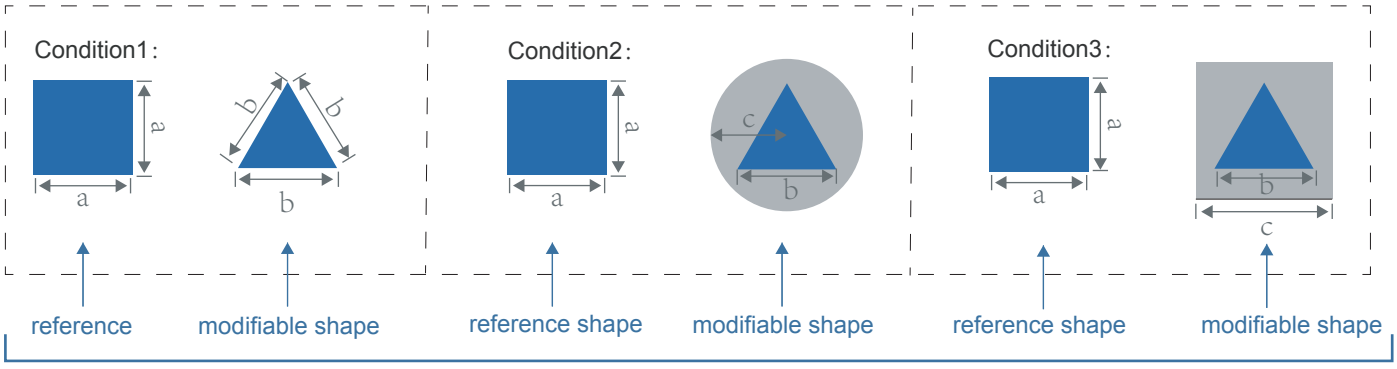
Shape Area Estimation Experiment-one：

Square, Circle Interference



IDENTIFIERS:

Base = Estimation
Trial Type = Estimation
Graph Type = Shapes
Balancing = Random
Condition Name = Shape Area Estimation

SPECIFICATIONS:

The goal is that the subjects will adjust the size (side length) of the modi_shape so that it is as equal as possible to the area of ref_shape.

SUBCONDITIONS:

① 3 types of shapes :
ref_shape: square, modi_shape: equilateral triangle, interference_shape: circle(con_2) and square(con_3).
② The central point of interference_shape and modi_shape are overlapping.
③ 3 sizes that the ref_shape can start on _a=2cm, 4cm or 6 cm
④ 2 ways the modi_shape can "start" on _they can be either smaller or larger in size than the ref_shape
For 2cm ref_square, low value(b)= 1.2, high value(b)= 3
For 4cm ref_square, low value(b)= 3.1, high value(b)= 5.3
For 6cm ref_square, low value(b)= 5.0, high value(b)= 6.5
⑤ For sub_condition2:
The ratio value of side length(b) in equilateral triangle and radius(c) in circle is constant: 1.3 : 1.
For sub_condition3:
The ratio value of side length(b) in equilateral triangle and side length(c) in square is constant: 1.3 : 1.

