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The achievement flow motive as an element of the autotelic personality: predicting educational attainment in three cultures

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Abstract Human behavior is directed by an implicit and an explicit motivational system. The intrinsic form of the implicit achievement motive has been demonstrated to predict the experience of flow. Thus, this achievement flow motive can be considered an integral component of the autotelic personality, posited in Flow Theory as dispositional difference in the propensity to experience flow. As implicit motivation predicts long-term behavioral trends and flow predicts quality of performance, the achievement flow motive should be predictive of a long-term goal pursuit such as educational attainment. This hypothesis is tested cross-culturally to shed some light on the universality of flow: Participants from Cameroon, Costa Rica, and Germany were asked about the level of education they attained. To assess their achievement flow motive, the Operant Motive Test was employed. After measurement equivalence was established, analyses revealed that, across all three cultures, the achievement flow motive explained variance in educational attainment independent of achievement values as measured by a scale of the Schwartz Value Survey. Consequently, as would be expected of an element of the autotelic personality, the achievement flow motive predicts long-term academic success.

Keywords Flow · Autotelic personality · Achievement motive · Educational attainment · Cross-cultural psychology

The state of flow is defined as "the holistic sensation that people feel when they act with total involvement" (Csikszentmihalyi 1977, p. 36). This state is experienced as pleasant and enjoyable, and the activity that elicits it is conducted for its own sake (Csikszentmihalyi 1990). Once in a state of flow, people feel completely absorbed by and fully concentrate on

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the task at hand so that they function at their fullest capacity, thus displaying good performances in what they are doing (Csikszentmihalyi et al. 2005).

Flow can be experienced in a variety of activities. It has been shown in the context of sports (Jackson et al. 1998), music (MacDonald et al. 2006), as well as in work (Eisenberger et al. 2005) and school (Bakker 2005) situations.

Situational and dispositional determinants of state flow

Whether a person experiences a state of flow depends on a variety of factors (Schmidt et al. 2007). Certain situational variables have been identified, which increase the likelihood of entering the state of flow. Among these are clear-cut goals that serve to direct attention while in a state of flow, instantaneous feedback to monitor the course of one's actions, and, in particular, an optimal balance between the perceived difficulty of a given task and the perceived ability to master this task (Csikszentmihalyi 1990; Csikszentmihalyi et al. 2005).

Considering determinants of the state of flow on the individual's side, an autotelic personality has been proposed to explain differences in how readily people experience flow (e.g., Csikszentmihalyi et al. 1993). However, only little is known about what exactly constitutes such an autotelic personality. Recently, however, some studies have demonstrated some within-person characteristics that affect how readily or strongly flow is experienced. For example, Keller and Bless (2008) showed that action-oriented individuals experience more flow when task demands and skill level were optimally balanced than less action-oriented individuals. Engeser and Rheinberg (2008) maintained that subjective perception of the importance of an activity influences when the state of flow is experienced: That is, when a task is considered important, flow can be experienced even if demands are relatively low.

Consequent to the lack of a compelling definition, there is little consensus about how to measure the autotelic personality. For example, Asakawa (2004) measured autotelic personality by the frequency of events, which individuals engage in during a week that are characterized by a balance of challenge/ability. On the other hand, Marsh and Jackson (1999) developed a scale to assess individuals' dispositional tendency to experience important features of flow such as doing something for its own sake, maximal concentration on a task at hand, and certainty about one's goals. Moneta (2004b) employed a questionnaire on trait intrinsic motivation to operationalize the autotelic personality. This lattermost approach is in line with research showing that an intrinsic motivational orientation rather than an extrinsic one facilitates flow experiences (Abuhamdeh and Csikszentmihalyi 2009).

We agree with Moneta's as well as Abuhamdeh and Csikszentmihalyi's notion that intrinsic motivation represents the core element of a personality structure, which facilitates the experience of the state of flow [note that this aspect is also included in the Flow Trait Scale by Marsh and Jackson (1999) and Work-related Flow Inventory by Bakker (2008)]. However, we propose that the instruments employed so far neglect an important aspect of human motivation. In motivational psychology, it is well-established that human behavior is directed and driven by two motivational systems: implicit motivation and explicit motivation, which develop independently and have impact on different forms of behavior (McClelland et al. 1989; Spangler 1992). In research on the autotelic personality, up to now, motivation in its explicit form has dominated the field [for an exception, see Engeser and Rheinberg (2008)].

