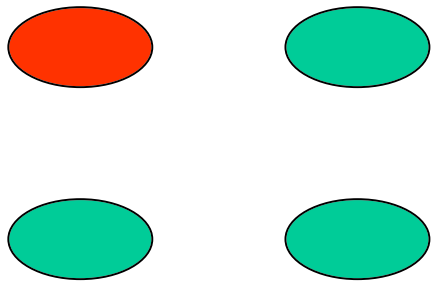
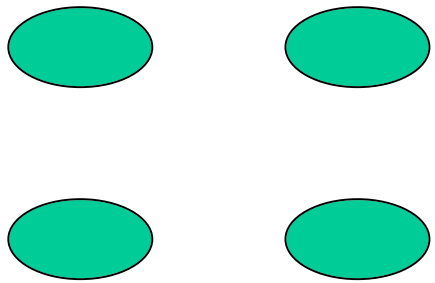
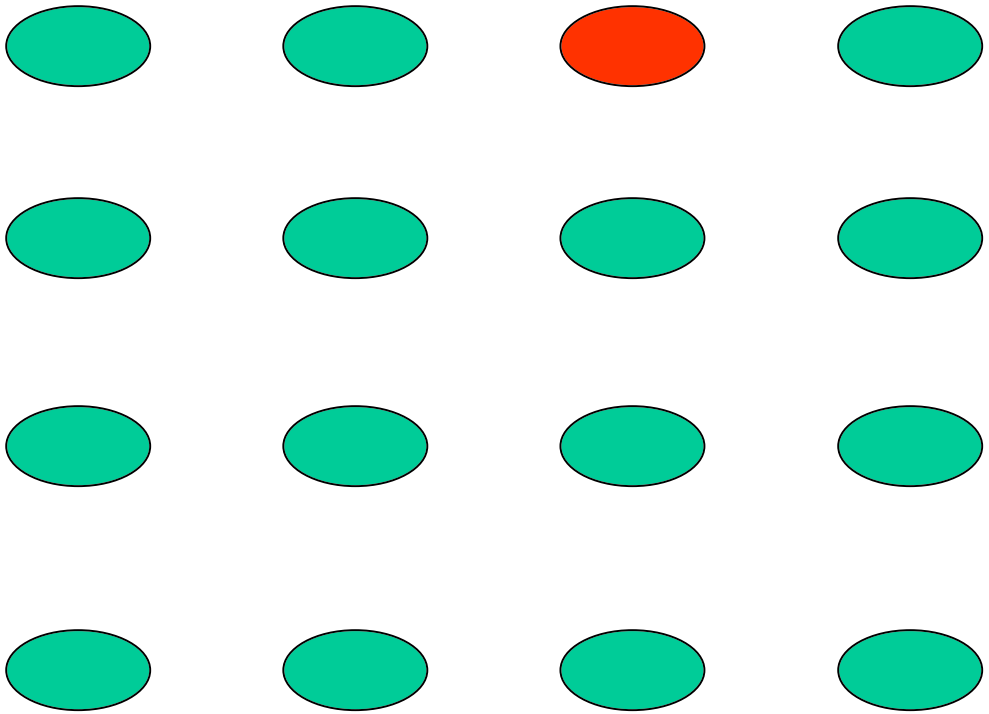
Visual Search -

