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Assessing Achievement, Affiliation, and Power Motives All at Once: The Multi-Motive Grid (MMG)

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In this article, we introduce the Multi-Motive Grid (MMG), a new diagnostic tool to measure motives with respect to their hope and fear components. The MMG combines features of the Thematic Apperception Test (TAT) with features of self-report questionnaires. Similar to the TAT, a set of 14 pictures representing a balanced set of achievement-arousing, affiliation-arousing, and power-arousing situations is presented together with a set of statements representing important motivational states. Six motive scores can be calculated: hope of success (HS) and fear of failure (FF) for the achievement motive, hope of affiliation (HA) and fear of rejection (FR) for the affiliation motive, and hope of power (HP) and fear of power (FP) for the power motive. Results of factor analyses suggest a 3-factor solution, with a general fear factor (FF, FR, FP), a factor combining the hope components of achievement and power (HS and HP), and a third factor representing HA, but the 6 a priori factors also reflect a sound structural model. Reliability data show that the internal consistency and retest reliability of the MMG scales satisfy traditional standards. External validity of the MMG has been established in all 3 motive domains. Three separate studies document that (a) individuals high in resultant achievement motivation perform better and report more flow experience, (b) individuals high in resultant power motivation profit more from a leadership training program, and (c) individuals high in resultant affiliation motivation recollect more highly memorable affiliative themes.

TWO WAYS OF MEASURING MOTIVES: THEMATIC APPERCEPTION TEST VERSUS QUESTIONNAIRE

About 50 years ago, researchers in personality began to develop interest in the experimental analysis of human motivation (McClelland, 1951; Spence, 1958). Since then, two different methods of measuring human motives have been established: self-report measures and projective techniques. *Self-report measures* directly ask persons what their motives are, what their goals are, or what they would prefer to do in specific situations. This method is based on the assumption that the causes of behavior are represented consciously. Nisbett and Wilson (1977), however, presented arguments that people do not always have conscious access to the causes of their behavior and that we tell more than we can know. However, self-report questionnaires to assess human motives have shown their usefulness in a host of empirical studies (e.g., Jackson, 1966; Mehrabian & Ksionzky, 1974; Spangler, 1992).

A second way to measure human motives is based on the assumption that "a scientist cannot believe what people say about their motives" and that "the best place to observe motives is in dreams, fantasies, or free associations" (McClelland, 1987, p. 11). Researchers measuring motives in fantasy usually confront persons with a set of ambiguous pictures and ask them to tell stories about them. This method was originally developed by Murray (1938). Motive scores are obtained through systematic content analysis by applying specific scoring systems to the imaginative stories. The predictive power of motive measures based on the Thematic Apperception Test (TAT) is also well documented (cf. Heckhausen, 1991; Heckhausen, Schmalt, & Schneider, 1985; McClelland, 1985; Smith, 1992; Winter, 1996).

A serious problem, however, is that the research literature is filled with studies that show fantasy-based motive scores (measured by TAT) and self-attributed motive scores (measured by questionnaires) to be statistically independent of each other (see Spangler, 1992). These nonsignificant correlations between the two types of measures led McClelland to conclude that they reflect two separate motive systems. *Explicit motives* reflect those aspects of the self-concept that are consciously accessible and are measured by self-report methods, whereas *implicit motives* reflect the more unconscious aspects of motive dispositions and are measured by the TAT. Furthermore, the two types of motives seem to predict different types of behavior. Implicit motives are good predictors of free choice or spontaneous behavior and long-term life development (e.g., career). In contrast, explicit motives are good predictors of attitudes and conscious goal settings, especially when the goal-striving activities are associated with experienced effort (McClelland, Koestner, & Weinberger, 1989; Spangler, 1992).

A THIRD WAY: THE GRID TECHNIQUE

In the 1970s, Schmalt (1976) developed the *grid technique,* which combines features of TAT and questionnaire measures. Analogous to the TAT, a series of ambiguous pictures is presented to arouse motive dispositions. Instead of requiring the writing of stories, a set of statements is appended to each picture. The statements

represent motivational tendencies in terms of typical emotions, cognitions, goal anticipations, and instrumental actions. The set of statements is identical for all pictures. People are asked to mark those statements that fit each picture best. The different picture situations (i) and the set of statements (j) yield a matrix with $i \times j$ cells, or a grid, which is why the measure is called the grid technique. The score of individual motive strength is calculated by adding up all the endorsed motive-relevant statements for all the situations illustrated.

Three types of grids have been developed in Germany thus far: the Achievement-Motive Grid (AMG; Schmalt, 1976), the Affiliation-Motive Grid (Sokolowski, 1992), and the Power-Motive Grid (Schmalt, 1987). Following a tradition originally proposed by Atkinson (1957, 1964) and by Heckhausen (1963, 1991), each motive is measured with respect to its approach and avoidance tendencies—its hopes and fears. All three grids have been proven to possess good psychometric properties with regard to factor structure, reliability, and predictive validity in a series of studies (see Heckhausen, 1991; Heckhausen et al., 1985). Quite recently, the grid technique was also introduced in the United States (Schmalt, 1999).

