FURTHER EVIDENCE OF INDEPENDENCE BETWEEN THE MOTIVE TO ACHIEVE SUCCESS AND THE MOTIVE TO AVOID FAILURE: A CONFIRMATORY FACTOR ANALYSIS

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The Motive to Achieve Success (MAS) and the Motive to Avoid Failure (MAF) are the most widely measured factors of achievement motivation. The relationships between MAS and MAF are controversial. To test the validity of these relations, we compared three models with different relationships between MAS and MAF by confirmatory factor analyses. Items from the achievement motivation subscale of the personality research form (Jackson, 1999) and from the motive to avoid failure scale (Hagtvet & Benson, 1997) were administrated to a large sample ($N = 1179$). The model in which MAS and MAF were separable and weakly correlated factors showed better results than independent and unitary models. Implications for the selection of participants were also discussed.

Introduction

Research on individual differences concerning achievement motivation has made considerable progress over the last few decades. Despite this headway, a number of theoretical issues remain under researched. One such issue concerns the relationship between the two most frequently studied factors of achievement motivation: the Motive to Achieve Success (MAS) and the Motive to Avoid Failure (MAF). The MAS is defined as a relatively stable personality disposition to strive for success and the desire to work toward accomplishing challenging personal and professional goals (McClelland, Atkinson, Clark, & Lowell, 1953). The MAS may be associated with behavioural activation system, positive emotionality, and extraversion to determine an approach temperament (Elliot, 2008). The MAF is defined as a relatively

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stable personality disposition to avoid and anticipate negative affects of failure outcomes in terms of shame, embarrassment, humiliation, and loss of status and esteem (McClelland et al., 1953). The MAF may be associated with behavioural inhibition system, negative emotionality, and neuroticism to determine an avoidance temperament (Elliot, 2008).

Intensive research focus on the potential influence of achievement motivation on psychological processes such as brain activity (Schapkin, Falkenstein, Marks, & Griefahn, 2007), effort-related physiological reactivity (Capa, Audiffren, & Ragot, 2008a), subjective well-being (Baumann, Kaschel, & Kuhl, 2005), or intention memory (Kazén & Kuhl, 2005). In these studies, participants high or low in achievement motivation are selected based on their scores of MAS and MAF. The current literature presents various methods to select participants from these two motive scores. To test the validity of these participant selection methods and then discuss the implications for investigating the effects of achievement motivation on the psychological processes, we compared three models with different relationships between MAS and MAF by Confirmatory Factor Analyses (CFAs). We focused on three models according to the different relationships postulated in the literature between the two motives: opposite factors of a unitary construct (McClelland, 1951), independent factors (Atkinson, 1957), and separable and weakly correlated factors (Byrne, Mueller-Hanson, Cardador, Thornton III, Schuler, Frintrup et al., 2004; Franken & Brown, 1995).

In the early theory of achievement motivation, a bipolar interpretation had been adopted in which MAS and MAF represented two opposite factors of a unitary construct (Figure 1a). It had been assumed that a high MAF score was characterised by a low MAS score (McClelland, 1951). One current implication is that the selection of participants is based only on the measure of one motive (e.g., Baumann et al., 2005; Kazén & Kuhl; 2005) or on a resultant achievement motivation score calculated by subtracting the score of the MAS from the score of the MAF (e.g., Capa et al., 2008a; Elbe & Wenhold, 2005; Puca, 2005). Another implication is that three groups of participants can be studied (those with a low score, a medium score, or a high score; Figure 1a). The bipolar concept in which MAS and MAF are two opposite factors of a unitary construct was supported by strong negative correlations between the two motives (McClelland et al., 1953). If the MAS and MAF essentially tap the same underlying construct and should thus be considered as opposite factors of a unitary construct, then a first model (M1; created by fixing the correlation among the two motives to -1) should provide an excellent fit to the data (Figure 2a).

