

Behavioral Syndromes



Animal Personalities
or
Individual Variation

People Have Personalities



History of Personality Psychology

- ~1850's - Eugéne Azam
 - Psychopathology
- 1865 - Sir Francis Galton
 - Correlated physical & psychological
 - Compared individuals & populations (eugenics)
- 1903 - Alfred Binet
 - Personality tests
- 1937 - Gordon Allport
 - Humanistic & social psychology
 - "Personality" appears scientifically
- 1951 - Ivan Pavlov
 - TNS (types of nervous systems) categorized
 - 'Weak' vs 'Strong'



Psychological Assessment of Personality 'The Big Three' Behavioral Types

Neuroticism	Extraversion	Psychoticism
(+)Neuroticism (+)Anxiety	(+)Extraversion (+)Sociability	(-)Conscientious (-)Agreeable (+)Psychoticism (+)Impulsivity (+)Sensation seeking (+)Aggression (+)Hostility

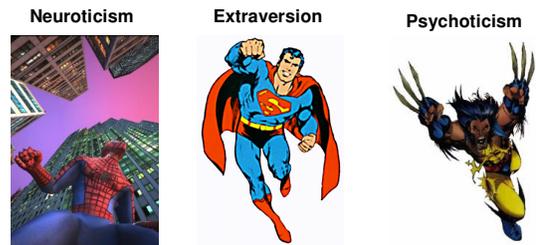
Derived from NEO-FFI (Costa & McCrae 1992); EPQ (Eysenck & Eysenck 1975); and ZKPQ (Zuckerman et al. 1993). [Reviewed in Figuerdo et al. 2006]

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Can We Use This Approach On Animals?



Can We Use This Approach On Animals?

Neuroticism



Extraversion



Psychoticism



Behavioral Syndromes (Non-Human Animal Personalities)

Definition

"...the correlation between rank-order differences between individuals through time and/or across situations and ... a property of a population" (Bell 2007)

Behavioral Syndromes

- Individual Behavior
 - Within-individual consistencies
 - Between-individual differences
- Syndrome
 - Suites of correlated behaviors
 - Carried across contexts
 - Exhibited by individuals or groups (spp)
- Behavioral Types
 - Aggression Levels
 - Activity Levels
 - Shyness / Boldness
 - Proactive - Reactive
 - Fearfulness



Aggressive Syndrome

Funnel Web Spider, *Agelenopsis aperta*

- Aggressive Individuals
 - More likely to attack prey & conspecifics
 - Show reduced anti-predator response
 - Excessive, non-adaptive wasteful killing
- Aggressive populations
 - Reside in areas with low food availability



M Gray © Australian Museum

Maupin & Riechert 2001; Riechert & Hedrick 1993



Activity Correlations

Salamander, *Ambystoma barbouri*

- Optimal behavior
 - Less active in the presence of predator
 - Moderately active in fish pools at night
 - Very active in fish pools in the day



- Actual Salamander behavior

- Positive activity correlations
 - Between the presence and absence of predator
 - Between day & night activity

Sih et al. 1992; Sih et al. 2003



Shy / Bold Syndrome

- Bolder sunfish (Wilson et al. 1994)
 - Engage in predator inspection
 - Acclimate quickly to the laboratory
 - Feed on exposed and difficult to capture prey
 - Carry different parasites
- Bolder killifish (Fraser et al. 2001)
 - Disperse further
 - Grow faster
- Bolder bighorn sheep (Réale et al. 2000)
 - Reproduce earlier
 - Higher weaning success



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Proactive-Reactive

Proactive Individuals

- Manipulate environments
- More aggressive
- (+) Constant environment
- Long time to adjust to change

Reactive Individuals

- Passive response to env.
- Less aggressive
- (+) Variable environment

Great tit (*Parus major*)

- Positive correlations
 - Exploratory Behavior
 - Foraging Behavior
 - Boldness / Reactions to novel environment
 - Aggressiveness / dominance in juveniles
 - Behavioral / Physiological Reactions to stress

Reviewed in Sih et al. 2004



When is it important to study Behavioral Syndromes? When are they Ecologically / Evolutionarily Important?

- When it is consistent over a lifetime?
- When there are short-term behavioral carry-overs?
- When there are differences between sexes?
 - Mating behaviors
 - Females mate more frequently than brothers to increase fitness
 - Territorial aggression
 - Males increase territorial aggression, while sisters do not

Do all behavioral correlations generate conflicts?

- Aggressive spiders do well in competition, but not so well in the presence of a predator
- Active salamanders eat more food, but are noticed more readily by predators
- Bolder sunfish feed on different prey, but engage in predator inspection more readily
- Great tits maintain proactive & reactive individuals in the population

Are there organisms that do not experience these trade-offs?

Negative Correlations

Male Crickets, *Gryllus integer* (Hedrick 2000)

- Longer courtship calling bouts → strong anti-predator behavior
- Shorter calling bouts → less response to predators



What are the benefits of *negative* behavioral correlations?

Which behavioral syndromes are important to study?

- Within-Context Comparisons
 - Anti-predator
 - Feeding
 - Mating
 - Conspecific contests
- Across-Contexts Comparisons
 - Feeding · antipredator · contest · mating
- Across-Individuals Types
 - Multiple · Single mating
 - Dispersers · Site faithful
 - Producers · Scroungers
 - Ambush · Active predators
 - High · Low vigilance individuals
 - Dominant · Subordinate

What do you think?

- In what environment would certain behavioral types be better suited? (e.g. aggression, boldness, etc.)
- How is genetic and individual variation in behavioral types maintained within or among populations?
- What types of environments would be better to maintain plasticity?
- When would individual variation be maladaptive?
- What role does experience play?

What do you think of these statements?

"In behavioral ecology, the tradition has generally been to ignore individual variation and instead emphasize shifts in mean behavior in response to changing environments."

"If behavioral carryovers are important, then no individual exhibits the optimal behavior in all situations"

"Behavioral syndromes might often have important ecological impacts because:

(i) behavioral correlations and limited plasticity can generate tradeoffs that limit the ability of a species to cope with limiting environmental factors; and

(ii) behavioral correlations across contexts (e.g. between reproductive, predator-prey and dispersal behaviors) can couple birth, death, and dispersal processes in ways that are not usually included in ecological analyses."

Conclusion

- Behavioral syndromes are rarely studied
- Little known about proximate mechanisms of individuality
 - Genes
 - Experience
 - Hormones
 - Interactions of each
- Human Personality research may influence behavioral syndrome research in other animals & vice versa



References

(for your perusing pleasure)

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