Depression in the Light of Evolution

Part Two: Focus on the *Social Risk Hypothesis* and General Implications of Evolutionary Hypotheses of Depressed Mood

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Outline

- Introduction and Review of Part One
  - Depression In the Light of Evolution: Why?
  - Picking Two Illustrative Hypotheses– The Social Competition and The Social Risk Hypotheses
- The Social Risk Hypothesis
- Implications: An Additional Way to "Biologize" Psychiatry

What <u>Do</u> These Hypotheses Claim to Explain?
Clinical Depression – Or Just Mood Variation?

- Two phenomena that call for an explanation:
    1. Common, harmful, <u>heritable</u> *mood disorders* persist in the population.
    2. We*... have moods.*

- Claim: The "best" hypotheses "only" explain a range of normal mood variation, but in doing so they fill an important "tier of explanation" of *normal psychobiological mechanisms* and *functions* of mood.
    - This should underlie the study of mood disorders and their dysfunction.

Darwin's Hunch

"Pain or suffering of any kind, if long continued, causes depression and lessens the power of action; yet it is well adapted to make a creature guard itself against any great or sudden evil."

Chronological List of Evolutionary Hypotheses
(**"Schools":** *Resource conservation* <u>Attachment</u> **Rank/competition**)

<u>Attachment</u>   (Bowlby, Harlow; 1960's)

Learned Helplessness   (Seligman; 1970's)

Resource Conservation / Incentive Disengagement (Klinger, Buss, Nesse, others; 1970's – 2000's)

Social Competition   (Price; 1994)

<u>Bargaining</u>   (Hagen; 1999)

<u>Group Utility of Guilt</u>   (O'Connor, Berry, Weiss; 2002)

<u>Social Risk</u>   (Badcock and Allen; 2003)

<u>Analytic-Rumination</u>   (Andrews and Thompson; 2009)

Pathogen Host Defense **(**Raison and Miller; 2012

Why These Top Picks

Attachment Too infancy-specific

Learned Helplessness Too general and laboratory-specific

Incentive Disengagement Too general, insufficiently social

Social Competition *Review: Depression as a strategy to cope with losing and having lost in social competition*

Bargaining Too specifically human, too cynical

Group Utility of Guilt Too group-selectionist, too human

Social Risk *Preview: Depression as a "retreat to safety" or risk averse social strategy to cope with threat of exclusion or ostracism*

Analytic-Rumination Too specifically human, too narrow a function

Pathogen Host Defense Too illness-focused, insufficiently social

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How Do These Illustrative Two Relate to Other Hypotheses?
Shallow and Deep Evolutionary Time Depths

Bargaining
Analytic Rumination,
Guilt
(Humans)

Social Risk
(Hominids)

Attachment
(Aves, Mammalia)

Social Competition
(Invertebrata and Vertebrata)

Resource Conservation and Learned
Helplessness
(Invertebrata)

Illness Behavior
(Animalia)

Conservation/Withdrawal
(Most Phyla)

How Do These Illustrative Two Relate to Other Hypotheses?

- **They are <u>adaptationist</u> hypotheses, positing adaptive challenges and survival and/or reproductive value (specifically in <u>*social arenas*</u>).**

- **They are *ethological and ecological*...**

- **They explain a cluster of depressive symptoms that are *relatively specific* to *moderate depression*.**

The Social Risk Hypothesis of Depressed Mood

social competition hypothesis attachment theory social cognition behavioral economics foraging theory

The Social Risk Hypothesis of Depressed Mood: Evolutionary, Psychosocial, and Neurobiological Perspectives

Nicholas B. Allen and Paul B. T. Badcock
University of Melbourne

The authors hypothesize that depressed states evolved to minimize risk in social interactions in which individuals perceive that the ratio of their social value to others, and their social burden on others, is at a critically low level. When this ratio reaches a point where social value and social burden are approaching equivalence, the individual is in danger of exclusion from social contexts that, over the course of evolution, have been critical to fitness. Many features of depressed states can be understood in relation to mechanisms that reduce social risk in such circumstances, including (a) hypersensitivity to signals of social threat from others, (b) sending signals to others that reduce social risks, and (c) inhibiting risk-seeking (e.g., confident, acquisitive) behaviors. These features are discussed in terms of psychosocial and neurobiological research on depressive phenomena.

No more fiendish punishment could be devised, were such a thing physically possible, that one should be turned loose in society and remain absolutely unnoticed by all the members thereof. If no-one turned around when we entered, answered when we spoke, or minded what we did, but if every person we met "cut us dead" and acted as if we were non existent things, a kind of rage and impotent despair would ere long well up in us, from which the cruelest bodily tortures would be a relief; for these would make us feel that, however bad might be our plight, we had not sunk to such a depth as to be unworthy of attention at all. (W. James, 1890/1948, p. 179)

Traditionally, theoretical conjectures concerning the nature of depression have focused on neurobiological, psychosocial, or more recently, evolutionary processes. Although these areas undoubt-

mechanism affects social–perceptual processes by initiating hypersensitivity for indicators of social risk. In the area of social behavior, the mechanism affects both communicative behavior (signaling in order to reduce threats and to elicit safe forms of support) and instrumental resource-acquisition behaviors (a general reduction in the motivation to engage in those behaviors that lead to social interactions with highly variable and uncertain outcomes, such as social competition or conflict).

It is worthwhile noting that the link between depression and risk-sensitive behavioral strategies is not a theoretical novelty. Indeed, Nesse (2000), Leahy (1997), and Klinger (1975) have all proposed that depressed states represent a risk-management strategy that has evolved to alter an individual's behaviors in contexts

Modulating Behavior As *Risk Strategies*

- Animals have "investment strategies":
  - *Risk-averse*: Prefer <u>less variability in outcomes</u> (safe bets)
  - *Risk-prone*: Prefer <u>more variability</u> (chance for big payoffs)
- Choosing risk-prone vs. risk-averse behavior "should" depend on *what kind of shape* the animal is in.
  - *This is one of the SRH's "roots in ethology"*
- Risk strategies are... not "simple instincts", not "learned behaviors", not "imprinted behaviors", but examples of *facultative mechanisms*.

Aspects of Sociality

- For social animals, a given individual's "access to goodies" (resources, food, mates, protection) depends on its position in *social contexts* (dyadic and hierarchical)
  - *Belonging* to certain social contexts carries fitness benefits, *exclusion* carries a fitness cost.
  - Outright *ostracism* from the group threatens *survival.*

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Managing the Costs and Benefits of Sociality

- As a whole, sociality brings benefits to all members of a group.

- But social animals practice exclusion and ostracism (for example, territoriality, status hierarchies ostracism of the sick, etc.)
  - Mechanisms to selectively reject conspecifics may "go with" mechanisms to cooperate.

- Sociality is often *discriminate*.