In the present study, we employ a measure of implicit motivation that captures people's dispositional propensity to engage in activities that allow entering the state

of flow (Baumann and Scheffer 2010). Thus, we view the autotelic personality as one which is defined by an inclination towards experiencing flow. Our point here is that this inclination is both unconsciously and consciously motivated. Thus, while some people actively seek for situations that allow them to experience flow (e.g., by structuring goals accordingly), others have a nonconsciously represented tendency to experience flow.

The achievement flow motive as element of the autotelic personality

First, let us elaborate on the differences between the implicit and explicit motivational systems. Then, we will argue for an implicit measurement of intrinsic achievement motivation as an important indicator of the autotelic personality, that is, for the propensity to experience flow.

Implicit and explicit motivation Implicit motives are defined as stable preferences for a certain kind of situations, for instance situations of competence or relatedness. These preferences are affective in nature. They develop in prelingual childhood (McClelland et al. 1989) and, for that reason, operate on a predominantly nonconscious level. Implicit motives drive operant behaviour; that is, they determine spontaneous action and thus reveal long-term behavioral trends (McClelland 1980).

Explicit motives, on the other hand, are those conscious goals and values that a person esteem and identify with. Their development requires language-mediated cognitive structures as they are predominantly taught by socialization agents of the surrounding environment and culture (e.g., McClelland et al. 1989). Explicit motives drive respondent behaviour; that is, they determine action in situations in which external incentives call for a decision for a course of action (e.g., Koestner et al. 1991). As such, they are related to people's actual performance (e.g., Anderman and Wolters 2006). That is why, in the present study, we will employ achievement values to test if our measure of implicit inclination towards experiencing flow independently predicts performance outcomes.

The implicit achievement motive and flow As a central feature of the autotelic personality, the ability to "manage a rewarding balance between the 'play' of challenge finding and the 'work' of skill building" (Csikszentmihalyi et al. 1993, p. 80) has been suggested. Thus, individuals with a pronounced autotelic personality should be highly motivated to seek out situations, which provide opportunities to engage in difficult tasks and master them. Hence, being defined as "propensity to engage in a behavior that is regarded as instrumental for testing, demonstrating, or developing one's ability to solve difficult problems, overcome obstacles, or meet challenging standards of excellence" (Kazén and Kuhl 2005, p. 428), the achievement motive is of particular importance in the context of flow.

As previously stated, setting appropriate goals (e.g., choosing a piece of music that matches one's piano playing abilities) increases the likelihood of flow. That is to say, the explicit achievement motive influences whether an individual experiences flow. The point here, however, is that the implicit achievement motive does so, too. For one, as flow is a state in which one loses self-consciousness and directs attention fully to the task at hand, conscious processing is reduced in favor of sub-conscious processes. Functioning in such an automatic way is a state that is hardly brought about by conscious efforts alone: You

cannot will yourself to experience flow. Thus, an intuitive or sub-conscious inclination towards choosing activities that afford the potential for flow experience should be a component of the autotelic personality.

Secondly, flow is a highly positive emotional experience (Csikszentmihalyi et al. 2005). Thus, it is more likely to be affectively learnt than cognitively: Once experienced, individuals would want to have the same emotional experience again. Hence, when engaging in mastery motivated behavior such as exploratory play (Jennings et al. 1979) even at a very young age children might develop an affective preference for situations which enable them to experience flow, i.e., an implicit motive to seek flow.

These assumptions are corroborated by empirical results demonstrating individuals with a strong implicit achievement motive to perform well even when performance is not emphasized in the instruction (Biernat 1989; deCharms et al. 1955). Thus, the implicit achievement motive should be an important element of the autotelic personality. Indeed, Engeser and Rheinberg (2008) found that, given an optimal balance of task demand and skill level, individuals characterized by a high implicit achievement motive experienced more flow than those low in the implicit achievement motive.

The achievement flow motive As said, it is characteristic of flow that the activity is conducted for its own sake and the joy of doing it. Thus, only the intrinsic form of the implicit achievement motive should be considered relevant for the autotelic personality.

Generally, the implicit achievement motive can take a variety of forms. For example, people can be motivated to strive for success or to avoid failure (e.g., Schultheiss and Brunstein 2005). A more fine-grained differentiation has been introduced by the Personality Systems Interactions Theory (Kuhl 2000). In this theoretical approach, four dispositional modes of realization of approach motives are discriminated. These depend on two factors: the affective tone of the motive (positive vs. negative) and the extent of self-involvement (self-determination vs. external incentives) (Baumann and Scheffer 2010; Kuhl and Koole 2008).

