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Identifying achievement-motive-types with CFA: A study to replicate the results from Wagner-Menghin (2003)

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Abstract

The test 'Work Style' assesses certain variables relevant for the achievement motive using Cattell's objective testing approach rather than by questionnaires or projective tests. By using the CFA, three so-called achievement motive types could be found, which in turn could be interpreted with respect to the theory of the achievement motive (Wagner-Menghin, 2003). These types were labeled 'hope for success'-type, 'fear of failure'-type and 'avoidance of failure'-type and were not only found within one sample, but within two samples that differed in respect of the motivational setting of the tests. CFA-types and antitypes could not be replicated exactly within this. However, as at least the types could be replicated, further validation of the types is regarded as useful.

Key words*:* Configural Frequency Analysis (CFA), achievement motive, assessment, objective test, aspiration-level

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1. Introduction

The test 'Work Style' was based on Cattell's objective personality testing approach (OPT, Cattell, 1955, 1958; Cattell & Warburton, 1967) to assess some variables relevant for the achievement motive. OPT measures rely on observing behaviour rather than self-rating behaviour and are therefore claimed to be less prone to faking than questionnaires but more objective than projective measures. Using results out of subtest 2 of this test battery Wagner-Menghin (2003) found three so-called achievement motive types by using the Configural Frequency Analysis (CFA), which were then interpreted with respect to the theory of the achievement motive (Atkinson, 1964; Dweck & Elliott, 1983; McClelland, Atkinson, Clark, & Lowell, 1953; Schmalt & Sokolowski, 2000). These types were labeled 'hope for success'-type, 'fear of failure'-type and 'avoidance of failure'-type and were not only found within one sample, but within two samples that differed in respect of the motivational setting (personnel selection situation versus volunteering in research project) and are described as follows. The 'hope for success type' are individuals who start the test with a realistic 'level of aspiration' and although they have to find out that other people do better in the respective task, they stick to their realistic 'level of aspiration'. They are more eager to achieve their own mastery standards, and do not let themselves be put under pressure by the normative (performance) standard. The 'fear of failure-type' are individuals who start the test with an unrealistically high 'level of aspiration'. They overestimate their performance. The negative social comparison causes a relevant decline in aspiration level, but their 'level of aspiration' remains unrealistic (either still overestimated or underestimated). The 'avoidance of failure-type' can be called cautious individuals. They start with an unrealistically low 'level of aspiration' but raise the level after gaining information about the other participants. Some of them finish with quite realistic predictions but others tend to overestimate their performance after the social comparison. They are cautious under the mastery goal standard, where they can avoid failure by keeping their goals low, however they make a concerted effort once the goal standard changes: Under a normative standard, being cautious is a non-effective strategy for avoiding failure.

The individuals of the two samples are distributed quite similarly over the 3 types and the so called mixed type, which was built to include all cases, not included in the 3 types. About 50% of each sample was classified as "avoidance of failure-type", approximately 25% of each sample was classified as 'mixed type', about 10% belong to the 'hope for success-type', and about 4% stick to 'fear of failure'. In order to validate the types they were compared with respect to different tests assessing aspects of intelligence (Matrices, Verbal Tasks; Complex Rule Recognition; Mathematical Tasks and Calculating with Symbols) and the personality questionnaire NEO-FFI. According to the results the 'hope for success' group can be characterized as being more capable with regard to their intelligence-test performance, and describe themselves as being more conscious. The 'fear of failure' and the 'avoidance of failure' groups can be characterized as being less capable with regard to their intelligence-test performance, and describe themselves as being less open for experience.

These results (Wagner-Menghin, 2003), the identification of types, as well as the first indications of validity are of relevance when interpreting the test battery Work style as the first OPT within the achievement motive framework. Traditionally, the story-based measures of TAT, a projective technique, had been the standard for assessing hope for success and fear of failure. Later constructed questionnaires were meant to replace TAT. However question-

naire based measures are not consistently related to the story-based motive measures, both measures reflect one area of the need achievement (McClelland, Koestner, & Weinberger, 1989). The self-attributed need achievement represents the conscious opinion of a person concerning (their own?) achievement and can be assessed with questionnaire-type measures. The implicit need achievement is unconscious and therefore only accessible with story-based measures. The difference between these two areas of the achievement motive is important in order for one to classify the behaviour. Questionnaire-type measures are able to predict respondent behaviour or motivation. The self-attributed need achievement is said to be provoked by characteristics of the situation – like social comparison, positive consequences, expectations etc. – or by characteristics of the task itself, e.g. difficulty. By analysing operant behaviour or the motive – with everything needing long-term planning or consequent pursuing of action – one cannot say how it has been provoked. The influence of a single situation or of single tasks is insignificant. The connecting constant is only the implicit need achievement of a person. This kind of behaviour is best predicted by story-based measures. Story-based measures work with different situations and aggregate a wide range of aspects (like feelings, expectations and situational themes). This kind of measure will therefore reproduce reality more accurately than questionnaires which focus on single and abstract aspects, that either have a lot in common with conscientiousness or with anxiety.

