

EXECUTIVE FUNCTION & ABILITY TO FOLLOW VERBAL INSTRUCTIONS

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Background

Following verbal instructions is an important skill necessary to function within social situations, the workplace and to excel academically.

Whilst there is a clear relationship between verbal working memory and one's ability to follow verbal instructions, the influence of other executive functions is yet to be explored. Executive function refers to a group of interdependent self-regulated cognitive skills used to effectively complete a range of everyday and novel tasks, typically understood as metacognition, emotional regulation and behavioural regulation.

Current Study

The aims of this study were firstly to explore whether or not an individual's executive functioning would predict how well they were able to follow verbal instructions.

Secondly, the study aimed to investigate whether specific aspects of executive function were stronger predictors of verbal instruction-following abilities than others.

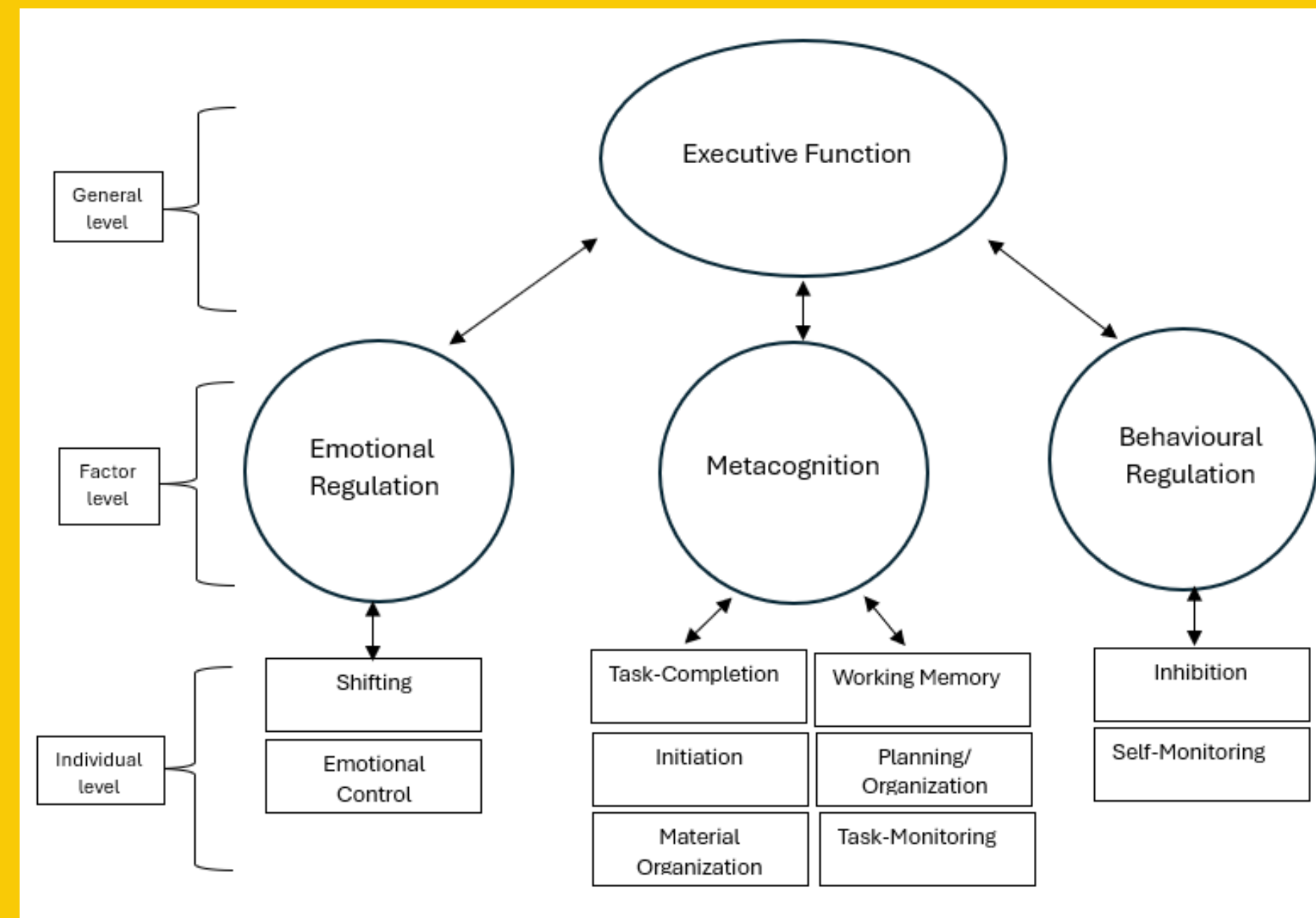
Research Questions	Hypotheses
RQ1) Does executive function predict one's ability to follow verbal instructions?	H1) Individuals who score greater in an executive function questionnaire will make fewer errors when following verbal instructions.
RQ2) Will some areas of executive function be stronger predictors than others?	H2) Stronger metacognitive executive functions will be a greater predictor of individuals' accuracy in following verbal instructions than emotional regulation and behavioural regulation domains.

