Final Project

September 8, 2023

1 Final Project Data Analysis

1.0.1 Libraries

[1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

1.0.2 Functions

[2]:
```
# standard deviation filter
def filt(arr,mean,n):
    limit = mean + n * np.std(arr)
    i = 0
    for t in arr:
        if (limit < t ):
            arr = np.delete(arr,i)
            i -= 1
        i += 1
    return arr
```

1.1 Participant 1

1.1.1 Read in Data

[3]:
```
p1_zero_dist_raw = pd.read_csv("p1_0.csv",sep=',')
p1_zero_dist_raw = p1_zero_dist_raw.to_numpy()
p1_one_dist_raw = pd.read_csv("p1_1.csv",sep=',')
p1_one_dist_raw = p1_one_dist_raw.to_numpy()
p1_two_dist_raw = pd.read_csv("p1_2.csv",sep=',')
p1_two_dist_raw = p1_two_dist_raw.to_numpy()

#only want reaction time
p1_zero_dist = p1_zero_dist_raw[:,0]
p1_one_dist = p1_one_dist_raw[:,0]
p1_two_dist = p1_two_dist_raw[:,0]
```

1.1.2 Trial Means

[4]:
```
# Mean
p1_d0_mean = np.mean(p1_zero_dist)
p1_d1_mean = np.mean(p1_one_dist)
p1_d2_mean = np.mean(p1_two_dist)
print("The mean reaction of participant #1 with zero distractions: "
      + str(round(p1_d0_mean ) ) )
print("The mean reaction of participant #1 with one distraction: "
      + str(round(p1_d1_mean ) ) )
print("The mean reaction of participant #1 with two distractions: "
      + str(round(p1_d2_mean ) ) )
```

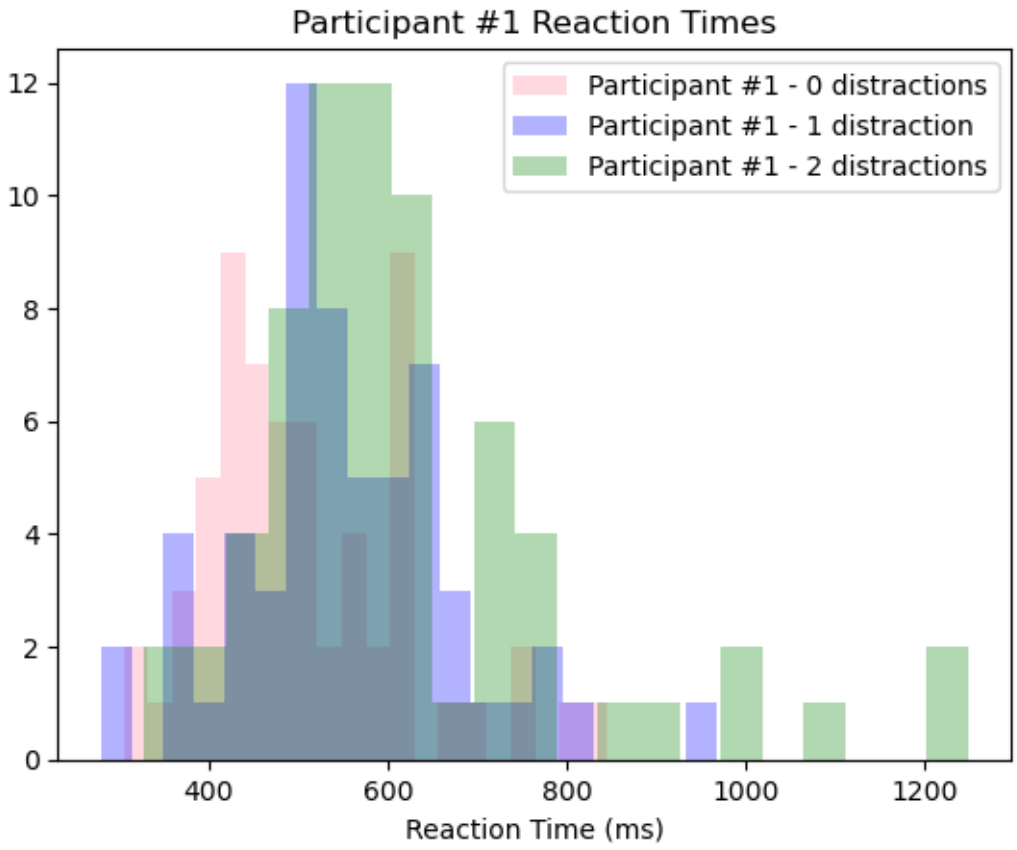
```
The mean reaction of participant #1 with zero distractions: 521
The mean reaction of participant #1 with one distraction: 553
The mean reaction of participant #1 with two distractions: 620
```

