**Experiment with all tiles heating together\***

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| Measurement | Description | Matlab |
| Minute | Minute of experiment: *indicated by LED* | TrackerAnalysis\_HeatMaps\_V17\_170304.m  Output file: group\_perflydata.csv |
| X and Y position | Location of fly per minute | TrackerAnalysis\_HeatMaps\_V17\_170304.m  Output file: group\_perflydata.csv |
| Mean speed | Speed per minute per fly | TrackerAnalysis\_HeatMaps\_V17\_170304.m  Output file: group\_perflydata.csv |
| Bouts of activity | Minute of experiment, frame, speed, and duration | Output file: group\_perfly\_bouts.csv |
| **Errors in tracking** | How often is the fly lost and for how long | Indicate per phase how many times a fly was lost, which fly, and for how long each time  Could be based on 'jumps' in the movement due to speed or distance  We are already eliminating anything faster than 12cm/s |
| Closeness | Average distance between flies | Average distance of the whole group of flies per phase |
| Group size | Number of flies under specific distance | Must be able to indicate the maximum distance to be considered part of the group  Must be able to indicate the amount of seconds within one phase that flies need to be under the maximum distance to be considered part of group  **--- Do they touch each other?? (manual) - just need the flag of when**  **--- Angle of interaction - males follow, females face to face** |
| Identity correction | Correction for fly identity | We need a manual correction for tracking errors:  - If two IDs are switched we could just ask to switch back automatically  - If more than two IDs are switched we need a manual intervention -- is it possible to create a program in which we could do this nicely |
| Leader fly | If a fly moves before the others | Per phase indicate if a fly moves before the others  Is this fly the same in all phases (ID needed)?  Do other follow the fly? Can be done manually if we identify which phases have a leader |
| **Direction of tracks** | Similarity between tracks followed per phase -- only when they move (threshold speed) | Do all flies follow one another or do they move in separate patterns?  Is there a non conformist - fly whose path is different than others? (We need ID) |

\* There are more measurements in this Matlab file (stops, borders), but we do not need them.

**Experiment with different temperature among tiles**

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| --- | --- | --- |
| Measurement | Description | Matlab |
| Phase number | Dependent on tile order; *the LEDs change every 1 minute approx.* | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Safe tile | 0-all tiles; 1-left; 2-middle; 3-right | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Time to move | Time to start moving in s | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Time in safe location | Time in safe tile in seconds | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Time in previously safe | Time in previously safe | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Time in unsafe | Time in unsafe before reaching safe tile | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Average speed | Speed per phase per fly | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Speed in safe | Average speed in safe tile per fly | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Speed previously safe | Average speed in previous safe per fly | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Speed unsafe | Average speed in unsafe before reaching safe | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Distance | Total distance walked per phase | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Distance to safe | Total distance travel | TrackerAnalysis\_Shifting\_V1\_170304.m  Output: Condition\_mean.csv |
| Errors in tracking | How often is the fly lost and for how long | Indicate per phase how many times a fly was lost, which fly, and for how long each time  Could be based on 'jumps' in the movement due to speed or distance  We are already eliminating anything faster than 12cm/s |
| Closeness | Average distance between flies | Average distance of the whole group of flies per phase |
| Group size | Number of flies under specific distance | Must be able to indicate the maximum distance to be considered part of the group  Must be able to indicate the amount of seconds within one phase that flies need to be under the maximum distance to be considered part of group |
| Leader fly | If a fly moves before the others | Per phase indicate if a fly moves before the others  Is this fly the same in all phases (ID needed)? **I can color this fly manually**  Do other follow the fly? Can be done manually if we identify which phases have a leader |
| Direction of tracks | Similarity between tracks followed per phase -- only when they move (threshold speed) | Do all flies follow one another or do they move in separate patterns?  Is there a non conformist - fly whose path is different than others? (We need ID) |

**Output files:**

- All measurements in cm/s or amount of occurrences per minute

- All measurements per fly (to do individual analysis)

- All measurements in group as average per group (one group can count as one individual for analysis comparing group size)

**Red LEDs**: They will indicate the phase (minute or other) of the experiment always and one of them will always be on. The phase is based on the LEDs because the 60s duration is not always precise (varies between 1796-1804 frames), so all the measurements per phase are based on the LED change already.

-- We now create all the summary tables using R (R\_4Mar17.Rdm): We always summarize per minute

**Color code:**

Green: We have it

Red: We need it and it is the most important

Orange: We need it but it is of secondary importance -- would make things much better but it is only worth it if we can have it done in October (not if it requires more time)