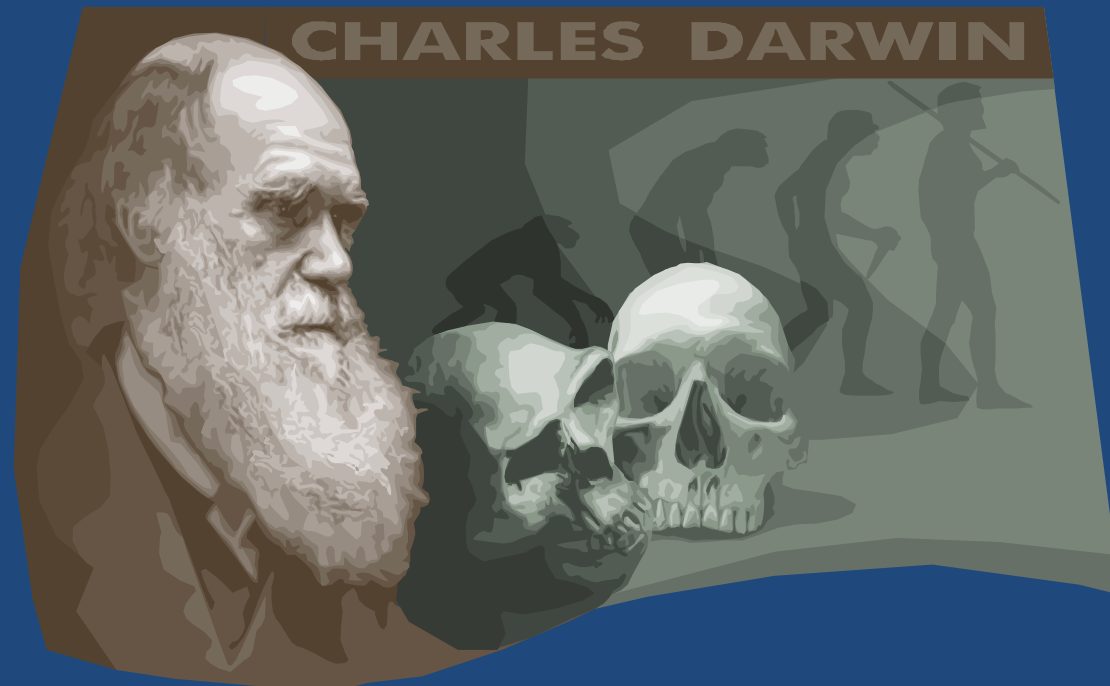


# Why should Psychiatry now consider Evolution ?

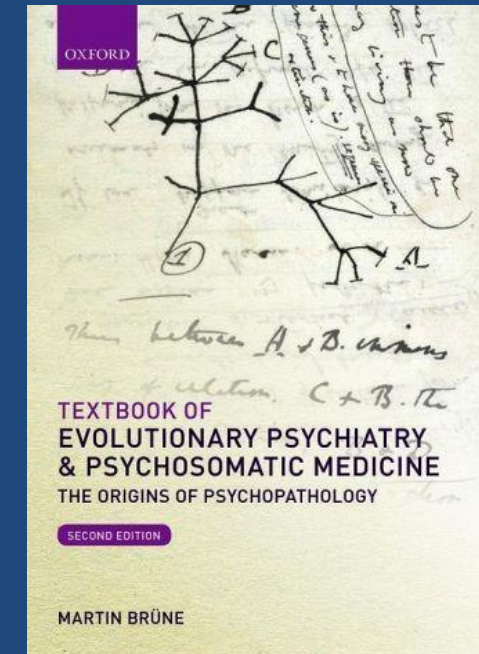
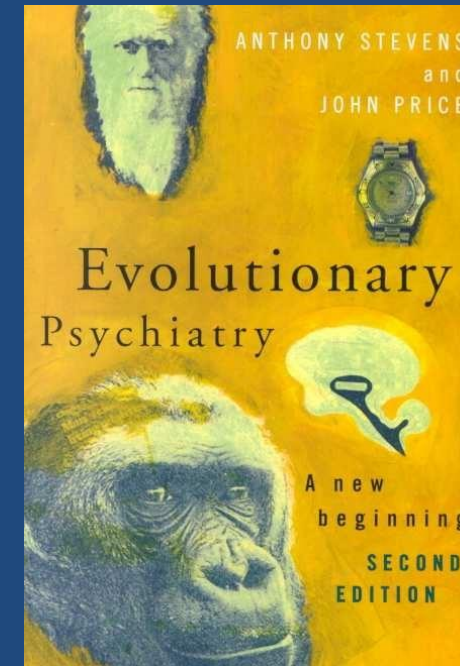
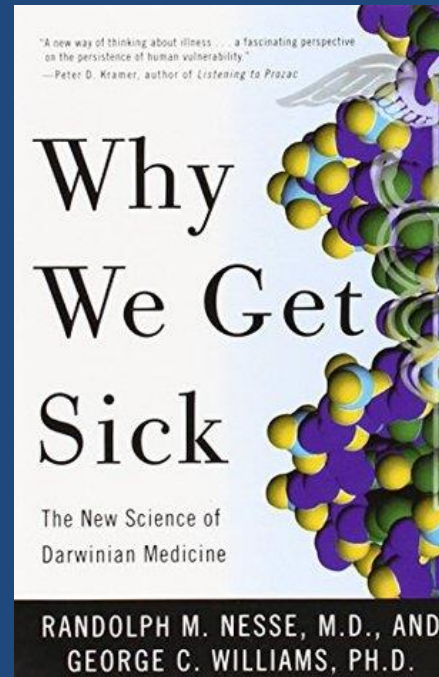
October 4<sup>th</sup> 2016



