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Prediction of placebo responses by multiple regression methods and CFA. Re-analysis of an experiment conducted by W. Janke between 1963 and 1966

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Summary

This paper is based on experimental studies on the psychological effects of placebo and their predictability by personality characteristics, which were conducted by the first author in prepration of his habilitation thesis between 1963 and 1966 in Marburg and Gießen. The first author describes his interactions with Gustav A. Lienert, which preceded the reported studies. He also demonstrates that the original analysis of the data was already inspired by Lienert's idea of a configural approach, although Lienert´s first presentation of the Configural Frequency Analysis (CFA) was still forthcoming at that time. A re-analysis of the data confirms that a configural approach like the CFA is of high value for the identification of personality patterns, which are predictive for placebo responders (PR) and non-responders (PNR). A bi-prediction analysis shows that PR and PNR are characterized by complementary patterns of specific personality traits.

Key words: Configural Frequency Analysis (CFA), bi-prediction analysis, placebo response

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A) Remarks on the background of the studies and Lienert´s influence on them between 1962 to 1968

Wilhelm Janke

Between 1963 and 1966, when the author was post-doctoral assistant in Marburg and Gießen, he performed a series of experiments on the effects of placebo and their determinants. These studies formed the basis of his habilitation thesis, which was submitted to the "Mathematisch-Naturwissenschaftliche Fakultät" of the university of Gießen in autumn 1966 and approved by the faculty in May 1967 (referees were the psychologist Karl-Hermann Wewetzer and the biochemist Hans-Jürgen Staudinger.)[3]. A part of the work was published in 1986 (Janke, 1986).

The studies were based on the assumption that responses to placebo are predictable only by measures from different areas, e.g. factors of drug administration, the situational context and personality characteristics (traits and states).

The study, which is reported in this paper, included as predictor-variables broad personality characteristics like neuroticism, extraversion and narrow traits like suggestibility, aggressiveness after frustration, attitudes towards drugs, expectation of drug effects, and experience with the use of drugs. Criterion-variables were subjective reports of mood and performance-measures. The subjective placebo-responses were assessed directly, from reports of the observed changes from baseline, as well as indirectly, from the reported state before and after the administration of placebo. The placebo responses were defined by dichotomous (Responder – Non-Responder) and by continuous measures.

Gustav **L**ienert (**GL**) influenced these experiments in several ways. His paper "On the role of suggestion in pharmacopsychological studies" (Lienert, 1955) had a great impact for the author´s interest in placebo-effects. Their study in relation to personality characteristics can also be considered as a continuation of Janke´s dissertation "Zur Abhängigkeit der Wirkung psychotroper Substanzen von Persönlichkeitsmerkmalen: Ein Beitrag zur Begründung der Differentiellen Pharmakopsychologie" (On the dependency of the effects of psychotropic drugs on personality characteristics. A contribution to the foundation of a differential pharmacopsychology) (Janke, 1964). GL was Janke´s mentor during the dissertation period from 1957 to 1961. He also proposed the subtitle of the doctoral thesis.

GL also played a considerable role during the planning of the experiments. He gave advice and made proposals. In 1963, when GL left Marburg and went to Hamburg and I (W. Janke) changed to Gießen, the topic "placebo" had been discussed with him with respect to the habilitation thesis several times.

[3] W. Janke would like to express his gratitude to Prof. Eberhard Todt for his help with the complex data analysis at the Deutsches Rechenzentrum (German Computing Center) Darmstadt. Without his help the completion of the habilitation thesis would have been delayed for months.

A major role of GL on my thinking becomes evident from another point: I was convinced that the prediction of placebo responses by means of traits would not be successful by a linear combination of trait-measures, only, and therefore searched for other models. At that time I prepared a paper about classification for the „Handbuch der Psychologie“ (handbook of psychology). The paper was finished in 1963 and published in 1964. GL read the paper and found it ok. The paper considered also classification procedures with respect to dichotomous variables with the conclusion that discrete variables were “generally underestimated in their importance” and should be improved, therefore (Janke, 1964, p. 916).