Hence, besides the avoidance mode, which is characterized by passiveness and fixation on negative affect (e.g., feeling overstrained) caused by the situation, the following realization modes of the achievement motive are discriminated (cf. Baumann et al. 2005; Baumann et al. 2010): *Pressure to achieve* (e.g., avoidance of mistakes) is the combination of a negatively toned achievement motive without any self-involvement, while *coping with failure* (e.g., interpretation of failure as challenges for the future) entails a self-determined regulation of negative affect. An achievement motive with a positive affective valence based on external incentives is called *standard of excellence* (e.g., pride in results).

The following approach mode, however, is central to the present study as it represents an intrinsic mode of motive realization. If the achievement motive is positively toned as well as self-determined, the motivation for an action stems from the self and the corresponding behavior is joyfully conducted for the activity's sake. This is phenomenologically experienced as a state of flow. Therefore, the motivational combination of positively toned and self-determined achievement motivation is termed *flow* motivation.

This specific component of the achievement motive has been demonstrated to reliably predict flow experience, whereas a more general measure of achievement motivation did not, and to predict intrinsic interest in studying (Baumann and Scheffer 2010). Thus, the specification of different modes of the achievement motive is helpful in predicting the

propensity to experience flow. This given, the achievement flow motive should be considered an important facet of the autotelic personality.

The present study

Flow has been argued to play a major role in the development of interests (Baumann and Scheffer 2010), talents (Csikszentmihalyi et al. 1993), and skills (Abuhamdeh and Csikszentmihalyi 2009). Thus, it is the aim of the present study to show that the achievement flow motive as described above predicts long-term achievement. For that reason, it is tested whether the achievement flow motive explains individuals' educational attainment, i.e., which educational degree is acquired.

To be able to adequately evaluate the predictive power of the achievement flow motive on educational attainment, the explicit motivational achievement domain is considered, too. This allows comparisons with the predictive strength of the explicit achievement motive, which is well-known to affect academic careers (Harackiewicz et al. 2000).

Moreover, the present study tests the influence of the achievement flow motive on educational attainment in a cross-cultural setting. Unfortunately, only little is known about flow or the autotelic personality in diverse cultures, although the flow experience seems to be a universal quality (Moneta 2004a; see, e.g., Asakawa's 2010, description of lives of Japanese young adults who frequently experience flow). The fact that cultural differences have been found in the challenge/skill ratio required for experiencing flow (Asakawa 2004; Moneta 2004b) does not imply that there was not a universal motivational aspect of personality, which determines the propensity to experience flow. Thus, the achievement flow motive should facilitate the state of flow independent of culture.

To summarize, the present study tests the hypothesis that the achievement flow motive contributes to the prediction of educational attainment independent of individuals' explicit achievement motive and cultural background. Given the universal importance of formal learning (cf. Kağitçibaşi 2002; reflected in a uniformly positive correlation between educational attainment and income in the present samples), education represents a good context for research on universal features of the achievement motive. In other words, across cultural groups, the achievement flow motive and the explicit achievement motive are hypothesized to each explain a unique share of variance in educational attainment (i.e., a person's educational degree).

Method

Selection of cultures

Cameroon, Costa Rica, and Germany were chosen because they differ in dominant mode of self-construal (Kağitçibaşi 2005): In Germany, an independent self-construal prevails (which is characteristic of Western cultures and is defined by high individual autonomy). In Cameroon, the self is interdependently construed (which is characteristic of traditional non-Western societies and is defined by high interrelatedness and hierarchical stratification of group members). Finally, for Costa Rica, the autonomous-related mode of self-construal is most representative (which is characteristic of traditional societies with increasing urbanization and industrialization and is defined by balanced importance of autonomy and relatedness).

Participants and procedure

In Cameroon, 126 (47.6% women; age, M=35.88; SD=13.92; range=20–65), in Costa Rica, 120 (49.2% women; age, M=36.39; SD=15.10; range=18–74), and in Germany, 124 (49.2% women; age, M=36.94; SD=13.80; range=18–75) participants were recruited via ads in newspapers and with the help of local research assistants. Instruments were administered by local assistants in single settings (see Hofer et al. 2005, for more details). In Cameroon, the data collection was restricted to the Anglophone Northwest Province.