Paul St John Smith FRCPsych

# Where does Evolution fit into Psychiatry?

- Aetiology
- Pathogenesis
- Diagnosis
- Treatments
- Outcomes
- The philosophy and science of psychiatry



# Disease model

- “People who suffer from mental disorder suffer from a **sick or broken brain**, not from weak will, laziness, bad character, or bad upbringing” (Nancy Andreasen; *The Broken Brain: The Biological Revolution in Psychiatry* 1983)
- Past president of the American Psychopathological Association and the Psychiatric Research Society. Andreasen contributed to DSM III and DSM IV Task Forces



# Thomas Szasz

## Psychosocial and anti-psychiatry model



- In the 20<sup>th</sup> century Szasz argued that except for a few identifiable brain diseases, such as Alzheimer's, there are "neither biological or chemical tests nor biopsy or necropsy findings for verifying or falsifying psychiatric diagnoses".
- Mental illness is only a metaphor for human problems in living, and that mental illnesses are not real in the sense that cancers are real.

# Evolutionary psychology model (Buss)

1. All behaviour is a function of psychological mechanisms and input into those mechanisms
  2. All psychological mechanisms, at some basic level, originate from evolutionary processes
  3. Natural and sexual selection are the most important evolutionary processes responsible for creating psychological mechanisms
- 
1. Evolved psychological mechanisms are functional: selected as they probabilistically solved recurrent adaptive problems that our ancestors faced

# Mental Disorder as 'Harmful Dysfunction' (Wakefield)

- a) Disorder is the failure of a biological mechanism to perform its evolved function,
- b) It inflicts some harm (Including subjective?) or damage on the affected person, as judged by sociocultural standards.

Equating mental disorder with physical disorder of the brain can be misleading.

More later if we have time!

# Where does Evolution fit into Psychiatry?

- Psychiatry and mental disorders still have no **single agreed** unifying or underlying framework.
- Plurality of approaches:- biological, psychological, socio-cultural, philosophical, anti-psychiatry, hermeneutics etc often diametrically at odds with each other.
- **Each provides only bits and pieces.** There is still no consensus on the role psychiatry should play in determining when socially unacceptable behaviour becomes a medical problem. However, psychiatry is central to many people's lives.

# Where does Evolution fit into Psychiatry?

- Why are humans biopsychosocial beings?
- Bio psycho social model = a series of *political* compromises
- Conventional definitions of mental illness lead to controversies over boundaries such as “When are crimes such as murder, terrorist bombing, rape or paedophilia psychiatric illnesses”?
- Or “Why are there no biological tests?”



