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NEW LEADERS LAUNCH POSITIVE NEUROSCIENCE

Award-winning researchers to explore human flourishing from neural networks to social networks

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PHILADELPHIA -- The Positive Psychology Center of the University of Pennsylvania and the John Templeton Foundation (www.templeton.org) have announced the recipients of the Templeton Positive Neuroscience Awards. The project will grant \$2.9 million in award funding to 15 new research projects at the intersection of Neuroscience and Positive Psychology.

The winning projects will help us understand how the brain enables human flourishing. They explore a range of topics, from the biological bases of altruism to the effects of positive interventions on the brain.

The Positive Neuroscience Project (www.posneuroscience.org) was established in 2008 by Professor Martin E.P. Seligman, Director of the Penn Positive Psychology Center, with a \$5.8 million grant from the John Templeton Foundation. In 2009, the project announced the Templeton Positive Neuroscience Awards competition to bring the tools of neuroscience to bear on advances in Positive Psychology. Seligman founded the quickly-growing field of Positive Psychology in 1998 based on the simple yet radical notion that what is good in life is as worthy of scientific study as what is disabling in life.

“Research has shown that positive emotions and interventions can bolster health, achievement, and resilience, and can buffer against depression and anxiety,” said Seligman. “And while considerable research in neuroscience has focused on disease, dysfunction, and the harmful effects of stress and trauma, very little is known about the neural mechanisms of human flourishing. Creating this network of positive neuroscience researchers will change that.”

Seligman recruited an expert Positive Neuroscience Steering Committee to help guide the Awards competition and select the winners. The Steering Committee includes Turhan Canli, Associate Professor of Psychology and Director of the Social, Cognitive, and Affective Neuroscience Center at Stony Brook University; Joshua D. Greene, Assistant Professor of Psychology and Director of the Moral Cognition Laboratory at Harvard University; Steven Maier, Distinguished Professor and the Director of the Center for Neuroscience at the University of Colorado; Barnaby Marsh, Senior Vice President, Management and Strategic Initiatives for the John Templeton Foundation; Helen Mayberg, Professor of Neurology and Psychiatry and the Dorothy Fuqua Chair in Psychiatric Imaging and Therapeutics at Emory University; Adrian Raine, the Richard Perry Professor of Criminology, Psychiatry, and Psychology at the University

of Pennsylvania; and Julian Thayer, Eminent Scholar in Health Psychology at the Ohio State University.

The 15 winning proposals – some collaborative, representing 24 researchers in all --were selected by the Steering Committee after a competitive process with 190 submissions from 249 investigators. The Awards represent the highest standards of scientific excellence and identify the winning researchers as future leaders in the new field of Positive Neuroscience. Examples include:

Abigail Marsh, Assistant Professor of Psychology at Georgetown University, will receive \$180,000 to study neural functioning of heroically altruistic people, such as those who donate a kidney to save the life of a complete stranger. Marsh has shown that sensitivity to others' fearful facial expressions predicts altruism better than gender, mood, self-reported empathy, or general sensitivity. Responding to fearful expressions seems to rely on the amygdala and its connections to the prefrontal cortex. Do heroically altruistic people show greatest sensitivity to fearful expressions, more amygdala activation, and enhanced amygdala-prefrontal connectivity?

James K. Rilling, Associate Professor of Anthropology, Psychiatry and Behavioral Sciences at Emory University, and Richmond R. Thompson, Associate Professor of Psychology and Neuroscience at Bowdoin College, will receive \$200,000 to study why some fathers are better parents than others. Children with nurturing and playful fathers are more likely to be popular with peers and teachers, be fair and generous, and have higher IQs than kids with absent fathers. Rilling and Thompson will compare genotype, hormonal, and neural differences in highly nurturing and less nurturing fathers, as well as men who are not fathers. They will test the effects of oxytocin and vasopressin on men's brains and behavior. Are some men just cads and others good dads, or can we help playboys become better parents?

Kateri McRae and Iris Mauss, Assistant Professors of Psychology at the University of Denver, will receive \$180,000 to study the neural bases of resilience. Extreme stress cripples some people, while others bounce back, and some even thrive due to post traumatic growth. Research shows that positive emotions and flexible thinking are hallmarks of resilience, and can be developed through training and therapy. McRae and Mauss will study the neural functioning of people recovering from a very stressful event, before and after a five-week training in positive coping skills. They will identify neural systems and adaptations that support positive emotions and resilient growth.

2010 Templeton Positive Neuroscience Awards:

- \$200,000 to Adam Anderson from the University of Toronto, to study the neural and genetic bases of positivity and resilience. Are some people genetically predisposed to be happier and more resilient in the face of life's slings and arrows? Anderson will build on work with Barbara Fredrickson, who defines positivity as the states and straits that promote broad thought and flexible action, which are also important for resilience. They will examine how

specific genes influence dopamine-related brain functions and behaviors, and how that supports positive emotion, creative problem solving, and recovery.