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Human Nature as <u>Constitutively</u> Social
There is no such thing as <u>a</u> human being.
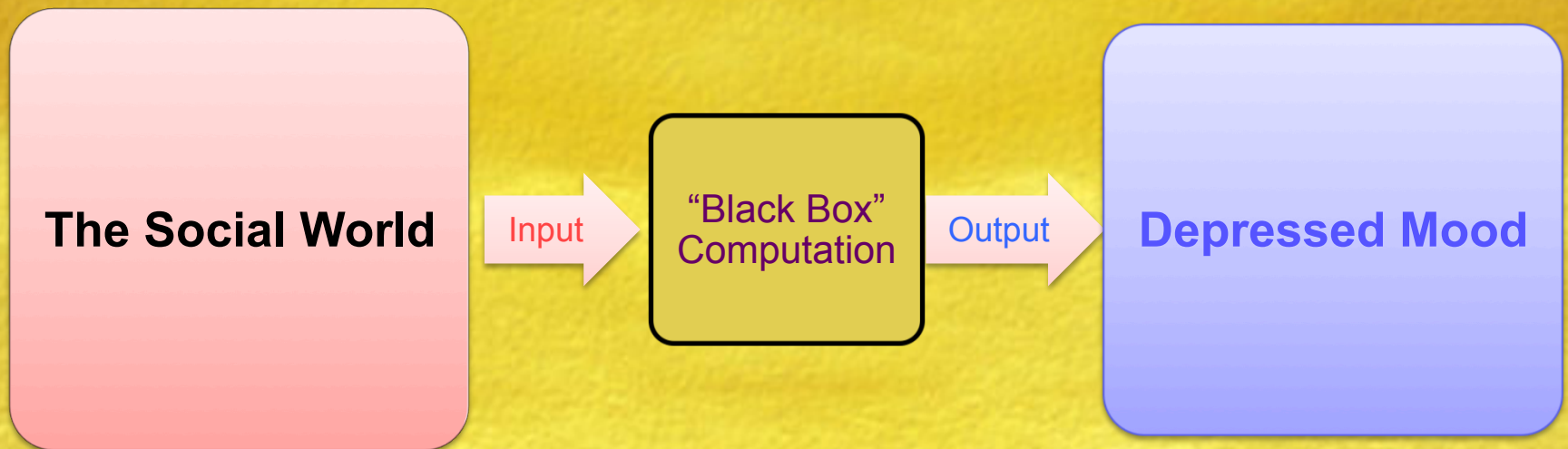

Illustration: Karen Carr

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Human Nature as Constitutively Social

- Latter human evolution occurred in <u>small social groups</u>. The main environment humans must adapt to is...*other humans.*

- Cooperative sociality created a new kind of adaptive challenge: The need to belong to survive and prosper.

- By "reverse engineering", we expect the human mind to contain cognitive systems "designed" to solve the problems of sociality

The Social Risk Hypothesis
Overview as an *Algorithm*

The Social World → Input → "Black Box" Computation → Output → **Depressed Mood**

Input The Social World

- **Social standing** is crucial, but precarious! Thus any clues that one is in *danger of exclusion and ostracism* could be understood as a kind of stress

- We may predict humans would possess *innate mechanisms to monitor social standing*, and *behavioral strategies* to adjust accordingly.

- Who is safe? Respected/feared and loved. Who is in danger? Defeated and shunned....

The Social World Input as Position on the Two Dimensions of Interpersonal Relatedness

"*Upon this a question arises: whether It be better to be loved than feared or feared than loved? It may be answered that one should be both...*" *("LOVED": X axis; "FEARED": Y axis)*

Agency

+ Victory, Power, Having Control of Resources, Being Honored or *Feared*

Communion

- Rejection, Shunning

+ Belonging, Being *Loved*, Being Esteemed

- Defeat, Humiliation, Entrapment

The "Black Box": Integration
Social Investment Potential

- What effectively determines an individual's danger of exclusion or ostracism (or the chances of success in social gambits) is the *ratio* of his/her **social value** to **social burden.**

- This the crucial variable: Social Value/ Social Burden, defined as Social Investment Potential

- SIP is the "capital" that determines risk strategy when investing in social gambits/behavior

- Individuals *estimate* their SIP based on **feedback** about where they are on both dimensions of relatedness - Agency/Power and Communion/ Affiliation

Social Investment Potential and *Self-Esteem*

- Claim: "The individual's *estimation of his or her SIP* may be reflected phenomenologically as ***self-esteem***."

  - ◉ (Compare with RHP, understood as the "primordium" or primitive stub from which *self-esteem* evolved.)

- Now, if SIP fluctuates according to social feedback, *self-esteem* <u>should</u> vary according to social feedback.

  - ◉ It does. ✔

  - ◉ (Low <u>state</u> *self-esteem* ≠ trouble with *self-esteem* regulation.)

Transducing Variation In Psychosocial Predicament to Mood Variation

- The Social World Input: Falling **rank (defeat, humiliation)** or disruption in **affiliation (loss)** are clues of a decrease in **social value** and **social burden,** and thus danger of exclusion and ostracism. Therefore, **rank** and **affiliation** are exquisitely monitored by the "*social brain".*

- The "Black Box": There is an "integration" into an estimate, which functions as a "*sociometer*", the *Social Investment Potential (SIP)*

- When it is dangerously low (a kind of stress), a set of psychobiological changes – the Output – is triggered...

Output A Risk Averse Social Strategy

◉ ...the individual's *social investment strategy* turns *risk-averse* in **three ways**:

   ◉ **1.** In <u>social perception</u>, "**hypersensitizing**" to indicators of social threat (*Attentional* and *inferential* biases).

   ◉ **2.** In <u>resource-acquisition behavior,</u> **reducing risk-taking** by promoting *cognitive* biases: *Lowering expectations of success, raising expectation of failure, undervaluing* positive outcomes, *overvaluing* negative outcomes. Also, *reducing appetitive motivation* (Thus, reducing interactions with uncertain outcomes, such as competition or conflict).

   ◉ **3.** In <u>communication</u>, **signaling** *submission* to competitors, *withdrawal* from exchange partners, and for *care-eliciting* from allies (ie, for <u>support</u> - signs that one is socially valued).

Output A Risk Averse Social Strategy

- These information processing and behavioral propensities (1, 2, 3) along with low *self-esteem constitute* depressed mood.

- They function as a **risk averse social investment strategy** to keep one safe until SIP rises.