DEVELOPMENT OF THE MULTI-MOTIVE GRID

Many psychologists are interested in identifying potentially important variables such as a person's achievement, affiliation, or power motives that influence social behavior with respect to research or practical (e.g., instructional) purposes. However, measuring all three motives is a rather time-consuming procedure. Therefore, we tried to develop an instrument that measures all three motives simultaneously by incorporating selected pictures and statements into one single measure called the *Multi-Motive Grid* (MMG). Our preliminary work began by selecting the most appropriate statements and pictures from the single-motive grids. The aim of the statement selection was to find a set of statements that represents the three motive domains (achievement, affiliation, and power) and their approach (hope) and avoidance (fear) components with two statements each, for a total of 12 statements (Table 1). We retained for each of the six motives those 2 statements with the highest factor loadings in the factor analyses computed for the three single-motive grids.

Whereas the selection of TAT pictures was often guided by intuitive strategies (Smith, 1992), we decided to give picture selection an empirical basis. In a study reported in Schmalt, Sokolowski, and Langens (1994), participants were confronted with the pictures originally used in the three single-motive grids. They rated the thematic content of each picture. They were asked the question "How much do you think that the picture illustrates an achievement theme?" Other questions refer to an affiliation theme or a power theme, respectively. The obtained means are indicative of the potential to arouse the three motives (achievement, affiliation, and power) under consideration. Means reflecting the arousal potentials of the 14 pictures are presented in Table 2.

TABLE 1
How the 12 Statements of the MMG Relate to Achievement, Affiliation, and Power

	Motive Theme		
Statement	*Achievement*	*Affiliation*	*Power*
1. Feeling good about meeting other people		HA 86/89	
2. Anticipating to lose standing			FP 71/70
3. Feeling confident to succeed at this task	HS 87/72		
4. Being afraid of being rejected by others		FR 79/77	
5. Thinking about lacking abilities at this task	FF 71/70		
6. Being afraid of being overpowered by other people			FP 85/77
7. Feeling good about one's competence	HS 76/75		
8. Being afraid of being boring to others		FR 79/71	
9. Wanting to postpone a difficult task for a while	FF 62/54		
10. Trying to influence other people			HP 78/66
11. Hoping to get in touch with other people		HA 64/67	
12. Hoping to acquire a good standing			HP 87/74

Note. MMG = Multi-Motive Grid; HA = hope of affiliation; FP = fear of power; HS = hope of success; FR = fear of rejection; FF = fear of failure; HP = hope of power. Factor loadings refer to the MMG (first entry) and the MMG–Short Version (second entry). Decimal points are deleted.

There are pictures that arouse only one motive and, hence, possess low ambiguity, like the "Taking a Test" item (Picture 9, Table 2), which arouses only the achievement motive. The picture portraying a group at work (Picture 14, Table 2) arouses all three motives simultaneously and possesses high ambiguity. The selection strategy was to provide a set of pictures that covers all three thematic domains with different levels of ambiguity. Therefore, we retained two pictures for each thematic domain with low ambiguity (arousing solely one single motive; $2 \times 3 = 6$ pictures), two pictures for each thematic domain with moderate ambiguity (arousing two motives; $2 \times 3 = 6$ pictures), and two pictures with high ambiguity (arousing all three motives), for a total of 14 pictures (see Table 2). Examples of pictures of each of these arousal types are shown in Figure 1.

Altogether, the MMG consists of 14 pictures and 12 statements, resulting in a matrix of $14 \times 12 = 168$ items. It usually takes 30 to 45 min to complete the MMG. Many users feel that this is still unduly long, so we tried to further reduce the number of items by constructing a short version of the grid, the MMG–S. Instead of presenting a full matrix comprising 168 items, only those items with the highest discriminative power were retained. Item reduction was performed separately for each of the six motives. Originally each motive was measured by two statements across the 14 pictures, resulting in a total of 28 items (2×14) for each motive. For the MMG–S, only those 12 items (picture–statement combina-

TABLE 2
Arousal Potentials (*z*-Transformed) for the Three Motives and the Attached Arousal Types of the 14 Pictures of the Multi-Motive Grid

Title of the Picture	*Achievement*	*Affiliation*	*Power*	*Arousal Type*		
1. Rope Climber	1.45	–0.27	–0.91	Achievement		
2. Discussion	0.03	0.61	0.60	Achievement	Affiliation	Power
3. Dispute	–0.73	–0.84	2.08			Power
4. Bar	–0.83	0.84	–0.09		Affiliation	Power
5. Roll-Call	–0.17	–0.76	1.01			Power
6. Jail	–1.05	0.08	1.22		Affiliation	Power
7. Apprenticeship	0.71	–0.21	0.48	Achievement		Power
8. Disco Dancing	0.21	1.69	–0.74		Affiliation	
9. Taking a Test	1.87	–0.68	–1.08	Achievement		
10. Beach	–0.75	0.17	–1.13		Affiliation	
11. Badminton	1.35	1.03	–0.70	Achievement	Affiliation	
12. Manager/Employee	0.64	–1.39	1.88	Achievement		Power
13. Labor Pause	0.34	0.35	–0.11	Achievement	Affiliation	
14. Work Group	1.42	0.48	1.01	Achievement	Affiliation	Power

