

EEG investigations on the management control problem

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Philip Eskenazi

Project 1

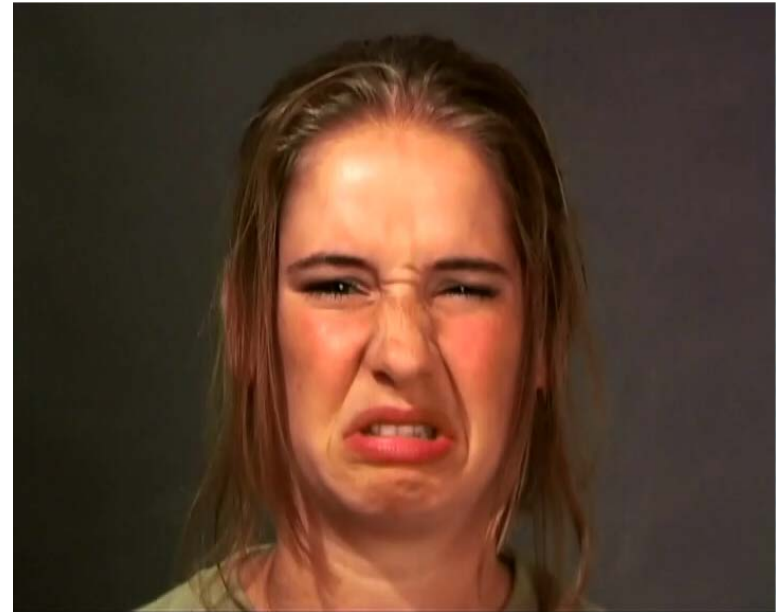
- The dual role of the business unit (BU) controller
 - Supporting local decision making
 - Fiduciary responsibility for financial reporting
- Tension
 - Pressure from BU manager (Hartmann & Maas, 2010)
 - The integrity threat
- Question: what determines a controller's vulnerability to social pressure?

Overview of study

- IV: EEG mu suppression in emotion observation
 - Measured using dynamic emotional facial expressions task by Van der Gaag et al. (2007)
- DV: likelihood of yielding to social pressure
 - Measured through six scenarios describing professional dilemmas
 - Distinction: is the manager's self-interest at stake?
- Sample: 29 professional controllers

EEG task

- 288 clips of 4 seconds
- Conditions:
 - Positive emotions
 - Negative emotions
 - Neutral expressions
 - Abstract shapes
- Electrodes: Cz, C3, C4
- Desynchronisation of Mu waves: 8-13 Hz



Professional dilemmas

Ben is BU manager and direct supervisor of BU controller Claire. Their company is starting the budget rounds for the coming year. As BU manager, Ben is responsible for meeting the target, which the BU will fail to meet this year due to unforeseen market circumstances. Ben fears the risk that the BU will miss its target again next year. This could cost him his job as BU manager. Ben tells Claire he is very afraid of losing his job, which would put him in serious personal trouble. He therefore wants to include a safety margin in next year's budget proposal by submitting a lower sales budget than the best estimate. HQ do not have sufficient market insight to detect this.

Results & conclusion

- Significant positive association between mu suppression and integrity compromises
- Moderation by type

		coefficient	st. error	t-ratio	p-value
<i>Model 1</i>					
INCPT	γ_{00}	0.000	.15	0.000	1.000
MU	γ_{01}	-1.321	.57	-2.338	.027
<i>Model 2</i>					
INCPT	γ_{00}	0.000	.18	0.000	1.000
MU	γ_{01}	-.546	.68	-.807	.427
TYPE	γ_{10}	0.000	.20	0.000	1.000
MU*TYPE	γ_{11}	-1.551	.74	-2.088	.039

Project 2

- **Accountability:** the expectation to have to justify your actions and decisions to some audience
- **Social psychology:**
 - Accountability causes a processing shift
 - Processes become more analytic, sequential, reason-based
- **Our question:** what is the effect of accountability on creative problem solving?

