Discovering Psychology: Updated Edition

13 The Mind Awake and Asleep

1	01:00:18:05	>> ZIMBARDO: Why do we have different states of consciousness, from wakefulness, to daydreaming, to sleep?
2	01:00:25:29	Are dreams the result of random bursts of electrical impulses deep within the brain or are they the product of hidden fears and desires?
3	01:00:40:00	"The Mind Awake and Asleep," this time on Discovering Psychology.
4	01:01:19:01	>> ZIMBARDO: Just as the Earth alternates between light and darkness, all living creatures alternate between daily cycles of sleep and activity.
5	01:01:31:03	The physical rhythms of nature, the daily rising and setting of the sun, the lunar month, the seasons of the year are paralleled by biological rhythms in ourselves.
6	01:01:42:24	Even plants show a daily cycle of changes in tempo every 24 hours, the circadian rhythm, from the Latin *circa dies,* "about a day."
7	01:01:55:02	This daily cycle of activity and rest is reflected in virtually every biological function.
8	01:02:01:06	Body temperature, blood pressure, pulse, blood-sugar levels, hormonal levels all fluctuate systematically over the course of 24 hours.
9	01:02:13:17	These internal shifts are reflected in fluctuations in our energy level, mood, and performance.
10	01:02:21:06	And so each of us has a finely tuned biological clock -- one which not only regulates bodily processes, but which also turns on and off our conscious contact with the world.
11	01:02:34:13	Human consciousness -- our awareness of the world and ourselves -- is a constantly changing process.
12	01:02:40:23	It ebbs and flows as inexorably as the ocean tides.
13	01:02:44:16	Every day we experience a variety of alternate states of consciousness, from perceptions while we're wide awake, to

daydreaming fantasies; from reveries at the onset of sleep known as the hypnagogic state, to sleeping and dreaming.

14 01:03:02:04 Without consciousness, we couldn't survive -- at least not for long.

15 01:03:07:09 We wouldn't know about the world outside.

16 01:03:10:00 In order to function, the mind constructs a set of working blueprints of the environment.

17 01:03:15:04 These blueprints include some reasonable expectations, hunches, and predictions about what we're liable to find out there.

18 01:03:22:10 Our consciousness enables us to read these blueprints and act accordingly and swiftly, helping to direct our behavior in adaptive and flexible ways, toward desirable goals and away from undesirable ones.

19 01:03:37:27 The conscious part of our brain in the cerebral cortex also serves as an interior decorator.

20 01:03:44:07 It tells us what things that enter our consciousness go together and how they should be arranged in our thinking.

21 01:03:50:22 In other words, it imposes order on the objects and events we experience.

22 01:03:58:07 The conscious part of the brain also takes on the role of dramatist.

23 01:04:02:18 It strives to discover some coherent meaning in a story line that knits together the elements in a way that makes sense to us.

24 01:04:15:15 Normally we're aware of only a small portion of what's happening in and around us.

25 01:04:20:29 But much of what we perceive, know, and can do is not constrained by the narrow limits of our conscious awareness.

26 01:04:28:26 Continual processing also takes place at nonconscious levels.

27 01:04:34:01 Most of the physiological housekeeping of our bodies occurs automatically, so we don't have to think about breathing, or

blood flow, or digestion, unless something goes wrong.

28 01:04:48:19 Most lower-level processing of sensory input is also nonconscious: estimating distance and size of objects, recognizing patterns, detecting edges, and much more.

29 01:05:02:08 Our brains are continually making complex computations that are essential for survival, and yet we're never aware of them.

30 01:05:10:16 We only notice the end results.

31 01:05:21:04 Learned skills which become routinized and automatic only need minimal awareness to carry them out.

32 01:05:28:00 This routinization frees our consciousness to deal more with the new and less predictable -- everything, in other words, that isn't yet a stable fixture in our mind.

33 01:05:42:02 As our consciousness works on this higher level, it does a number of things.

34 01:05:47:14 It reduces the continual bombardment of sensory stimulation to only two categories: the relevant and noticed, and the irrelevant and ignored.

35 01:05:56:25 Without this filter, we'd be overwhelmed by sensory data.

36 01:06:02:04 Consciousness also empowers our mental processes to analyze, compare, and interpret whatever we've extracted from the stream of experience.

37 01:06:11:17 And it enables us to respond flexibly to experiences by integrating what we know from the past, what we perceive in the present, and what we anticipate from the future.

