

Why Does Prozac Work?

A Socio-Evolutionary Perspective
ISTP 2007



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Outline of Today's Presentation

- Give current theories for why Prozac and the SSRIs work
- Share the social competition hypothesis of depression
- Show why the evolution of human emotions is central to the explanation of the once-adaptive benefits of depression
- Explain why Prozac works in developed nations in the current global context

Why Care About How Prozac Works?

- Prozac currently prescribed to 54 million people worldwide
- In 2003, sales of antidepressants worldwide reached \$19.5 billion, up 10 percent from 2002
- In the United States, 10% of women and 4% of men 18 and older are currently taking antidepressants
- The vast majority of persons taking antidepressant medications are in the Western developed world

WHO: Depression is a global threat

- Estimates depression affects about 340 million people worldwide
- Depression is currently one of the leading causes of disability in the world
- Depression is predicted to be the second leading cause of death by 2020

WHO's Symptoms for Depression

- Depressed mood
- Loss of interest or pleasure
- Feelings of guilt or low self-worth
- Disturbed sleep or appetite
- Low energy
- Poor concentration

Extreme Social Sensitivity

- Depressed individuals are keenly attuned to the social world
- Depressed individuals are often morbidly sensitive
- Excessive rumination over social events the norm
- Leads to avoiding human contact
- Contributes to low self-esteem

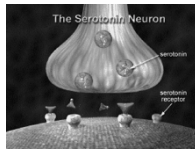
When Prozac "Works"

- People feeling less dependent on the approval of others and are less likely to define the actions of others as rejecting
- Mood brightens
- Greater self-esteem

Social Psychological Understanding of How Prozac Works

- John Hewitt, Michael Fraser and Leslie Beth Berger, "Is It Me or Is It Prozac?" (2000):
 - Alters role-taking by making it more benign
 - Begin attributing positive motivation and responses to others

The Biopsychiatry Explanation of Why Prozac Works



Inhibits reuptake of serotonin in the synaptic gap, prolonging the action of serotonin

Serotonin Does Many Things

- **Sleep-wake cycles**
- **Appetite**
- **Memory**
- **Learning**
- **Cardiovascular function**
- **Muscle contraction**
- **Endocrine regulation**
- ***Inhibitory effect on the CNS thought to alleviate depression**

Relationship Between Serotonin, Aggression and Rank

- Shift in dominance hierarchy accompanied by changes in serotonin levels
- Witnessed in lobsters, crayfish and Vervet monkeys
- Manipulation of serotonin shown to affect behavior, and indirectly, rank



The Social Competition Hypothesis of Depression

- Depression originally an adaptive response to the problems of living in small, status-obsessed social groups
- Depression is a marker for needed introspection

Why Depression No Longer Functions As An Adaptive Trait

- [No longer leads to future advantages in our present global context.
- [Philosopher Dominic Murphy : *"If the mechanism is set off by the realization that one is not even close to being the best at anything in the global village of the information age then getting depressed is not likely to be an effective reaction. For it is typically the case that there is no other strategy to adopt—no other niche one could fill—in which one would do much better in that global competition."*

I Agree with Murphy

- [Depression is often characterized by continual rumination
- [Rumination increases isolation
- [Rumination does not lead to contentment about social standing

I Disagree (a bit) With the Social Competition Hypothesis

- [Depression still very much "in the head" of the sufferer
- [Increased isolation and emotional detachment leads to mismatch of depression for current environment

Jonathan Turner on the Evolution of Human Emotions

- [On the Origins of Human Emotions (Stanford U Press, 2000)
- [Two important evolutionary developments that set the stage for modern humans:
 - The development of a wide emotional repertoire, in conjunction with the increased capacity for memory, were the key to hominid survival
 - A tension emerged and continues to exist in all humans between the need to be part of a social group while retaining a sense of autonomy

The Miocene



Neocortex Size = Managing Social Relationships

- Recognizing and interpreting visual signals for identifying either individuals or their behavior
- Memorizing faces
- Remembering who has a relationship with whom
- Manipulating information about a set of relationships
- Processing emotional information, particularly with respect to recognizing and acting on cues about others' emotional states

Pronounced Sense of Self Became an Adaptive Trait

- Necessary for stronger emotional ties
- Expressed as a capacity to identify the self in relation to objects and others in one's environment
- Allowed anticipating one's own actions
- Supported a sense of autonomy
- Awareness of self increased awareness of other minds

What Does This Have to Do With Prozac?

Prozac dampens the effects of selection forces that led to a more social hominid.

Sanctioning

The capacity to learn and reproduce constructed rules of social organization (and morality) through emotional communication.

Negative Sanctioning of Limited Use

- Rely on mammals' most primal and least associative emotions
 - aversion-fear
 - assertion-aggression
- Involves one party's anger directed at another's failure to meet expectations
 - Requires the ability to arouse fear
 - Creates an anger-fear-anger cycle that does not promote sociality

Shame & Guilt: Negative Sanctions

- Combination of
 - fear
 - sadness
 - anger
- Motivates the individual to change behavior without excessive anger
- Anger directed at self rather than others

Pride: A Positive Sanction

- Occurs when expectations imposed by self and others have been met or exceeded
- Tied to an individual's feelings about self as an object
- Combination of happiness with self shadowed by fear that one might not be able to act again in ways that make one proud
- Pushes the individual to meet future expectations, thereby increasing sociality

Disappointment-Sadness Spectrum

- Critical for the development of emotional sanctioning
 - Includes our ability to recognize sadness and disappointment in others
 - Reduces the anger-fear-anger cycle and motivates individuals to make amends
 - Communicates our failure to receive the positive sanctions we desire

Examples of Happy Facial Expressions Used in fMRI Procedure



What Does This Have To Do With Prozac?

- Too isolated in many developed countries and too emotionally detached for depression to meaningfully communicate our needs and elicit a response
- Prozac decreases reliance on emotional communication to meet emotional needs

Depression is a Mismatch Evolutionary Trait

- Depressed individuals fail to get necessary feedback before depression becomes a homeostatic norm
- Resistance to responding to depression because perceived as sign of failure
- Social groups not perceived as emotionally safe
- Prozac: turns off depression's adaptive advantages in an environment not equipped to deal with them

Thank you for your
time & attention!



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