Tool Use in Free Ranging Cetaceans

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What is tool use? (Mann and Patterson, 2013)

"The conditional[1] external employment of an unattached or manipulable attached environmental object to alter more efficiently the form, position, or condition of another object, another organism, or the user itself, when the user holds and directly manipulates the tool during or prior to use and is responsible for the proper and effective orientation of the tool."

[1]purposively to achieve a goal

What is tool use? (Mann and Patterson, 2013)

"The conditional external employment of an unattached or manipulable attached environmental object[2] to alter more efficiently the form, position, or condition of another object, another organism, or the user itself, when the user holds and directly manipulates the tool during or prior to use and is responsible for the proper and effective orientation of the tool."

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[2]floating object vs. kelp, physical touch (Shumaker et al., 2011)

What is tool use? **(Mann and Patterson, 2013)**

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[3]modify object for appropriate use (Shumaker et al., 2011)

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[4]grasp or move objects (Shumaker et al., 2011)

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[5]purposeful relationship between object and goal (Shumaker et al., 2011)

Behavioral contexts of tool use in cetaceans

(Barber, 2016)

Play

- Objects thrown in air
- Objects draped around body
- Carrying object in mouth or on fin
- Pushing object around in water
- Throwing object to conspecific

Foraging

- Placing object over rostrum for foraging/protection of rostrum

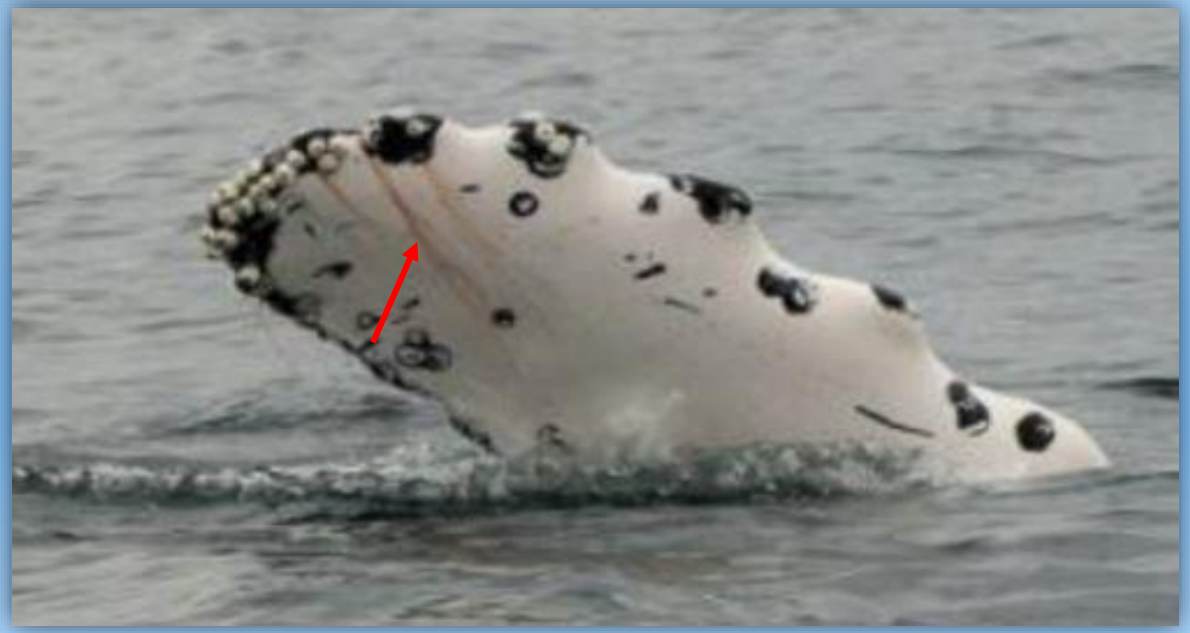
Social

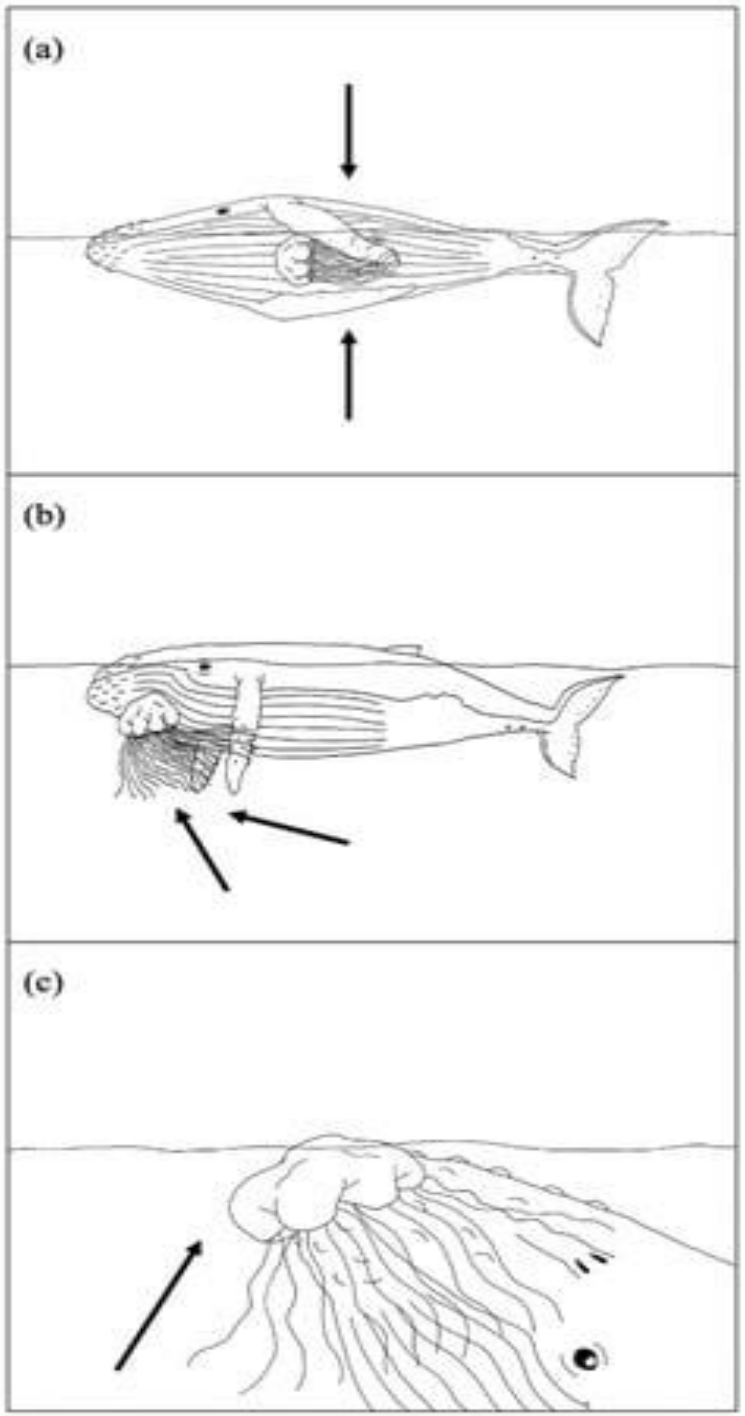
- Presenting objects
- Object in mouth in the presence of mix gender conspecific group
- Passing/tossing fish within pod

Humpback (*Megaptera novaeangliae*) use of lion's mane jellyfish (*Cyanea capillata*)

(Shea and Gallagher, 2021)