Note. $N = 41$. Positive z values indicate the presence of a specific arousal potential (with the exceptions of Picture 8/Achievement and Picture 4/Power).

tions) with the highest discriminative power were retained, leading to a reduction to 72 (6 × 12) items out of the original 168 items. In fact, then, this kind of item selection yields an incomplete matrix in which each statement is only presented in 6 of the 14 pictures. Most of the analyses reported here were run separately for the MMG and the MMG–S. It usually takes 15 to 20 min to complete the MMG–S.

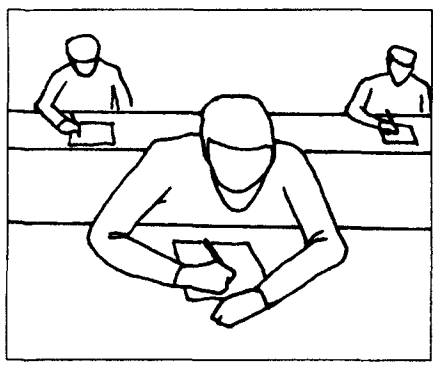
INTERNAL STRUCTURE

Method

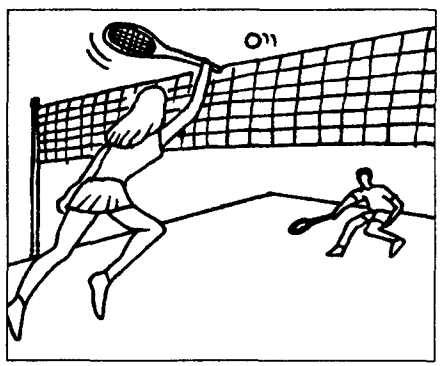
Participants. The MMG and MMG–S versions were analyzed using two large samples. The MMG sample consisted of 587 individuals (310 men and 277 women) who participated in experimental studies of motivation and personality at the Universities of Wuppertal and Freiburg, Germany, between 1994 and 1996. Most of them ($n = 494$) were students of various faculties (M age = 25.76, SD = 5.76). Ninety-three individuals (76 men and 17 women) were manager applicants in a German supermarket chain.

The MMG–S sample consisted of 280 individuals (143 men and 137 women) who took part in an experimental study of motivation and personality at the Universities of Wuppertal and Munich, Germany, between 1995 and 1996 (M age = 27.3; SD = 8.0). Most of them ($n = 188$) were students.

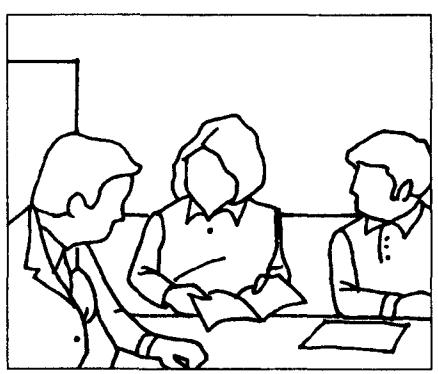
Method of data analysis. The MMG yields data from k participants in i (14) situations for j (12) statements that represent a three-dimensional data block ($i \times j \times k$). The analyses reported here were conducted on the basis of $j \times k$ data matrices by adding up the raw scores across all situations, thus eliminating situational



Picture 9: Taking a test



Picture 11: Badminton



Picture 14: Work group

FIGURE 1 Three pictures of the Multi-Motive Grid with low ambiguity (Picture 9, "Taking a Test"), moderate ambiguity (Picture 11, "Badminton"), and high ambiguity (Picture 14, "Work Group").

variance. This procedure allows the application of conventional techniques of exploratory factor analyses (principal component factor analysis with varimax rotation). In addition to exploratory factor analyses, confirmatory factor analyses were run using AMOS 3.6 (Arbuckle, 1997) to directly compare different solutions. This model was evaluated in several steps and by different methods. First we assessed the fit using chi-square statistics and global fit indexes like the Goodness-of-Fit Index (GFI) and the Adjusted Goodness-of-Fit Index (AGFI; Jöreskog & Sörbom, 1984). Large data sets can produce significant chi-squares, not because of suboptimal fit but because smaller differences appear to make a significant contribution in larger sample sizes. In contrast to the chi-square statistics, GFI and AGFI are not decisively influenced by sample size. GFI values above .85 and AGFI values above .80 are generally interpreted as representing a good fit (Bryant, Yarnold, & Grimm, 1996). GFI and AGFI indexes were intended for the evaluation of isolated models (e.g., a correlated three-factor model).