38 01:06:25:07 And finally, consciousness enables us to recognize our own mortality because we have that awareness of past, present, and future -- a mixed blessing if ever there was one.

39 01:06:39:24 Now, you might think that consciousness must have been a prime interest of psychologists throughout the history of the discipline, but in fact, scientific interest in this phenomenon has waxed and waned, just as consciousness does in our daily lives.

40 01:06:53:00 And therein lies a major theme in the history of psychology.

41 01:06:58:26 At the end of the 19th century, German psychologist Wilhelm Wundt explored the conscious thoughts and feelings of subjects in the hope of revealing the underlying structure of the human mind.

42 01:07:13:27 Edward Titchener then carried on Wundt's work in the U.S.

43 01:07:18:04 He, too, believed that psychology should concern itself with what's on your mind instead of the how and why it got there.

44 01:07:25:12 This brand of psychology is known as structuralism.

45 01:07:30:15 On the other side of the debate was William James, who regarded consciousness as essential for adapting to the environment.

46 01:07:38:06 For James, consciousness was to be studied not in terms of its contents, but in terms of its function, from which his brand of psychology, functionalism, derives -- in other words, what consciousness does for us.

47 01:07:54:27 The first characteristic of consciousness that James specified is that it's personal and unique to each individual.

48 01:08:02:07 It's also continuous and perpetually changing.

49 01:08:06:16 And lastly, it's selective, choosing from the environment whatever is most relevant for the individual's adaptation.

50 01:08:18:08 But in the 1920s, the famous behaviorist John B. Watson declared that consciousness was a scientifically worthless concept altogether.

51 01:08:27:18 Only external behavior can be observed and studied, said Watson.

52 01:08:37:21 It wasn't until the late '50s that the subject of consciousness was reintroduced by a new breed of cognitive psychologists.

53 01:08:47:20 Today psychologists are exploring consciousness in a number of different ways.

54 01:08:53:17 One of their most fascinating subjects is how and why we pay attention to certain things and not others.

55 01:09:00:07 Attention is the bridge across which information travels from the external world out there to the subjective world of consciousness in here.

56	01:09:10:24	Attention is really a state of focused awareness.
57	01:09:14:06	Whatever we pay attention to is processed and transformed from mere sensory signals extracted from the external world into perceptions, thoughts, and experiences.
58	01:09:26:12	It's attention that serves as a selective filter which excludes much of the available stimuli that constantly bombard us.
59	01:09:33:26	It reduces confusion and prevents what would otherwise be a massive sensory overload.
60	01:09:43:11	British psychologist Donald Broadbent showed how attention works in an ingeniously simple experiment.
61	01:09:50:26	Subjects were given headphones and asked to pay attention to either a story that was played into their right ear...
62	01:09:57:22	>> There was this little boy...
63	01:09:59:11	>> ZIMBARDO: ...or another, different story that was being played simultaneously into their left ear.
64	01:10:04:06	(*overlapping voices*) When tested later, the subjects could not remember anything about the story presented to the unattended ear.
65	01:10:14:12	So attention has a limited capacity.
66	01:10:18:09	Attention is also a selective filter.
67	01:10:21:12	When the material in the unattended ear is our name...
68	01:10:24:07	>> Hey, Phil.
69	01:10:25:24	>> ZIMBARDO: ...or has some personal significance, we do notice and remember it.
70	01:10:30:01	>> Happy birthday, Phil.
71	01:10:32:27	>> ZIMBARDO: Sometimes, of course, it's hard to pay attention to anything, as any student sitting through a boring lecture can attest.
72	01:10:40:11	Your mind wanders, irrelevant thoughts surface, and images of other situations far removed from the present float into view.
73	01:10:50:22	When that happens, you're in the midst of a daydream.

74 01:10:55:10 >> It's the bottom of the ninth, two out and two on.

75 01:10:58:10 Nathan steps to the plate.

76 01:11:00:05 He's 0 for 4 so far.

77 01:11:02:12 It's been a rough day.

78 01:11:04:05 >> ZIMBARDO: Daydreams reveal another unique feature of the mind -- its ability to create inner private realities unconnected to the world around us.

79 01:11:13:11 >> The first pitch -- it's low and inside.

80 01:11:16:10 >> ZIMBARDO: Contrary to popular belief, daydreaming is often good for us.

81 01:11:21:16 It helps us overcome boredom, cope with problems, and be more creative.

