Do floral forces affect flower choice in bumblebees?

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Many melittophilous flowers use pollination mechanisms that rely on the physical force of their pollinators. In the genus *Salvia,* the evolutionary significance of the floral force is largely unknown. To push away the nectar restricting barrier generated by levered anthers, the pollinator needs to exert a specific amount of force. The lever forces differ between the sage species (0.5-10 mN) and are generally not high enough to exclude small bee species *(Apis mellifera:* 15 mN). However, the effect of varying lever forces on flower choice has never been tested. Therefore, we asked whether bumblebees (*Bombus terrestris)* – among the main pollinators of *Salvia* – are influenced in their behaviour by the force they have to overcome when searching for nectar. Due to their strict energy balancing, we hypothesized that bumblebees would prefer to visit flowers with lower lever forces if given the choice between different forces. To diminish the influence of other floral traits, we constructed artificial sage flowers with adaptable lever forces. We first trained bumblebees to learn the handling of those artificial flowers. Then we allowed single individuals to choose among flowers with weak levers (2 mN) and flowers with strong levers (10 mN). We observed the number of flowers per group visited over time. Our results provide interesting insights into the cost-benefit ratio in bumblebees.