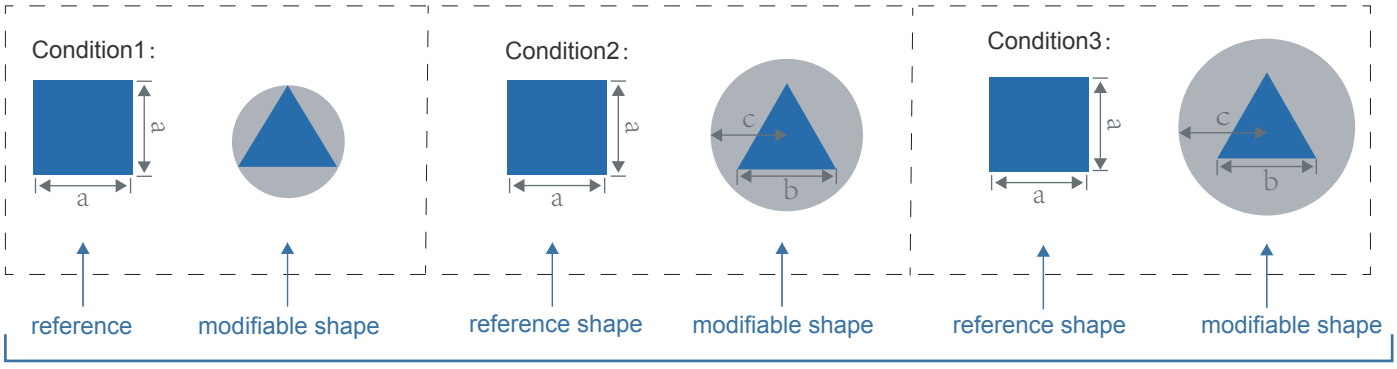
The order of subcondition is random,The ref_& modi_shape positions can be either left or right (randomized).
For a given subcondition, there are 4 trials. In each trial, the subject basically has to make
the modi_shape the same as the ref_shape.
For trials 1 and 3, the modi_shape's size will start on the low value as specified above
For trials 2 and 4, the modi_shape's size will start on the high value as specified above.
The y position of the shapes relative to each other should be slightly jittered - the degree of jitter can be randomized.

The subjects can press the z [make shape bigger] or m [make shape smaller] keys.
The step size of the adjustment will be randomized (so not constant).
They can adjust for an unlimited amount of times.
Once satisfied, they hit space bar, which then records the size of their modi_shape.

This happens 3 more times (for the same subcondition).
After the 4 trials for a given subcondition, experiment then moves to the next subcondition.

Circle Interference

Shape Area Estimation Experiment-Two:



IDENTIFIERS:

Base = Estimation
Trial Type = Estimation
Graph Type = Shapes
Balancing = Random
Condition Name = Shape Area Estimation

SPECIFICATIONS:

The goal is that the subjects will adjust the size (side length) of the modi_shape so that it is as equal as possible to the area of ref_shape.

SUBCONDITIONS:

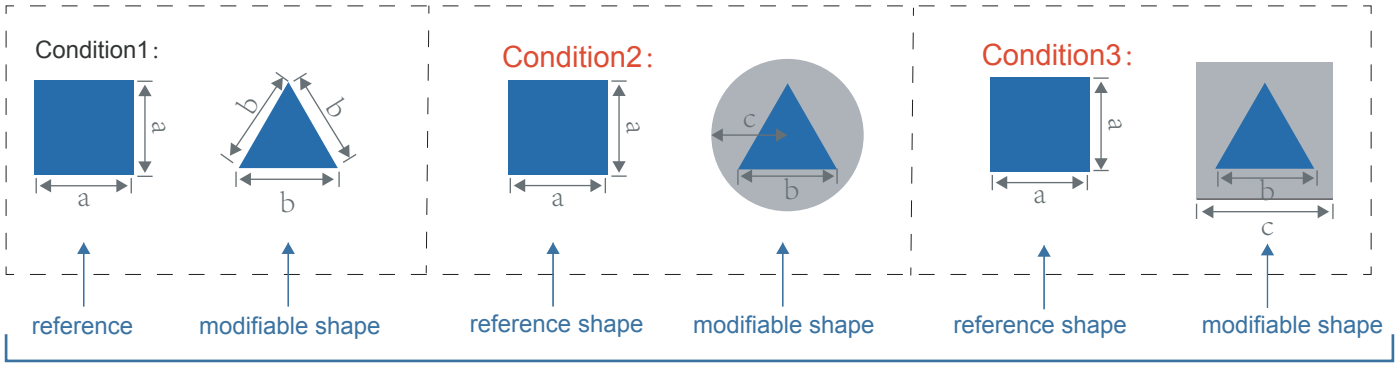
① 3 types of shapes :
ref_shape: square, modi_shape: equilateral triangle, interference_shape: circle.
② The central point of interference_shape and modi_shape are overlapping.
③ 3 sizes that the ref_shape can start on _a=2cm, 4cm or 6 cm
④ 2 ways the modi_shape can "start" on _they can be either smaller or larger in size than the ref_shape
For 2cm ref_square, low value(b)= 1.2, high value(b)= 3
For 4cm ref_square, low value(b)= 3.1, high value(b)= 5.3
For 6cm ref_square, low value(b)= 5.0, high value(b)= 6.5
⑤ For sub_condition1:
Inscribed equilateral triangle in circle