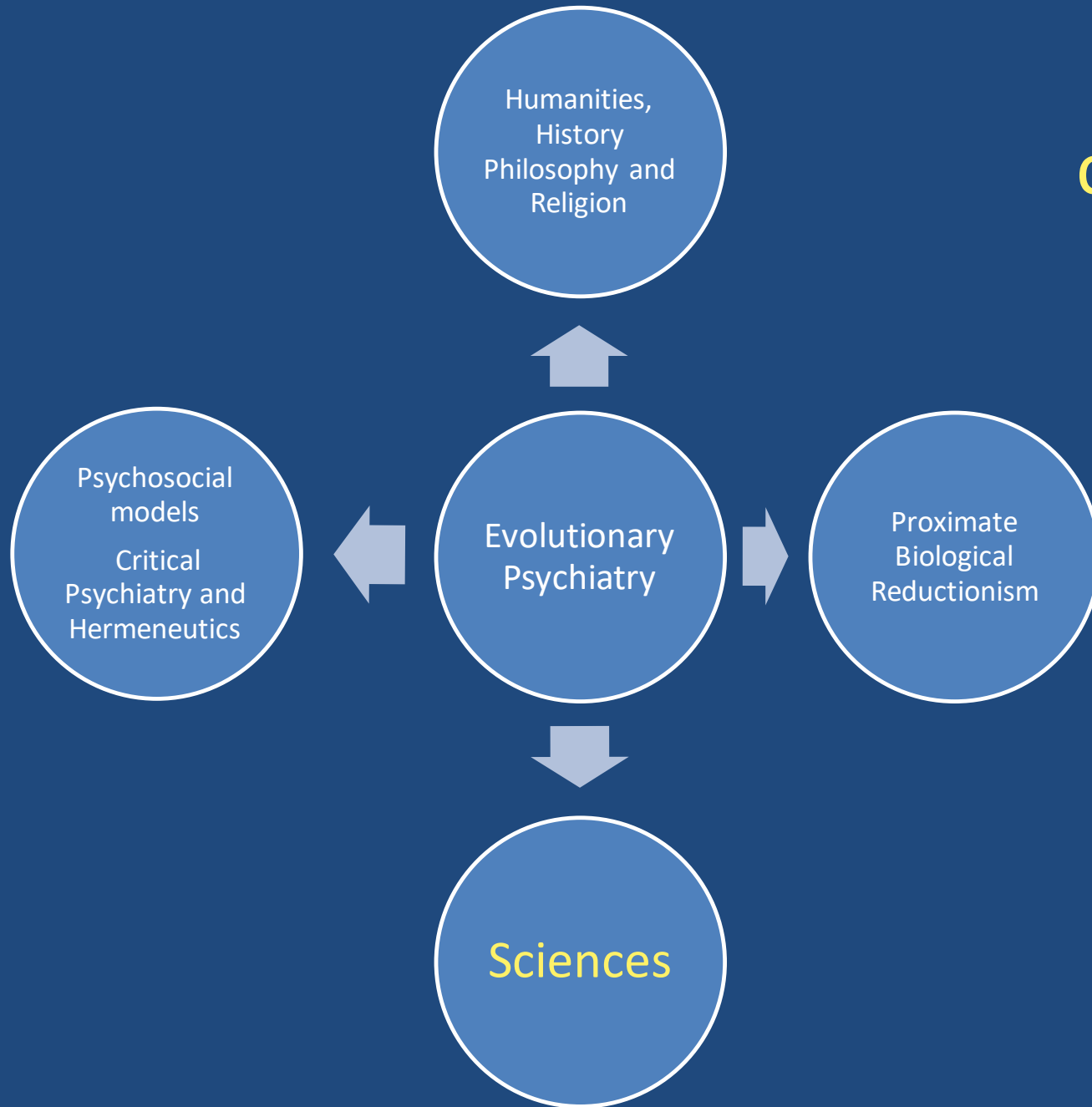
# Evolutionary psychiatry definitions

1. A psychiatric condition is a broad term that includes all diseases and disorders.
2. A disease is an abnormal pathology (cellular or biochemical etc) affecting the body of an organism.
3. A disorder is a functional abnormality or disturbance (=dysfunction).
4. Illness and sickness are generally used as synonyms for disease but also refers to the patient's **personal experience** of disease. (**Subjectivity!** =Harm).

# Why Evolutionary theory is relevant to psychiatry

- **Evolutionary Psychiatry (EP)** proposes a new conceptual framework: a **Meta-Theory** for psychiatry based on Darwinian theory.
- EP challenges a purely reductionist medical model which has supplied few effective answers to many long-standing questions e.g. what is mental illness?
- Why do genes exist that “cause” schizophrenia?  
Why 1%? Dunbar’s number??
- EP also challenges dualist and exclusively non-biological outlooks as well

EP's "social brain" formally connects biology & genes to the humanities



# Darwinian or Evolutionary psychiatry proposes

1. Mental processes were naturally selected and have important functions,
2. Human evolutionary heritage resulted in mental mechanisms including cognitive, motivational, affective, hedonic, linguistic, and behavioural dispositions and structures.
3. Some mental conditions interfere with the ability of these mental mechanisms to perform the functions that they were selected/designed to perform.
4. The concept of disorder in evolutionary psychiatry must also refer to dysfunctions that harm the person in the **current environment and social circumstances**.

# Darwinian or Evolutionary psychiatry

1. EP considers a species perspective, with related interests to Evolutionary psychology and medicine
2. EP is not about why one individual has an illness now.
3. EP considers the human social brain evolution and specifically proposes that some human psychiatric mechanisms, defences and traits, are consequences of adaptations to reproductive problems frequently encountered in Pleistocene environments (known as the Environment of Evolutionary Adaptation (EEA)).

# Darwinian or Evolutionary psychiatry

4. EP focuses on the evolutionary significance of psychiatric **vulnerability**, symptoms and behaviours.
5. *However*: EP recognises there are also other mechanisms, some related to evolution but not specifically related to EEA, and some conditions appear to have no evolutionary basis e.g. trauma though even this may be partly evolutionary.

# What does evolutionary psychiatry do that the standard models have not covered

- EP thereby emphasises the various implicit factors involved in causation, assessment, diagnosis and treatment of psychiatric reactions so not only the “Hows” but also the “Whys” become equally important to any explanation and course of action.
- Thus the nature of why people get a condition/disorder and in what circumstances a doctor needs to treat it with pharmacology or social or psychological means becomes more explicit.

# Why should Psychiatry consider Evolution?

- EP proposes evolutionary theories to account for the widespread existence of, substance misuse, borderline states and schizophrenia, bipolar disorder, the dementias and affective disorders as well as other defences, childhood and neurodevelopmental disorders
- The new science of Darwinian Psychiatry is readily accessible to psychiatrists **integrating not replacing** current scientific knowledge
- EP describes in detail the disorders and conditions commonly encountered in psychiatric practice and show how evolutionary theory can account for their biological origins and functional nature.