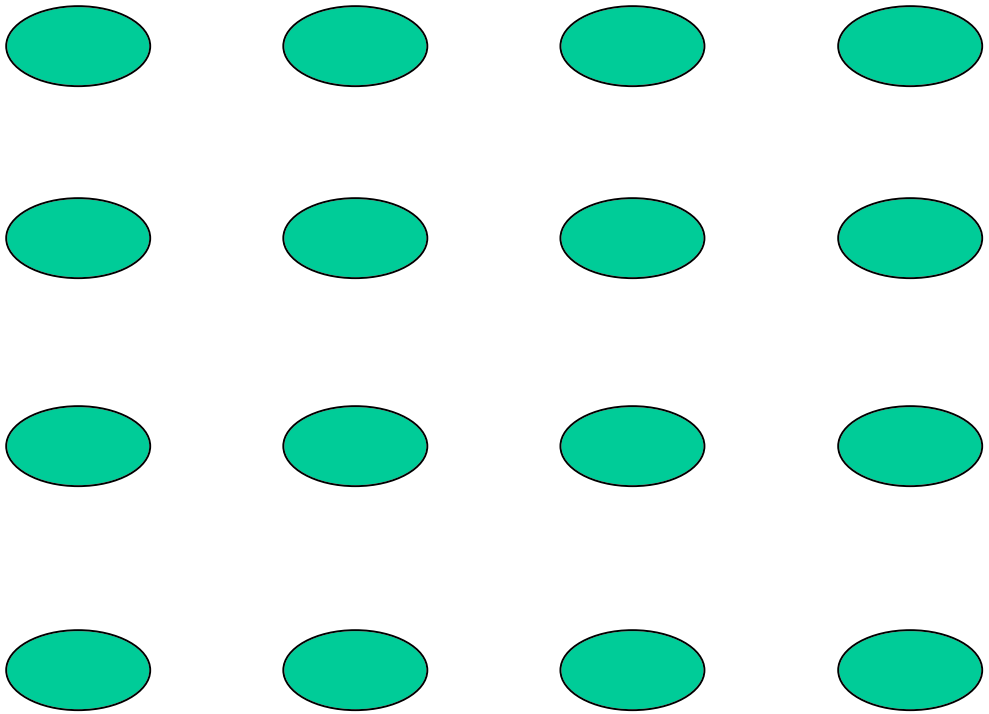
Find target among distractors

Target: Red oval









Target: F

E E

E F

E E

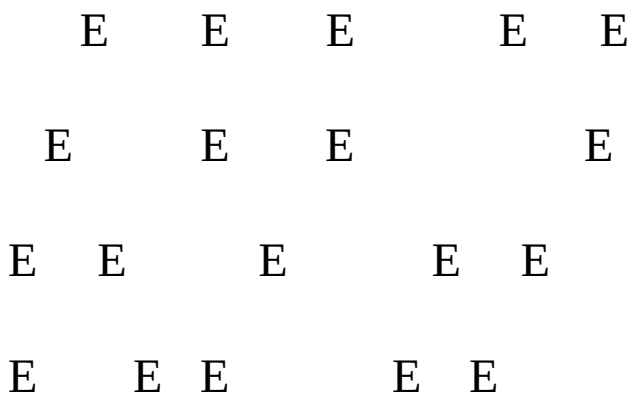
E E

E E E E E

E E E E

E E E F E

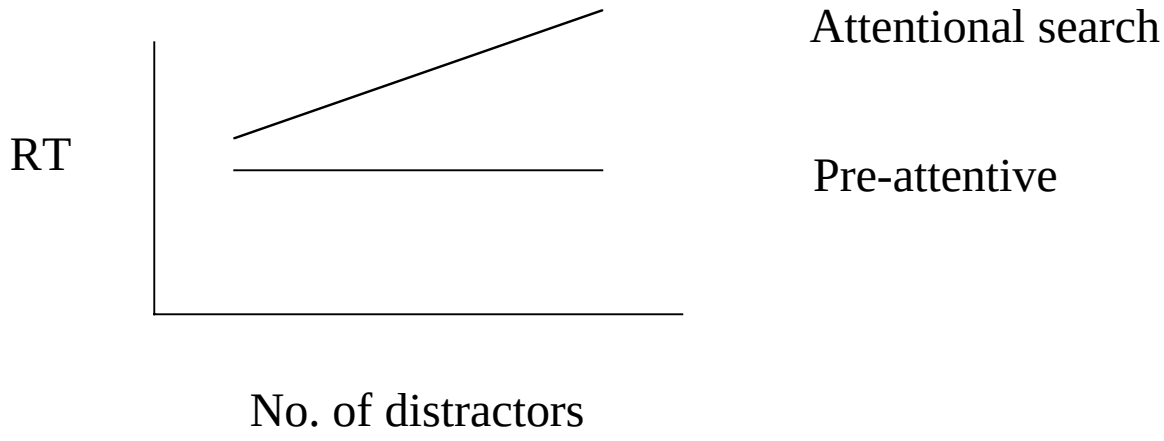
E E E E E


E E E E E
E E E E
E E E E E
E E E E E

“Pop-out” - Red/green circles

Pre-attentive - search not needed
Signature: flat slope for number of distractors

Attentive - F among E’s, search through display, directing attention to different locations