82 01:11:26:22 And it keeps our minds active and our brains operating efficiently when they would otherwise be understimulated.

83 01:11:39:03 Sleep, on the other hand, helps us reduce stimulation.

84 01:11:43:00 In fact, for years, psychologists weren't particularly interested in sleep because nothing seemed to be happening, except for the occasional dream.

85 01:11:52:19 Even though we sleep for over a third of our lives, we knew little about it until a discovery in 1937.

86 01:12:01:05 It was found that the brain is far more active during sleep than previously thought.

87 01:12:07:10 Our brain waves change in form with the onset of sleep and continue to show systematic changes during the entire sleep cycle.

88 01:12:17:15 Psychiatrist Ernest Hartmann of Tufts University is an expert on sleep.

89 01:12:24:04 >> I think sleep has a restorative function and probably two restorative functions, one involving something like protein synthesis, which the whole body needs, and one involving restoration of brain processes, which our higher functions need.

90 01:12:43:09 And the second function is the more interesting one.

91	01:12:45:20	This function involves putting together new material from the day before with old material.
92	01:12:52:29	It involves making connections in the brain.
93	01:12:57:20	So I think Shakespeare put it beautifully when he said, "Sleep knits up the raveled sleeve of care."
94	01:13:05:00	You can kind of see the sleeve of care, some unraveled material, new stuff that you've learned the day before; it doesn't fit in, loose ends and so on at night.
95	01:13:14:12	In the morning, sleep has done its thing, has pulled it all together, and you're in good shape.
96	01:13:20:27	Your sleeve has been restored for the next day's wear.
97	01:13:25:23	>> ZIMBARDO: Using electroencephalograph technology, or EEG, brain-wave tracings made from sensors attached to the scalp and face, researchers since the early '50s have observed adults during night-long sleep sessions.
98	01:13:41:29	They have found consistent patterns of brain waves which occur during predictable cycles for virtually everyone.
99	01:13:52:26	When these brain waves are compared with the sleeper's rapid eye movements, known as REM, a clear relationship emerges.
100	01:14:01:02	Recurrent episodes of REM sleep are accompanied by very rapid, irregular changes of low electrical voltage in the brain.
101	01:14:10:20	When subjects are awakened during periods of REM, which come about every 90 minutes throughout the night, most of them report that they are dreaming.
102	01:14:21:22	>> This is a diagram of a typical night of sleep in a human, a young adult who is sleeping quite well.
103	01:14:28:26	If you follow this line here, it shows that beginning from waking, a person goes into deeper and deeper non-REM sleep.
104	01:14:37:16	This means slow waves in the EEG, brain waves.
105	01:14:42:09	Then, after 90 minutes, there's a dream period, a REM period with lot of activation.

106 01:14:48:17 The same thing happens four or five times during the night.

107 01:14:52:15 Usually there are one or two awakenings during the night, too.

108 01:14:55:28 But this is the typical pattern that we all go through, quite surprisingly.

109 01:15:01:20 Whether or not... whether we remember 200 dreams a year, as some people do, or never remember a dream, we still go through this pattern.

110 01:15:11:08 >> ZIMBARDO: So it's possible to have a scientifically precise index of a dream -- an experience we usually have for a total of about two and a half hours each night.

111 01:15:24:25 But what do dreams mean?

112 01:15:27:23 Since the dawn of history, people have been analyzing them as forecasts of the future or as the intervention of spirits of the dead.

113 01:15:38:25 But it was Sigmund Freud who put dreams on a unique psychological pedestal.

114 01:15:43:23 Dreams were significant, said Freud, because they revealed the presence of deep secrets that the unconscious part of the mind was trying to hide from its conscious awareness.

115 01:15:54:22 This is Freud's office in Vienna, where he analyzed his patients' dreams as they lay on his couch.

116 01:16:01:28 Acting as a sort of psychological archaeologist, Freud tried to unearth the hidden associations and symbolic meanings of these dreams, which he believed concealed unconscious desires and fears, many of them sexual.

117 01:16:18:10 But there's another, current theory that proposes that dreams begin not with unconscious wishes, but with a spontaneous discharge of random bursts of electrical impulses deep within the brain stem.

118 01:16:34:24 The proponents of this controversial new theory are Robert McCarley of the Harvard Medical School and his colleague J. Allan Hobson.