GL addressed this point several times and asked for references. I informed him about the available literature. He concluded that much had to be done on this point in the future (Janke, 1964, p. 918/919, Lienert, 1969).

With regard to the prediction of placebo-responses from trait-measures in my studies, three steps of analyses were considered: (1) the use of conventional single correlations; (2) the use of multiple correlations with quantitative and dichotomous criteria on the basis of the linear additive model of multiple regression; (3), most importantly, the refusal of the model of additivity and of the assumption of the adequacy of bivariate correlations and the use of configurations of predictors. This step might have been stimulated by discussions with GL, but I do not remember this exactly.

The data listed in table 2 on page 222 of the habilitation thesis (Janke, 1967) seemed to wait for the CFA. The CFA was not available at that time, however, and GL did not propose anything in the direction of the CFA. He presented the CFA in September 1968 for the first time.

GL did also not use these data in his historical lecture in Tübingen, perhaps he had forgotten them. He used data of Margit von Kerekjarto, his doctoral fellow in Hamburg (see Lienert, 1969, p.246). Regrettably, I could not listen his lecture, because I was involved in a simultaneous symposium on classification (Janke, 1969).

A historical discussion about the CFA took place at the DGPs congress in Kiel in September 1970, were I organized a symposium on the “construction of personality inventories”. Lienert was invited as discussant together with Bastine, Eggert, Ehlers, Eyferth, Fischer, Huber, Keil, Lennertz, and Pawlik (Janke, 1973). GL was very active in presenting his view about the appropriate approaches in personality research with the focus on configural instead of dimensional approaches. He tried to convince the audience about the importance of configural perspectives in personality research and diagnostics (see Janke, 1973, p. 73).

GL presented his view over and over again with eloquence (Fischer) and an enthusiasm, which was amazing. He changed the topic of the symposium almost completely. We all did not increase our knowledge about the construction of personality inventories but learnt very much about configural approaches.

The organizers of the congress took a tape of the discussion, which was given to me. Nearly 30 years later I found this tape and presented it to GL in November 2000. He listened the discussion from 1973 in Kiel during his last lecture on the CFA at the university of Würzburg, a few months before he died in May 2001. He was evidently touched by the enthusiastic remarks of the 49 years old Lienert. Parts of this discussion are presented in appendix C of this paper.

B) Analysis and Re-Analysis [4]

Marcus Ising, Wilhelm Janke

1. Aim of the Study

The report refers to one of three studies examining the psychological effects of placebo in healthy volunteers. The first study was concerned with placebo effects under a „undirected" instruction, which resulted in substantial shifts of the mean values, especially, in cognitive-behavioral measures. With the second study the placebo effects under a „sedative" instruction was assessed by repeated applications at three consecutive days. The results did not reveal differences in mean values, but a distinct variability of the individual values could be shown.

The third study, which has been selected for the actual re-analysis, was concerned with the prediction of individual responses under a „stimulant" instruction.

2. Methods

2.1. Subjects and Study Design

60 male students participated in the study which was announced as a „pharmaco-psychological" study including two experimental sessions. In one session, the subjects received placebo (experimental condition), and in the other session (control condition) at another day, they did not receive any medication. The order of the two sessions was balanced.

2.2. Procedure

During the first 30 minutes a mood questionnaire (adjective check list EWL), a semantic differential, and cognitive-behavioral tests were applied for baseline evaluation. After that the subjects received the medication with the "stimulant" instruction in the experimental condition followed by a 30 minutes break which was announced as necessary for the development of the stimulant effects. Finally, the questionnaires and cognitive-behavioral tests were repeated in the same order and supplemented by a drug evaluation questionnaire.

The placebo medication was a gelatine cachet, which was orally administered with a glass of water. The procedure was standardized according to a written instruction, which was also orally presented by the experimenter. In the experimental condition the effects of the drug were described as stimulating to mental and motor performance and as motivation enhancing and as mood improving (stimulant instruction). The subjects were told that the medication was clinically approved and that the drug would not exhibit any somatic side-effects. At the day of the control condition the subjects were informed that the current session serves for control purposes.

