

TOWARD A CLASSIFICATION TABLE OF HUMAN PSYCHOLOGICAL ADAPTATIONS

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ABSTRACT

One of the first steps in the development of any scientific discipline is to parse the phenomena under study and to develop a useful classification system. For example, the periodic table of basic elements helps to structure and integrate the discipline of chemistry. Early human physiologists worked to parse the fundamental organs systems of the human body, and later, they identified their functions (e.g., *Grey's Anatomy*) and dysfunctions (e.g., the *Merck Manual*).

Evolutionary psychology too needs a classification system for human psychological adaptations – a *Grey's Anatomy* of human psychological adaptations. This paper presents a tentative sketch of how such a table of human universals might be structured.

It is argued that human psychological adaptations evolved in response to survival and reproductive problems that appeared repeatedly in the human ancestral environment. The proposed classification structure includes a list of ancestral problems and subsequent putative mental mechanisms across several psychological modalities. These modalities may include modular processing by perceptual, motivational, emotional, behavioral, and cognitive systems. For example, adaptations to solve the problem of social cheating include perceptions (detection of cheating via facial expressions, tone of voice, “shifty eyes,” etc.), motivations (e.g., revenge), emotions (e.g., anger), cognitions (sense of injustice), and personality traits (e.g., suspiciousness). Activation of these modules generally result in behaviors to enforce reciprocity among, especially, non-kin.

The task of identifying the list of ancestral problems, and consequent evolved psychological adaptations across mental modalities, is discussed. A preliminary classification table of human psychological adaptations is presented.

- **CLASSIFICATION SYSTEMS IN SCIENCE.** One of the first steps in the development of any scientific discipline is to parse the phenomena under study to develop a useful classification system of the structures under study and their functions. For example:
 - IN CHEMISTRY: The Periodic Table of basic elements helps to structure and integrate the discipline.
 - IN PHYSIOLOGY: Early human physiologists worked to parse the fundamental organs systems of the human body (e.g., *Grey's Anatomy*), and later, they identified their functions and dysfunctions (e.g., the *Merck Manual*).
- **PSYCHOLOGY** too needs a classification system for human psychological adaptations, i.e., a *Grey's Anatomy* of evolved human mental mechanisms.

- **SURFACE UNIVERALS.** In his book *Human Universals* (1991) Donald Brown proposed a list of “surface universals” noted by ethnographers. Surface universals are overt behaviors, including language, that are found in all known cultures. Surface universals are not themselves the underlying evolved mental mechanisms, but rather they are behavioral manifestations of them.
- **UNDERLYING PSYCHOLOGICAL ADAPTATIONS.** Unlike surface universals, a comprehensive list of underlying psychological adaptations has yet to be created. The purpose of this paper is not to provide a comprehensive list of these adaptations – that large task that will require many decades of work. Instead, I would like to propose that we begin to think about what such a classification system might look like – how it would be structured and organized.

- For example, Plutchik (2002) proposed a classification system relating emotions, cognitions and behaviors as evolved, inter-related adaptations designed to deal with stimulus events relevant to survival and/or reproduction.

Plutchik's Classification Table of Emotions

| stimulus event | cognition | feeling state | overt behavior | effect |
|-----------------------|---------------|---------------|------------------|-------------------------|
| threat | "danger" | fear | escape | safety |
| obstacle | "enemy" | anger | attack | destroy obstacle |
| gain of valued object | "possess" | joy | retain or repeat | gain resources |
| loss of valued object | "abandonment" | sadness | cry | reattach to lost object |
| member of one's group | "friend" | acceptance | groom | mutual support |
| unpalatable object | "poison" | disgust | vomit | eject poison |
| new territory | "examine" | expectation | map | knowledge of territory |
| unexpected event | "what is it?" | surprise | stop | gain time to orient |

- It may be helpful to classify adaptive problems, such as those identified by Plutchik (2002) above, into several major classes of problem categories, including: personal survival and reproduction, mating, parenting and relations with kin, interactions with non-kin, and information transfer.

- Indeed, as the complexity of biological organisms increased over evolutionary time, new survival and reproductive problems emerged:
 - Early organisms evolved to deal with problems associated with survival and asexual reproduction. Darwin described how traits evolved to solve these problems.
 - The evolution of sexual reproduction created new problems to solve, and a new type of evolution, sexual selection (also described by Darwin).
 - However, Darwin did not take a “gene’s eye” view of evolution and thus he did not understand altruism toward kin (e.g., the behavior of the social insects). Hamilton’s concept of inclusive fitness helped to explain the evolution of kin altruism.
 - Inclusive fitness, however, cannot explain cooperation between non-kin. Trivers helped to explain this phenomena with his theory of reciprocity.
 - Most recently, Dawkins (1976) noted that replicators can be things other than genes – and could include ideas, or “memes,” that replicate by information transfer between organisms.