119 01:16:44:13 >> It's as if, in this primitive part of your brain called the brain stem, there's an automatic activation system that turns on

every 90 minutes for 30 minutes or so.

120 01:16:57:13 And it produces this structured series of activations and the dreamer knits them together.

121 01:17:02:18 But meaning is built into the dream, we think, and it's not intrinsically a part of the dream itself.

122 01:17:10:22 >> ZIMBARDO: McCarley and Hobson call these ideas the activation synthesis theory.

123 01:17:16:00 During a dream, the part of the brain called the pons sends electrical charges to the forebrain.

124 01:17:21:20 That's what they mean by activation.

125 01:17:24:15 The dreamer then tries to make sense of it all by creating a story line.

126 01:17:28:22 That's what they mean by synthesis.

127 01:17:30:29 In other words, the brain creates order out of chaos.

128 01:17:36:26 >> The brain is a marvelous organ and one of its things that it loves to do is to try to organize and to try to make meaning, even if no meaning is there.

129 01:17:49:15 And that is the way that our brain is constructed.

130 01:17:54:01 We're more or less forced to try to knit together a coherent picture of the world.

131 01:18:02:07 >> ZIMBARDO: McCarley has measured the electrical impulses in the brain during dreaming, but these impulses are only turned on for body maintenance and memory storage, McCarley says, and not for the sake of dreaming.

132 01:18:14:11 >> Why do we breathe?

133 01:18:15:12 We don't breathe for any particular meaning.

134 01:18:17:11 We breathe so that we can continue to live.

135 01:18:19:29 Why does blood go to our brain?

136 01:18:21:15 It doesn't go there for any particular meaning.

137 01:18:23:14 It goes there so our brain can continue to survive and function.

138 01:18:27:06 I think dreaming sleep, or REM sleep, is like that.

139 01:18:30:20 Now, REM sleep is not only our special property as humans.

140 01:18:35:07 REM sleep is seen throughout the entire mammal kingdom and is present also, to a small extent, in birds.

141 01:18:43:03 So it's something we share as part of a common biological heritage dating back millions of years.

142 01:18:49:26 Now, it's hard to imagine chipmunks having dreams as a way of generating some kind of internal meaning.

143 01:18:57:28 They have REM sleep, but it's hard to imagine that this is generated by a psychological process, for example.

144 01:19:04:06 The other kind of evidence that REM sleep -- the basis, the biological state associated with dreaming -- is something that's built into the brain comes from our own personal history.

145 01:19:16:14 And when we're first born, we spend over half our time in dreaming sleep.

146 01:19:21:25 It's something very important to the brain and we think that what REM sleep likely does to the brain is furnish an internal source of activation that promotes growth and development of the brain.

147 01:19:35:04 So it's present in infants, whose psychological apparatus is very poorly developed and who probably don't have many complex psychological constructs, but they dream a lot.

148 01:19:47:05 They dream even more before they're born.

149 01:19:51:00 >> ZIMBARDO: The Hobson/McCarley theory of dreams is still very controversial.

150 01:19:55:18 In fact, an article outlining it in the *American Journal of Psychiatry* provoked more letters to the editor than any other article in the journal's history.

151 01:20:04:26 But there is also a middle ground between their theory that dreams are all physiological in origin and Freud's theory that they're all psychological.

152 01:20:15:17 This middle view starts with the brain's ability to form an idea about what the external world is like based on the

information available to it.

153 01:20:24:20 This construction, or model of the world, which is formed by the cerebral cortex, both informs our beliefs and directs our actions.

154 01:20:34:08 But when we sleep, information from the external world is largely cut off.

155 01:20:40:04 So the only world our constantly active brain can model is the one already inside it -- stored memories, recent concerns, current emotions, and expectations, which can be activated by electrical impulses discharged from within the brain.

156 01:20:58:29 In other words, dreams are the interplay of the physiological triggering of brain waves and the psychological functioning of the imaginative, interpretive parts of the mind.

157 01:21:15:05 Steven LaBerge of Stanford University has been studying this interplay between mind and body in a series of provocative experiments on dreaming.

158 01:21:25:14 >> Our scientific laboratory studies have indicated there are striking correspondences between what you do in the dream state and what happens to your physical body and brain, so that if you dream you're doing something, to your brain it's as if you're actually doing this.

159 01:21:40:23 Fortunately, there are some restraints on physiological responses.

