Standard Test 003

SCP-1162

Invariem

Intermediate Researcher, Scientific Department, Level 2

July 13, 2024

Test Information

NB: *Two attempts were made, as the first attempt was cut short by rioting CD, the second spectator was killed.*

Attempt 1

Class-D:

- xJackTR
- roadkillr2

Combatives:

- Fes1d, Security Specialist, Security Department, Level 2
- Audacious_F3llow, Sigma-9 Sgt, Mobile Task Force: Sigma-9 "Valkyries", Level 2

Spectators:

- jaydennbmt, Level 2
- Lancerrv, Level 2

Attempt 2

Class-D:

- queencupcake99998
- Kreemex

Combatives:

- MrPotatOfficial, Security Sentinel, Security Department, Level 2
- Audacious_F3llow, Sigma-9 Sgt, Mobile Task Force: Sigma-9 "Valkyries", Level 2

Spectators:

- Lancerrv, Level 2

1 Question

What is the statistical distribution of SCP-1162's output items, and the frequency of which they are obtained?

2 Hypothesis

Considering my previous research on SCP-1162, I understand that SCP-1162 outputs a supposedly random selection of items, of which there is a discrete number of. I believe that we will see a uniform probability distribution, with the probability of obtaining any item being equal to any other. This can be expressed as the following:

> A continuous random variable **X** is said to have a *Uniform* distribution over the interval $[a, b]$, if its PDF is given by
>
> $$f(x) = \begin{cases} \frac{1}{b-a} & a < x < b \\ 0 & x < a \text{ or } x > b \end{cases}$$

We will have n items, and so a PDF graph will typically look something like this:

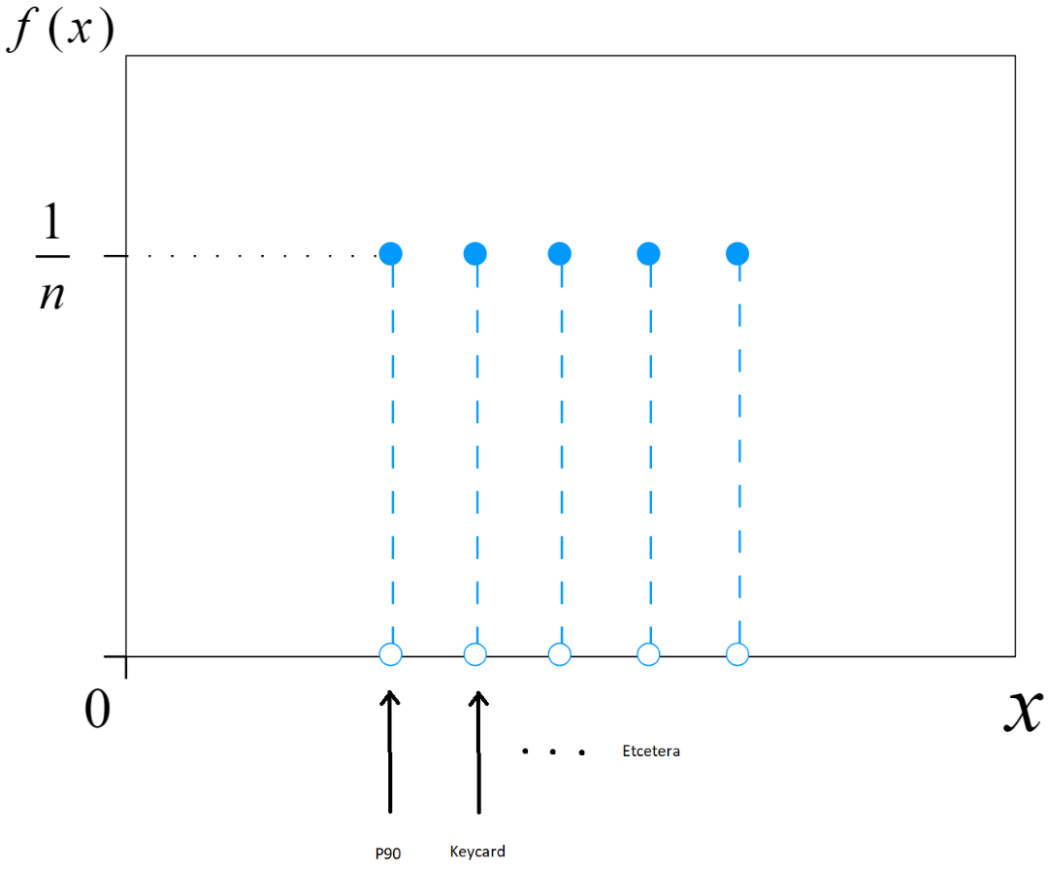

Figure 1: Discrete uniform PDF

There is another possibility here, and it may be that some items are *weighted*; meaning that they have a higher probability to appear than others. This would not be any specific statistical distribution, and would need to be modelled using a discrete random variable. This usually looks something like this:

x	0	1	2	3	4	5
$\Pr(X = x)$	0.02	0.13	0.38	0.17	0.05	0.25

Figure 2: Table form of a discrete random variable with no specific distribution.