1.1.3 Histogram

[5]:
```
p1_zero_filt = filt(p1_zero_dist,p1_d0_mean,4)
p1_one_filt = filt(p1_one_dist,p1_d1_mean,4)
p1_two_filt = filt(p1_two_dist,p1_d2_mean,4)

plt.hist(p1_zero_filt, bins = 20, alpha = 0.6,
         label = "Participant #1 - 0 distractions", color = "pink")
plt.hist(p1_one_filt, bins = 20, alpha = 0.3,
         label = "Participant #1 - 1 distraction", color = "blue")
plt.hist(p1_two_filt, bins = 20, alpha = 0.3,
         label = "Participant #1 - 2 distractions", color = "green")
plt.title("Participant #1 Reaction Times")
plt.xlabel("Reaction Time (ms)")
plt.legend()
```

[5]:
```
<matplotlib.legend.Legend at 0x7fac7cf62200>
```



1.2 Participant 2

1.2.1 Read in Data

[6]:
```
p2_zero_dist_raw = pd.read_csv("p2_0.csv",sep=',')
p2_zero_dist_raw = p2_zero_dist_raw.to_numpy()
p2_one_dist_raw = pd.read_csv("p2_1.csv",sep=',')
p2_one_dist_raw = p2_one_dist_raw.to_numpy()
p2_two_dist_raw = pd.read_csv("p2_2.csv",sep=',')
p2_two_dist_raw = p2_two_dist_raw.to_numpy()

#only want reaction time
p2_zero_dist = p2_zero_dist_raw[:,0]
p2_one_dist = p2_one_dist_raw[:,0]
p2_two_dist = p2_two_dist_raw[:,0]
```

1.2.2 Trial Means

[7]:
```
# Mean
p2_d0_mean = np.mean(p2_zero_dist)
p2_d1_mean = np.mean(p2_one_dist)
p2_d2_mean = np.mean(p2_two_dist)
print("The mean reaction of participant #1 with zero distractions: "
      + str(round(p2_d0_mean ) ) )
print("The mean reaction of participant #1 with one distraction: "
      + str(round(p2_d1_mean ) ) )
print("The mean reaction of participant #1 with two distractions: "
      + str(round(p2_d2_mean ) ) )
```

