## Equal area circles

Folders A1-A5, each folder contains 9 subfolders 1-9 (corresponding to each numerosity), each subfolder contains 20 images.

An image is solid black circle(s) plotted against a white background using matplotlib. Total area of each image is 720 \* 720 = 518400 pixels. Total area covered by stimulus in A1 is 1036.8 (518400 \* 0.2%), A2 is 2073.6 (0.4%) increasing in increments of 0.2% all the way to 5184 (1%) in A5.

| #@title Equal area circles # Fixing random state for reproducibility # np.random.seed(19680801) N = 9 # numerosity of stimulus k = 0 # unique plot number # Example stimuli generation for A5 = 5184 prev\_area = 518.4 while N > 0:  area = prev\_area + prev\_area/N  prev\_area = area  for i in range(20):  x = np.random.rand(N)  y = np.random.rand(N)  fig = plt.figure(k, (10,10))  # s is the marker size  plt.scatter(x, y, s=area, color = "black", marker="o")  plt.savefig('/content/drive/MyDrive/numerosity\_project - All Stimuli/Equal area circles/A5/'+str(N)+'/'+str(N)+'\_'+ str(i+1)+'.png', facecolor='white', transparent=False)  k+=1  N -= 1 |
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## Equal circumference circles

Folders C1-C5, each folder contains 9 subfolders 1-9 (corresponding to each numerosity), each subfolder contains 20 images.

An image is solid black circle(s) plotted against a white background using matplotlib. Total area of each image is 720 \* 720 = 518400 pixels. Total circumference covered by stimulus in C1 is 100, C2 is 150 increasing in increments of 50 all the way to 300 in C5.

| #@title Equal circumference circles # Fixing random state for reproducibility # np.random.seed(19680801) N = 9 # numerosity of stimulus k = 0 # unique plot number # Example stimuli generation for C5 = 300 total\_circum = 300 while N > 0:  circum = total\_circum/N  radius = circum/ (2\*np.pi)  area = np.pi \* radius\*\*2  for i in range(20):  x = np.random.rand(N)  y = np.random.rand(N)  fig = plt.figure(k, (10,10))  plt.scatter(x, y, s=area, color = "black", marker="o")  plt.savefig('/content/drive/MyDrive/numerosity\_project - All Stimuli/Equal circumference circles/C5/'+str(N)+'/'+str(N)+'\_'+ str(i+1)+'.png', facecolor='white', transparent=False, pad\_inches=0)  k+=1  N -= 1 |
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## Equal area squares

Folders A1-A5, each folder contains 9 subfolders 1-9 (corresponding to each numerosity), each subfolder contains 20 images.

An image is solid black square(s) plotted against a white background using matplotlib. Total area of each image is 720 \* 720 = 518400 pixels. Total area covered by stimulus in A1 is 1036.8 (518400 \* 0.2%), A2 is 2073.6 (0.4%) increasing in increments of 0.2% all the way to 5184 (1%) in A5.

| Code snippet same as "Equal area circles" but change marker "o" -> "s" |
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## Equal area triangles

Folders A1-A5, each folder contains 9 subfolders 1-9 (corresponding to each numerosity), each subfolder contains 20 images.

An image is solid black triangle(s) plotted against a white background using matplotlib. Total area of each image is 720 \* 720 = 518400 pixels. Total area covered by stimulus in A1 is 1036.8 (518400 \* 0.2%), A2 is 2073.6 (0.4%) increasing in increments of 0.2% all the way to 5184 (1%) in A5.

| Code snippet same as "Equal area circles" but change marker "o" -> "^" |
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## 

## Random shape random area

Folders 1-9 (corresponding to each numerosity), each folder contains 20 images.

Images have been plotted with matplotlib such that each item can be one of (circle, triangle, square) and can have any area from the range A1/N-A5/N where N is the numerosity of the stimulus.

| #@title Random shape and random area within stimulus # Fixing random state for reproducibility # np.random.seed(19680801) N = 9 # numerosity of stimulus k = 0 # unique plot number # Example stimuli generation for numerosities N=1-9 while N > 0:  for i in range(20):  for j in range(N):  x = np.random.rand()  y = np.random.rand()  shapes = ['s', 'o', '^']  area = np.random.uniform(1036.8/N,5184/N)  fig = plt.figure(k, (10,10))  plt.scatter(x, y, s=area, color = "black", marker=np.random.choice(shapes))  k+=1  plt.savefig('/content/drive/MyDrive/numerosity\_project - All Stimuli/Random shape random area/'+str(N)+'/'+str(N)+'\_'+ str(i+1)+'.png', facecolor='white', transparent=False)  N -= 1 |
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## Natural Images

Folders 1-9 (corresponding to each numerosity), each folder contains 40 images.

Images are a random sample, collected from the internet and manually scanned to determine usability.