- The evidence? An abductive "good fit": 1, 2, 3 are known depressive phenomena; 1, 2, 3 have the right "social effects".
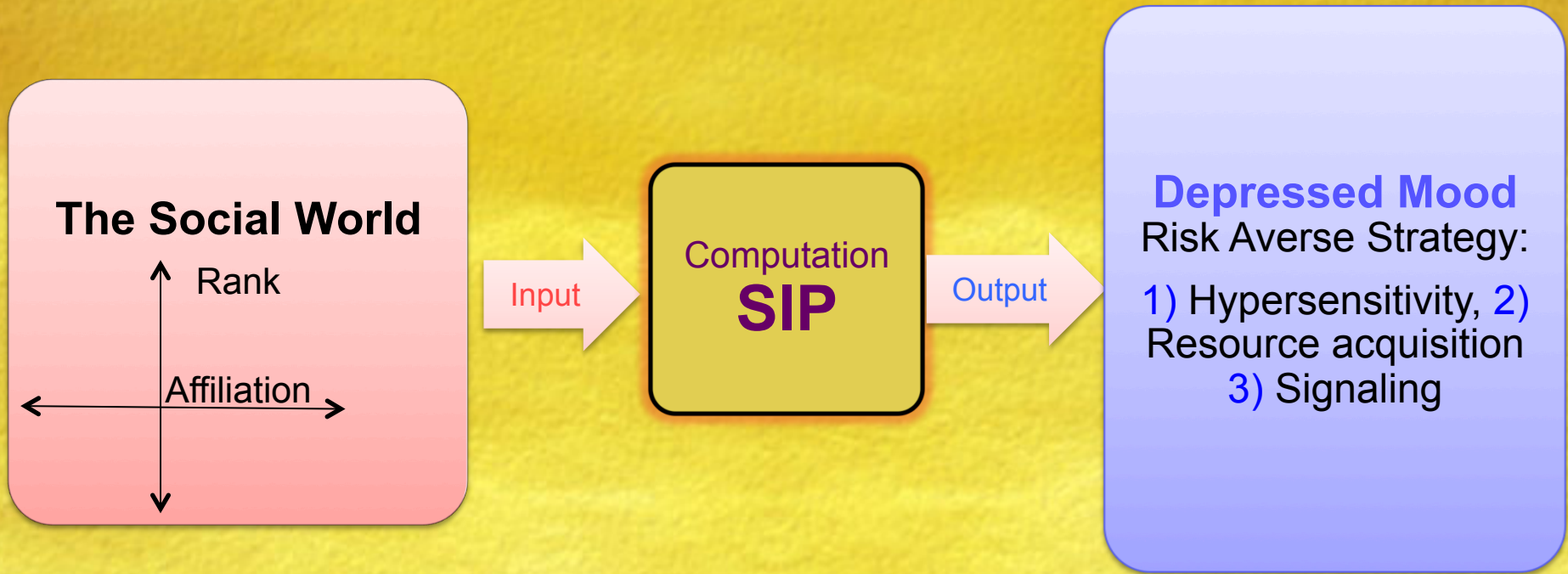
The SRH Strengths