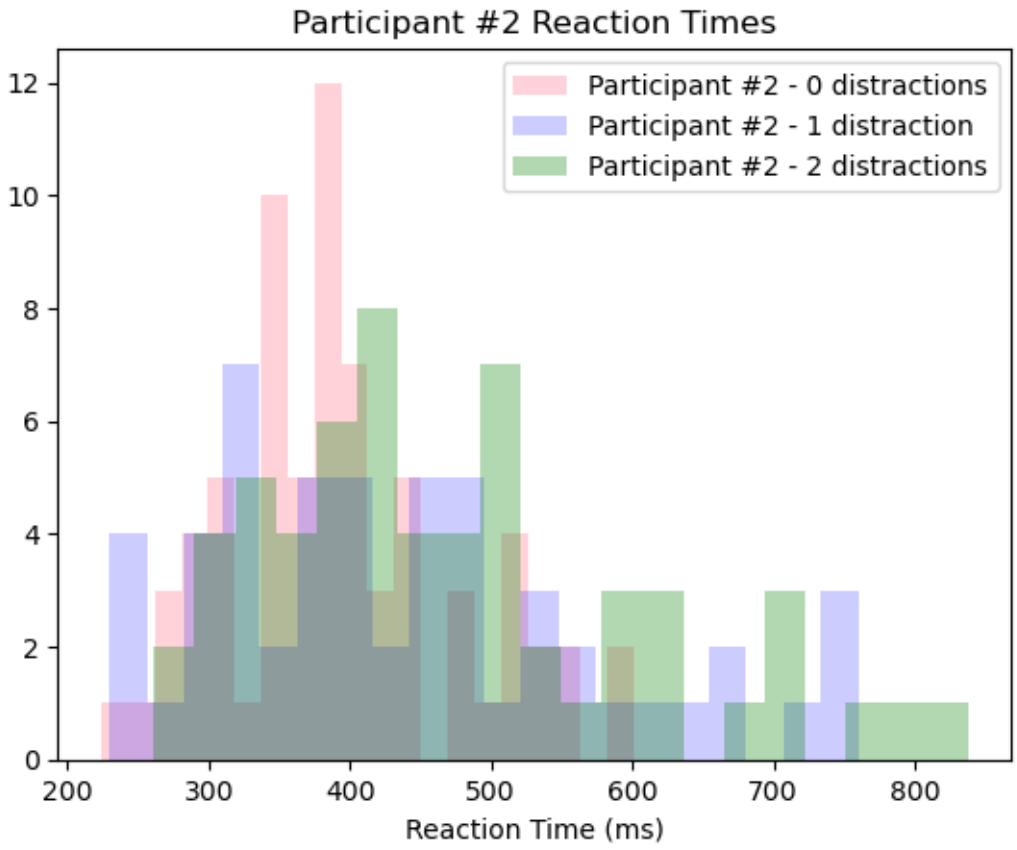
```
The mean reaction of participant #1 with zero distractions: 405
The mean reaction of participant #1 with one distraction: 480
The mean reaction of participant #1 with two distractions: 485
```

1.2.3 Histogram

[8]:
```
p2_zero_filt = filt(p2_zero_dist,p2_d0_mean,2.2)
p2_one_filt = filt(p2_one_dist,p2_d1_mean,2.2)
p2_two_filt = filt(p2_two_dist,p2_d2_mean,2.3)

plt.hist(p2_zero_filt, bins = 20, alpha = 0.7,
         label = "Participant #2 - 0 distractions", color = "pink")
plt.hist(p2_one_filt, bins = 20, alpha = 0.2,
         label = "Participant #2 - 1 distraction", color = "blue")
plt.hist(p2_two_filt, bins = 20, alpha = 0.3,
         label = "Participant #2 - 2 distractions", color = "green")
plt.title("Participant #2 Reaction Times")
plt.xlabel("Reaction Time (ms)")
plt.legend()
```

[8]:
```
<matplotlib.legend.Legend at 0x7fac7ce0acb0>
```



1.3 Participant 3

1.3.1 Read in Data

[9]:
```
p3_zero_dist_raw = pd.read_csv("p3_0.csv",sep=',')
p3_zero_dist_raw = p3_zero_dist_raw.to_numpy()
p3_one_dist_raw = pd.read_csv("p3_1.csv",sep=',')
p3_one_dist_raw = p3_one_dist_raw.to_numpy()
p3_two_dist_raw = pd.read_csv("p3_2.csv",sep=',')
p3_two_dist_raw = p3_two_dist_raw.to_numpy()

#only want reaction time
p3_zero_dist = p3_zero_dist_raw[:,0]
p3_one_dist = p3_one_dist_raw[:,0]
p3_two_dist = p3_two_dist_raw[:,0]
```

1.3.2 Trial Means

[10]:
```
p3_d0_mean = np.mean(p3_zero_dist)
p3_d1_mean = np.mean(p3_one_dist)
p3_d2_mean = np.mean(p3_two_dist)
print("The mean reaction of participant #3 with zero distractions: "
      + str(round(p3_d0_mean ) ) )
print("The mean reaction of participant #3 with one distraction: "
      + str(round(p3_d1_mean ) ) )
print("The mean reaction of participant #3 with two distractions: "
      + str(round(p3_d2_mean ) ) )
```

