


# 生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	狒狒透過群體妥協來保持一起行動 (Baboons stay together by making compromises as a group)
生物系統 LIVING SYSTEM	東非狒狒 <i>Papio anubis</i> (Olive baboons)
功能類別 FUNCTIONS	#透過自我組織維持群落協調 #Coordinate by self-organization
作用機制標題	狒狒透過分散式的決策及妥協來一起行動 (Baboons stay together through distributed decision-making and compromise)
生物系統/作用機制 示意圖	

## 作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)

東非狒狒在覓食時會組成大群的隊伍 (troops) 一起行動，牠們在陸地上移動時往往會互相跟隨。隊伍中包含了主導的雄性及雌性狒狒，牠們在隊伍中作出許多決策。有時會發生有一隻狒狒對一個區域的水果有興趣，而另一隻狒狒則想要在另一區域取食葉片的情況。因為牠們必須一直待在一起，狒狒是如何決定整個群組到底要跟隨哪一隻狒狒呢？有趣的是，這些具主導權的個體並不會決定隊伍要前往覓食的方向。相反地，隊伍的方向隨時隨地都由一組簡單的規則所決定。

如果兩隻領隊狒狒朝著不同方向前進，跟隨者狒狒 (follower) 就需要作出選擇。牠到底要跟隨其中一隻領隊狒狒 (leaders)，還是朝自己的方向前進呢？結果這被證實是取決於與兩隻領隊狒狒距離多遠。領隊狒狒們是在兩條直線的末端點上，並形成了一個角度，而跟隨者狒狒則是頂點 (vertex)，或是兩條直線的交叉點 (intersect)。如果三隻狒狒形成的角度大於 90 度，跟隨者狒狒會跟隨其中一隻領隊。如果角度小於 90 度，跟隨者狒狒則在兩者之間移動，因此在兩隻狒狒之間作出妥協。

因此，狒狒在牠們生活環境中的移動是一種持續性的妥協 (continuous compromise)。群組可能不會跟隨一個個體選擇的方向，但每個個體都可以影響群組的方向，或是被群組的方向影響。最重要的是，這個內在化決策規則 (internalized decision-making rules) 的系統使群組大部分個體保持一起行動。

Olive baboon troops travel together in large groups as they forage for food, and they tend to follow one another as they move across the land. The troops consist of dominant males and females that make many of the troop's decisions. Sometimes one baboon will be interested in fruit in one area, while another baboon may be interested in eating some leaves in another area. Because they must always stay together, how do baboons decide as a group which baboon to follow? Interestingly, these dominant individuals don't determine the direction the troop forages in. Instead, the troop's direction is shaped moment to moment by a set of simple rules.

If two leading baboons are heading in different directions, a follower baboon has to make a choice. Does it follow one of the leaders, or go in its own direction? It turns out that it depends on how far apart the two leading baboons are. Imagine there is an angle created between the two leading baboons and the follower. The leading baboons are the two points at the ends of the lines that make up the angle, and the follower is the vertex, or point where the two lines intersect. If the angle created between the three baboons is greater than 90 degrees, the follower baboon follows one of the leaders. If the angle is less than 90 degrees, the follower baboon moves in between the two baboons so that it splits the difference between them.

Hence, the movement of baboons through their environment is a continuous compromise. The group may not go where any one individual would choose, but each individual can shape, and be shaped by, the group's direction. Most importantly, this system of internalized decision-making rules keeps the group's many individuals together.

#### 文獻引用 (REFERENCES)

「在出現兩位發起者 (initiators) 的情況中，當兩位發起者的方向形成大於約 90 度時，跟隨者 (followers) 會一貫地選擇其中一個方向，但當這個角度低於 90 度的閾值 (threshold) 時，跟隨者則會在兩者之間作出妥協。」 (Strandburg-Peshkin et al. 2015: 1360)

“In events with two initiators, followers consistently choose one direction or the other when the angle between the initiators' directions is greater than approximately 90°, but they compromise when the angle falls below this threshold...” (Strandburg-Peshkin et al. 2015: 1360)

#### 參考文獻清單與連結 (REFERENCE LIST)

Strandburg-Peshkin, A., D. R. Farine, I. D. Couzin, and M. C. Crofoot. (2015). Shared decision-making drives collective movement in wild baboons. *Science* 348: 1368-1361. (<https://science.sciencemag.org/content/348/6241/1358>)

#### 延伸閱讀

生物系統延伸資訊連結 (LEARN MORE ABOUT THE LIVING SYSTEM/S)

[https://en.wikipedia.org/wiki/papio\\_anubis](https://en.wikipedia.org/wiki/papio_anubis)

[https://www.onezoom.org/life/@papio\\_anubis](https://www.onezoom.org/life/@papio_anubis)

<https://eol.org/pages/2925214>

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<https://asknature.org/strategy/baboons-stay-together-by-making-compromises-as-a-group/>