- Incorporates many of the strengths of the SCH ✔
- Predicts greater rates of depression in women. ✔
- Predicts that not only defeat, but also breakdown of relationships would trigger depression ✔
- Predicts that <u>social support</u> would be important for recovery ✔
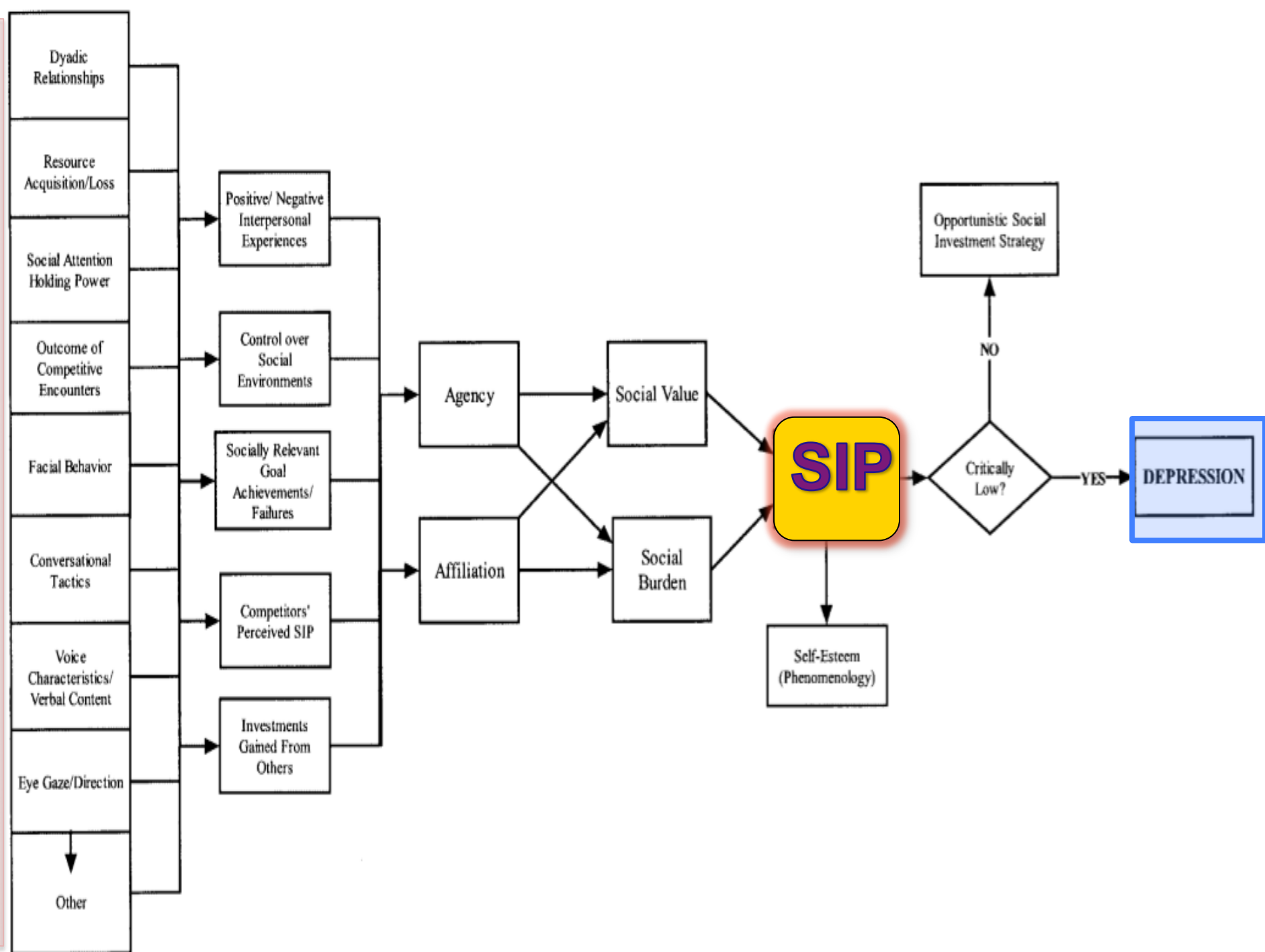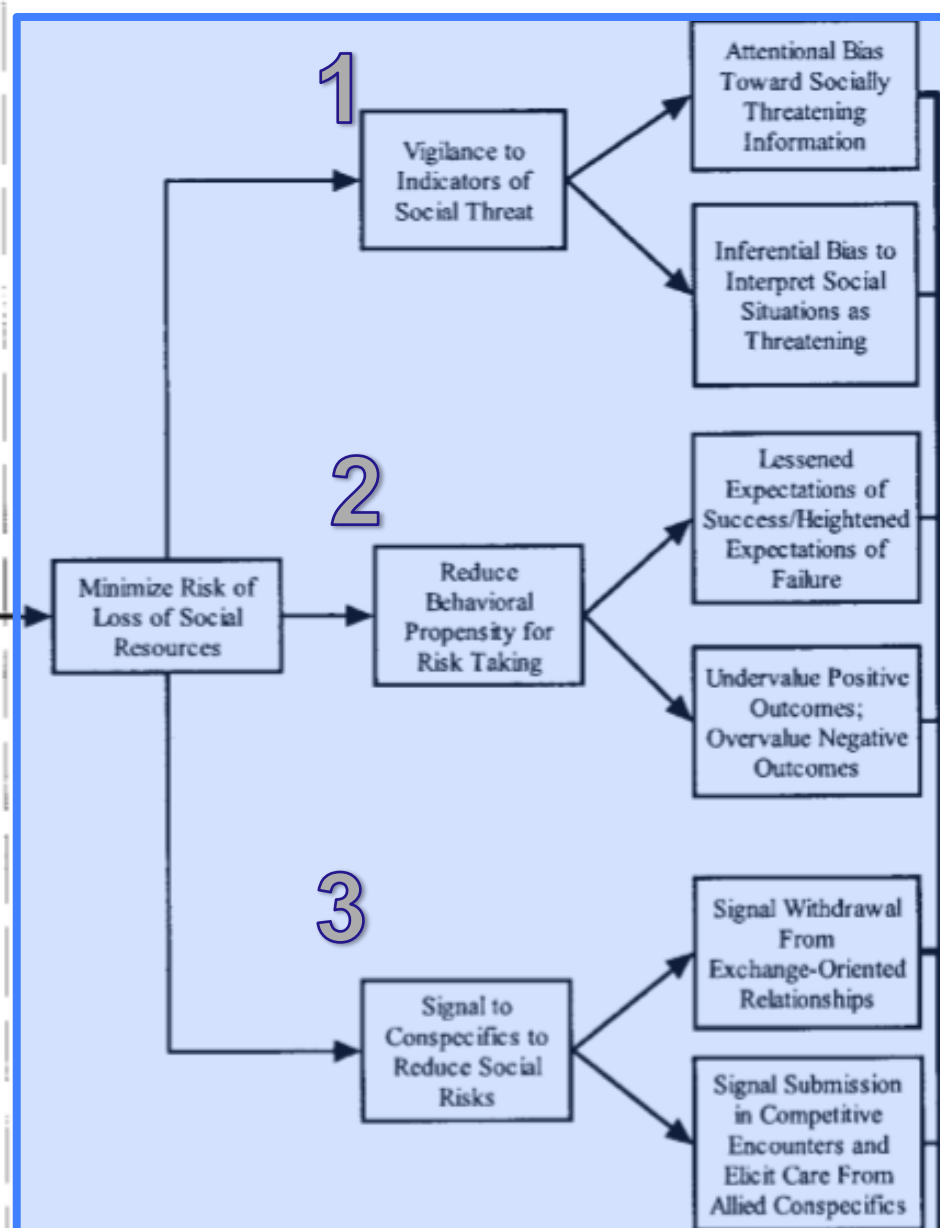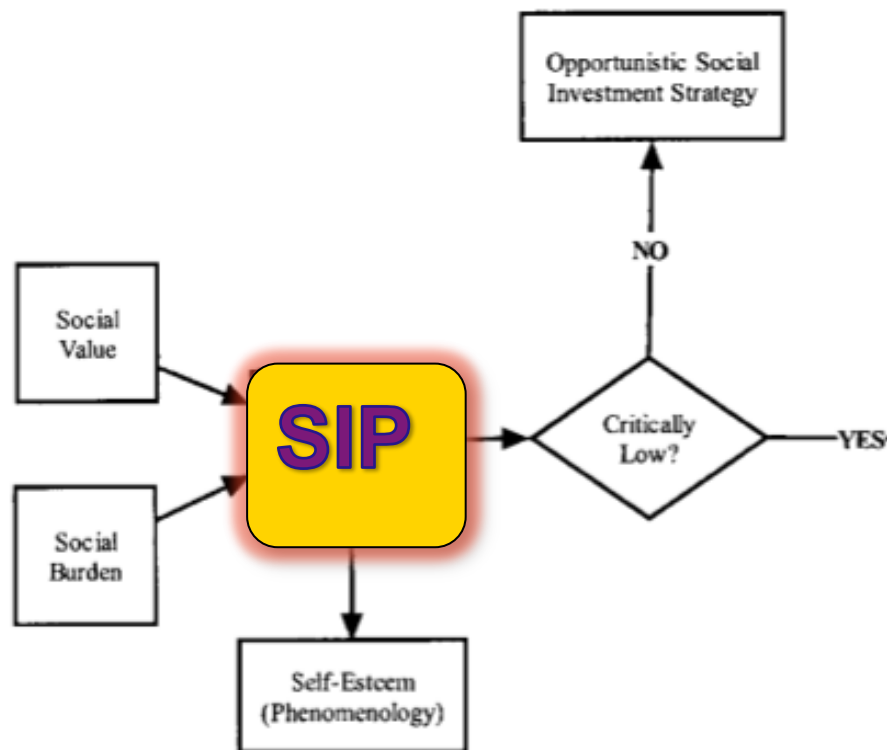- Has some empirical support ✔

The SRH Strengths

- Concordant with known neurobiological mechanisms ✔:
    - Amygdala activation and hypersensitivity to social danger
    - Serotoninergic hypoactivity and social vigilance; effects of SSRIs on social rank in animal models
    - Hypoactivation of left DLPFC and undervaluing of future positive outcomes
- Amounts to a sophisticated algorithm "transducing" *the social world*, via "black box" constructs (SIP), to the *subjective phenomenology* of depression, depressive *behaviors* and finally to social *function.* The algorithm in more detail...

The Algorithm in More...and More Detail

The Social World

Rank

Affiliation

Input →

Computation
SIP

Output →

Depressed Mood
Risk Averse Strategy:

1) Hypersensitivity, 2) Resource acquisition
3) Signaling

Opportunistic Social Investment Strategy

Social Value

Social Burden

SIP

Self-Esteem (Phenomenology)

Critically Low?