Measures

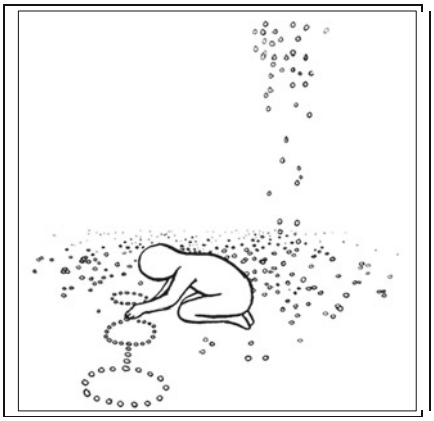
Educational attainment Among other sociodemographic information participants also stated the highest educational degree they obtained. These degrees were then classified into five categories: *basic primary schooling* (school was left after a few years of primary school education; n=23), *basic secondary schooling* (secondary education was quit after 2 years; n=86), *O levels* (secondary education was finished but university entrance prerequisites were not accomplished; n=59), *A levels* (secondary school education was finished and university entrance prerequisites were accomplished; n=140), and *university* (an academic degree was acquired at a university; n=62). To avoid misclassifications of degrees, educational systems were discussed with local experts and cultural informants (Hofer et al. 2005; see Van de Vijver and Leung 1997 on such means to avoid construct bias).

Achievement flow motive Given their nonconscious nature, implicit motives are assessed with fantasy-based measures. Based on and modifying the original Thematic Apperception Test (Murray 1938), the logic behind such Picture Story Exercises is that ambiguous stimuli can be used to elicit reactions, which reflect the person's underlying motive structure (Schultheiss and Brunstein 2005).

Here, the Operant Motive Test (OMT; Kuhl and Scheffer 1999) was administered (for behavioral correlates and validity see, e.g., Baumann et al. 2010). Twelve ambiguous picture cues (sketches, blurred photographs) are presented, and participants are asked to imagine a story for each of them. Then, participants answer the following three questions in writing: "What is important for the person in this situation and what is the person doing?," "How does the person feel?," and "Why does the person feel this way?" The full version of the OMT includes a fourth question (How does the story end?), which was dropped as has been done before in cross-cultural research on motivation employing the OMT (Hofer et al. 2008).

Per picture, the dominant underlying motive (achievement, affiliation-intimacy, or power) is coded. Moreover, the OMT allows identifying the predominant mode of motive realization. The achievement flow motive, the intrinsic form of the implicit achievement motive, which is in the focus of the present study, is represented by the combination of a positively toned achievement motive grounded in the self, indicating a person's propensity to have an experience of flow in achievement situations (Fig. 1).

OMT responses from the Costa Rican subsample were scored by two local assistants who had previously received extensive training on the definition of motive categories and on all relevant scoring rules. German and Cameroonian responses were scored by two well-trained research assistants at the University of Osnabrück. All assistants had achieved a percentage agreement of at least 0.85 with test material prescored by experts. During the scoring



What is important for the person in this situation and what is the person doing?

She is trying to form a particular pattern with the stones.

How does the person feel?

Excited.

Why does the person feel this way?

Because she enjoys building patterns the way she likes them.

What is important for the person in this situation and what is the person doing?

He is busy solving the other people's difficult problem.

How does the person feel?

Happy, challenged.

Why does the person feel this way?

Because he loves what he's doing and is sure that soon he will come up with a solution.

Fig. 1 Scoring the flow motive: two examples of OMT-picture cues with responses scored for achievement flow motive

process, all unclear cases were discussed in groups to come to a final score. Whether scorers' agreement remained stable was regularly checked.

Explicit achievement motivation As conscious values are a good indicator of explicit motivation (McClelland 1980), the achievement-subscale of the Schwartz Value Survey (SVS; Schwartz 1992) was employed as measure of the explicit achievement motivation. This scale consists of four items (e.g., successful, ambitious) as only those items were included that have previously been shown to have comparable meanings across cultural groups. The 9-point Likert scale on which the importance of these values as a guiding principle in one's life has to be evaluated ranges from −1 (opposed to my values) to 7 (of supreme importance). In the present study, the internal consistency (Cronbach's alpha) of the achievement scale was 0.60 for the German, 0.50 for the Cameroonian, and 0.51 for the

Costa Rican subsample, respectively. Although these values are moderate in height, they are sufficiently high for a scale with so few items (Nunnally 1978).

The SVS has been widely used in cross-cultural research (e.g., Schwartz 1994). Thus, English, German, and Spanish versions, respectively, were readily available for use.

Results

First, bias analyses will be conducted on the OMT-picture cues to ensure cross-cultural comparability of subsequent analyses. Bias analyses were not conducted for the SVS as it has specifically been designed for use in diverse cultural contexts and has received much scientific attention (e.g., Schwartz 1992, 1994). Second, descriptive data on and first-order correlations between the measures of interest will be presented. Third, and of supreme importance, the present study's hypothesis will be tested with regression analysis technique.