Atkinson (1957) postulated a quadripolar model of achievement motivation in which individuals differ by their relative placements on the two motives (Figure 1b). One implication is that the selection of participants
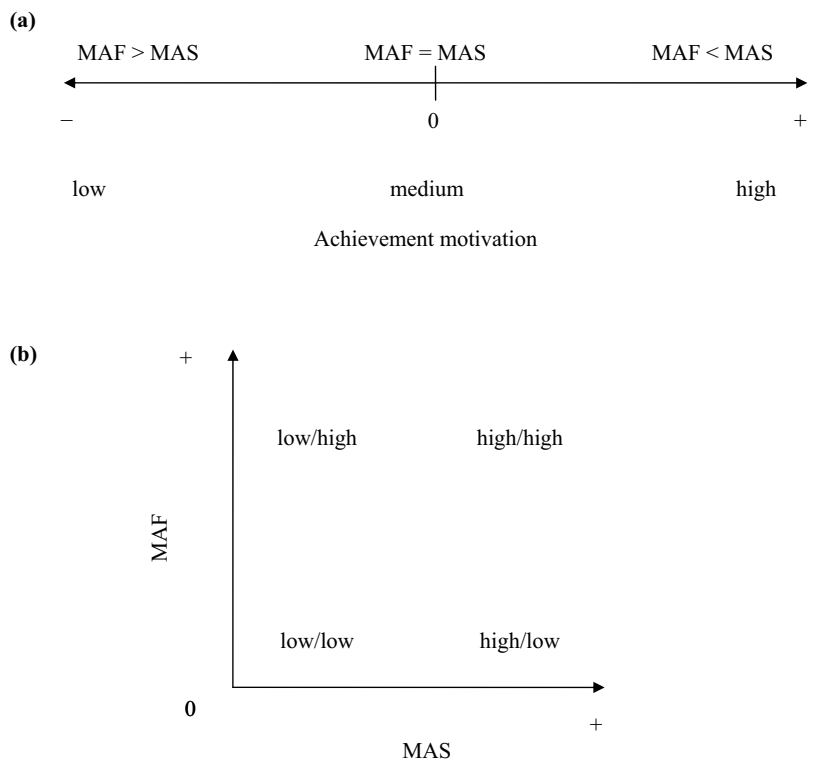
(a)

| MAF > MAS | MAF = MAS | MAF < MAS |

$$\longleftrightarrow$$

| − | 0 | + |

| low | medium | high |

Achievement motivation

(b)

Figure 1
(a) graphical representation of the bipolar model (i.e., MAS and MAF are two opposite factors of a unitary construct) and the three groups corresponding (i.e., low, medium, or high score of achievement motivation), and (b) graphical representation of the quadripolar model (i.e., MAS and MAF are independent factors) and the four groups corresponding (i.e., high in both motives, low in both motives, high in one motive and low in the other motive)

should be based on the respective scores of the two motives (e.g., Capa, Audiffren, & Ragot, 2008b; Covington & Roberts, 1994; Martin, Marsh, & Debus, 2001). Contrary to the first model, the selection of participants could not be based on solely the measure of one motive or on a resultant achievement motivation score. Another implication is that four groups of participants can be selected. Persons could thus be driven simultaneously by high MAS and MAF, or conversely by low scores on both dimensions, or by a high score on one dimension and a low score on the other dimension (Figure 1b). There is some evidence for this quadripolar model in which MAS and MAF are independent factors. Atkinson and Litwin (1960) established one of the first

arguments for the quadripolar model. In this study, some participants with high scores of MAS, traditionally conceptualised to focus on the affective anticipations of hope of success, reported feelings of avoidance (i.e., shame and embarrassment). Atkinson and Litwin (1960) suggested that some participants are only driven by the MAS and that other participants could also be driven by MAF and MAS. Moreover, a series of studies indicated that the four groups were behaviourally distinct (Covington & Roberts, 1994). If the MAS and MAF are completely independent, then a second model (M2; created by fixing the correlation among the two motives to zero) should provide a good fit to the data (Figure 2b).

