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► **To cite this version:**

Marion Inigo, Éric Raufaste. Academics' motivations explain time-allocation and well-being at work. *European Review of Applied Psychology / Revue Européenne de Psychologie Appliquée*, 2019, 69 (1), pp.19-30. 10.1016/j.erap.2018.11.002 . hal-01954556

HAL Id: hal-01954556

<https://hal.science/hal-01954556>

Submitted on 21 Oct 2021

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Les motivations des universitaires expliquent
l'implication temporelle et le bien-être au travail

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Abstract

Introduction. Little is known about the determinants of Faculty members' well-being and the temporal distribution of academics activities (research, teaching, and collective tasks). We linked well-being in the sense of PERMA (Seligman, 2011) to an inventory of academics' motives and to measures of relative involvement in work activities.

Aim. Testing the hypothesis that an inventory of academics' motives could explain inter-individual variations in well-being and in time distribution of work activities.

Method. 222 senior lecturers from French universities filled in a questionnaire of professional motives, a collection of well-being scales implementing PERMA. They also provided a measure of their relative time-distribution by means of a tool designed for this purpose.

Results. A seven-motive structure was extracted and confirmed by CFA. It explained 81.7% of the variance of the 21 final items: (1) *Contribution to Progress by Research*; (2) *Teamwork in Teaching*; (3) *Self-esteem through Teaching*; (4) *Autonomy in Research Activities*; (5) *Positive Relationships with Students*; (6) *Autonomy in Teaching*; and (7) *Collaboration*. The motives explained membership to six Relative 'Temporal Allocation Profiles' extracted by k-means (Cox and Snell pseudo- $R^2=.332$). In path analyses, the motives explained from 40 to 52% of the variance of the five PERMA elements.

Conclusion. The study provides three contributions: an original inventory of the structure of academics' motives; a first use of the PERMA model for measuring academics' well-being; and a new tool for measuring differential involvement in academic activities.

Keywords: well-being; well-being at work; PERMA; higher education; motivation;

Résumé

Introduction. Il existe peu de littérature sur les déterminants du bien-être des universitaires, et de la distribution temporelle de leurs activités (recherche, enseignement ou activités collectives). Nous avons mis en relation le bien-être au sens de PERMA (Seligman, 2011) avec un inventaire de motivations académiques et avec des mesures d'implication relative dans les activités de travail.

Objectif. Tester l'hypothèse qu'un inventaire de motivations académiques pourrait expliquer des variations interindividuelles du bien-être et de la distribution temporelle des activités.

Méthode. 222 maîtres de conférences d'universités françaises ont rempli un questionnaire de motivations professionnelles et une batterie d'échelles de bien-être opérationnalisant le modèle PERMA. Nous avons aussi mesuré la répartition temporelle relative entre activités grâce à un outil conçu à cet effet.

Résultats. Une structure à sept motivations expliquant 81,7% de la variance des 21 items finaux a été extraite puis confirmée par AFC : (1) Contribution au Progrès par la Recherche ; (2) Travail d'équipe dans l'Enseignement ; (3) Respect de soi dans l'Enseignement ; (4) Autonomie dans les Activités de Recherche ; (5) Relations Positives avec les Étudiants ; (6) Autonomie dans l'Enseignement ; et (7) Collaboration. Les motivations ont expliqué l'appartenance (Cox and Snell pseudo- $R^2=.332$) à six Profils d'Allocation temporelle relative extraits par classification k-moyennes. Dans des pistes causales, les motifs expliquaient de 40 à 52% de la variance des 5 éléments de PERMA.

Conclusion. L'étude apporte trois contributions : un inventaire original

de la structure des motivations des enseignants-chercheurs ; une première utilisation du modèle PERMA pour la mesure du bien-être des universitaires, et un nouvel outil de mesure de l'implication différentielle dans les activités académiques.

