pain is not very important.

The scene returns to Spiegel and Patsy. After desensitizing Patsy's hand, Spiegel asks whether some part of her may have sensed something of which the rest of her was unaware. She responds: "You pinched the back of my right hand twice. I didn't feel it—but I did."

The narrator, speaking over a visual of a brain recording, points out that hypnotic dissociation is reflected in a change in brain wave patterns. The act of reassigning priorities is shown to originate in the cortex of the brain.

Spiegel returns for a closing statement. He believes that hypnosis works by affecting cortical information-processing mechanisms—places where we filter out certain things and filter in others. In this way, imagination can influence perception.

INTERPRETIVE COMMENTS

This module describes vividly what may be going on during hypnosis. Most general psychology texts describe hypnosis as a possible dissociative state, and here we have a clear example of a dissociative response pattern. The presentation also features a look at brain activity patterns related to the different dissociative states.

This module looks at states of consciousness, hypnosis as a phenomenon, and the therapeutic use of hypnosis in treating the chronic pain of arthritis.
MODULE  3

The Placebo Effect: Mind-Body Relationship
(time: 9:14 minutes)

DESCRIPTION

The opening shows an old black-and-white movie clip of someone selling Vita-Zone, a so-called cure-all. The narrator claims that anything, from voodoo to Vita-Zone, can work a miracle if enough faith is placed in it. The power of belief, called the placebo effect, has made it more difficult for modern medical researchers to determine the effectiveness of new drugs. At the same time, however, it offers the promise that, in some cases, the mind can heal the body.

Dr. Jon Levine of the University of California, San Francisco, is shown conducting an experiment designed to study the placebo effect. His male patients have had their wisdom teeth extracted and are administered saline solution in place of a real analgesic. A patient in the recovery area is approached by Levine, who is dressed in a white coat with a stethoscope in his pocket. Levine injects the contents of a syringe into the patient's I.V. hookup. As he does this, he says he is giving him a shot for the pain and that it will take about twenty minutes for it to take effect. Next we see another patient whose saline solution is administered by a computer. The two patients' reactions are dramatically different. The patient, who thinks his analgesic was administered by a doctor, reports feeling much less pain. The second patient reports that his pain has only gotten worse. The patients' responses illustrate that mere belief in the healer and the healing agent can alleviate pain.

The narrator explains that since this original program was made, Levine has confirmed his research on the physiological effects that accompany mind/body interactions. He explains the specific mechanism in the brain that is activated when a patient responds to a placebo treatment for pain with a decrease in the pain. This reaction involves endorphins, a morphinelike compound manufactured by the brain itself. Levine states that having a physiological basis for a psychological construct opens up a number of avenues of research, including what he calls the "nocebo" effect--a situation in which an intervention can actually make a condition worse. He goes on to say that we now know that there are a lot of individual differences involving gender, age, and race, which can interact to affect the physiological basis of the placebo effect.

INTERPRETIVE COMMENTS

This module deals with a number of areas presented in general psychology: It illustrates an experimental design that uses placebo conditions; how blind and double-blind conditions can function; and how, through endorphins, pain control can be understood physiologically. This module deals with the biological bases of behavior, experimental control, health, and mind-body relationships.
Cognition and the Immune System: Mind/Body Interaction  
(time: 10:20 minutes)

DESCRIPTION

The module opens with an action graphic of the central nervous system. The narrator suggests that the brain and mind may influence the immune system. The graphic moves to the cellular level as the narrator details the action of nerve fibers and the chemistry of the immune system.

Dr. Steven Greer of the Royal Marsden, London, states: "It is very controversial, particularly in the medical profession, to accept even the possibility that mental processes could affect cancer. This is partly because as medical doctors we are all taught that there is a rigid division between the mind and the body, which, of course, is nonsense."

Next, we see a breast cancer patient named Rachael Beales playing with her dog. Greer provides a commentary: "We studied a group of sixty-nine women with early breast cancer who had mastectomies... The women who had an active attitude and a fighting spirit had the best outcome. They were twice as likely to be alive and well ten years later."

Next we see Rachael reviewing her four-month medical history with a physician looking at X-rays of her lungs. The doctor indicates that her condition is currently arrested. Her treatment includes both psychological and physical intervention, but it does not ignore the accepted therapy. Rachael believes, beyond question, that what she does is essential to her survival: "There's more to life than physical things. There is a soul, a spirit... The mind can affect the body for bad and for good."

Greer indicates that an attitude cannot cause cancer. What it can do is improve the quality of life and, perhaps, the longevity of the cancer patient. Rachael is seen riding her bicycle as the narrator states that she lived four more years beyond the time the original film was taken. Although Dr. Greer would not verify that "fighting spirit" was the deciding factor in her longevity, there is a strong possibility that it may have been. In recent years, other investigators have initiated additional studies in an attempt to isolate the effect of this so-called "fighting spirit."

Dr. David Spiegel of Stanford University reviews the early work of employing coping and adjustment strategies in a naturalistic setting. He then goes on to describe his work using treatment trials comparing routine medical care with what he terms "supportive-expressive group therapy." By teaching patients how to improve communication with family, friends, and their physicians coupled with self-hypnosis for pain and anxiety, Spiegel's results complement Greer's work. Spiegel finds that women who took part in
this group therapy, in addition to receiving routine medical care, lived on average 18 months longer than did control patients.

INTERPRETIVE COMMENTS

This module ends where the first module began—with a look at mind/body interactions, providing a graphic example of mind/body interactions and disease. Most general psychology texts present the workings of the immune system, especially in their presentation on AIDS. Greer presents rather compelling correlational evidence. Spiegel's treatment trials research appears to corroborate earlier correlation data. This may be a good place to point out the difference between cause-and-effect results and correlational evidence.
MODULE 5

Endorphins: The Brain's Natural Morphine
(time: 5:01 minutes)

DESCRIPTION

This module opens with a combat scene of Vietnam, with soldiers smoking drugs. The scene changes to Jack Barchas, MD of New York Hospital, who describes the reaction in the United States to drug use by American soldiers in Vietnam and the resulting federal funding of studies on the effects of drugs on behavior. A graphic of the synapses and neurotransmitters acting on receptor sites leads to the introduction of lab scientist Hans Kosterlitz of Aberdeen University, Scotland. Kosterlitz reflects on his discovery that the brain manufactures its own morphinelike substances. Endorphin receptor sites, which are identical to recognition sites for heroin, are pictured. Barchas ends the module by saying that the brain may have a number of morphinelike neurotransmitters that function in a variety of ways, including those that affect pain, blood pressure, depression, psychosis, and other important bodily processes.

INTERPRETIVE COMMENTS

The module shows a rather disturbing image of soldiers in combat who apparently seek pleasure from smoking drugs in an attempt to alleviate the constant trauma of war. It is certainly not the case that all soldiers during the Vietnam conflict illicitly used drugs. The module provides good diagrammatic action graphics of neural networks, synaptic junctions, and neurotransmitter sites and interesting laboratory scenes from Professor Kosterlitz's facility in Aberdeen, Scotland. This module relates to other topics, including states of consciousness, drug addiction, withdrawal symptoms, and nerve functioning. It provides the basis for which other modules in the series may be more fully understood. Dr. Hans Kosterlitz in now deceased.
Brain Mechanisms of Pleasure and Addiction
(time: 6:51 minutes)

DESCRIPTION

This module begins with classic footage of a chronically depressed patient and Dr. Robert C. Heath discussing the effects of self-administered electrical stimulation to the brain. Action graphics locate an area in the brain (the nucleus accumbens) where Heath induced pleasurable sensations. Early film clips of Dr. James Olds's pioneering experiments on self-administered brain stimulation in rats are shown and discussed by Dr. Conan Kornetsky of Boston University School of Medicine. Comparisons are made between this electrical stimulation and the insatiable and addictive pleasure experienced by some drug abusers.

The pleasure centers discovered by Olds in the early 1950s appear to be in the same brain areas that are affected by drugs. Olds's brain stimulation experiments led the way for testing the addictive potential of drugs and the brain areas affected by them.

Dr. Chris Fibiger of the University of British Columbia discusses his research on a dopamine circuit in the nucleus accumbens that seems to be active in both the hunger for food and the pleasurable stimulation provided by heroin and cocaine. When dopamine neurons are selectively removed from the nucleus accumbens, an animal loses interest in self-administering cocaine and other amphetamines. Action graphics show where brain-specific drugs like morphine and cocaine have their greatest effect.

INTERPRETIVE COMMENTS

The early black-and-white footage of Heath's work on human brain stimulation is integrated with current research on specific loci in the limbic area apparently involved in pleasurable sensations. However, the audio on the black-and-white portions is weak, so you may want to review it before showing it in class in case you are asked questions about what was said.