For sub_condition2:
The ratio value of side length(b) in equilateral triangle and radius(c) in circle is constant: 1.3 : 1.

For sub_condition3:
The ratio value of side length(b) in equilateral triangle and side length(c) in square is constant: 1.1 : 1.

Other parameters are the same as the experiment-one.

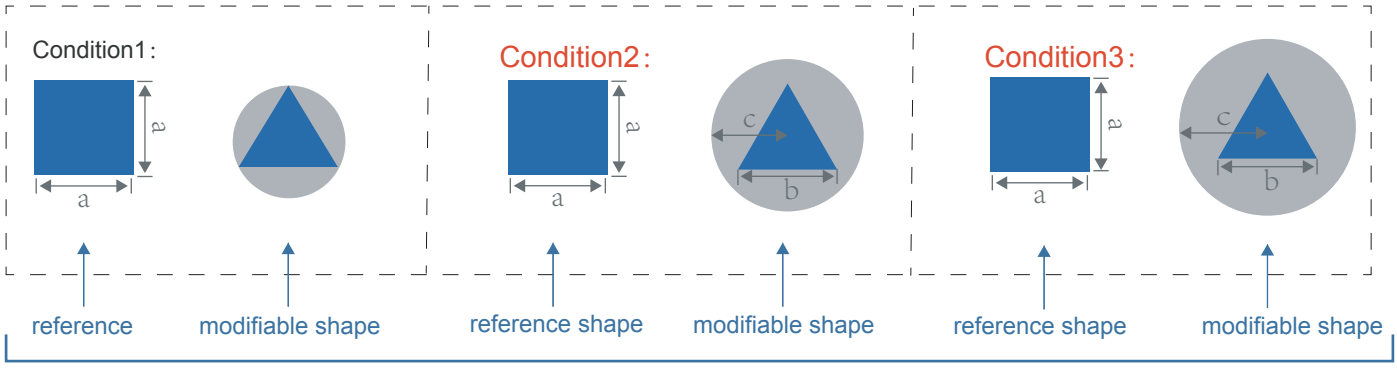
Problem-One:



the square_circle_interference expeirment (condition2+condition3):

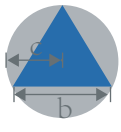
①: While adjusting the size of the modi_shape, the inter_shape also changes at the same time(Increase or decrease size simultaneously). In order to keep the ratio between the inter_shape (c) and the modi_shape(b) is constant (1:1.3).

Problem-Two:



circle_interference expeirment:

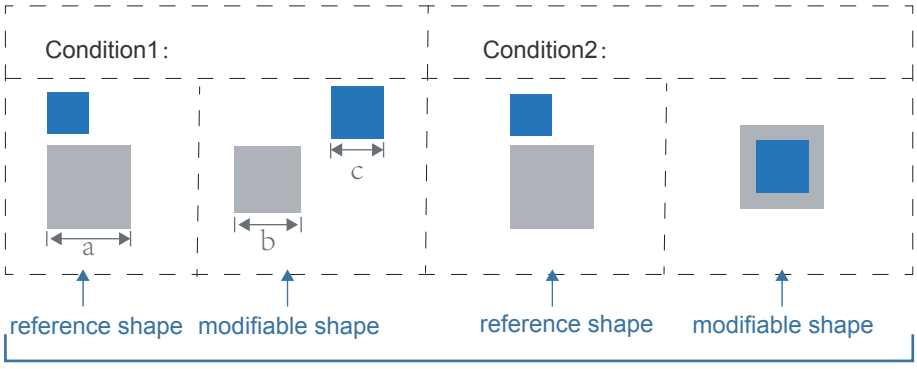
①: For the modi_shapes in condition 1. The three vertices of the modi_equilateral triangle are on the circumference of the inter_circle. The ratio between b and c is not 1:1.



