

Referential Overspecification as a Rational Strategy



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Introduction & Hypothesis

Specificity in referential communication

- **Grice's Maxim of Quantity** [1]: Speakers should produce only information that is strictly necessary for identifying the target
- However, it is possible to establish reference with either **minimally-specified** (MS; precise) or **over-specified** (OS; redundant) expressions
- Moreover, **speakers overspecify frequently** and systematically [e.g., 2-6]

Q: Why do people overspecify?

Referential Entropy

- A measure of visual scene **complexity** based on number of potential targets that are consistent with the description at a given point in the referring expression
- Incoming **words can reduce referential entropy** to a greater or lesser extent [7]
- **Overspecification facilitates processing**, in general, and even more so when it reduces entropy efficiently [8]

Hypothesis: Speakers may include redundant information in order to help listeners restrict search space, and thereby reduce cognitive effort

Methods

Participants

- 47 pairs of native German speakers (mean age = 23.7, 69 female)
- Randomly assigned to Speaker and Listener role

Task

- Speaker and Listener see same set of objects, but in different spatial arrangements
- Speaker's task: Ask which side of the Listener's screen the target object appears on

Stimuli

- Crossed **Necessary Adjective** (Colour, Pattern) X **Entropy Reduction Advantage** (Colour, Pattern, Equal)
- 6 items per condition (labels, e.g. 2s2c4p, indicate the number of objects with the same shape, colour and pattern relative to the target)
- Intermixed with 3 kinds of fillers for total of 144 trials

Predictions

- Greatest OS rate should be found when redundant adjective reduces entropy more than necessary adjective (b & e)

Exclusion Criteria

- 3 speakers > 90% minimal specifications
- 2 speakers > 15% underspecifications (cf. <5%)
- Overspecifications primed by the immediately previous trial (i.e. identical word order) (19.67%)
- Trials containing self-repairs of adjective/noun or order/amount of information conveyed (4.42%), or underspecifications (3.85%)

Necessary Adjective	Colour	 a. 2s 2c 4p Colour reduces entropy more	 b. 2s 4c 2p Pattern reduces entropy more	 c. 2s 4c 4p Colour and Pattern reduce entropy equally
		Example MS utterance: <i>Is the blue ball on the left?</i>		
		Pattern	 d. 2s 4c 2p Pattern reduces entropy more	 e. 2s 2c 4p Colour reduces entropy more
	Example MS utterance: <i>Is the striped ball on the left?</i>			