This module has to do with biological motivation and addictive behavior. These studies provide an excellent backdrop for class discussion about the application of animal research to the human situation and the ethical implications of human brain stimulation.
The Frontal Lobes: Cognition and Awareness
(time: 9:05 minutes)

DESCRIPTION

This module begins with a description of Bill, a law school graduate who had been in the upper ten percent of his class and had passed the bar exam on his first try. After suffering an aneurysm that damaged his right frontal lobe, Bill is noticeably different. He is seen undergoing a test to measure the extent of his deficit. His wife describes the event and its effect on their lives.

Dr. Daniel Weinberger of the National Institutes of Mental Health describes in behavioral terms the role of the frontal lobe. Bill's wife describes the change in his behavior. Bill's loss of problem-solving ability is described by his former law partner, Tom Fender.

Dr. Patricia Goldman-Rakic of Yale University School of Medicine describes the importance of the frontal lobe for thinking, reflecting, and planning for the future. A normal rhesus monkey is shown being tested on his ability to remember where a food reward has been placed after his vision is momentarily blocked by a screen. He has no difficulty locating the food after this delay. Goldman-Rakic describes how the frontal lobe assists in this process. A galago monkey, a species with a more primitive frontal lobe, is shown having difficulty on this same task. This comparison is related to evolution and to the developmental stage of a young child whose frontal lobe has not yet developed to its full potential. A seven-month-old child is observed as she is distracted and loses track of a food reward.

INTERPRETIVE COMMENTS

This module conveys the importance of the frontal lobe in human functioning. Several testing situations are demonstrated for assessing brain damage. The difference between the rhesus and galago monkeys is clearly presented.

This module has to do with brain function, diagnostic assessment, cognitive function, evolution, and comparative behavior.
MODULE 8

Language Processing in the Brain
(time: 6:19 minutes)

DESCRIPTION

As this module begins, we see a research team preparing a volunteer named Patty for a PET scan procedure. Dr. Marcus E. Raichle of Washington University School of Medicine explains how the PET scan is used to record which areas of the brain are activated when we see and respond to single nouns.

Patty is presented with a serial list of nouns, which appears on a screen in front of her as she lies inside the PET scan apparatus. At first she is only asked to read the words silently. When she does so, her brain registers activity in the visual part of her cortex. Next, she is asked to read the words aloud. This task brings into action additional areas of the brain in the temporal region used for hearing and motor functions. Finally, Patty is asked to generate a verb for each word presented. This added complexity is reflected in the activity noted in Patty's frontal lobes, particularly the left hemisphere.

An action graphic combined with PET scan pictures clearly identifies the areas of language processing that are active when the brain responds to single words in different ways. Action graphics diagrammatically present the various levels of activity as the narrator describes what is taking place.

Raichle summarizes what has been demonstrated, emphasizing the complexity involved in the processing of a single word.

INTERPRETIVE COMMENTS

This module shows the versatility of the PET scan as a research tool. The still pictures and the action diagrams effectively present this method of measuring brain function. In addition to illustrating the remarkable advances in the methodology of studying the brain, the module nicely demonstrates that learning is an active process. It also relates to a new module in the series on brain/mind functions in bilingual individuals.
MODULE 9

Studying the Effects of Subliminal Stimulation on the Mind
(time: 4:46 minutes)

DESCRIPTION

The module opens with the narrator commenting on Sigmund Freud's contributions to the study of personality and the place of the unconscious in his theory.

The scene changes to a laboratory where a researcher is conducting an experiment on a subject whose attention is concentrated on a screen. This is the laboratory of Dr. Howard Shevrin of the University of Michigan, who describes his research and the use of subliminal and supraliminal stimulation in studying the unconscious.

The subject in the experiment suffers from a fear of talking in class. Shevrin suggests that he has an unconscious conflict—a fear of being thought of as "wild" and "disrespectful." Each of these words is flashed on the screen, first subliminally for one-thousandth of a second, then supraliminally for one-fourth of a second. The subject's brain activity is recorded, and there is a marked difference in brain reaction time to each of the words at the different exposure times. Shevrin offers a "suggestive conclusion": At the slower speed, the subject is able to recognize the "loaded" word, and his reaction is slower because the brain delays the response as a form of the Freudian concept of repression. The word is received unconsciously, then selectively filtered into consciousness. It is the filter system that accounts for the delay in the brain's response.

The program closes with Shevrin describing the rationale for his research. He states, "What we're trying to do is demonstrate that what is meaningful to the mind has an existence in the brain. It isn't simply a matter of synapses, or electrical, biochemical activity. What is going on is part of the meaningful transactions of human life." The narrator comments on the results of the more recent research of Dr. Shevrin involving actual clinical settings. Patients are exposed to a series of words, some of which represent psychological conflict for them. Responses to these words suggest that the brain can subliminally identify the conflict words, whereas the mind then seeks to defend against their conscious recognition.

INTERPRETIVE COMMENTS

This module presents an example of how researchers like Howard Shevrin study a construct like the unconscious with state-of-the-art technology. Shevrin is cautious in offering what he calls a "suggestive conclusion" about his research findings. The program shows a clear example of sub- and supraliminal perception and how they can be studied in the laboratory. Shevrin's more recent research is published in his 1996 book entitled: Conscious and Unconscious Processes: Psychodynamic, Cognitive, and Neurophysiological Convergences, Guilford Press.
This module has to do with perception, studying unconscious processes, and research methodologies. Many introductory psychology texts present this topic by means of its possible effect in advertising. The module is a good example of the impact that Freud has had on psychology and how it is possible to test some of his hypotheses in the laboratory. It may be wise, however, to note that these studies provide no support for the popular claims of subliminal persuasion.

MODULE 10

(time: 12:35 minutes)

DESCRIPTION

The module opens with a formerly world-renowned choir director and musical arranger, Clive Wearing, and his wife, Deborah, sitting on a park bench. Deborah is asking Clive questions. His answers indicate his inability to form new memories, the result of his recently having contracted viral encephalitis.

Next we see Deborah entering Clive's room, which is in a quasi-hospital setting. He greets her as if it were the first time he has seen her for years. Deborah draws him out with questions that reveal Clive has no memory of anything beyond the last minute or two. He makes constant reference to the fact that he is now conscious for the first time.

Dr. Alan Parkin of the Amnesia Association describes Clive's condition. It is a result of encephalitis, an inflammation of the brain, which in Clive's case destroyed his right and left temporal lobes and a good portion of his left frontal lobe. The hippocampus on both sides of his brain has been destroyed.

Deborah describes Clive's world as a moment-to-moment consciousness with no past to anchor him and no future to await. He perceives everything correctly because he has all his faculties. Indeed, as we see, his conducting ability is still intact. However, only moments after he's seen something, it is gone for him. He is constantly wakening afresh. As Clive and Deborah are seen walking down the aisle of a church, he tells her he has no knowledge of music and has never heard a note of music. Deborah leads him to a group of singers and a piano. He sits down and begins to play (reading the music), sign, and conduct the singers as if everything were perfectly normal. When he finishes performing, however, he begins to belch and choke, then has what appears to be a brief convolution. Deborah explains that this musical connection to the past is unsettling to Clive. Deborah talks of Clive's deep and abiding love for her despite his debilitating condition.
INTERPRETIVE COMMENTS

(This module is Part 1 of a two-part series on Clive Wearing. Part 2 (Module 11) is an update on Clive's condition 15 years later. Although the opening of Part 2 recaps Clive's case, it is an integral part of the case and, therefore, it is suggested that they be shown in their proper sequence.)

Through the presentation of this tragic case, the module raises many questions about the nature of memory. Parkin's comments are given rather hurriedly, but Deborah's questions to Clive effectively bring out the magnitude of his impairment. It is essential to understand that Clive maintains the fundamental abilities related to speech, recognizing his wife, Deborah, reading music, singing, and conducting because he had overlearned these skills.

The module has to do with memory and its importance for our human existence. Overlearning is exhibited through Clive's use of language and musical ability. Hippocampal and frontal lobe functioning in memory formation and emotional control are demonstrated (see Module 7). This module should promote discussion of several topics related to the complexity of the nervous system. It may also be interesting to discuss the difficulties placed on loved ones of the victims of memory loss associated with Alzheimer's disease (see Module 19).
Clive Wearing, Part 2: Living Without Memory
(time: 32:35 minutes)

DESCRIPTION


The program opens with a brief review of Clive's tragic encounter with viral encephalitis. He is seen greeting his wife, Deborah, outside of Ticehurst House. Dr. Michael Oddy, a neuropsychologist at Ticehurst, describes Clive's situation and the special care taken to make the environment less demanding on his memory. Special consideration is afforded to Clive to keep his life calm and content.

As Deborah enters the room, Clive greets her (with a sense of surprise). Clive responds to the gracious comments offered by Dr. Oddy and Deborah and responds to a series of leading statements offered by Deborah. Deborah gives a lengthy description of what it is like to engage Clive in conversation. Her description of Clive's behavior is similar to her earlier comments seen in Part 1 but with a somewhat different interpretation reflecting deeper insight into Clive's residual cognitive functions.