Mots clés : bien-être ; bien-être au travail ; PERMA ; Enseignement supérieur ; motivation ;

Academics' motivations explain

time-allocation and well-being at work

Well-being at work is a major issue (Clot, 2008) in education (Laugaa, Rascle, & Bruchon-Schweitzer, 2008) and health care (Gilibert & Daloz, 2008; Roland-Lévy, Lemoine, & Jeoffrion, 2014). In Academia, well-being at work also tends to become a problem due to organizational changes. The structure of research funding has also been changing rapidly in Europe. Such organizational and legal changes can redefine academics' work (Annoot, 2011) and affect satisfaction at work. More generally, academics may feel difficulties at work. Just like anybody, academics can be frustrated and express feelings of envy, jealousy and seeking of recognition (Viry, 2015). In specialised newspapers, survey after survey, French academics express feelings of discomfort, not to say anxiety (e.g., Blitman et al., 2014; Lecherbonnier, 2016; Stromboni, 2015). Such discomfort also exists outside Europe (e.g. Bexley et al., 2013, Blackmore & Blackwell, 2006) and deserves psychological investigation.

In this paper, motivational determinants of academics' well-being at work were investigated. We start by studying the structure of academics' motivations (i.e., for research and teaching) and their relationships to well-being at work.

Motivation can also affect time-allocation. All around the world, academics accomplish research, teaching, and collective tasks. Presumably, spending more time in an activity than in another depends on motivation. Most studies focussed on teaching (Visser-Wijnveen et al., 2012) or educational development (Blackmore & Blackwell, 2006), but few studies investigated motives that are specific to higher education professionals. What about research and collective tasks? Over the last forty years, the plurality of administrative tasks has

increased (Annoot, 2011). It may cause frustration, particularly in those who feel they carry an unjust load of collective tasks (Misra et al., 2011). A perceived lack of recognition and rewards might also promote demotivation in academics (Winter & Sarros, 2002).

In this study, various motives of academics were identified. The capacity of these motives to explain profiles of time-allocation, well-being, and the links between profiles and well-being were investigated.

Motivations in the academic workplace

Intrinsic vs. extrinsic motives. Our first objective is to understand well-being at academics' work. Because intrinsic motivation goes along with enjoyment and satisfaction (Vallerand et al., 2012), we first examine whether specific activities are associated with intrinsic motivations in academics. Visser-Wijnveen, Stes and Van Petegem (2012) studied motivation in higher education teachers, but only the motivation to teach, not the motivation for research activities or for collective tasks.

Teaching and research activities motivate academics more than collective tasks, with variations depending on specialty or status (see Musselin & Becquet, 2008). In an Australian study (Bexley et al., 2013), 5479 academics indicated which aspect of work drew them to the profession. Intrinsic intellectual motives had attracted most people: *opportunities for intellectually stimulating work* (95.9% of respondents); *Genuine passion for a field study* (93.8%) and *Opportunity to contribute to new knowledge* (91.1%). On the contrary, extrinsic motivation items received far less agreement: From 57.5% agreement given to *Good or satisfactory income* or 57.2% to *Job security*, down to

33.7% given to *Status of the profession in the public eye*. In Romania a study of 102 teachers from a state university (Cucu-Ciuhan & Guită-Alexandru, 2014) suggested that self-fulfilment motivation was the main source of interest, higher than economic or social motivation.