②: Also While adjusting the size of the modi_shape, the inter_shape also changes at the same time. In order to keep the ratio between the inter_shape (c) and the modi_shape(b) is constant (1:1.1 in condition2 and 1:1.3 in condition3).

Multi Square Interference

Area Ratio Estimation Experiment-Three:



IDENTIFIERS:

Base = Estimation
Trial Type = Estimation
Graph Type = Shapes
Balancing = Random
Condition Name = Area Ratio Estimation

SPECIFICATIONS:

The goal is that the subjects will adjust the size(c) (side length) of a shape(blue) in the modi_shapes so that the area ratio are as equal as possible to the area ratio in the ref_shapes.

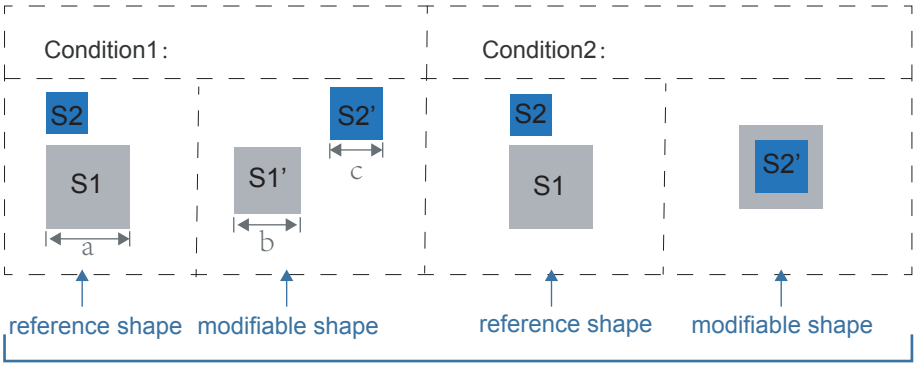
SUBCONDITIONS:

① Totally one type of shapes : square.
② There are two kinds of modi_shapes: modi_blue_shape in and outside of the modi_grey_shape.
For the condition1:
The y position of the modi_blue_shape relative to modi_grey_shape should be slightly jittered - the degree of jitter can be randomized, the positions of blue & grey shape in modi_shapes can be either left or right.
For the condition2:
The central point of blue & grey shape in modi_shapes are overlapping.
③ 2 ways the modi_grey_shape (b) can "start" on _they can be either smaller or larger in size than the ref_shape.
For 2cm ref_grey_square(a) , low value(b)= 1.2, high value(b)= 3.
For 4cm ref_grey_square(a) , low value(b)= 3.1, high value(b)= 5.3.
④ 3 area ratios between grey and blue shapes in the ref_shapes can start on =1:1/4, 1:1/2 or 1:3/4.
⑤ Initial area ratio between grey & blue shape in the modi_shape is 1.5 : 1.

Other parameters are the same as the experiment-one.

Question： I don't know if I express clearly?

For the experiment 3: the experimet task is to adjust size b,until the area ration between s1' and s2' are the same as the area ratio of s1 and s2.