Second, the significance of the path coefficients was estimated, and comparisons to alternative models are discussed. These models were compared by the difference in chi-square values when they were nested. If they were not nested, information-theoretic measures like Akaike's information criterion (AIC; Akaike, 1987) and the Bayes information criterion (BIC; Raftery, 1993) were calculated. These indexes are designed to compare different models (e.g., to compare a three-factor model with a six-factor model). Smaller values indicate a better model fit.

Results

Exploratory factor analyses. The principal components analysis was conducted to determine the underlying factor structure of the 12 statements. The number of interpretable factors of the MMG was determined by inspection of the absolute magnitude of the differences between adjacent eigenvalues. In this study, these differences were 1.82, 1.64, 0.39, 0.14, and 0.04. Thus, this criterion strongly suggests a three-factor solution. The first factor is a general fear factor, combining all three single fear motives (Statements 2, 4, 5, 6, 8, and 9). The second factor is a composite of the hope motives of achievement and power (Statements 3, 7, 10, and 12). The third factor represents the hope component of the affiliation motive (Items 1 and 11). The three factors explain 69.8% of the total variance.

As far as the MMG–S is concerned, data analyses were run analogous to the MMG analyses. The resulting three-factor solution exactly replicates the structure already known from the MMG analysis (Table 1).

Confirmatory factor analyses. Confirmatory factor analysis was used to test whether the data fit a single factor model and to compare different factor models. Following the findings of the exploratory factor analyses, a three-factor model was postulated. It was assumed that the three factors were uncorrelated and that the measurement errors of the observed variables were uncorrelated. To establish a common metric for the factors and to identify the model, one item of each subscale, called a *reference indicator,* was fixed to unity. The results are presented for both the MMG and the MMG–S in Table 3.

The global fit of the uncorrelated three-factor model is just acceptable for the MMG (the corresponding indexes for the MMG–S are given in parentheses): $\chi^2(55, N = 587) = 664.7$ ($\chi^2[55, N = 280] = 247.5$), $ps < .001$, GFI = .85 (.88), AFGI = .79 (.83). Because of the overlap between the HA factor and the HS–HP factor, we performed the same analysis with these two factors correlated. The results indicate a better fit for both versions: $\chi^2(53, N = 587) = 408.5$ ($\chi^2[53, N = 280] = 159.5$), $ps < .001$, GFI = .90 (.92), AFGI = .85 (.88). The difference between the two chi-squares is significant, $\chi^2_{Difference}(2, N = 587) = 256.4$ ($\chi^2_{Difference}[2, N = 280] = 86.0$), $ps < .001$, indicating that the correlated model is preferable. Next, the factor loadings for this last model were evaluated. Every factor loading is significant beyond the .05 level.

TABLE 3
Goodness-of-Fit Statistics for Factor Models of the MMG[a] and MMG–S[b]

Model	χ^2	χ^2/df	*GFI*	*AGFI*	*AIC*	*BIC*
Three-factor model uncorrelated						
MMG	664.9	12.1	.85	.79	712.8	877.5
MMG–S	247.5	4.5	.88	.83	293.5	434.3
Three-factor model correlated						
MMG	408.5	7.7	.90	.85	458.5	629.9
MMG–S	159.5	3.0	.92	.88	209.5	362.5
Two-factor model correlated						
MMG	527.7	9.8	.87	.81	575.7	740.3
MMG–S	192.3	3.0	.90	.86	240.3	387.2
Alternative three-factor model						
MMG–S	657.3	12.2	.67	.53	705.3	852.1
Six-factor Model I: Hopes correlated fears correlated						
MMG–S	123.5	2.6	.94	.90	183.5	367.1
Six-factor Model II: As Model I plus hopes and fears correlated per motive domain						
MMG–S	110.1	2.5	.94	.90	176.1	378.1

Note. MMG = Multi-Motive Grid; MMG–S = Multi-Motive Grid–Short Version. The fit was assessed by chi-square statistics, the goodness-of-fit-index (GFI), and the adjusted-goodness-of-fit-index (AGFI; Jöreskog & Sörbom, 1984), Akaike's information criterion (AIC; Akaike, 1987), and Bayes's information criterion (BIC; Raftery, 1993).

[a] $N = 587$. [b] $N = 280$.

Finally, four alternative models were calculated to compare them with the correlated three-factor model. First, a two-factor model with one fear factor and one hope factor was evaluated. Second, a model with an achievement factor, a power factor, and an affiliation factor was computed. The third and fourth alternative models consider the six a priori factors (HA, HS, HP, Fear of Rejection [FR], Fear of Failure [FF], and Fear of Power [FP]). The third model assumes a correlation first among all hope factors and then among all fear factors; the fourth model assumes an additional correlation for every motive domain between the corresponding hope and fear components.