Goal conflicts. Although academics enjoy some degree of latitude in time-allocation between job activities, time remains a limited resource. Academics can succeed with regard to research or teaching, but more rarely in both domains (Bucheit et al., 2001; Chow & Harrison, 1998). The amount of time devoted to research and teaching constrains the time left for collective tasks (Lawrence, Ott & Bell, 2012). Research and teaching motives may also conflict because research productivity benefits from research efforts but is hindered by the teaching load (Hardré et al., 2011). Such conflict would generate, according to Esdar et al. (2015), psychological strain in 62% of German junior academics. Hellemans and Van de Leemput (2014) reported a study of work motivations and psychosocial risk in 185 tenured teachers from a University in Brussels, Belgium. The two most cited factors were *difficulty to find enough time for research* (88.6%) and *workload associated with service (collective tasks)* (83.8%). Thus, optimising the working-time trade-off between research, teaching and collective activities seems inevitable (Clark, 1987). In Becquet and Musselin (2004), French tenured academics exhibited strong individual differences in the management of these activities, depending on practice areas. Academics in Sciences seemed to be more engaged in research activity than academics in the field of Arts and Literature, who in turn were more engaged in teaching. Academics can develop various time-management strategies. They can limit the weight of teaching or administration, partly delegate or even abandon some activities (Becquet & Musselin, 2004). A reasonable assumption is that motivational factors

govern time allocation strategies.

Let us turn to the question of what is understood by 'well-being' and how to measure it.

Choosing a well-being framework

Well-being at work is multidimensional (Fisher, 2010) and in the perspective of eventually applying diagnostic investigations to real work situations, a multidimensional approach can be preferred. Yet several multidimensional frameworks exist.

According to PERMA (Seligman, 2011), five elements contribute to well-being. (P) *Positive emotions* refers to hedonic well-being, having a pleasant time with such feelings as satisfaction or pleasure. In the context of work, this element relates to 'job satisfaction' even though job situations may trigger both negative and positive affects (Payne & Cooper 2001)—a feature also promoted by Kern et al. (2014). (E) *Engagement* corresponds to the involvement in an activity or a project and refers to the concept of 'Flow' (Csikszentmihalyi, 1990). (R) [*Positive*] *Relationship* regards experiencing positive, warm and trusting interpersonal relationships. A potentially crucial feature in many work domains (e.g., Coissard, Ndao, Gilibert, & Banovic, 2017), R is also relevant to the University context, with teaching and research colleagues, and with students. (M) *Meaning* corresponds to how people relate themselves to something higher than the self (Seligman, 2011). In academics, 'something higher than the self' might include various entities, from your local department to Science as a whole.... Finally, (A) *Achievement* is a feeling of self-fulfilment through achieving self-defined objectives.

The *Psychological Well-Being* approach (Ryff, 1989; Ryff & Keyes, 1995) considers six dimensions. 'Positive relations with others' roughly corresponds to R. 'Purpose in life' resembles M (e.g., a low Purpose-in-life scorer 'lacks a sense of meaning in life', as Ryff formulates it, 1989, p. 1072) albeit more remotely because it also emphasizes goals. The other dimensions seem very different, 'Self-acceptance', 'Autonomy', 'Personal growth', and 'environmental mastery'. More recently, Keyes (2002) proposed a mental-Health Continuum that combines the six dimensions of Ryff's *Psychological well-being* to the three dimensions of *subjective well-being* (Positive and negative emotions, and life satisfaction, according to Diener, 1984), and five dimensions of *social well-being*. Despite its 14-dimensions, this model does not embed the E and A elements of PERMA. Yet, the concept of Engagement seems well fitted to work situations that include discovery and invention (Csikszentmihalyi, 1996), two highly valued features for academic carriers. Achievement also sounds particularly relevant to academic carriers.

Hence, PERMA seems to be a promising framework for the study of well-being at work in academics, with the following general hypothesis: What intrinsically motivates academics should explain their well-being at work, as measured by PERMA elements.

Method

Testing strategy

The testing strategy involved three steps. First, a scale of job motives was designed, specifically dedicated to higher education academics and their activities (i.e., research, teaching, collective tasks). Second, from measures of relative time-allocation on research, teaching, and collective tasks, Time-Allocation Profiles were inducted. Because

academics enjoy some freedom in allocating their time to the various job activities, Time-Allocation Profiles should be associated with measurable differences in some of the PERMA elements. Finally, it was tested whether the motives would explain (1) membership to Time-Allocation Profiles, and (2) measures on the PERMA elements of well-being.

