Mandm project report

Science, Mathematics

M&M Project report Introduction. As a quality control manager at Masterfoods plant, I wrote this report containing all the five parts of M&M project. The first part of the paper discusses the sampling method I used in the research. I bought three M&M bags and recorded the samples in an excel worksheet. The second part is the calculation of sample proportions for each bin: mean of candies, creating the Histogram, compute descriptive statistics, and later summarized the information (Larson & Farber 96). The third part, I located confidence interval of 95% for the total candies in the bin. The fourth part is tested analysis for each bin's percentage. The last part is the quality control where testing if the ratio of candies in each bin are equal. The paper discusses methods, analysis and results of each part of the project (Larson & Farber 37). The report presents the statistical data from M&M investigation. Additionally, the paper contains mean of candies found in each bag. Testing was conducted to ensure that the set proportions are on target. Consequently, hypotheses were done to ascertain that the proportions are also on target.

Part 1.

I collected three M&M 1. 69 Oz PLAIN M&M candy bag. We counted each color of the candy bag and recorded the total information on a worksheet. The personal samples for the researchers were combined to come up with complete random samples. Each researcher purchased a 1. 69Oz bag of plain M&M candy from different shops (Larson & Farber 66). The random sampling method used was to make sure each bag had an equal chance of being selected. Buying the 1. 69Oz bags of plain M&M candy ensured a true sample of the bags. After buying the bags were emptied and the number of

each candy color was recorded. The results were tabulated as one, in a worksheet.

Part2.

In this section of the project report, I calculated the proportion of samples for each product color. Additionally, I calculated the mean number of 69Oz bags of plain M&M candies (Larson & Farber 74). I created a Histogram for the candies per bag and summarized the number of calculating proportion. I also calculated the sample SD. Histogram's explanation was also provided.

Sample proportions:

I sampled 343 candies. Their proportions based on color were as shown below.

Color

Number

Proportion

Blue

79

0. 23

Orange

75

0. 22

Green

58

0. 17

Yellow

41

0. 12

Red

45

0. 13

Brown

45

0. 13

Total

343

Blue: 79, Orange: 75, Green: 58, Yellow: 41, Red: 45, and Brown: 45

Table:

Bin

Midpoint (x)

Frequency (f)

fx

x^2

F (x^2)

1-2

1. 5

5

7. 5

2. 25

11. 25

3-4

3. 5

25

87. 5

12. 25

306. 25

5-6

5. 5

27

148. 5

30. 25

816. 75

7-8

7. 5

46

345. 0

56. 25

2587. 50

9-10

9. 5

54

513. 0

90. 25

4873. 50

11-12

11. 5

63

724. 5

132. 25

8331. 75

13-14

13. 5

27

364. 5

182. 25

4920. 75

15-16

15. 5

23

356. 5

240. 25

5525. 75

17-18

17. 5

11

192. 5

306. 25

3368. 75

19-20

19. 5

4

78. 0

380. 25

1521. 00

21-22

21. 5

4

86. 0

462. 25

1849. 00

23-24

23. 5

0

0. 0

552. 25

0. 00

25-26

25. 5

3

76. 5

650. 25

1950. 75

27-28

27. 5

8

220. 0

756. 25

6050. 00

29-30

29. 5

3

88. 5

870. 25

2610. 75

31-32

31. 5

0

0. 0

992. 25

0. 00

33-34

33. 5

3

100. 5

1122. 25

3366. 75

35-36

35. 5

6

213. 0

1260. 25

7561. 50

37-38

37. 5

3

112. 5

1406. 25

4218. 75

39-40

39. 5

7

276. 5

1560. 25

10921. 75

41-42

41. 5

9

373. 5

1722. 25

15500. 25

43-44

43. 5

8

348. 0

1892. 25

15138. 00

45-46

45. 5

4

182. 0

2070. 25

8281. 00

Total

41. 5

343

4894. 5

1722. 25

109711. 75

Mean

(4894. 5/343)

14

Estimated Mean

(109711. 75/343)

319. 8593294

Variance

(319. 8593-14^2)

123. 8593294

SD

Sqrt (Variance)

11. 12921064

Part 3:

I constructed a confidence level of 95% for the proportion of all colors. Additionally, I constructed the means' confidence level. I also calculated the smallest sample size needed to calculate the confidence interval of 95% for blue candies having a margin error of 4% (Larson & Farber 73). Using the Confidence interval Science calculator at the link http://www. mccallum-layton. co. uk/stats/ConfidenceIntervalCalc. aspx. I found the following results.

Blue: (0. 21, 0. 24), Orange: (0. 20, 0. 23), Green: (0. 15, 0. 18), Yellow: (0. 12, 0. 14), Red: (0. 12, 0. 14), Brown: (0. 12, 0. 145)

Mean: (13. 52, 14).

Part 4:

I tested the distribution of color in the candies. The following results were noted.

Color

Hypothesis1(Claim)

Hypothesis2

z

Decision

Comment

Evidence

Blue

0. 24

≠ 0. 2

-2. 36

Reject

True proportion is not 0. 24

Sufficient

Orange

0. 20

≠ 0. 20

2. 75

Reject

True proportion is not 0. 20

Sufficient

Green

0. 16

≠ 0. 16

1. 07

Fail to reject

True proportion is not 0. 16

Insufficient

Yellow

0. 14

≠ 0. 14

-1. 57

Fail to reject

True proportion is not 0. 14

Insufficient

Red

0. 13

= 0. 13

-0. 1041

Fail to reject

True proportion is not 0. 13

Insufficient

Brown

0. 13

= 0. 13

0. 19

Fail to reject

True proportion is not 0. 13

Insufficient

Mean

≤12

> 12

. 0000

Reject

Will contain more than 12 candles

Sufficient

H0

H1

X2test

X2crit

Decision

Comment

Bonus

≥ 1. 5

< 1. 5

155

47. 45

Fail to reject

At 5% significance level Evidence is not enough to support SD claim.

Part 5:

I tested the hypothesis the proportion of red and brown if their population is

equal.

H0

Ha

X1

N1

P1

X2

N2

P2

P-bar

z

Zcrit

(Rejected region)

Decision

Comment

P1= p2

P1≠p2

45

343

0. 13

45

343

0. 13

. 13

-0. 21

-1. 96 & 1. 96

| z| > 1. 96

Fail to reject the null

No evidence to reject the claim

Quality control

I investigated if some of the color were off the target. I ascertained the plants setting to make sure no alterations were made. Any anomalies in the mixing or bagging is realized, it may cause variations in their proportion (Larson & Farber 75). During the bagging process, M&M is prone to spill. Consequently, the plant may stop working. Therefore, the machine may need service or replacement. I would recommend for constant service of the machine, in order for the company its set standards.

Conclusion.

My investigation was a success. The average number of candies was greater than 13. The proportion of colors is on target. The Histogram gave me an easier understanding of the results. The analyses have enabled me to learn

that the proportion of M&M is on target.

Reference

Larson, R., & Farber, B. Elementary statistics. Picturing the world. 4th ed.: N

J: 2009. Print.