The confirmatory factor analyses for these models reveal an acceptable fit for the two-factor model. The results for the alternative three-factor model and the six-factor models were not admissible for the MMG because variance estimates were negative or some exogenous variables have an estimated covariance matrix that is not positive (Jöreskog & Sörbom, 1984). The results for the MMG–S indicate that the fit of the alternative three-factor model is insufficient, whereas the results for the six-factor solutions indicate a very good fit. The AIC and BIC indexes suggest that the six-factor models fit the data best. There are only some minor differences, depending on the kind of factor intercorrelations admitted. In sum then, the correlated three-factor model that emerged from the exploratory factor analyses yields the best interpretable solutions for both test versions. Besides that, there is also good evidence, confined to the MMG–S, that the six a priori factors reflect a sound structural model.

Interscale correlations. The Pearson product–moment correlations among the six motives of the MMG are shown in the upper part of Table 4. All motives are significantly correlated. The range of coefficients is high, with a low of $r = .11$ between HP and FR and between HP and FP and a high between FR and FP ($r = .73$) and between HP and HS ($r = .75$). There seems to be one hope cluster (HS, HA, HP) and one fear cluster (FF, FR, FP). There are two possible explanations for the emergence of these generalized hope and fear clusters. One explanation is theoretical, and the other is methodological. The theoretical explanation holds that the different hopes and fears are manifestations of generalized hope and fear factors (Snyder et al., 1991; Snyder et al., 1996). The methodological argument holds that the interpretation of a statement is strongly determined by the context in which it appears (e.g., the statement "Feeling confident to succeed at this task" [Statement 3] indicates an aroused achievement motive in achievement situations, but in a power situation, it may be a sign of an aroused power motive). Apparently, such statements change their motive–sign character depending on the situational context. As a consequence, their discriminative power should be rather low. If so, throwing out items with low discriminative power, as we did for the MMG–S, should lead to a marked reduction of interscale correlations.

TABLE 4
Pearson Product–Moment Correlations Among the Six Motives Measured by the MMG[a] and by the MMG–S[b]

Motive	*HS*	*HA*	*HP*	*FF*	*FR*	*FP*
MMG						
HS		.53*	.75*	.31*	.17*	.12*
HA			.52*	.35*	.29*	.22*
HP				.22*	.11*	.11*
FF					.66*	.65*
FR						.73*
MMG–S						
HS		.48*	.55*	.10	−.03	.06
HA			.40*	.10	.06	.09
HP				.29*	.22*	.35*
FF					.44*	.52*
FR						.54*

Note. MMG = Multi-Motive Grid; MMG–S = Multi-Motive Grid–Short Version; HS = hope of success; HA = hope of affiliation; HP = hope of power; FF = fear of failure; FR = fear of rejection; FP = fear of power.

[a] $N = 587$. [b] $N = 280$.

*$p < .01$.

The lower part of Table 4 reveals motive intercorrelations for the MMG–S. As can be seen, most correlations were lower for the MMG–S as compared with the corresponding correlation for the MMG. In particular, the intercorrelations among hopes and fears dropped distinctly. These results seem to indicate that changing the test format significantly reduces scale intercorrelations. The fact that in the MMG all the statements appear in identical manner below each of the 14 pictures could have fostered a response style, whereas presenting a changing pattern of statements below each picture—namely, only the maximally discriminating ones as done in the MMG–S—could have worked against the formation of a response style. Interestingly, the hope–fear intercorrelations are reduced to near zero in most cases, whereas there remains a substantial overlap within the hope and fear scales. This may indicate common variance shared by all hopes and fears, as described by a generalized hope and fear model.

INTERNAL CONSISTENCY, CONVERGENT, AND DISCRIMINANT VALIDITY

One indicator of successful test construction is provided by a measure of internal consistency. The alpha coefficients of the six motive scores have a range from .78 to .90. The complete results for the two test versions are shown in Table 5, together with means and standard deviations of the six motive scores.

TABLE 5
Means, Standard Deviations, and Alpha Coefficients of the Six Motive Scores of the MMG[a] and the MMG–S[b]

Motive Score	*M*	*SD*	α
HS			
MMG	13.15	5.63	.84
MMG–S	6.40	2.50	.69
HA			
MMG	14.29	4.75	.78
MMG–S	5.09	2.13	.61
HP			
MMG	11.63	7.04	.90
MMG–S	6.90	2.70	.72
FF			
MMG	8.02	4.80	.80
MMG–S	4.29	2.56	.67
FR			
MMG	8.76	4.94	.80
MMG–S	4.52	2.71	.72
FP			
MMG	9.81	4.85	.78
MMG–S	5.71	2.55	.67

Note. MMG = Mulit-Motive Grid; MMG–S = Multi-Motive Grid–Short Version; HS = hope of success; HA = hope of affiliation; HP = hope of power; FF = fear of failure; FR = fear of rejection; FP = fear of power.
[a]$N = 587$. [b]$N = 280$.