Methods

Participants: 62 participants over 18 years old, without any uncorrected hearing impairments, were recruited, 28 of which were included in the analysis. 34 were excluded due to incomplete responses.

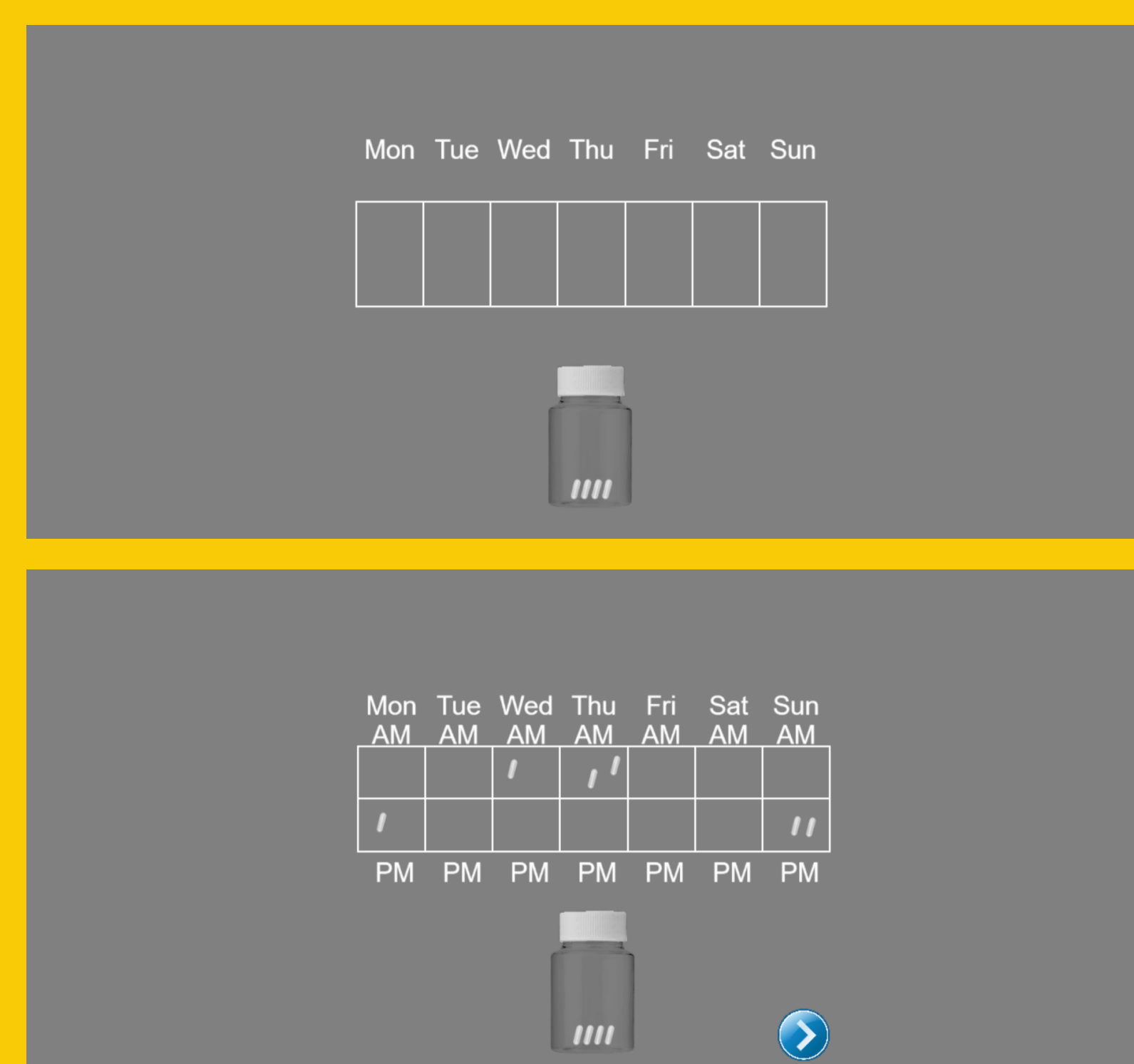
Design: The study was online, taking approximately 10 minutes.

