PERSONALITY AND PSI: UNRAVELLING RELATIONS BETWEEN EXTRAVERSION, AGREEABLENESS AND OPENNESS TO EXPERIENCE WITH GANZFELD PERFORMANCE

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Abstract

The relations between the 5 personality factors, extraversion, neuroticism, agreeableness, conscientiousness and openness to experience and scoring in the Ganzfeld were analysed for the two Utrecht novice series. Two personality measurement instruments were used, the NEO-PI and the 4DPT. It was found that subjects who had a hit (N=22) were marginally higher on extraversion ($p<0.05$) and significantly higher on agreeableness ($p<0.05$) and openness ($p<0.004$) than subjects who had a miss (N= 54).

Further refined analyses using the facet-scores of the NEO-PI reveals that the weak extraversion effect was restricted to the facets: 'warmth' ($p<0.06$) and 'positive emotions' ($p<0.02$). This strongly suggests that extraversion is effective through the social processes in the experimental situation. Although all facet-scores for the openness factor contributed to the over-all effect, there were three facets which were independently significant: aesthetics ($p<0.008$), feelings ($p < 0.001$) and values ($p < 0.01$).

The aesthetics effect confirms earlier findings with artistic populations like the Juilliard students. The feelings effect seems to confirm earlier results with the MBTI as an instrument but the meaning of this facet is different from the one attached to it in the MBTI. The values effect is a more general form of the sheep-goat effect since it directly measures open-mindedness.

Stepwise multiple regression reveals that all relations are subsumed in the relation between openness for feelings and psi. This finding may have important consequences for the interpretation of the sheep-goat effect and the apparent relevance of artistic ability. All the findings are discussed in terms of the over-all chance scoring.

Introduction

Many studies have explored the relation between personality of a subject and his/her performance in a laboratory psi experiment (e.g. Kanthamani and Rao, 1972). In a review article in the Handbook of Parapsychology Palmer argued that the positive correlation between extraversion and psi scores was well-established while a negative correlation between neuroticism and psi scores was visible but less apparent (Palmer, 1977). Recently a meta-analysis confirmed the extraversion finding (Honorton et al, 1992). The average correlation for all experiments in this meta-analysis was +0.20.

Similarly, a consistent and apparently replicable finding is the correlation between belief in psi phenomena and the scores obtained in a lab psi test (Lawrence, 1993). Although 'belief in psi' is formally more an attitude than a personality trait it is not impossible that this attitude is born out of personality characteristics like tolerance for ambiguity.

In a recent article (Bem & Honorton, 1993) these findings are discussed within the context of Ganzfeld psi. Although the correlation between extraversion and Ganzfeld psi performance in the auto-Ganzfeld study is virtually identical to the one found in the meta-analysis ($r= +0.18$; N=218), it is concluded that the interpretation of this solid relation is still quite open. It is suggested to use a well accepted

personality measurement instrument like the NEO-PI (rather than the MBTI used in previous Ganzfeld research) in future experimental work because this instrument measures also facets within the 5 major personality factors which might help to unravel the processes underlying these relations between personality and psi. These 5 factors are also supposed to be independent from each other, in strong contrast with the scales of the MBTI. It should be remarked however that recently confirmatory factor analysis of the NEO-PI has cast some doubt on the assumed orthogonality of the 5 factors and especially on the classification of certain facets within a specific factor (Church & Burke, 1994).

From the Utrecht Ganzfeld program 2 series of 50 sessions have been reported last year (Bierman et al., 1993). The over-all results were at chance (25%) but marginal relations were found with having been involved with a mental discipline like meditation. Those subjects had a scoring rate of 32.1%. In this paper we present the relations between Ganzfeld scoring in these two series and the personality of the subjects (the 'receivers').

The instruments

Two questionnaires were sent to the 100 receivers several months after they had completed their session. This leaves open the possibility that the result of the session has influenced the responses on the questionnaires. However we feel that the large time-gap and the fact that the instruments do not measure attitudes or moods but rather stable aspects of the personality render this possibility extremely small.

One questionnaire, the 4DPT (van Kampen, 1993) is an original Dutch instrument and measures the following 4 factors: Insensitivity (S), Extraversion (E), Neuroticism (N) and Orderliness (O). Although the general consensus is that personality can be represented in 5 orthogonal factors (the so called 'Big Five'; McCrae and John, 1992) research with the 4DPT has indicated that it is extremely difficult to add a fifth factor which is invariant with respect to various sample parameters, like sexe and age (van Kampen, in preparation).