It currently remains unclear which area of the achievement motive the test battery Work styles is valid for. The study from Wagner-Menghin (2003) already cited above took the finding that the same types could be identified in two samples that differed regarding the motivational setting to be first evidence for the assessment of not only motivational components but also the underlying motive. One might argue that more evidence is needed to maintain this assumption, especially the relation to measures already established is of prime interest. However, before discussing the relation of the types to other measures it is of importance to have more evidence on the replication of the types themselves.

Therefore the current study aims to contribute to the validity of the CFA- types assessed with subtest 2 of the test battery Work style. Using another sample, the 3 types found by Wagner-Menghin (2003) should be replicated.

2. Materials and methods

2.1 Test battery ´Work Style´

'Work Style' is a short computer administered test battery influenced by the work of Cattell's Objective Analytic Personality Test Battery (O-A, Cattell, 1955; Cattell & F.W., 1967). Besides the variables of the achievement motive, 'Aspiration Level' and 'Tolerance for Frustration', one can assess the variables 'Reflectiveness/Impulsiveness' and 'Endurance on boring work'. The assessment is not based on questionnaires but on tests encouraging subjects to do their best. For the current study only subtest 2 is relevant. (For a more detailed description and Figures illustrating the test see Wagner-Menghin, 2003).

2.2 Samples

Two samples were available for the cross-classification and identification of types by using the CFA. The first replication analysis was done on a sample (n = 629; age: 16 - 56, mean: 26.05, sd: 5,37; sample 1-'research-sample') which volunteered for a research project (University of Vienna, Austria) as a part of their training (students of psychology) or just for interest. Their results had no consequences and were kept anonymous. The desire to achieve good results is therefore only driven by internal factors. This sample is comparable with sample 1b-research-sample from Wagner-Menghin (2003).

A second analysis was done with a sample of young people (sample 2a – 'selection sample') (n = 79; age: 16 - 44, mean: 23.94, sd: 8.34) taking the test in order to apply to attend a school. The data has been kindly placed at this study's disposal by Test- und Beratungsstelle des Arbeitsbereichs Psychologische Diagnostik (2003)

In addition, data from the study from Benesch (2003), who studied the effect of faking on instruments assessing personality variables, was also available. He took data from a group of persons, who were instructed to answer as honestly as possible (sample 2b –'imagine selection - answer honest') (n = 82; age: 17 - 49, mean: 29.35, sd: 8.66) and from a group of persons who were instructed to give the answer that would give the best impression when applying for a job (sample 2c – 'imagine selection - fake good').) (n = 86; age: 16 - 53, mean: 28.72, sd: 8.3). These two groups are of interest as their data can be compared with the data from the real selection situation. With respect to the planed use of the test as an OPT it is of relevance whether the types can be replicated under the experimental manipulation of successful faking.

2.3 Method

Based on the results of subtest 2 (measures for the aspiration level) subjects are *cross-classified* according to their 'Aspiration Level - measure 1' (realistic prediction 2, overestimation 1, underestimation 3) at the beginning of the test (internal standard, mastery goal) and the change of 'Aspiration Level' at the end of the test, after repeated negative social comparison (stick to aspiration level 2, raise aspiration level 3, lower aspiration level 1).

A first order Configural Frequency Analysis (CFA; von Eye, 2002, 1990; Lautsch & von Weber, 2002; Lienert & Krauth, 1975) with Lehmacher's asymptotic hypergeometric test (Lehmacher, 1981) will be used to identify types in the new sample. Alpha will be adjusted for all possible configurations using a Bonferroni correction.

A two sample CFA (Lienert, 1971) will be used to identify configurations that occur with different probability between two samples. To estimate the expected cell frequencies and to perform the significance tests the software Configural Frequency Analysis - Version 2000 (von Eye, 1998) will be used.

3. Results

Table 1 shows the results of the Configural Frequency Analysis of the old sample (sample 1b- 'research sample') and the new sample (sample 1-'research-sample'). As is the case for the old sample, three of the nine cross-classified groups could be identified as a type, and three as an antitype. Of particular interest is the fact that the three types (type 3, type 5, type 7) and three antitypes originally identified by Wagner-Menghin (2003) could again be identified in comparable samples. However, the two sample CFA indicated that there are statistical differences between the distribution of persons over the configurations. Two configurations, type 5 and type 7, are identified as discrimination types.