Clive describes his troubled lack of associations with the past. He repeats several times, "No thoughts of any kind. No dreams! No difference between day and night! No sight, no sound! No taste! No touch! No smell! Exactly like death. No difference between day and night. No thoughts. Nothing at all. To any question you have, the answer, I don't know. There's nothing to say." Deborah probes his episodic memory in an attempt to draw from him some semblance of past memory. She asks him about his memory for his illness. He responds with sincerity but with no specific recollection. Clive gives a facetious response or two showing signs of humor.

The next scene has Clive and Deborah sitting before neuropsychologist Dr. Barbara Wilson who shows Clive a series of twelve pictures of various doors (front door, garage door, cottage door, etc.). When she asks him to identify what he has just seen by pointing to a composite of several pictures he says, "It's a waste of time I can't remember what happened. My brain's not working enough for you."

Wilson describes her long association with Clive and her many (approximately fifteen) testing sessions since the onset of his illness. She indicates that in over 700 brain injured people with whom she is familiar, Clive is definitely the most amnesic she has ever seen. Her detailed description of Clive's behavior reveals great insight into his condition. She comments on his retention of musical skills as Clive is seen playing. She attributes his
"musical memory" to both his well-practiced talent and to the fact that his right hemisphere suffered less damage than his left. She draws a comparison between Clive's semantic and episodic memory. "He's been virtually unable to learn anything new since the onset of the illness. However, if questioned appropriately, he indicates some knowledge in a few select areas. For example, he seems to have picked up on the fact that Germany is no longer divided and Hong Kong is now back with China. He does not reveal these facts when asked directly. But if you start talking about Hong Kong he will say, "Has Hong Kong gone back to China yet?" This may relate to the fact that Clive watches a lot of television and gets the daily newspapers.

The narrator mentions that images of Clive's brain have been examined by Dr. Erin Bigler of Brigham Young University. Employing the latest generation of neuroimaging techniques, Dr. Bigler describes Clive's neurological impairment as determined through a series of 3-D images he constructed of Clive's brain. The damage is dramatic and verifies earlier interpretations of Clive's condition.

Deborah concludes the program by describing her observations of Clive's behavior over the past thirteen years. During this period, he continues to be very lucid and articulate and has retained an intelligent and semantic memory about his life showing few signs of implicit learning. Deborah's characterization of Clive is presented in terms that reflect her very extensive knowledge of memory function.

INTERPRETIVE COMMENTS

This program presents an extraordinary example of the relationship between brain damage and memory function. What makes this case so special is the fact that over an extended thirteen year period, Clive Wearing has had caring and nurturing people who have been willing to share their knowledge and experience about Clive with the scientific community. We are greatly indebted to Deborah Wearing, Dr. Michael Oddy and Dr. Barbara Wilson for making this opportunity available to the many students interested in the neuropsychology of memory. We hope to continue to follow this case in the years ahead and we wish the best for Clive in his struggle with the realities of his condition.
DESCRIPTION

The opening scene of this module shows an egg cell surrounded by tiny sperm cells. The narrator describes the process of cell division and embryonic growth. Time-lapse photography allows us to see a fertilized egg dividing and folding into itself to form the basic structures of the brain. As the tissue becomes more specialized, a tube comprised of neurons and glial cells forms. Scanning electron micrographs show a glial fiber reaching out to a neuron—an essential step in brain development.

The growth process is represented by still photos of young embryos. The narrator describes how genes interact with the environment to form what will become a human being, susceptible at critical periods in its development to genetic and environmental hazards.

The scene shifts to an account of the Chernobyl nuclear meltdown and compares the radiation contamination it caused to the Hiroshima and Nagasaki incidents in Japan. Dr. William Schull of the Radiation Effects Research Foundation describes his extensive studies of some of the offspring of the victims now living in Japan. He discusses when in its development the growing embryo is most susceptible to the detrimental effects of radiation and the consequent implications on mental functioning manifested at birth and beyond.

The narrator describes neuronal proliferation and migration using time-lapse photography of actual cell growth, demonstrating how excessive radiation disrupts the normal process of cell growth and migration.

The scene changes as the camera pans across a row of very young infants. The narrator calls attention to the individual differences already apparent at this young age. Some of the infants are stoic, some crying, some moving or interacting with one another, demonstrating the wide range of temperaments present.

The narrator introduces an etching of *Gin Lane, A Portrait of Despair* (1751) by William Hogarth, focusing on one woman in the picture pouring alcohol down the mouth of a baby. The narrator explains that only since 1970 have we known of the deleterious condition known as fetal alcohol syndrome (FAS).

Dr. Sterling K. Clarren of the University of Washington School of Medicine describes how alcohol as a teratogen was discovered in his department of pediatrics by Christy Euland, who had observed infants who were small although born full-term. She noticed that some of the children were not only small but also had similar features and were
mentally retarded, and she found that many of their mothers had a history of heavy alcohol use.

The scene shifts to Marita Aronson of the University of Goteborg, Sweden, who describes the behavioral symptoms of young children with alcoholic mothers—hyperactivity, impulsiveness, short memory span, temper tantrums, and perceptual disorders. Examples of drawings by FAS children are compared with drawings of normal children of the same age. Dramatic differences and distortions are noted—in one case, a sign of damage to the frontal lobe of the brain.

Clarren shows autopsy pictures of the brain of an infant who suffered from FAS and compares them with images of the brains of normal infants of the same age. Huge differences are noted in the size of the brain, the number of convolutions, the relative size of the ventricles (in cross section), and overall conformation. Microscopic tissue photographs reveal malformations of the cerebrum in FAS infants. Heterotopias are also noted, with cell groups migrating to distant locations in an unsystematic fashion early in development.

The program ends with a summary of the detrimental effects of alcohol and radiation as but two examples of teratogens that, when present during critical periods of development, can adversely affect the brain and mind.

INTERPRETIVE COMMENTS

Radiation and alcohol are but two examples of substances that can harm a growing fetus. Cocaine, crack, and even cigarettes can have devastating consequences in utero. The time-lapse footage of cell proliferation and migration is elegant and illustrates how much has been learned about brain development through careful observation. This module relates to the biological basis of behavior and to the developmental sections of general psychology texts.
MODULE 13

Capabilities of the Newborn
(time: 3:59 minutes)

DESCRIPTION

The opening scene shows a newborn being carried to the lap of a young sibling. The narrator suggests that newborns are capable of extraordinary things.

Dr. Cecelia M. McCarton of Albert Einstein College of Medicine reviews her early training in medical school, where she was led to believe that newborns were mostly "brainstem preparations." She then demonstrates a young infant's rooting and grasping responses while she discusses the innate capacities of babies only hours old. McCarton introduces a small population of infants who, because of modern technology, are capable of surviving even when born as young as three and a half months before full term. The survival rate is surprising even though the risks are enormous.

Joy Williams, born at twenty-eight weeks gestational age (thirteen weeks premature), is seen as she undergoes careful observation of her sensory capacities. Her parents and McCarton demonstrate how alert she is at this astonishingly young age. Babies come into the world with many capacities, which are just beginning to be understood.

The next scene shows William Fifer of the New York State Psychiatric Institute testing a newborn's capacity to distinguish his mother's voice from other sounds. The infant's sucking response is measured in terms of its frequency and duration while exposed to his mother's voice. When other sounds or voices are presented, the sucking response is diminished. The baby's reaction indicates that he is biologically prepared to respond to his mother.

INTERPRETIVE COMMENTS

Video segments of newborn infants undergoing tests of their sensory capacities present a creative method for measuring a young infant's preferences. The relative size comparison between Joy Williams and the size of her father's hand is dramatic.

This module has to do with infant development and the capacities of the newborn. At this level of sensory development, nature clearly has the upper hand over nurture.
DESCRIPTION

Dr. Jerome Kagan of Harvard University opens this module by describing how infant behavior changes at about two or three months of age. The infant begins to cry less, babble more, react with surprise, recognize unfamiliar things in its environment, and smile at humans. He calls this smile the *smile of assimilation*. Kagan describes the young infant as built to seek new information, consolidate that knowledge, and move on from there. The narration is mixed with illustrative scenes of an infant with its mother.

The scene shifts to the laboratory of Dr. Eric Courchesne of the University of California, San Diego, who is shown monitoring an infant's brain activity while the child is exposed to pictures of human faces. Courchesne is interested in finding out at what age an infant first notices a difference between faces. He describes infants as living in a world of constant change. They have to reach out with their sensory abilities and try to hold on to images so that they can build a picture of what's happening in their world. A baby's brain activity changes when it notices something different, unusual, or interesting.

The scene moves to the laboratory of Dr. Leslie Cohen of the University of Texas, Austin. Cohen is using a different technique to determine when infants notice a change in their visual world. He is studying habituation by measuring visual fixation on objects and angles. He maintains that children get bored after looking at the same object for a period of time. When the object changes, they fixate on the object more if it is perceived as being different. In his studies he finds that a dramatic change occurs in this capacity between the ages of six weeks and three months. Cohen also uses stuffed toys to study concept formation in infants. His results challenge the time-honored wisdom that language is crucial to the formation of concepts.