The second questionnaire was a Dutch version of the NEO-PI. It measures the following factors: Neuroticism, Extraversion, Conscientiousness, Agreeableness and Openness to experience. In the current US version of the NEO-PI each factor has 6 facets. However the Dutch version used had no facets for Conscientiousness and Agreeableness. This version was well tested and validated. The average coefficient alpha for the factors of the NEO-PI found in the present experiment is 0.85 (for details on facet-alpha's see table I). A full Dutch version of the NEO-PI is currently under development.

Results

76 subjects returned the questionnaires. The hit-rate in this sample was slightly above chance (29%) in contrast with the total sample which had an over-all score exactly at chance. In the conclusions we will discuss if this bias might have influenced the results.

The scales of the 4DPT and the NEO-PI which were expected to measure the same factor did correlate reasonably to highly (4DPT-S with NEO-A: -0.561; 4DPT-E with NEO-E: 0.859; 4 DPT-N with NEO-N: 0.773; 4DPT-O with NEO-C: 0.588). It was concluded that the instruments highly overlap and data will be presented for the NEO-PI only because the NEO-PI is a generally accepted instrument and available in most western languages.

Neo-PI scores for 'hitters' and 'missers'.

Table I gives a t-test for the scores on the personality factors of hitters and missers. It can be seen that scores on extraversion, agreeableness and openness are higher for those subjects who had a hit than for those who had a miss. The extraversion effect is marginal and is restricted to the facets 'warmth' and 'positive emotions'. There is also a weak negative effect from the facet N2, 'hostility', of the neuroticism factor.

Factor / facet	alpha	Hitters (N=22)	Missers (N=54)	diff	t	p (1-t.)
Neuroticism	0.92	80.57	83.96	-3.39	-0.57	0.28
N1 (Anxiety)	0.88	13.32	14.83	-1.52	-0.93	0.13
N2 (Hostility)	0.70	8.91	10.70	-1.8	-1.59	0.06
N3 (Depression)	0.77	14.71	15.44	-0.73	-0.54	0.30
N4 (Self-Consciousness)	0.55	13.91	14.32	-0.41	-0.40	0.34
N5 (Impulsiveness)	0.85	19.04	17.22	1.83	1.18	0.13
N6 (Vulnerability)	0.80	10.71	11.44	-0.73	-0.61	0.28
Extraversion	0.89	109.62	101.02	8.60	1.67	0.05 *
E1 (Warmth)	0.77	23.55	21.70	1.84	1.60	0.06
E2 (Gregariousness)	0.67	13.73	13.80	-0.07	-0.06	0.48
E3 (Assertiveness)	0.79	16.52	15.35	1.17	0.84	0.21
E4 (Activity)	0.68	18.00	16.43	1.57	1.39	0.09
E5 (Excitement-Seeking)	0.77	15.33	14.13	1.20	0.78	0.22
E6 (Positive Emotions)	0.77	22.52	19.61	2.91	2.20	0.02 *
Openness	0.89	138.7	125.57	13.13	2.79	0.004 **
O1 (Fantasy)	0.82	23.05	21.26	1.79	1.34	0.09
O2 (Aesthetics)	0.73	23.24	20.02	3.22	2.5	0.008 **
O3 (Feelings)	0.63	26.29	23.32	2.97	3.20	0.001 **
O4 (Actions)	0.72	18.71	17.65	1.07	0.88	0.20
O5 (Ideas)	0.78	22.81	20.89	1.92	1.48	0.07
O6 (Values)	0.61	24.75	22.44	2.31	2.42	0.01 **
Agreeableness	0.71	50.62	47.06	3.56	2.10	0.02 *
Conscientiousness	0.84	48.62	47.93	0.69	0.29	0.39

Table I

Mean personality scores for 'hitters' and 'missers'

The openness effect is global, visible in every facet and independently significantly so for openness for aesthetics, openness for own feelings and openness for (other) values.

In order to compare the size of these effects with the correlations reported in earlier studies we calculated the correlations between the facets that gave a significant difference between hitters and missers and the psi-score. For the psi-score of a session a z-score was calculated from the ratings according to the method given by Stanford (Stanford, 1987).