- It is interesting to note that the major theoretical advances in evolution / evolutionary psychology correspond with these major evolutionary epochs (see table below).

Major Theoretical Advances / Levels of Adaptive Problems

| <i>Theoretician</i> | <i>Focus</i> | <i>Concept</i> | <i>Problems</i> | <i>Example Adaptations</i> |
|---------------------|-----------------|---|-------------------------------------|--|
| C. Darwin | Individual | Survival Selection | Survival & Asexual reproduction | Bones, skin, vision, etc. |
| C. Darwin | Individual | Sexual Selection | Sexual Reproduction | Peacock's tail, courtship behavior, etc. |
| W. Hamilton | Family / Kin | Inclusive Fitness / "Gene's eye view" of evolution | Indirect gene replication (via kin) | Altruism toward kin, parenting. |
| R. Trivers | Group (non-kin) | Reciprocity between non-kin | Symbiotic cooperation | Cheater detection |
| R. Dawkins | Culture | Meme replication (Genes are not the only replicators) | Information transfer | Language, writing, music, etc. |

Human psychological adaptations evolved in response to survival and reproductive problems that appeared repeatedly in the human ancestral environment. The proposed classification structure includes a list of ancestral problems and subsequent putative mental mechanisms across several psychological modalities:

- **Specific Problem:** What problem is the adaptation designed to solve?
- **Motive / Perception:** What motives and/or perceptions are associated with the adaptation when it is activated?
- **Emotion:** What emotions are associated with the adaptation when it is activated?
- **Function:** How does the adaptation function to solve the problem?
- **Stimulus:** What are the environmental inputs that trigger the psychological adaptation?
- **Cognition:** What conscious cognitions are associated with solving the problem?
- **Behaviors:** What manifest behaviors may typically result from the activation of the adaptation?
- **Effect:** How does the adaptation solve the problem?

In the future, the table may include:

- Associated neurological structures
- Associated personality traits

For example, adaptations to solve the problem of social cheating include *perceptions* (detection of cheating via facial expressions, tone of voice, “shifty eyes,” etc.), *motivations* (e.g., revenge), *emotions* (e.g., anger), *cognitions* (knowledge of a rule violation, a sense of injustice), and *personality traits* (e.g., suspiciousness). Activation of these modules generally result in behaviors to enforce reciprocity among, especially, non-kin.

It is also important to clarify the distinctions between these modalities.

For example, what is the distinction between motivations and emotions? An initial classification of these two modalities is noted below:

| | Emotions | Motives |
|-------------------------------------|--|---|
| Have “hedonic tone” (pain/pleasure) | Yes | Generally no. |
| Relation to adaptive problem | Informational. Informs the organism if an event has occurred with potentially important positive or negative adaptive consequences, initial reduction of potential solution search space. | Cognition and Action oriented. Focused on solving an adaptive problem by inducing a search of more specific potential solution space, often selecting a “strategy,” and typically producing behavioral output. |
| Some may be non-conscious | No. | Yes. |

What is the distinction between motivations and personality traits?
 An initial classification of these two modalities is noted below:

| | Motives & Emotions | Personality Trait |
|--|--|--|
| Change over time | Variable over time. | Stable over time. |
| Subjectively Experienced as a “felt state”? | Yes. | No. |
| Problem / goal Oriented? | Yes | No, or very indirectly as a genetically and environmentally predisposed facultative social strategy. |
| Appetitive? (intensity increases with passage of time) | Many motives: yes Emotions: often no – may decline with passage of time | No. |
| Neural correlates (?) | Hypothalamus / Limbic System | Cerebral Cortex |

WHAT MIGHT A “PERIODIC TABLE” OF HUMAN PSYCHOLOGICAL ADAPTATIONS LOOK LIKE?