INTERPRETIVE COMMENTS

Two focuses for studying infant behavior are illustrated in this module: brain activity and visual fixation. Kagan provides warm explanations of the beauty of human behavior.
MODULE 15

Social Development in Infancy
(time: 6:44 minutes)

DESCRIPTION

Dr. Jerome Kagan of Harvard University opens this program by discussing social development in infants eighteen–twenty-four months of age. It is at this age, he says, that we begin to see intentions emerging. Feelings, insight, and the "aha" experience come about as infants interact with each other.

Kagan maintains that a sense of self emerges in the middle of the second year. The rouge test is demonstrated with infants age three, nine, and eighteen months. The eighteen-month-old recognizes and points to the rouge painted on his nose. Kagan points out that even deaf children of deaf parents begin to point to themselves (discover self) at about this same time.

During this same time period, a second milestone emerges—a moral sense. A child is seen fondling and looking at a doll with a missing head. Kagan describes the child's reaction to the flawed object, pointing out that at around eighteen months children notice the integrity of objects and are bothered when things differ from their perceptual schemas.

The final portion of this program addresses the relationship between emotions and cognitions. Kagan compares the early nineteenth-century understanding—that emotions precede cognition—with the way we have turned the relationship around today. Kagan then defends the interpretation that cognition is essential for the expression of emotions.

INTERPRETIVE COMMENTS

Here we see a leading child psychologist describe infant social/cognitive development. As Kagan is talking, children act out the developmental sequence described by both him and the narrator. A parallel can be drawn between Kagan's description and the work of Piaget on cognitive developmental stages. This module has to do with infant social/cognitive development and the emergence of self. There is a delightful example of the rouge test in this segment.
MODULE 16

The Effect of Aging on Cognitive Function: Nature/Nurture
(time 10:09 minutes)

DESCRIPTION

This module opens with still pictures of identical twins of many ages and races, both male and female. The narrator tells us how the study of identical twins can help us to determine how factors such as life-style, diet, and stress may contribute to individual differences in the aging process.

The scene shifts to Nancy Pedersen of the Karolinska Institute, Sweden, who describes the study of genes and the environment and their respective roles in identical twins reared together and apart. Identical seventy-year-old twins named Dan and Boe, raised together until age twenty, individually undergo a matching block pattern test. They differ in their ability to remember, perceive, and understand.

Information from over four hundred sets of twins is currently under study at the Pennsylvania State University, where it is logged and analyzed by Dr. Gerald McClearn. He discusses the project and talks about the wide individual differences in performance over the life span. He challenges the widely held view that we simply unfold in a prescribed, predetermined manner. He notes how we have come to realize that the genetic system is a dynamic one, with genes being turned on and off at different times throughout the life span. McClearn says that by identifying important times for intervention in our development, we may be able to promote successful again.

In this second edition, Dr. McClearn is re-visited on the question of identical twin studies and he summarizes his most recent research which was published as the lead article in Science, June 6, 1997, Vol. 276, involving twins who are eighty years old and beyond. McClearn describes his latest research, comparing the influence on genes and the environment on a variety of cognitive abilities. The module ends with a statement from McClearn about future directions for research on genetics and its relationship to aging and cognitive function.
INTERPRETIVE COMMENTS

Dr. McClearn's results are summarized on camera with two graphs comparing identical and fraternal twins on a number of cognitive abilities. The graphs are reproduced on the following pages to facilitate the explanation and to help students understand the distinctions between the two groups. Study of the graphs prior to showing the video will help to clarify the findings and to answer questions about the significance of the research. The original work presented in the first part of this module was recorded in 1988. The most recent work reported was recorded ten years later in 1998. It is amazing how little Dr. McClearn has aged in those ten years. (For someone studying the aging process, he seems to have found a secret or two).
Aging and Memory
(time: 11:16 minutes)

DESCRIPTION

The program opens with four elderly people in their seventies and eighties commenting on their memory change over the years. The narrator relates the results of research on memory recall versus recognition and introduces a new approach to understanding memory called prospective memory.

Dr. Mark McDaniel of the University of New Mexico and Dr. Gilles Einstein of Furman University are introduced as leading investigators in this new area of memory research. McDaniel and Einstein describe prospective memory and how it is studied in the laboratory. The description is accompanied by visual examples of the experimental paradigm, which simulates how prospective memory functions in our everyday experience. The paradigm manipulates time-based and event-based cues.

McDaniel describes the results of their studies and compares the performance of older and younger people, illustrating that older people can perform as well as younger ones if they are given salient stimulus cues during the acquisition process. He draws from real-life experiences to explain that memory is not a unitary ability but depends on the specific elements of the task to be learned and how the stimulus material is organized when it is originally learned. Prospective memory does not decline with age under these special circumstances. McDaniel discusses how the results of this research can be applied to facilitate memory related to future intentions.

INTERPRETIVE COMMENTS

The module illustrates how a common form of forgetting involving future intentions can be studied in the laboratory. Most psychology texts review research on retrospective memory, comparing younger people with older adults. This module presents a new way of studying age differences in a form of memory that is commonplace and that is now beginning to receive the attention of memory researchers.
MODULE  18

Effects of Mental and Physical Activity on Brain/Mind
(time:  9:27  minutes)

DESCRIPTION

The module is introduced with comments about the effect of aging on both mental and physical decline as we observe Bert and Hugh, senior citizen twins, walking along a shoreline. The narrator asks if this decline is inevitable and does it follow the same progression in everyone.

Dr. William Greenough of the University of Illinois is introduced as a leading investigator in the study of the effects of mental and physical activity on the aging brain and mind. Greenough describes his animal research comparing impoverished versus enriched environments and their effects on the brain circuitry and vascular blood supply of his laboratory rats. His commentary is accompanied by lab scenes with pictures and graphics of sections of rat brains.

Greenough makes a distinction between physical and mental activity describing how he separated out physical exercise from learning in his animal experiments. The exercise group developed an increase in their vascular blood supply whereas the learning group showed an increase in the number of neural connections in the general range of twenty to twenty-five percent.

He draws a parallel from his animal experiments to the human brain of older adults who engage in both physical and mental activity throughout their life span. His narrative is accompanied by scenes of older adults engaged in physical activity. The adults comment on the benefits they observe through their participation in physical activity and their perceived benefits in cognitive functioning.

The module ends with comments from several elderly attesting to the benefits of "Use It or Lose It."

INTERPRETIVE COMMENTS

This module is a new version of the original first edition series module entitled "Environmental Stimulation and Brain Development." Since the original MIND program from which the first edition module was developed, Dr. Greenough has expanded his work to include both learning and physical exercise. He has been able to separate the effects of physical activity and its concomitant effect on neural networks from the influence of physical exercise on the brain’s vascular system. The module shows actual pictures from rat brain tissue as well as diagrams of vascular enrichment. As Greenough indicates, however, the viewer should keep in mind that the line between enriched and
impoverished environments for humans and animals in a natural setting may be quite different than the typical unstimulating environment of a laboratory animal colony.

MODULE 19
Understanding Alzheimer's Disease
(time: 11:40 minutes)

DESCRIPTION

The topic of Alzheimer's disease is introduced by describing our mistaken earlier view of the disease as the dementia that inevitably accompanies old age. Dr. Peter Davies of the Albert Einstein College of Medicine correctly describes Alzheimer's as a distinctive disease, more common among the elderly but by no means a function of age alone. The disease is genetically predisposed and triggered by unknown factors.

The scene shifts to identical twins, Bert and Hugh. Hugh has Alzheimer's and is shown talking to his brother. Hugh's behavior suggests that he is quite different in cognitive functioning from Bert. Bert describes the gradual onset of his brother's disease as he recalls the symptoms, which were subtle at first. Hugh is shown in a testing situation with a therapist where he is having difficulty identifying some common objects. Photomicrographs of brain tissue affected with the disease show neuro-fibrillary tangles and senile amyloid plaques, which contribute to the dementia. Bert describes his family history of dementia and his concern that he may also be afflicted by some form of the disease.

Davies states that a definitive diagnosis of Alzheimer's can only be made at autopsy. There can be a genetic predisposition to the disease, but a case like this with identical twins makes it obvious that something in the environment has to trigger its onset. When we can identify the "trigger," we may be able to prevent or delay the onset of the disease.

Now, thirteen years since this original recording was made, there is a breakthrough in the diagnosis of Alzheimer's disease employing the latest neuroimaging techniques discussed by Dr. Erin Bigler of Brigham Young University. Through the use of 3-D Magnetic Resonance Imaging (MRI), Bigler shows us actual comparison pictures of the brains of an Alzheimer's patient compared to a person without the disease. We see dramatic differences. The Alzheimer's patient shows global atrophy, in frontal, temporal, parietal regions with dilated ventricles. Images of identical twins, one with Alzheimer's the other without, compared to a control. The brain image of the twin with Alzheimer's is colored in green the twin without Alzheimer's is colored in red.