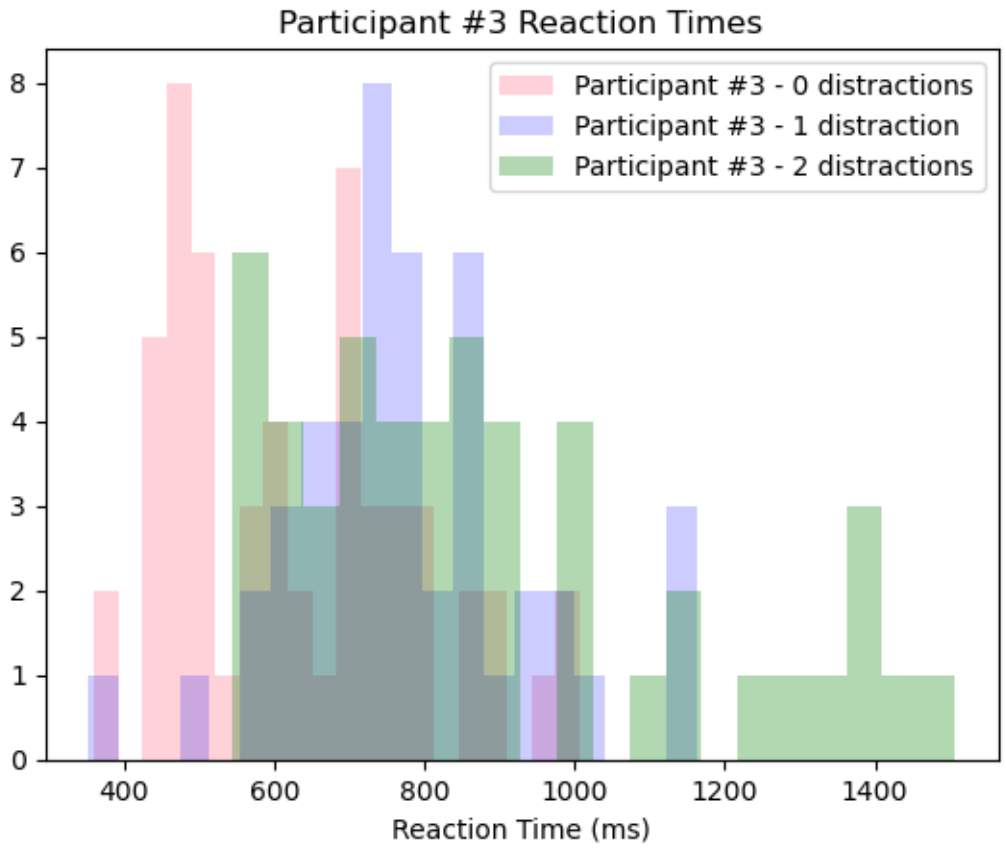
```
The mean reaction of participant #3 with zero distractions: 651
The mean reaction of participant #3 with one distraction: 808
The mean reaction of participant #3 with two distractions: 913
```

1.3.3 Histogram

[11]:
```
p3_zero_filt = filt(p3_zero_dist,p3_d0_mean,2)
p3_one_filt = filt(p3_one_dist,p3_d1_mean,2)
p3_two_filt = filt(p3_two_dist,p3_d2_mean,2)

plt.hist(p3_zero_filt, bins = 20, alpha = 0.7,
         label = "Participant #3 - 0 distractions", color = "pink")
plt.hist(p3_one_filt, bins = 20, alpha = 0.2,
         label = "Participant #3 - 1 distraction", color = "blue")
plt.hist(p3_two_filt, bins = 20, alpha = 0.3,
         label = "Participant #3 - 2 distractions", color = "green")
plt.title("Participant #3 Reaction Times")
plt.xlabel("Reaction Time (ms)")
plt.legend()
```