Not surprisingly, the alpha coefficients for the MMG–S fell short of those reported for the MMG. The lower number of items is certainly responsible for this effect. In a study by Sokolowski and Langens (1997), the MMG–S was administered twice, separated by an interval of 40 min, during which participants had to rate fantasy stories. Before the second administration of the MMG–S, they received the instruction to take the test a second time. The retest correlations for the motive scores ($n = 49$) were as follows: HS $r = .88$, HA $r = .91$, HP $r = .92$, FF $r = .80$, FR $r = .77$, and FP $r = .80$. To test the influence of memory on the responses to the MMG–S, another group of participants ($n = 48$) received the instruction to answer the test just the same as before after the filler task. In the memory condition, the retest correlations for the motive scores were as follows: HS $r = .82$, HA $r = .86$, HP $r = .83$, FF $r = .75$, FR $r = .86$, and FP $r = .76$. No significant differences in the retest correlations between the two instructions were found. Thus, we can conclude that intentional recall does not play an important role in answering the MMG items.

One subsample of the total sample ($n = 64$) received the MMG together with the Crowne–Marlowe Scale to measure social desirability (Crowne & Marlowe, 1960). No significant correlations were found among the six motive scores of the MMG and social desirablity: Pearson product–moment correlations ranged from $r = -.23$ (*ns*) for FP to $r = .07$ (*ns*) for HA.

In another subsample ($n = 110$), the MMG was administered together with three subscales (Achievement, Affiliation, and Dominance) of the Personality Research Form (PRF; Jackson, 1966). The multitrait–multimethod matrix reveals only nonsignificant correlations between the MMG and PRF. If we agree with McClelland's proposition (McClelland et al., 1989) that self-report measures of human motives assess conscious aspects of the self-concepts that are conceived of as explicit motives, we must conclude from these results that the MMG does not measure explicit motives.

EXTERNAL VALIDITY

This section reports in detail on three studies demonstrating external validity of the MMG in the three motive domains of achievement, power, and affiliation. Furthermore, some other related studies are briefly summarized that also corroborate the validity of the MMG.

The Achievement Motive

The first study was conducted by Puca and Schmalt (1999). A total of 160 male university students between 20 and 38 years of age ($M = 25.47$, $SD = 3.30$) participated in the study. At the beginning of the session, they completed the MMG. For each motive domain (achievement, power, and affiliation), hope and fear scores were transformed into z scores. Individuals were classified as approach-oriented if their (standardized) hope score was higher than their (standardized) fear score. If the fear score was higher than the hope score, individuals were classified as avoidance oriented. This procedure to calculate a score for resultant motivation was originally introduced by Atkinson (1964) and adopted and widely used in Germany by Heckhausen and his associates (Heckhausen, 1991; Heckhausen et al., 1985; see also Elliot, 1997; McClelland, 1992).

After the completion of the MMG, participants worked on a complex choice-reaction task. Following this, they reported on their flow experience (Csikszentmihalyi, 1975) during performance of the reaction task. The reaction task is called the *Vienna Determination Apparatus*. It is an instrument providing a computer-assisted assessment of car-driving abilities. Persons who are working on this multiple reaction task have to respond in a prearranged way with left and right hands and feet, according to visual and acoustic stimuli. The main dependent measure of performance was the error rate. To obtain indicators of flow experience, we asked the

participants to answer seven questions concerning their feelings during task performance. The construction of the items was based on the elements of flow experience described by Csikszentmihalyi (1975, p. 113). Sample items for flow experience are "How much did you enjoy working on the reaction task?" or "Did you have the feeling that your reactions were automatic?" Flow items were added up to produce one composite measure. Results (see Table 6) show motive-linked differences in actual performance and flow experience. Approach-oriented participants reported more flow and performed significantly better in the reaction task than their avoidance-oriented counterparts. Affiliation and power motives, although correlated to a substantial degree with the achievement motives (see earlier), did not make any significant contribution to the prediction of the achievement-related variables.

The Power Motive

A second study was run by Sokolowski and Kehr (1999). Participants were 53 industrial managers who were attending leadership training programs. They were between 24 and 51 years of age (M = 37.1, SD = 5.94). At the beginning of the program, participants completed the MMG–S. At the end, they judged their subjective contentment and how much they had gained in leadership competence (learning). Three months later, participants judged how much they thought that the training program had positively influenced their intrinsic and extrinsic motivation to do their jobs. As predicted, it was only the power motive that predicted the criterion variables. Individuals high in resultant power motivation (approach-oriented individuals) reported more contentment, thought that they had learned from the program, and felt that it had enhanced their motivation (see Table 7). As can be seen in Table 7, neither the affiliation motive nor the achievement motive made any significant contribution to the prediction of the effectiveness of a leadership training program.