Besides the unitary and independent concepts, there is also a growing body of evidence indicating that achievement motivation is a multidimensional latent structure (Byrne et al., 2004; Franken & Brown, 1995). These studies suggest that achievement motivation is best designed as a multidimensional latent structure composed of several factors – such as MAS, MAF, and also pride in productivity, or competitiveness – generally considered as separable and weakly correlated. As for the independent conception, two implications are that the individuals differ in achievement motivation by their relative placements on the two motives and four groups of participants can be selected (Figure 1b). To test a third model in which MAS and MAF are separable and weakly correlated factors, we first have to determine the nature of the correlation between the two motives. We referred to the studies of Elliot and Church (1997) and Elliot and McGregor (2001). In these studies a weak negative correlation of around $-.30$ ($r = -.23$ and $r = -.32$) was obtained in large samples (178 and 148 participants). These correlations were obtained with achievement motive measures frequently used in the literature. The achievement motivation subscale of Jackson's (1974) personality research form, and the work and family orientation scale (Spence & Helmreich, 1983) were used as indicators of the MAS. Herman's (1990) fear of failure measure and the motive to avoid failure scale of Hagtvet and Benson (1997) were used as indicators of the MAF. If the MAS and MAF are two separable and weakly correlated factors, then a third model (M3; created by fixing a weak negative correlation of $-.30$ among the two motives) should provide a good fit to the data (Figure 2c).

In the present study, CFAs are used to test the three hypothesised models. Based on the theoretical argument of a quadripolar model of achievement motivation postulated by Atkinson (1957) and the fact the four groups are behaviourally distinct (Covington & Roberts, 1994), we have one primary expectation. We expect that the independent model (M2) would provide a better fit to the data than the unitary model (M1). Moreover, based on the theoretical argument of a multidimensional latent structure of achievement motivation (Byrne et al., 2004; Franken & Brown, 1995) and the fact that there
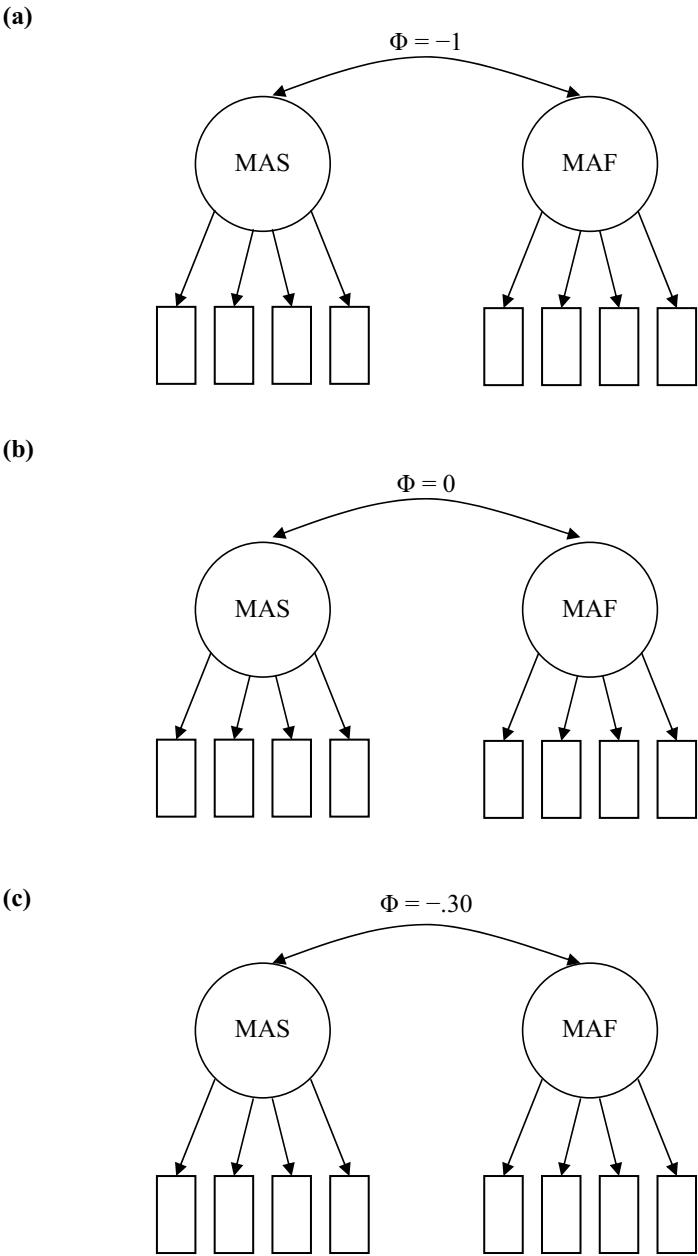
(a)