Cross-cultural equivalence of implicit achievement motive measurement

To date, the OMT has not yet been frequently applied in diverse cultural groups [for exceptions see Chasiotis et al. (2010) and Hofer et al. (2008)]. Therefore, knowledge on the applicability of picture cues used to elicit motive-related imagery in non-Western cultures is scarce. For that reason, bias analyses were conducted to test whether picture stimuli can be meaningfully compared across cultures. This was done to prevent the occurrence of item/picture bias. Item bias is present when individuals from different cultural groups respond differently to an item (here, picture cue), although they share the same underlying psychological construct (here, strength of implicit achievement motive) (Van de Vijver and Leung 1997; for a detailed description on how to deal with item bias in cross-cultural research on implicit motives, see Hofer et al. 2005). Thus, it was aimed to create a picture set that is applicable in the three cultural groups under investigation here.

As a first step, the stimulus pull for each of the pictures was identified, that is, the frequency with which each picture elicited motive imagery that could be scored as reflecting achievement motivation. Pictures with very low stimulus pull (i.e., markedly less than ten percent of all answers were scored for achievement motivation; here, cue strength$\leq$6.5 %) were eliminated from further analyses. This reduced the original 12-picture set by five pictures. The remaining seven pictures ranged in their stimulus pull from rather low to high.

Subsequently, log-linear model analysis was conducted to identify item bias (Kok et al. 1985). This method tests for dichotomous items whether they are biased by comparing the fit of nested models (taking into account all one-way effects, that is culture and score level, and two-way effects, that is the interaction of culture by score level) to the actual frequencies in the cross-tabulation of categorical variables. The dichotomous-dependent variable here was whether the implicit achievement motive was scored (yes=1; no=0). The two factors for the analysis were culture and score level with the latter being dichotomized into respondents scoring high on the implicit achievement motive and those scoring low. Thus, if a main effect of culture is identified or if the interaction term culture$\times$score level is significant, an item is considered biased.

The most parsimonious model fitting the data is to be identified. To do so, likelihood ratio chi square was used to evaluate the models. This procedure is iterated (Lord 1980): If biased

Table 1 Descriptive statistics of the achievement flow motive and achievement values for the three cultural samples

Measurement[1]	Germany *M* (SD) Min/max	Cameroon *M* (SD) Min/max	Costa Rica *M* (SD) Min/max	*F*
OMT: Flow	0.24_b (0.46) 0/2	0.07_a (0.26) 0/1	0.50_c (0.64) 0/2	24.55*
SVS: Achievement	3.71_a (1.04) 1.25/6.25	4.39_b (1.16) 1/7	4.29_b (1.03) 1.75/6.5	14.41*

Possible range of variables is 0–6 for the achievement flow motive (OMT) and −1–7 for achievement values (SVS). Different subscripts indicate significant differences between cultural samples (see text)

*$p<0.001$

items are discovered, the one that is most strongly biased is removed and analyses are repeated until there is no more biased item in the picture set.

Applying this procedure with the present data, only one item was found to be biased ($\chi^2=31.30$; $p<0.01$). This picture was then eliminated and not taken into account in any of the following analyses any more. When the log-linear model analysis was rerun, all other items were shown to not be biased. Thus, all subsequent analyses on the flow component of the implicit achievement motive are conducted with a bias-free set of six picture cues.

Note, however, that all analyses were also run without having removed the five items with very low stimulus pull (bias analyses, correlations, and regressions). However, none of the results found with the resulting 11-picture set differed significantly from those obtained by using the 6-picture set and reported in the following.

Descriptive statistics and correlational analyses

Table 1 reports how data of the two motivational measures were distributed among the three cultural samples. As can be seen, cultures differed on the importance assigned to achievement values ($F_{2/364}=14.41$; $p<0.001$). Post hoc analyses (Scheffé tests) revealed that in the German subsample achievement values were rated as significantly less important than in the Cameroonian and Costa Rican subsamples, respectively (p's<0.001). The latter two subsamples did not differ from each other.

Considering the achievement flow motive, the three cultural groups also differed from each other ($F_{2/362}=24.55$; $df=2$; $p<0.001$): Here, the Scheffé procedure showed that Cameroonian participants scored lower than German ($p<0.05$) and Costa Rican ($p<0.001$) participants, respectively. Moreover, German participants scored lower than Costa Rican participants ($p<0.001$).

On the distribution of educational attainment, the three cultural groups also differed significantly from each other ($\chi^2=73.26$; $df=8$; $p<0.001$). Inspecting the differences between pairs of cultural groups, it was found that the distribution in the Costa Rican subsample differed from that in the Cameroonian ($\chi^2=50.15$; $df=4$; $p<0.001$) and German ($\chi^2=56.98$; $df=4$; $p<0.001$) subsample, respectively, while it did not differ between the latter two cultural groups. This was due to the fact that in the Costa Rican sample very low and very high educational statuses were highly represented.

