Individual Differences in the Tendency to See the Expected

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Introduction

Possessing prior knowledge of stimuli facilitates their entry into visual awareness[1,3]

Expected stimuli are:
- More likely to enter awareness
- Consciously registered faster
- Require weaker sensory evidence for detection

Different methods are used to induce priors:
- Perceptual priming[2]
- Expectancy cues[3]
- Self-generated imagery[4]
- Inducing a predictive context[5]

RQ1: Do people reliably differ in the tendency to see the expected percept?

RQ2: Do different methods of manipulating perceptual priors engage the same mechanism (e.g. activate sensory templates[6])?

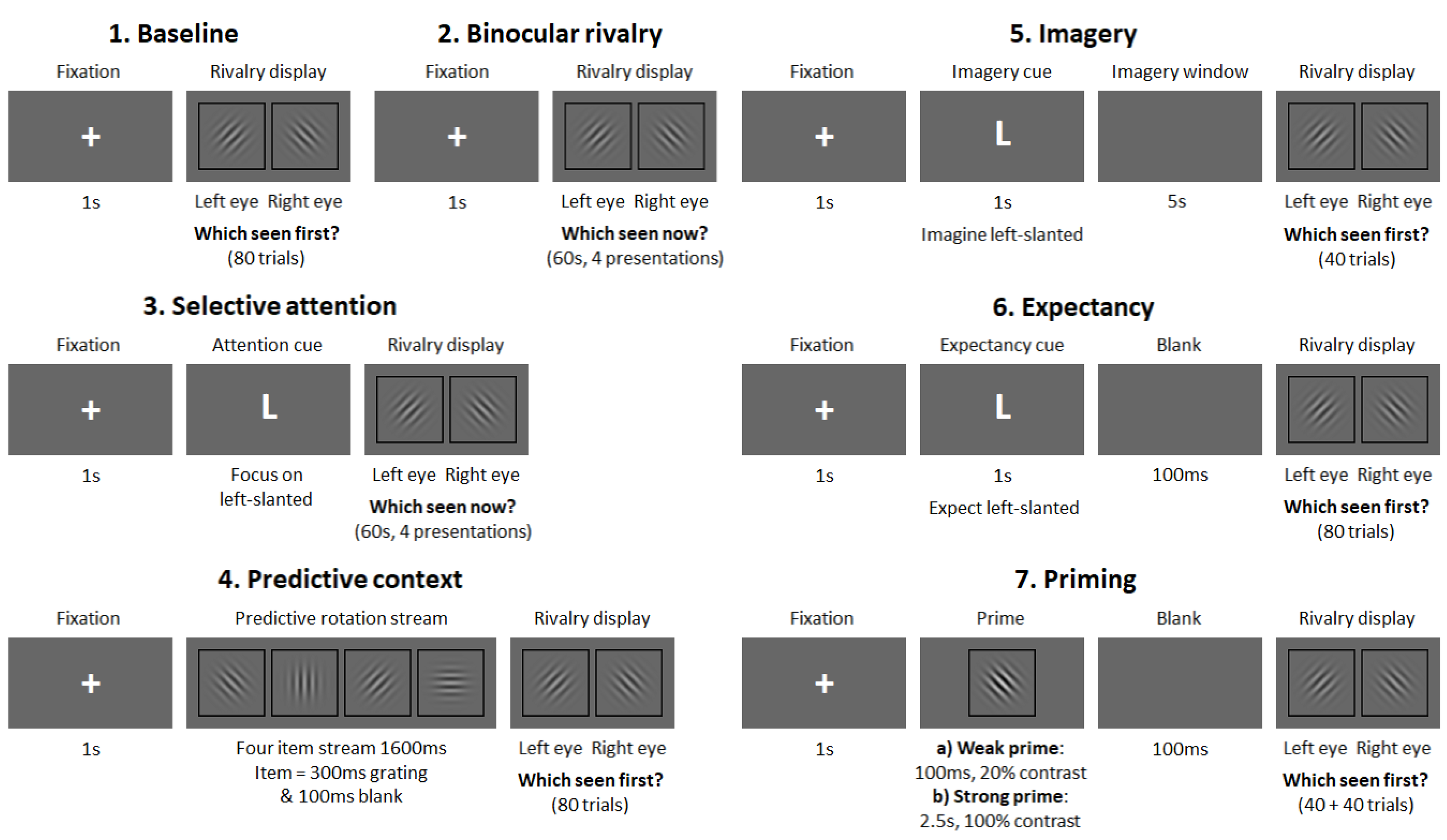
RQ3: Does reliance on perceptual priors predict perceptual abilities and traits?

