A FACTOR ANALYSIS OF THE PICTURE COMPLETION ITEMS OF THE WAIS [1, 2]

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INTRODUCTION

It appears that there are at least as many statistically significant dimensions tapped by the WAIS as there are distinct subtests, but that the factor structure and subtest structure of the battery are *not* congruent[5]. Several of the significant factors apparently depend upon *content* domains overlapping more than one subtest, and the Picture Completion (PC) subtest, for one, is factorially complex. The efforts of previous investigators to place Wechsler PC items on a unidimensional scale of difficulty have yielded discordant results[1, 2, 3], a fact which also points to a multidimensional underlying structure. The primary purpose of this study was to verify and describe the factorial complexity of PC by a factor analysis of its constituent items, in order to provide a basis for differential interpretation and keying of the separate dimensions.

METHOD

The sample of subjects was the same as that used previously[5], comprising a combined group of 228 male college and college-preparatory students. Items 1 and 3 were dropped from the analysis because each of them was failed by only two subjects in our sample. Item "PA" was added to the regular PC items, basing its scoring upon evidence of recognition of the fish in the basket in item 7 of Picture Arrangement.

Tetrachoric correlations were computed by machine, and are reported in Table 1. The factor analysis was carried out using an iterative procedure for communality estimation[7]. Stable results for three factors were obtained after four iterations. The latent roots for these factors are 3.475, 1.612, and 1.232, accounting for not quite

TABLE 2. ROTATED FACTOR MATRIX

Item	I	II	III	h^2
2	−090	232	818	732
4	029	370	317	238
5	262	054	115	084
6	095	357	353	261
7	144	285	106	114
8	007	868	006	754
9	313	770	−051	693
10	−162	387	354	301
11	277	212	−224	172
12	441	235	058	252
13	029	481	030	233
14	−001	015	655	429
15	312	368	−054	236
16	605	020	−001	366
17	187	247	364	229
18	767	110	291	685
19	−257	290	208	193
20	291	243	181	176
21	264	111	178	114
PA	093	111	193	058
Σa^2	1.819	2.607	1.895	6.320

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[2]This report may be regarded as the second in a series[6] looking toward objective interpretation of the Wechsler as a personality measure.

TABLE 1. TETRACHORIC INTERCORRELATION MATRIX (N = 228)

Item	2	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	PA	P_1
2		30	−14	30	23	19	08	46	−32	18	18	57	10	00	39	24	29	12	06	17	.95
4			26	29	10	36	29	21	06	06	05	24	19	−08	16	07	14	20	23	31	.89
5				10	21	−13	15	18	15	11	15	22	06	20	22	15	−17	00	02	10	.85
6					10	42	29	15	06	06	16	30	−03	06	16	21	14	31	23	25	.89
7						26	29	−01	05	11	35	16	17	05	−01	18	06	−06	41	−16	.91
8							71	32	15	23	35	06	39	05	14	10	27	34	00	00	.84
9								26	19	35	29	−04	47	15	24	34	15	11	26	10	.78
10									00	−04	34	17	−06	−13	24	02	19	27	13	03	.74
11										06	12	−12	19	20	11	13	05	22	11	02	.73
12											26	06	23	29	02	42	−13	42	−16	18	.76
13												−13	18	−02	21	12	21	11	−09	04	.90
14													04	−08	22	19	15	04	11	04	.66
15														27	31	19	−14	−11	06	15	.79
16															11	49	05	12	26	13	.73
17																32	19	13	11	19	.49
18																	−17	43	28	03	.80
19																		03	−01	14	.40
20																			18	02	.56
21																				00	.22
PA																					.59

one-third of the total variance of the 20 items. The communality estimates range from .058 (Item PA) to .754 (Item 8). Various rotational positions were explored; items 8, 14, and 16 were used to define the final rotation[6]. The orthogonally rotated factor loadings and communalities are reported in Table 2.

Results[3]

Only items 11 and 19 appear to represent appreciable violations of the positive manifold bounded by the planes of rotated factors, but both of these items are of comparatively low communality. The simple structure is therefore judged to be satisfactory.

Factor I is most highly correlated with Item 18, which is the same item used by Rapaport[4] to illustrate what he termed "increase of distance from the picture" or "impaired contact with reality" as one of three major sources of failure on PC items. By elimination (*cf.* below), Factor 1 may also be identified with Factor VI of the previous analysis of split-half subtest scores for this sample[5].

Factor II is most highly correlated with items 8 and 9. The most common wrong responses to these items are "Bow" and "Oarsman," respectively, and such responses may be judged to be psychologically similar to what Rapaport[4] terms "loss of distance" as a second source of failure. "Maintenance of perspective" appears to provide a suitable rubric for the positive pole of this factor.

Consideration of the fate of the odd- and even-numbered PC items in Table 2, in the light of the previous analysis[5], suggests that Factor II is very similar to the previous Factor IX. This leads to the prediction that certain Comprehension and Arithmetic items should correlate selectively with the items of Factor II. That such items can be found is illustrated by the values in Table 3.

Table 3. C vs PC Item Intercorrelations

	C #5	C #6	C #11	C #13	
PC #18	−10	19	−30	−17	I
16	03	03	−03	01	
12	05	08	−06	03	
PC # 8	16	40	26	20	II
9	22	21	21	06	
13	02	33	15	17	
PC # 2	09	14	−33	34	III
14	14	05	−14	00	
10	06	14	16	12	

Factor III is most highly loaded by items 2, 10, and 14, which are precisely the three items used by Rapaport[4] to illustrate failure in PC when a "query for information replaces concentration," his remaining major source of failure. In the case of this factor it seems to us that *awareness* of uncertainty must be primarily involved, since subjects may suspect a correct answer without having the confidence to guess it overtly.

Re-examination of Factor XI in the previous study of this sample[5] suggests that it may be very close to the present Factor III, and should not have been rejected. If so, then the PC items correlating with Factor III should exhibit selective correlation with the Object Assembly (OA) items. Verification for this prediction may be found in Table 4.

We have not yet isolated any items from any other subtest that correlate selectively with Factor I, and postulate that this factor embodies an unique contribution of PC to the Wechsler battery.

[3]A more extensive discussion of these results may be found in [6].

TABLE 4. OA vs PC INTERCORRELATIONS

	OA #1	OA #2	OA #3	OA #4	
PC #18	22	11	19	28	
16	15	13	10	12	I
12	−20	00	00	07	
PC # 8	−04	17	17	21	
9	−16	12	15	25	II
13	29	39	13	30	
PC # 2	21	54	26	23	
14	22	11	31	07	III
10	46	42	29	27	

SUMMARY

The PC subtest of the WAIS is found to depend on three orthogonal factors: I. Maintenance of Contact; II. Maintenance of Perspective; and III. Effect of Uncertainty.

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MEASURES OF OVER-CONTROLLED AND UNDER-CONTROLLED BEHAVIOR: A VALIDATION[1, 2]

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PROBLEM

Two of the most frequently used objective measures of behavior in recent years have been the MMPI and the Taylor Manifest Anxiety Scale (TAS). A major problem that confronted experimenters who used these instruments was the frequent finding that they were useful where interest lay only in establishing differences between various groups of subjects but were not adequate for predicting the behavior of individuals. A clear demonstration of this is seen in the results of studies that employed the TAS[4, 5] and the MMPI[1, 3, 7] to evaluate outcome of psychotherapy. The tests differentiated groups of patients judged improved from those judged unimproved, but they did not predict individual changes. The lack of discriminatory power may be attributed, in part, to the fact that there is considerable uncertainty

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