

Name:

Student number:

MOT2312 2020/2021

Research Methods (Exam; part Laurens Rook)

Date: --

Time: --

Place: --

Instruction

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Question 1 (total score 3 points)

Researchers investigated the impact of two personality meta-traits (Stability and Plasticity) on a person's susceptibility to authoritative persuasive messages (Authority). Two (alternative) hypotheses were tested:

Hypothesis 1: People high (vs. low) in Stability are more susceptible to authoritative persuasive messages (Authority).

Hypothesis 2: People high (vs. low) in Plasticity are more susceptible to authoritative persuasive messages (Authority).

- a) On the next page, you find the JASP output of a regression analysis for this study. Do we accept or reject (alternative) *Hypothesis 1*? [open question; **0.5 point**]. Use the JASP regression output to motivate your answer [open question; **1 point**].

- We **accept** H_{alt} that people high (vs. low) in Stability are more susceptible to authoritative persuasive messages (Authority) --> [**0.5 point** for correct answer].
- We have: $t = +4.573$. The **t-value is positive** as hypothesized --> [**0.5 point** for correct answer].
- Also we have $p < .001$. The associated **p-value is less than .05** (H_{alt} thus is significant) --> [**0.5 point** for correct answer].

- b) Do we accept or reject (alternative) *Hypothesis 2*? [open question; **0.5 point**] Use the JASP regression output to motivate your answer [open question; **1 point**].

- We **reject** H_{alt} that people high (vs. low) in Plasticity are more susceptible to authoritative persuasive messages (Authority) --> [**0.5 point** for correct answer].
- We have: $t = +1.706$. The **t-value is positive** as hypothesized --> [**0.5 point** for correct answer].
- However. We also have $p < .089$. The associated **p-value is bigger than .05** (H_{alt} thus is not significant) --> [**0.5 point** for correct answer].

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JASP Regression Output for Question 1

Linear Regression ▼

Model Summary

Model	R	R ²	Adjusted R ²	RMSE
1	0.257	0.066	0.062	4.100

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
1	Regression	613.2	2	306.59	18.24	< .001
	Residual	8674.4	516	16.81		
	Total	9287.6	518			

Coefficients

Model		Unstandardized	Standard Error	Standardized	t	p	Collinearity Statistics	
							Tolerance	VIF
1	(Intercept)	0.060	3.101		0.019	0.984		
	Stability	0.068	0.015	0.214	4.573	< .001	0.830	1.205
	Plasticity	0.039	0.023	0.080	1.706	0.089	0.830	1.205

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Question 2 (total of 3 points)

Below you find a brief description of a journal article by:

Beaty, R. E., Seli, P., & Schacter, D. L. (2019). Thinking about the past and future in daily life: An experience sampling study on mental time travel. *Psychological Research*, 83, 805-816.

Brief description:

Remembering the past and imagining the future are hallmarks of mental time travel. The authors wished to find out, whether people differ in the temporal direction of their mental time travels. In other words, do some people think more about the past, and others think more about the future? To find out, empirical research was conducted. Participants completed a 7-day, cellphone-based study, in which they were asked about their experiences with past- and future-oriented thoughts at random intervals during the day. The authors found (from 2483 phone surveys) that most people think about the present (68%), but some think about the past (13%), or about the future (19%). The authors compared these naturally occurring groups with each other on various variables of interest.

- a) Jackson, in her statistics book, describes three (3) goals of science. Which of those three goals best applies to what the authors did? Motivate your answer [open question; **1.5 point**]?

- The goals of science are: description (of behaviors), prediction (of factors that predict behaviors), explanation (of causes and mechanisms underlying behaviors) --> **0.5 point** for mentioning these three goals.
- The goal of this study was **prediction** --> **0.5 point** for correct answer (no explanation needed)
- (a) The authors wished to learn how to predict two forms of behavior (past vs. future-oriented thinking) in (b) naturally occurring groups --> **0.5 point** for providing either (a) or (b) in some form.

According to Bougie and Sekaran, experiments are defined by the extent to which three (3) building blocks of the experiment are present or not.

- b) Which theoretical building blocks of the experiment, if any, are probably present in the authors' study, and why [open question; **1 point**]?

- The theoretical building blocks are: treatment (having an experimental condition in the study), control (having a control condition), randomization (of participants over conditions). --> **0.6 point** for mentioning the three blocks (0.2 per block)
- Absent are treatment and control. The authors have randomization of thought probes, but not of participants (that's something different). So, they have **none** of these --> **0.4 point** for correct answer with explanation (0.2 points when answer is "none", but without explanation).