$\Phi = -1$

MAS   MAF

(b)

$\Phi = 0$

MAS   MAF

(c)

$\Phi = -.30$

MAS   MAF

Figure 2
Three hypothesized models according to the relationship between MAS and MAF.

was a weak negative correlation between the two motives (Elliot & Church, 1997; Elliot & McGregor, 2001), we expect that M3, in which MAS and MAF are separable and weakly correlated factors, would provide a better fit to the data than a strictly independent conception of the two motives (M2).

Method

Participants

A total of 1179 (581 women) undergraduates enrolled in courses at the University of Poitiers participated in the study. Such a large sample helps increase the likelihood of identifying a stable model (Guadagnoli & Velicer, 1988). The mean age of participants was 20.2 years (*SD* = 2.7). Participants were recruited from several departments of the University of Poitiers: biology (12%), business (12%), history (7%), kinesiology (16%), law (13%), mathematic (9%), medicine (8%), physics (13%), and psychology (10%). Data from the University of Poitiers indicated that the undergraduates were generally from a background that matched the socio-economic distribution of French students.

Procedure

All measures were administered by a research assistant to classes of up to 30 students in quiet classroom conditions. All assessments took place immediately before class, with the professor absent from the room. Participants were assured that their responses would remain confidential and would in no way influence their course grade. Participation was strictly voluntary. Participants were informed that they could refuse or discontinue participation at any time. The questionnaire was composed of two distinct parts. The first part contained the informed consent agreement. The second part contained the MAS and MAF items that were randomly mixed. Completion times for participants ranged from approximately 5 to 10 min. No time limit was placed.

Measures

Motive to achieve success

Four items based on the achievement motivation subscale of the personality research form (Jackson, 1999) were administered to measure the MAS. Items assess MAS in measuring aspiration to accomplish difficult tasks, to maintain high standards, to respond positively to competition and to make an effort to attain excellence (i.e., I enjoy difficult work, I often set goals that are difficult

to reach, I generally prefer difficult tasks than easy tasks, I feel particularly challenged by a difficult task). Participants indicated their responses on a 5-point scale ranging from *completely disagree* (1) to *completely agree* (5). This scale was conceptualised as a broad construct of need for achievement. A number of empirical investigations have attested to the reliability, the construct validity of the measure, and its predictive validity in the classroom (Elliot & Church, 1997).

Motive to avoid failure

Four items selected from the motive to avoid failure scale (Hagtvet & Benson, 1997) were used as an indicator of the MAF (i.e., I am afraid of failing in situations where the outcome is uncertain; Just thinking about working on new, somewhat difficult tasks makes me feel uneasy; I am afraid of failing when I am given a task which I am uncertain that I can solve; I dislike working in situations if I am uncertain how well I will do). Items assess MAF as a capacity to anticipate negative affects related to failure and to avoid situations of uncertainty. Participants indicated the extent to which they agreed with the item on a 1 (*completely disagree*) to 5 (*completely agree*) scale. This scale was developed to represent the various components of fear of failure identified by Atkinson and Feather (1966) in their portrait of the "failure threatened personality." The reliability and validity of this measure has been demonstrated by Hagtvet and Benson (1997). Predictive validity in the classroom has also been established (Elliot & McGregor, 2001).