- Wound healing
- Ectoparasite removal
- Play

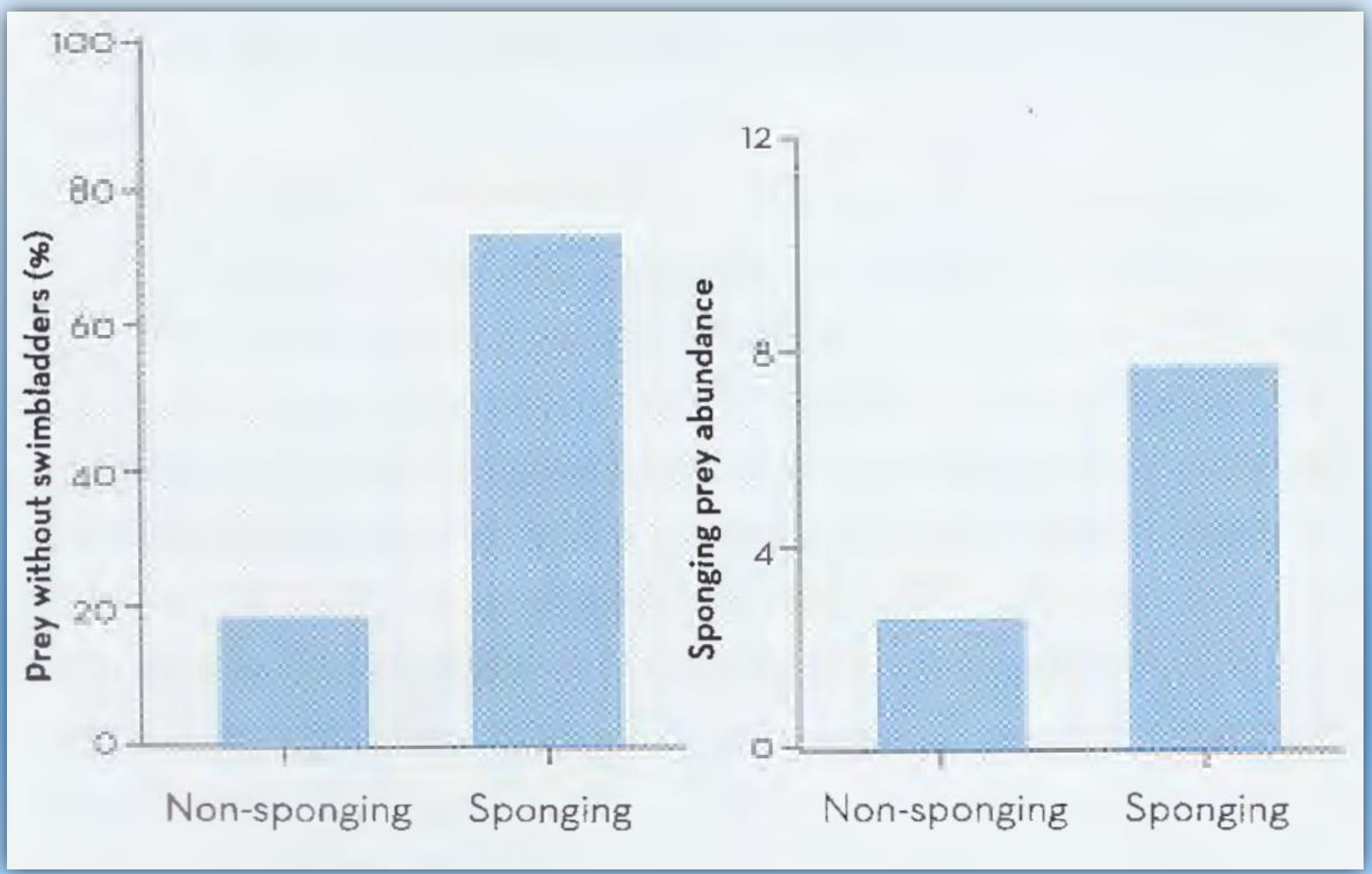




Sponging (Patterson and Mann, 2018)