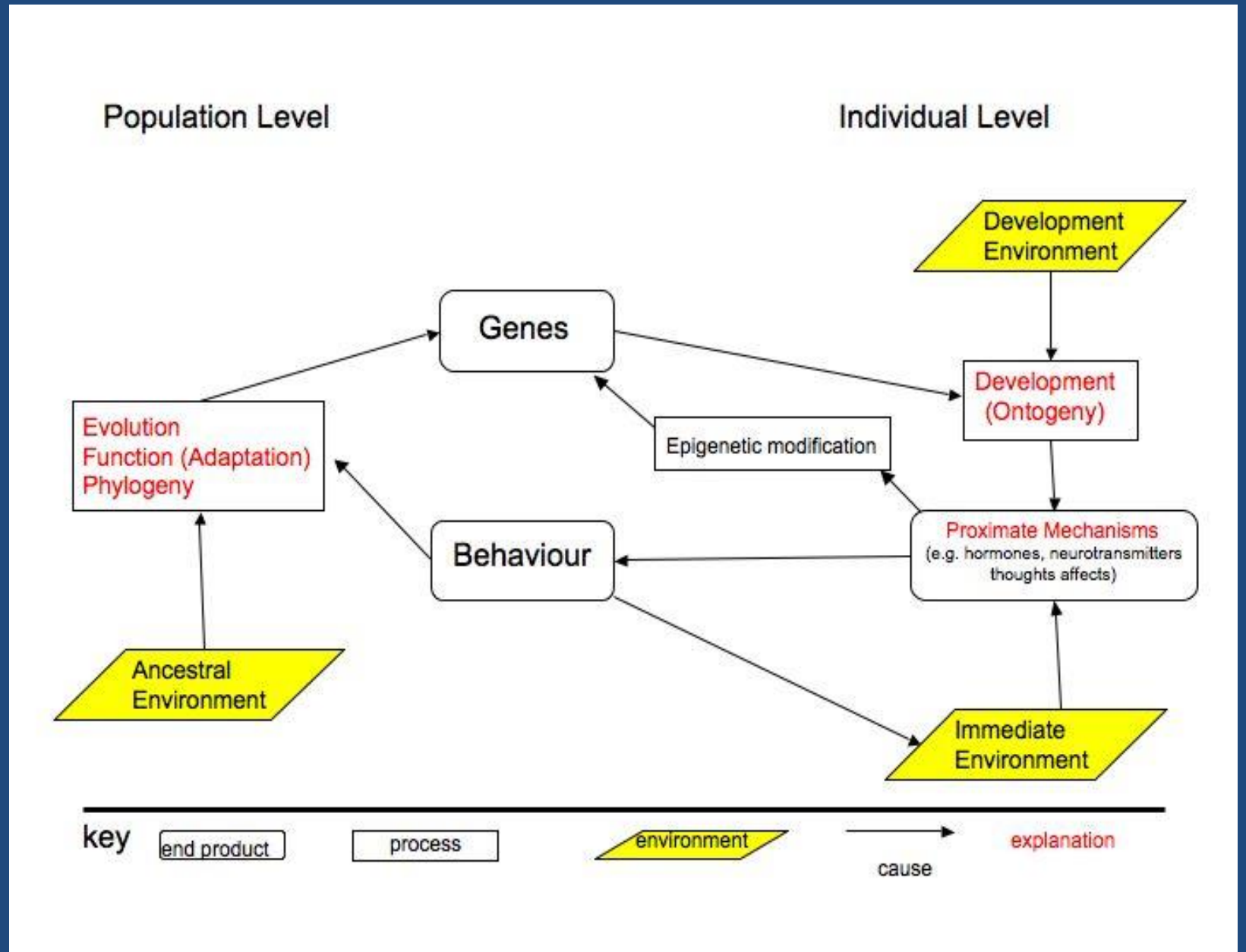


# Tinbergen

What does evolutionary psychiatry do that the standard models have not covered ?

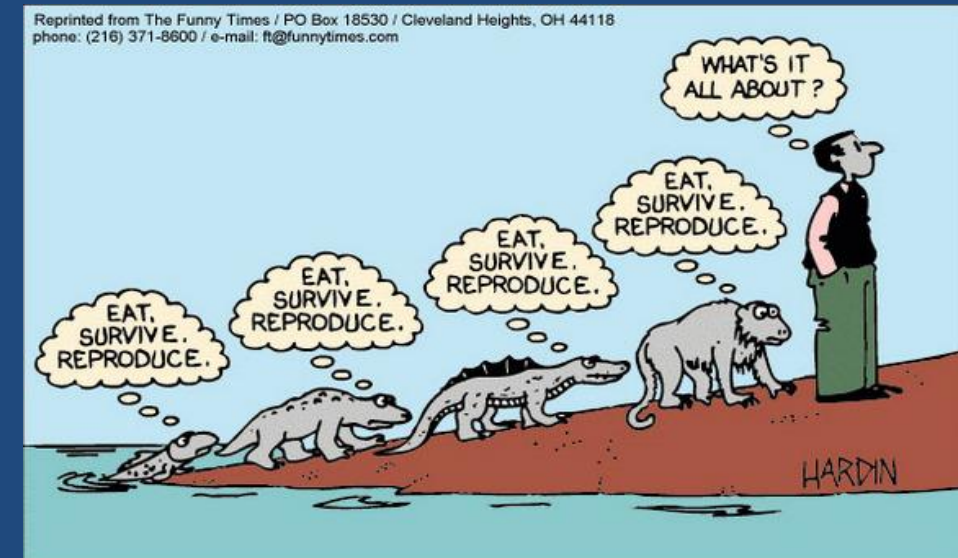
A complete biological explanation of a behaviour or response requires four components:

- (1) mechanism,
- (2) Individual development,
- (3) function, and
- (4) phylogeny.



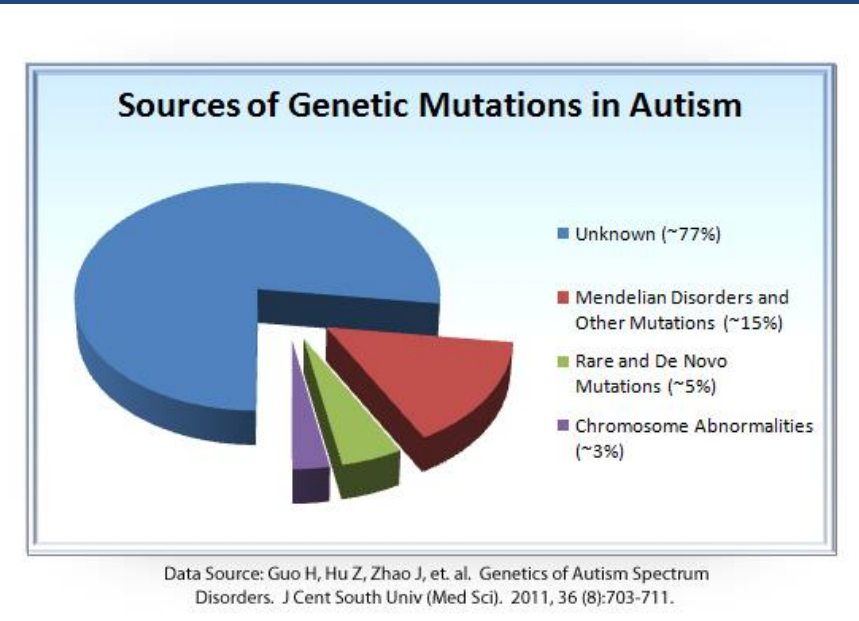
# Evolutionary Psychiatry Warning!