[11]:
```
<matplotlib.legend.Legend at 0x7fac74d7b6a0>
```



1.4 Participant 4

1.4.1 Read in Data

[12]:
```
p4_zero_dist_raw = pd.read_csv("p4_0.csv",sep=',')
p4_zero_dist_raw = p4_zero_dist_raw.to_numpy()
p4_one_dist_raw = pd.read_csv("p4_1.csv",sep=',')
p4_one_dist_raw = p4_one_dist_raw.to_numpy()
p4_two_dist_raw = pd.read_csv("p4_2.csv",sep=',')
p4_two_dist_raw = p4_two_dist_raw.to_numpy()

#only want reaction time
p4_zero_dist = p4_zero_dist_raw[:,0]
p4_one_dist = p4_one_dist_raw[:,0]
p4_two_dist = p4_two_dist_raw[:,0]
```

1.4.2 Trial Means

[13]:
```
p4_d0_mean = np.mean(p4_zero_dist)
p4_d1_mean = np.mean(p4_one_dist)
p4_d2_mean = np.mean(p4_two_dist)
print("The mean reaction of participant #4 with zero distractions: "
      + str(round(p4_d0_mean ) ) )
print("The mean reaction of participant #4 with one distraction: "
      + str(round(p4_d1_mean ) ) )
print("The mean reaction of participant #4 with two distractions: "
      + str(round(p4_d2_mean ) ) )
```

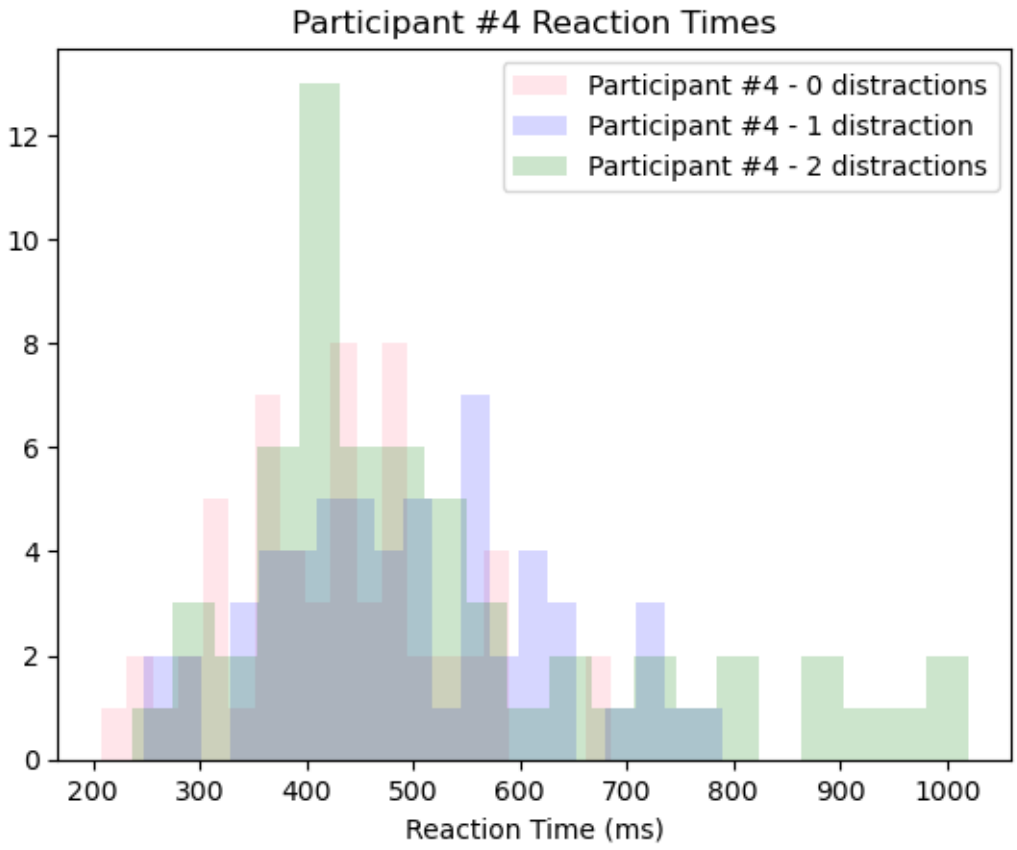
```
The mean reaction of participant #4 with zero distractions: 485
The mean reaction of participant #4 with one distraction: 521
The mean reaction of participant #4 with two distractions: 567
```

