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A FACTOR-ANALYTICAL COMPARISON OF FANTASY AND QUESTIONNAIRE MEASUREMENTS OF ACHIEVEMENT-RELATED MOTIVES

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Two factor analyses were carried out on total and item scores respectively of several fantasy (TAT) and questionnaire measurements of achievement-related motives. Five dimensions were hypothesized to describe the relationships between the various measurements: two kinds of questionnaire achievement motives, one questionnaire fear of failure motive and two projective motives: respectively, the motive to attain success and the motive to avoid failure. Subjects were 243 high school girls of the last year of eight different schools. Factor analysis of scores confirmed the five hypothesized factors and supported the construct validity of both the McClelland and Arnold projective system for scoring the achievement content of stories. Factor analysis of questionnaire items yielded the following dimensions: personal versus social need achievement, scholastic achievement anxiety versus intelligence test anxiety, and personal risk anxiety. Contrary to former research in the field, no clearcut physiological factor could be detected.

This present research was undertaken to bring some order and clarification to the questionnaires and projective techniques that are commonly used in the diagnosis of achievement-related motives. Atkinson's theory of achievement motivation (Atkinson & Feather 1966) served as the theoretical framework. This theory discerns two independent intrinsic achievement-related motives: the motive to achieve success and the motive to avoid failure. The success-motive is supposed to enhance performance, the failure avoidance motive to debilitate performance.

A survey of the literature revealed that questionnaires which claim to measure the motive to achieve could be divided in two groups: one inspired by Murray's 1938 concept of achievement motivation (e.g., Edwards 1959), the other (e.g., Hermans 1967a) by the theoretical formulations and research findings of the McClelland-Atkinson tradition (McClelland et al. 1953; Atkinson 1958). Therefore, it was anticipated that questionnaires from both groups might be measuring two different kinds of success motives. The development of the debilitating anxiety scales seemed to be more straightforward in that they were based mainly on Mandler and Sarason's Test Anxiety Questionnaire (1952). On the projective side of the picture one can find two achievement-

related apperceptive techniques. The nAch-score of the McClelland group (McClelland et al. 1953) should reveal the motive to achieve, but the literature offers indications that some categories of this type would be rather typical for subjects with a high degree of failure anxiety (Atkinson 1958; Heckhausen 1963). The Story Sequence Analysis of Magda Arnold (1962) recognizes positive and negative motivation but makes no clearcut discriminations between various kinds of achievement oriented motives. However, the first check list of the scoring key contains story characteristics that are labeled as indications of 'achievement, success, happiness and active effort (or lack of it)' (Arnold 1962 : 226). It was felt that this list would have some connections with the McClelland need achievement construct and that both apperceptive methods would reveal a negative (anxiety) and positive (hope for success) achievement dimension.

Between projective and questionnaire measures of achievement motivation a significant relationship is rarely found. Such a relationship then, was not expected to appear in the present research. In summary, five dimensions were hypothesized to describe the relationships between the various measurements: two kinds of questionnaire achievement motives, one questionnaire fear of failure motive and two projective motives: respectively, the motive to attain success and the motive to avoid failure.

PROCEDURE

METHOD

Two factor analyses¹ were carried out by the principle axis method followed by varimax rotation. The first analysis concerned the total score intercorrelations (r) of all variables. In the second analysis, the relationships between some questionnaires were explored further by analyzing the inter-item correlations (r_i). The scores of items of the multiple response type were converted into a zero-one score by using the median. Some items had to be discarded. Their score distribution was too asymmetric to compute a tetrachoric correlation. Finally, the second analysis depends on 157 items of eight different questionnaires.

MEASUREMENTS

Table 1 presents the different variables ordered according to the label they received in the analyses. SWCM was included to control the effect of social desirability on achievement statements. Though it was

¹ The factor analyses were carried out at the 'Universitaire Rekencentrum' of the University of Leuven (Louvain). We are indebted to F. Florizoone for his advice and technical assistance.

not intended to study facilitating anxiety, HEFP was maintained in the first analysis for practical reasons². The subjects in this study were Dutch speaking. The questionnaires of Hermans were constructed for Dutch speaking people while for SWCM (Hermans 1967) and EDWA (Van Dooren 1967) Dutch adaptations were available. The other questionnaires were translated, and the TAQC was presented in a slightly adapted form. The pictures used for the projective techniques were numbers 2, 8, 1, and 7 of the list described in Atkinson (1958 : 832-834)