In the following, statistics are given for the whole study sample. If the associations reported in the text were found to be different in one of the cultural subsamples, this will explicitly be referred to.

Educational attainment did not differ between men and women. In addition, gender did not relate to the achievement flow motive as measured by the OMT. In general, this was also the case for achievement values, although in the German subsample a gender difference could be identified (t=1.99; df=110; p=0.05) with men reporting higher importance of achievement values than women.

On a correlational level, the following associations between variables of interest were identified: Age was negatively correlated with educational attainment (r=−0.32; p<0.001) and importance of achievement values (r=−0.25; p<0.001). It was, however, not associated with the achievement flow motive (r=−0.03).

As expected, the achievement flow motive and achievement values were uncorrelated (r= 0.07) in the total sample. The Costa Rican subsample, however, was an exception in that a significant correlation was found there (r=0.23; p=0.01).

Regression analysis

A hierarchical regression analysis with educational attainment as dependent variable was conducted to test whether the achievement flow motive uniquely contributed to the prediction of educational attainment independently from achievement values. Additionally, it was tested whether the interaction between those two constructs significantly contributed to the prediction of educational attainment. To turn educational attainment into a quasi-continuous variable, it was z-standardized per culture. In this context, note that when the subsequent regression analysis was repeated using the unstandardized educational attainment as dependent variable, results did not differ significantly from those obtained with the standardized variable and reported in the following. In particular, results for achievement values, the achievement flow motive, and their interaction remained unchanged.

Given its significant association with educational attainment, age was standardized and entered into the model in block 1. In block 2, the measures of explicit achievement values and the achievement flow motive were standardized across cultures and added to the model. This regression model indeed predicted educational attainment (F=18.11; df=3; p<0.001) and explained a significant share of variance (R^2=0.13). Age turned out to be a significant predictor (β=−0.30; p<0.001). Concerning the motivational constructs, the hierarchical regression analysis confirmed a main effect for achievement values (β=0.10; p<0.05) as well as a main effect for the achievement flow motive (β=0.11; p<0.05).

Block 3 additionally included the interaction between the standardized achievement values and the standardized achievement flow motive. However, there was no increase in variance explained (F_{change}=1.01; n.s.). Accordingly, the interaction of achievement values and the achievement flow motive did not contribute to the prediction of educational attainment (β=0.05; n.s.).

Testing whether these effects are equivalent across all three cultures, in additional steps, first, culture was entered into the regression model described above in the form of two dummy variables (coded 0/1) and, secondly, the interactions of these dummy variables with all variables previously entered into the model (age, achievement values, achievement flow motive, interaction term values × achievement flow motive) were added to the model (Cohen and Cohen 1975). Including these two additional blocks did not add to the prediction of educational attainment (F_{changes}≤0.86; n.s.). Thus, it can be concluded that the effects do not differ between cultural groups (Van de Vijver and Leung 1997). Inspection of variance inflation factors (VIFs) indicated a negligible impact of collinearity among predictors in the regression model (all values≤4.20). To conclude, educational attainment was predicted by

the explicit achievement motive (i.e., achievement values) and the achievement flow motive (i.e., *flow* component of the OMT) independent of each other but not conjointly.[1]

Discussion

The present study intended to show that across diverse cultural groups the propensity to seek flow experiences in the achievement domain, i.e., the achievement flow motive, predicts educational attainment. This effect was hypothesized to be independent of the explicit achievement motive. Indeed, two main effects were found so that both motivational systems independently predict educational attainment. Before these findings and their implications are elaborated upon, some cross-cultural differences are discussed.

Cross-cultural differences in explicit and implicit achievement motivation

Replicating previous findings (e.g., Hofer et al. 2005; Schwartz 1992), significant differences in the importance assigned to achievement values were found. Among the three cultural groups, German participants scored lowest. Achievement values can be considered to