Within the new sample 1-'research-sample' more individuals are classified as type 5 than within the old sample 1b. The reverse applies for the discrimination type 7 (table 2).

Table 1:
Configural frequencies for the variables 'aspiration level 1 (test start)' and 'Change of aspiration-level after social comparison' for the research samples

		Wagner-Menghin (2003), sample 1b- 'research sample'					sample 1-'research-sample'					Two Sample CFA			
	C	***f(o)***	***f(e)***	***stat.***	***p***		***f(o)***	***f(e)***	***stat.***	***p***		***stat.***	***p***	***pi****	
1	11	4	25.637	-7.492	.0000	A	0	23.548	-7.209	.0000	A	1.76	.184	.455	
2	12	11	10.255	.278	.3904		15	18.210	-1.004	.1575		1.12	.289	.211	
3	13	24	3.108	12.679	.0000	T	31	4.242	14.153	.0000	T	2.28	.130	.192	
4	21	75	121.614	-8.309	.0000	A	92	144.874	-8.471	.0000	A	6.59	.010	.174	
5	22	94	48.645	8.715	.0000	T	169	112.030	9.329	.0000	T	45.09	.000	.292	D
6	23	16	14.741	.393	.3470		22	26.095	-1.134	.1284		1.93	.164	.214	
7	31	416	347.749	11.456	.0000	T	230	153.577	12.195	.0000	T	47.29	.000	.154	D
8	32	93	139.100	-8.342	.0000	A	65	118.760	-8.769	.0000	A	1.19	.276	.074	
9	33	20	42.151	-6.516	.0000	A	5	27.663	-6.248	.0000	A	5.677	.017	.319	
		753 χ^2 for CFA model = 259.3519; df = 4; p = .000; p < 0.05 sign.; LR-χ^2 for CFA model = 183.1588; df = 4; p =.000; p < 0.05 sign.;					629 χ^2 for CFA model = 322.7612 df = 4; p = .000; p < 0.05 sign.; LR-χ^2 for CFA model = 255.7262 df = 4; p = .000; p < 0.05 sign.;								

Notes: C = Configuration; stat. = statistic, A = Antitype, T = Type, a CFA of order 1 was performed, Lehmachers test was used; Bonferroni-adjusted alpha = 0.0055556, χ^2 Test with continuity correction was used for Two Sample CFA.

Table 2:
Overview of the distribution of individuals between the three types and the 'mixed types'

	Wagner-Menghin (2003), sample 1b- 'research sample'		sample 1-'research-sample'	
	n	%	n	%
Type 5 'hope for success'	94	12.48%	169	**26.78%**
Type 3 'fear of failure'	24	3.19%	31	4.93%
Type 7 'avoid failure'	416	**55.52%**	230	36.57%
Mixed Types	219	29.08%	20	31.64%
	753		629	

Within sample 2 the results are heterogeneous (table 3 and 4): Admittedly the three configurations – 3, 5 and 7 could be replicated for all subsamples of sample 2 as types, like in the samples analysed before. But for configurations (1, 4, 8 and 9), originally identified as antitypes, one can see certain discrepancies: Within sample 2a - selection sample - no configuration is identified as an antitype. For sample 2b - 'imagine selection - answer honestly', configuration 4 is identified as an antitype, for sample 2c - 'imagine selection - fake good configuration 1 and 8 are identified. However, the deviation between the observed and exceptive frequencies for the respective configurations is in the expected direction for all samples.

The two-sample-CFA yields that there are no discrimination types identifiable when comparing the two experimental groups (sample 2b and 2c) with the data from the field group (sample 2a) (see again table 3 and 4).

4. Discussion

The current study aimed to replicate the CFA-types found by Wagner-Menghin (2003). With respect to this goal the results are not unified. The types and antitypes could be replicated within a similar sample, as used in the original study, which is regarded as positive and indicates that the type concept might be a promising approach for interpreting the individual results of this subtest. However, it must be stated that the person distribution between the types changed. There are several possible reasons for this phenomenon. One of them is that although the samples were comparable regarding age and situational influences when taking the test, the underlying motives of each person might be different. Another reason may be the software used for test presentation. The Wagner-Menghin 2003 data was collected with an older version of the software used for test presentation. For the current version, major improvements to the instruction and the user guide were made, which might explain the shift of frequencies between the types. To test this hypothesis at least with the existing data, an additional two-sample CFA was performed using the current sample 1-'research-sample' and the current sample 2a - 'selection sample' to compare the frequencies of the two samples who took the test with the new software. This CFA did not identify differences between the samples.