[4] A preliminary report of this study – title page and three manuscript pages – was handed over to Gustav Lienert on the occasion of his last birthday celebration in Rauischholzhausen, December 14, 2001.

2.3 Placebo Response

2.3.1 Response Dimensions

The placebo response (criterion) was assessed on a subjective and a cognitive-behavioral level comprising the following dimensions:

Subjective Level

The subjective response was assessed with a preliminary version of the „Eigenschaftswörterliste“ (Adjective Checklist) by Janke and Debus (1978) and with a semantic differential. Response assessment was restricted to the following dimensions:

(1) Subjective activation
(2) Emotional stability
(3) Mood
(4) Direct assessment of the “stimulating properties” of the drug

Cognitive-behavioral level

Established cognitive behavioral tests from the following areas were applied:

(1) Cognitive performance: digit cancellation (d2), digit-symbol test, word fluency test
(2) Psychomotor performance: tapping, aiming, tracing

2.3.2 Definition of Placebo Response

Two different criteria for the assessment of placebo response were applied:

(1) Continuous criterion: Change between the experimental („drug“) condition and the control (“no drug”) condition ($D_{\text{Placebo-Control}}$)
(2) Dichotomized criterion: Placebo response (PR) and Placebo non-response (PNR)

a) PR: $X_i > 1.96 * S_E$

b) PNR : $X_i \leq 1.96 * S_E$, with $S_E = \frac{S_D}{\sqrt{1 - r_{tt}}}$

2.4 Predictor Variables

As placebo response predictors broad traits, namely neuroticism, extraversion, and intelligence, and narrow (specific) traits were applied, namely dominance, lack of self-criticism (Mittenecker Persönlichkeits-Interessen-Test), intropunitivity (Rosenzweig Picture Frustration Study), suggestibility in the body-sway test (under the suggestion of falling ahead), measures of deceptability in optical geometric delusions, individual average drug use, and subjective misgiving towards the “drug” application in the experimental condition. The last predictor has to be considered as a state variable while the other predictors comprise trait information.

The set of predictors was analyzed at a univariate level for each of the variables and at a factorial level with standardized sum scores defining factor-analytically derived second order dimensions.

3. Results

Placebo response differs between the various response dimensions. Significant associations were obtained only for the response dimensions subjective activation and emotional stability (r = .62). Since subjective activation is closest to the intended effect of the "stimulant" instruction applied in this study, the following results refer only to "subjective activation", a factorial response dimension assessed with high reliability (r_{tt} = 0.9; see Janke, 1967, p.210).

3.1 Single Predictors and Placebo Response

Continuous Criterion

The initial criterion was the arithmetic difference of the response scores under the two conditions ($D_{Placebo\text{-}Control}$). The association between the single predictors and the continuous criterion ranged between .14 and .41 (for further details see Janke et al., 1967, 1986).

Dichotomized Criterion

The dichotomized criterion corresponds best with the intention to identify placebo responders. We argue that placebo response is characterized by a significant change of the response towards the suggested direction compared to the null or baseline response. Therefore, a static response dichotomization, e.g. at the median, appeared to us as less adequate [5].

Following classical test theory and a conventional statistical approach we classified the subjects according to the above mentioned criterion: PR: Xi > 1.96SE; PNR: Xi 1.96SE. Twenty of the 60 subjects showed a significant subjective activation to the placebo medication compared to the control condition without application ($p < .05$) who are subsequently denoted as placebo responders (PR). The other 40 subjects did not show a significant enhancement of activation and are subsequently denoted as placebo non-responders (PNR).

3.2 Multiple Predictors and Placebo Response

3.2.1 Prediction of Placebo Response by Multiple Regression Analysis

Multiple regression analyses (standardized regression coefficients) are presented separately for the continuous and dichotomized criterion of placebo response in table 1. Only predictors with a significant contribution at least to one of the multiple regression models are reported.

The two multiple regression analyses for the continuous and dichotomized response criterion obtained a comparable prediction result with R_{corr} = .61 and .58.