label	identification	publication
BENA ^o	factor scale of personal need achievement	Bendig 1964
BENB ^o	factor scale of social need achievement	Bendig 1964
COSA ^o	factor scale of need to do well on a task	Costello 1967
COSB ^o	factor scale of need to be a success	Costello 1967
DASA ^o	debilitating anxiety scale	Alpert & Haber 1960
EDWA ^o	need achievement scale	Edwards 1959
FURS	academic achievement motivation scale	Furst 1966
HEFN ^o	negative failure anxiety	Hermans 1967b
HEFP	positive failure anxiety	Hermans 1967b
HERM ^o	achievement motivation scale	Hermans 1967b
MANA	negative motivation on the achievement check list	Arnold 1962
MAPA	positive motivation on the achievement check list	Arnold 1962
MCLN	negative motivation score based on some categories of the nAch-score	McClelland et al. 1953
MCLP	positive motivation score based on some categories of the nAch-score	McClelland et al. 1953
TAQC ^o	test anxiety questionnaire High school form	Cowen 1957
SWCM	social desirability scale	Crowne & Marlowe 1964

TABLE 1. IDENTIFICATION OF MEASUREMENTS. ^o Scales included in both analyses.

in that order. The administration followed the recommended instructions (Atkinson 1958 : 837). The stories were independently scored by two coders who had completed intensive training with the manuals of their respective methods. One hundred stories were rescored after 5 weeks for nAch and after 8 weeks for the Arnold system, yielding intrascorer reliabilities of .84 and .87 respectively. After scoring, specific arrangements were made to isolate positive and negative scores. In the case of the Arnold method, the negative and positive scores on the achievement check list were not combined into one single score as usual but were kept separately. In addition, following suggestions in the literature, some subcategories of the McClelland nAch-score were combined into a positive and others into a negative motivation score. So, the positive motivation score (MCLP) contained the categories 'Stated

² The questionnaires of Hermans are compounded in one booklet with a mixed order of items of the three scales.

need for achievement', 'Successful instrumental activity', 'Positive anticipatory goal state', and 'Positive affective state'. The negative motivation score (MCLN) contained the categories 'Unsuccessful instrumental activity', 'Negative anticipated goal state', and 'Negative affective state' (Atkinson 1958 : 179).

SUBJECTS

Two hundred and forty-three (243) high school girls of the last year of eight different schools received the testing program in two sessions at the beginning of the first term. The first session contained the TAT; the second, the questionnaires in a variable order. Four female researchers each examined approximately one fourth of the sample⁴.

RESULTS AND DISCUSSION

FACTOR ANALYSIS I

Table 2 presents the correlation matrix and Table 3 the rotated factor matrix. Five factors could be identified. Factor I was clearly a questionnaire 'Fear of failure' factor with the highest loadings on HEFN (.85), TAQC (.77), and DASA (.73). The success motive questionnaires were divided along two separate factors as was expected. Following Bendig (1964), Factor II can be called 'Personal need achievement' and Factor IV 'Social need achievement'. Highest loadings for personal need achievement were found for HERM (.71), COSA (.71), FURS (.68) and BENA (.64). Highest loadings for social need achievement were found for BENB (.89), EDWA (.43) and COSB (.35). These results reflect the general findings of the literature except for COSB. That scale did not appear to be a relatively pure factor scale as it was presented by Bendig (1964). On the contrary, COSB had loadings on Fear of failure (.48), Social need achievement (.35) and Personal need achievement (.31). The negative loading of HEFP (-.53) on the debilitating fear of failure factor corresponds with the findings of Alpert & Haber (1960), Dember et al. (1962), and Hermans (1971).

As was expected, no common factor for questionnaires and projective techniques appeared, but no common factor was found for both projective methods either. Instead of it, both methods brought out a factor on its own, and the sign of the loadings was entirely in line with the initial theoretical position of their authors. Indeed, both MCLP (.83) and MCLN (.53) had positive loadings on the same apperceptive achievement motivation factor with the highest loading for MCLP. So the combination of these sub-categories into one single nAch-score seems to be justified. The analysis also revealed some

³ We are indebted to Marie-Thérèse Hayen, Rose-Ann Vanderostyne, Marie-Rose Vaneykvelde, and Irène Veulemans who participated in this research as a requirement for obtaining their degree.

	BENA	BENB	COSA	EDWA	FURS	HERM	DASA	COSB	TAQC	HEFN	HEFP	MCLP	MAPA	MCLN	MANA
BENA	1														
BENB	21	1													
COSA	47	11	1												
EDWA	05	41	13	1											
FURS	45	22	42	20	1										
HERM	54	23	55	16	49	1									
DASA	17	00	-22	04	-04	-03	1								
COSB	33	34	12	14	37	23	30	1							
TAQC	27	07	-03	01	10	12	56	45	1						
HEFN	23	08	-04	04	12	04	58	44	66	1					
HEFP	-12	12	09	-02	01	07	-42	15	-35	-53	1				
MCLP	-07	05	-01	-06	01	-03	-11	02	-05	-15	23	1			
MAPA	04	02	03	-04	04	-02	02	05	-07	-02	07	29	1		
MCLN	-08	05	03	-04	05	-02	05	01	01	-02	11	45	07	1	
MANA	-12	-10	01	-06	-03	-06	03	-06	00	-01	-02	-00	-31	-04	1
SWCM	16	07	17	00	06	20	-09	-05	-01	-02	-02	03	-03	00	-06

TAB 2. MATRIX OF INTERCORRELATIONS ($\times 100$) BETWEEN THE TOTAL SCORES OF ALL VARIABLES IN ANALYSIS 1 (N = 243)

empirical basis for Arnold's method that discerns between positive and negative motivation scores, at least so far the achievement check list is concerned. MAPA loaded positive on Factor v (.83) while MANA received a negative loading (-.38) on the same dimension.