- So while evolution suggests new ways of viewing psychiatric phenomena
- **EP complements more conventional approaches**
- **EP does not displace them.**
- Brains are not designed machines or computers but products of millions of years of natural selection that work remarkably well, given that no trait can be perfect, and that selection maximizes reproduction, not health.



# Brain circuitry and neurotransmitters

- The end products of the human mind/brain are behaviour patterns, emotions and cognitions which are the phenotypic characteristics of our brains that have been **shaped by selection**.
- Brain circuitry, genes and neurotransmitters are subservient systems that have evolved to generate those end products.
- EP does not deal in false dichotomies.



# Pathways that mediate the influence of evolutionary processes on disease vulnerability

1. Mismatch: exposure to evolutionarily mismatched or novel environment e.g. culture, alcohol, drugs and diet , environments.
2. Life History factors e.g. reproduction, ageing , menopause, senescence
3. Excessive defence mechanisms *See slide 22*
4. Co-evolutionary considerations: losing the arms race against pathogens e.g. HIV, parasites, antibiotic resistance
5. Constraints imposed by evolutionary history e.g. eyes, backache and brain size

# Pathways that mediate the influence of evolutionary processes on disease vulnerability

6. Sexual Selection and its consequences e.g. sexual dimorphism mating strategies, mortality rates
7. Balancing selection: maintaining an allele that raises disease risk (Pleiotropy)
8. Demographic history and its consequences (Huntington's)
9. Selection favours reproductive success at the expense of health (r/k strategies)

Psychiatric conditions may involve several of the above

# Defences: Pathways that mediate the influence of evolutionary processes on disease vulnerability

- Evolutionary Medicine makes a distinction between defects, disorders and protective responses.
- Evolution/nature has selected adaptations (**defense mechanisms**) that help protect against injuries and infections.
- These include:
  1. Pain, sickness, illness behaviour
  2. Anxiety, Depression, OCD,
  3. Fever, Lethargy, Fatigue
  4. Nausea,
  5. Itching,
  6. Expulsions: Sneezing, Vomiting, Coughing,
- **Much of medicine/psychiatry involves blocking the above defense reactions (Nesse).**

# Adaptationist and non-adaptationist conceptualizations: criticism

- *Not everything should be considered an adaptation!*
  - Darwinian psychiatry's main proponents endorse the adaptationist ideas in evolutionary psychiatry.
  - This is an attempt to view all evolutionary novelties as adaptations, i.e., classically, features that favour survival and/or reproduction.
  - This position is in its own way as teleological, and anthropomorphism plays a central role in its construction.
  - Organism–environment interactions are bidirectional processes.
- Bernardo Dubrovsky n.b Niche constructionism*

# Useful Evolutionary Links

- <https://www.psy.ox.ac.uk/team/robin-dunbar>
- <https://www.autismresearchcentre.com/people/Baron-Cohen>
- <https://sols.asu.edu/people/randolph-nesse>
- <https://evmed.asu.edu>



## Part 2

# Darwin's primary theory

Darwin theorised that evolution by natural selection is a process demonstrated by the observation that more offspring are produced than can possibly survive.

And:

- 1) traits vary among individuals with respect to morphology, physiology, and behaviour  
(phenotypic variation),
- 2) different traits confer different rates of survival and reproduction  
(differential fitness in a given environment),
- 3) traits can be passed from generation to generation  
(heritability of fitness)

**Darwinism = variation, selection and retention.**

# Consequently Evolution is irrelevant if:

1. Changes in DNA or mutations do not occur.
2. When changes or mutations do occur, they cannot not be passed down through the generations.
3. Although changes/mutations are passed down, no change/mutation could produce any sort of phenotypic change that drives natural selection.
4. Gene frequencies never change between generations perhaps by demonstrating a mechanism that would *always* prevent gene changes.
5. Selection or environmental pressures do not favour the (survival of) or reproductive success of better adapted individuals (For a specified environment).

## Thus Evolutionary Psychiatry is also not relevant if:

1. Biology has nothing to do with the human behaviour, psychology, brains or minds and by extension psychiatric disorders.
2. Mental disorders have no genetic component nor heredity
3. No outside environmental or cultural influences affect any human biological process and those processes have no influence on survival or reproduction (fitness).

# Why some psychiatrists neglect or are opposed to Darwinism:

1. EP is not relevant and does not help our understanding of mental disorder.
2. Because they assume EP leads to biological reductionism.
3. Or leads to the neglect of psychosocial factors.
4. Or leads to the neglect of human subjectivity, meaning and/or the uniqueness of the individual
5. Lack of exposure to or knowledge of evolutionary ideas
6. Evolution has a tainted history e.g. eugenics (Appeal to Hitler?)
7. Religious or ideological opposition

## A comment on Values

- Patients have complex profiles and need to be treated as unique individuals with their own values and priorities respected .
- Whether something “Is” or can be done medically is not the same issue as to whether it should be done.
- “Is” questions differ from “Ought” questions.
- These ethical issues are not resolved simply by science.
- Darwinian psychiatrists must accept that their task as clinicians is to be healers of the distressed, not watchdogs of biological adaptation.

