

# **Correlation and Contrast Analyses of Practitioner Judgments of Patients with Parkinson's Disease**

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# Research Hypotheses

- The higher a patient's degree of facial masking relative to other patients, the lower the practitioner will judge that patient's extraversion relative to other patients.
- This finding will be stronger for novice than expert practitioners.

## DATA SET: Practitioner Judgment of Patient Extraversion

Practitioner	Novice/ Expert	PATIENT SET A			PATIENT SET B		
		C1	C2	C3	C4	C5	C6
1	N	<b>20</b>	<b>16</b>	<b>26</b>	.	.	.
2	N	<b>18</b>	<b>12</b>	<b>14</b>	.	.	.
3	N	<b>24</b>	<b>26</b>	<b>15</b>	.	.	.
4	N	.	.	.	<b>33</b>	<b>28</b>	<b>31</b>
5	N	.	.	.	<b>22</b>	<b>34</b>	<b>34</b>
6	E	<b>21</b>	<b>26</b>	<b>29</b>	.	.	.
7	E	<b>18</b>	<b>19</b>	<b>28</b>	.	.	.
8	E	<b>19</b>	<b>24</b>	<b>22</b>	.	.	.
9	E	.	.	.	<b>36</b>	<b>24</b>	<b>34</b>
10	E	.	.	.	<b>37</b>	<b>26</b>	<b>32</b>

**Possible ways of calculating a score for each practitioner or group that is the association between facial masking and judged extraversion**

Indiv Prac	N/E	SET A			SET B		
		<b>1.0</b>	<b>2.0</b>	<b>1.7</b>	<b>.8</b>	<b>2.3</b>	<b>1.8</b>
1	N	<b>20</b>	<b>16</b>	<b>26</b>	.	.	.

**Corr. Score**  
Mask Score  
Extra. Score

Indiv Prac	N/E	SET A			SET B		
		<b>1</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>3</b>	<b>2</b>
1	N	<b>2</b>	<b>3</b>	<b>1</b>	.	.	.

**Tau Score**  
Order Mask  
Order Extra.

Indiv Prac	N/E	SET A			SET B		
		<b>.57</b>	<b>-.43</b>	<b>-.14</b>	<b>.83</b>	<b>-.67</b>	<b>-.16</b>
1	N	<b>20</b>	<b>16</b>	<b>26</b>	.	.	.

**Contrast Score**  
Mask Score  
Extra. Score

Group Prac	N/E	SET A			SET B		
		<b>.6</b>	<b>-.4</b>	<b>-.1</b>	<b>.8</b>	<b>-.7</b>	<b>-.2</b>
	N	<b>26.29</b>	<b>17.65</b>	<b>22.47</b>	<b>29.92</b>	<b>28.77</b>	<b>24.92</b>

**Con. Analysis**  
Mask Score  
Group Avg.

## Correlation Score Method

Indiv Prac	N/E	SET A			SET B		
		1.0	2.0	1.7	.8	2.3	1.8
1	N	20	16	26	.	.	.

For each practitioner, create a score: correlation between patients' facial masking scores and prac's extraversion judgments.

This new score is a dependent variable in

- One sample t-tests to compare against 0 (no association).
- 2 X 2 ANOVA (expert vs. novice X set A vs. B) to test difference between expert and novice scores.

**Limitation: Score based on 3 observations.**

## Correlation Score Results: Means and t-tests

	E P	N	Mean	SD	One-sample t	p
Overall	* *	80	-0.30	0.63		
E (EXPNOV)	N *	30	-0.46	0.51	4.95	.0000
	E *	50	-0.20	0.67	2.08	.043
P (PTSET)	* A	47	-0.38	0.58		
	* B	33	-0.18	0.68		
PC	N A	17	-0.63	0.34		
	N B	13	-0.26	0.63		
	E A	30	-0.24	0.64		
	E B	20	-0.13	0.72		

Facial masking is significantly negatively associated with extraversion judgments for both novice and expert practitioners.

## Correlation Score ANOVA

(Sums of squares based on unique variance)

Source	DF	SS(U)	MSS	F	P
Between Subjects	79	31.138			
E (EXPNOV)	1	1.179	1.179	3.13	.08
P (PTSET)	1	1.061	1.061	2.82	.10
PC	1	0.305	0.305	0.81	.37
Error 1	76	28.633	0.376		

Novice judgments of extraversion tend to be more associated with patient facial masking than are expert judgments.

## Tau Score Method

Indiv Prac	N/E	SET A			SET B		
		1	3	2	1	3	2
1	N	2	3	1	.	.	.

For each practitioner, create a score: non-parametric measure of proportions of concordant versus discordant ordered pairs of observations.