Task

- We use the Remote Associates Task (RAT; Mednick, 1962)
- Example: BLUE – COTTAGE – MOUSE
- Associations between verbal/lexical concepts are crucial to creative insights
- RAT allows for many trials per participant and easy scoring
- RAT problems can be solved in multiple ways
 - Insight solution
 - Analytic solution

Core theory

- Under accountability, people tend to use cognitive processes that are 'transparent' to themselves/accessible for introspection
- In the case of remote associates problems, analytic strategies are more transparent than insight solving processes
- Therefore, imposing accountability will lead to fewer insights, even if this comes at the expense of performance

Overview of studies

1

- **Behavioural experiment**
- H1: Accountability lowers performance

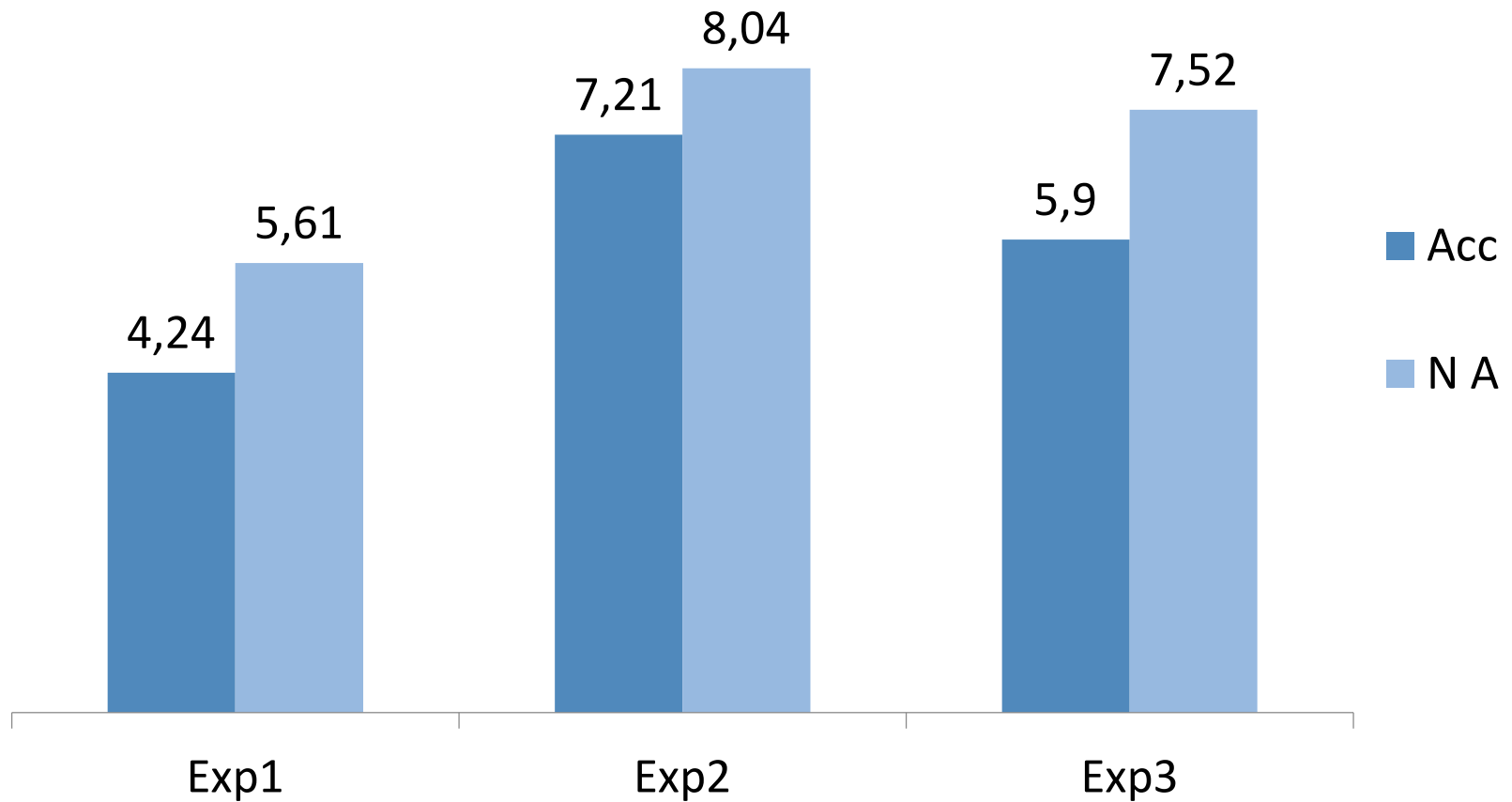
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- **EEG experiment**
- H2: Accountability lowers beta and gamma power in the right hemisphere

