**Pillbug Orientation Lab**

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**Adapted from: Granger and De la Mater 2022**

Instructions:

1. **0° degree is facing the board, 180° is facing the back of the room.** Each tick mark on your arena is 10°. Turn your lamp on. **You will leave the lamp on for three animals (experimental group) and then turn the lamp off for three animals (control group).**
2. Place the experimental arena at the center of your table. Put the pillbug in the center of the arena and cover it with a plastic cup. Keep the cup on top of your pillbug for about 30 seconds.
3. Make sure the lamp is on. Then, carefully remove the cup, trying not to disturb the animal. Allow the pillbug to move towards the edge of the circle. Once it crosses the circle, mark the location that it crossed the boundary with your pen to the nearest 10.
    a. *It's OK if a few of your bugs don't respond at all – this is normal with behavioral experiments! Just move on to the next bug if they haven't moved in 1 min.*
4. Record the angle that each pillbug crossed the boundary to the nearest 10° in the table below. Remember that these are the experimental individuals (Pillbugs 1 – 3). Then, calculate the relative angle as the crossing angle – lamp position.

| **Pillbug #** | **Group** | **Angle** |
|---|---|---|
| 1 | Experimental | |
| 2 | Experimental | |
| 3 | Experimental | |
| 4 | Control | |
| 5 | Control | |
| 6 | Control | |

5. Repeat steps 2-4 for two more experimental animals.

6. We still need to collect control data. For the final three individuals, we will perform the exact same experiment but with the lamp off.
7. Turn off your lamp.
8. Place one pillbug in the center of the table with the arena in the same orientation as before.
9. Carefully remove the cup.
10. Allow the pillbug to move towards the edge of the circle. Once it crosses the circle, mark the location that it crossed the boundary with your pen to the nearest 10.
11. Record the angle that each pillbug crossed the boundary to the nearest 10° in the table above. Remember that these are the control individuals. Then, calculate the relative angle as the crossing angle – lamp position.
12. Repeat steps 6 – 11 for the final animal.
13. Once you have data for all 6 animals, we will aggregate data from the entire class. On the board, we have started two columns: Group #, Light Conditions (on/off), Angle.
14. We will now go through the data analysis using R Shiny