1.4.3 Histogram

[14]:
```
p4_zero_filt = filt(p4_zero_dist,p4_d0_mean,2)
p4_one_filt = filt(p4_one_dist,p4_d1_mean,2)
p4_two_filt = filt(p4_two_dist,p4_d2_mean,2)

plt.hist(p4_zero_filt, bins = 20, alpha = .4,
         label = "Participant #4 - 0 distractions", color = "pink")
plt.hist(p4_one_filt, bins = 20, alpha = .16,
         label = "Participant #4 - 1 distraction", color = "blue")
plt.hist(p4_two_filt, bins = 20, alpha = .2,
         label = "Participant #4 - 2 distractions", color = "green")
plt.title("Participant #4 Reaction Times")
plt.xlabel("Reaction Time (ms)")
plt.legend()
```

[14]:
```
<matplotlib.legend.Legend at 0x7fac74c86c50>
```



1.5 Participant 5

1.5.1 Read in Data

[15]:
```
p5_zero_dist_raw = pd.read_csv("p5_0.csv",sep=',')
p5_zero_dist_raw = p5_zero_dist_raw.to_numpy()
p5_one_dist_raw = pd.read_csv("p5_1.csv",sep=',')
p5_one_dist_raw = p5_one_dist_raw.to_numpy()
p5_two_dist_raw = pd.read_csv("p5_2.csv",sep=',')
p5_two_dist_raw = p5_two_dist_raw.to_numpy()

#only want reaction time
p5_zero_dist = p5_zero_dist_raw[:,0]
p5_one_dist = p5_one_dist_raw[:,0]
p5_two_dist = p5_two_dist_raw[:,0]
```

1.5.2 Trial Means

[16]:
```
p5_d0_mean = np.mean(p5_zero_dist)
p5_d1_mean = np.mean(p5_one_dist)
p5_d2_mean = np.mean(p5_two_dist)
print("The mean reaction of participant #5 with zero distractions: "
      + str(round(p5_d0_mean ) ) )
print("The mean reaction of participant #5 with one distraction: "
      + str(round(p5_d1_mean ) ) )
print("The mean reaction of participant #5 with two distractions: "
      + str(round(p5_d2_mean ) ) )
```

