

Label the two dichotomous categories that define Tinbergen's 4 questions and write those 4 terms in the appropriate boxes below.

For each journal article title below, put the number in the box for the question that best captures the type of research being presented. (you may choose more than one box). Make notes about your reasoning.

ANIMAL BEHAVIOUR

1. Kin recognition and inbreeding avoidance in wild birds: the first evidence for individual kin-related odour recognition
2. Mating rate influences female reproductive investment in a simultaneous hermaphrodite, *Lymnaea stagnalis*
3. Scent of the enemy: behavioural responses to predator faecal odour in the fowl
4. The mating system of a 'lazy' mammal, Hoffmann's two-toed sloth
5. Dolphins restructure social system after reduction of commercial fisheries
6. Ontogenetic colour change in females as a function of antiharassment strategy
7. Mating system and reproductive skew in a communally breeding cuckoo: hard-working males do not sire more young
8. Birth weight and sucrose responsiveness predict cognitive skills of honeybee foragers
9. Is birdsong music? Evaluating harmonic intervals in songs of a Neotropical songbird
10. Escape behaviour of birds provides evidence of predation being involved in urbanization
11. Learning individual signatures: rove beetle males discriminate unreceptive females by cuticular hydrocarbon patterns
12. Ontogenetic shift in the schooling behaviour of sardines, *Sardina pilchardus*
13. Heritability and genetic correlations of escape behaviours in juvenile scallop *Argopecten purpuratus*
14. Eyespots interact with body colour to protect caterpillar-like prey from avian predators
15. Early social experience significantly affects sexual behaviour in male guppies
16. Food imprinting and visual generalization in embryos and newly hatched cuttlefish, *Sepia officinalis*

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HORMONES AND BEHAVIOUR

1. Corticosterone and brood abandonment in a passerine bird
2. Do honeybees use the directional information in round dances to find nearby food sources?
3. Male great bowerbirds accumulate decorations to reduce the annual costs of signal production
4. Habitat change influences mate search behaviour in three-spined sticklebacks
5. Different social-learning strategies in wild and domesticated zebrafish, *Danio rerio*
6. Maternal gestational androgens are associated with decreased juvenile play in white-faced marmosets (*Callithrix geoffroyi*)
7. Social experience induces sex-specific fos expression in the amygdala of the juvenile rat (ASK IF YOU DON'T KNOW WHAT fos IS)
8. Evidence that sex chromosome genes affect sexual differentiation of female sexual behavior
9. Isotocin regulates paternal care in a monogamous cichlid fish
10. The role of testicular hormones and luteinizing hormone in spatial memory in adult male rats
11. Females of an African cichlid fish display male-typical social dominance behavior and elevated androgens in the absence of males
12. Divergent hormonal responses to social competition in closely related species of haplochromine cichlid fish
13. Hormone levels of male African striped mice change as they switch between alternative reproductive tactics
14. Female goats use courtship display as an honest indicator of male quality
15. Older mothers follow conservative strategies under predator pressure: The adaptive role of maternal glucocorticoids in yellow-bellied marmots
16. Inhibiting influence of testosterone on stress responsiveness during adolescence

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BEHAVIORAL ECOLOGY

1. Food stress during juvenile and maternal development shapes natal and breeding dispersal in a spider
2. Latency to flee from an immobile predator: effects of predation risk and cost of immobility for the prey
3. Learned recognition of brood parasitic cuckoos in the superb fairy-wren *Malurus cyaneus*
4. Opposing effects of sperm viability and velocity on the outcome of sperm competition
5. The evolution of multimale groups in Verreaux's sifaka, or how to test an evolutionary demographic model
6. Territorial song sparrows tolerate juveniles during the early song-learning phase
7. Host location by visual and olfactory floral cues in an oligolectic bee: innate and learned behavior
8. Rival presence leads to reversible changes in male mate choice of a desert dwelling ungulate
9. Male greater sac-winged bats gain direct fitness benefits when roosting in multimale colonies
10. Optimal marauding in bowerbirds
11. Unmasking Zorro: functional importance of the facial mask in the Masked Shrike (*Lanius nubicus*)
12. No evidence for inbreeding avoidance through active mate choice in red-billed gulls
13. The effects of neighbor familiarity and size on cooperative defense of fiddler crab territories
14. Nuptial gifts protect male bell crickets from female aggressive behavior
15. Vocal behavior predicts reproductive success in a teleost fish
16. Handling time and the evolution of caching behavior

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BEHAVIOUR

1. Territorial defence behaviour in red squirrels is influenced by local density
2. Behavioral characteristics of pair bonding in the black tufted-ear marmoset (*Callithrix penicillata*)
3. Electric discharge patterns in group-living weakly electric fish, *Mormyrus rume* (Mormyridae, Teleostei)
4. The effect of experience and rearing environment on the behaviour of crab spiderlings during their first weeks of life
5. Maternal inheritance and exploratory-boldness behavioural syndrome in zebrafish
6. The calling songs of male spring field crickets (*Gryllus veletis*) change as males age
7. Evolution of calling songs as multicomponent signals in crickets (Orthoptera: Grylloidea: Eneopterinae)
8. Degree of synchronization of tree sparrows in flocks under different predation risk
9. Do natural differences in acoustic signals really interfere in conspecific recognition in the pan-Amazonian frog *Allobates femoralis* ?
10. Evolution of advertisement calls in African clawed frogs
11. Effects of urbanization on the behaviour of a keystone species
12. Effects of fighting on pairing and reproductive success
13. Olfactory and visual species recognition in newts and their role in hybridization
14. Support for a role of colour vision in mate choice in the nocturnal European treefrog (*Hyla arborea*)
15. Differential retention of predator recognition by juvenile rainbow trout
16. Is there a trade-off between caring for offspring and territorial aggression in tropical male rufous-collared sparrows (*Zonotrichia capensis*)?

