Categorical discrimination of colour

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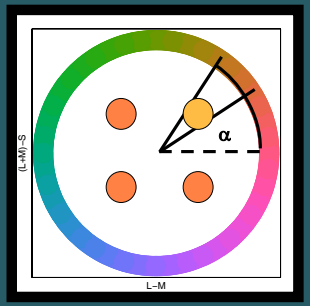
INTRODUCTION

Objective:
- Clarify the relationship between perceptual colour discrimination and linguistically distinguished colour categories.

Particularity:
- The construction of a local metric for equal discriminability.

Tests:
- Do colour discrimination thresholds in the *Derrington-Krauskopf-Lennie (DKL)* colour space decrease at category boundaries?
- Is there a *Category Effect* in terms of a decrease in reaction times (RTs) at category boundaries for equally discriminable stimuli?



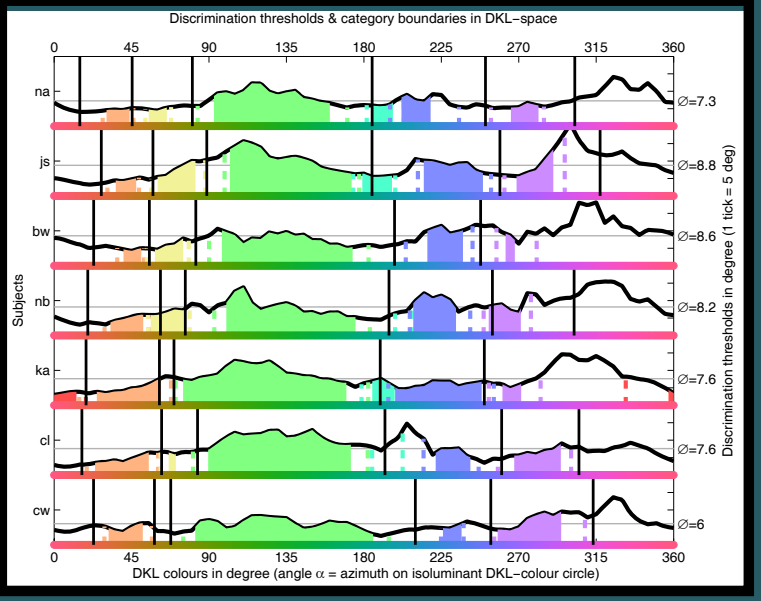
METHOD

Stimuli:
- Disks with hues of approx. equal saturation along an isoluminant colour circle in the DKL-space.

Colour Discrimination:
- *4-Alternative Forced-Choice* discrimination task; convergence through staircase technique.

Colour Naming:
- Method1: Assignment of random colours to one category at a time.
- Method2: Differential border between two adjoined categories, convergence through staircase.

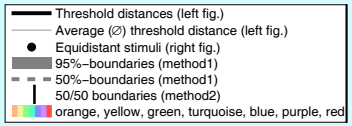
RTs in colour identification:
- Discrimination task for equally and clearly discriminable colours within & across categories.
- For this purpose discrimination intensities were set to 2 thresholds.

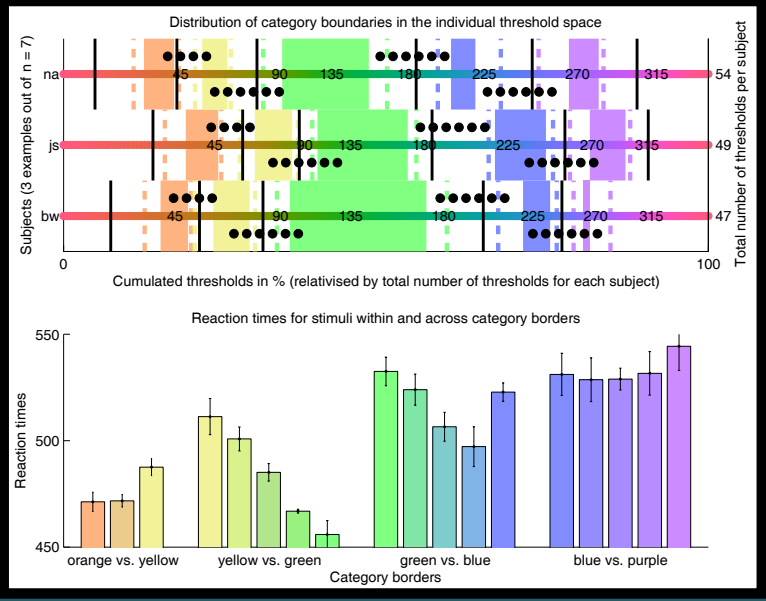


RESULTS

Thresholds in DKL-space:
- The average thresholds betw. 50%-boundaries were smaller than those within 95%-boundaries of both categories together for:
  - yellow/green by 4.1% (n=5);
  - green/blue by 5.7% (n=7);
  - blue/purple by 1.6% (n=7).
- For yellow/green this was only due to the high thresholds within green.
- For green/blue & blue/purple there was a local minimum between categories.
- For orange/yellow the average thresholds within categories were higher by 2.2% (n=5).

RTs for equally discriminable stimuli:
- RTs between green & blue tend to be reduced compared to RTs within green & blue (528ms within vs. 507ms between, n=9).





CONCLUSION

Blue & green in particular
- Current studies on colour naming have supported the assumption of categorical perception through a category effect at the blue/green-boundary of Munsell chips.
- In the present study, the blue/green boundary seems to be the most prone to any such effects.
- However, in pilot studies discrimination measurements exclusively at the blue/green boundary led to smaller overall thresholds, but not to a particular threshold reduction at the category boundary (n=7).

Colour categories in general:
- In view of the overall pattern of discrimination thresholds, local extrema seem not to coincide with category boundaries.

Outlook:
- A metric of equal discriminability will be applied to the respective Munsell colours in order to investigate the origin of the category effect at the blue/green boundary.