Chang, S., & Egeth, H. E. (2019). Enhancement and Suppression Flexibly Guide Attention

**Perspective:** Selection models: (Broadbent: **early**, Treisman: **attenuation**, modern: **all levels** + sensory memo)

Cocktail party effect: stimulus/semantics-driven attention

**Negative priming**: middle letter in ‘suppression’ test slower to read after being suppressed/ignored in previous trial

**Posner cueing task:** Validity and endogenous/exogenous -> disengagement, movement, engagement

**Authors’ conclusion: enhancement and suppression!**

clear demonstration that **both target-feature enhancement and distractor-feature suppression** contribute to guiding attention in **separate and independent ways**.

clear behavioural evidence for an **enhancement-plus-suppression model**; observers can concurrently maintain two different attentional control processes and use either one of them as the occasion demands

**Method (Fig. 1)**: search and probe trials

**Search trials (70%):** Search for diamond, report dot position

-In some trials a **singleton** (one shape shown in a different colour) was present as a **distractor**.

-All other shapes are the same colour, which varies between participants, though they are naïve to the meaning of colours.

-**Trains participants to enhance target colour and suppress distractor colour.**

**Probe trials (30%):** Four ovals of different colour, task being to report whether an **A or a B (probe target)** was present. One oval would have a **critical colour** (target or distractor colour in search trials)

-Sometimes the probe target would appear on a **critical** colour and sometimes it would appear on a **neutral** colour.

-Target display shown for **100 ms to avoid reallocation of attention** after initial selection

Feedback was given immediately by showing ‘correct!’ or ‘incorrect!’ in the middle of the screen for 500 ms.

**Motivation and hypothesis**: Salient but irrelevant stimuli can be supressed top-down, but is this also target enhancement?

**Capture-probe paradigm** test whether attention can be guided by target enhancement as well as distractor suppression.

**What is attention?**

“The marshalling of cognitive processing resources on a particular aspect of the external or internal environment, or on internal processes such as thoughts or memories.”

-Selects information/directs focus (external/perceptual or internal/thoughts/memories)

-Selective attention: highlights a type of stimulus

-Selection: **early** (stimulus driven, based on physical characteristics) and **late** (top-down, based on semantic knowledge or controlled attention)

**Results: Search trials**

-Faster responses with singleton present (9 ms benefit)

-Participants learned the significance of colour.

**Results: Probe trials (Fig. 2)**

**Target colour present**

-Probe on target: ↓RT ↑ACC: 34-ms target-colour benefit.

-Probe on neutral: ↑RT ↓ACC

**Distractor colour present:**

-Probe on distractor: ↑RT ↓ACC: 43-ms distractor cost

-Probe on neutral: ↓RT ↑ACC

**Criticism**

-Ceiling effect: task too easy? Very high accuracy scores! Able to solve without relying on either suppression or enhancement?

-No masking of probe target display: might have **more than 100 ms** to search (**iconic memory**/**after image**)

-No controls: **comparisons are between distractors and targets**, rather than with controls that have neither.

Comparison between easier task (supressed distractor) and harder task (enhanced target) instead of ‘unaltered’ task (without target or distractor colour)

-**Uncertainty**: Are we measuring people’s attention or how certain they are of their answer? Stopping to make sure they are doing the right task when they realise target is on distractor colour?