When the two brains are combined together the red and green make yellow, and so wherever you see yellow, you'll see a similarity in the brain and wherever you see green,
that signifies the Alzheimer's twin who has a bit more atrophy. The remarkable thing about the scans is that the unaffected twin has signs of atrophy of the brain. The results suggest that there are significant genetic control factors at play in the evolution and development of Alzheimer's disease. Bigler's research points to the high probability that if one identical twin has Alzheimer's, the other will most likely be affected.

Bigler describes his collaborative research with Dr. John Brightner of Johns Hopkins University involving the testing of everyone sixty-five years and older in a particular county in Utah suspected of the first stages of Alzheimer's or some other type of dementia. Bigler's analysis of the brain images reveals damage to the temporal lobe, more specifically, the hippocampus region, in each of the individuals studied. Bigler ends the program by stating, "We anticipate that these improvements in diagnostic imaging and quantification will lead to much earlier diagnosis of Alzheimer's disease."

INTERPRETIVE COMMENTS

This second edition Alzheimer's disease module is a clear demonstration of how research into the etiology of disease has been aided by the advent to new technologies. In the original footage with Dr. Davies, it was not possible to positively diagnose Alzheimer's disease until a patient died and underwent an autopsy. Now, through the application of neuroimaging techniques used by Dr. Bigler, we see a new generation of diagnoses allowing for the confirmation and perhaps early detection of the disease. It is also interesting to observe that the brains of identical twins are indeed identical when compared with by means of neuroimaging. This, of course, raises yet another issue. Do we really want to know if we have the predisposition for the disease prior to its behavioral onset?
Phantom Limb Pain: Fooling the Mind
(time: 4:29 minutes)

DESCRIPTION

This short module presents the phenomenon of phantom limb pain. As the program opens, the narrator is describing two different pain channels. One communicates information about the quality of pain—throbbing, sharp, or dull. The second channel conveys information about the amount of pain. A diagram shows pain signals terminating in the brain. The question raised by the narrator is whether pain is purely mechanical.

The scene turns to Fred Lay, who is describing pain sensations in a foot that no longer exists—it has been amputated as the result of a work-related injury. He describes, in vivid terms, the burning sensations he feels in his missing foot and toes.

Dr. Patrick D. Wall of University College, London, then poses the question, "Where exactly, do the wrong signals start? Are they starting in what remains of the limb?" His description of this possibility derives from a peripheral interpretation of phantom limb pain. The false signals may be generated from within the cut nerves and then move centrally into the spinal cord. An animated graphic traces the pain signal description. But that is only part of the story, states Wall. Spinal cord cells may recognize that they have been cut off from the periphery and increase their excitability. As a result, they may also generate false signals.

Yet another possibility recently proposed by Ronald Melzack of McGill University is that phantom limb experiences may arise from within the brain itself. Melzack has hypothesized that the brain is genetically wired with an indelible imprint of the intact body. Even without stimulation from the periphery, the brain can generate nerve impulses, producing a conscious perception of the missing limb in the person's mind.

INTERPRETIVE COMMENTS

This module is short and to the point. It presents a vivid example of phantom limb pain and raises important questions about the origin of the pain. Fred's description of his pain is delivered in a rather soft voice, and one has to listen carefully to hear every word.

Action diagrams accompany the three theories of the phantom pain perception and effectively show the course of pain signals transmitted up the spinal cord. The instructor may want to consult the article by Ronald Melzack published in the special issue of Scientific American, entitled "Mysteries of the Mind," 1997, pp. 84-91.
MODULE 21

Treating Chronic Pain
(time: 14:23 minutes)

DESCRIPTION

The module opens by showing a sufferer of chronic pain, Fran Brooks, in her rural environment. Fran is moving with great effort and is in obvious discomfort. She describes her pain as constant, incapacitating, and involving most of her body.

In the next scene we see Dr. John Loeser, Director of the Pain Clinic at the University of Washington, examining X-rays of Fran's spinal column and bone structure. He notes that there are no abnormalities that would account for her pain. Dr. Wilbert L. Fordyce, a staff psychologist and colleague of Loeser's, describes the reality of the pain. Loeser discusses how someone can continue to feel pain long after bodily tissue is totally healed.

Fran is seen entering the clinic for a three-week treatment program. Fran's case is discussed by a team of therapists at the clinic, and a program of treatment is developed that involves both physical and behavioral therapies. Fran is shown in the various stages of her therapy, ranging from physical exercise to group therapy where she discusses with other patients the conditions surrounding her pain. Her first "speed walking test" takes her 50.6 seconds. She executes this test with great difficulty. Loeser and Fordyce describe the physical and psychological models that govern their approach to treating chronic pain, using Fran's case as an example.

At the end of the three-week treatment program, Fran performs the "speed walking test" in 29 seconds flat with no apparent difficulty. The difference is dramatic. As fellow patients applaud her performance and congratulate her, the scene changes to Dr. Loeser, who now, ten years later, discusses an additional treatment procedure for the management of chronic pain through the use of opiates or narcotics.

Loeser discusses the use of opiates for the management of both acute pain due to injury or surgery and in the treatment of pain due to longer term conditions, like nerve injuries or cancer. Long-term treatment of pain with opiates involves tolerance, habituation, and addiction. He points out that there is an important distinction between those who take opiates for pain control and those who use opiates for other reasons. Those who take opiates for the management of chronic pain virtually never become addicts. The issue boils down to adequacy of management, not risk of addiction.

New developments in pain management are not going to be built on using opiates more aggressively or assertively but on new medications that act in different places in the nervous system and within the body tissues to alleviate pain.
The message in this program is one of hope for those who suffer from chronic pain. No information is given about the long-term effects of the therapy shown, but given the rather cautious nature of the narration, we can reasonably assume that wide individual differences in recovery are the rule. It is important to emphasize that the use of opiates or narcotics, as described by Dr. Loeser, should always be under the direction and prescription of a qualified medical practitioner.

This module provides an excellent example of how psychologists and medical practitioners work together under a shared set of assumptions about cause and treatment. The module is a nice supplement to a discussion of coping with chronic pain.
MODULE 22

Depressants and Their Addictive Effect on the Brain
(time: 4:24 minutes)

DESCRIPTION

As the module begins, a former addict named Lisa describes her addiction to tranquilizers. Dr. John Littleton of Kings College, London, describes the effects of benzodiazepines and alcohol on brain cells, particularly their inhibition of nerve cell excitability.

A diagram of a synaptic junction shows how chronic use of drugs like alcohol causes suppression of calcium channel activity, which results in compensatory action that creates more channels. When the drug is later removed, both old and new channels can operate. The nerve cells then overreact, producing the painful symptoms of withdrawal.

Lisa then describes the vivid but distorted sensations and perceptions she experienced during her addiction and the withdrawal phase of her treatment.

Littleton ends the module by noting that this change in the number of calcium channels may be a common mechanism underlying the development of physical dependence on depressants.

INTERPRETIVE COMMENTS

This program shows what happens biochemically in alcohol and drug addiction. If Littleton is essentially correct, his explanation accounts for both addiction and withdrawal. The action diagram of the synapse and neurotransmitter activity is vivid and descriptive. The narrative comments are well-coordinated with the visuals and produce a clear account of what is probably occurring in heavy drug and alcohol users. The action described in the module has been attributed to the use of marijuana, considered by some to be a milder drug and therefore not addicting. The instructor may want to consult an article in Science, Vol. 276, June, 1997, p. 67, for a detailed account.

Lisa contributes to our understanding of addiction in important ways. She describes the distorted perceptions and sensations during her addictive years and also demonstrates that addicts can recover from the debilitating effects of addiction.

This module deals with states of consciousness, addiction, and alcohol-related abnormal behaviors.
MODULE 23

Infant Speech Sound Discrimination
(time: 4:03 minutes)

DESCRIPTION

The module opens with Dr. Janet Werker of the University of British Columbia and a group of Salish Indians who speak an obscure dialect. Their language has a set of consonants that are not used in English and that English speakers cannot discriminate between. Werker is shown recording the consonant sounds, which she uses in her laboratory to study sound discrimination in infants eight to twelve months old. The experiments are designed to determine up to what age infants are able to discriminate among word sounds (phonemes). The infants are taught to turn their heads when they hear a change in sound quality. They are reinforced for doing so by being able to see moving toys that light up in a glass case.

Werker has found that at some time between eight and twelve months a child loses the ability to discriminate between these subtle differences in sound. It is at this point that a child begins to specialize in one set of phonemes and is no longer neutral in terms of learning any language.

The narrator brings the module to a close by stating that we become better at learning one language as we lose the ability to perceive others.