THE FOLLOWING TABLES PRESENT SOME INITIAL SKETCHES

(Note: For simplicity, associated personality characteristics and underlying neurological structures are excluded from these initial outlines).

| INDIVIDUAL SURVIVAL ADAPTATIONS (based on fundamental survival problems and asexual reproduction) | | | | | | | |
|---|--------------------------------|---------------------|---|--------------------------|--|----------------------|-------------------|
| PROBLEMS | MOTIVE / PERCEPTION | EMOTION | FUNCTION | STIMULUS | COGNITION | BEHAVIOR | EFFECT |
| How to acquire food? | Hunger | | Caloric intake | Appetitive or responsive | | Search | Locate food |
| How to evaluate food? | Good or bad taste or smell | Satiation / Disgust | Consume Correct Foods | | | Eating (or vomiting) | Eat correct foods |
| How to deal with a threat to personal safety? | Fight or flee | Anger or Fear | | | Danger | Escape | Safety |
| How to deal with a personal resource loss? | | Sadness | | Lose valued object | Failure | Cry | Re-evaluate |
| How to acquire resources for self (and kin)? | | Joy | | Obtain valued object | Success | Repeat / Retain | |
| How to find resources / dangers in environment? | Curiosity | Wonder | Obtain knowledge of local resources / dangers | New territory | Mental maps | Exploration | |
| How to deal with an important unexpected event? | Assess situation (?) | Surprise | Focus attention | | | Stop / Orient | |
| How to overcome an obstacle? | Persist (+) Or (-) give up. | Frustration | | | Analyze alternative possible solutions | | |

| SEXUALITY RELATED ADAPTATIONS (based on sexual selection / sexual reproduction) | | | | | | | |
|--|--|-------------------------------|-----------------|---|------------------|---------------------|---------------|
| PROBLEMS | MOTIVE / PERCEPTION | EMOTION | FUNCTION | STIMULUS | COGNITION | BEHAVIOR | EFFECT |
| How to find a mate? | Flirting / Courtship | Attraction/ Desire | Obtain mate | Attractive individual / flirting by other | | Pursuit / Courtship | |
| How make offspring? | Sex / Orgasm | Sexual Desire | Reproduce | | | | |
| How to keep mate? | Bonding – desire to be with or stay with partner | + love - Loss: Abandonment | | | | | |
| How to guard mate from other potential suitors? | | Jealousy, Vigilance | | | | | |
| How to provision mate? | | | | | Generosity | | |

KIN / FAMILY RELATED ADAPTATIONS (based on kin altruism)

Note: the more closely related the kin, the stronger the motive is likely to be.

| PROBLEMS | MOTIVE / PERCEPTION | EMOTION | FUNCTION | STIMULUS | COGNITION | BEHAVIOR | EFFECT |
|---------------------------------|---------------------|-------------------|----------|---------------|------------|----------|--------|
| How to protect kin? | | Anger / Assertion | | Threat to kin | | | |
| How to provision / nurture kin? | | | | | Generosity | | |
| How to teach / socialize kin? | | | | | | | |

| GROUP (NON-KIN) RELATED ADAPTATIONS (based on reciprocity) | | | | | | | |
|---|--------------------------------|---|----------------------|-----------------|---|--------------------|---------------|
| PROBLEMS | MOTIVE / PERCEPTION | EMOTION | FUNCTION | STIMULUS | COGNITION | BEHAVIOR | EFFECT |
| How to join a group? How to maintain membership? | Inclusion (+) Ostracism (-) | (+) "Belonging" (-) Rejection Sadness | | | Membership / Identification (In/out group) (-) Isolation | Grooming Gossip | |
| How to detect a social cheater (non-reciprocator)? | Revenge | Anger | Enforce Reciprocity | | Injustice / "I been done wrong" | | |
| How to decide when cheat (without getting caught)? | Break social rules | Glee / Guilt / Spite | Resource acquisition | | Conscience (or lack of) / Rationalization | | |
| How to increase you social status in the group? | Envy | Low self-esteem? | | | Covet / Status striving | | |

| MEMETIC RELATED ADAPTATIONS (based on information transfer) | | | | | | | |
|---|-----------------------------------|---------|----------------------|----------|-----------|----------|---------------------|
| PROBLEMS | MOTIVE / PERCEPTION | EMOTION | FUNCTION | STIMULUS | COGNITION | BEHAVIOR | EFFECT |
| | | | | | | | |
| How to verbally transfer information | Gain or give valuable information | | Information transfer | | | Language | Vicarious learning. |

As can be seen above, many of the cells of these preliminary sketches are empty. It may be that we do not yet have a word to describe a motive, emotion, or cognition associated with a particular adaptive problem. However, this may be heuristic in that the tables suggest the existence of certain mental states and modules that require further research to elucidate.

References

- Brown, D.E. (1991). *Human Universals*. New York, McGraw-Hill
- Plutchik, R. (2002). *Emotions and Life: Perspectives from Psychology, Biology, and Evolution*. Washington, D.C.: American Psychological Association.