Material

Motives questionnaire. An exploratory set of 156 questions was built in a pilot study of French academics' motives (Inigo & Raufaste, 2016). The set was designed to cover the eight metamotivational states of reversal theory (Apter, 1982). Ninety-three academics ranging from post-doc to full professor provided answers. Using PCA runs, we selected the 35-questions subset used in the present study. Items were randomized and introduced by the sentence *In the last four years, I appreciated my teacher-researcher job because...* Responses were provided on a 7-point Likert type scale ranging from *absolutely disagree* to *strongly agree*.

Activity Involvement Measures. Participants rated their subjective involvement: *During the last four years, the part of my time actually spent on this activity was_____*. They responded using a tool consisting of three scales separately displaying relative-time allocation for teaching, research, and collective tasks (Figure 1). Validation required that the three values summed up to 100%.

Well-being questionnaires. The five elements of PERMA were assessed (items in Table 6). The French version of the SPANE scales (Diener et al., 2010) provided *Positive emotions*, but also negative emotions. In PERMA, *Engagement* primarily relates to the concept of Flow (Csikszentmihalyi, 1990). We used the Educational Flow questionnaire (EduFlow, Heutte et al., 2014), with four subscales, cognitive

absorption, time transformation, autotelic experience and loss of self-consciousness. In a professional context, however, the concept of Engagement may also relate to 'job involvement' (Brown, 1996) which "... is thought to depend on both need saliency and the potential of a job to satisfy these needs" (May et al., 2004, p. 12). Hence, participants were asked to answer a series of nine questions selected from the 'Emotional' and 'Physical' subscales of the 'engagement' questionnaire (May et al., 2004, p. 36). *Relationships* were assessed using ten items from the 'Rewarding co-worker relations' dimension in May et al. (2004, p. 37), and eight new items. *Meaning* was assessed using six items from the 'meaningfulness' dimension in May et al. (2004, p. 36). *Achievement* was assessed using three items from the PERMA scale (Positive Psychology Center, 2013), and two adapted from Kern et al. (2014). For all the items of the various parts of the questionnaire, the focus was placed on 'the past four years'. Other items were part of a larger research program and are not presented here.

Population and sampling procedure

The study URL was emailed to 1200 tenured academic members from three French Universities—Toulouse, Poitiers and Montpellier (initial response rate: 36%, $N=431$). We only retained data from participants who fully completed the motives questionnaire ($N=222$). They were aged 27 to 65 ($M_{age}=43.6$), and 58% were women. Most had no habilitation (85%, $N=189$). Most were from the humanities and social sciences (45%, $N=100$; Table 1). Universities from the region of Toulouse represented 66% of all respondents, followed by Poitiers (17%) and Montpellier (15%). These universities were selected for geographical proximity. Respondents could not respond twice.

Procedure

The study was conducted online using Qualtrics® and began by participants' consent and personal data (i.e., sex, age, date of first registration into a doctoral program, date of first recruitment and professional field). The different parts of the questionnaire were randomised. All data were anonymous.

Data analyses

Structure of the motive scale. A series of PCA was conducted with equamax rotation using SPSS®. On each run, only items with the main loading $>.59$ and no cross-loading $>.33$ were kept. On the last run, the cross-loading exclusion criterion was strengthened to $.29$ to keep only three items per subscale. Finally, a CFA using MPLUS® (MLR method) was carried out on the remaining items.

Time allocation. A hierarchical analysis on activity-involvement data (Ward's method, Euclidean distances) suggested six clusters. Then a k-means classification ($k=6$) was used to constitute six Time-Allocation Profiles.

Multinomial logistic regressions were conducted to investigate whether scores on the motive subscales could predict membership to Time-Allocation Profiles. Predictors were scores on the motivation subscales, Age and experience. The reference profile was *Teaching-Research* because these two activities are the baseline of job investment for an academic. The generic name for academics in France is 'Enseignant-Chercheur' ('Teacher-Researcher'). Unsurprisingly, it was the modal category ($N=56$).