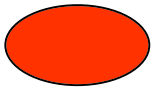


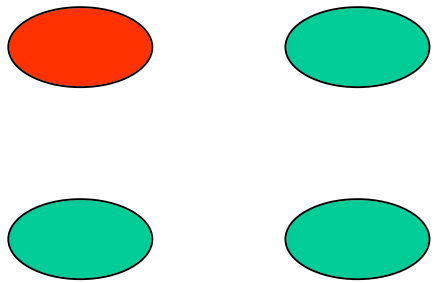
Triesman’s Feature-Integration Theory

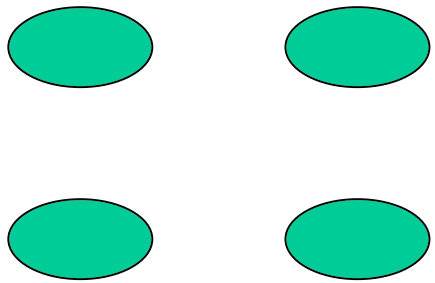
If targets can be distinguished from distractors by a single feature, then pre-attentive

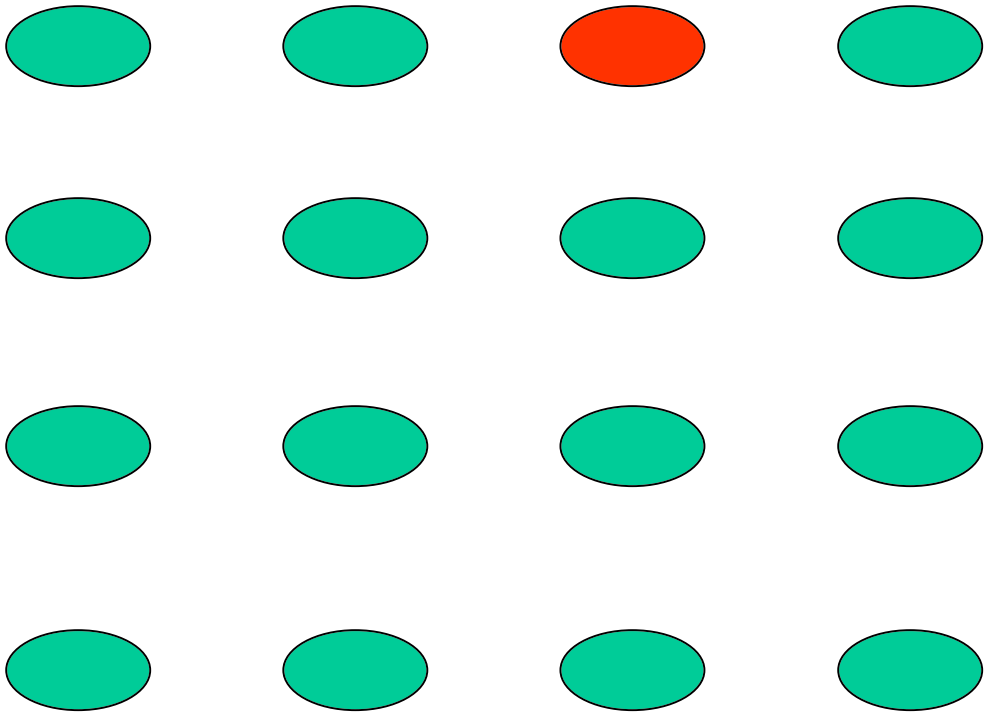
If targets can only be distinguished from distractors by a combination of feature, then attentional search