①： There are three subconditions for the area ratio of ref_shapes:
3 area ratios(S1:S2) between grey and blue shapes in the ref_shapes can start on:

1:1/4

```
"ref_ratio": 0.25,
```

1:1/2

```
"ref_ratio": 0.5,
```

1:3/4

```
"ref_ratio": 0.75,
```

②： There are two subconditions for the a and b:

a=2,b=1.2 or 3.

```
"mod_min_size": 1.2,
"mod_max_size": 3,
```

a=4,b=3.1 or 5.

```
"mod_min_size": 3.1,
"mod_max_size": 5.3,
```

③： There have two initial area ratio between s1' and s2'of modi_shapes:

S1':S2'=2:1

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"interf_initial_ratio": 2,
```

S1':S2'=1:2

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"interf_initial_ratio": 0.5,
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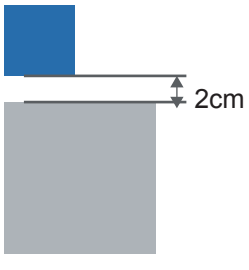
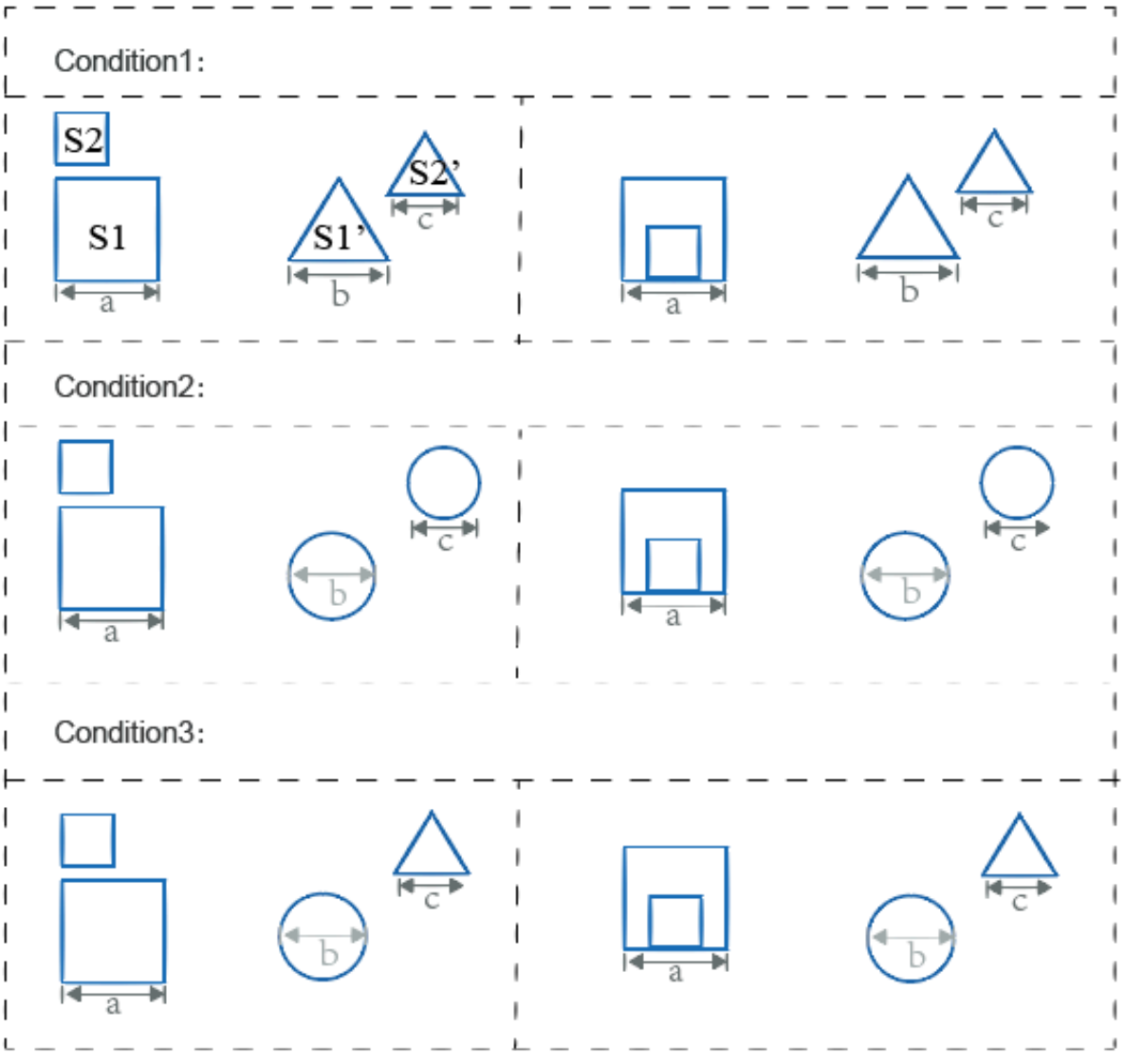
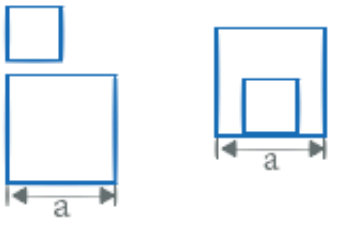
④ For ref_shapes, the vertical distance between the two square is fixed 2 cm



Area Ratio Estimation Experiment-Four:



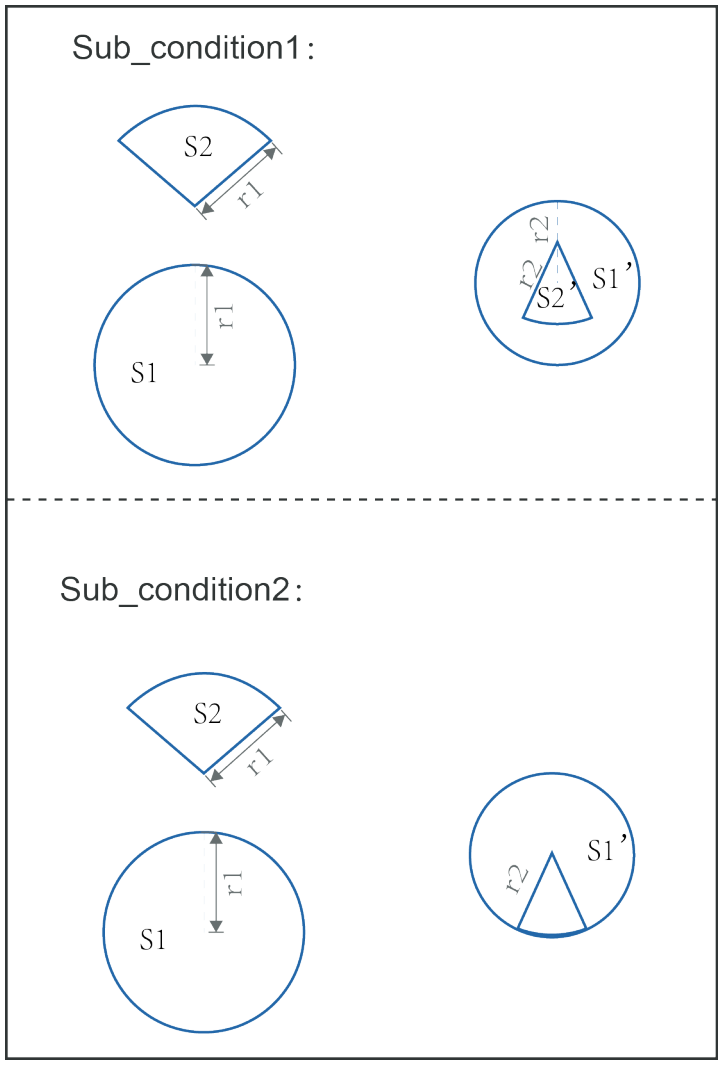
(1) There have two kinds of ref_shapes:



(2) There has a constant initial area ratio between s1' and s2'of modi_shapes: 0.5