Explaining PERMA elements. Analyses were conducted separately on each PERMA element. PCA followed CFA analyses were used to obtain a structural model. Thereafter, path analyses were conducted with aggregated scores on the motivation subscales as predictors and PERMA elements as DV.

Aggregated scores on the PERMA elements were also introduced as dependent variables in a series of five one-way ANOVAs with Time-Allocation Profile as independent variable.

Results

Structure of the motives inventory

The final structure included 21 items (Table 2, Figure 2, and for the French version supplementary content). Sampling adequacy was good ($KMO=.819$). Alphas ranged between .796 and .924 for individual factors, .883 for the entire questionnaire. Seven factors explained 81.7% of the variance: (1) *Contribution to Progress by Research* (ProgresR) groups items presenting the overarching goal of research activity (e.g., 'My research works contribute to the development of knowledge'); (2) *Teamwork in Teaching* (TeamT) refers to team working dedicated to building courses (e.g., 'The educational teams that I lead bring me elements to improve my teaching'); (3) *Self-esteem through Teaching* (SelfsT) refers to the boost to self-esteem provided by team work around teaching (e.g., 'Teaching helps me build my self-confidence'); (4) *Autonomy in Research Activities* (AutoR) represents subjective autonomy and a sense of control in research activities (e.g., 'I feel myself autonomous in driving my researches'); (5) *Positive Relationships with Students* (RelStuds) refers to the pleasure provided by interactions dedicated to helping students (e.g., 'I appreciate interactions with students'); this factor provided the highest ratings ($M=6.13$ on a 7-point scale), leading to a slight loss of discrimination power due to a distribution cut on the right tail. (6) *Autonomy in Teaching* (AutoT) (e.g., 'I am autonomous in my teaching missions'); (7) *Collaboration* (RelPeers) refers to the positive relationships with colleagues (e.g., 'I can work on a collaborative basis with my research colleagues.') Interestingly, this factor combines items

that relate to research and to teaching.

The factorial structure was satisfyingly confirmed: $\chi^2(168)=326.1$, $p<.001$; $AIC=13196.6$; $CFI=.969$; $RMSEA=.043[.029,.055]$; $SRMR=.056$. The seven motivational factors were correlated. Table 4 provides the matrix of correlations between corresponding subscales. A second-order factor was tested, $\chi^2(182)=314.1$, $p<.001$; $AIC=13257.6$; $CFI=.940$; $RMSEA=.057[.046,.068]$; $SRMR=.092$. By adding two correlations -between TeamT and AutoR on one hand, and TeamT and RelPeers on the other hand-the fit could be improved to $\chi^2(180)=280.0$, $p<.001$; $AIC=13224.4$; $CFI=.955$; $RMSEA=.050[.038,.061]$; $SRMR=.079$. But even with these adjustments, the simpler model with just seven correlated factors outperformed the second-order model, so the simpler was kept (Figure 2).

Time-Allocation Profiles

Of the 222 participants who completed the motivation inventory, 215 also provided Activity Involvement measures. Classification analyses provided six profiles (Figure 3) with a straightforward interpretation. The *Teaching-Research Profile* corresponds to participants who declared spending approximately the same time in teaching and research activities, while keeping collective investment at a low level. This profile is modal, as could be expected given that research and teaching are the two main activities in the job: Teaching and research are mandatory. The *Balanced Profile* ($N=39$) gathers academics who weighted the three activities similarly. The *Teaching Profile* ($N=51$), the *Research Profile* ($N=25$), and the *Collective tasks Profile*, ($N=7$) correspond to academics who indicated precedence of one activity over the two others. Participants of the *Teaching-collective Profile* were Faculty members giving little weight to research. We could observe no *Research-Collective profile*.

Up to this point, the motivational scales were established and time-allocation profiles were extracted. Now how the former could be a predictor of the latter will be examined.