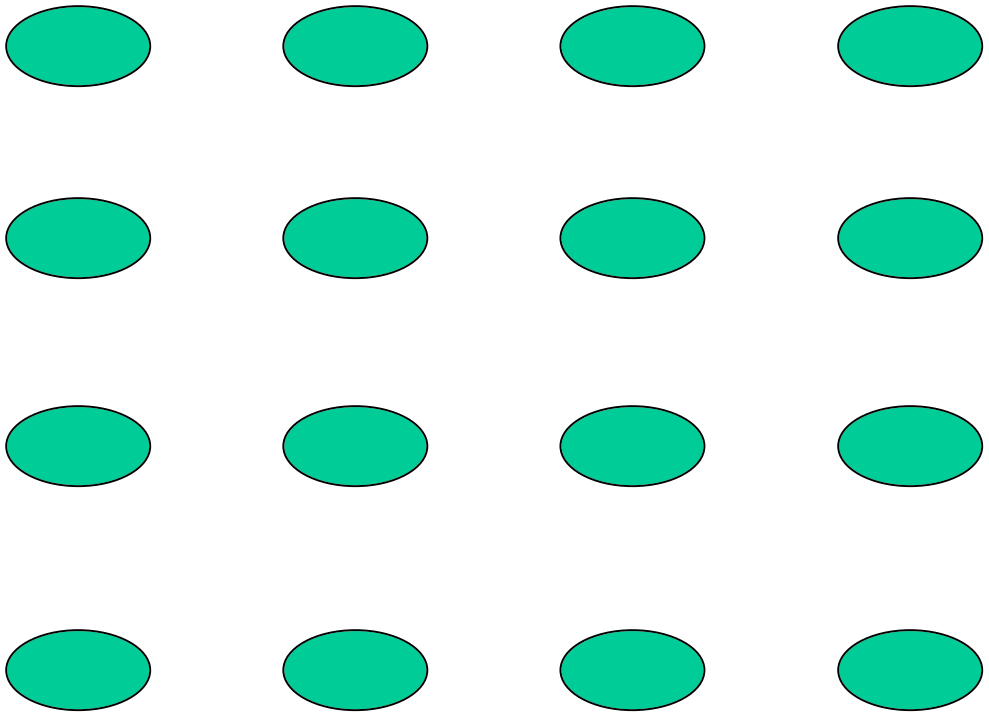
Target: Red oval

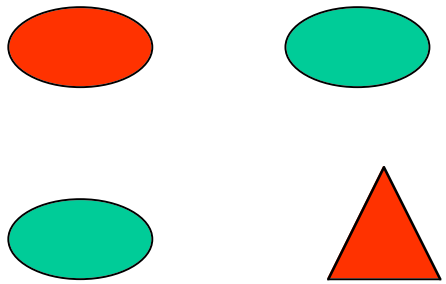


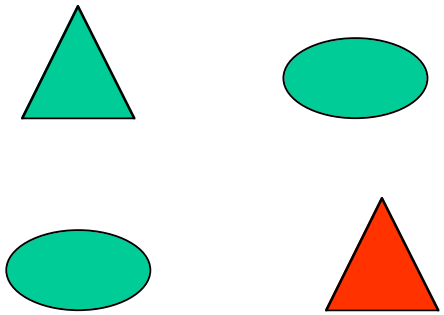