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[5] Note: G. A. Lienert might have favoured a median dichotomization. He argued this way in November 2000, when dichotomized criteria were discussed at his last CFA colloquium in Würzburg.

Table 1:
Prediction of placebo response in subjective activation assessed with the continuous criterion ($D_{Placebo\text{-}Control}$) and with the dichotomized criterion of placebo response (PR) and placebo non-response (PNR) by means of multiple regression.

Predictors	$r_{P\text{-}K}$ (ΣZ_{akt})		**ß($D_{P\text{-}K}$)**	**ß(PR/PNR)**
Neuroticism (7 tests sum score)	0.24	*	0.30	0.23
Dominance	-0.14		0.17	0.13
Lack of self-criticism (2 tests sum score)	0.22	*	0.12	0.25
Intropunitivity (Picture Frustration Test)	0.31	**	0.23	0.33
Suggestibility (Body-Sway Test)	0.31	**	0.27	0.32
Misgiving towards "drug" intake	0.41	**	0.29	ns
Average drug use	-0.36	**	-0.26	-0.39
		R_{corr}	0.61	0.58

Note: Only significant standardized regression coefficients are presented (ns := not significant). Additionally, bivariate correlations between single predictors and the continuous criterion ($D_{Placebo\text{-}Control}$; **: $p < 0.01$; *: $p < 0.05$) are reported in the second column (see Janke, 1967, p.210).

3.2.2 Prediction of Placebo Response by Predictor Configurations

Subsequently, only narrow trait variables were considered for a configural prediction analysis. The trait variable dominance was omitted due to the low association in the multiple regression analysis, and the drug associated predictors were omitted for theoretical considerations. Consequently, the configural analysis was restricted to the following three predictor variables: 1) lack of self-criticism (LS), 2) intropunitivity (IP), and 3) body sway suggestibility (BS).

The predictor variables were dichotomized at the arithmetic mean (X_{crit}). Subjects with predictor scores greater than X_{crit} were assigned to '+', subjects with scores less than X_{crit} were assigned to '**-**'. The configuration frequencies of the three dichotomized predictor variables were cross-tabulated with placebo response. The results are presented in table 2.

Table 2:
Configuration pattern in placebo responders (PR) and placebo non-responders (PNR) for the predictor variables "lack of self-criticism (LS)", "intropunitivity (IP)", "body-sway suggestibility (BS)": Two-sample CFA.

LS	IP	BS	PR	PNR	Chi^2	p
+	**+**	**+**	**8**	1	***14.71***	***0.0001***
+	+	**-**	2	3	0.11	0.7412
+	**-**	+	3	4	0.32	0.5695
+	**-**	**-**	1	4	0.44	0.5089
-	+	+	1	3	0.13	0.7144
-	+	**-**	4	6	0.24	0.6242
-	**-**	+	1	8	2.35	0.1250
-	**-**	**-**	0	11	6.74	0.0095
			20	40		
$Chi^2_{df=7}$ = 21.11; p = 0.0036						

Note: $\alpha^*_{+++} = 0.05/8 = 0.00625$; $\alpha^*_{---} = 0.05/7 = 0.00714$

A two-sample configuration frequency analyses (CFA) was applied. Due to simultaneous comparisons of eight configurations a protection of the test-wise error level was required (Bonferroni/Holm adjustment). Only the '+++' configuration frequency differs significantly between responders and non-responders. According to the results of the two-sample CFA, lack of self-criticism, high intropunitivity, and high body sway suggestibility were characteristic for subjects with placebo response.

In the next step, it was examined whether the observed response configuration '+++' defines together with the complementary '**---**' configuration a biprediction type indicating lack of self-criticism, high intropunitivity, and high body sway suggestibility as a response type and self-criticism, extrapunitivity, and low body sway suggestibility as a non-response type. In order to answer this question a biprediction CFA was conducted (see table 3).