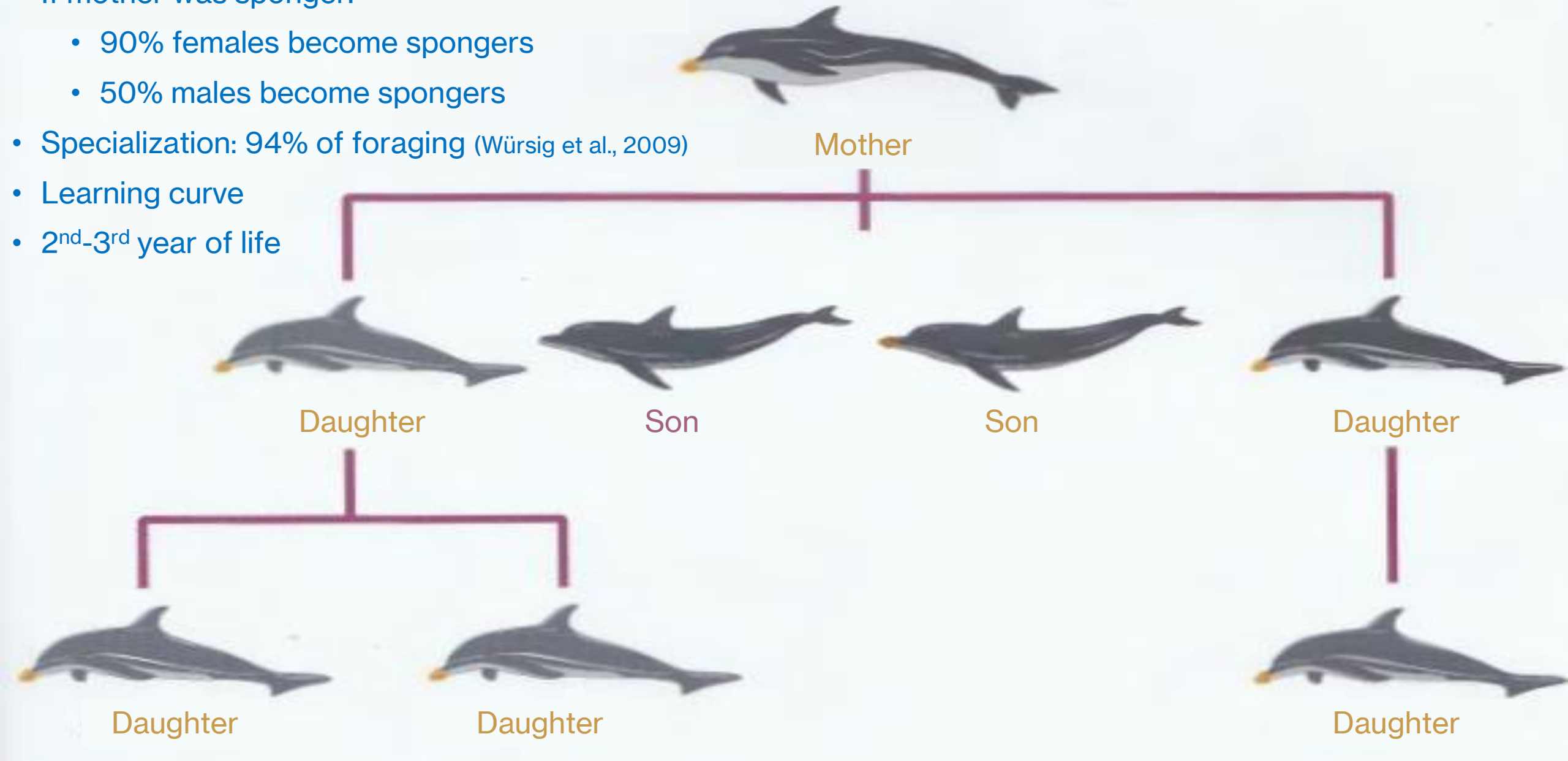
- Indo-Pacific humpback dolphin (*Sousa chinensis*)
- Australian humpback dolphin (*Sousa sahulensis*)
- Indo-Pacific bottlenose dolphin (*Tursiops aduncus*)
  - Shark Bay, Australia pop.
  - Intraspecific competition (Barber, 2016)
  - Forage
  - Protection (Mann and Patterson, 2013)
  - Swim bladder = echolocation

Sponging: Indo-Pacific bottlenose dolphin echolocation (Patterson and Mann, 2018)