TABLE 6
Means and Standard Deviations for Error Rate and for Flow Experience for Approach-Oriented Individuals and Avoidance-Oriented Individuals in Achievement, Power, and Affiliation Motivation

	Resultant Motivation					
	Avoidance Oriented		*Approach Oriented*			
Theme	*M*	*SD*	*M*	*SD*	*t*	*p (One-Tailed)*
Achievement[a]						
Flow	39.44	8.94	43.69	9.68	−2.89	.002
Error Rate	6.90	5.83	5.60	3.74	1.68	.05
Power[b]						
Flow	40.56	9.59	42.69	9.38	−1.42	*ns*
Error rate	6.39	4.67	6.09	5.23	0.38	*ns*
Affiliation[c]						
Flow	41.02	10.48	42.25	9.01	−0.81	*ns*
Error rate	6.27	5.13	6.23	4.69	0.48	*ns*

Note. N = 160. df = 1, 158.
[a] n = 80/80. [b] n = 85/75. [c] n = 90/70.

TABLE 7
Pearson Product–Moment Correlations Between Three Measures of Resultant Motivation and Indices of Training Effectiveness

	Training Effectiveness			
Resultant Motivation	*Contentment*	*Learning*	*Extrinsic Motivation*	*Intrinsic Motivation*
Power	.25	.28*	.30*	.35*
Affiliation	.08	−.01	.06	.20
Achievement	−.12	.02	.03	.06

Note. N = 53.
*$p \leq .05$.

The Affiliation Motive

The third study reported here was conducted by Schmalt and Langens (1999). In this investigation, we scrutinized the relations between motive dispositions and cognitive variables such as memories of daily events. In recent years, the intersection of motivation and cognitive processes has become increasingly interesting to motivational psychologists. They have stressed the role of motives in the functions of organizing, encoding, and retrieving certain kinds of memories (see Woike, 1995). We derived our main hypothesis from the congruency principle (Bower & Cohen, 1982; Taylor, 1992). If an event acquires personal significance from its connection to motives, individuals should process information pertaining to this event by preference. Accordingly, memories of daily events pertaining to the affiliative domain should be easily retrieved from memory by individuals with a strong motive to affiliate.

Seventy-eight students (M age = 27.8, SD = 6.5) took part in this investigation. Besides the MMG–S, participants were given the Daily Events Questionnaire, which asked them to record up to four daily events that stood out in their minds over a period of 4 weeks. They were reminded to record those events that seemed

meaningful to them and to record their memories every day. The data here pertain to those 61 participants who provided memories of at least 40 daily events. These were scored according to Winter's (1992) running-test system.

As expected, the number of affiliation themes that occurred in the diaries could be predicted by resultant affiliation motivation ($r = .35$, $p < .01$) but not by resultant achievement motivation ($r = .17$, *ns*) or resultant power motivation ($r = .14$, *ns*).

Multimotive Studies

Another study (Wegge, Quaeck, & Kleinbeck, 1996) investigated the influence of motives as measured by TAT, questionnaire (Achievement Motive Scale; Gjesme & Nygard, 1970), and MMG on video game preferences. Participants had to choose one out of a number of games: a fighting tournament game (Chaos Engine), a comic adventure game (Nicky Boom), and the simulation of a motorcycle race (Road Rush). Wegge et al. (1996) assumed that Chaos Engine primarily arouses the power motive; that Nicky Boom, because of its friendly character, arouses the affiliation motive; and that Road Rush, with individual standard settings, arouses the achievement motive. As a general result, Wegge et al. found that HS had no effect on game preferences, whereas FF was a good predictor of time spent playing video games (the higher the FF, the more time spent). Individuals with high HP and low HS tried the greatest number of video games. Individuals with high FP were owners of the largest number of video games. FP and FF thus seem to be strong motives for being involved in video games. People with high HA significantly had the highest preference for Nicky Boom, especially when HP was low. Asked for general preferences among video games, people with high HA mentioned colors and music, whereas people with high HS appreciated games with variable and self-determined levels of difficulty.

In a correlational study, Abele, Andrä, and Schute (1999) measured the motives of 1,216 university students (MMG–S) and looked at their social and career developments. Participants who had stable romantic relationships scored significantly lower on FR and FF than those who lived alone. All the other motives did not significantly differentiate between the two groups. Participants who had received an employment contract shortly after their final examination scored significantly lower on FF than those who had not. Again, the other motives did not discriminate between these two groups. Vocational goals, too, are closely related to motives. Participants with high HP scores mentioned prestige as an important goal significantly more often than those with low HP. Participants with high FF had significantly lower expectancies of professional efficiency than those with low FF. Taken together, these results show that the affiliation motive is predictive of interpersonal behavior, the achievement motive is predictive of career development and vocational efficiency, and the power motive predicts positive evaluation of prestige. Prestige relates to the power motive by definition according to Winter (1973) and McClelland (1975).