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ETHOLOGY

1. When to Run and When to Hide: The Influence of Concealment, Visibility, and Proximity to Refugia on Perceptions of Risk
2. Chronological vs. Physiological Age as Determinants of Mating Decisions: Studies on Female Choice Over Lifespan in An Acoustic Moth
3. The Role of Climatic Factors in the Expression of an Intrasexual Signal in the Paper Wasp *Polistes dominulus*
4. Mink with Divergent Activity Levels have Divergent Reproductive Strategies
5. Spatial Proximity between Newborns Influences the Development of Social Relationships in Bats
6. Seismic Signaling is Crucial for Female Mate Choice in a Multimodal Signaling Wolf Spider
7. Do Feeding Resources Induce the Adoption of Resource Defence Polygyny in a Lekking Butterfly?
8. The Evolution of Large Testes: Sperm Competition or Male Mating Rate?
9. Intake Rate under Competition on a Natural Food Distribution
10. Non-Conceptive Sexual Behavior in Spiders: A Form of Play Associated with Body Condition, Personality Type, and Male Intrasexual Selection
11. Corticosterone, Avoidance of Novelty, Risk-Taking and Aggression in a Wild Bird: No Evidence for Pleiotropic Effects
12. Learning to Avoid Dangerous Habitat Types by Aquatic Salamanders, *Eurycea tynnerensis*
13. Mating Behavior and Dual-Purpose Armaments in a Camel Cricket
14. Duet Function in the Yellow-Naped Amazon, *Amazona auropalliata*: Evidence From Playbacks of Duets and Solos
15. Fine- and Broad-Scale Approaches to Understanding the Evolution of Aggression in Crickets
16. Rats Benefit from Winner and Loser Effects

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ETHOLOGY AND SOCIOBIOLOGY

- Changes in male courtship intensity and androgen levels during brood cycling in the blennioid fish *Rhabdoblennius nitidus*
- Pheromones and body coloration affect mate recognition in the Japanese nine-spotted moth *Amata fortunei* (Lepidoptera: Arctiidae)
- Territory fidelity, space use, and survival rates of wild coyotes following surgical sterilization
- Male-biased sex ratio increases female egg laying and fitness in the housefly, *Musca domestica*
- Size-mediated dominance and aggressive behavior of male Japanese fluvial sculpin *Cottus pollux* (Pisces: Cottidae) reduce nest-site abundance and mating success of conspecific rivals
- The role of innate and environmental influences in shaping antipredator behavior of mainland and insular gartersnakes (*Thamnophis sirtalis*)
- Females may not obtain indirect genetic benefits from extra-pair paternity in vinous-throated parrotbills, *Paradoxornis webbianus*
- Barn swallow (*Hirundo rustica*) parents use past information to decide on food provisioning to the brood, but not to decide on allocation within the brood
- Physical attractiveness influences reproductive success of modern men
- Foraging behavior of golden hamsters (*Mesocricetus auratus*) in the wild
- Do displays and badges function in establishing the social structure of male toad-headed lizards, *Phrynocephalus vlengalii*?
- Effect of hind-limb autotomy on calling and hiding behavior in the band-legged ground cricket, *Dianemobius nigrofasciatus*
- Age-dependent changes in calling effort in the bell cricket *Meloimorpha japonica*
- Why do grebes cover their nests? Laboratory and field tests of two alternative hypotheses
- Vomeroneasal organ ablation elicits chemosensory dysfunction and abnormal behavior in mice
- Role of olfaction and vision cues in feeding behavior and alarm reaction in the catfish *pintado*, *Pseudoplatystoma corruscans*

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Journal OF NEUROSCIENCE

1. Sexual Behavior Activity Tracks Rapid Changes in Brain Estrogen Concentrations
2. FMRFamide-Like Neuropeptides and Mechanosensory Touch Receptor Neurons Regulate Male Sexual Turning Behavior in *Caenorhabditis elegans*
3. Interactions between Circadian Neurons Control Temperature Synchronization of *Drosophila* Behavior
4. Diminishing Risk-Taking Behavior by Modulating Activity in the Prefrontal Cortex: A Direct Current Stimulation Study
5. DLGS97/SAP97 Is Developmentally Upregulated and Is Required for Complex Adult Behaviors and Synapse Morphology and Function
6. Inhibition of Serotonin But Not Norepinephrine Transport during Development Produces Delayed, Persistent Perturbations of Emotional Behaviors in Mice

Behavioral Ecology and Sociobiology

1. Correlated evolutionary changes in *Drosophila* female genitalia reduce the possible infection risk caused by male copulatory wounding
2. Bateman gradients in a promiscuous mating system (DO YOU REMEMBER BATEMAN'S GRADIENT FROM INTRO?)
3. The role of male harassment on female fitness for the dengue vector mosquito *Aedes aegypti*
4. Evolution of the fast start response in the cavefish *Astyanax mexicanus*
5. Social competition masculinizes the communication signals of female electric fish
6. Leading from the front? Social networks in navigating groups
7. Cooperative web sharing against predators promotes group living in spider mites
8. Racial mixing in South African honeybees: the effects of genotype mixing on reproductive traits of workers
9. Giant pandas attend to androgen-related variation in male bleats
10. Singing activity stimulates partner reproductive investment rather than increasing paternity success in zebra finches