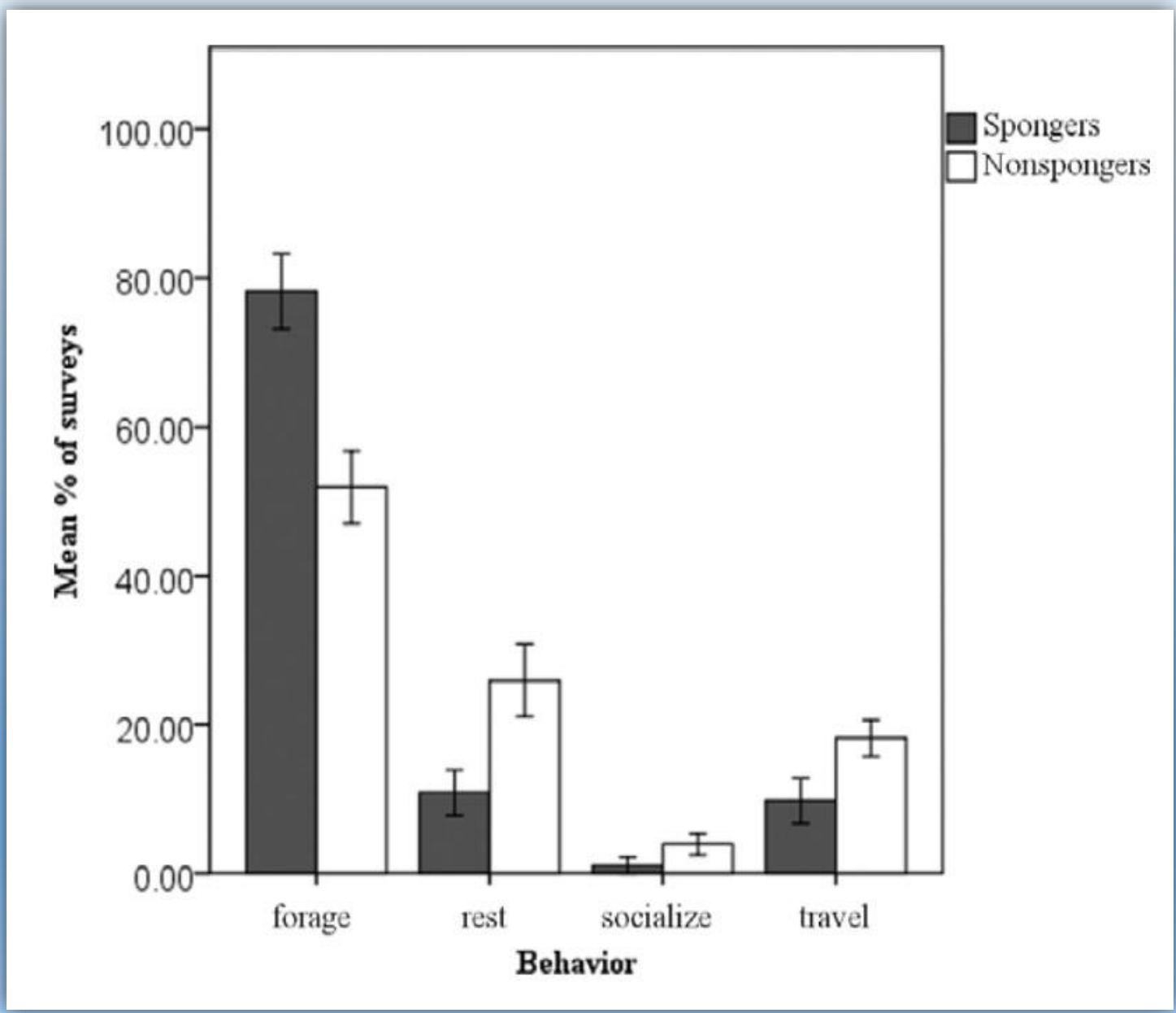
Sponging: a learned behavior (Patterson and Mann, 2018)

- If mother was sponger:
  - 90% females become spongers
  - 50% males become spongers
- Specialization: 94% of foraging (Würsig et al., 2009)
- Learning curve
- 2nd-3rd year of life



Sponging: prevalence of females>males (Kopps et al., 2014)

- Solitary females (Patterson and Mann, 2018)
- Sponges in deep waters >6 m (~20 ft)
- Protection from predators
  - Females with calves
- Males travel more than females
- Forage multiple habitats
- Males dominate females for resources