In a previous sample of 362 participants, a CFA revealed that the full version of the achievement motivation subscale of the personality research form (Jackson, 1974) provided a marginal fit to the data ($\chi^2 = 489.14$; $df = 104$; CFI = .71; RMSEA = .10). To obtain similar psychometric properties between the MAS and the MAF scales, poorly fitting items from the achievement motivation subscale of the personality research form (Jackson, 1974) were removed. Twelve items, with factor loadings less than 0.4, were removed. Moreover, two items of the MAF scales were removed to harmonise the number of items between scales. Moreover, in another of 120 participants, the MAS and MAF reduced scales strongly correlated with the full scales of the MAF (Hagtvet & Benson, 1997) and the MAS (Jackson, 1999), $r = .73$ and $r = .81$, respectively. Finally, in the present study, to confirm adequate psychometric properties of these MAS and MAF reduced scales, internal consistency, data distribution, and parameter estimates were examined before analysing CFAs results. According to Nunnally (1978), self-report scales with internal consistencies in the [.70, .90] range are acceptable for research purposes. To test data distribution, univariate skewness, and univariate kurtosis of items were examined. Curran, West, and Finch (1996) considered that a skewness of ±3 and a

kurtosis of ±7 indicate an extreme departure from normality. The adequacy and the significance of the parameter estimates (factor loadings, squared multiple correlations [R^2], and *t* values) were also examined.

Confirmatory Factor Analysis

CFAs were conducted with LISREL 8 (Jöreskog & Sörbom, 1993a). Analyses were based on the covariance matrix, and the solutions were generated by using maximum likelihood estimation. The covariance matrix that was analysed was produced using PRELIS 2 (Jöreskog & Sörbom, 1993b). Following the recommendations of Hu and Bentler (1999), several types of fit indices were used: (a) incremental fit indices including comparative fit index (CFI), Bentler-Bonett normed fit index (NFI), Bentler-Bonett nonnormed fit index (NNFI), and Bollen's incremental fit index (IFI); (b) absolutes fit indices including goodness-of-fit index (GFI), and root mean square error of approximation (RMSEA). Acceptable fit was determined by CFIs, NFIs, NNFIs, IFIs, and GFIs greater than .95 and RMSEAs less than .06.

Results

Validity of motive measures

Internal consistency (i.e., Cronbach's alpha) of the MAS scale was α = .80 (*M* = 3.15; *SD* = .94). Internal consistency of the MAF scale was α = .70 (*M* = 3.09; *SD* = 1.07). The scores exceeded or equalled the .70 criterion and attested to the reliability of the measures (Nunnally, 1978). Moreover, the univariate skewness of the MAS scale ranged from −.05 to −.35 and the univariate kurtosis ranged from −.40 to −.63. The univariate skewness and the univariate kurtosis of the MAF scale ranged from −.61 to .22, and from −.41 to −.93, respectively. We considered the scores as generally approximating a normal distribution (Curran et al., 1996). Finally, the parameter estimates (factor loadings, squared multiple correlations [R^2], and *t* values) are summarised in Table 1. All parameter estimates were adequate and significant. All error residuals were found to be significant (*t* > 1.96). Taken together, internal consistency, data distribution, and parameter estimates results indicated that the MAS and MAF measures had good psychometric properties. Table 1 presents the parameter estimates of a model, in which the relationship between MAS and MAF was not fixed (i.e., a free model). The parameter estimates changed slightly between M2, M3, and the free model (i.e., less than 2% of variance). However, the fact to fix the relationship between MAS and MAF to −1 (i.e., M1) involved a decrease of the parameter estimates.

Table 1
Factor loadings, squared multiple correlations, and t values for items

	MAS	**MAF**	**R²**	**t values**
MAS Item 1	.60	–	.45	23.63
MAS Item 2	.71	–	.58	27.69
MAS Item 3	.65	–	.48	24.58
MAS Item 4	.73	–	.55	26.88
MAF Item 1	–	.54	.24	15.36
MAF Item 2	–	.63	.36	18.94
MAF Item 3	–	.66	.37	19.17
MAF Item 4	–	.77	.57	23.90

Note: MAS: motive to achieve success; MAF: motive to avoid failure.