INTERPRETIVE COMMENTS

This succinct presentation dramatically demonstrates how young infants are able to discriminate between very subtle sound differences and the creative methodology employed in this study. The module has to do with infant speech development, which is usually presented in either the development or the thinking and language section of a general psychology text.
Language Predisposition
(time: 3:44 minutes)

This module opens with young children playing in an open-field laboratory setting. The narrator poses the question “When do children first distinguish among the sounds of human language?”

Dr. Patricia K. Kuhl of the University of Washington is seen in her laboratory investigating the perception of different human voices and language sounds in infants six months and older. One six-month-old is studied while she is exposed to two vowel sounds: "ah" and "e." The babies are trained to respond to a change by turning their heads, which lights up a moving toy. The babies are not only able to recognize a change in sound, but they can also detect when a new voice generates the same sound.

Kuhl then compares infant response to research on machine sound recognition. Machines are not yet able to recognize the qualities of different voices that make the same sounds. It seems that infants come into the world specially prepared to perceive and categorize the sounds of human language.

INTERPRETIVE COMMENTS

The same methodology employed in Module 21 is shown here. This module deals with language, development, and research methodology. It is a good demonstration of our remarkable sound recognition abilities. Since this original program was made, remarkable progress has been made in computer voice recognition. It is now possible to acquire software for under $100 capable of continuous speech recognition. Progress continues.
Human Language: Signed and Spoken
(time: 6:08 minutes)

DESCRIPTION

This module opens with a scene of a young deaf child communicating with her family through sign language, with the narrator describing human language as having been forged throughout evolution in connection with speech and sound. The very concept of language was thought to be intimately connected with the auditory sense.

Dr. Ursula Bellugi of the Salk Institute studies American Sign Language (ASL), in which the transmission of language resides in the hands rather than in the vocal cords. She studies the basic elements of signing in an effort to sift out the properties of language that are due to the mode in which language is transmitted—either by signing or speaking.

Howard Poizner, also of the Salk Institute, is then seen attaching lights to the hand and arm joints of a deaf colleague. This allows the complex patterns of ASL to be analyzed by a 3-D computer imaging system. ASL has its own rules of grammar, not derived from any particular language, that depend upon signals perceived from the shape and location of movements in space. The recordings are made in the dark so that the small lights can be seen as smooth waves.

The narrator reminds us that sign language exploits visual and spatial abilities rather than auditory abilities and that the right hemisphere of the brain is primarily involved in spatial relationships. So where is sign language mediated? Dr. Helen Neville, Bellugi's colleague, describes startling results: The hearing impaired use the same hemisphere to read signs that hearing people use to process spoken language. The left hemisphere apparently processes language regardless of the way in which it enters the nervous system.

INTERPRETIVE COMMENTS

This topic is not usually presented in a general psychology text, but it provides an opportunity to enrich the discussion of several other subjects, including hemispheric specialization, language acquisition, the nature of language formation, and methodology. This module may also be referred back to in the chapter on emotion, specifically on the topic of differentiating between facial expressions and body language.
The Bilingual Brain
(time: 7.29 minutes)

DESCRIPTION

This module opens in the functional magnetic resonance imaging (fMRI) laboratory at Sloan Kettering Cancer Research Institute. The narrator wonders whether looking in on the brain at work will give us more insight into the intricacies of the mind.

Dr. Joy Hirsch of Sloan Kettering describes the distinction between structural and functional magnetic resonance imaging and how we are now able to look in on the brain as it performs many functions. She shows a picture produced by fMRI taken from a simple finger/thumb tapping exercise and explains how it can be identified across the two cortical hemispheres.

By using fMRI technology, Hirsch and her colleagues are able to map sensory, motor, and language regions of patients' brains prior to surgery to remove a brain tumor. This neurosurgical planning allows the surgeon to more adequately guard against any functional loss that could occur during any particular surgical procedure. In the process of brain mapping prior to surgery, some interesting discoveries have been made in the area of human language acquisition, especially in the case of those individuals who learn two or more languages.

Using fMRI images, the narrator describes two different situations. In the case of people who learn a second language in adolescence or later, the brain uses two segmented areas in Broca's region to process language. In the case of a young child learning two languages early in life, the situation in the brain is quite different. In this case the areas used to process the two languages overlap, producing an enlargement in Broca's area for the two languages. In other words, it makes a difference when a second language is learned in terms of how the brain area for language distributes its functions.

Hirsch expresses optimism about the future that this new technology holds for learning about the neurophysiological substrate that subtends the many complex human functions that go beyond language.

INTERPRETIVE COMMENTS

This module allows us to see one of the latest technologies used by scientists for investigating brain functions. The instructor might want to point out that in the brain image showing the finger tapping exercise we see a ventral view of the brain activity whereby the right motor image is generated by the left hand, and vice versa. Although not mentioned in the program, it is possible for someone to lose the language function for one language while retaining full capacity in another language after injury or surgery. This is
the reason why the brain of a multilingual patient is mapped prior to any planned surgery.

MODULE 27

Animal Language
(time: 14:39 minutes)

DESCRIPTION

The module opens with some eye-catching scenes of animals in the wild communicating as a means of survival. Scenes of feeding, mating rituals, and avoiding danger from predators are shown. The narrator poses questions about where communication leaves off and language begins. Next we see Jane Goodall observing chimpanzee behavior. She tells a poignant story of Lucy, a chimpanzee who demonstrated her use of American Sign Language years after her initial acquaintance with the language. Goodall concedes that Lucy's story does not provide conclusive evidence that animals use language as humans employ it.

Dr. David Premack of the University of Pennsylvania then describes his research on the study of animal language. He asserts that all language begins by associating objects with symbols, something that animals are capable of doing. However, the more complex notions of sentence structure, "without which the rules of human language could not be formed," are absent in animals. There is a qualitative difference between human language and what is going on in the chimps' minds when they use a plastic symbol to represent an object.

This interpretation is challenged by Dr. Roger Fouts and his wife Debbi of Central Washington University who have been studying chimpanzee language with some of the most "learned" students in the animal species, such as Washoe, Loulis, and Tutu. The Fouts use remote video recording techniques to study how chimpanzees communicate with each other. They have uncovered what they believe to be the development of linguistic aspects of communication, and we see examples of what appears to be language that goes beyond simple sign-object substitution.

Debbi describes the chimpanzee-to-chimpanzee social interaction in terms of private and imaginary signings. Roger has now identified what he describes as dialectic differences between colonies of chimpanzees living in the Gombe Stream of Africa and in the Mahali Mountains. The chimps have apparently established variations in signing to accomplish similar ends. The use of tools is also culturally derived. Fouts explains these phenomena in terms of cultural communication differences among the colonies.
INTERPRETIVE COMMENTS

This module includes some classic scenes of early studies of chimpanzees raised with human families. Seeing chimpanzees interact with signs and symbols reveals the painstaking care researchers have taken in studying animal communication. The most recent work employing remote video recordings of chimpanzee-to-chimpanzee signing calls into question earlier interpretations of animal communication as simply learning to substitute a symbol for an object. This module has to do with animal communication, the linguistic abilities of chimpanzees, and comparative cognitive behavior.

MODULE 28

Language and Culture
(time: 4:42 minutes)

DESCRIPTION

The module begins with several different languages being spoken by their native speakers. The narrator introduces the topic of language and suggests what conditions could have brought about the wide differences in the approximately 5000 languages that currently exist in the world.

Dr. Derek Bickerton of the University of Hawaii is studying how certain Creole languages emerged among primitive peoples. He explains that Creole languages are hybrid languages that are created when established languages collided. Bickerton is seen in Amsterdam interviewing Creole speakers from Surinam, a former Dutch colony in South America. African slaves were brought to Surinam from various places. Some of them fled the harsh conditions and formed their own communities, which had no common language. An improvised language with a limited vocabulary and no true grammar emerged and was called pidgin. The children of these people automatically imposed a form of grammar on their parents' pidgin speech. Bickerton notes that in one generation a completely new language came into being.

Bickerton concludes that syntax in children develops as naturally as if it were a physical part of their bodies. It is built into the hard-wiring of the brain's neural circuits.

INTERPRETIVE COMMENTS

Bickerton's interpretation of his data supports Chomsky's nativist view that language derives from the nature of the mind. This position and the data presented provide us with the opportunity to contrast this view with the behaviorist view represented by B. F. Skinner.
This module relates to language development, the nature versus nature debate, and cultural influences on behavior.

**MODULE 29**

**Alcohol Addiction: Hereditary Factors**  
(time: 11:40 minutes)

**DESCRIPTION**

As the module opens we see Al Croom, a reformed alcoholic, talking about the heavy drinking in his family background. He relates his early involvement in drinking and how he became an alcoholic. Al seems to have a type of alcoholism that is passed from father to son. He says he didn't confront his problem until his four-and-a-half-year-old son commented on his heavy drinking. Al is seen entering the research laboratory of Dr. Henri Begleiter of the State University of New York, Brooklyn, where studies of brain deficits in alcoholics are underway. Begleiter's previous studies indicate that alcoholics suffer from extensive deficits in sensory function, brainstem activity, and cognition. Al's results will be especially interesting to Begleiter since Al has not had any alcohol for six years.