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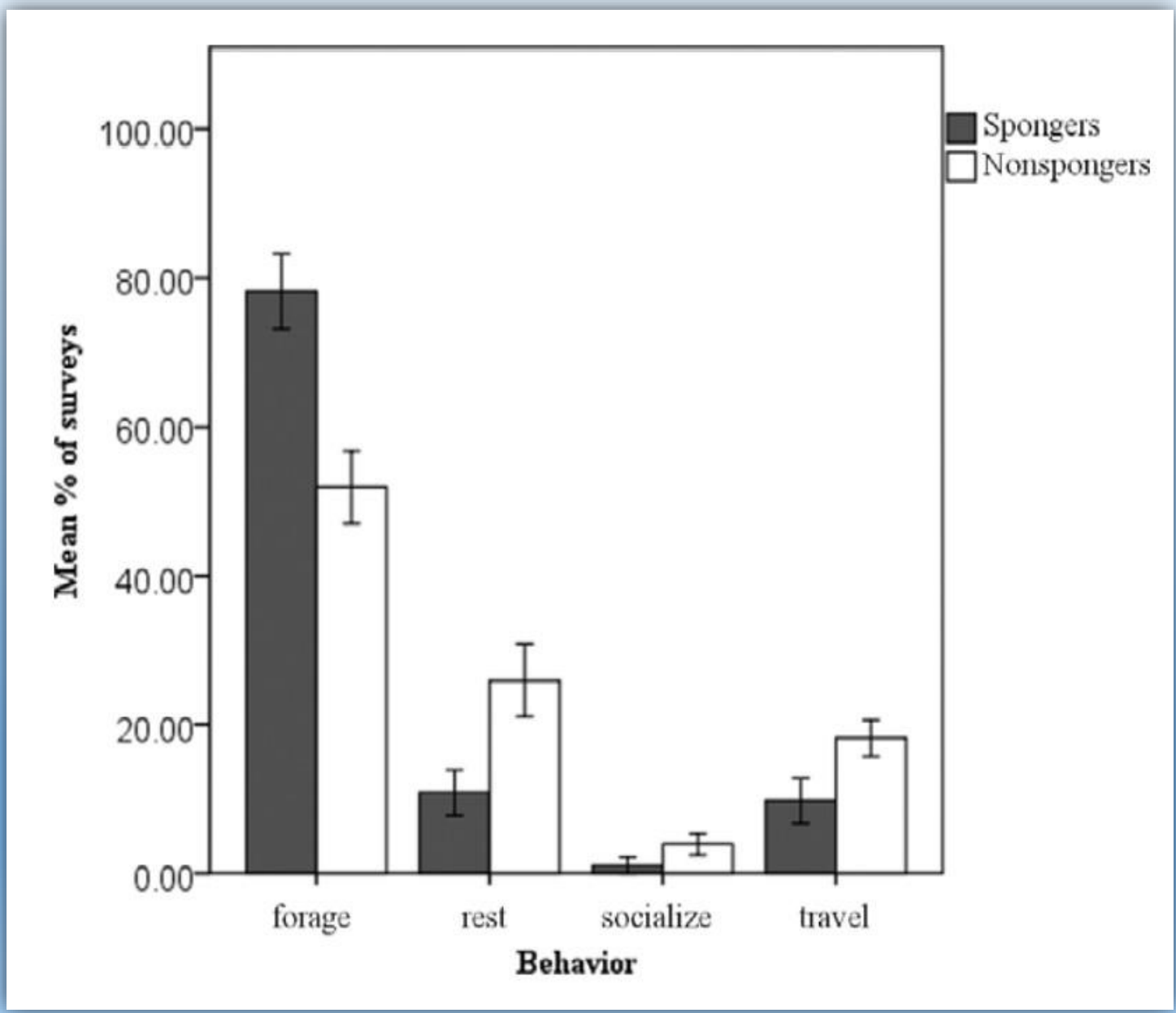
- Males travel more than females
- Forage multiple habitats
- Males dominate females for resources
- Sexual selection theory (Bizzozzero et al., 2019)
  - Males engage in behaviors to increase mating opportunities
    - Group mating (Galezo et al., 2018)
    - Females avoid males (Galezo et al., 2018)
  - Females invest in protecting offspring and access to resources