(3) There are two subconditions for the area ratio of ref_shapes:
2 area ratios(S1:S2) between S1and S2 in the ref_shapes
can start on: 1:0.6 , 1:0.8.

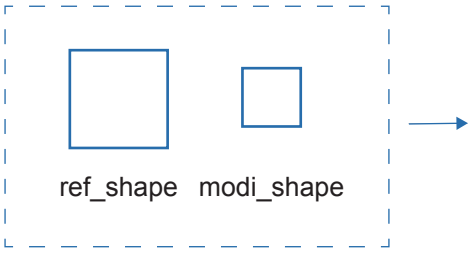
Multi Fan Interference



Absolute Area Ratio

Experiment 1--Absoluted area ratio:

The goal is that the subjects will adjust the area of the modi_square until they feel the area ratio between ref_square and modi_square are as equal as possible to the specified area ratio. the specified area ratio dispaly on the center of the screen.



Independent variable:

①The specified area ratio : 1: 1/2, 1:1/3, 1:1/4

②The ref_area : 4cm and 16cm(That's ref_size= 2cm and 4cm before)

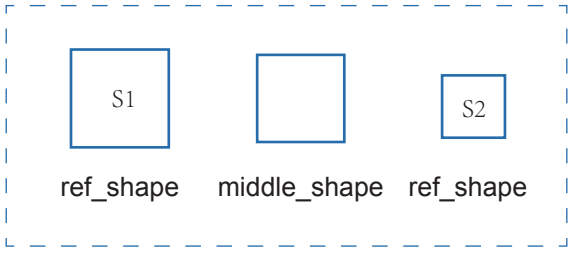
③The modi_area : 1.44 cm² , 9cm² and 9.61cm², 28.09²
(That's ref_size= 1.2 cm,3cm and 3.1cm , 5.3cm before)

Dependent variable:

① Estimated _area ratio

Experiment 2--Absoluted area ratio (similar to steven' experiment):

The goal is that the subjects will adjust the area of the middle_square until its area is halfway between those of the two ref_square.