Motivational scales predict Time-Allocation Profiles

Multinomial logistic regression confirmed that motivation subscales can partially explain membership to the six clusters. The resulting model had a good fit. Deviance was not significant and the likelihood Ratio test was significant $\chi^2(20)=86.7, p=.000$, Cox and Snell Pseudo- $R^2=.332$.

Neither age, sex, nor experience significantly predicted time-allocation. Belonging to a profile other than the modal *Teaching-Research* Profile was predicted by four motivation subscales (Table 5): The main contributing predictor was *Autonomy in Research Activities* (AutoR), $\chi^2(5)=36.57, p=.000$. It significantly favoured the reference profile over the *Balanced*, *Teaching*, *Collective tasks*, and *Teaching-Collective* profiles. This is to consider in the light of Figure 3, which shows that only participants in the *Research* Profile allocated more relative time to research than participants in the reference profile (i.e., *Teaching-Research*). Unsurprisingly, *Autonomy in Research Activities* was positively linked to the *Research* Profile. Nevertheless, despite its intuitive appeal, the latter contribution was only a trend (two-tailed), which might correspond to a slight lack of statistical power. The second motive that contributed to Time-Allocation Profile membership was *Autonomy in Teaching* (AutoT), $\chi^2(5)=20.71, p=.001$. AutoT significantly drove participants towards the *Teaching* Profile and away from the *Research* Profile. The third most important factor was *Contribution to Progress by Research* (ProgresR), $\chi^2(5)=18.51, p=.002$, which drove participants towards the *Research*

Profile or, less intuitively, towards the *Balanced Profile*. Fourth and last, *Teamwork in Teaching* (TeamT) significantly contributed to Time-Allocation Profile membership, $\chi^2(5)=11.57$, $p=.041$.

Relationships between Motivations and well-being

Positive emotions. Path analyses were run with motives as predictors. DVs were the SPANE-P for positive emotions and SPANE-N for negative emotions. A three-motive solution (Figure 4) explained 39.6% of the variance in positive affect and 11.4% of the variance in negative affect. The fit was good, $\chi^2(1)=1.10$, $p=.29$, CFI =.999, RMSEA=.022 [.000,.183], SRMR=.013, although the upper value of the RMSEA CI was high. *Autonomy in Research Activities and Collaboration* positively predicted positive emotions and negatively negative emotions. *Relations with students* only predicted positive affect.

Engagement. The structure of Engagement combined six items for flow—corresponding to the absorption and autotelic subscales—and three items for the dimension of Job Involvement (*I really put my heart into my job; I exert a lot of energy performing my job; I stay until the job is done*). Five motivational factors explained 48.8% of the variance in the Autotelic experience factor, 38.5% in the Cognitive Absorption factor, and 35.1% of Job Involvement. The fit was good, $\chi^2(62)=85.29$, $p=.026$, CFI =.965, RMSEA=.042 [.015,.062], SRMR=.055 (Figure 5).

Relationships. After reversal, three items relating to a lack of connection with other people in the workplace constituted a dimension called *linking*. A *Positive relationships* dimension combined four other items. Three motives could explain 45.7% of the variance in the *Linking* factor, 38.5% in the *Positive relationships* factor. The fit was good, $\chi^2(30)=36.47$, $p=.19$, CFI=.990, RMSEA=.031 [.000,.063], SRMR=.042

(Figure 6).

Meaning. Four motives explained 49.3% of the variance in Meaning, $\chi^2(29)=40.30$, $p=.01$; $CFI = .970$; $RMSEA=.057$ [.028,.084]; $SRMR=.035$. Correlating residual variances of items *m2* and *m5* improved the fit with 50.5% of explained variance, $\chi^2(28)=36.4$, $p=.133$, $CFI = .987$, $RMSEA=.037$ [.000,.069], $SRMR=.030$ (Figure 7).

Achievement. Three motives explained 52.2% of the variance of the Achievement factor, $\chi^2(11)=23.57$, $p=.015$, $CFI = .965$, $RMSEA=.073$ [.031,.113], $SRMR=.028$ (Figure 8).