Table 3:
Configuration pattern in placebo responders (PR) and placebo non-responders (PNR) for the predictor variables "lack of self-criticism (LS)", "intropunitivity (IP)", "body-sway suggestibility (BS)": Biprediction CFA

LS	IP	BS	PR	PNR	∑
+	+	+	8	1	9
-	**-**	**-**	0	11	11
		Rest	12	28	40
		∑	20	40	60
$Chi^2_{df=1}$ = 17.60; p = 0.00003					

Note: $\alpha^* = 0.05/4 = 0.0125$

Since only complementary prediction types are compared, the number of simultaneous comparisons is reduced to four resulting in a less conservative outcome of the Bonferroni error protection necessary to maintain the test-wise level of significance. The biprediction result is highly significant.

However, the biprediction CFA does not consider the information of the other configurations besides the biprediction types. It needs to be examined whether this information reduction is justified. In order to answer this question a non-standard log-linear model (see von Eye & Niedermeyer, 1999) was applied. The proposed hypothesis of complementary biprediction types for placebo response and non-response was included as model vector P in a non-standard log-linear model (table 4).

Table 4:
Configuration pattern in placebo responders (Yes) and placebo non-responders (No) for the predictor variables "lack of self-criticism (LS/L)", "intropunitivity (IP/I)", "body-sway suggestibility (BS/B)": Biprediction analysis by a non-standard log-linear model

R	LS	IP	BS	f	e	R	LS	IP	BS	L*I	L*B	I*B	L*I*P	P
Yes	+	+	+	8	8.18	1	1	1	1	1	1	1	1	**1**
Yes	+	+	-	2	1.45	1	1	1	-1	1	-1	-1	-1	0
Yes	+	-	+	3	2.04	1	1	-1	1	-1	1	-1	-1	0
Yes	+	-	-	1	1.45	1	1	-1	-1	-1	-1	1	1	0
Yes	-	+	+	1	1.16	1	-1	1	1	-1	-1	1	-1	0
Yes	-	+	-	4	2.91	1	-1	1	-1	-1	1	-1	1	0
Yes	-	-	+	1	2.62	1	-1	-1	1	1	-1	-1	1	0
Yes	-	-	-	0	0.18	1	-1	-1	-1	1	1	1	-1	**-1**
No	+	+	+	1	0.82	-1	1	1	1	1	1	1	1	**-1**
No	+	+	-	3	3.55	-1	1	1	-1	1	-1	-1	-1	0
No	+	-	+	4	4.96	-1	1	-1	1	-1	1	-1	-1	0
No	+	-	-	4	3.55	-1	1	-1	-1	-1	-1	1	1	0
No	-	+	+	3	2.84	-1	-1	1	1	-1	-1	1	-1	0
No	-	+	-	6	7.09	-1	-1	1	-1	-1	1	-1	1	0
No	-	-	+	8	6.38	-1	-1	-1	1	1	-1	-1	1	0
No	-	-	-	11	10.82	-1	-1	-1	-1	1	1	1	-1	**1**
				60	60.00					$LR_{df=6}$ = 3.76; p = 0.709				**$z(\lambda_p)$ = 3.01 p = 0.003**
					Base model (without P):					**$LR_{df=7}$ = 27.57; p = 0.001**				
					Gain in model fit by P:					**$LR_{df=1}$ = 23.81; p < 0.001**				

The biprediction model of placebo response is confirmed again: Firstly, the inclusion of the critical prediction vector P (biprediction vector) results in a highly significant gain in model fit compared to the base model ($p < 0.001$). Secondly, the biprediction vector contributes significantly to the log-linear model ($p = 0.003$). And thirdly, the clear non-significance of the likelihood ratio of the complete non-standard log-linear model ($p = 0.709$) shows a high correspondence between the observed and the expected frequencies derived from the model. This means that the biprediction hypothesis modeled by the prediction vector P describes sufficiently the data, and that the non-consideration of the other configurations besides the biprediction types can be regarded as a justified information reduction.

Finally we examined whether all three predictors are required for the optimal biprediction model or whether an optimal prediction can also be achieved with less predictors. We

successively removed predictors from the original tri-variate configuration. The resulting model fit coefficients (likelihood ratios) are presented in table 5.