Initial area ratio between s1 and s2 = 1:1/2

① In the first round, observers judge the halfway area between the area S1 = 8 and S2= 4.(1:1/2) This is done four consecutive times, with the mean of these judgments taken as the area value for subjective estimate s' = 6 [(1+1/2)/2=3/4].

② The second round apply this method recursively, with each observer again asked to find the area that appear to be halfway between the ref_squares. Two variants are used. In variant A observers judge the area halfway between s'= 8 and 6(1:3/4); in variant B they judge the area halfway between s' = 6 and 4(3/4:1/2). The order of these is counterbalanced across observers. Again, each judgement is made four consecutive times, with the averages providing the area corresponding to subjective estimates s' = 7 [(1+3/4)/2] and s' = 5 [(3/4+1/2)/2].

③ In the third round, this method is again applied to determine the area corresponding to the subjective estimates s' = 18/32, 19/32, 22/32, and 23/32. The variants at this stage are presented in random order.

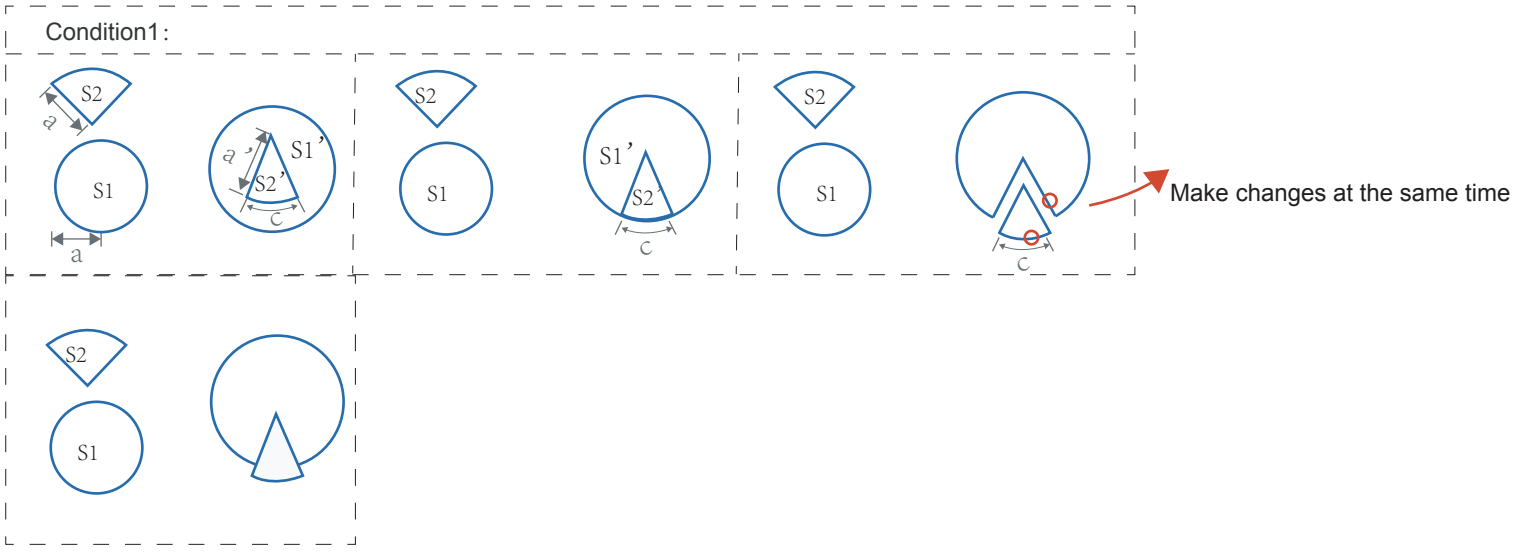
In next stage: I'll change the square into other shapes.