NO

YES

Minimize Risk of Loss of Social Resources

1 Vigilance to Indicators of Social Threat
- Attentional Bias Toward Socially Threatening Information
- Inferential Bias to Interpret Social Situations as Threatening

2 Reduce Behavioral Propensity for Risk Taking
- Lessened Expectations of Success/Heightened Expectations of Failure
- Undervalue Positive Outcomes; Overvalue Negative Outcomes

3 Signal to Conspecifics to Reduce Social Risks
- Signal Withdrawal From Exchange-Oriented Relationships
- Signal Submission in Competitive Encounters and Elicit Care From Allied Conspecifics

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The SRH Weaknesses

- ◉ Won't "depression" DECREASE "social value"?? ✖✖✖

  - ◎ "…(even mild symptoms of) depression induce rejection in other people…the findings from ethological observations indicate that depression is a consequence of malfunctioning interpersonal processes, rather than a strategy to ameliorate stressful interpersonal situations." (Geerts and Brune, 2011)

- ◉ Counter Arguments:

  - ◎ 1) "The proposed ecological function... works only for mild..depressed states" (NDDM?)
  - ◎ 2) *Raising* SIP is not the point of depressed mood – it is only a risk averse strategy (a retreat to safety).
  - ◎ 3) Even if mild depression fails to elicit care or reduce threat in *exchange* relationships, it does in *communal* relationships.

IMPLICATIONS
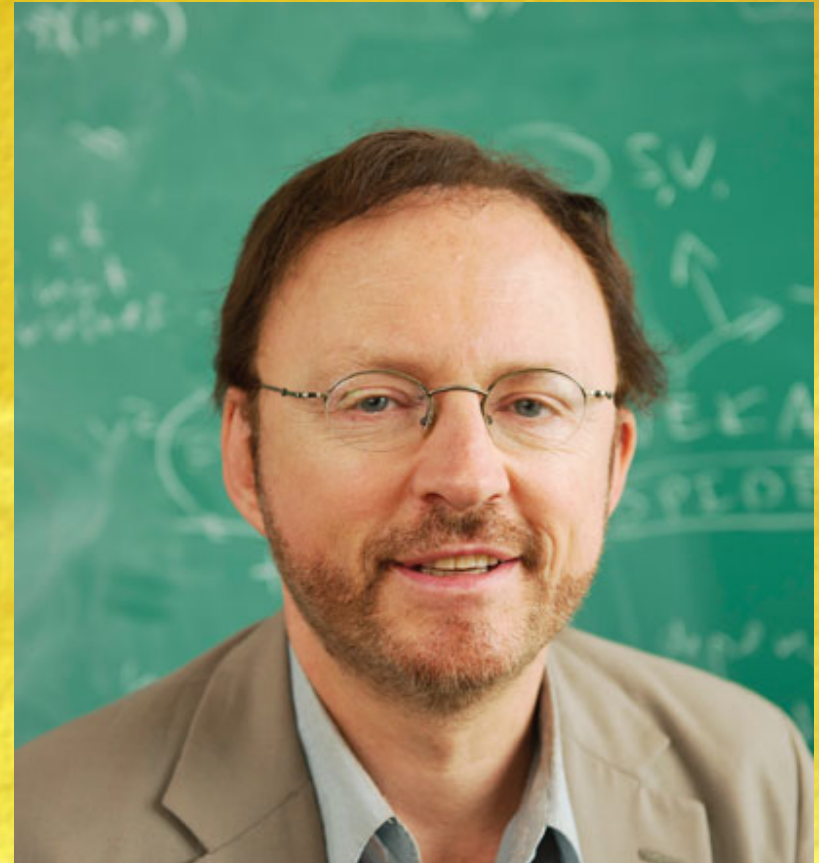## AN ADDITIONAL WAY TO BIOLOGIZE PSYCHIATRY

- "trying to understand perception by studying only neurons is like trying to understand bird flight by studying only feathers" *David Marr*

  - Hint, hint, psychiatry: We need an *ecological*, *functional and evolutionary* analysis of depressed states.

  - We must "work backwards" from function.

Defining "Non Disordered Depressed Mood" (NDDM)

- A "V Code" (not just DSM IV's "...periods of sadness")
  - *Even it it were* true that "what we see in the clinic" is rarely NDDM, it's conceptually important for epidemiology and medical research.
  - "Proposed criteria"...[1]

- "Clinical depressions" become *dysfunctions* of the mechanisms that regulate the <u>precipitation</u> and <u>perpetuation</u> of NDDM

- Lumping NDDM with MDD muddles epidemiology and antidepressant effectiveness studies.

A Better "Carving Nature at the Joints"?

- Considering "dissections" of the diagnostic category MDD by *psychosocial precipitant*. Research does validate some *situation-symptom congruence:*
  - **Loss-depression?**
  - **Defeat/humiliation depression?**
  - **Chronic low rank depression?**
  - **Sickness-behavior/inflammatory depression?**
- "Dissecting out" from "true MDD" other syndromes:
  - If *self-esteem* is a "central variable" "depression" <u>without low state *self-esteem*</u> must instead be...
    - (Recall DSM IV has "worthlessness" as a non-essential "menu item")
  - "Depression" with <u>increased aggression</u> must instead be...

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Clinical Implications: Assessment of Depression

- NDDM as a "Rule Out" Dx:
  - Requires an "idiographic understanding" of patient's predicament.
  - Prolonged or severe stress, hx of adverse childhood experiences, known genetic predisposition, unremitting social adversity make NDDM less likely...

- Identifying **precipitating** and ***perpetuating*** factors:
  - Start with patient's *realistic social predicament*.**:** Loss, defeat/ powerlessness/entrapment, low Social Value, high Social Burden (suggested by the SRH)
  - Consider goal-attainment failure, entrapment, heplessness (suggested by other evolutionary hypotheses)
  - In cases of chronicity consider *failure to yield voluntarily* (suggested by the SCH), or a social environment *mismatched* to presumed ancestral environments (close kin and allies) that allowed for recovery.

Clinical Implications: Psychotherapy of Depression

- Patient's *objective predicament* must be acknowledged.
- The *normal* functions of (reactive, proportionate) low mood explained:
  - Classic "intra-psychic" functions (e.g. **mourning**)
  - Evolutionary theory- inspired "intra-psychic" functions such as **incentive disengagement**
  - Social functions suggested by the **SCH**: **Yielding**
  - Social functions suggested by the **SRH: Risk-averse social strategy** (retreating to safety)
- Preventive advice suggested by the **SRH**: Increase "social value" (volunteer work, helping others, joining group, becoming a sponsor, etc.)
- Preventive or therapeutic strategies suggested by the **SCH**: Attend to stagnant conflict, help patient win (Assertiveness Training), compromise, or substitute <u>voluntary</u> for involuntary yielding.
- IPT ✔ ✔ CBT ✔

Clinical Implications: Psychotherapy in General

Wo Es war, soll Ich werden (Where id was, there ego shall be)

=

"Where involuntary unconscious social strategies were, there alternative social strategies at higher levels of mental organization shall be"

- Psychodynamic psychotherapy discovers <u>unique</u> sources of suffering. Evolutionarily informed psychotherapy teaches <u>universal</u> sources of suffering.

