AP Bio FRQ Fridays

2018 #5
Biological Interactions

FRQ Friday #24

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Some birds, including great spotted cuckoos, lay their eggs in the nests of other birds, such as reed warblers. The warbler parents raise the unrelated chicks and provide them with food that would otherwise be given to their biological offspring. A researcher conducted an investigation to determine the type of relationship between warblers and cuckoos in an environment without predators. The researcher found that nests containing only warblers were more likely to be successful than nests containing warblers and cuckoos (data not shown). A successful nest is defined as a nest where at least one chick becomes an adult warbler.

In some geographic areas, several species of nest predators are present. Researchers have found that cuckoo chicks, while in the nest, produce a smelly substance that deters nest predators. The substance does not remain in the nest if cuckoo chicks are removed. Figure 1 shows the probability that nests containing only warblers or containing both warblers and cuckoos will be successful in an environment with predators. In a follow-up experiment, the researchers added cuckoos to a nest that contained only warblers (group 1) and removed cuckoos from a nest containing warblers and cuckoos (group 2).

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(a) **Describe** the symbiotic relationship that exists between the cuckoo and warbler in an environment without predators.

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Description (1 point)

- Cuckoos are parasites (of the warbler).
- The cuckoo benefits from the relationship, and the warbler is harmed by the relationship.

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a) without predators, cuckoos are helped by warblers because the warblers feed the cuckoo chicks. warbler chicks, on the other hand, are negatively effected because the warbler parents care less for their own chicks when cuckoos are present, and the warbler chicks get less food.

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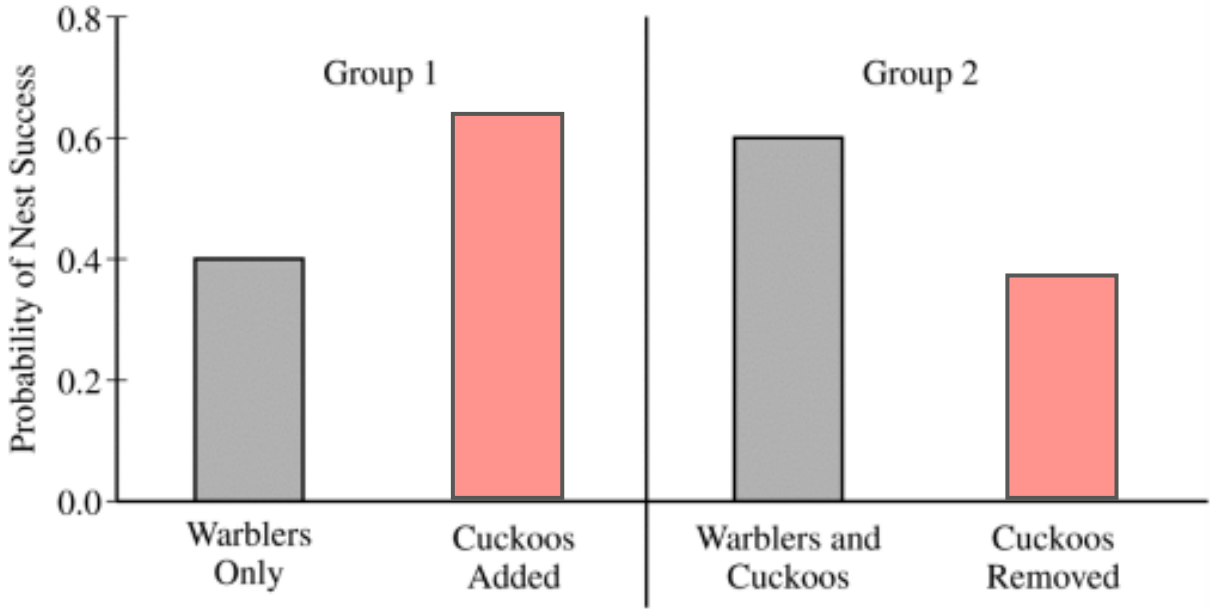
(b) On the template provided, **draw** bars in the appropriate locations to predict the relative probability of success for the nest in the presence of predators where:

- the cuckoos were added to the nest containing only warblers (group 1)
- the cuckoos were removed from the nest containing warblers and cuckoos (group 2)



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(b) On the template provided, **draw** bars in the appropriate locations to predict the relative probability of success for the nest in the presence of predators where:

- the cuckoos were <u>added</u> to the nest containing only warblers (group 1)
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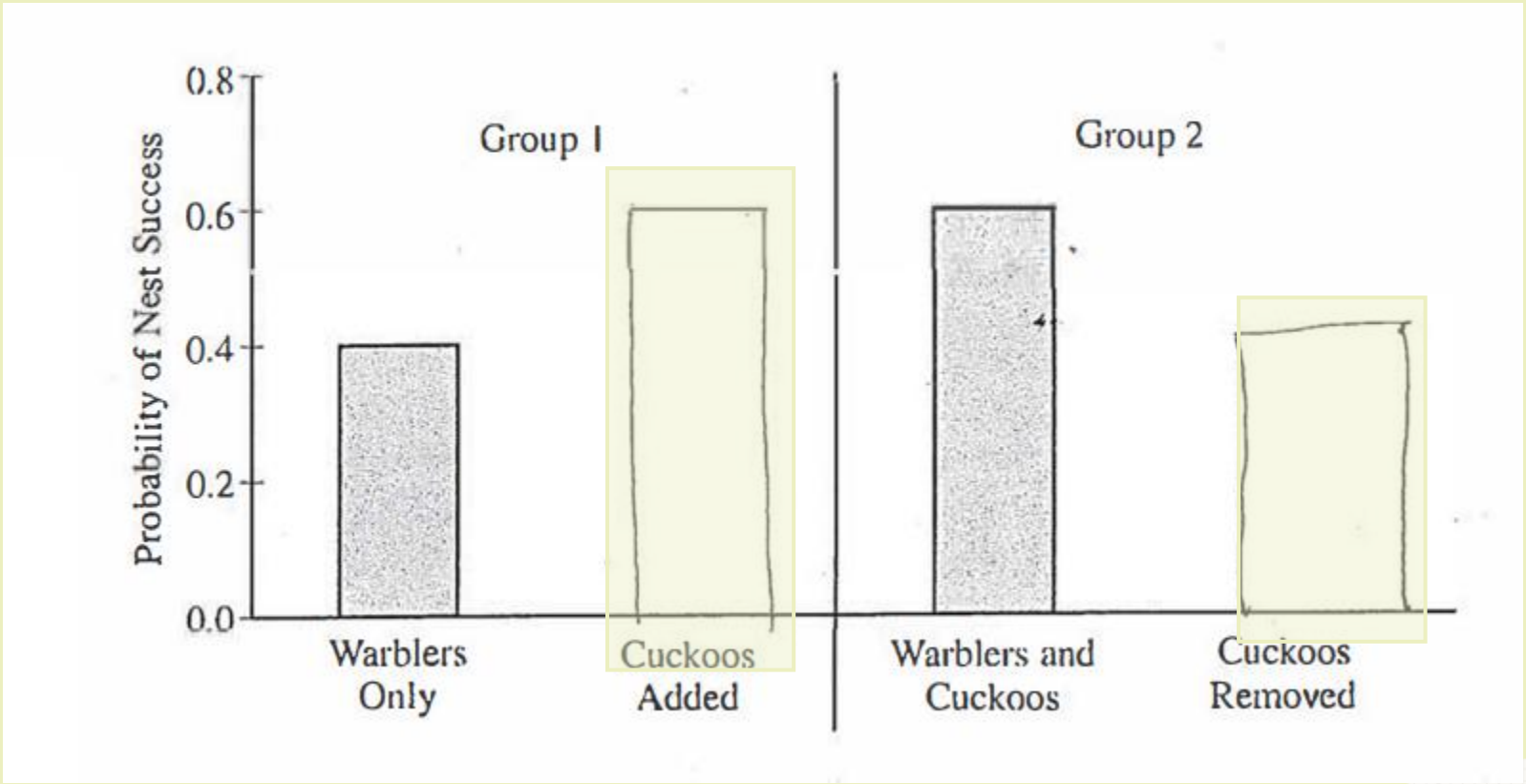

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(c) **Identify** the symbiotic relationship that exists between the cuckoo and the warbler in the presence of predators.

Identification (1 point)

- Mutualism
- Both organisms benefit

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(c) **Identify** the symbiotic relationship that exists between the cuckoo and the warbler in the presence of predators.

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- Mutualism
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c) when predators are present, the relationship between warblers and cuckoos is mutualistic.