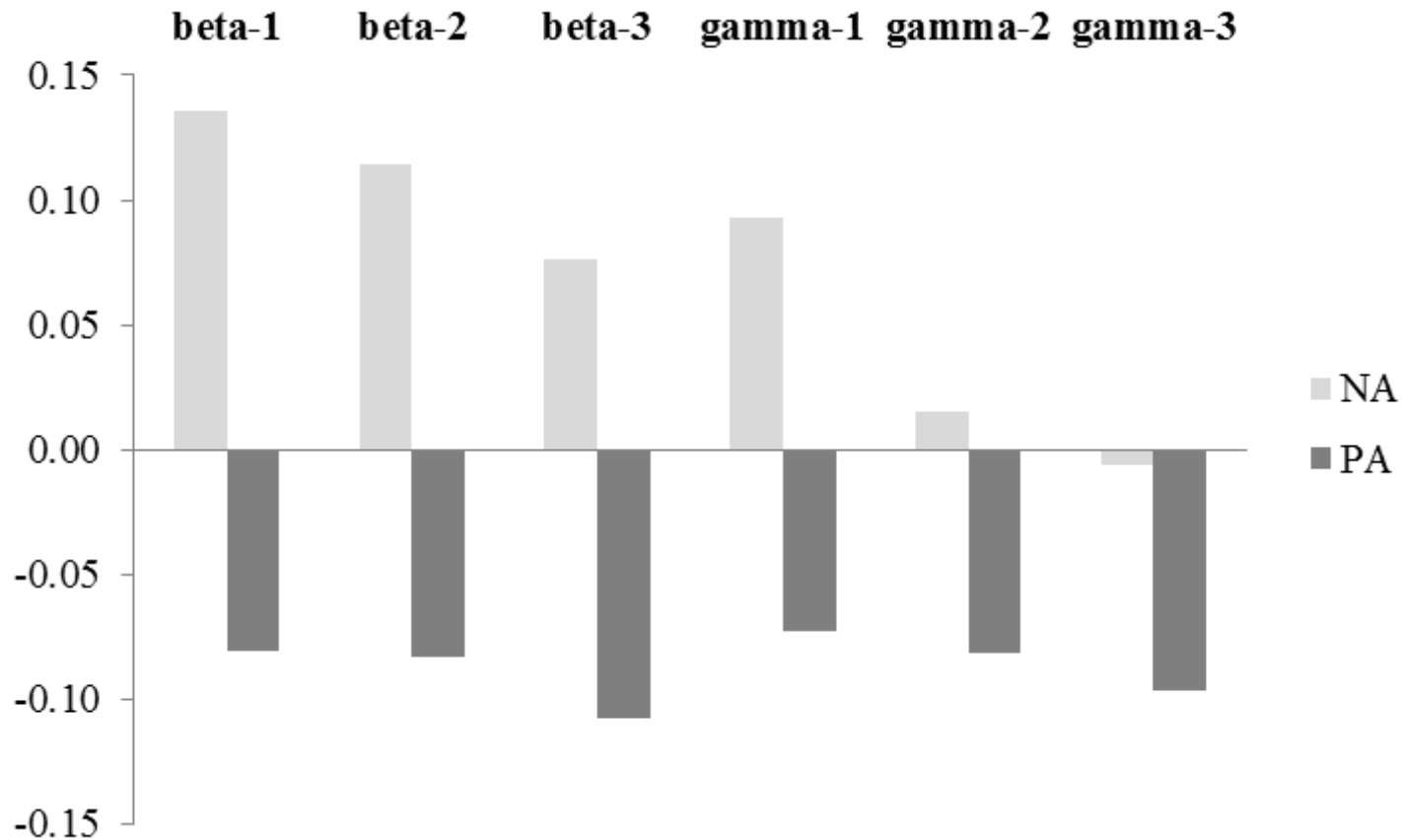
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- **Eye-tracking experiment**
- H3: Accountability lowers first-pass dwell times
- H4: Accountability lowers proportion of dwell time in least-attended area of interest

Results: RAT scores



Results: EEG (I)



Results: EEG (II)

Frequency band		<i>F</i> -statistic	<i>p</i> -value	eta-squared
beta-1	13.00-17.75 Hz	6.993	0.011	0.143
beta-2	18.00-24.75 Hz	5.775	0.021	0.121
beta-3	25.00-29.75 Hz	3.672	0.062	0.080
gamma-1	30.00-39.75 Hz	4.349	0.043	0.094
gamma-2	40.00-49.75 Hz	1.358	0.251	0.031
gamma-3	50.00-58.00 Hz	1.012	0.320	0.024

Conclusions

- Accountability increases reliance on analytic strategies in problem solving, even if performance suffers
- This processing shift manifests in increased relative involvement of the left hemisphere and in distinctive oculomotor behaviour

Neuroaccounting

- Opportunities for research
 - New measurement techniques
 - New theoretical constructs
 - New research questions
- Opportunities for teaching
- Challenges

Q&A

Thank you!