FACTOR ANALYSIS II

The second analysis was carried out on the inter-item correlations of BENA, BENB, COSA, COSB, DASA, HERM, HEFN and TAQC. The number of

items maintained for each of these scales was as follows: BENA 8, BENB 11, COSA 10, COSB 14, DASA 10, HERM 43, HEFN 25, TAQC 36: a total of 157⁴. The analysis resulted in five meaningful factors. Two of them were related to the achievement motivation questionnaires, three to the

	I	II	III	IV	V	VI
BENA	27	64	-08	10	13	-27
BENB	00	10	08	89	06	-13
COSA	-14	71	00	01	00	-15
EDWA	-03	13	-08	43	00	05
FURS	06	68	03	20	02	18
HERM	02	71	-01	15	01	-24
DASA	73	-12	-05	00	05	-02
COSB	48	31	10	35	07	20
TAQC	77	09	06	07	-05	-04
HEFN	85	09	-05	-08	-01	10
HEFP	-53	03	21	09	03	-01
MCLP	-11	-03	83	-03	15	-04
MAPA	-03	02	18	-10	83	12
MCLN	-02	00	53	00	-01	01
MANA	00	-03	02	-09	-38	06
SWCM	-04	16	01	00	00	-31

TAB. 3. ROTATED FACTOR LOADINGS ($\times 100$) FOR THE TOTAL SCORES OF ALL VARIABLES IN ANALYSIS I (N = 243)

anxiety questionnaires. To avoid excessively long lists of item descriptions, items with a loading of .40 or more will be given with the number they received in the original publications. The exact formulation of these items can, of course, be found in the existing literature.

scale	item	statement	loading
DASA	1	Nervousness while taking an exam or test hinders me from doing well	.79
HEFN	39	While taking an exam or test paper I had the idea that I would not make it	.75
HEFN	34	In the past examination anxiety was troubling me	.73
HEFN	63	When I was working on a test paper in school and felt that I just could not finish in time, I got panicky	.68
TAQC	29	I am concerned with the grade I receive on an examination	.65

TAB. 4. FACTOR I: ANXIETY IN SCHOLASTIC ACHIEVEMENT SITUATIONS

⁴ The correlation matrix and the rotated factor matrix respectively, can be obtained from the *Center for Psychodiagnostics*, Department of Psychology, Tiensestraat 102, B-3000 Leuven.

However, to specify the factors, the five items with the highest loadings on the dimension concerned will be represented in a more detailed statement.

Factor I had loadings for BENA (items 12, 26), COSB (item 4), DASA (items 1, 3, 4, 5, 6, 8, 9, 10), HEFN (items 4, 7, 13, 22, 27, 31, 34, 37, 39, 40, 45, 54, 56, 59, 63, 65, 67, 75, 76, 81), and TAQC (items 8, 14,

scale	item	statement	loading
BENA	19	I try to do my very best on work that I do	.82
BENA	3	I like to do my very best in whatever I undertake	.79
COSA	4	I would not describe myself as being lazy	.76
HERM	18	I liked to study very hard at school	.73
BENA	16	I regulate my life by the rule: work comes before play	.70

TAB. 5. FACTOR II: PERSONAL NEED ACHIEVEMENT

16, 25, 29, 30, 34, 36, 44, 49, 50, 51, 52). This factor can be described as anxiety in scholastic achievement situations as can be seen in Table 4. Factor III represents the dimension of social need achievement. The factor had loadings for BENA (items 3, 15, 16, 19, 20), COSA (items 3, 4, 5, 6, 7, 9, 10), COSB (item 11), and HERM (items 6, 16, 18, 30, 32, 41, 49, 53, 55, 57, 60, 66, 72, 74, 78, 86, 89). The personal task oriented nature of this factor is illustrated in Table 5.