Al's task is to press a button whenever he recognizes a change in either a line length or a tone. Al reacts to the stimuli, and Begleiter reviews the results. Compared with a control subject (a non-alcoholic), Al's brain activity is quite different. His brain waves are devoid of a particular sign called P3. Begleiter describes the differences between Al's brain activity and the control subject's. The critical question raised is whether the P3 deficit is the result of a history of heavy alcohol consumption or a sign of a true genetic trait.

Begleiter's team then tests young boys who "probably have never had a drink." The boys with alcoholic fathers show the same P3 brain deficit. Begleiter hopes this deficit of P3 can be used as a valid and reliable biological marker for a predilection to alcoholism.

Now, ten years after the original module was completed, Dr. Begleiter and his colleague, Dr. Bernice Porjecz, along with other investigators have confirmed and extended the original findings presented in this module. Begleiter states that his work has been replicated by approximately fifty studies from coast to coast. Recent studies have added DNA and genetic data to establish a close hereditary factor in the predisposition for alcoholism. Youngsters who had been tested for the biological markers have been followed longitudinally for over a ten-year period. It turns out that those showing the deficit go on to abuse alcohol and drugs. Using linkage analysis, it is now established that there are very specific loci that are, in fact, associated with neurophysiological features. Genetic loci for protective factors in non-affected individuals from the same family have also been identified.
Porjecz discusses the interaction between the environment and hereditary predisposition for alcoholism, which may involve disinhibition. Disinhibited individuals tend to overrespond, which can lead to a state of hyperexcitability in which alcohol is used as a way of medicating oneself to feel more "normal."

INTERPRETIVE COMMENTS

Al confronts his alcoholism with openness and honesty and offers a good model for those who may be experiencing the denial he describes. The P3 deficits are well presented in the video comparisons of Al's brain waves to a control subject's. This module illustrates how research into the biological roots of a problem unfolds with replication and the advent of new technologies. What starts out as a neurophysiological study develops into a broad-based investigation into the genetic roots of alcoholic addiction and the potential for early diagnosis and intervention.

The module deals with alcoholism, addiction, biological evidence for hereditary traits, and how science progresses through replication and the development of new technologies.
MODULE 30

Treating Drug Addiction: A Behavioral Approach
(time: 19:40 minutes)

DESCRIPTION

This module opens with a street scene in a run-down section of Philadelphia. Jim Sloan, who was a drug addict for seventeen years, describes how plentiful the drugs are. For a former addict, he says, the triggers for drug use are numerous: money in your pocket, the smell or sight of cigarettes, people who stop and ask if you want drugs.

Jim discusses his progress with Dr. Ann Rose Childress of the Veterans Administration Medical Center, Philadelphia. She asks him questions about the triggers he encounters and how he is able to deal with them. The narrator notes that for eight months Jim has been involved in a program designed to desensitize him to the triggers of drug use. Jim is shown watching a movie of two individuals smoking illegal drugs. He is asked to rate how tempted he feels by what he is seeing on a scale from one to ten. His response is good: one. He is unlearning some of his own triggers.

Jim is then asked to prepare cocaine for smoking. He goes through all the preparations up to the point of lighting the match. He repeats this procedure while his reactions are measured. His temperature remains normal. It has taken him twenty sessions to achieve this level of desensitization. Jim says, "You eventually can handle these things without the craving because you know you are not going to complete the act." Jim has clearly made progress in fighting off the craving brought about by the triggers. But are these the triggers he will encounter in his environment outside the laboratory?

After his successful treatment, Jim was able to reunite with his family. He has remained drug-free for over ten years and relocated to a Western state a great distance from his drug related environment. Dr. Childress returns to the camera after thirteen years of research on the behavioral approach to treatment drug addicts.

Childress describes the new directions of her research that goes beyond establishing an in-patient setting for deconditioning addicts to the triggers that they encounter in their natural environment out of the laboratory. She and her colleagues developed an active strategy for patients to cope with their craving in the presence of cues wherever they occurred outside the laboratory.

Greg Scirrotto describes his history of drug addiction, which ruined his personal and professional careers. Now that he is no longer addicted, he describes how he was taught to differentiate between the craving response for crack cocaine and the drug action itself. He has been drug-free for over four years.
Childress began to look into what is actually going on in the brain when a person experiences craving. Through the use of PET scans, she is able to separate out activity in a region of the amygdala and the anterior cingulate of the forebrain when an addict is looking at neutral scenes compared to scenes depicting cocaine usage. The differences are dramatic and associated with the emotional limbic system. Images are shown on her computer screen. She discusses the future direction of her research into anatomical brain mapping for specific cravings ultimately identifying specific neurotransmitter activity associated with craving. The ultimate goal would be to develop anti-craving medications specific to cocaine without necessarily reducing the desires for other good things in life. This, in combination with behavioral therapies, may provide the protocol for cure of these powerful and destructive addictions.

INTERPRETIVE COMMENTS

The module provides a salient example of how drug therapies incorporate the results of research on several levels of behavior. Childress' earlier work enjoyed a great deal of success for individuals who were sufficiently motivated to learn the behavioral strategies necessary for avoiding environmental triggers sustaining their addictions. Now, with the advent of functional MRI, PET scans, and brain imaging analysis, it may indeed be possible to identify the anatomical and neurochemical basis of craving associated with addictions. Dr. Childress provides a wonderful role model for women in science who are making significant societal contributions applying the results of carefully executed laboratory research to the solution of a critical social problem of drug addiction.
MODULE  31

Mood Disorders:  Mania and Depression
(time:  7:34 minutes)

DESCRIPTION

The module opens with a woman describing her cycles of mania and depression.  She focuses on her depressive episodes and tells how they are so distressing and intense that suicide sometimes seems the only relief.

The scene shifts to a clinical setting where Dr. Samuel Guze is interviewing a patient who has been referred to the clinic because of his desire to be "eliminated from Earth."  The patient talks with great difficulty and seems to lack the desire to go on.  Guze then describes the symptoms of depression and the toll it takes on the people who have it.  The scene changes back to the female patient who opened the program.  She is interacting with her children in the backyard.  She describes the severity of her depression, which at times is so great she fears she will take her own life.  This would destroy the one thing she loves more than anything else—her children.  Dr. Paul Wender of the University of Utah then describes the two different types of affective (or mood) disorders:  unipolar and bipolar.

The next scene presents a group therapy session with members of the Manic Depressive Association of St. Louis.  A support group leader is shown discussing the overwhelming effects of bipolar disorders and how important it is for sufferers to help each other to cope with their problems.  Various members of the group relate personal stories of how the illness has affected their lives.  One of the male members is shown strolling through an art museum.  He stops to describe the reactions he experienced to certain paintings while he was suffering from severe mania and mood fluctuations.

Guze closes the module with a description of mania in the behavioral terms of optimism, euphoria, rapid speech, and overactivity.

INTERPRETIVE COMMENTS

This module is one of four on depression.  It presents vivid examples of the mood fluctuations of patients who suffer from periodic affective episodes.  The patients' stated feelings and the professionals' descriptions of their illnesses supplement each other and help us to understand the suffering experienced by people with this disorder.
MODULE 32

Mood Disorders: Hereditary Factors
(time: 6:11 minutes)

DESCRIPTION

This module opens with rural scenes of an old-order Amish community in eastern Pennsylvania. The narrator describes how this close-knit group acts as a natural laboratory for studying the genetic potential of some forms of manic-depressive (bipolar) illnesses. The scene continues with the voice of Dr. Janice A. Egeland of the University of Miami School of Medicine describing her early work in the field of medical anthropology. This work encouraged her to study a very homogenous population, such as the Amish, for signs of genetic factors in physical and behavioral patterns.

Egeland then explains that if chromosomes carry the blueprint for our inheritance of physical traits, we should also consider how hereditary factors may influence our behaviors. The Amish environment became Egeland's laboratory for studying manic-depressive disorders. She describes her findings by using a graphic representation of a chromosome that shows a genetic marker on the short arm of chromosome 11. Egeland concludes that there is a hereditary factor involved in some forms of manic-depressive (bipolar) disorders.

Dr. Peter Shybrow of the University of Pennsylvania suggests that with further exploration of chromosome 11, it may be possible to precisely determine the biochemical actions taking place within the chromosome. Doing so might allow us to possibly develop a pharmacology for helping those afflicted.

INTERPRETIVE COMMENTS

Manic depression is an earlier term for bipolar disorder. This module is based on a comprehensive ten-year study (one of the first such studies) involving 12,000 volunteers in an Amish community. Egeland's work represents careful analysis of genetic factors related to manic-depressive disorders. Since this seminal investigation was begun, other investigators (Barinaga, M. [1989], Science, 246, 886-887 and Faraone, S.V. et. al. [1990] Psychological Bulletin, 98, 41-46) have failed to establish that the genetic marker is located on chromosome 11. Egeland's research has stimulated the work of numerous investigators worldwide in search of the specific genes that predispose one to this debilitating condition.
MODULE 33

Mood Disorders: Medication and Talk Therapy
(time: 12:29 minutes)

DESCRIPTION

As this module opens, a female patient suffering from mania discusses her reaction to medication taken for her disorder. The narrator indicates that the medication is beginning to mute her long-term manic reaction.