Methods

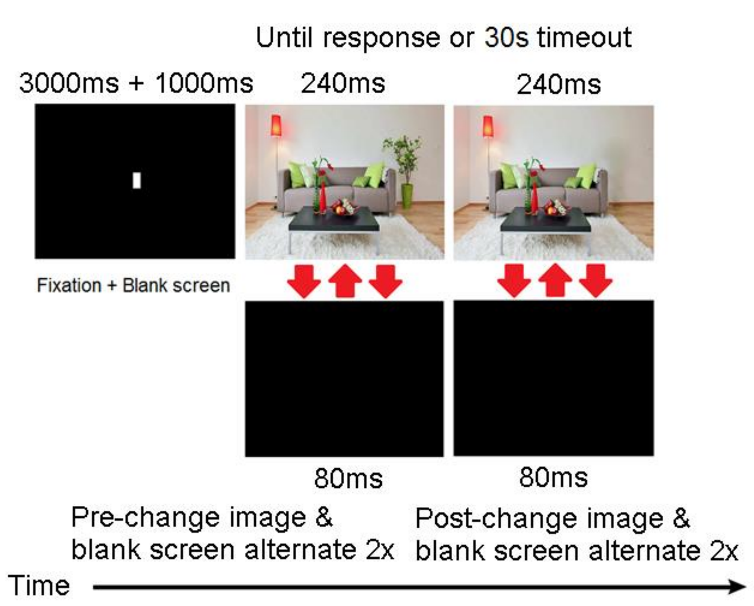
- 75 participants (58 female, aged 18-46) with normal or corrected-to-normal vision
- Study duration 2h (30min online questionnaires, 1h 30min lab-based tasks)

TNO test for stereoscopic vision

Binocular rivalry task



Change blindness task & a battery of questionnaires assessing perceptual traits



- Cognitive Failures Questionnaire (Broadbent et al., 1982)
- Sussex Cognitive Styles Questionnaire: Imagery Ability (Mealor et al., 2016)
- Cardiff Anomalous Perceptions Scale (CAPS) (Bell et al., 2005)
- Autism-Spectrum Quotient (Baron-Cohen et al., 2001)