- Evolutionary hypotheses valorize the therapeutic *relationship,* understanding one function of the therapist as an *ally*.
  - This is c/w research showing the therapeutic relationship is more important than "techniques".

- Don't construe ultimate <u>causes</u> as "unconscious <u>motives</u>".

- Don't assume that primeval adaptations must be "adaptive" (have a useful function) today.

- *Don't assume that there must be a one-to-one mapping between **disorders** and **conditions meriting treatment**.*

  - *"Whatever gets you thru the night is alright, alright..."*

  - NDDM is **Natural,** not *Granola Natural*

  - *Medicine is the art and science (techne and praxis) of alleviating the suffering that comes with being biological beings – not of "treating disorders".*

Summary

- The ferment of evolutionary thinking in psychology, medicine and psychiatry has generated a number of evolutionary hypotheses of depressed mood.

- Human depressed mood may be homologous with depressed states in other animals.

- Adaptationist hypotheses posit that these depressed states are coping (adaptive) responses to certain kinds of stressors.

- The most *ecologically relevant* "depressogenic" stressors for human beings are *social adversities* which may be organized as existing in two orthogonal axes of interpersonal relatedness: rank and affiliation.

Summary

○ The capacity for mood variation regulates our social behavior. Specifically, two *adaptationist*, *ethological* evolutionary hypotheses suggest that depressed states are ancestral, social *behavioral strategies*:

1. **The Social Competition Hypothesis** posits that very primitive mechanisms to cope with defeat or subordination may persist and/or be homologous with human depressed mood.

2. **The Social Risk Hypothesis** posits that we have evolved sensitivity to clues regarding rank and affiliation, and mechanisms to cope with danger of exclusion or ostracism by social risk-averse strategy, a "retreat to safety".

Summary

- Adaptationist accounts suggest that we should consider some depressed states as non disordered.
- We should "make room" for **non-disordered depressed mood** in research design, individual patient assessment, psychoeducation, and treatment.
- We should understand <u>clinical</u> depression as *as a dysfunction of mechanisms that had a primeval function*.
- Evolutionary concepts suggest an "additional way to biologize psychiatry" that has implications for nosology, metapsychology, and treatment.
- Evolutionary logic opens a "tier of explanation" that is truly biopsychosocial.

APPENDIX

What Prompts Evolutionary Explanations of Depressed Mood?

- **Advances in Ethology**
  - Learned helplessness, illness behavior, ritual submission, low-rank stress...suggest **a deep homology** to depressed states.
  - Concept of *facultative behavioral strategies*.
  - Tinbergen's "Four Questions"

- **Epidemiology**
  - Puzzles: High prevalence of "depression", <u>*and*</u> highest incidence when reproductive value peaks
    - Either 1) "Depression" is <u>not a disorder</u> (Radical adaptationist reconciliation) 2) Epidemiologists are "lumping" disorder and "normal depressed mood" (Definitional reconciliation) or 3) Most sampled depressions are disordered, due to modernity ("Mismatch" reconciliation- compare Type 2 Diabetes, CAD, myopia etc)
  - *All three "reconciliations" invoke evolution.*

- **Relationship to Stress**
  - *Over and above* other causative correlations depression is *causally* linked to *current*, INDEPENDENT *stressors*: **Loss, entrapment, defeat, humiliation.**
  - Animal-model stressors - *social defeat, aversive stimuli* yoked to *futility of response*- echo these human stressors
  - Understanding stress as stimuli prompting an adaptive response (vs. stress-as-damage).

Various **Human** Depressed States as Partially Differentiated?

Non-Disordered Depressed Mood

**Anhedonia, low motivation, loss of energy
low *self-esteem*, sense of incapacity
self -deprecation, negative cognitive biases,
hypersensitivity, social withdrawal, sadness**

Clinical Depressions
(dysfunctions)

Bereavement

Demoralization
(Defeat/
Entrapment)

easonal
Depression

Illness Behavior

A primitive generic state of inhibition

("Conservation-withdrawal" as per Engel and Schmale?)

The Social Competition Hypothesis

- ***Animals Fight:***
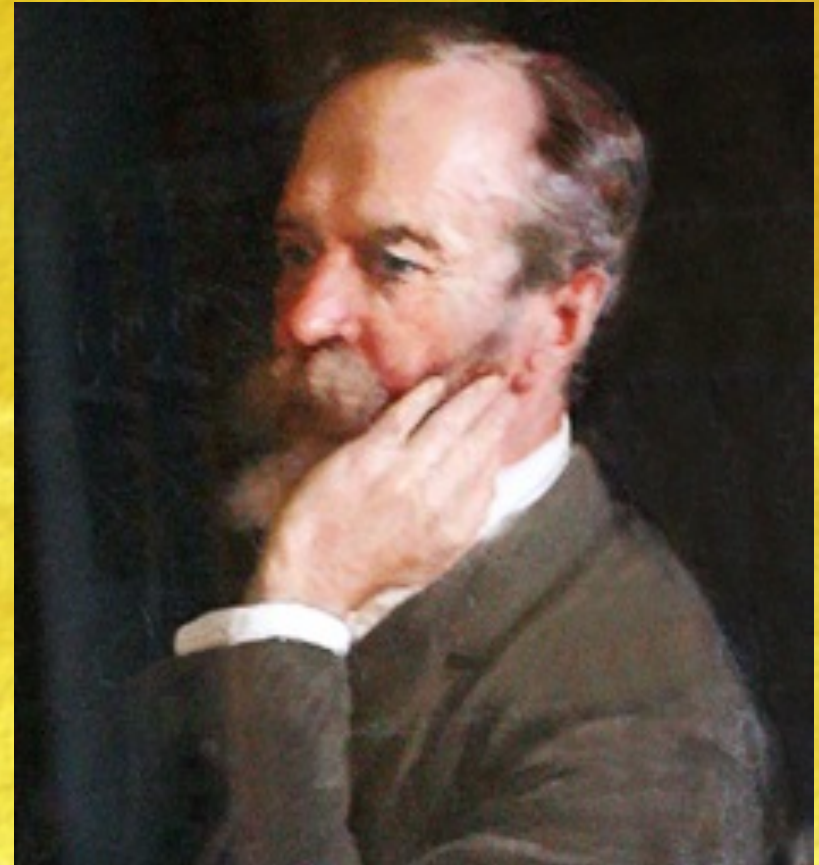 - *"Fighting is a phylogenetically ancient mechanism that creates social asymmetry."*

- Fighting creates adaptive challenges for losing, "predicting" **adaptations** - <u>behavioral strategies</u> - for losing and having lost.