Dr. Paul Wender of the University of Utah then distinguishes between the physical and psychological factors responsible for depression. As he talks, we see a bipolar disorder patient named Doug Barton tracing his family genealogy. We learn that Doug's medication has relieved most of his pain. With the aid of an action graphic, the narrator describes where the chemical action of the medication has its effect—at the synapse. Antidepressant drugs seem to alleviate a deficiency of serotonin and norepinephrine in the synapses of depressed patients. Conversely, manic patients seem to have an excess of certain neurotransmitters. For them lithium dampens or eliminates mania in eighty percent of the cases.

The next scene shows a group therapy session. Where drugs alone do not seem to work, talk therapy and group support systems can be very helpful. David Conner of Barnes Hospital opens the group's discussion by stating the importance of being able to talk about problems and hear from others about their illnesses.

Dr. Peter Whybrow of the University of Pennsylvania then explains that all interactions in daily life have a neurochemical equivalent. He says it is important to understand the extent to which our biology is perturbed by these interactions in order to intervene therapeutically.

The narrator states that many successful treatment programs for depression incorporate both biological and psychological interventions. Talk therapy, in combination with appropriate antidepressant medication, seems to work best when both treatment approaches are integrated as seen in a dramatization of patient and therapist.

Dr. Christian Hageseth is seen, in an enactment, talking to a depressed person. She is suffering from lack of sleep and other symptoms of rather severe depression. Hageseth probes about her sense of worth and prescribes medication to assist her sleep and overall mood.

The next scene looks in on Hageseth and the same patient three weeks later. The patient is obviously less distraught and the positive effects of her medication are discussed. Her physical appearance is much more upbeat and she looks much more presentable.
Hageseth discusses her medication and her referral to another therapist, a psychologist. This seems to be working out very well.

The final segment, six months later, shows a transformed person who is now well groomed and apologizes for missing a recent appointment due to the fact that she had another more important obligation at her daughter's school. Apparently the combination of medication and talk therapy with both psychiatrist and psychologist have been of great benefit to this patient. She now describes herself as a survivor, not a victim. The program ends with a statement by Hageseth on the beneficial effects of biological and psychological treatment for depression.

INTERPRETIVE COMMENTS

This module shows the efficacy of combining drug therapies with traditional psychotherapy. Through several patients and their families, a number of professionals relate treatment techniques and their effectiveness. The action diagram assists in understanding the nature of neurotransmitter action. The program projects a positive perspective on the interplay between psychological and biological therapies as applied to mania and depression. New medications are becoming available at a rapid rate and it behooves the instructor to remind students the importance of seeking professional help by certified practitioners who are sensitive to the interplay between biology and psychology.

The module relates to the treatment section of a general psychology text and completes the module sequence on mood disorders. It is important to mention to students that the drugs Doug refers to when he says "just ordinary pills that can be found at any pharmacy," are prescription drugs. There are several non-prescription drugs available which claim relief from mild to moderate depression. It is always a good idea to seek advice from a certified professional before using any substance that claims to relieve psychological discomfort. Reminder your students that the patient/doctor interviews are a dramatization of a somewhat "typical" scenario involving treatment of depression.
MODULE 34

Treating Depression: Electroconvulsive Therapy (ECT)
(time: 5:45 minutes)

DESCRIPTION

This module opens with a very depressed patient, Mary, being interviewed about her suicide attempt. Mary says that she feels worthless, that she is the devil, that she smells and is generally disgusting. She describes how she tried to take her own life. The narrator presents the reasons for treating some individuals with electroconvulsive therapy.

Dr. Max Fink of the State University of New York describes the desperation that led to Mary's suicide attempt. She was discovered by her husband after taking an overdose of aspirin. After recovering physically, she became a continuous risk, requiring around-the-clock surveillance. All she could think about was trying to kill herself. Fink indicates that it became necessary to treat her as rapidly and effectively as possible.

Mary is then shown being wheeled into a treatment room under sedation. She is being prepared for electroconvulsive therapy (ECT). The narrator describes the preparation and treatment procedures in detail, along with some of the expected memory losses that often follow. We see Mary as the treatment is administered. She displays a grand mal convulsion. When the treatment is over, Mary is seen rubbing her face.

In the next scene, Mary looks dramatically different from her initial appearance. She is being interviewed by an off-screen therapist. She answers questions readily, even smiling on occasion. She says she doesn't remember much about her depression but does remember some of the events leading up to her suicide attempt.

The narrator ends the module by saying: "Electroconvulsive therapy has a very important place in the treatment of certain depressions. It's not a panacea. It doesn't help everyone. By and large, it is probably still the single most effective treatment we have for severe depression."

INTERPRETIVE COMMENTS

This is a clear and dramatic presentation of some of the effects of ECT. The opening scene vividly displays severe depression. The treatment procedure is clearly presented, along with some data about the frequency and effectiveness of this treatment protocol. Actually seeing the treatment takes away some of the negative reactions associated with it. Virtually all general psychology texts include this topic under treatment for depression.

It is important to emphasize that although ECT seems to help in some cases of severe depression, it is done selectively, and the positive effects may not last indefinitely.
Mary, for example, regressed into a depression just one month after the treatment shown in this module. In addition, it is not fully understood why the treatment is effective.

MODULE 35

The Mind of the Psychopath
(time: 18:39 minutes)

DESCRIPTION

This program opens in the middle of an interview with Patrick Frisell, serving time for manslaughter in a Canadian prison describing his chances for parole. The narrator describes Frisell's participation in a study of psychopathy conducted by Dr. Robert Hare of the University of British Columbia. Hare defines psychopathy as a clinical construct characterized by a cluster of behaviors. The cluster includes interpersonal, affective, and socially deviant behaviors.

The narrator describes specific behaviors related to psychopathy as: callous, impulsive, manipulative, glib, egocentric, predatory, grandiose, with a lack of empathy and emotional affect. Hare reviews his twenty-five year history studying the psychopathic personality and the development a various measuring tools. The narrator describes the Hare Psychopathy Check List-Revised (PCL-R). The assessment procedure involves the integration of file information and collateral data gather by a trained clinician shown interviewing a client.

Frisell is seen walking to Hare's laboratory where he will participate in a lexical decision task requiring him to press a key in response to neutral words, non-words, and emotional words. His brain is monitored by means of EEG during the task. Hare discusses the results with Frisell. The narrator describes yet another brain measuring technique involving magnetic resonance imagining. A rotating computerized image of Frisell's brain reveals no structural anomalies.

Hare describes one of the most convincing studies to date comparing psychopaths with non-psychopaths. This study involves Single Photon Emission Computerized Tomography (SPECT) done at the Bronx VA Hospital in collaboration with Dr. Joanne Intrator. Hare reviews the results of the study with brain images that show a distinct difference between reactions to emotional and non-emotional words of the psychopaths compared to non-psychopaths. Hare interprets these differences in terms of semantic processing but cautions that the basis of the differences is still not completely understood. It may be that the differences are primarily responses to the differences in strategy where different parts of the brain are involved.
The question of how we deal with psychopaths is raised by the narrator as we see a group therapy session involving Frisell and other inmates responding to a prison therapist. Hare discusses the inability of such programs to change the behavior psychopaths. The psychopath does not suffer from subjective experience such as anxiety or lack of self-esteem. The psychopath's behavior is simply at odds with what society considers to be acceptable. They see nothing wrong with them, the problem is with society.

Hare's current research continues to search for how the different parts of the brain are interconnected and how these connections are used in a particular situation. His current focus on the ventromedial and orbitofrontal frontal cortex involve functional MRI. Other research indicates that these areas have been associated with integration of emotional and other aspects of cognition. His final speculation concerns the role of neurotransmitters and their possible role sorting out the differences in function among with very complex and disturbing behavior pattern.

INTERPRETIVE COMMENTS

This module traces the ongoing attempt to obtain objective data differentiating the psychopath from the non-psychopath. Hare's work spans over 25 years of research focusing on objectifying the process by measures such as the Psychopathy Check List and brain imaging. Structural MRI studies have failed to find any anatomical differences between the brains of psychopaths and others. Hare's current research focuses on the search for how brain interconnections are sequenced within neural networks. One of the main difficulties encountered in this line of research is that most psychopaths are not available for study. Hare has historically focused his research on the rather small number of psychopaths who are serving time for crimes against society. The larger population of psychopaths is out in the real world undetected and unavailable for study. This problem is discussed in more detail in Hare's book, *Without Conscience: The Disturbing World of the Psychopaths Among Us*, published by Guilford Press, 1999.
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