Table 5:
Biprediction analysis by a non-standard log-linear model for the predictor variables "lack of self-criticism (LS)", "intropunitivity (IP)", "body-sway suggestibility (BS)": Change in model fit (LR, likelihood ratio) for configurations with three, two, or only one predictor.

Biprediction vector	**Model fit**
Three predictors	
LS + IP + BS	$LR_{df=6} = 3.76$; $p = 0.709$
Two predictors	
IP + BS	$LR_{df=6} = 10.79$; $p = 0.095$
LS + BS	$LR_{df=6} = 14.94$; $p = 0.021$
LS + IP	$LR_{df=6} = 6.71$; $p = 0.349$
One predictor	
LS	$LR_{df=6} = 15.77$; $p = 0.015$
IP	$LR_{df=6} = 13.12$; $p = 0.024$
BS	$LR_{df=6} = 21.20$; $p = 0.002$

It could be shown that only the simultaneous consideration of all three predictor variables results in an excellent model fit indicated by the clear non-significance of the likelihood ratio of the resulting non-standard log-linear model.

4. Discussion

A configural re-analysis of a study from 1966 (habilitation thesis of the first author, 1967) was performed to predict placebo response in healthy male subjects. We could show that placebo responders are characterized by a pattern of specific personality traits comprising lack of self-criticism, intropunitivity, and high body-sway suggestibility, while placebo non-responders are characterized by the complementary personality type. Subsequently, it could be shown that the limitation to one tri-variate placebo response type and the complementary non-response type represents a reduction in information justified by the data. For the optimal prediction of placebo response the simultaneous consideration of all three predictor variables is required, although the predictive contribution of body sway suggestibility appears to be inferior compared to the other two predictors.

In context with the prediction of person related variables like placebo response the configural approach represents an important supplementation to multivariate regression models. The reduction of quantitative traits to ordinal or binary variables implies on the one hand a loss of statistical efficiency. However, this disadvantage is more than compensated by the advantages of statistical robustness and of an easy and comprehensible transfer of the multivariate results into diagnostic and prognostic statements. Because of the person orientation of this approach the identification of configural types implies simultaneously the classification of cases. This means for the present analysis that 20 of the 60 cases are attributed to the two distinct prediction types, and post-hoc analyses might address exclusively these two sub-samples as prototypical groups for placebo response and placebo non-response.

Which method, CFA or multiple regression analysis, can be regarded as superior for multivariate prediction? When the rate of correctly classified cases is considered a limited superiority of the biprediction CFA can be observed (table 6).

Table 6:
Correctly classified cases in multiple regression and biprediction CFA.

Classification in multiple regression analysis			
predicted\observed	PR		PNR
PR	17		05
PRN	03		35
Rate of correctly classified cases:		86,7%	
Rate of unclassified cases:		0,0%	
Classification in biprediction CFA			
predicted\observed	PR		PNR
PR	08		01
PRN	00		11
Rate of correctly classified cases:		95,0%	
Rate of unclassified cases:		66,7%	

When the rate of unclassified cases is considered, multiple regression resulted in an exhaustive classification of cases, while a considerable rate of cases remained unclassified in biprediction CFA. However, this putative advantage of the linear regression model cannot be regarded as authentic: the true exhaustivity of the prediction is indicated by the rate of explained variation expressed by the square of the multiple regression coefficient, which is far away from optimum. Therefore, the high rate of unclassified cases in the biprediction CFA should not be interpreted as a disadvantage, but as a confirmation of the high transparency of this method indicating evidently the lack of exhaustivity of prediction rules.