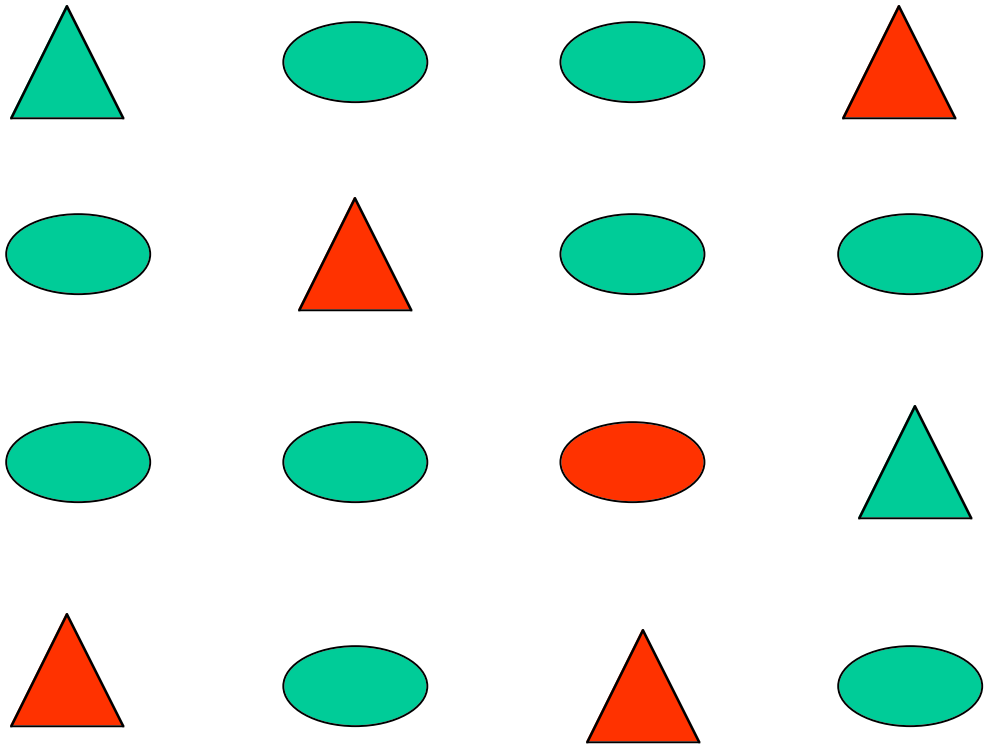


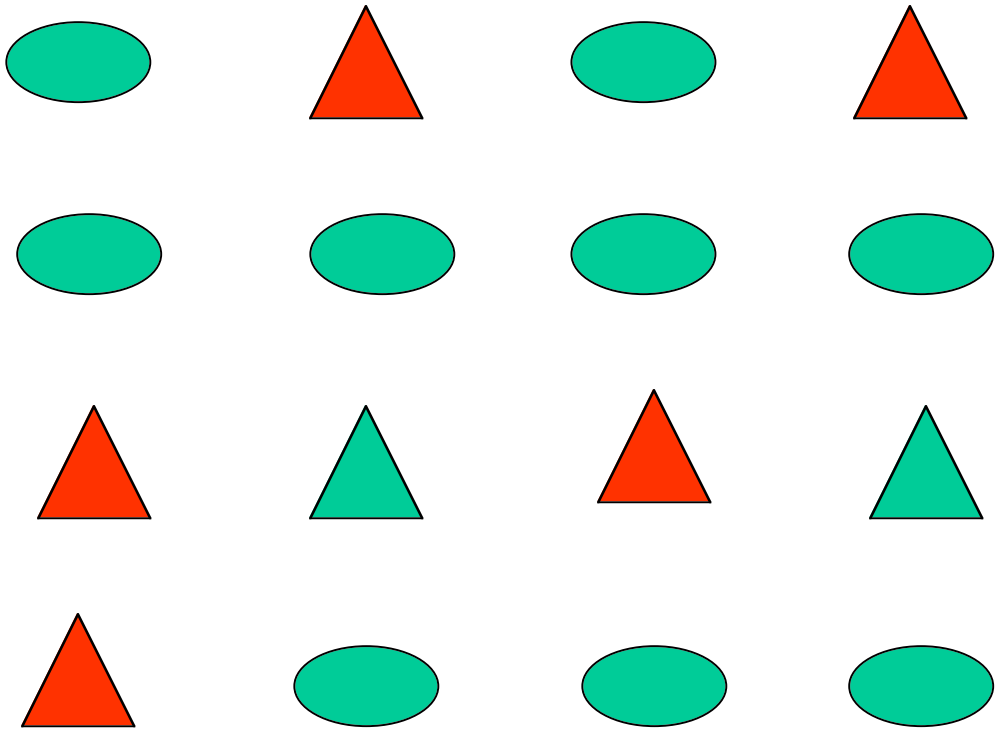


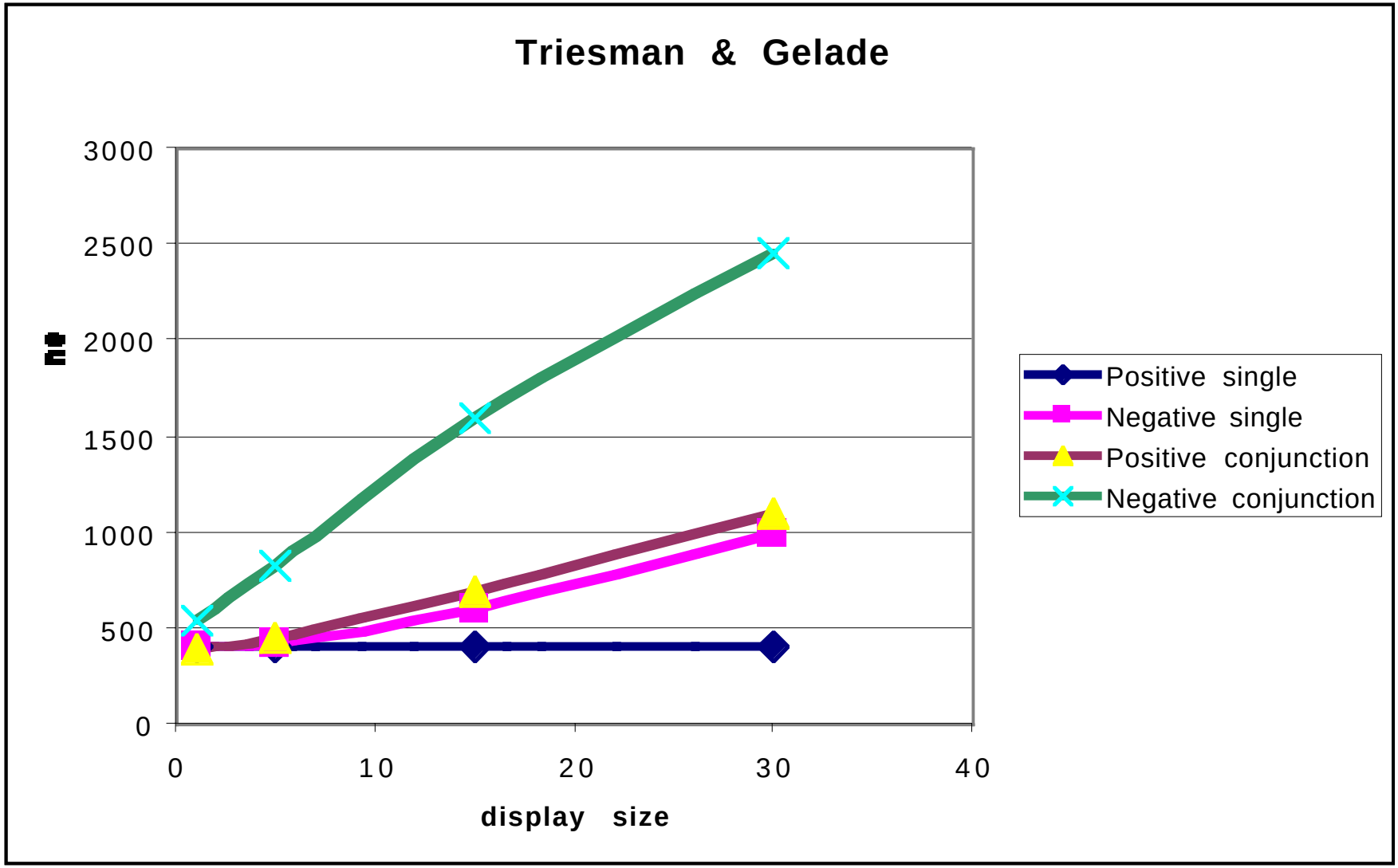






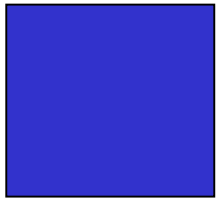





Triesman & Gelade
3000
2500
2000
1500
1000
500
0
0
10
20
30
40
display size
Positive single
Negative single
Positive conjunction
Negative conjunction