- Namely... "**depressive states**" whose *functions* are:
  - *inhibiting* challenging behavior
  - *inhibiting* resource-seeking
  - *signaling* "fight's over!"
  - *facilitating acceptance* of low status

- *Human* competition no longer (often) manifests as physical combat. Instead...

- "Looking under the hood": *Resource Holding Potential (RHP)* , "the primordium of $self\text{-}esteem$"

- <u>Strengths</u>: The SCH "makes sense" of the ***incapacity***, ***cognitive distortions*** and $low\ self\text{-}esteem$ of depression, and is concordant with epidemiology and animal models. ✔✔✔

- <u>Weakness</u>: It does not account for depressed mood after loss/ bereavement. ✖✖✖

William James

- "No more fiendish punishment could be devised... that one should be turned loose in society and remain absolutely unnoticed by all the members thereof. If no-one turned around when we entered, answered when we spoke, or minded what we did, but if every person we met "cut us dead" and acted as if we were non existent things, a kind of rage and impotent despair would ere long well up in us, from which the cruelest bodily tortures would be a relief..." (1890)

A "Phylogenetic Speculation"
Depressive Phenomena, Assuming Deep Homology

- **Conservation/Withdrawal** (Most Phyla) **Precipitant**: General unpropitious environment Dysregulation (example): Seasonal Affective Disorder
  - **Illness Behavior** (Animalia) **Precipitant**: Infection, wounds Dysregulation: Chronic inflammation, pleiotropic effect of alleles for host defense; "inflammatory depression subtype"
    - **Learned Helplessness** (Invertebrata) **Precipitant**: Stress + futile effort. Dysregulation: "Glucocorticoid toxicity"
      - **Losing Strategies in Social Competition** (Invertebrata and Vertebrata) **Precipitant**: Losing (drop in RHP) or low rank. Dysregulation: Blocked yielding, low rank stress
        - **Response to Attachment Disruption** (Animals with parental care, i.e. Aves and Mammalia) **Precipitant**: Attachment disruption Dysregulation…
          - **Social Risk Strategies** to cope with social rank and affiliation adversity (Early Humans)…
            - **Bargaining** and other hypotheses requiring Theory of Mind and sophisticated social reasoning…

Grand (iose?) Implications

- "In the distant future... **psychology will be based on a new foundation**, that of the necessary acquirement of each mental power and capacity by gradation." Charles Darwin, 1859
  - "Capacity": mood variation
  - "Gradation": natural selection
- "Nothing in biology makes sense except in the light of evolution" Theodosius Dobzhansky
- *Nothing in psychology makes sense either, except in the light of evolution.*

Can Stress Models of Depression be Reconciled with Evolutionary Models?
The Tangle of Good Stress, Bad Stress

- Mild stress, associated with successful adaptation, may not lead to dysregulation. *Here is where adaptationist models fit in…*

- Chronic, excessive, inescapable stress may be damaging, especially in combination with a predisposing diathesis.

- Yet, "passive coping" during prolonged stress may be adaptive: "It has been hypothesized that proactive behavioral responses are maladaptive under repeated, uncontrollable or unpredictable stress" (O. Overli et al, Neuroscience and Neurobehavioral Reviews, 2007)

- The epigenetic changes that early adversity may cause on later stress responsivity… damage, or *adaptation to prepare for a rough life*?

- In a non-human primates, all subordinates are stressed, but many subordinates do not exhibit "depressive behavior"…

- Life stress research (Kendler, Brown) certainly lumped our **non-disordered depressed mood** with depressive disorders. This would conflate stress ➔ disorder with stress ➔adaptive response.

Context
Where Do These Ideas Come From?

- **Charles Darwin** Theory of Evolution (1859)
- **Konrad Lorenz** and **Niko Tinbergen** Ethology / Behavioral Biology (1950s, 1960s)
  - Animal behaviors as *organs* that *evolve*, just like biological structures
- **John Bowlby** Attachment, EEA
- **Martin Seligman** Learned Helplessness (1967)
- **Edward O. Wilson** (synthesizing William Hamilton on kin selection, George Williams on individual vs. "group" adaptation, Maynard Smith, Robert Trivers on reciprocity - all key to understanding the evolution of *social behavior*) Sociobiology
  - *Sociobiology: The New Synthesis* (1975)
- **Leda Cosmides and John Tooby** Evolutionary Psychology
  - *The Psychological Foundations of Culture* (1992)
- **Randolph Nesse and George Williams** Evolutionary Medicine
  - *The Dawn of Darwinian Medicine* (1991)

Clinical Implications: Pharmacotherapy

- **Establishing efficacy**
- **Deciding on initiating pharmacotherapy** Consider MDD vs NDDM. Consider whether there is **any plausible current functional value.** *Consider* "not interfering" with such **function**...
- **Individualizing pharmacotherapy?** Not quite yet. Could a functional dissection of depressive subtypes have implications for choosing drugs with different mechanisms of action?
  - **Loss-depression?**
  - **Defeat/humiliation depression?**
  - **Chronic low rank depression?**
  - **Sickness-behavior/inflammatory depression?**

Two of Today's "Fields of Study"

Evolutionary Psychology

- "The study of the **phylogenetic history** and **adaptive functions** of the mind." *(Two of Tinbergen's Four Questions)*

- The "Heir of Sociobiology"

- Concerned with <u>adaptive function</u> (not concerned with pathology).

- *Sensu strictu*: **"UCSB Brand Evolutionary Psychology"** The "Cosmides and Tooby School". Controversial areas of study: Cooperation, reciprocity, exchange, mating strategies, decision heuristics. Adopts a "Swiss-Army-Knife-Model": Our mind comes pre-equipped with **modular** gadgets - innate mechanisms – that evolved to solve adaptive problems (i.e. committed to a "massive modularity" model of the mind).

Evolutionary Psychiatry

- An <u>*application*</u> *of Evolutionary Psychology* to the study mental disorders (and non-disordered mental suffering).

- Or *a* <u>*branch*</u> *of Evolutionary Medicine*, that applies to mental disorders evolutionarily-informed etiological hypotheses, such as

  "Disorder" as a functional adaptation or defense, or as a dysfunction, due to a mismatch between the environment our genes expected and our current environment.

- Concerned with <u>maladaptive dysfunction</u>, i.e. with pathology (or with <u>*non-dysfunctional mental suffering*</u>)

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Jungian Evolutionary Psychology

"If the unconscious is anything at all, it must consist of earlier evolutionary stages of our psyche... It is time this obvious fact were grasped at last. Just as the body has an anatomical prehistory of millions of years, so also does the psychic system. And just as the human body today represents in each of its parts the result of that evolution, and everywhere still shows traces of its earlier stages - so the same may be said of the psyche."