# Why Darwinism is not just another ideology

- Nothing in evolutionary science is sacrosanct and any aspect of it can be refuted by counter-evidence
- Theories on psychiatric disorder based on Darwinian theory will stand or fall based on the evidence not on dogma

# Evolution of placebo

- “Comforting myths” remain an important mode of treatment and care for some distressed people, albeit acting through biological or what have been called placebo mechanisms.
- The biological substrate and instinctual underpinning of interpersonal healing is likely to be rooted in the evolution by natural selection of mammalian attachment instincts and related grooming (bonding) behaviours (Benedetti).



# Evolution of placebo

- The idea that placebo, social and reproductive processes may enlist common emotional brain systems, top down processes including hormones and neuro-chemicals, raises many evolutionary questions.
- These include how evolution, environmental cues, rituals, social dynamics and attachment might play an important role in both facilitating healing, functional recovery and placebo responses as well as reproduction and survival.



# Evolutionary approach

- It follows that although human behavioural strategies are biological phenomena they can only be fully understood within their correct social and environmental contexts.
- Hence, it becomes legitimate to speak of a biology of human social behaviour, a biology of culture and so forth.

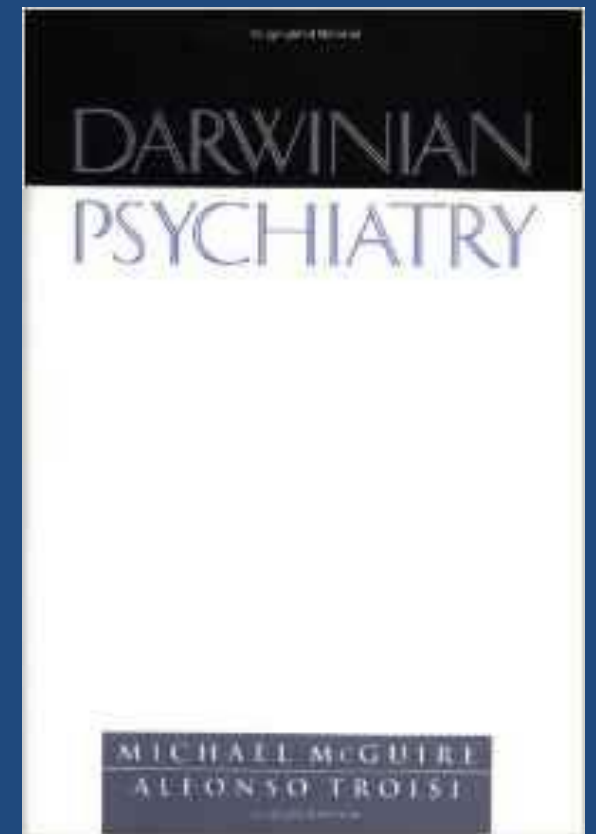


# Therapy

- Therapy ought to help patients understand the bio-ecological bases inherent and communicated through their symptoms and provide motivations for giving up unprofitable behavioural strategies or defences.
- EP also informs what biological processes may be altered and why this may be safe, necessary or otherwise e.g. blocking anxiety, pain or other defences
- It also reinforces what psychological or social changes need to be made and why.

# The evolutionary diagnosis of mental disorder

- EP's (*Possible*) major contribution to psychiatric theory is the elimination of the necessity to find a brain lesion or dysfunctional mechanism to validate the distinction between disorders and non-disorders.
- Alfonso Troisi



# Summary 1

## An evolutionary perspective on mental disorders (Nesse)

1. Asks new questions about why natural selection has left us all vulnerable to mental disorders, questions with several kinds of possible answers,
2. Offers the beginnings of the kind of functional understanding for mental health professions that physiology provides for the rest of medicine,
3. Provides a continuing framework for a deeper and more empathic understanding of individuals,
4. Explains aspects of how relationships work, Kin selection, Parental Investment , Attachment etc.

## Summary 2

### An evolutionary perspective on mental disorders

5. Provides a way to think clearly about development and the ways that early experiences influence later characteristics,
6. Provides a foundation for understanding emotions and their regulation,
7. Provides a foundation for a scientific diagnostic system,
8. Provides a framework for incorporating multiple causal factors that explain why some people get mental disorders while others do not.

Studying the proximate mechanisms of illness is standard in psychiatry.

Ascertaining phylogenetic requires indirect methods as we do not have time machines.

1. EP therefore uses insights from comparative animal evolution,
2. genetics, and comparative genomes
3. ethology,
4. palaeo-anthropology,
5. Studies of comparative culture,
6. philosophy & other humanities.
7. evolutionary biology,
8. epidemiology,
9. biochemistry,
10. psychotherapy & psychology.
11. psychiatry ,
12. medicine,
13. public health



# Evolutionary approach

- Darwinian approaches may advance the endeavour to formulate optimal ways of conceptualizing and explaining psychopathology and from there aid therapy.
- EP necessitates rigorous analyses of how environments have and continue to shape and constrain adaptive behaviours, producing different varieties of signs, symptoms, and responses.



# Epilogue

## Evolution

**“Nothing in biology  
makes sense except in  
the light of evolution”**

**Theodosius Dobzhansky  
(1900-1975)**



- This quote is apposite for psychiatry and psychiatric neuroscience, if not medicine and the life sciences in general.
- It is time not just to rethink but to implement such an integrative approach in research, clinical practice and medical education.