The first section assessed executive function using a 3-point Likert scale self-report questionnaire, according to the multidimensional model provided in the first image below. The questionnaire comprised 20 items relating to executive function, requiring participants to rate how frequently they engaged in the presented behaviours. Individuals were given 1 overall executive function score, 3 factor scores and 10 individual sub-scale scores, as seen below.



The second section was a computerised task assessing verbal instruction-following abilities. In this task, participants were to listen to and subsequently follow a set of 8 instructions regarding moving various quantities of pills into pill pots by the correct numbers, days and times of day. The instructions increased in complexity over the trials, represented by levels in the diagram below, and total scores were calculated based on how many components were correctly scored per round. The images below depict the instructions and scoring system used as well as what was seen on the computer screen of participants during this phase.

Level 1	Level 2
Take two (1) pills on Wednesday (1) Max. points= 2	Take two (1) pills on Thursday (1) afternoon (1) Max. points= 3
Take one (1) pill on Wednesday (1) and three (1) on Monday (1) Max. points= 4	Take three (1) pills on Saturday (1) afternoon (1) and one (1) on Monday (1) morning (1) Max. points= 6
Take two (1) pills on Thursday (1), one (1) on Sunday (1) and one (1) on Friday (1) Max. points= 6	Take one (1) pill on Wednesday (1) morning (1), two (1) on Tuesday (1) morning (1) and one (1) on Friday (1) afternoon (1) Max. points= 9
Take one (1) pill on Tuesday (1), three (1) on Saturday (1), three (1) on Monday (1) and one (1) on Thursday (1) Max. points= 8	Take two (1) pills on Sunday (1) afternoon (1), three (1) on Thursday (1) morning (1), three (1) on Monday (1) morning (1) and one (1) on Monday (1) afternoon (1) Max. points= 12



Results

To assess the relationship between total executive function scores and verbal instruction-following ability, a Pearson r correlation matrix was used. There was no significant relationship found between the two variables.

Two separate multiple linear regression models were used to assess the influence of factor scores and individual scores on verbal instruction-following. Neither metacognition, behavioural or emotional regulation were significant predictors of verbal instruction-following. Of the ten individual executive function sub-components, task completion positively predicted improved verbal instruction-following abilities, while poorer shifting and planning/organization predicted improved verbal instruction-following abilities.

	Total EF score	SUM total VIF
Total EF score	Pearson's r — p-value —	
SUM total VIF	Pearson's r -0.17 p-value 0.400	—

Note. * p < .05, ** p < .01, *** p < .001

(VIF= Verbal instruction-following)

Regression model coefficients for ability to follow verbal instructions and EF factors.

Predictor	b	SE	t	p	β	95% Confidence Interval	
						Lower	Upper
Intercept *	43.20	2.74	15.75	<.001			
Metacognition	-0.34	0.24	-1.42	0.160	-0.34	-0.84	0.16
Emotional Regulation	0.82	0.74	1.12	0.275	0.30	-0.26	0.86
Behavioural Regulation	-0.75	1.14	-0.6	0.517	-0.15	-0.83	0.32

* Represents reference level

Table 4

Regression model coefficients for ability to follow verbal instructions and individual EFs.

Predictor	b	SE	t	p	β	95% Confidence Interval	
						Lower	Upper
Intercept *	36.92	3.19	12.52	<.001			
Inhibition	-0.05	1.38	-0.04	0.972	-0.01	-0.48	0.46
Self-monitoring	-0.04	1.58	-0.41	0.690	-0.06	-0.55	0.37
Shifting	2.75	1.13	2.44	0.026	0.55	0.07	1.02
Emotional Control	-1.23	1.11	-1.10	0.285	-0.27	-0.78	0.25
Initiation	0.91	1.23	0.74	0.468	0.18	-0.32	0.68
Working Memory	0.17	1.20	0.15	0.886	0.04	-0.55	0.63
Task-completion	-3.21	1.29	-2.49	0.023	-0.79	-1.45	-0.12
Planning/Organization	2.31	1.06	2.18	0.043	0.54	0.02	1.00
Task-monitoring	-0.05	1.21	-0.04	0.970	-0.01	-0.48	0.46
Material Organization	-1.10	0.96	-1.15	0.268	-0.27	-0.77	0.23

* Represents reference level

Discussion & Conclusion

The results did not meet the expectations of H1 nor H2, therefore the null was accepted. This was likely due to poor measurements of executive function and a flawed scoring system for verbal instruction-following, which was unable to discredit incorrect responses, thus significantly threatening the internal validity of the construct. The small sample within this study and poor measurements of both executive function and verbal instruction-following abilities provide caution when interpreting these results. Therefore, further research should replicate this study, with more robust measures for executive function and verbal instruction-following, using a larger sample, to increase generalisability, thus providing more reliable results to apply within the workplace and educational setting specifically.