Illusory Conjunction

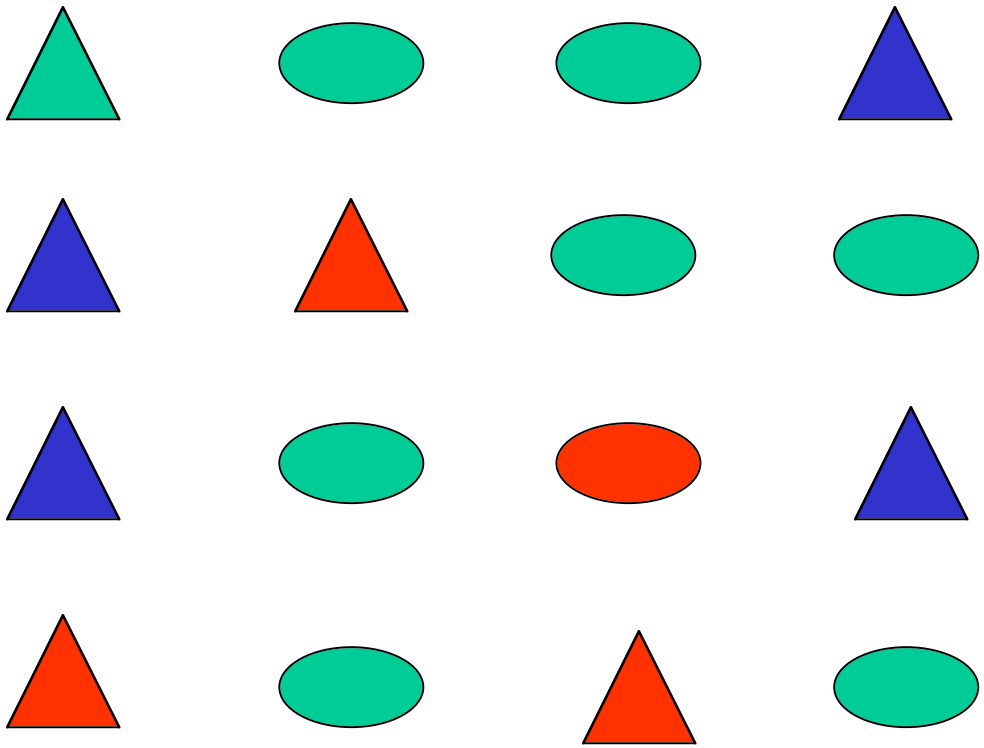
TARGET



Problems for Feature Integration Theory

Problems for Feature Integration Theory

1. Only non-targets that share a feature with target effect search times - target: red oval, blue triangles have no effect



2. Slopes don't fall neatly into flat or steep with certain slope. Continuous variation related to similarity of distractors to target

3. Illusory conjunctions only occur between stimuli that are close to each other - some degree of location uncertainty

Alternative: Wolfe's guided search theory

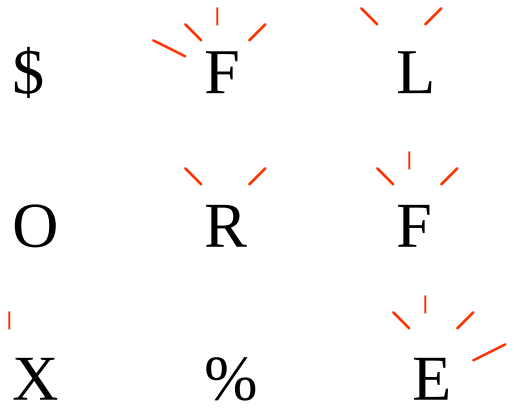
A. feature detection first.

B. each stimulus given an activation value that depends on number of features shared with target. The more features shared, the higher the activation.

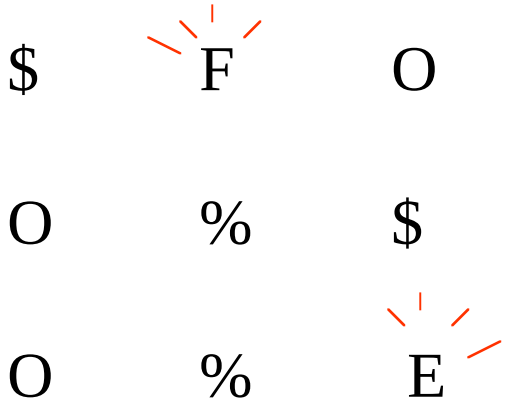
C. search those with highest activation to check for match to target.

D. assume some noise in activation values.

Target: E



Target: E



Activation unit

DIVIDED ATTENTION -

Ability to attend to two things simultaneously

Factors affecting?

