



ARC CENTRE OF EXCELLENCE IN COGNITION AND ITS DISORDERS

Conflict in an integrated and a primed Stroop task

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Introduction

Stroop task

Categorise the colour of the stimulus:

blue red

- **Congruence effect:** Faster response when the colour and the word match (=congruent) compared to mismatch (=incongruent)
- Generally regarded as the gold standard in demonstrating the **automaticity of reading** (see review by MacLeod, 1991)
- Effect reflects the **conflict** between the task of categorising the colour and the task of reading the to-be-ignored written word

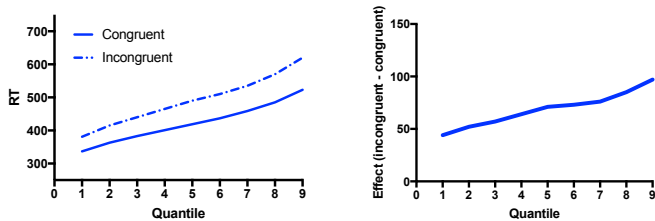
RT distribution analysis

Plot the effect of the manipulation on the entire RT distribution:

- Quantile plot: Quantile estimates for conditions separately
- Delta plot: Difference between conditions as function of quantiles

Consistent pattern (e.g., Pratte et al., 2010)

- Stroop congruence effect increases across the quantiles (left)
- Positive slope of delta plot (right)
- Explained in terms of difference in evidence accumulation rate



Stark contrast to the primed semantic categorisation task

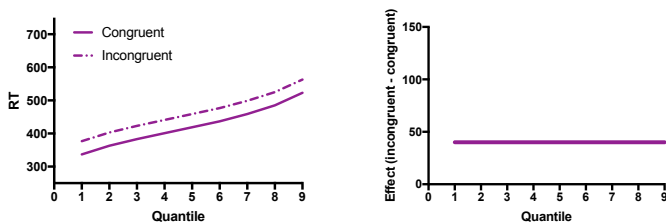
Categorise the target word as an "animal or "non-animal":

hawk-EAGLE table-EAGLE
chair-BENCH stork-BENCH

- **Congruence effect:** Faster response to the target when the preceding prime is semantically related compared to unrelated

Consistent RT distribution pattern (e.g., De Wit & Kinoshita, 2014, 2015a,b; Voss et al., 2013)

- Semantic priming effect is constant across the quantiles (left)
- Flat slope of delta plot (right)
- Explained in terms of "head-start" in the accumulation process



Key difference between tasks

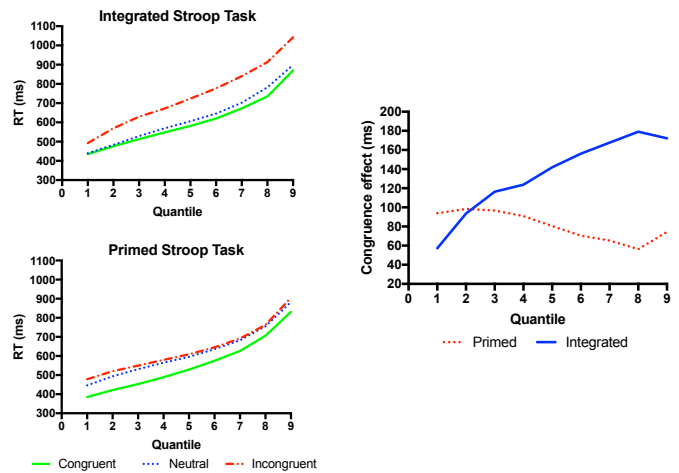
Integration of word distractor and colour target vs. **temporal separation** of prime and target

Our study

Investigating the **nature of the conflict** underlying the Stroop congruence effect, using 2 variants of the **manual** Stroop task:

- **Integrated** Stroop task
 - Simultaneous presentation of colour and distractor word
- **Primed** Stroop task (460 ms prime, 40 ms blank)
 - blue - ##### xxxx - ##### red - #####

Results



Key findings

Quantile analysis

- Integrated Stroop task
 - Congruence effect increased across the quantiles
 - Interference-dominant pattern
- Primed Stroop task
 - Congruence effect relatively constant across the quantiles
 - Facilitation-dominant pattern

Explanation in terms of evidence accumulation account

- Integrated Stroop task
 - Word distractor and colour target are integrated into 1 object
 - Task conflict:
 - Evidence accumulation occurs **in parallel**
 - Affects the effective rate of evidence accumulation
- Primed Stroop task
 - Word distractor and colour target are separate objects
 - Little task conflict:
 - Evidence accumulation is **temporally separated**
 - Affects the head start or change in response threshold

Conclusion

- Modulation of RT distribution by task variant tells us **how** the accumulation of conflicting information impacts on the response
- **Integration** of stimuli into 1 object drives the consistent RT distribution pattern in the 'standard' Stroop task