



Current Research in **Neuroscience**

ISSN 1996-3408



Academic
Journals Inc.

www.academicjournals.com

Darwin's Study of Recognizing Emotion Has Implications in The Areas of Schizophrenia, Autism Spectrum Disorders, Neuropsychiatric Conditions

Historical research by Peter J. Snyder, PhD, reveals more of Charles Darwin's thinking when he completed what may be the first example of a prospective "single-blind" study of human perception of emotional expression. Through scrutiny of Darwin's work, including previously unpublished handwritten notes on his experiments, Snyder explains how this early experiment has direct implications to current work today in the areas of schizophrenia, autism spectrum disorders and other neuropsychiatric conditions. The paper is published in the Volume 19, Issue 2, 2010 of the Journal of the History of the Neurosciences.

Charles Darwin is well-known for his pioneering theory of evolution, but far less is known about some of his later work, such as delving into experimental psychology. While researching his book, *The Expression of the Emotions in Man and Animals* (1872), Darwin corresponded with a French neurologist, G.B.A. Duchenne. Duchenne conducted experiments on human facial expression of emotion by applying electrical stimulation directly to facial muscles. He produced a set of 65 photographic plates to show his belief that there are different muscles in the face that are responsible for every single, discrete emotion.

Darwin studied Duchenne's work closely and doubted this view. He believed there was a smaller set core of emotions commonly expressed cross-culturally. As a result, Darwin designed and conducted a truly novel scientific test of Duchenne's claim in what may be the first ever single-blind study of the recognition of human facial expression of emotion.

Snyder, who is Vice President of research for Lifespan, began an in-depth study of this experiment and relied on what is believed to be previously unpublished notes recorded by Darwin with the help of his wife, Emma.

Snyder says, "No one in history has done more to shape modern biological science. After finding these handwritten tables in the Cambridge University Library (with the

assistance of staff from the Darwin Correspondence Project), I found it to be a phenomenal experience to find something new and remarkable in Darwin's work." Snyder continues, "Darwin is certainly not one of the first who come to mind when we think of human experimental psychology, but here is proof of the tremendous impact he has had upon our current work and thinking."

Snyder, who is also Professor of Neurology at The Warren Alpert Medical School of Brown University, explains that Darwin designed an "experiment" that he conducted at his home, during which he showed a selection of Duchenne's photographic plates to 24 guests. To determine which of the plates to include in his book, Darwin initially chose 11 of the plates and listed them in a data table, which Snyder uncovered in the Cambridge Library. Darwin then showed those images without identifying titles to his guests and asked them to describe the emotion represented in each photographic image.

Snyder says, "As far as we are aware, the images of these three data tables from Darwin's experiment are being reprinted in this paper for the first time. The markings in the tables tell us that he started to tabulate the results of his 'subjects' to determine the fewest number of the 11 plates that were associated with the most agreement with respect to the identification of the emotion being displayed." Snyder's research sought to determine,

specifically, which of the original 65 plates in the larger Duchenne folio he specifically chose as the 11 stimuli in his experiment. "We can only surmise which plates he chose based on his own labels for these images, reflected on the y-axis of the data tables, and by relating this information to specific mention of this experiment in *Expression* and his actual selection of the woodcut reproductions of the original photographic plates found in the first edition."

Recognition of emotion, and tests for it, serve as a proxy for "social cognition" -- the accurate and rapid recognition of emotion in human faces -- have been shown repeatedly to be compromised in a variety of psychiatric diseases. "This single and very novel psychological experiment is a little-known forerunner for an entire modern field of study with contemporary clinical relevance," says Snyder. Darwin's specific questions regarding the cardinal human emotions remain an actively studied topic today, with the intent of identifying novel biomarkers to promote and assist in the development of new therapies for the treatment of schizophrenia, autism and other neuropsychiatric diseases. Snyder notes, "Just over the past three years, we have designed and validated a facial recognition of emotion test that has been used in multiple drug trials, and is essentially the same paradigm pioneered by Darwin in the late 1860's

and early 1870's." As Snyder says, "The core skills or abilities required for successful completion of our tests today differ very little from that small experiment conducted by Darwin at his home in England approximately 140 years ago".

"Charles Darwin provided the evidence and model that forms the cornerstone of modern biology, as well as the framework by which we place advances in genetics and molecular biomedicine into context. Far less known is his unique contribution to experimental psychology and the beginnings of a line of enquiry that is being used today in the discovery of novel therapeutics for the treatment of several devastating human disorders, including autism spectrum and schizophrenia. I, for one, continue to remain in awe of Darwin's contributions," Snyder comments.

Other researchers who worked with Snyder include Rebecca Kaufman of the department of neuroscience at Brown University; John Harrison, PhD, division of neurosciences and mental health at the Imperial College of London, UK, and CogState, Ltd., in Melbourne, Victoria, Australia; and Paul Maruff, PhD, centre for neuroscience, University of Melbourne and CogState, Ltd., Melbourne, Victoria, Australia.