Results

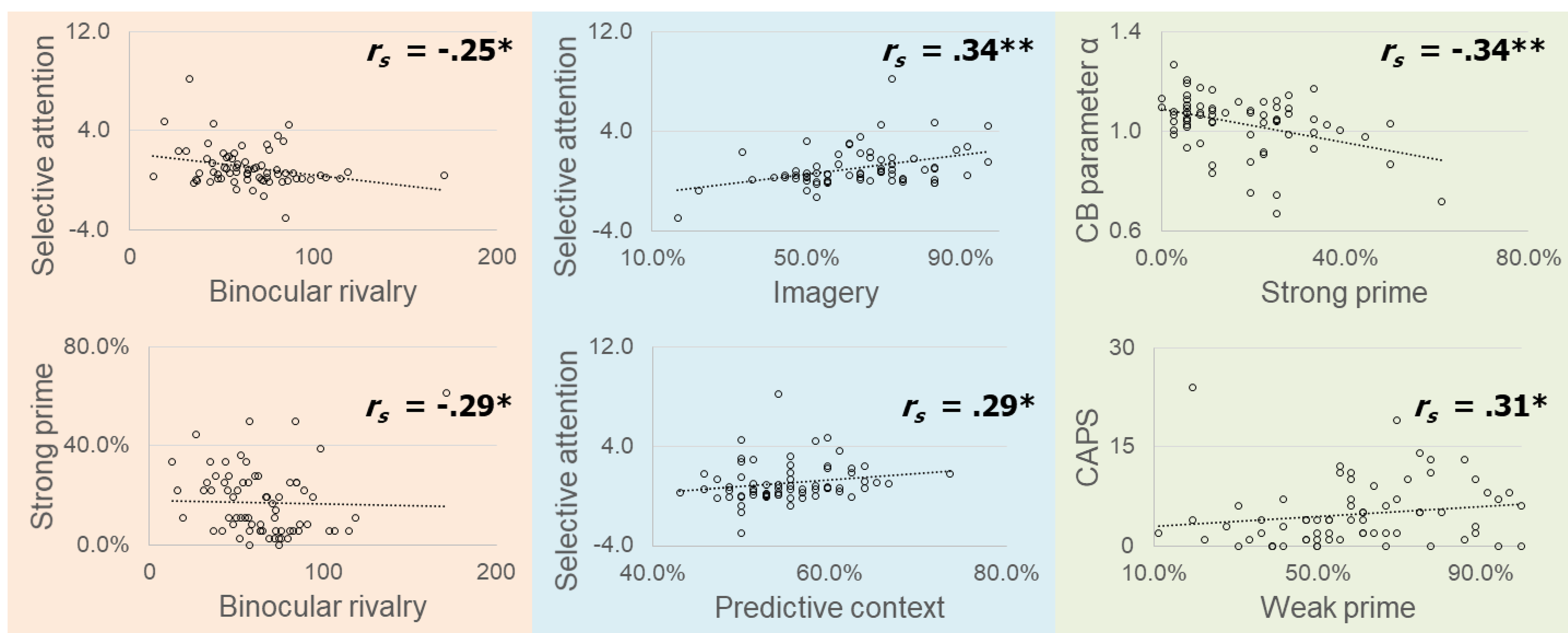
All attentional and prior manipulations significantly biased the subjective experience of binocular rivalry

- Expected stimuli were likely to be perceived first (relative to 50%) and were reported faster (strong primes showing the opposite)

	Mean (SD)	Cohen's d	t-test (two-tailed)
Selective attention (s)	1.04 (1.61)	0.71	$p < .001$
Predictive context (%)	55.0 (5.8)	0.86	$p < .001$
Imagery (%)	63.5 (16.3)	0.83	$p < .001$
Expectancy (%)	56.3 (9.2)	0.68	$p < .001$
Weak prime (%)	59.2 (21.0)	0.44	$p = .001$
Strong prime (%)	17.2 (13.4)	2.45	$p < .001$

Some (but not all) expectancy-based effects correlated, suggesting a common mechanism

- The ability to use selective attention to control rivalry predicted expectancy-based effects (imagery & predictive context)
- Proneness to adaptation by strong signal primes predicted superior naturalistic change detection
- Proneness to priming by weak signal primes predicted the experience of perceptual anomalies



Exploratory factor analysis with varimax rotation (N = 67)

	Selective attention	Adaptation	Binocular rivalry
Binocular rivalry	-.20	-.02	**.90**
Selective attention	**.69**	-.04	-.13
Predictive context	.27	.29	.03
Imagery	**.59**	.22	.16
Expectancy	**.45**	-.17	-.04
Weak prime	**.42**	.10	-.16
Strong prime	.05	**-.65**	-.02
CB parameter α	.13	**.66**	-.05
CB parameter β	.15	-.23	.16

Discussion

- All prior manipulations led to significant effects on awareness of binocular rivalry (with moderate to large effects)
- Attentional control predicted expectancy-based effects, suggesting they may share a common mechanism
- Adaptation predicted naturalistic change detection, whereas facilitatory priming predicted the experience of perceptual anomalies

References

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