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C) Appendix
Comments by G. A. Lienert in the Symposium I at the 27th DGPs Congress 1970 in Kiel (Germany) [6]

Wilhelm Janke (1973)

G. A. Lienert: *„Es ist ganz offensichtlich, [dass] hier Wechselwirkungen nicht [zwischen] 2, sondern zwischen 3 und 4 Variablen [vorliegen], die sich nicht auf Wechselwirkungen erster Ordnung, auf Korrelationen, abbilden lassen. Und ich sage Ihnen, ich vermute und hoffe, dass sich dieses Modell, [das konfigurale Modell], gerade für jene Fälle als wirksames Prädiktionsmittel erweisen wird, wo solche Wechselwirkungen zweiter, dritter und höherer Ordnung am Werke sind, die wir mit den heutigen parametrischen Methoden der Interkorrelations-analyse einfach überhaupt nicht erreichen. Denn diese Methode impliziert alle Möglichkeiten nichtlinearer, hyper-nichtlinearer Regression zwischen Items und Skalen. Sie ist parameterfrei [...] und ermöglicht also die Beibehaltung aller Informationen, die wir sonst schlechthin aufgeben, wenn wir nur immer zwei zusammen sehen und nie auch 3 oder 4 zusammen sehen (sehen kann man sie ja nicht mehr gut, weil es sich ja im mehrdimensionalen Raum abspielt). Aber wenn es uns gelingt, diese Wechselwirkungen (bzw. Kovarianzen im parametrischen Sinn) höherer Ordnung mit einzubeziehen, die möglicherweise da sind - ich habe sie da und dort beobachtet - dann könnten wir unter Umständen zu der Hypothese kommen, dass das dimensionale Konzept der Persönlichkeit gar nicht das optimale ist, sondern dass Persönlichkeit etwas ist, was sich nicht dimensional aufspannen lässt oder nicht* ***nur*** *dimensional aufspannen lässt, sondern einem Klassifikationssystem im mehrdimensionalem Raum entspricht, wo wir dann mit der heutigen Methode eben diejenigen Dimensionen aufspannen, die wir in den sogenannten, wie ich [sie] nennen würde, Double-Korrelationen als den uns bekannten Korrelationen eben sehen bzw. berechnen, und alle anderen Korrelationen sehen wir nicht, die lassen wir vollkommen aus dem Spiel. Und wenn wir die Techniken haben werden, heute sind wir noch nicht so weit, auf der hyper-nichtlinearen Ebene also die Mehrfachkorrelationen mit einzubeziehen, dann dürfen wir nicht von Korrelationsmatrizen, wir müssen dann von Korrelationskuben, Hyperkuben, mehrdimensionalen Korrelationsmatrizen ausgehen.*

[3] Report on the 27th Congress of the Deutsche Gesellschaft für Psychologie in Kiel, 1970, pp. 41-68; a tape recording of the symposium was handed to the symposium organizer W. Janke (Düsseldorf, Germany) by the congress management. G. A. Lienert listened to parts of the recording in November 2000.

Wenn uns das gelingt, könnte es sein, dass wir zu der Konklusion kommen: es gibt nicht ***nur*** *oder vielleicht gar keine Dimensionen, sondern Cluster im mehrdimensionalen Raum, in denen wir uns einordnen lassen, [wenn] wir eine geringere Binnenvarianz als Zwischenvarianz haben und damit also Klassen im engeren Sinne darstellen. Sehen Sie, kein Mensch expliziert diese strenge und bedeutsame wissenschaftstheoretische Alternative, und ich meine, dass diese Position möglicherweise ein erster Zugang ist, um, wie ich an dem Beispiel LSD gezeigt habe, glaube, gezeigt zu haben, dass eben auch im, sagen wir, Normalverhalten solche Cluster vorkommen und dass wir damit rechnen müssen, dass wir, wenn wir weiterhin insistieren auf den Theorien, auf deren „mythischen" Voraussetzungen, auf dem Postulat dimensionaler Persönlichkeitsstrukturen, dass wir uns festlaufen. Und ich habe so manchmal den Eindruck, wir haben uns schon festgelaufen. - Danke!"*

W. Janke: *„Vielen Dank Herr Lienert. Wobei man vielleicht ergänzen kann, dass Sie ja nicht nur konfigural auf der Itemebene arbeiten müssen (u.a. wegen chronischer Unzuverlässigkeiten der Items, mangelnder Crossvalidität), sondern dass Sie mit homogenen Clustern von Items arbeiten können, unter Umständen sogar mit Raschmodellen, mit Raschdimensionen, die dann verschiedene Konfigurationen bilden."*