Carl Jung, *Memories, Dreams, Reflections* (1961)

(Interpreting the "psychoid unconscious"...)

Comparison

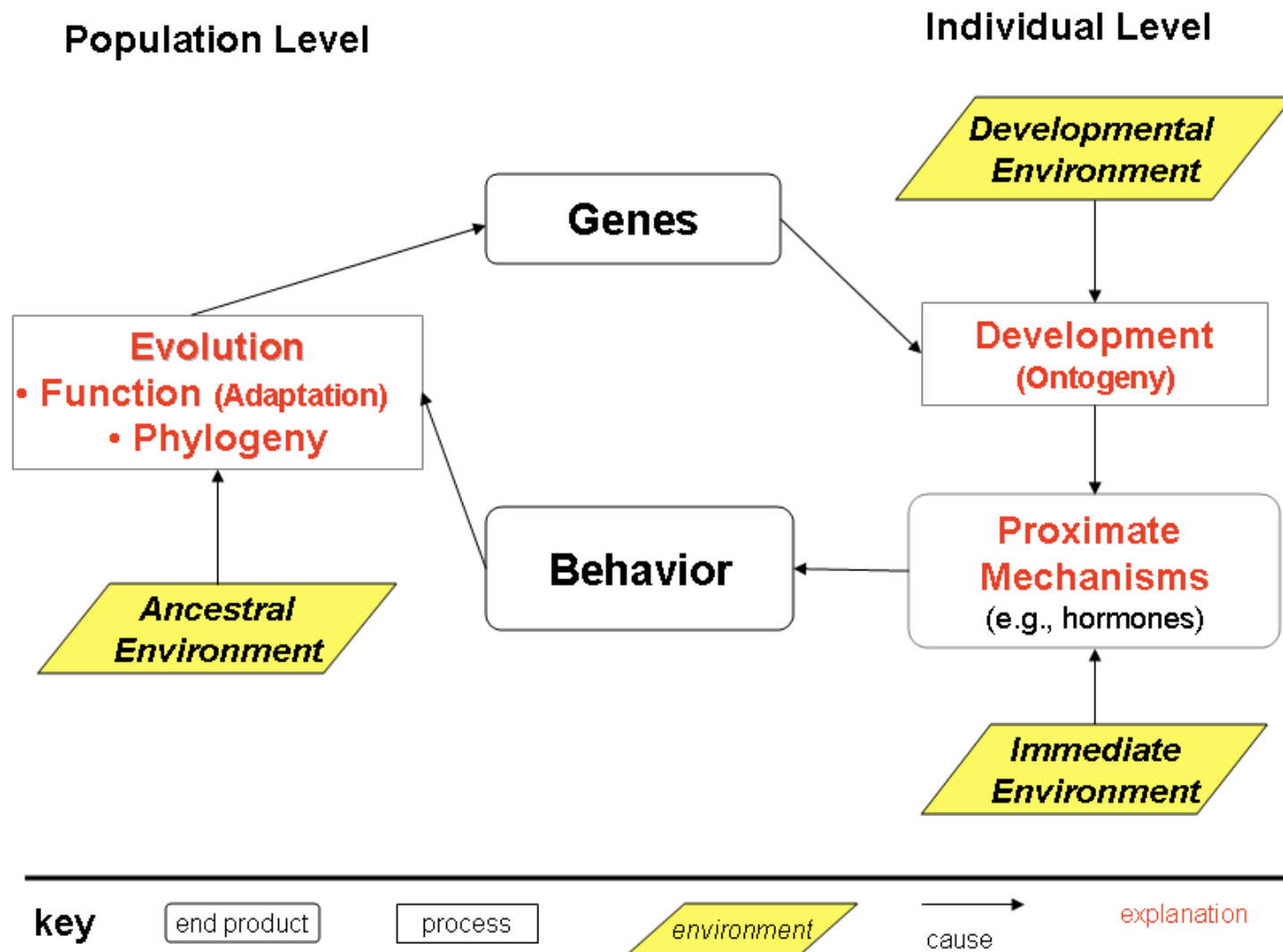|	Evolutionary "Time Depth"	Grounding In Ethology	Primordium of *Self - Esteem*	Requires a "Theory of Mind"?
Social Competition	Ancient (Evolution of Fighting Behavior); Vertebrates ?	Fighting behavior	Resource Holding Potential	No
Social Risk	Recent (Human Evolution)	Foraging risk	Social Investment Potential	Yes

Comparison

	Accounts for Vicissitudes of Relatedness In Which Axis?	Predicts Different Prevalence in Men and Women
Social Competition	**Agency** (Defeat, Loss of Status, Powerlessness)	No (not well)
Social Risk	**Agency <u>and</u> Affiliation** (Exclusion, Loss)	Yes

Causal Relationships Among the Categories of Explanation (Tinbergen 1963; from Wikipedia)

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A Defense of "Adaptationism"
Tinbergen's Four Questions as a *Periodic Table for Psychiatry*

Mechanism *(Causation)*	Development *(Ontogeny)*	Evolution *(Phylogeny)*	Adaptation *(Function)*
HOW is X, <u>mechanistically</u> caused? (<u>Proximal</u> Causes) ("Efficient /Material Causes")	HOW does X <u>develop</u> in the organism? ("Nature/Nurture Interaction")	WHY did X evolve just <u>this</u> way? (What's the STORY of X's evolution?)	WHY does X exist in the first place? What does it DO? (<u>Ultimate</u> Causes) ("Final Causes", Τελος)
Gene expression, the "language acquisition device", brain circuits, neurotransmitters, birdsong nuclei that change with sex hormones, amygdala activation… The "PHYSIOLOGY OF BEHAVIOR", but also "releasers", "triggering thoughts", etc	Imprinting ducklings; toddler learning <u>English</u>; birds learning song from "tutor", attachment experiences forming implicit and schema, learning automatic behaviors. The way it is "because it got that way way…" (D'Arcy Thompson) within the organism.	Mother-child bond as precondition for evolution of social behavior; constraints of earlier evolutionary path on later options; "spandrels" The way it is because it got that way thru the aeons…	Anxiety functions as alert to threat; seeking sweets leads to ripe fruit, broody behavior keeps eggs developing, mating dances attracts mates, punishing cheaters sustains reciprocity…ADAPTATIONIST EXPLANATIONS fit here.

Analogy: The "Metastasis of Mood" (from Dubovsky)

- Cell growth
  - Protective factors
  - Cancer

- Affective arousal
  - Protective factors such as attachment)
  - Mood disorders

- Bipolar disorder as "the metastatic cancer of psychiatry"