Correlation Matrix

	z	N2	E1	E6	O2	O3	O6	NEO-A
z	1.000	-.088	.128	.170	.137	*.273*	.109	.181
N2		1.000	*-.374*	-.144	.018	-.054	-.140	*-.539*
E1			1.000	*.606*	.202	*.340*	.194	*.592*
E6				1.000	.210	*.508*	*.303*	*.458*
O2					1.000	*.254*	*.241*	*.336*
O3						1.000	*.369*	*.392*
O6							1.000	.208
NEO-A								1.000

74 observations were used in this computation.
26 cases were omitted due to missing values. 1 case has incomplete N2, 1 case has incomplete O6.

Table II

Correlations between several personality facets and the psi score (z)

The correlation matrix in table II shows that the absolout values of the correlations between the z-scores and the personality measures range between 0.09 and 0.27. The correlation between the total

openness score and z which is not given in the Table is r=+0.171. This is the same order of magnitude as the r=+0.20 which was found in the meta-analysis of the relation between extraversion and psi scores.

Non-orthogonality of factors/facets

It should be remarked that the factor Agreeableness correlates positively with the two extraversion aspects 'warmth' and 'positive emotions' and negatively with the NEO-N aspect 'hostility'. More problematic is that apparently the relevant aspects of the Openness factor do also correlate moderately with most of the other aspects. This is quite similar to the findings reported by Church & Burke. The question thus becomes whether the correlations may be due to a single underlying factor. In order to correct for the apparent non-independence of the personality facets involved, a partial correlation matrix, partialing out all variables exept the two in the correlation matrix cell, was calculated (table III).

Partial Correlation Matrix

	z	N2	E1	E6	O2	O3	O6	NEO-A
z	1.000	-.053	-.020	.023	.064	.196	-.015	.024
N2		1.000	-.161	.146	.253	.173	-.159	-.509
E1			1.000	.462	.019	-.013	-.034	.291
E6				1.000	-.034	.294	.138	.118
O2					1.000	.025	.183	.320
O3						1.000	.252	.219
O6							1.000	-.084
NEO-A								1.000

74 observations were used in this computation.
26 cases were omitted due to missing values.

Table III

Partial correlation matrix for relations between psi and personality aspects

Most correlations, most notably those with extraversion facets, do disappear and are subsumed into the correlation between psi score and O3 (openness to feelings). Minor contributions remain from the factor 'Agreeableness', and from the facet 'openness to aestethics'.

A stepwise multiple linear regression confirmed this result. All initial facets were removed because they contributed too little to the variance with only the O3-facet in the final regression formula ($p<0.02$). (see table IV).

Regression Summary
z vs. 7 Independents
Step: 6

Count	74
Num. Missing	26
R	.273
R Squared	.075
Adjusted R Squared	.062
RMS Residual	.881

ANOVA Table
z vs. 7 Independents
Step: 6

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Regression	1	4.511	4.511	5.816	.0184
Residual	72	55.835	.775		
Total	73	60.346			

Variables In Model
z vs. 7 Independents
Step: 6

	Coefficient	Std. Error	Std. Coeff.	F-to-Remove
Intercept	-1.530	.659	-1.530	5.384
O3	.065	.027	.273	5.816

Variables Not In Model
z vs. 7 Independents
Step: 6

	Partial Cor.	F-to-Enter
N2	-.076	.412
E1	.039	.108
E6	.038	.100
O2	.073	.377
O6	.008	.005
NEO-A	.084	.503

Table IV

Result of stepwise backward regresssion

1-Factor rather than a 3-factor model

In previous studies on the relation between subject characteristics and psi performance in the Ganzfeld it was found that subjects which were selected on the basis of the 3 factors: I: involvement with meditation and other mental disciplines, II: high scores on the Feeling and III: high scores on the Perception scale of the MBTI, scored significantly higher than the remainder of the population. The scoring rates of these selected subjects would be as high as 64% (in the Princeton Ganzfeld experiments; Honorton and Schechter, 1986) or 43% (in the Duke experiments; Broughton et al, 1990). In both studies 28% of the subjects fulfilled the selection criteria.
The present results do suggest a 1-factor rather than a 3-factor recipe for success. If we select all subjects with an Openness (O3) score larger than the mean O3-score (in this sample 24.15) we get a scoring rate of 47% (15 hits for 32 subjects). Remark that in this recipe the selected group constitutes 42% of the total population, considerably more than the 28% in the previous studies which used a 3-factor model. Applying slightly more severe selection criteria by using only those subjects who had a score of 0.5 standard deviation (in this sample 3.83) or more above the mean score results in a scoring rate of 56.5 % (13 hits for 23 subjects corresponding to 30% of the unselected population)