Preliminary Results

Listener Accuracy

- Mean = 98.3%

Speaker Productions

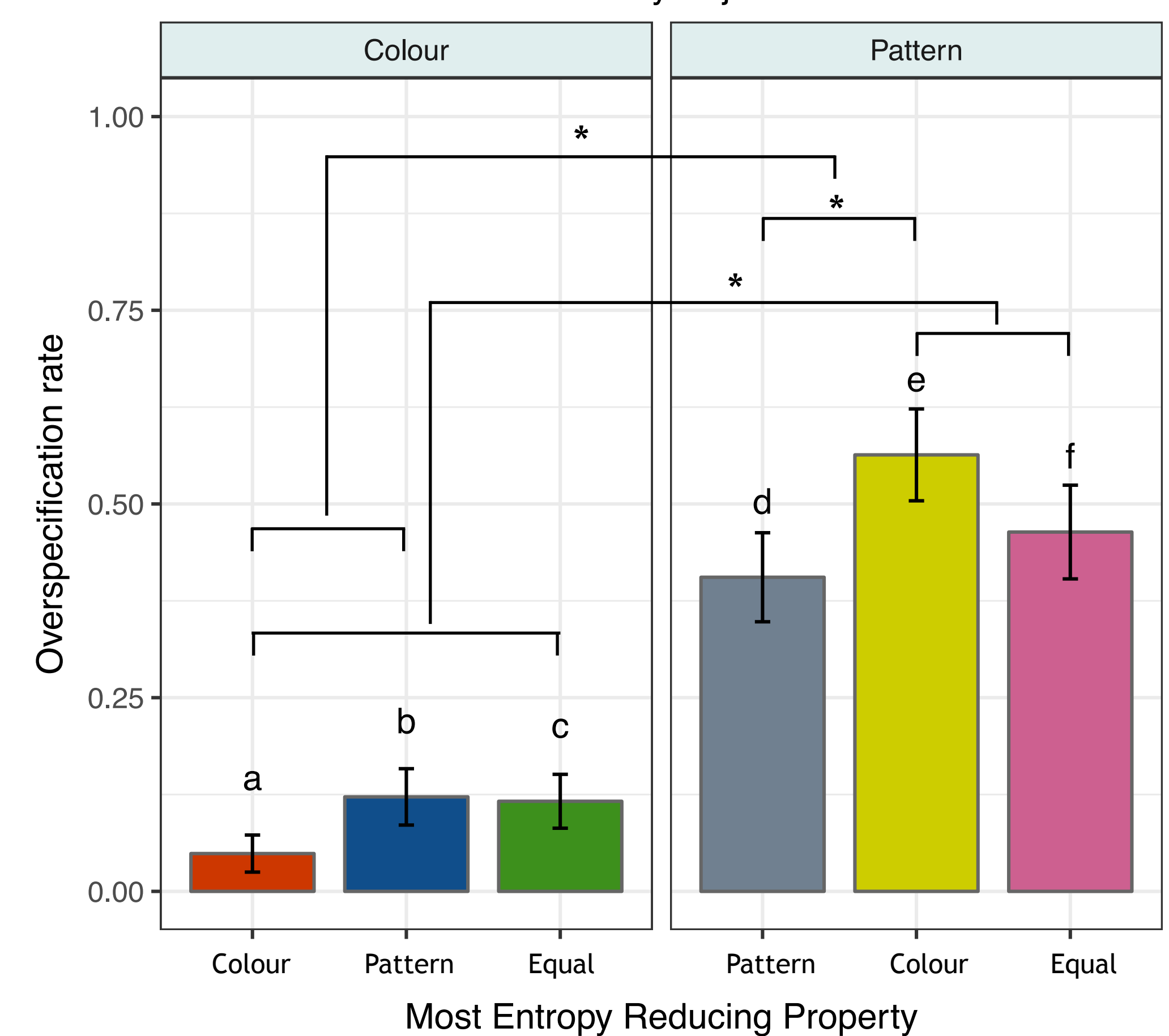
- MS = 66.41%
- OS = 33.59%

Speakers were categorised into 3 groups

- **Universal OS Group** (N=16): OS rate > 80% for both Colour and Pattern Necessary items
- **Colour OS Group** (N=10): OS rate > 80% for Pattern Necessary items
- **Rational OS Group** (N=16): remainder of speakers

