SMELLING PARKINSON'S DISEASE

INTRODUCTION

As reported by the Washington Post, Joy Milne of Perth, UK, smelled a "subtle musky odor" on her husband Les that she had never smelled before. At first, Joy thought maybe it was just from the sweat after long hours of work. But when Les was diagnosed with Parkinson's 6 years later, Joy suspected the odor might be a result of the disease.

Scientists were intrigued by Joy's claim and designed an experiment to test her ability to "smell Parkinson's." Joy was presented with 12 different shirts, each worn by a different person, some of whom had Parkinson's and some of whom did not. The shirts were given to Joy in a random order and she had to decide whether each shirt was worn by a Parkinson's patient or not.

1. Why would it be important to know that someone can smell Parkinson's disease?

   - Early research
   - Could lead to figuring out what causes it.
   - Early detection

2. How many correct decisions (out of 12) would you expect Joy make if she couldn't really smell Parkinson's and was just guessing?

   6, she has a 50/50 chance of guessing correctly. The person does or does not have Parkinson's.

3. How many correct decisions (out of 12) would it take to *convince* you that Joy really could smell Parkinson's?

   A lot, 10, 11 or 12 possibly.

SIMULATING THE EXPERIMENT

Although the researchers wanted to believe Joy, there was a chance that she may not really be able to tell Parkinson's by smell. It's logical to be skeptical of claims that are very different than our experiences. If Joy couldn't really distinguish Parkinson's by smell, then she would just have been guessing which shirt was which. The researchers were not willing to commit time and resources to a larger investigation unless they could be convinced to that Joy's wasn't just guessing. To investigate the idea that Joy was just guessing which shirt was worn by which type of person, we will begin by assuming that Joy was just guessing.

Why is this important?

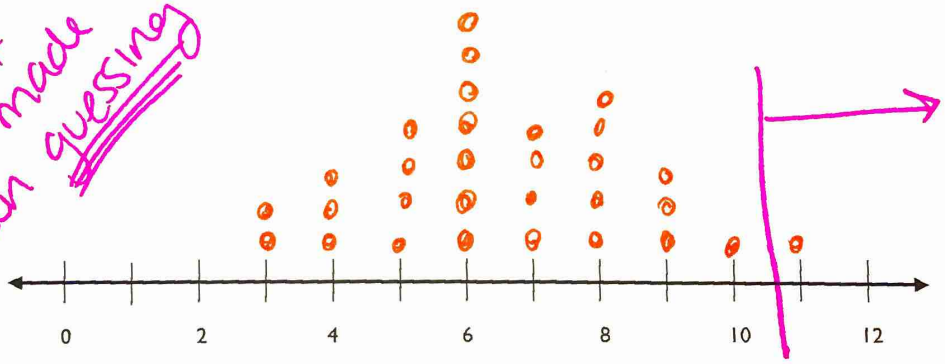
4. Mrs. Gallas will hand you 12 cards (shirts) that have been shuffled into a random order. Don't turn them over yet! On the back of some of them is "Parkinson's" and on the back of others is "No Parkinson's." For each card, guess Parkinson's or No Parkinson's. Once you have made your guess, turn the card over and see if you were correct. Repeat this for each card and record the number of correct identifications (out of 12) below.

Each person should complete a set of 12

Tally of correct identifications	Number of correct identifications	Proportion of correct identifications
~~HH~~ |	6	6/12 = 0.5

5. Create a dotplot of the number of correct identifications with the rest of the class. Record the results below.

What does each dot represent? Number of correct ID's made by a person guessing



6. In the actual experiment, Joy identified 11 of the 12 shirts correctly. Based on the very small-scale simulation by you and your classmates, what proportion of the simulations resulted in 11 or more shirts correctly identified, assuming that the person was guessing?

1/30 = 0.03

How many dots are 11 & 12?

Are you convinced? What would convince you?