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Quantitative Reasoning Lesson plan- Correlations and Psychology of Aging

This is my lesson from last year, a simpler (though not simple) version of the one that I posted for this year. The idea is to develop an understanding of linear relationships- direction, strength, and what it means when two variables are correlated (causation? Third variables? Etc.). This would be a project that would take some time, involving both in-class instruction and work, as well as work that the students do on their own outside of the classroom. A note: some students will have had stats, others will not have, at this point.

1. First day of the lesson: In-class
   1. An introduction to the ideas of correlation and scatter plots:
      1. Instruction: Today we'll be thinking about the idea of correlation, and learning one way to graph data points to look for correlations. … (I'd discuss the importance of understanding correlations in the context of the class, since a lot of what we are looking at is changes related to aging, and introduce the broader assignment of data collection and analysis that we'd be doing as individuals and as a class.) First we'll be creating a graph called a scatter plot- to get you started thinking about relationships between two variables and how they can be visually demonstrated
      2. As a class, I'd have them create a scatterplot on the board. Something simple that they can each put one point up for- for example, shoe size and height, and have one of the students draw a line in the data that seems to represent the data points
         1. Then we'd discuss the visual that this creates- the linear relationship, and discuss positive vs. negative relationships and strength- questioning them as such:
            1. What does the scatterplot seem to show us?
            2. As the line goes diagonally up from bottom left to top right, what does that mean? (explain that this is called a positive correlation)
            3. What is the line and how it's situated among the data points show us? What would it mean if the data points were all closer to or further away from the line?
            4. I'd introduce the idea of Pearson's r- explain that there is a number that describes these two points- strength and direction)
      3. Then might be start discussing variables that might be related to age. I'd have them brainstorm a lot of different variables, ask them about the relationship between the variables and age (list them on the board and have the students say whether they think each variable increases or decreases with age). I'd direct them to some degree here- ask them about

technology, recreation, social interaction, health- to get the variables I'll want them examining up on the board.

1. I'd then pick a few (that I'd had planned to pick, of course!) and pass out a short survey for them to take home to collect data with – for example (variables below subject to change based on my plans for the semester). We'd start broadly discussing what we thought we might find when we collected the data. What are our hypotheses about the relationships between age and the other variables ? Why? Does aging cause these changes, or is something else happening? After the class decides on its hypotheses, we might also examine why the reverse might happen.

Age category	Age	Internet use- days per week	Alcohol use – days per week	Exercise- days per week
20s				
20s				
30s				
30s				
40s				
40s				
50s				
50s				
60s				
60s				
70s				
70s				
80s				
80s				
90s				
90s				

1. At home data collection- I'd have students attempt to collect data from 1-2 people in each decade from 20s-90s, as possible (they'd be given a lot of time and some pointers to do this)
2. In class: Once data collection is complete, we'd meet and examine the data (I may have them enter their data into a google spreadsheet and send it to me before the class, so that I could compile the data and look it over. As a class we'd create a scatterplot for each of the variables (perhaps the first variable step by step, so they can see the scatter plot coming together, maybe even make guesses about the relationship between the variables as the data began to come together, then the remaining variables more quickly to save time).
   1. We would discuss the scatter plots- what is the direction? Strength? Based on just looking at the scatterplot

2. Then we would conduct (in software- excel or SPSS) Pearson's correlation coefficient and we would discuss the meaning of the number. Is it positive/ negative? Strength? Can we get an idea of that information when looking at the scatter plot?
3. In class (hopefully same day, or next class): Discuss reasons for the relationships between age and these variables. Have them brainstorm, come up with more causal reasons, third variable reasons, and detail what these relationships might mean for health and cognitive aging (we'd continue to come back to some of these correlations during the course of the semester, as these variables come up again)
4. At home: students will be asked to find news articles and research articles (one of the variables (internet, alcohol, or exercise) and bring to class- students asked to highlight any correlations discussed and any graphs given. They would send me these in advance, and I'd pick a few
5. In class: We would examine some of these articles, specifically discussing those with scatterplots (and other graphs) and those with Pearson's correlation coefficients, to deepen their understanding of correlations.