160 01:21:44:28 For instance, in some of our work with dream sex we found that in the elusive dream state that people's respiration rate would double, for instance, but their heart rates only went up by five or ten beats per minute, instead of doubling.

161 01:21:58:20 And it seems that the heart rate is held down in the dream state, in REM sleep, by the strong parasympathetic nervous system activation, so that there are some built-in safety factors that prevent you from acting out your dream.

162 01:22:11:28 Likewise, your muscles are generally paralyzed during REM sleep.

163 01:22:15:09 So if you dream you're running, you don't actually run.

164 01:22:17:22 What happens is the brain sends impulses to your muscles,

probably the same ones it would if you were actually running, except for, thanks to the part of the brain that prevents you from acting out your dreams, you just get twitches in your legs that correspond to it.

165 01:22:32:01 So it's really the brain is the level on which you find the most striking changes, so that if in your dream you sing or count, the same parts of the brain get activated as would if you were actually singing and counting.

166 01:22:43:22 >> ZIMBARDO: The work being done in LaBerge's sleep lab also involves the relationship between the mind and the dream itself, especially in a dream state known as lucid dreaming.

167 01:22:54:13 >> A lucid dream is a dream in which you know that you're dreaming while it's happening, so that you're in the middle of a dream and suddenly something tells you that you're dreaming, that you're making it all up, it's all in your own mind, and therefore that you could do anything.

168 01:23:07:27 >> Are you awake then?

169 01:23:09:10 >> Yes.

170 01:23:10:14 >> What just happened?

171 01:23:11:14 >> I was dreaming.

172 01:23:12:22 I was sitting in a car, when suddenly the sun was in my eyes, but almost immediately I knew that it was not the sun, but actually the light.

173 01:23:22:27 I knew I was dreaming, so I flew out of the window of the car.

174 01:23:27:16 >> ZIMBARDO: Dreamers were taught to clench their fists and use very specific eye movements to alert LaBerge when they were having a lucid dream.

175 01:23:37:10 LaBerge then triggered a flashing light, which brought the dreamers to conscious awareness of the dream.

176 01:23:42:25 The dreamer could then take conscious control of the dream and even alter its outcome.

177 01:23:49:13 >> Let's say you're running away from something.

178 01:23:51:26 You realize it's just a dream.

179 01:23:53:10 Then you can get the extra courage necessary to turn around and face it, say, "What is this?

180 01:23:58:01 What do you want?" And in my experience, when you do this, you... every time the dream transforms in some positive way, so that whatever you're afraid of then becomes friendly in some way, and that from having faced these fears, naturally your waking self- confidence improves.

181 01:24:15:04 >> ZIMBARDO: The idea of changing the direction of a dream is highly controversial.

182 01:24:20:07 Many psychologists feel that a dreamer should allow a dream to follow its own course to fully benefit from the dream symbolism.

183 01:24:28:14 But LaBerge suggests that if something is chasing you, it doesn't necessarily matter what that something symbolizes.

184 01:24:35:02 Simply facing it in your dream may subconsciously solve the problem.

185 01:24:41:00 >> The kind of argument to say that you shouldn't control your dreams I think is exactly parallel to you shouldn't control your thinking; your thinking should just be random and however it happens, without the conscious mind.

186 01:24:55:06 >> ZIMBARDO: Wherever they stand in this controversy, many psychologists are fascinated by lucid dreaming, mainly because it represents a new way of intentionally altering our consciousness.

187 01:25:06:08 While daydreaming, fantasizing, sleeping, and dreaming are the stuff of ordinary alterations in consciousness, other kinds of alterations may provide new insights into how our mind works.

188 01:25:18:08 What happens, for instance, when people use psychoactive drugs or hypnosis or when they undergo an operation that separates the cerebral cortex into two parts that can't communicate with each other?

189 01:25:37:05 Or when they develop multiple personalities to cope with severe mental problems, what transformations in consciousness occur then?

190 01:25:47:02 Join us next time for some of the most remarkable and unusual aspects of consciousness: "The Mind Hidden and

		Divided."
191	01:25:54:16	Until then, I'm Philip Zimbardo.
192	01:26:01:07	[Captioned by The Caption Center WGBH Educational Foundation]
193	01:27:03:21	*>> Funding for this program is provided by Annenberg/CPB to advance excellent teaching .*
194	01:27:16:19	*For information about this and other Annenberg/CPB programs, call 1-800-LEARNER and visit us at www.learner.org .*