By
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QuickStart Data Science Bootcamp
Boston city Experiment

Assuming that I am a city planner of Boston city. First let's explore this city a little bit. It is the capital and most populous city of the Common Wealth of Massachusetts. In 2019, Boston was estimated to have 692,600 residents living in 266,724 households, a 9% population increase over 2010. The city is the third-most densely populated large U.S. city of over half a million residents, and the most densely populated state capital.

Every single resident of this city must require a little or big home as per his need. As T.S Eliot said, "Home is where one starts from...". When you think of a dwelling space, it has to be cozy and comfortable. Moreover, it must be designed in a way that can help you and your family live happily & comfortably.

Does the perfect house exist? Yes, it does. Combine these ideal features with the personalized wants, and the perfect house is ready. Every house is indeed unique. Our homes are supposed to be the perfect representation of ourselves- personality, style, and class. Being the city planner of Boston city, I want to add up some new features to each census tract. Those features are:

- Green features
- Outdoor living areas
- Sunroom
- Pool
- Low maintenance exterior
- Garage with storage
- Walkability
- Security

Now to explore the effects of above included features, I have designed a survey keeping in mind the psychology of the people providing data and their demand characteristics.

Survey

1. Does an Ideal home practically exist?

   ☒Yes

   ☐No

   ☐Maybe

2. What is your average household family income per month?

   ☐Below 3000$

   ☐3000-5000$

   ☐5000-8000$

   ☐Above 8000$

3. Number of Adults in your family?

   _____

4. Number of kids in your family?

   _____

5. How much do you love nature? (Rate on the scale of 1 to 10, 1 = least and 10 = most)

   _____

6. Where you spend most of your home time?

   ☐Living area

   ☐Kitchen

   ☐Bedroom

   ☐Bathroom

7. Gardening as a hobby? (Rate on the scale of 1 to 10, 1 = least and 10 = most)

   _____

8. Do you prefer to have a cup of coffee with your loved one outside your home sitting in a cozy environment?

   ☐Definitely!

   ☐Not at all!

   ☐Not sure.

9. Patio or deck for the home?

   ☐A big Yes!

   ☐Not interested.

10. Spending a nice warm afternoon with nature appeals you!!! (Rate on the scale of 1 to 10, 1 = least and 10 = most)

    _____

11. Do you consider Sunlight is necessary for healthy life?

☐Extremely important

☐Moderately important

☐Not really important

12. Do you love to play with water?

☐I just love it!

☐Boring!

☐I don't know

13. Do you like swimming?

☐Yes!

☐No

☐I can't swim

14. How much amount can you spend on the maintenance of your home?

☐Below 100$

☐100-500$

☐500-1000$

☐Above 1000$

15. Do you have a car?

☐One

☐Two

☐More than two.

16. Do you need any storage space in your home?

☐Yes, definitely.

☐May be

☐I don't need one.

17. Do you prefer yoga or brisk walk?

☐Yoga

☐Brisk walk

☐Other

_____

18. If you select brisk walk in previous option, then which of the following will you choose?

☐Treadmill

☐Sidewalk tracks

19. How easy it would be for someone to break in or enter your home unnoticed?

☐Impossible

☐Not sure

☐Easily

20. Which is more secure?

☐Home with security alarms and cameras

☐Separate colony of houses surrounded by walls

Data Analysis

For the analysis of the above survey, keeping in mind that I have to consider the smallest effect size I would care to be able to detect, I set effect size to 0.8 with the power of 80% or 0.8 (minimum desired level). Sample size can be calculated from tt_ind_solve_power function in the statsmodels.stats.power Python package.

```
[20]  1  tt_ind_solve_power(effect_size=0.2, nobs1 = None, alpha=0.05, power=0.8, ratio=1,
         alternative='two-sided')
```

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393.4056989990351
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The required sample size per group is 394 people, which means total 788 people must be required to perform above survey analysis, and then the results will be significant.