DISCUSSION

In the studies reported here, a new technique for measuring the "big three" motives—achievement, affiliation, and power—was introduced. The new measure was based on the grid technique, originally developed to combine the advantages of TAT and questionnaire methods. The idea guiding the construction of the grid technique was to arouse motives by pictorial stimuli (like the TAT) and to measure the evaluative reactions of participants by asking them to endorse a number of predetermined statements (like questionnaires). The results of these developments were three different tests for the three motives in question. For many purposes, it seems appropriate to measure all three motives, but the application of the three single-motive measures is often too costly or time consuming. In these cases, the newly developed MMG might be an interesting alternative.

As far as the pictures are concerned, we selected a broad spectrum of pictures varying in degree of thematic ambiguity. As far as the statements are concerned, those statements were selected that most unequivocally characterize the six motives in the original single-motive grids. As fostered by the Michigan tradition (Atkinson, 1964, 1982) and in Germany by Heckhausen (1963, 1991), approach and avoidance motives (hopes and fears) are measured independently. However, most of the currently used measures for assessing human motives do not consider this fundamental difference. Contemporary motivational research, on the other hand, seems to have rediscovered the relevance of the approach–avoidance dichotomy, recommending that one should separately assess hope motive and fear motive dispositions (Covington & Omelich, 1991; Elliot, 1997; Elliot & Church, 1997; Elliot & Sheldon, 1997).

Results of factor analyses of the MMG and MMG–S show that hopes and fears can be separated reliably, but differentiating the three approach motives and avoidance motives is fraught with difficulties. If we assume a certain degree of correlation among the hope and fear motives and between hopes and fears of the same thematic domain, the results of the confirmatory factor analyses are clearly supportive of our suppositions. For the MMG–S, the six-factor model assuming correlations among hopes, fears, and motive domains clearly outperforms all other models, thus corroborating our theoretical conceptions underlying the construction of the measure.

The assumption of a set of interrelated hopes and fears is quite in line with contemporary approaches that describe generalized hope as entailing an overall estimation that one's goals can be met. Snyder et al. (1991) described hope as "a cognitive set that is based on a reciprocally-derived sense of successful agency (goal-directed determination) and pathways (planning to meet goals)" (p. 571).

Hope is similar to optimism in that it is conceptualized as a stable cognitive set reflecting general rather than specific individual differences. In a ladder of abstraction, the hope motives described here are located somewhat below the hope construct as described by Snyder et al. It seems quite in line with the assumption that the three hope motives and their thematic counterparts, the three fear motives, share some amount of common variance. This conclusion is further corroborated by the observation that the hopes and fears, with the exception of the HA motive, tend to cluster together in a three-factor solution that can be found in both versions of the grid measures.

Results of the confirmatory factor analyses examining the goodness of scale development suggest also that the MMG–S comprises six factors, reflecting hope and fear motives in the three thematic domains of achievement, affiliation, and power. The contention that it seems worthwhile to look for specific hopes and fears in the different thematic domains is further corroborated by the observation of lowered scale intercorrelations for the MMG–S as compared with the MMG. This effect may be attributed to the elimination of some equivocal and nondiscriminating items. Reliability data show that the internal consistencies and test–retest reliabilities of the MMG and MMG–S scales are reasonably high. Not surprisingly, they are somewhat lower for the short version (MMG–S) as compared with the standard version (MMG) of the grid technique. For those who feel that they still fall short of typical standards set by tests of intelligence or consciously organized aspects of self-schemata, it must be remembered that motive scores ascertained by the grid technique reflect to a certain degree the arousal potential of the whole test-taking situation. As a consequence, the test-taking situation must be standardized carefully.

The last section of this article presented data pertaining to the external validity of the MMG and MMG–S. First of all, the achievement motive predicts performance in a laboratory task that has a high level of face validity for evaluating competence at driving an automobile. Furthermore, approach-oriented individuals report more flow experience during task performance. Flow experience emanates from performing intrinsically motivating tasks and is reported by individuals who are completely involved in that activity, forgetting time and their own fatigue (Csikszentmihalyi & Rathunde, 1993). It is quite in line with our theoretical reasoning that individuals high in resultant achievement motivation report more flow experience and perform better. The other two motives, although correlated with the achievement motive, do not make significant contributions in the achievement domain. Many psychologists are interested in identifying potentially important motivational variables that influence learning in training programs. Our data show, as expected, that individuals high in resultant power motivation profit from a leadership training program as far as learning and motivation are concerned. The third study reported in detail here extends the nomological network of the affiliation motive, including memories of daily events.

Taken together, the studies reported in the external validity section are guided by theory and make significant contributions to the nomological networks of the three motives. Quite importantly, the chosen criteria could only be predicted by the related domain-specific motive. This corroborates the statement that the various measures, although interrelated to a certain degree, show a high level of discriminant power. In sum then, the data demonstrate that the grid technique for measuring the achievement, affiliation, and power motives is a psychometrically sound measure, combining economic applicability with a reasonably high standard of reliability and validity.

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