Confirmatory Factor Analysis

We tested the hypotheses by creating and comparing three models (one in which MAS and MAF were completely independent factors [M2], another in which MAS and MAF were separable and weakly correlated factors [M3], and an unitary model [M1] in which MAS and MAF were opposite factors of a unitary construct). M1, M2, and M3 were created by fixing the correlation among the two motives to −1, 0, and −.30, respectively. Fit indices for the three hypothesised models are reported in Table 2.

Table 2
Fit indices for confirmatory factor analysis models

Fit-indices	**M1**	**M2**	**M3**
χ^2	920.39	158.26	86.61
df	20	20	20
p	.00	.00	.00
CFI	.70	.94	.97
NFI	.70	.93	.96
NNFI	.59	.92	.96
IFI	.71	.92	.97
GFI	.84	.97	.98
RMSEA	.20	.08	.05
90% CI for RMSEA	.18-.21	.07-.09	.04-.06

Note: M1: model with correlation among the motive to achieve success and the motive to avoid failure to −1; M2: model with correlation among the motive to achieve success and the motive to avoid failure to 0; M3: model with correlation among the motive to achieve success and the motive to avoid failure to −.30; CFI: comparative fit index; NFI: Bentler-Bonett normed fit index; NNFI: Bentler-Bonett nonnormed fit index; IFI: Bollen's incremental fit index; GFI: goodness-of-fit index; RMSEA: root mean square error of approximation; CI = confidence interval.

First, results from CFAs indicated that the independent model (M2) produced a better fit to the data than the unitary model (M1). Moreover, we tested

the second hypothesis that MAS and MAF are not completely independent by creating a model in which MAS and MAF were separable and weakly correlated factors (M3) and comparing it with the independent model (M2). Results from CFAs provided supports for the second hypothesis. Even though all the fit indices were respectable for the independent model (M2), M3 obtained a better fit to the data. The values of the fit indices for M2 were all poorer than M3. Only CFI, NFI, NNFI, IFI and GFI of M3 were above the .95 criterion. Furthermore, only RMSEA of M3 was less than the .06 criterion and indicated an acceptable fit. In conclusion, the correlation among MAS and MAF could be set to 0 without worsening the fit of the model. Results from CFAs indicated that MAS and MAF share at least some commonality and cannot be considered completely independent.

Discussion

According to the first hypothesis, the independent model (M2) obtained better fit to the data than the unitary model (M1). So, the bipolar interpretation in which MAS and MAF are two opposite factors of a unitary construct can be rejected. One implication concerns the methodology used to select participants. If the bipolar interpretation can be rejected, then the selection of participants cannot be based on only the measure of one motive or on a resultant achievement motivation score calculated by subtracting the score of the MAS from the score of the MAF. The selection of participants should be based on the respective scores of the two motives. Another implication concerns the groups of participants. Under a bipolar model (Figure 1a), there are three groups of individuals: those with a low, a medium, or a high score of achievement motivation. An individual in whom the MAS is stronger than the MAF is an approach-driven individual (high score). An individual in whom the MAF is stronger than the MAS is an avoidance-driven individual (low score). An individual in whom the MAF score equals the MAS score is defined as a neutral achievement motivation individual (medium). With this classification, a neutral achievement motivation individual can have high scores or low scores on the two motives. Contrary to the bipolar model, under a quadripolar model (Figure 1b; Covington & Roberts, 1994), there are four groups of individuals: failure-avoider (low MAS and high MAF), overstriver (high MAS and high MAF), success-oriented (high MAS and low MAF), and failure-accepting individuals (low MAS and low MAF). With this classification, the selection is more accurate. Individuals with high scores or low scores on the both motives are respectively considered as overstriver or failure-accepting individuals and not as neutral achievement motivation individuals in accordance with the bipolar conception.