Discussion

A superficial inspection of the correlations found between psi Ganzfeld performance and personality aspects does confirm all the trends found in previous work on the relation between psi and personality. Most notably the 'openness to values' effect confirms the sheep-goat effect. The sheep-goat question now seems to be a specific instanciation of a more general form of open-mindedness which correlates positively with psi. Also the 'openness for aesthetics' effect fits nicely with the findings that a specific artistic population like the Juilliard students does produce strong psi in the Ganzfeld situation.
The fact that from the extraversion factor only the aspect 'positive emotions' and marginally the aspect 'warmth' do contribute, suggests that extraversion effects are mediated through the social effect they have on the experimental situation. In a recent critical evaluation of the NEO-PI (Church & Burke, 1994) the authors found that exactly these two facets loaded better on the 'agreeableness' factor than on the extraversion factor. One could hypothesize that if the NEO-PI instrument is properly corrected the relation between extraversion and psi will disappear altogether and this effect may be attributed to the factor 'agreeableness'. It this light it seems that previously found extraversion effects may also be due to non-orthogonality of factors in the instrument.
Although it is claimed that the NEO-PI has pure facets and factors, it is clear that at least for our population this is not the case. There are 3 correlations (between NEO-A and E1, NEO-A and N2, O3 and E3) which are larger than 0.5 which is generally used as the criterion by which the non-orthogonality is judged.
The partial correlation matrix enables us to see what the correlations would be in case the non-orthogonality is removed. From this analysis it can be concluded that although at first sight the correlations seem to confirm earlier findings we better re-interpret the earlier findings in terms of pseudo-effects caused by the non-orthogonality of our instruments. The major facet which remains is the 'openness to feelings'. About the 'openness' factor in general the authors of the NEO-PI write:
"As a major dimension of personality, Openness to Experience is much less well known than Neuroticism and Extraversion. The elements of O - active imagination, aesthetic sensitivity, attentiveness to inner feelings, preference for variety and independence of judgement- have often played a role in theories of personality, but their coherence into a single broad domain has seldom been recognized.
Open individuals are curious about both inner and outer worlds, and their lives are experientially richer. They are willing to entertain novel ideas and unconventional values, and they experience both positive and negative emotions more keenly than do closed individuals. Openness is especially related to aspects of intelligence, such as divergent thinking, that contribute to creativity. But openness is by no means

equivalent to intelligence. Men and women who score low on O tend to be conventional in behaviour and conservative in outlook. They prefer the familiar to the novel."
In a previous study on the relation between psi and perceptual vigilance (Watts, 1993) Openness as measured with the NEO-PI was also used as a measure. It was found that perceptual vigilant subjects scored better and it was also found (contrary to expectations) that 'Openness' did correlate *negatively* with perceptual vigilance. Nevertheless a puzzling result was that weak positive correlations were found between Openness and ESP scores. The magnitude of this correlation (r= +0.106) was somewhat lower than the correlation between Openness and z-score of +0.171 reported in this study.
Apparently no aspects of the Openness scale were measured. Therefore it may still be that the O3-aspect correlates positively with perceptual vigilance and it cannot be excluded that the O3 effect is not only 'explaining' extraversion effects, aesthetic effects and sheep-goat effects but that it is also at the root of the relation between perceptual vigilance and ESP performance.

Although the results of these analyses seem to display a simple and clear picture, we would like to finish with a word of caution. It should not be forgotten that the over-all results are flat chance. Thus if the present results are not a mere chance fluctuation, the traditional conclusion must be that the 'closed' subjects do display 'negative' psi in the sense that they seem to 'pick up' information on the target and subsequently avoid choosing this target.
Remark that in our study ALL subjects were sheep. So this apparent avoidance of the target cannot be explained by a negative attitude of the subjects. We therefore feel that in explaining these data we have to transcend the traditional subject centred models and include the experimenters, other people directly related to the experiment and possibly the scientific community at large.

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