Absolute Area Ratio Bisection (Variant A & B)

Multi Fan Interference (Part B)

Experiment 3-Relative area ratio :

The goal is that the subjects will adjust the arc length C of fan in the modi_shapes so that the area ratio are as equal as possible to the area ratio in the ref_shapes.



① The independent variable: a=4, a'=3.1 and 5.3 . The area ratio between s1 and s2= 0.2, 0.4 and 0.6.

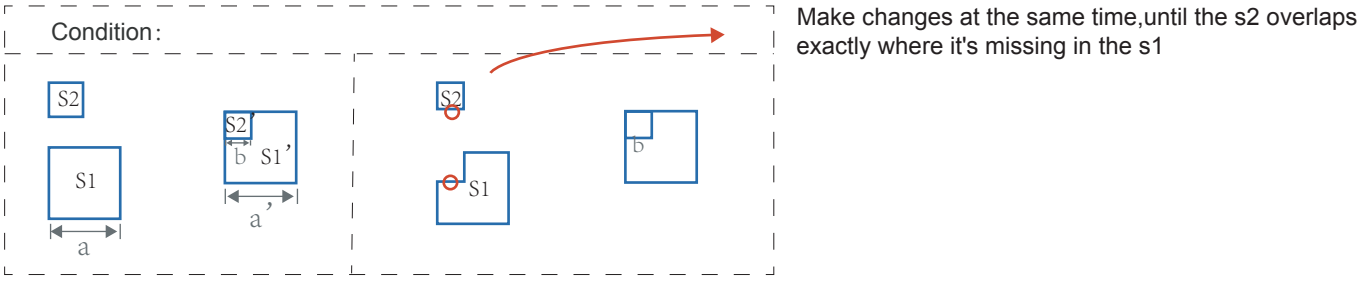
② The initial area ratio between s1' and s2' =0.125.

③ we need to change the dependent variable into estimated_area ratio
The dependent variable: Estimated_area ratio(not the arc length)
Modi _shapes alignment: Center, Bottom , Outside and overlapping

Experiment 4-Relative area ratio:

Multi Square Cutout Interference

The goal is that the subjects will adjust side length b of square in the modi_shapes so that the area ratio are as equal as possible to the area ratio in the ref_shapes.



① The independent variable :a=2cm and 4cm, a'=1.2, 3cm and 3.1, 5.3cm, S2:S1=0.25 and 0.4, initial area ratio between s1'and s2'=0.125.

② The dependent variable: Estimated_area ratio(not the size)