[1] Two additional analyses were performed to test how robust these findings are. First, we checked if the time lag between educational attainment and the assessment of the achievement flow motive has any impact on the size of correlation between these two variables. With increasing time lag an increase in correlation size would suggest that it is educational attainment that fosters the achievement flow motive rather than vice versa, as we have argued. The said time lag was calculated by subtracting years of schooling and age at beginning of schooling (set as 6 as proxy because no further information was available and in Cameroon age at school entry varies) from age at achievement flow motive assessment. Then, a hierarchical regression analysis was conducted: Educational attainment was regressed on time lag and achievement flow motive (block 1), and, critically, the interaction of these two variables (block 2). While age (β=−0.51; p<0.001) and achievement flow motive (β=0.11; p<0.05) were significant predictors of educational attainment (cf. results presented above), the interaction term was only marginally so (β=0.08; p=0.10). While this result does not definitively rule out the alternative explanation that educational attainment drives the achievement flow motive, it does not support that explanation either. Second, additional sociodemographic information was taken into account in our analysis. For example, birth rank (only child, first, later, or last born) did not have any effect on educational attainment; however, perceived financial situation of the family did have an effect. Three items were used to assess how the participant rates the family's financial situation during his/her childhood (financial situation compared to neighbors and friends, parents' satisfaction with finances at that time, satisfaction of participant's material needs at that time). Cronbach's alpha was 0.71 for the Cameroonian, 0.83 for the Costa Rican, and 0.60 for the German sample, respectively. Including perceived financial situation of the family in the hierarchical regression described in the text led to the following results (only block 3): This regression model (F=11.98; df=5; p<0.001) explained a significant share of variance (R^2=0.14) of educational attainment. Age (β=−0.27; p<0.001) and family finances during childhood (β=0.11; p<0.05) were significant predictors of educational attainment. Deviating from the results presented in the text, achievement values were only marginally significant predictors of educational attainment (β=0.09; p<0.08). However, results did not change with respect to the achievement flow motive (β=0.11; p<0.05) or the interaction of achievement values and the achievement flow motive (β=0.05; n.s.). Including two additional regression blocks (culture coded as dummy variables; interaction terms of dummy variables with the other predictors) did not improve the prediction of educational attainment ($F_{changes}$≤1.59; n.s.), indicating equivalence of results across the three cultural groups. VIFs did not point to collinearity among predictors in the regression model (all values≤4.52). Thus, participants' financial situation during childhood affected educational attainment. This did not, however, decrease the predictive value of the achievement flow motive. Rather, results for achievement values, which have been argued to be related to sociodemographic factors (Inglehart and Baker 2000), were affected by including financial family background. Still, the finding holds that the implicit achievement flow motive predicts educational attainment and that this main effect is not qualified by a significant interaction with achievement values.

be materialistic values, which somewhat lose importance in favor of self-expression and subjective well-being in postindustrial societies such as Germany (Inglehart and Baker 2000).

Moreover, there were pronounced differences in the strength of the achievement flow motive: Cameroonian participants scored lowest, Costa Rican participants highest, and German participants ranked in between the other two. As implicit motivation develops in early childhood (McClelland et al. 1989), childhood contexts are likely to account for these differences. While in Cameroon socialization generally stresses obedience and discipline from early childhood on (Nsamenang and Lamb 1995), leaving children only little opportunity to unrestrainedly perform activities they themselves choose, in Germany socialization patterns foster the development of an independent self-concept and thus maybe leave children too free to choose behavior, so they run the risk of engaging in activities that do not feature a balanced ratio of task difficulty and skills, which would facilitate flow (Csikszentmihalyi et al. 1993). On the other hand, Costa Rican children might benefit from both the opportunity to rather unrestrainedly act and a more guiding parental behavior (cf. Hofer et al. 2008), which might result in more immediate feedback and helpful structuring of the child's activity, thus facilitating flow (Csikszentmihalyi et al. 2005).

Admittedly, this explanation is speculative. However, it would be a fruitful avenue for future research to test the idea that, although in general flow seems to be a universal quality (Moneta 2004a), the propensity to experience flow is related to culturally different modes of self-construal (Moneta 2004b) and can be derived from culture-specific socialization practices.

The influence of the achievement flow motive on educational attainment

In line with motivation theory and previous research, achievement values and the implicit achievement motive were found to be independent (McClelland et al. 1989). Moreover, across the cultural groups achievement values and achievement flow motive predict educational attainment independently of each other. The state of flow has previously been shown to predict performance (for an overview, see Nakamura and Csikszentmihalyi 2005; also Vollmeyer and Rheinberg 2006). This association could be explained by flow being such a pleasant emotional experience that people enjoy the task at hand, invest more time in it, and consequently increase their skill level. Interestingly, Engeser and Rheinberg (2008) found the state of flow to be more closely related to performance in a long-term than in a short-term task context. That is, the impact that flow can have on performance seems to increase with time: Individuals will show more persistence in and willingness to engage in a certain task situation when they are likely to experience flow in these situations. As trait flow, as represented by the achievement flow motive (Baumann and Scheffer 2010), denotes how readily individuals actually experience flow (Moneta 2004b), it is likely that trait flow can also exert its full influence in long-term achievement contexts as a school career rather than a specific achievement task.