Conching/Shelling in the Indo-Pacific bottlenose dolphin

(Allen et al., 2011)

- Shark Bay pop.
- Learned behavior
- Mollusk absent
- Empty out water
- Obtain fish

(Patterson and Mann, 2018)

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(Patterson and Mann, 2018)

https://youtu.be/zzLwku4fxGE

Mate Attraction

(Patterson and Mann, 2018)

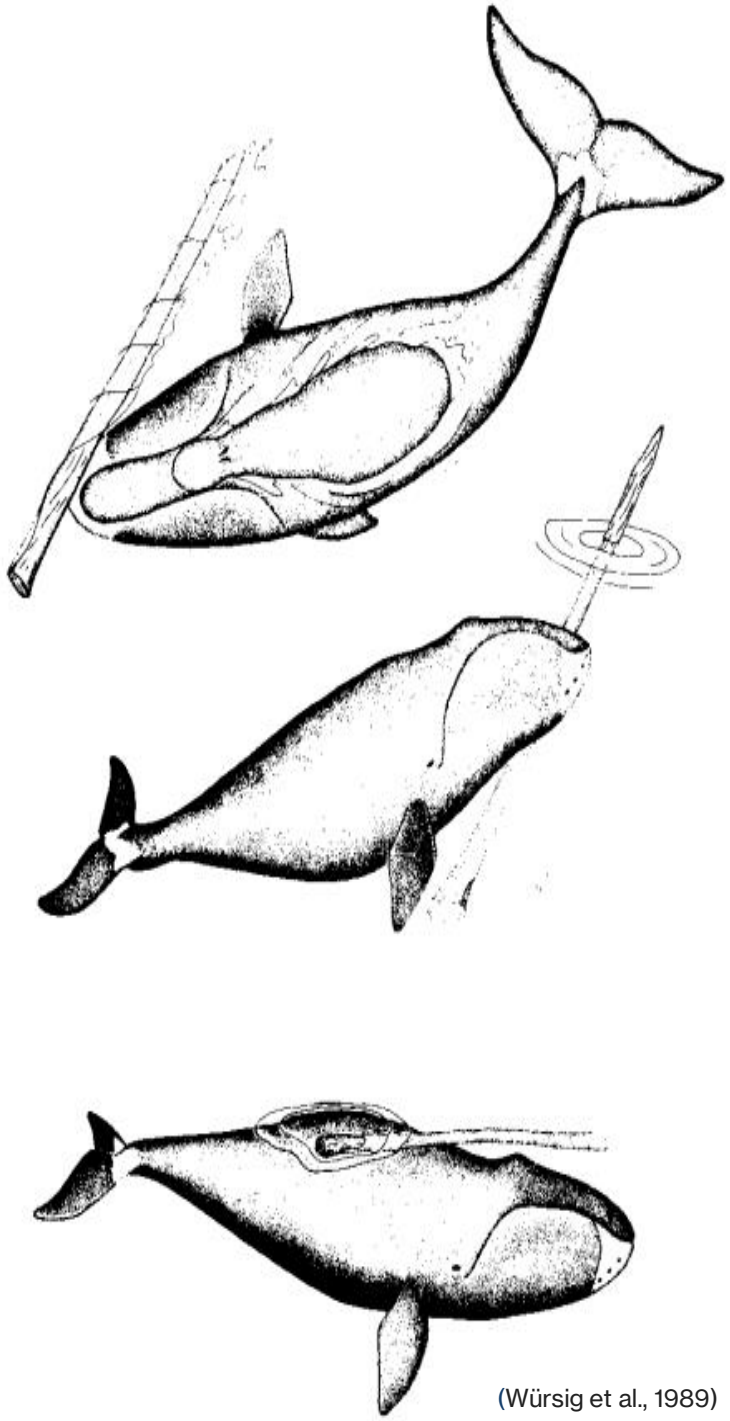
- Amazon river dolphin (*Inia geoffrensis*)
- Wave sticks, stones, and mud
- Adult males when adult females present