Results suggest also theoretical implications. Under a bipolar model, the following general hypotheses are often formulated: while approach-driven individuals (MAF < MAS) should be stimulated by all achievement-oriented activity, avoidance-driven individuals (MAF > MAS) should inhibit all achievement-oriented activity. In the achievement motivation literature (McClelland et al., 1953), there is no general hypothesis for the neutral achievement motivation individuals (MAF = MAS). From these general hypotheses postulated under the bipolar concept, some hypotheses on mental effort mobilisation can be formulated. Humphreys and Revelle (1984) postulated that achievement motivation interacts with task difficulty to influence mental effort mobilisation. Consequently, we have postulated in a previous study that approach-driven individuals should have a stronger effort-related physiological reactivity than avoidance-driven individuals, especially during difficult tasks (Capa et al., 2008a). Under a quadripolar model, the following general hypotheses are formulated (Covington & Roberts, 1994). Failure-avoider individuals (low MAS and high MAF) have considerable doubts about their ability, fearful of being exposed as incompetent and feeling highly anxious. Overstriving individuals (high MAS and high MAF) experience a classic approach/avoidance conflict. They are characterised by the defensive strategy of avoiding failure by succeeding. Success-oriented individuals (high MAS and low MAF) set realistic learning goals and are hard workers. Failure-accepting individuals (low MAS and low MAF) are resigned or at least passive in the face of challenges. They abandon efforts to maintain a sense of dignity via a reputation for ability. From these general hypotheses postulated under the quadripolar model, some hypotheses on mental effort mobilisation can be formulated. As for the bipolar concept, we can consider that success-oriented individuals should have a stronger effort-related physiological reactivity than failure-avoiding individuals. Moreover, supplementary hypotheses can be formulated. For example, as the overstriving individuals experience a classic approach/avoidance conflict, they may have a strong effort-related physiological reactivity and may develop interfering cognitions such as self-preoccupations in term of worry or test-irrelevant thinking.

According to the second hypothesis, the model in which the correlation between the two motives was fixed to a weak and negative correlation produced a better fit to the data than the complete independence model. One implication is that in the sample used here there are more success-oriented (high MAS and low MAF) or failure-avoiding (low MAS and high MAF) participants than overstriving participants (high MAS and high MAF) or failure-accepting (low MAS and low MAF) participants. This could be a reason why success-oriented and failure-avoiding individuals are less investigated in the achievement motivation literature than the two other groups.

Some limitations of the study should be mentioned. The MAS and the MAF were measured by items from the achievement motivation subscale of the personality research form (Jackson, 1999) and from the motive to avoid failure scale (Hagtvet & Benson, 1997), respectively. One should be cautious in generalising our findings. Whether the two motives as measured by other scales are separable and weakly correlated factors remains an open question. Moreover, it is important to point out that the current data were based on a population of undergraduates. Complementary studies are necessary to generalise the obtained results on other populations such as working individuals, young children, or elderly adults. For example, the degree of separability of the two motives may be less pronounced among larger samples. Although such limitations in generalizability across populations and scales are possible, similar patterns of results emerging across different populations with different measures can be expected, given that a weak negative correlation between the two motives is often obtained in literature (Elliot & Church, 1997; Elliot & McGregor, 2001).

In conclusion, different factorial models in accordance with the different relationships postulated in the literature between MAS and MAF were tested. The results demonstrated that MAS and MAF are separable and weakly correlated factors. There are several potential implications for the selection of participants and for the study of the influence of achievement motivation on psychological processes. Participants who have remained undifferentiated under a bipolar model emerge as distinctive under a quadripolar model. Detection of individuals with the quadripolar model allows a more accurate selection of participants than this with the bipolar model. Moreover, the selection of participants with the quadripolar model requires more accurate hypotheses of the influence of achievement motivation on psychological processes than this with the bipolar model. Before assessing the generalizability of the results and the implications for the selection of participants, it is necessary to compare the three models tested across other populations and with other scales.

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