- c) Did the authors conduct a laboratory, field quasi-experiment, or a simulation, and why [open question; **0.5 point**]?

- **Quasi-experiment** --> **[0.25 point]**
- The authors **compared naturally occurring groups** with each other on variables of interest (= the definition of the quasi-experiment) --> **0.25 point** for

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Question 3 (total of 3 points)

A descriptive analysis of the BIS/BAS scales yields the following JASP output.

Descriptive Statistics

Descriptive Statistics

	BIS	BAS
Valid	132	130
Missing	3	5
Mean	19.14	41.58
Std. Deviation	3.983	4.242
Skewness	-0.01385	-0.06149
Std. Error of Skewness	0.2108	0.2124
Shapiro-Wilk	0.9754	0.9842
P-value of Shapiro-Wilk	0.017	0.137
Minimum	10.00	31.00
Maximum	27.00	50.00

- a) A researcher worries about the potential non-normal frequency distribution for the BIS/BAS. Hence, she runs a Shapiro-Wilk test for each of them. What is your formal interpretation of the Shapiro-Wilk test for the BIS and the BAS summarized in the JASP output? [open question; **2 points**].

The formal interpretation of the S-W test is: If not significant ($p > .05$), the distribution is probably normal; if significant ($p < .05$) the distribution is probably non-normal.

- For BIS: S-W test = 0.9754, $p < .017$ (= signif. --> **BIS is probably non-normal**) --> **1.0 point** (noemen van p-waarde is hiervoor voldoende; alleen zeggen "signif" levert slechts **0.5 points**)
- For BAS: S-W test = 0.9842, $p < .137$ (= nonsignif. --> **BAS is probably normal**) --> **1.0 point** (noemen van p-waarde is hiervoor voldoende; alleen zeggen "signif" levert slechts **0.5 points**)

- b) Skewness values for the BIS/BAS in the JASP output are close to zero. This may illustrate the documented weaknesses of the Shapiro-Wilk test. What are those weaknesses [open question; **1 point**]?]

- Formal tests for normality are always problematic: The test works well for large groups, but not for small groups (it lacks power). **We can never be sure that the test results (as above) is true. [0.75 point for this]**
- That skewness values are very close to zero (which suggests virtually absent skew) is an illustration of this **[0.25 point for this observation]**

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Question 4 (total of 3 points)

A correlation analysis of all eight dimensions of the Servant Leadership Scale (SLS) yields the following JASP output.

Correlation Matrix

Pearson Correlations

		Empowerment	Standingback	Accountability	Stewardship	Courage	Authenticity	Forgiveness (reversed)	Humility
Empowerment	Pearson's r	—							
	p-value	—							
Standingback	Pearson's r	0.621***	—						
	p-value	< .001	—						
Accountability	Pearson's r	0.466***	0.226	—					
	p-value	< .001	0.098	—					
Stewardship	Pearson's r	0.569***	0.236	0.217	—				
	p-value	< .001	0.082	0.111	—				
Courage	Pearson's r	0.554***	0.290*	0.370**	0.597***	—			
	p-value	< .001	0.032	0.005	< .001	—			
Authenticity	Pearson's r	0.492***	0.321*	0.134	0.523***	0.549***	—		
	p-value	< .001	0.017	0.328	< .001	< .001	—		
Forgiveness (reversed)	Pearson's r	0.220	0.345**	-0.219	-0.062	-0.196	0.122	—	
	p-value	0.113	0.010	0.108	0.652	0.151	0.373	—	
Humility	Pearson's r	0.702***	0.510***	0.127	0.472***	0.371**	0.799***	0.350*	—
	p-value	< .001	< .001	0.363	< .001	0.006	< .001	0.010	—

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

- a) How many strong bivariate correlations are summarized in the table? Identify the pairs [open question; **1 point**].

Correlations between $|\cdot| .70, 1.00|$ are strong. Here, we have this **twice**, for:

- Humility – Empowerment ($r = .702$) --> **0.5 point** for providing this pair
- Humility – Authenticity ($r = .799$) --> **0.5 point** for providing this pair

- b) Your statistics course book describes four (4) ways, in which correlations can – theoretically – be misinterpreted. List, and briefly describe, each of those misinterpretations [open question; **2 points**].

- Interpret correlation (prediction) in terms of **causality** (causes, mechanisms), which infers directionality
- The **third-variable problem**: the correlation between two variables is dependent on a third variable
- **Restrictive range**: when a variable does not covary enough, and we cannot observe any relationship
- **Curvilinear** relationships: We have a partial relationship between the variables, but this is cancelled out in the other half of the curve

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