

Social structure, opportunistic punishment and the evolution of honest signaling

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Abstract

We have three program files that produced all of the results we discuss in the paper. All are iPython Jupyter Notebook files. The names are: `wasps_replicator_11-single_caste.ipynb`, `wasps_replicator_11.ipynb`, and `dothegraphics.ipynb`. The main code is in `wasps_replicator_11.ipynb`, with the first file simply modified for convenience for running the case in which every agent has the same caste. The results here were obtained in order to assure the conclusion that social hierarchy is influencing the results. The third file, `dothegraphics.ipynb`, accesses the data in the .csv files produced by the first two files. Because this is straightforward we include the here, but do not discuss it further. So, our protocol amounts to little more than: put the files in the right directory structure, open the notebook file, edit it to set the desired parameter values (defaults are given), and run it. We note that the iPython Notebook files have been given extensive annotation for the sake of documentation. The right directory structure is this:

```
codeandoutputs/
```

```
    code/
```

```
    outputs/
```

And the three code files mentioned above (the *.ipynb files) go into the code/ directory and are run from there.

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