Object Play

Bowhead whale (*Balaena mysticetus*)

(Würsig et al., 1989)

- Nudge and push log
- Lift on back or fluke
- Clasp on belly



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Object Play

Bowhead whale (*Balaena mysticetus*) (Würsig et al., 1989)

- Nudge and push log
- Lift on back or fluke
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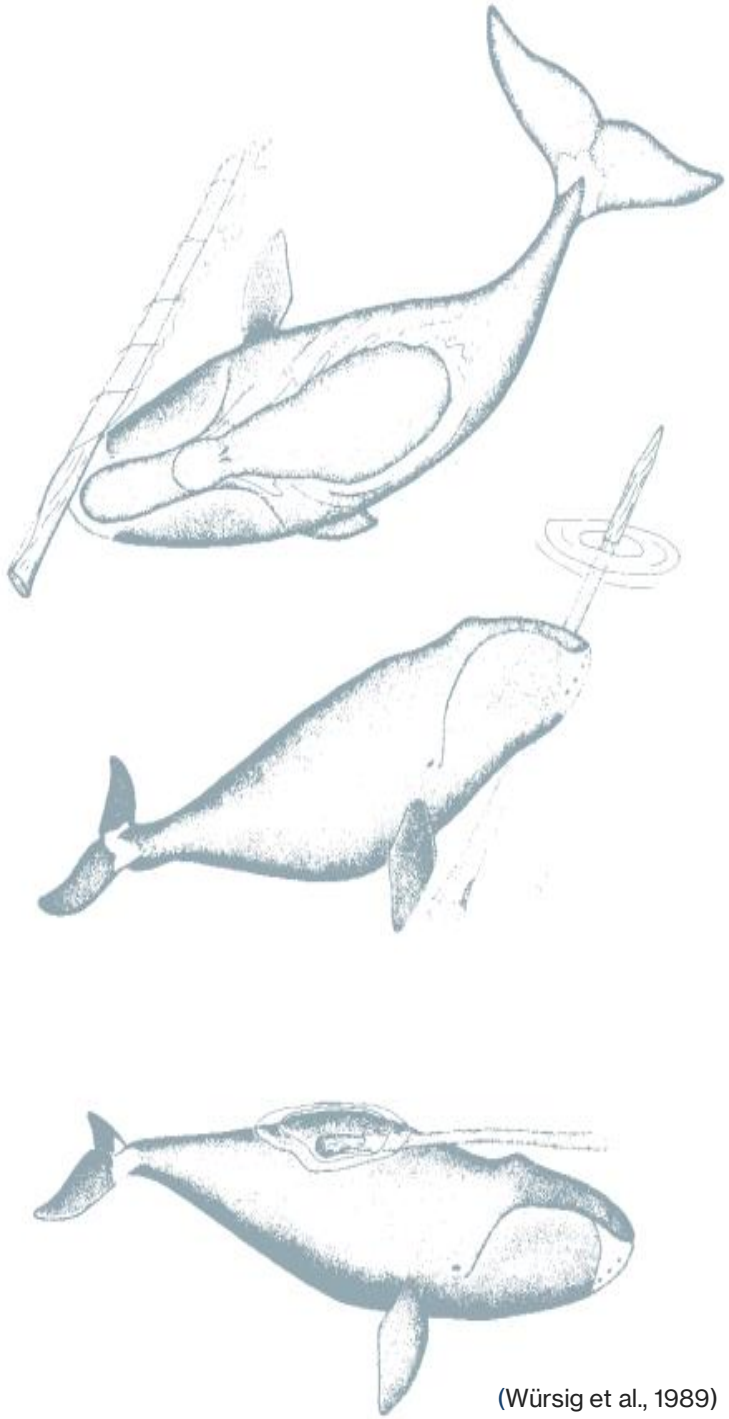
Humpback whale (Owen et al., 2012)

- Seaweed in mouth and roll
- Spy hop with seaweed
- Drape over pectoral fin
- Rubbing behavior: relation to jellyfish

https://youtu.be/Ytx1MFhsDQU?t=76



(Würsig et al., 1989)

© Shoal Hollingsworth

(Owen et al., 2012)

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