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Abstract Insert your abstract here. Include keywords, PACS and mathematical subject classification numbers as needed.

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1 Introduction

Target Contrast Signal Theory: "precise mathematical model that allows one to make specific point predictions about how components of visual complexity combine to impact human performance".

Model predicts search performance in heterogeneous scenes based on parameters estimated in homogeneous scenes.

"Wang, Buetti and Lleras (2017) developed an equation to predict search performance in heterogeneous visual search scenes (i.e., multiple types of non-target objects simultaneously present) based on parameters observed when participants perform search in homogeneous scenes (i.e., when all non-target objects are identical to one another). The equation was based on a computational model where every item in the display is processed with unlimited capacity and independently of one another, with the goal of determining whether the item is likely to be a target or not. The model was tested in two experiments using real-world objects."

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Buetti (2019): Parallel search efficiency (logarithmic search slope) to find target amongst homogeneous distractors estimated: different colours (red target in orange, blue, yellow distractors) or shapes (semicircle target in circle, diamond, triangle distractors) tested. New group of participants searched for same target in heterogeneous displays that contained multiple types of distractors (e.g. blue circles, orange diamonds, yellow triangles). Observed RTs in latter experiment compared to predicted reaction times from model.

Lleras (2019):

1.1 Hypothesis

We plan a number of experiments to test the extent to which the original results replicate and generalise. As well as following the original, between-subjects, experiment design, in which data from one group of observers in one task is used to predict behaviour of a second group of participants in a different task, we will allow for within-subject comparisons. Specifically, to what extent do the individual differences in the homogeneous task explain the differences in the heterogeneous task?

1. **Replication of Buetti et al (2019) with online data collection.**

Specifically, that the *collinear contrast ingratiation model* outperforms the *best feature guidance*, and *orthogonal contrast combination models*. Furthermore, the $R^2 = (99\% \text{ HPDI} = [,])$ between predicted and observer reaction times.

2. non-independent features
3. Larger number of distractors
4. Larger number of distractor types

2 Reanalysis of Buetti et al (2019)

In our proposed experiments, we would like to make use of multi-level models, and work within a Bayesian framework. To start, we will re-analysis previous data to verify that this does not invalidate the original conclusions. And, how to phrase, something about these new results (on the old data) being the ones we want to replicate.

2.1 Methods

2.1.1 Data

Data taken from OSF... using the exclusion criteria originally used. What about incorrect trials etc?

Do we want to re-do any of the other papers while we're at it?

2.1.2 Modelling Approach

R, brms, details.

Funky equation from Buetti.

2.1.3 Prior Predictions

2.2 Results

2.3 Discussion

3 Experiment 1

H0: confirm collinear method is best (compared to orthogonal contrast combination and best feature guidance models)

[If this is indeed the case, we will use only the collinear contrast integration model in the following experiments].

3.1 Methods

3.2 Results

3.3 Discussion

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References

1. Author, Article title, Journal, Volume, page numbers (year)
2. Author, Book title, page numbers. Publisher, place (year)