Body Posture and Viewing Angle Modulate Detectability in a Poison Frog and Batesian Mimic

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Aposematic signals warn predators that prey should be avoided due to dangerous secondary defences. However, as warning signals do not produce perfect avoidance, warning colours evolve as a trade-off balancing signal saliency against predator detection. For Batesian mimics, which display salient signals but lack secondary defences, the costs of predator encounters are greater, potentially increasing the benefit of crypsis. This raises the question of whether mimicked signals should evolve to be less salient than model signals, such that imperfect mimicry reduces detectability while retaining mimetic efficacy. Using simulated predator vision and screen-based human detection trials, we tested this “Cryptic Imperfection” hypothesis with the poisonous frog *Ameerega bilinguis* and Batesian mimic *Allobates zaparo*. We further test the effect of body posture and viewing angle on signal salience and detectability. We found that both species incorporate camouflage into their warning colours, but to different degrees depending on viewing angle and posture behaviour. We find differential detectability between model and mimic that does not perfectly adhere to a hypothesis of a cryptic mimetic phenotype. Our results suggest that imperfect mimicry can be an adaptive trait that balances defensive strategy with other signalling functions.