Table 3:
Configural Frequencies Analysis for the variables 'aspiration level 1 (test start)' and 'Change of aspiration- level after social comparison' for the selection samples

		sample 2a 'selection sample'					sample 2b 'imagine selection - answer honestly'					Two Sample CFA		
	C	***f(o)***	***f(e)***	***stat.***	***p***		***f(o)***	***f(e)***	***stat.***	***p***		***stat.***	***p***	***pi****
1	11	1	3.494	-2.134	.0164		1	3.476	-2.467	.0068		.47	.493	.019
2	12	1	2.127	-.994	.1601		1	1.159	-.172	.4316		.47	.493	.019
3	13	4	.380	6.274	.0000	T	3	.366	4.640	.0000	T	.00	.960	.141
4	21	18	22.709	-2.135	.0164		12	17.378	-2.785	.0027	A	1.27	.260	.182
5	22	20	13.823	2.888	.0019	T	11	5.793	2.942	.0016	T	2.94	.086	.239
6	23	1	2.468	-1.348	.0888		2	1.829	.156	.4379		.00	.974	.236
7	31	27	19.797	3.297	.0005	T	44	36.146	3.887	.0001	T	5.43	.020	.178
8	32	7	12.051	-2.384	.0086		7	12.049	-2.727	.0032	A	.04	.836	.019
9	33	0	2.152	-1.995	.0230		1	3.805	-2.454	.0071		.000	.985	.491
		79					83							
		χ^2 for CFA model = 48.3893					χ^2 for CFA model = 33.0020							
		df = 4, p = .0000; p < 0.05 sign.;					df = 4, p = .0000; p < 0.05 sign.;							
		LR-χ^2 for CFA model = 28.5794					LR-χ^2 for CFA model = 22.4439							
		df = 4, p = .0000; p < 0.05 sign.;					df = 4, p = .0002; p < 0.05 sign.;							

Notes: C = Configuration; stat. = statistic, A = Antitype, T = Type, a CFA of order 1 was performed, Lehmachers test was used; Bonferroni-adjusted alpha = 0.0055556, ChiSquare Test with continuity correction was used for Two Sample CFA.

Table 4:
Configural Frequencies Analysis for the variables 'aspiration level 1 (test start)' and 'Change of aspiration- level after social comparison' for the selection samples

		sample 2a – 'selection sample'					sample 2c 'imagine selection - fake good'					Two Sample CFA		
	C	f(o)	f(e)	stat.	p		f(o)	f(e)	stat.	p		stat.	p	pi*
1	11	1	3.494	-2.134	.0164		0	6.267	-4.063	.0000	A	.00	.966	.521
2	12	1	2.127	-.994	.1601		4	3.453	.378	.3527		.66	.416	.348
3	13	4	.380	6.274	.0000	T	7	1.279	5.728	.0000	T	.23	.632	.181
4	21	18	22.709	-2.135	.0164		11	14.814	-1.798	.0361		2.19	.139	.229
5	22	20	13.823	2.888	.0019	T	14	8.163	2.936	.0017	T	1.54	.215	.186
6	23	1	2.468	-1.348	.0888		1	3.023	-1.473	.0703		.43	.515	.042
7	31	27	19.797	3.297	.0005	T	38	27.919	4.409	.0000	T	1.33	.248	.108
8	32	7	12.051	-2.384	.0086		9	15.384	-2.978	.0014	A	.01	.933	.073
9	33	0	2.152	-1.995	.0230		2	5.698	-2.498	.0063		.43	.555	.479
		79					86							
		χ^2 for CFA model = 48.3893					χ^2 for CFA model = 47.1414							
		df = 4, p = .0000; p < 0.05 sign.;					df = 4 p = .0000; p < 0.05 sign.;							
		LR-χ^2 for CFA model = 28.5794					LR-χ^2 for CFA model = 40.9089							
		df = 4, p = .0000; p < 0.05 sign.;					df = 4 p = .0000, p < 0.05 sign.;							

Notes: C = Configuration; stat. = statistic, A = Antitype, T = Type, a CFA of order 1 was performed, Lehmachers test was used; Bonferroni-adjusted alpha = 0.0055556, χ^2 Test with continuity correction was used for Two Sample CFA.

According to current results about 35% of each sample was classified as “avoidance of failure-type”, approximately 30% of each sample was classified as ‘mixed type’, about 25% belong to the ‘hope for success-type’, and about 5% stick to the ‘fear of failure-type.’

What is positive is that the types could also be replicated within experimentally manipulated samples and a sample taking the test in a real selection situation. No differences regarding the distribution over the configurations were identified for these samples! (All of the data was collected with the newer software!).

Regarding the heterogeneous results for the replication of the antitypes it has to be said that at least no other configuration was identified as an antitype and that the deviation between the observed and expected frequencies for the respective configurations is in the expected direction for all samples.

It can be concluded that the same type structure can be replicated within several samples and that it might be promising to keep on working on the validation of the types within the framework of achievement motive.

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