# Articles for the newsletter

- We still need articles, reviews and interviews for the newsletter.
- Please send to me at:
- [paulstjohnsmith@hotmail.com](mailto:paulstjohnsmith@hotmail.com)
- Any evolutionarily related or inspired ideas or topics in 100 words
- Book reviews
- Small articles are always welcome.



## Part 3

- In EP a mental disorder can be usefully characterised as at least a two stage process i.e. **harmful dysfunction**
- **Harmful** is a value term based on personal and social norms,
- **Dysfunction** is a scientific term referring to the failure of a mental mechanism to perform a natural function (for which it was designed by selection processes in evolution).
- Thus, the concept of mental disorder combines social/personal **value** and **biological** components.

# Mental Disorder as 'Harmful Dysfunction' (Wakefield)

(a) Disorder is the failure of a biological mechanism to perform its evolved function, and;

(b) it inflicts some harm or damage on the affected person, as judged by sociocultural standards.

Hence it builds on 2 ideas: (Troisi & McGuire, 2002)

1. An impairment in the capacity of the individual to achieve important biological goals; and

2. The fact that an individual's functional capacity cannot be assessed without consideration of the environment in which that individual lives

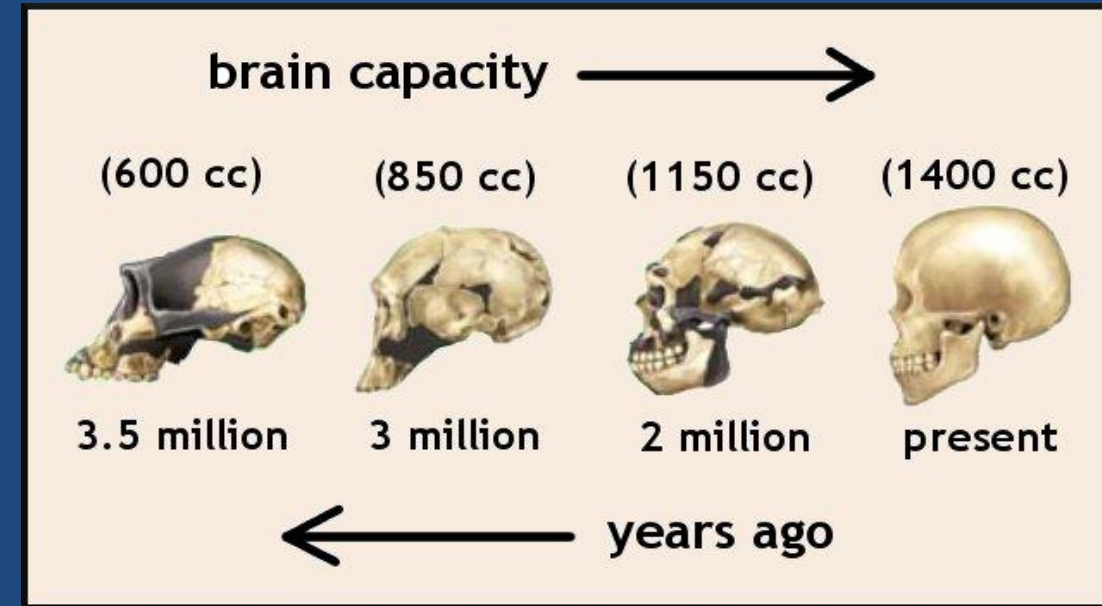
**This highlights why simply equating mental disorder with physical disorder of the brain can be misleading.**

# Evolutionary Psychiatry considers:

- What are human minds actually for?
- What are xxx symptoms for?
- What were the factors that lead to the human mind?
- Can Minds as distinct from brain tissue, become ill?
- What constitutes a mental as distinct from “Brain” illness or disease?
- How does this inform psychiatry especially diagnosis and treatment ?
- How does this reconcile anti-psychiatry versus the medical model controversy..... ICD/DSMitis and Cartesian Dualism

# Start with questions. “Why the large brain?”

- Why and how are humans different from other mammals? e.g. Why do humans have symbolic thought, cultures, religions, learning, the ultimate social brain etc
- What drove these attributes?
- What are the functions of universal human behaviours e.g. the purpose of emotions etc
- Does this predispose us to unique disorders e.g. Schizophrenia?