Factor III represents the dimension of social need achievement. The achievement context of the items involves competition with or recognition by others as can be seen in Table 6. The factor had

scale	item	statement	loading
BENB	4	I like to be able to do things better than other people can	.81
BENB	2	I would like to be a recognized authority in some job, profession, or field of specialization	.69
BENB	13	I arrange to get acquainted with important people	.61
BENB	6	I like to accomplish tasks that others recognize as requiring skill and effort	.60
BENB	8	I like to solve puzzles and problems that other people have difficulty with	.53

TAB. 6. FACTOR III: SOCIAL NEED ACHIEVEMENT

loadings for BENA (item 21), BENB (items 1, 2, 4, 6, 7, 8, 13, 27, 29), COSA (items 1, 2), COSB (items 3, 10, 13) and HERM (items 47, 80).

Factor IV was completely represented by items of the Test Anxiety Questionnaire (items 6, 10, 11, 12, 17, 19, 26, 28, 31, 39, 48). All these items have to do with symptoms of stress and anxiety in intelligence

test situations illustrated in Table 7. Therefore, that factor is called anxiety in intelligence test situations.

scale	item	statement	loading
TAQC	26	Before beginning an intelligence test I aware that my heart is beating faster	.67
TAQC	31	While taking an intelligence test, I worry about the possibility of failing it	.67
TAQC	17	After I have completed an intelligence test, I worry about how well I have done	.65
TAQC	11	Before taking an intelligence test, I tend to worry	.62
TAQC	12	While taking an intelligence test, I perspire more than I do at other times in school	.57

TAB. 7. FACTOR IV: ANXIETY IN INTELLIGENCE TEST SITUATIONS

Factor v had loadings on BENA (item 12), BENB (item 27) and HEFN (items 7, 8, 13, 21, 23, 31, 37, 59, 76, 81). The common idea of these items could not be stated as easily as was the case with the other factors. As can be seen in Table 8, this factor can probably be called anxiety in personal risk situations.

scale	item	statement	loading
HEFN	76	When I unexpectedly confront something important I feel very uncertain	.74
HEFN	37	When I did not study my school lessons very well and when there was a chance of being examined, I felt very uncomfortable	.61
HEFN	23	When talking to strangers, I usually feel very uneasy	.56
HEFN	13	When I find myself in difficult situations, I feel very uncertain	.55
BENB	27	I enjoy matching my wits against my friends and try hard to outwit them	.49

TAB. 8. FACTOR V: ANXIETY IN PERSONAL RISK SITUATIONS

In this second analysis the single fear of failure dimension was broken up into three separate factors: anxiety in scholastic achievement situations, anxiety in intelligence test situations, and anxiety in personal risk situations. The first two factors (Factors I and IV) appeared also in the factor analyses on item level of the Test Anxiety Questionnaire-College Form by Sassenrath (1964) and Fisch & Schmalt (1970). However, both studies also detected some physiological anxiety factors, but no such clearcut dimension was found in the present analysis.

The physiological emotional reactions loaded on the same factors as the cognitive ones. This is clearly illustrated by Factor iv in Table 7. Worrying about his performance on an intelligence test was connected with reactions such as faster heartbeat and greater rate of perspiration.

The third anxiety factor (Factor v) was an unexpected one. Items having the largest loading on this factor are characterized by anxiety feelings in unforeseen, difficult, or important situations. The label 'personal risk' intends to indicate that the risk involved concerns the total personality as a 'self' rather than a gain or loss in chance or achievement situations. This factor was mainly determined by items of the negative failure anxiety scale of Hermans (1967). Interestingly enough, such items of risk taking related feelings were initially formulated by Hermans to capture the risk aspect of need achievement. He found that these items were not related to the achievement cluster but instead to the failure anxiety cluster. That finding is reproduced in the present study in that a lot of the risk items appeared to have substantial loadings on Factor i: Anxiety in scholastic achievement situations. In contrast with the Hermans study however, these items also give rise to a separate factor which appeared to be an anxiety factor indeed. There was only one item on this factor that also had a loading on an achievement factor. Item 27 of BENB loaded .49 on Anxiety in personal risk situations and .45 on Social need achievement.

CONCLUSION

The factor analytical exploration of different methods of scoring projective techniques (TAT) for need achievement and fear of failure led to evidence for the construct validity of these methods rather than to any substantial relationship between them. In agreement with former research, no relationship was found between projective and self-report measurement of need achievement and fear of failure. It may be useful to stress here that the projective techniques in this matter do not involve clinical interpretation. The detailed manuals guarantee sufficient scorer reliabilities. The lack of relationships previously mentioned also seems not to be restricted to TAT-like methods only. Hermans (1967) reports that sentence completion items were not related to clusters of items of the usual questionnaire type.

The analysis of the questionnaire items generally confirmed the findings of the literature. Factor analytical evidence was gathered for personal versus social need achievement and for scholastic achievement anxiety versus intelligence test anxiety. However, a clearcut physiological factor did not emerge while, on the other hand, a personal risk anxiety dimension was detected. Further research has to point out whether these dissonant findings have something to do with the homogeneous female composition of the sample.

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