台大杜鵑花節錯覺展：科學的藝術與藝術的科學
下條信輔教授暨台大師生聯合特展
Close Encounter – Illusions where science meets art
Shinsuke Shimojo's work in collaboration with National Taiwan University
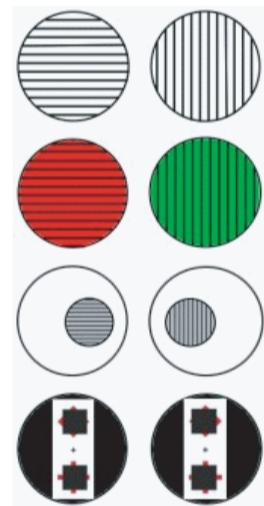
立體視覺與
雙眼競爭

**STEREOPSIS &
BINOCULAR RIVALRY**

要做什麼？

請將同組不同樣式的兩張片子（如下圖所示）放入藍色鏡蓋中，有圖案的一面朝向蓋內，將鏡蓋旋緊於鏡口，過程中請保持片子背面的線段為水平，以確保呈現圖案的正確性。將兩相連的鏡筒儘量貼近兩眼，使得一隻眼睛僅能看到其中的一種圖案，觀看一段時間後，你看到了什麼？

【本作品由陳馨梅製作】

What to do?

Insert a set of two slides (with patterns as in the following figures) into the blue caps with the patterns facing inside. Turn the caps and fix them on the bottles. To ensure that the patterns are in the right orientation, be sure to keep the lines in the back of slides in the horizontal position. Watch inside the bottles from the opening side with one eye for each bottle for a period of time. What happens?

(This demonstration was produced by Hsin-Mei Chen)

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發生了什麼事？

由於我們的雙眼彼此分離，其中並有一小段的距離，因此在一般的生活情境中，來自兩眼的影像訊息會有些許的不同，如此些微的差異便是所謂的"像差"。當大腦將來自兩眼的影像融合在一起時，藉由像差而形成了深度知覺，這便是"立體視覺"產生的過程。

當兩眼接收完全不同的影像時，大腦便無法將來自左右眼的影像融合在一起，相反地，接收來自其中某一眼訊息的視覺神經元會交相抑制，使得視覺系統交替地壓制來自某一眼的影像並接收另一眼的影像，這樣的現象被稱為"雙眼競爭"。

更多嘗試與體驗

* 你能依據圖案的特徵，在觀看前就猜到會看到「立體視覺」或「雙眼競爭」嗎？
* 你能運用這些原理，創造出其他有趣的影像嗎？

What's going on?

Our two eyes are separated by a small distance. As a result, there is a small difference the images from the two eyes. The tiny difference is called disparity. Our brain relies on disparity to construct a depth percept when it fuses images from both eyes. This process is called stereopsis.

When two eyes are presented with completely different stimuli, the brain can no longer fuses left and right eye images. Instead, visual neurons receiving input from each eye tend to inhibit each other. As a result, the visual system alternately suppresses image from one eye and perceives the other. This phenomenon is called "binocular rivalry."

Other things to try

* Take a guess based on the characteristic of the sets of patterns. Either "stereopsis" or "binocular rivalry" will occur, before you view the images?
* Can you create other interesting images with these principles?

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