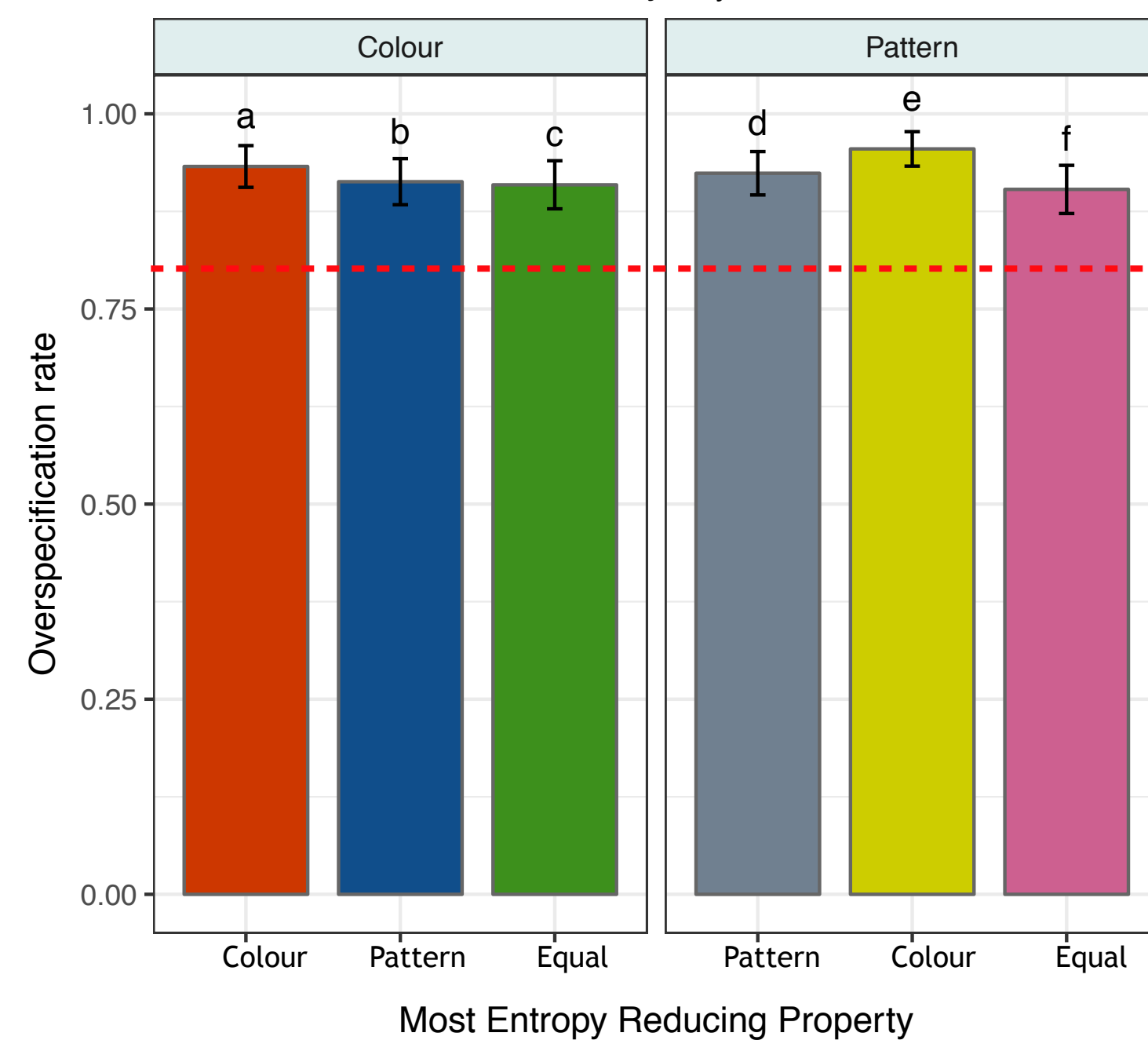
Rational Overspecification Group

Necessary Adjective



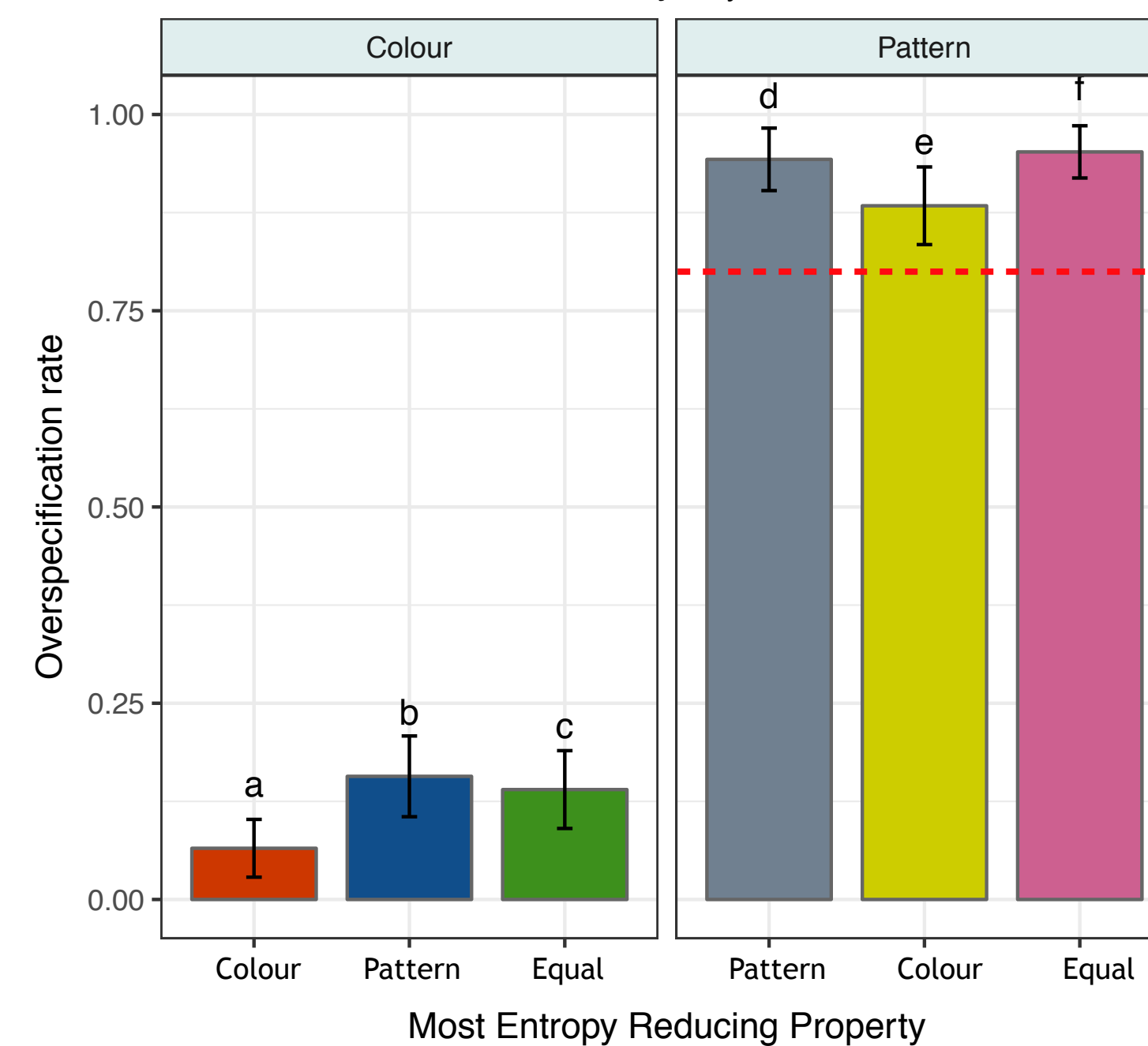
Universal Overspecification Group

Necessary Adjective



Colour Overspecification Group

Necessary Adjective



References

- [1] Grice (1975) in Cole & Morgan
- [2] Pechmann (1989) *Linguistics*
- [3] Arts et al. (2011) *J Pragmat*
- [4] Koolen et al. (2013) *Cognitive Sci*
- [5] Tarenskeen et al. (2015) *Front Psych*
- [6] Rubio-Fernández (2016) *Front Psych*
- [7] Hale (2003) *J Psycholing Res*
- [8] Tourtouri et al. (2017) *CogSci*
- [9] Frank & Goodman (2012) *Science*

Conclusion & Discussion

- Results contribute to growing evidence that speakers frequently use redundant information, and that this does not adversely affect listeners' performance (listener accuracy at ceiling)
- **Individual differences** in use of redundant information may reflect differing strategies
 - Universal OS may be a strategy to minimise speaker effort
 - Colour OS may be efficient for both Speakers and Listeners [cf. 6] due to language-wide frequency of colour modification and/or visual salience of colour [5]
 - OS may be a rational strategy when redundant information reduces entropy [cf. 9]

Ongoing Analyses

- Data collection under way, so stay tuned!
- Does the Entropy Reduction Advantage manipulation influence word order preferences?
- Does entropy reduction also influence the production of overspecifications in contexts without shape competitors (fillers in which the target shape is unique)?