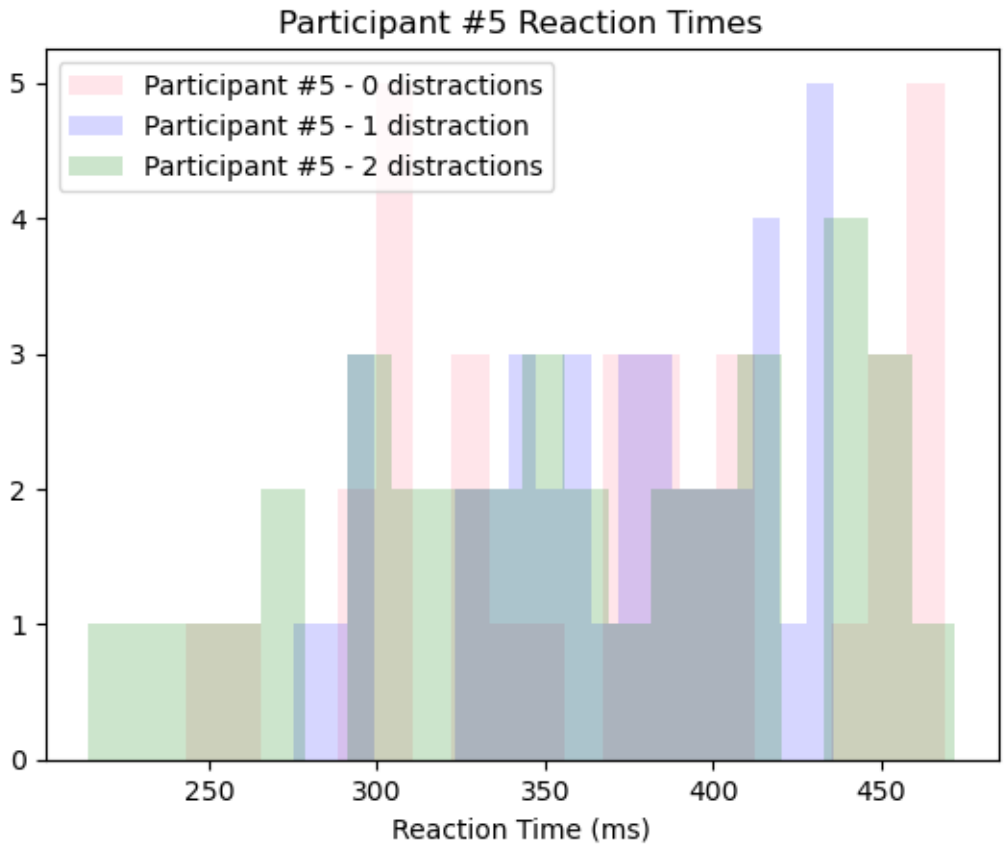
```
The mean reaction of participant #5 with zero distractions: 475
The mean reaction of participant #5 with one distraction: 437
The mean reaction of participant #5 with two distractions: 472
```

1.5.3 Histogram

[17]:
```
p5_zero_filt = filt(p5_zero_dist,p5_d0_mean,0)
p5_one_filt = filt(p5_one_dist,p5_d1_mean,0)
p5_two_filt = filt(p5_two_dist,p5_d2_mean,0)

plt.hist(p5_zero_filt, bins = 20, alpha = .4,
         label = "Participant #5 - 0 distractions", color = "pink")
plt.hist(p5_one_filt, bins = 20, alpha = .16,
         label = "Participant #5 - 1 distraction", color = "blue")
plt.hist(p5_two_filt, bins = 20, alpha = .2,
         label = "Participant #5 - 2 distractions", color = "green")
plt.title("Participant #5 Reaction Times")
plt.xlabel("Reaction Time (ms)")
plt.legend()
```

[17]:
```
<matplotlib.legend.Legend at 0x7fac74b8a680>
```



1.6 Participant 6

1.6.1 Read in Data

[18]:
```
p6_zero_dist_raw = pd.read_csv("p6_0.csv",sep=',')
p6_zero_dist_raw = p6_zero_dist_raw.to_numpy()
p6_one_dist_raw = pd.read_csv("p6_1.csv",sep=',')
p6_one_dist_raw = p6_one_dist_raw.to_numpy()
p6_two_dist_raw = pd.read_csv("p6_2.csv",sep=',')
p6_two_dist_raw = p6_two_dist_raw.to_numpy()

#only want reaction time
p6_zero_dist = p6_zero_dist_raw[:,0]
p6_one_dist = p6_one_dist_raw[:,0]
p6_two_dist = p6_two_dist_raw[:,0]
```

1.6.2 Trial Means

[19]:
```
p6_d0_mean = np.mean(p6_zero_dist)
p6_d1_mean = np.mean(p6_one_dist)
p6_d2_mean = np.mean(p6_two_dist)
print("The mean reaction of participant #6 with zero distractions: "
      + str(round(p6_d0_mean ) ) )
print("The mean reaction of participant #6 with one distraction: "
      + str(round(p6_d1_mean ) ) )
print("The mean reaction of participant #6 with two distractions: "
      + str(round(p6_d2_mean ) ) )
```