1. Task similarity - two verbal tasks more interfering than verbal and visual

Shadowing speech while classifying written words vs. pictures

2. Response similarity - button press with left hand for one task, right for other

vs. button press for one task, vocal response for other

3. Practice - driving car and talking or listening to radio

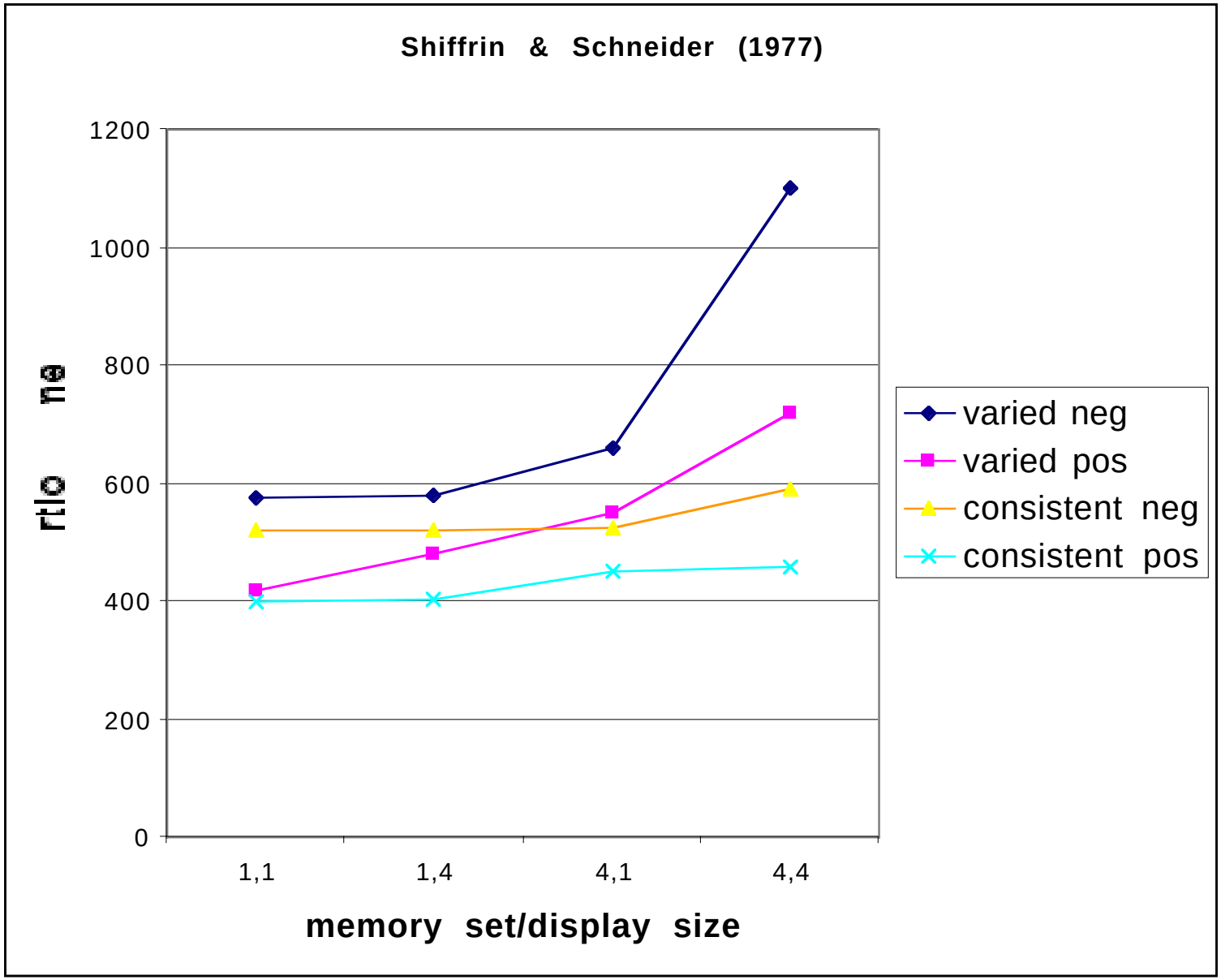
Development of “automaticity”

Shiffrin & Schneider (1977)

Visual search task

1. varied number of targets in memory set (1, 4)
   i.e., search for “A” or search for “A” “T” “B” or “F”
2. varied display size (1, 4)

3. consistent vs. varied mapping
   consistent - targets always drawn from the same set
   distractors always from same set
   varied - targets and distractors vary from trial to trial


Shiffrin & Schneider (1977)
1200
1000
800
600
400
200
0
1,1
1,4
4,1
4,4
memory set/display size
varied neg
varied pos
consistent neg
consistent pos

Additional findings:

1. Used digits/letters initially as targets/distractors

2. Similar pattern obtained if used arbitary sets of letters as targets/distractors

3. Great interference if consistent mapping, then switch targets/distractors

4. More difficult to ignore part of space if trained on consistent mapping - attention drawn to targets

Development with practice of automaticity in detecting targets. Inflexible, difficult to inhibit

What underlies automaticity?

1. Restructuring: Change nature of task. Determine small set of features that distinguishes targets from distractors?

2. Logan - memory explanation.

Each time stimulus associated with response, memory trace laid down. The more such traces that are identical, the faster a new example of that stimulus will elicit response. No need to think through decisions.