This new score is a dependent variable in

- One sample t-tests to compare against 0 (no association).
- 2 X 2 ANOVA (expert vs. novice X set A vs. B) to test difference between expert and novice scores.

**Limitation:** Score based on 3 observations, but is non-parametric and easy to interpret, so may be better than correlation score.

## Tau Score Results: Means and t-tests

	E P	N	Mean	SD	One-sample t	p
Overall	* *	80	-0.26	0.59		
E (EXPNOV)	N *	30	-0.39	0.48	4.45	.0001
	E *	50	-0.19	0.64	2.08	.043
P (PTSET)	* A	47	-0.36	0.56		
	* B	33	-0.12	0.61		
EP	N A	17	-0.56	0.38		
	N B	13	-0.17	0.52		
	E A	30	-0.25	0.61		
	E B	20	-0.09	0.68		

Facial masking is significantly negatively associated with extraversion judgments for both novice and expert practitioners.

## Tau Score ANOVA

Source	DF	SS(U)	MSS	F	P
Between Subjects	79	27.265			
E (EXPNOV)	1	0.659	0.659	1.99	.16
P (PTSET)	1	1.383	1.383	4.19	.04
EP	1	0.250	0.250	0.76	.39
Error 1	76	25.077	0.329		

Novice judgments of extraversion tend to be more associated with patient facial masking than are expert judgments, but the difference is not statistically significant.

## Contrast Analysis on 6 X 2 Factorial Design

Group Prac	N/E	C1	C2	C3	C4	C5	C6
		.6	-.4	-.1	.8	-.7	-.2
	N	26.29	17.65	22.47	29.92	28.77	24.92

Treats patient as between factor rather than repeated within practitioner. Judgments are relatively uncorrelated across patients within practitioners ( $r = .05$ ), so this may be okay.

Benefit: more patients going into the analysis of the association between masking and judged extraversion.

6 X 2 ANOVA (6 patients X exp vs. novice practitioner) with prac's extraversion judgment as dependent variable.

**Limitation: Does not test sensitivity of a single practitioner to patient facial masking. Tests facial mask “effect” on “average” or “composite” practitioner. Benefit outweighs limitation?**

## Contrast Analysis Results: Means and Contrast Weights

	P	E	N	Mean	SD	Contrast weights
Overall	*	*	240	24.29	6.93	
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PATIENT	C1	*	47	24.85	5.92	.6
	C2	*	47	20.36	6.00	-.4
	C3	*	47	21.77	5.50	-.1
	C4	*	33	29.12	7.36	.8 (lowest mask)
	C5	*	33	28.33	6.41	-.7 (highest mask)
	C6	*	33	23.79	6.65	-.2
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EXPNOV	*	N	90	24.62	6.94	
	*	E	150	24.09	6.94	
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PE	C1	N	17	26.29	7.36	.6
	C1	E	30	24.03	4.87	-.6
	C2	N	17	17.65	5.60	-.4
	C2	E	30	21.90	5.75	.4
	C3	N	17	22.47	5.69	-.1
	C3	E	30	21.37	5.44	.1
	C4	N	13	29.92	4.66	.8
	C4	E	20	28.60	8.76	-.8
	C5	N	13	28.77	3.72	-.7
	C5	E	20	28.05	7.76	.7
	C6	N	13	24.92	6.01	-.2
	C6	E	20	23.05	7.09	.2
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simple effects

interaction

## ANOVA Contrast Analysis on 6 X 2 Factorial Design

Source	DF	SS(U)	MSS	F	P
Between Subjects	239	11481.162			
P (PATIENT)	5	2478.158	495.631	12.82	.0000
E (EXPNOV)	1	13.942	13.942	0.36	.55
PE	5	302.457	60.491	1.57	.17
PE contrast	1			1.28	NS
Error 1	228	8813.134	38.654		

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### Simple Main Effects

Source	DF	SS	MSS	F	P
P effect for NOVICE	5	1543.354	308.670	7.99	.0000
Contrast	1			5.95	.025
P effect for EXPERT	5	1108.540	221.708	5.74	.0001
Contrast	1			1.58	NS
Error	228	8813.134	38.654		

Novice r effect size = -.15, r alert = -.40

Expert r effect size = -.08, r alert = -.25

## Comparison of Results

	Correlation		Tau		Contrast	
	assoc	p	assoc	p	assoc	p
Novice	-.46	.00001	-.39	.0001	-.15 (-.40)	.01
Expert	-.20	.04	-.19	.04	-.08 (-.25)	>.10
N>E	--	.04	--	.08	--	>.10

In future replication, can we design the judging paradigm better so as to create association scores based upon larger numbers of patients?

- 6 male patients and 6 female patients
- Each of 80 practitioners will judge 4 patients.
  - How many patient sets/blocks?
  - How should these sets be comprised?