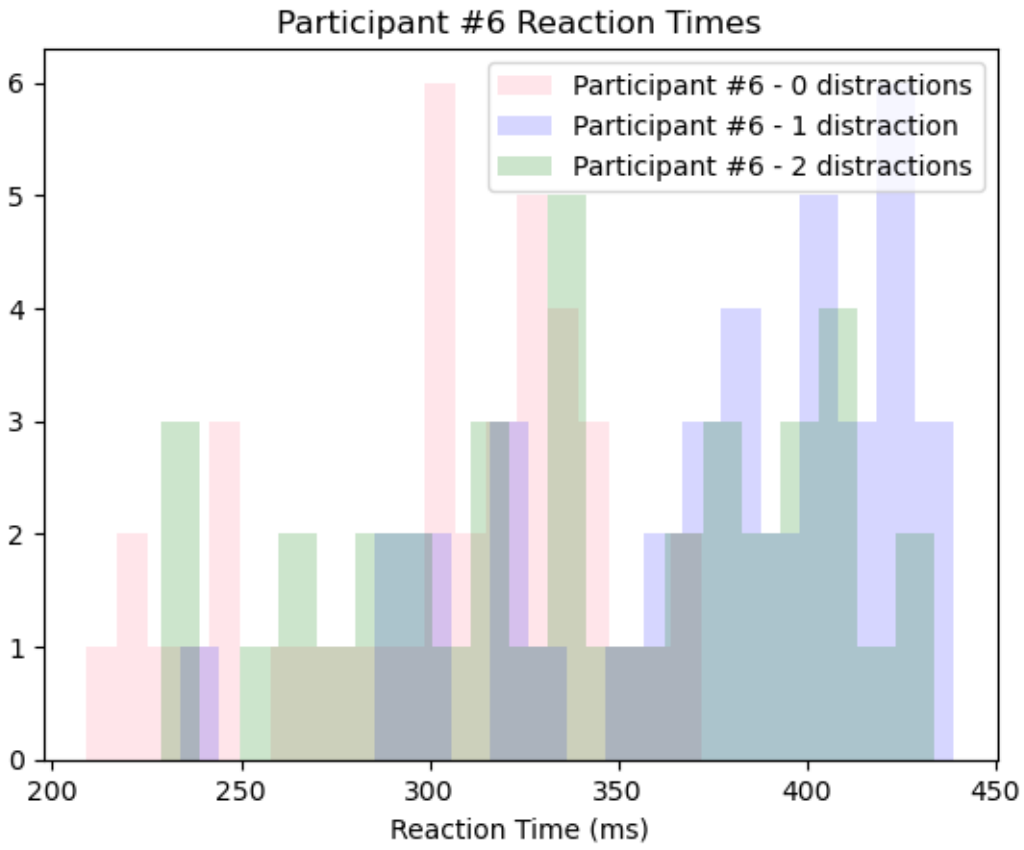
```
The mean reaction of participant #6 with zero distractions: 373
The mean reaction of participant #6 with one distraction: 446
The mean reaction of participant #6 with two distractions: 437
```

1.6.3 Histogram

[20]:
```
p6_zero_filt = filt(p6_zero_dist,p6_d0_mean,0)
p6_one_filt = filt(p6_one_dist,p6_d1_mean,0)
p6_two_filt = filt(p6_two_dist,p6_d2_mean,0)

plt.hist(p6_zero_filt, bins = 20, alpha = .4,
         label = "Participant #6 - 0 distractions", color = "pink")
plt.hist(p6_one_filt, bins = 20, alpha = .16,
         label = "Participant #6 - 1 distraction", color = "blue")
plt.hist(p6_two_filt, bins = 20, alpha = .2,
         label = "Participant #6 - 2 distractions", color = "green")
plt.title("Participant #6 Reaction Times")
plt.xlabel("Reaction Time (ms)")
plt.legend()
```

[20]:
```
<matplotlib.legend.Legend at 0x7fac7489ea70>
```


Participant #6 Reaction Times
Participant #6 - 0 distractions
Participant #6 - 1 distraction
Participant #6 - 2 distractions
0
1
2
3
4
5
6
200
250
300
350
400
450
Reaction Time (ms)