3 Procedure

3.1 CDC

I will begin by requesting my test in accordance with the on-site testing procedures format; posting myself at the relevant TSTA. I will request 2 Class-D (CD) and 1 Security Department (SD) personnel. I will prepare my recording software to capture the required evidence necessary for the report. I will now inform the SD to brief the 2 CDs if not already briefed.

3.2 MD

I will instruct the escort to take us to the Medical Department, in order to obtain a lollipop. This is essential, as every Class-D will be issued a lollipop as the item that SCP-1162 will transform into various weaponry and items.

3.3 CZ

At the scanners, I will obey orders from combative personnel through the containment zone scanners and request the MTF escort mandated by the AOS, request all items be removed from the Class-D with the exception of the lollipop and subsequently make my way to SCP-1162. I will instruct one CD to interact with SCP-1162 until they reach a sensible number of reports (20, 30, or more). I will do this for the remaining Class-D, **ensuring to obtain at least 30 readings, as this is vital for my analysis.** Should any Class-D riot occur or general disobedience, I will speak with my combative escort and confide in them for protection. Should any Class-D attempt to fire upon the escort as we move to disarm them at the scanners following the end of the test, I will report to a safe area whilst the combative escort issues relevant orders and secure the area.

4 Conclusion

For this analysis, I will be conducting the following statistical analysis:

- Using a Chi-Squared test for goodness of fit of a discrete uniform distribution.

Here is the summarised data in the form of a bar chart:

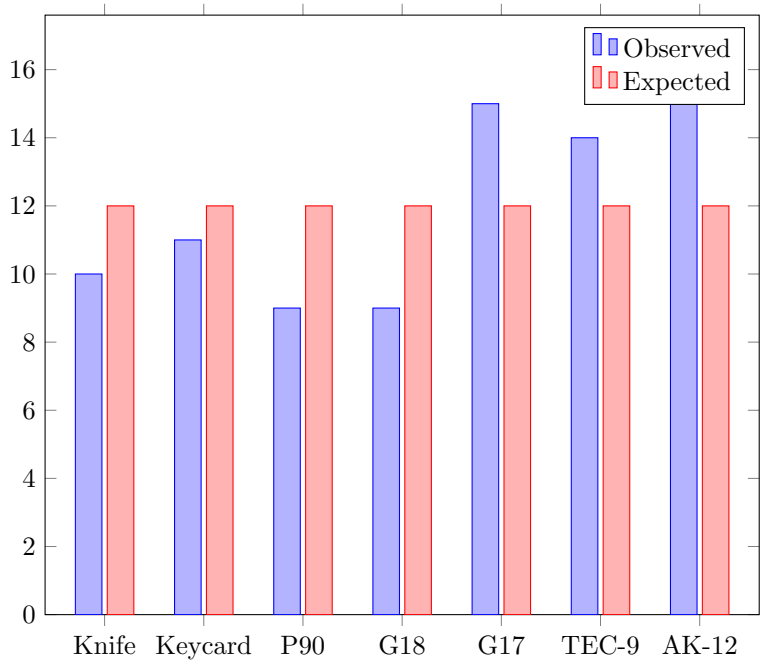

Figure 3: Bar chart of collected sample of 84 items, where the observed data is plotted against the expected amount (this was obtained by $\frac{\text{sample}}{\text{amount of items}}$)

We can use a Chi-Squared test for goodness of fit in order to determine if my model of a discrete uniform distribution is appropriate:

H_0 : The data can be modelled by a discrete uniform distribution.
H_1 : The data cannot be modelled by a discrete uniform distribution.

Item	Observed	Expected	Chi-Sq Contribution $\frac{(O-E)^2}{E}$
Knife	10	12	0.333333 ($\frac{1}{3}$)
Keycard	11	12	0.083333 ($\frac{1}{12}$)
P90	9	12	0.75
G18	9	12	0.75
G17	15	12	0.75
TEC-9	14	12	0.333333 ($\frac{1}{3}$)
AK-12	16	12	1.333333 ($\frac{4}{3}$)

Table 1: Table showing observed values, expected values and their chi-squared contributions.

We will use the sum of the chi-squared contributions to calculate our test statistic, where: $\chi^2 = \sum \frac{(O-E)^2}{E} = 4.333$ (3.d.p)

- Degrees of freedom $\nu = n - 1 = 6$
- Test statistic $\chi^2 = 4.333$
- Critical value (95%) = 12.592

Conclusion:
Test statistic (4.333) is less than the critical value (12.592). Therefore, at the 5% significance level, strong evidence to reject H_0 in favour of H_1. Strong evidence to suggest that the data can be modelled by a discrete uniform distribution. (the items come out randomly, all same probability)