- \$180,000 to Elena Antonova from King's College London, to study how meditation effects sensory processing in the brain. Human brains filter the barrage of information flowing in through the senses. We wouldn't be able to notice anything if we noticed everything, and therefore our brains help us quickly habituate to repeated signals, filtering most information under the radar of attention. Experienced meditators do not habituate to stimuli like most of us, nor do people with schizophrenia. But meditators develop stronger attention, mental flexibility, and emotional regulation, while schizophrenics become overloaded, which leads to mental fragmentation. Antonova will study neural processing in these two groups of people to better understand how mindful awareness protects the brain and increases well-being.
- \$200,000 to Alon Chen and Elad Schneidman from Weizmann Institute of Science, to study the warm glow of companionship at the molecular level. Positive social interactions make us happier, healthier, and even buffer us against ailments including heart disease and depression. But how does the body translate social support into physical and emotional well-being? Chen and Schneidman will study groups of mice to learn more about how genes and cells transform good times into good health.
- \$200,000 to Britta Hoelzel and Mohammed Milad from Harvard Medical School, to find out if meditation helps people conquer their fears. Mindfulness meditation impacts the structure and function of the ventromedial prefrontal cortex, hippocampus, and amygdala -- brain regions that are also part of the neural circuitry critical for deactivating conditioned fears. Hoelzel and Milad will directly test the relationship between meditation and conditioned fear, and determine if unlearning fear is one of the benefits of mindfulness practice.
- \$180,000 to Psyche Loui from Harvard Medical School, to study how the brain enables artistic genius. Do artists and musicians perceive the world differently than most of us? Creative expression may rise from unusual perceptual abilities perception, supported by stronger and faster neural connections between multiple brain regions. Loui will study neural connectivity in musicians with absolute pitch and people with synesthesia to better understand supernormal perception.
- \$180,000 to Abigail Marsh from Georgetown University, to study neural functioning of heroically altruistic people, such as those who donate a kidney to save the life of a complete stranger. Marsh has shown that sensitivity to others' fearful facial expressions predicts altruism better than gender, mood, self-reported empathy, or general sensitivity. Responding to fearful expressions seems to rely on the amygdala and its connections to the prefrontal cortex. Do heroically altruistic people show greatest sensitivity to fearful expressions, more amygdala activation, and enhanced amygdala-prefrontal connectivity?
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thinking are hallmarks of resilience, and can be developed through training and therapy. McRae and Mauss will study the neural functioning of people recovering from a very stressful event, before and after a five-week training in positive coping skills. They will identify brain regions and brain changes that support positive emotions and resilient growth.

- \$180,000 to Jason Mitchell and Jamil Zaki from Harvard University, to study the relationship between doing good and feeling good, and how both can be amplified within and between people. Sharing happiness may double your pleasure. Reward areas of the brain may respond more strongly when we witness and share the positive emotions of others, as opposed to acting in pure self-interest. How else does the brain process thoughts and feelings in relationship to others' interests, and how does this lead to caring behavior?
- \$180,000 to India Morrison from the University of Gothenburg, to study how pleasurable touch effects the way we understand and relate to others. Touch is more than skin deep -- skin is a social and emotional organ. Touch carries affective meaning, enhances social bonding, and shapes our beliefs about what it feels like to be in another person's skin. Morrison will focus on a recently discovered type of nerve fiber that transmits the pleasure of gentle touch, and examine a people with a rare genetic mutation resulting in a severe reduction of those nerve fibers. How does sensation shape empathy and contribute to human flourishing?
- \$200,000 to Stephanie D. Preston from the University of Michigan and Tony W. Buchanan from St. Louis University to study the neural differences between sensing that someone is in pain or danger and taking action to help them. Empathy is bodily response. Research shows that when people feel another's pain psychologically, they also resonate physically, in heart rate, facial muscles, skin response, neural activity, and pupil dilation. Even so, we frequently fail to help those in need, and sometimes even cause their distress. Preston and Buchanan will build on research suggesting that brain regions and activity for empathy are quite different from those supporting altruistic action, and will test a stress-reduction exercise to combat compassion fatigue in a health care setting.
- \$200,000 to James K. Rilling from Emory University, and Richmond R. Thompson from Bowdoin College, to study why some fathers are better parents than others. Children with nurturing and playful fathers are more likely to be popular with peers and teachers, be fair and generous, and have higher IQs than kids with absent fathers. Rilling and Thompson will compare genotype, hormonal, and neural differences in highly nurturing and less nurturing fathers, as well as men who are not fathers. They will test the effects of oxytocin and vasopressin nasal on men's brain and behavior. Are some men just cads and others good dads, or can we help playboys become better parents?
- \$250,000 to Laurie Santos from Yale University, to study how altruism evolved in the brain. Positive Psychology research has shown that good deeds lead to great pleasure. Altruistic actions can increase happiness even more than beneficial but selfish actions. How did the reward systems of the brain evolve to support the pleasure of virtue? Santos will work with two primate species, rhesus macaques and capuchin monkeys, to find out if they also

experience prosocial actions as inherently rewarding. Her research will offer new insight into the evolutionary origins of human altruism.

- \$180,000 to William Cunningham from Ohio State University, and Alexander Todorov from Princeton University, to study how people's social goals influence how their brain processes important social stimuli. Can you become a valiant person by retuning your amygdala? The amygdala has been described as a neural watchdog, alerting us to any threat to self-preservation. But recent research shows that amygdala activation depends more broadly on a person's social goals. Can the amygdala become vigilant for the needs of others if a person's goals are caring and altruistic?
- \$200,000 to Tor Wager and Sona Dimidjian from the University of Colorado, to find how compassionate thinking impacts brain function and leads to more caring behavior. The researchers will conduct a 4-week compassion meditation training and identify neural processes that support positive thoughts and affiliation with others. Can compassion be strengthened like a muscle through training, and does that lead to more generous actions?
- \$180,000 to Thalia Wheatley from Dartmouth College, to study how different brain regions process emotion and support social intelligence. People see emotion in movement and hear emotion in music. We express and recognize feelings in many ways, and some people are more in tune than others. How do different neural regions work together to process complex but universally understood emotion, and how does that relate to empathy and social skill?

For more information about the Positive Neuroscience Project and Templeton Positive Neuroscience Awards please visit www.posneuroscience.org