# Why do we have complex culture?



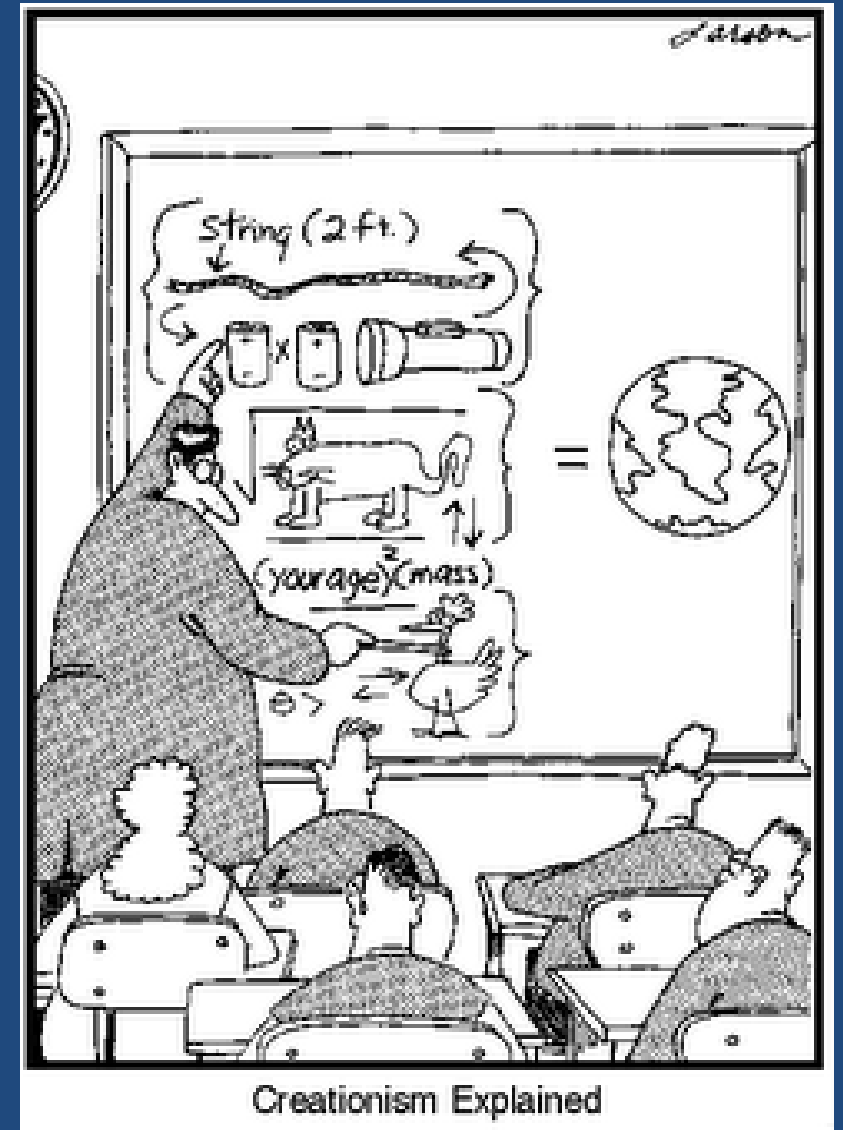
# Evolutionary Psychiatry in 100 words

- Evolutionary psychiatry (EP) brings profound Darwinian “Why” questions to psychiatry’s biopsychosocial “How” *does psychiatric disorder arise*.
- It re-evaluates psychiatric epidemiology, genetics, biochemistry & psychology, using insights from comparative animal evolution, ethology, palaeo-anthropology, culture, philosophy & other humanities.
- EP investigates what it means to be human from the functions or “purpose” of the mind-brain seeking explanations for persistent heritable traits (syndromes, defences, emotions, cognition & behaviours), shaped by selection (Natural, sexual and social) & other evolutionary processes.
- It reviews human traits, behaviours & “disorders”, using evolutionary history, development & psychotherapy, considering interactions with modern environments, illuminating causation, prevention and humanistic treatments.

# Challenges

## The conflict with special creation and essentialism

- **Victorian Creationism (teleological)**: Intelligent cause (Supernaturalism) creates the designed effects of organized complexity, orthogenesis, teleology and order seen in diversity.
- **Biological Essentialism** presupposes there is an ideal “created” genotype or phenotype any deviation from which is a category of disease.
- **Darwinism (anti-teleological)**: unintelligent material causes (Materialism/Naturalism) produce the effects of organized complexity, and order seen in diversity.





# Why Darwinism is not just another ideology

- Evolution by natural (and sexual) selection is the accepted organising principle for all biological sciences
- It is supported by evidence from diverse sciences including palaeontology, archaeology, anthropology, primatology, zoology, genetics, molecular biology and many others
- There has been a convergence of findings from the above sciences that support evolution as the means through which life has evolved and diversified.

# Why Evolutionary theory is relevant to psychiatry

- First:- Psychiatry lacks a formal definition of what constitutes a mental disorder.
- The failure to set a valid distinction between mental health and mental illness has largely undermined its scientific credibility.
- Psychiatry's difficulty in defining mental disorder derives from its difficulty in defining mental health.
- To identify what has gone wrong with the individual's mental and behavioural functioning, one should have a detailed idea of how the individual functions or would function when nothing is going wrong.
- Evolutionary explanations of human mind and behaviour have much to offer psychiatry.
- Evolutionary behavioural science is for psychiatry what physiology is for the rest of medicine. Alfonso Troisi

# Why Evolutionary theory is relevant to psychiatry

- Second, the approach of mainstream psychiatry to individual differences is basically based on typological thinking: homogeneity in a population is the natural state and variation is the result of some sort of interference.
- Rejecting typological thinking, evolutionary theory suggests that it may prove useful to think about individual differences in human behaviour in terms of adaptive within-species variation, including some of those deviant profiles that are currently defined as psychiatric disorders or psychological dysfunctions.
- A hallmark of modern evolutionary models is the capacity to integrate explanations focusing on species-typical patterns with explanations focusing on individual differences that diverge from these modal patterns.

**Alfonso Troisi**

# Why Evolutionary theory is relevant to psychiatry

- Third, recent findings from molecular genetics and developmental psychology are questioning dichotomies that have dominated psychiatric thinking for centuries (i.e., brain vs. mind, genes vs. environment, biology vs. psychology, nature vs. nurture).
- To integrate these new findings, we need new theoretical models that explain why (not only how) genes interact with environments in shaping individual phenotypes, what are the pros and cons of behavioural plasticity, and which and when behavioral systems are more sensitive to environmental influences.
- The development of these new models will not be possible without the contribution of evolutionary sub-theories such as life-history theory, attachment theory, and sexual selection theory. Alfonso Troisi