

Performance-Approach Goals Deplete Working Memory  
and Impair Cognitive Performance

Marie Crouzevialle

Fabrizio Butera

University of Lausanne

## Supplementary material

### Experiment 1 Accuracy Data Analysis

We submitted mean accuracy scores to a 2 (condition: control, performance-approach goal induction) X 2 (phase: 1, 2) X 3 (problem demand: low-demand, intermediate-demand, high-demand) mixed-model ANOVA with repeated measures on the second and third factors (see Table S1). This analysis revealed a significant main effect of problems' demand,  $F(2, 42) = 29.21, p < .001$ , showing that accuracy was significantly higher for low- than for high-demand problems. The condition X phase X problem demand interaction appeared to be non-significant,  $F(2, 42) = 1.29, p = .28, PRE = .06$ . No other effect reached significance. The same analysis that takes into account only low- and high-demand problems, to allow comparison with the following experiments, i.e., a 2 (condition: control, performance-approach goal induction) X 2 (phase: pre-manipulation, post-manipulation) X 2 (problem demand: low-demand, high-demand) mixed-model ANOVA with repeated measures on the second and third factors also revealed a significant main effect of problems' demand,  $F(1, 42) = 59.35, p < .001$ . The condition X phase X problem demand interaction appeared to be non-significant,  $F(1, 42) = 2.48, p = .12, PRE = .06$ . No other effect reached significance.

### Experiment 2 Accuracy Data Analysis

We submitted mean accuracy scores to a 2 (instructions: control, performance-approach goal induction) X 2 (design: horizontal, vertical) X 2 (problem demand: low-demand, high-demand) X 2 (phase: 1, 2) mixed-model ANOVA with repeated measures on the third and fourth factors (see Table S2). This analysis revealed a significant main effect of phase,  $F(1, 110) = 20.80, p < .001$ , as well as a significant main effect of problem demand,  $F(1, 110) = 230.95, p < .001$ . The phase X difficulty interaction also appeared to be significant,  $F(1, 110) = 20.12, p < .001$ , as well as the phase X problem demand X

instructions interaction,  $F(1, 110) = 5.65, p < .05$ . The four-way interaction appeared to be marginally significant,  $F(1, 110) = 3.84, p = .06, PRE = .04$ . No other effect reached significance.

### **Experiment 3 Accuracy Data Analysis:**

In order to take the phase (1, 2) into account in the linear regression analysis, we used the computed differences in performance (phase 2 – phase 1); additionally, in order to test whether the two computed differences in performance—for both low- and high-demand problems—differed as a function of experimental conditions, we computed a difference score by subtracting the difference in performance for high-demand problems from the difference in performance for low-demand problems (Judd & McClelland, 1989); but see Table S3 for accuracy means. We then conducted a linear regression analysis, where predictors were a set of orthogonal contrasts; results revealed that the first contrast – the one testing the planned comparison corresponding to the hypothesis: “1 -1 1 -1”, respectively associated with control, performance-approach goal-only, performance-approach goal with neutral topic hyperaccessibility, and performance-approach goal with performance-goal hyperaccessibility conditions – appeared to be marginally significant,  $B = -3.62, t(84) = -1.65, p = .10, PRE = .03$ . Conversely, the second and third orthogonal tests (respectively, “1 0 -1 0” and “0 1 0 -1”), designed to assess the residual variance, were not significant (respectively,  $B = 0.15; t < 1$ , and  $B = 3.75, t(84) = 1.25, p = .22$ ).

Table S1.

*Experiment 1: Mean Accuracy (in Percentage) as a Function of Experimental Conditions, Phase, and Problem (Standard Deviations in Parentheses).*

	Low-demand problems		Intermediate-demand problems		High-demand problems	
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 1	Phase 2
Control	97.39	97.92	93.23	93.23	79.17	81.25
	(6.36)	(4.76)	(9.01)	(9.74)	(16.76)	(13.79)
Performance- approach Goal	95.62	95.62	95.00	95.00	86.25	78.12
	(6.11)	(8.38)	(8.51)	(7.48)	(12.10)	(19.82)

Table S2.

*Experiment 2: Mean Accuracy (in Percentage) as a Function of Instruction, Problem design, Phase, and Problem (Standard Deviations in Parentheses).*

	Low-demand problems		High-demand problems	
	Phase 1	Phase 2	Phase 1	Phase 2
Orientation				
	Control			
Horizontal	95.37 (9.62)	96.29 (5.34)	73.14 (15.21)	87.34 (10.68)
Vertical	98.48 (3.47)	97.47 (3.89)	75.25 (17.11)	82.07 (12.52)
	Performance-approach Goals			
Horizontal	94.55 (11.04)	96.22 (7.28)	77.24 (15.01)	78.84 (18.74)
Vertical	96.43 (6.18)	96.43 (5.29)	74.70 (16.27)	81.25 (12.71)

Table S3.

*Experiment 3: Mean Accuracy (in Percentage) as a Function of Experimental Conditions, Phase, and Problem (Standard Deviations in Parentheses).*

	Low-demand problems		High-demand problems	
	Phase 1	Phase 2	Phase 1	Phase 2
Control	95.83 (6.04)	98.81 (3.76)	76.19 (19.33)	85.12 (15.11)
Performance- approach Goal- only	96.74 (7.74)	98.37 (5.72)	82.06 (14.99)	78.80 (19.01)
Performance- approach Goal and Neutral hyperaccessibility	94.37 (8.58)	96.25 (7.14)	78.12 (17.15)	86.25 (18.54)
Performance- approach Goal and Goal hyperaccessibility	97.92 (4.76)	98.43 (5.60)	77.60 (17.70)	80.73 (19.14)