Context-Driven Control Is Not Cued By Gender

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What cues Context-Driven Control?

Context-driven control refers to a fast and flexible form of cognitive control that emerges as a function of experience within a task (Bugg & Crump, 2012).

While the majority of research on context-driven control has focused on perceptual dimensions such as location, size, and shape, it has been suggested that social categories, including gender, can serve as cues for context-driven control (Cañadas, Rodríguez-Bailón, Milliken, & Lupiáñez, 2013).

However, previous studies reporting evidence for gender as a cue for context-driven control are confounded by stimulus-response contingencies (Cañadas et al., 2013; Cañadas, Lupiáñez, Kawakami, Niedenthal, & Rodríguez-Bailón, 2016). Therefore, it remains an open question as to whether social categories such as gender serve as cues for context-driven control or serve as cues for contingency learning.

Experiment 1: Can Gender Serve to Cue Context-driven Control?

Participants were presented with trials which included a Stroop stimulus and a nominally irrelevant face. Participants were instructed to ignore the face and the meaning of the word and to report the color in which the word appears.

A context-level manipulation was constructed in which one face was presented with congruent stimuli on 75% of all trials (mostly congruent face: **MC**). The other face was presented with incongruent stimuli on 75% of all trials (mostly incongruent face: **MI**) (Crump, Gong, & Milliken, 2006).

Stimulus Frequencies in Experiment 1

			Word			
Face PC	Set Type	Color	Red	Green	Blue	Yellow
Female Face (MC)	Inducer	Red	44	4		
		Green	4	44		
	Diagnostic	Blue			24	24
		Yellow			24	24
Male Face (MI)	Inducer	Red	4	44		
		Green	44	4		
	Diagnostic	Blue			24	24
		Yellow			24	24

Stimuli in the **inducer set** (Red and Green) consisted of contingency biased items: participants could use the compound-cue of face and word to predict the upcoming response (Schmidt & Lemercier, 2019).

Items in the **diagnostic set** (Blue and Yellow) were contingency unbiased.

If gender cues control, the size of the congruency effect should be reduced for the MI relative to the MC face and this context-specific proportion congruent (CSPC) effect should emerge for both the **inducer** and **diagnostic** sets (Braem et al., 2019).

Experiment 1: Results

Sixty-six participants (Mean Age = 27.01, SD = 6.43, range 18 – 40) completed the experiment online via the Gorilla™ online experiment builder (Anwyl-Irvine, Massonnié, Flitton, Kirkham, & Evershed, 2020).

Mean Response Time (ms)					
		Trial Type			
Set Type	Face PC	Congruent	Incongruent	Congruency Effect	CSPC Effect
Inducer	Mostly Congruent	762 (17)	919 (25)	157	44*
	Mostly Incongruent	775 (20)	888 (18)	113	
Diagnostic	Mostly Congruent	746 (16)	888 (18)	142	0
	Mostly Incongruent	753 (17)	895 (19)	142	
Values in parentheses indicate standard error of the mean.					

A CSPC effect emerged for the **inducer** set suggesting participants learn about variations in stimuli across faces. The absence of a CSPC effect for the **diagnostic** set suggests that this learning is not generalized to contingency unbiased stimuli. In this experiment, gender does not cue control.

Experiment 2: Encouraging Category Level Control

In Experiment 1, participants were presented with 1 female face and 1 male face. In Experiment 2, participants were encouraged to use category level control settings (Bugg & Dey, 2020) through the inclusion of three female and three male faces.

Stimulus Frequencies in Experiment 2

			Word			
Face PC	Set Type	Color	Red	Green	Blue	Yellow
Female Face 1 (MC)	Inducer	Red	22	2		
		Green	2	22		
	Diagnostic	Blue			12	12
		Yellow			12	12
Female Face 2 (MC)	Inducer	Red	22	2		
		Green	2	22		
	Diagnostic	Blue			12	12
		Yellow			12	12
Female Face 3 (MC)	Inducer	Red	22	2		
		Green	2	22		
	Diagnostic	Blue			12	12
		Yellow			12	12
Male Face 1 (MI)	Inducer	Red	2	22		
		Green	22	2		
	Diagnostic	Blue			12	12
		Yellow			12	12
Male Face 2 (MI)	Inducer	Red	2	22		
		Green	22	2		
	Diagnostic	Blue			12	12
		Yellow			12	12
Male Face 3 (MI)	Inducer	Red	2	22		
		Green	22	2		
	Diagnostic	Blue			12	12
		Yellow			12	12

Experiment 2: Results

Sixty-five participants (Mean Age = 27.33, SD = 6.38, range 18 – 41) completed the experiment remotely via Gorilla™.

Mean Response Time (ms) in Experiment 2					
		Trial Type			
Set Type	Face PC	Congruent	Incongruent	Congruency Effect	CSPC Effect
Inducer	Mostly Congruent	793 (20)	954 (24)	161	37*
	Mostly Incongruent	795 (23)	919 (19)	124	
Diagnostic	Mostly Congruent	790 (21)	920 (21)	130	1
	Mostly Incongruent	792 (22)	921 (21)	129	
Values in parentheses indicate standard error of the mean.					

Replicating the results of Experiment 1, a CSPC effect was observed for the **Inducer** but not the **diagnostic** set. Again, participants appear to be learning about variations in stimuli across famous but do no appear to be using gender as a cue for context-driven control.

Experiment 3: Is Gender or Facial Identity Being Learned?

Experiment 3 served as a replication of Experiment 1, with the exception that individual faces varied in identity but not gender.

Stimulus Frequencies in Experiment 3 - 1 Male vs. 1 Male

			Word			
Face PC	Set Type	Color	Red	Green	Blue	Yellow
Male Face 1 (MC)	Inducer	Red	44	4		
		Green	4	44		
	Diagnostic	Blue			24	24
		Yellow			24	24
Male Face 2 (MI)	Inducer	Red	4	44		
		Green	44	4		
	Diagnostic	Blue			24	24
		Yellow			24	24

Sixty-five participants (Mean Age = 27.33, SD = 6.38, range 18 – 41) completed the experiment remotely via Gorilla™.

Mean Reaction Time (ms) in Experiment 3					
		Trial Type			
Set Type	Face PC	Congruent	Incongruent	Congruency Effect	CSPC Effect
Inducer	Mostly Congruent	783	940	157	61*
	Mostly Incongruent	817	913	96	
Diagnostic	Mostly Congruent	777	905	128	-1
	Mostly Incongruent	776	905	129	
Values in parentheses indicate standard error of the mean.					

For a third experiment, a CSPC effect was observed for the **inducer** but not the **diagnostic** set. This result suggests that what is being learned in these experiments may be specific to the identify, and not the gender, of the face.

Conclusions

Across three experiments, faces were found to be an important cue for individuals to organize stimuli in the task (as indicated by a CSPC effect in the **inducer** sets). However, this did not generalize to contingency unbiased items (as indicated by the absence of CSPC effects in the **diagnostic** sets). Therefore, gender does not appear to cue context-driven control.

In Experiment 3, a CSPC effect was found for the inducer set within gender suggesting that identity and not gender which serves as an important cue for learning.

Future work will explore the impact of other social categories, including race, on context-driven control and the extent to which individual differences of participants interact with the use context-driven control.

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