This finding of two main effects for the implicit achievement flow motive and achievement values indicates that there are two influential factors on educational attainment. On the one hand, explicit achievement motivation plays an important role as individuals who highly esteem achievement and performance are likely to show corresponding behavior (Anderman and Wolters 2006). On the other hand, the propensity to experience flow is relevant for educational achievement, too: Being able to fully commit oneself to tasks and tackle them in a rather playful manner facilitates learning by providing positive emotions along the way to goal attainment particularly when the individual aims at an abstract goal, which requires sustained motivation and persistence. Thus, like developing one's talents (Csikszentmihalyi et al. 1993), furthering one's educational attainment may benefit from the tendency to enter situations which allow optimal experience.

Limitations and outlook

The present study has several limitations that should be addressed. For instance, the picture set used for measuring implicit achievement motivation could certainly be optimized. As the OMT has not yet been regularly applied in cross-cultural research, thoroughly testing pictures on their cross-cultural applicability, as was done here, might result in stimuli that more specifically address the achievement motive and maybe even more specifically only its intrinsic component of flow propensity. In addition, our definition of the implicit achievement flow motive does not cover all areas of daily activities that flow can be experienced in. For example, Graham (2008) has investigated flow in the context of shared activities with one's romantic partner. In this context, one would rather assume the implicit affiliation-intimacy motive (defined as the desire for interpersonal contact in a warm and friendly atmosphere; McClelland et al. 1989) to be involved than the achievement motive. Thus, future research might want to examine the role of other implicit motives than achievement in the autotelic personality.

Moreover, it should be noted that predictor variables were assessed after an educational degree was acquired. This of course leaves open whether individuals' motivational structure was the same at the time when the educational process was not yet completed (see footnote 1). However, motivation is argued to be a relatively stable trait, particularly implicit motivation as this is represented on a subconscious level of personality (McClelland 1980; McClelland et al. 1989; see Baumann and Scheffer 2010, for stability of the achievement flow motive).

Finally, the operationalization of educational attainment employed here is rather vague. However, it nevertheless is a marker of long-term educational success (e.g., being placed into a high educational track depends at least to some extent on previous school achievement; see Trautwein et al. (2006). Of course, to stay in school long enough to attain high levels of education depends on various factors that are outside the individual's control (Flouri 2006; Lloyd and Blanc 1996; the abundance of external factors might explain why effects identified here are rather small), but it also requires motivation.

Moreover, our measure represents a way to assess long-term educational success. While it would be possible to construct a culture-fair test of specific scholastic abilities, which could then be administered after implicit achievement motivation has been assessed, this would only represent educational success at one given point of time. Prospective studies would be intricate due to the time-span needed to be covered. These difficulties given, the educational degree obtained seems to be a valid measure of educational attainment.

Then, what are the implications of the independent effects of the achievement flow motive and achievement values on educational attainment? So far, in research on educational performance, implicit aspects of achievement motivation have largely been neglected in favor of more cognitive aspects of achievement motivation such as achievement goals and values. However, when examining the autotelic personality or propensity of experiencing flow, it is not sufficient to solely rely on self-report data on motivation. In sum, there is a clear need for more studies on what constitutes an autotelic personality and to what extent unconscious dispositions such as implicit motives play a role in it. Following Engeser and Rheinberg (2008) and particularly Baumann and Scheffer (2010), the present study provides a valuable step in this direction.

For educational practice, the present results corroborate findings, which suggest that it would be beneficial if pupils are able to learn in settings which allow them to experience flow. Although this certainly sets high demands for teaching staff (cf. Brophy, 1999), it seems possible to do so. If learning settings are designed in a way that demands to the learner are neither too high nor too low, that a meaningful structure emerges from previously unconnected elements, and that the task is presented in a positive way (see Rheinberg et al. 2000), flow can

be experienced even when the task is initially perceived as unattractive, thus helping "to integrate new abilities into our repertory of skills" (Csikszentmihalyi et al. 1993, p. 15).

To summarize, the present study has demonstrated that, besides conscious achievement values, the achievement flow motive as an element of the autotelic personality contributes to predicting educational attainment across cultural groups as diverse as Germany, Cameroon, and Costa Rica and thus, above all, makes it clear that research on educational outcomes needs to take into account the implicit system of human motivation, particularly achievement flow motivation or propensity to experience flow. Such research will enhance our understanding of how people can combine effective learning and enjoyment of their learning task.

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