Up to this point, results established a link between academic motives and well-being elements. How about TAP and well-being?

Relationships between Time-Allocation Profiles and well-being

To substantiate the link between time-allocation profiles and well-being, 1-way ANOVAs with TAP as predictor and well-beings elements as DV were conducted.

Positive Emotions. The profiles did not significantly differ on positive or negative emotions.

Engagement. Time-Allocation Profiles differed on the cognitive absorption subscale, $F(5,205)=4.96$, $p<.001$, $MSE=1.16$, $\eta^2=.11$. The effect mainly resulted from the *Research Profile*, associated with more cognitive absorption ($M=5.31$, $SE=.22$) than any other profile. Bonferroni post-hoc tests showed that differences were significant with *Teaching* ($M=4.33$, $SE=0.15$, $p=.005$), *Collective tasks* ($M=3.67$, $SE=0.41$, $p=.007$), and *Teaching-Collective* ($M=4.36$, $SE=.18$, $p=.014$).

Relationships. Time-Allocation Profiles differed on the Positive relations subscale, $F(5,208)=3.50$, $p=.005$, $MSE=1.47$, $\eta^2=.08$, particularly with a significant difference between the *Teaching* ($M=4.74$, $SE=0.17$) and

Teaching-Research Profiles ($M=5.49$, $SE=0.16$), $p=.024$).

Meaning. Time-Allocation Profiles differed on the *Meaning* subscale, $F(5,213)=3.47$, $p=.005$, $MSE=0.99$, $\eta^2=.08$. This effect must be interpreted cautiously since it might result from a lower level of meaning associated with the *Collective tasks* Profile, with post-hoc differences not holding due to unequal variances.

Achievement. Time-Allocation Profiles differed on the *Achievement* subscale, $F(5,213)=5.27$, $p<.001$, $MSE=0.81$, $\eta^2=.113$. Games-Howell post-hoc tests for unequal variances suggested that the effect was due to the higher value of the *Research* Profile ($M=5.74$, $SE=0.18$) compared to the *Teaching* ($M=5.00$, $SE=0.13$, $p=.008$) and *Teaching-Collective* Profiles ($M=4.90$, $SE=0.15$, $p=.016$).

General discussion

This exploratory study was designed so as to identify specific sources of academic job appreciation and check whether they could explain (1) time-allocation between research, teaching and collective tasks, and (2) professional well-being as measured with the PERMA framework. An Inventory of Academics' Positive Motives (IAPM) was developed and linked to measures of professional well-being based on the PERMA framework. IAPM ratings could explain ratings on the five PERMA elements as well as profiles of time-allocation between teaching, research and collective activities. In addition, participants in the various time-allocation profiles were related to significant differences in terms of the PERMA elements of well-being.

The IAPM could help understanding what positively motivates academics' investment at work in their various activities. Previous works like Visser-Wijnveen et al. (2012) were devoted to the study of motivation in higher education with regard to teaching but not taking research or collective

activities into account.

In this discussion, it is argued that the IAPM really addresses motivations. Then reasons of the links that were observed between motives and well-being elements are discussed and the limits of the study are presented. Finally, some perspectives are sketched.

On the motivational status of IAPM

Linking IAPM to basic psychological needs. The IAPM was developed using reversal theory (Apter, 1982) but basic needs proposed by other theories can also help understanding the explanatory power of IAPM items. Self-determination theory (SDT, Deci & Ryan, 2000) proposed that intrinsically determined behaviours would satisfy three psychological needs: Autonomy, Competence, and Relatedness. Relatedness might underpin *Teamwork in Teaching*, *Collaboration with peers*, and *Positive Relationships with Students*, the most contributory factor to job appreciation. The need for Autonomy could clearly be the basis of *Autonomy in Research Activities* and *Autonomy in Teaching*, both tied in second rank as far as job appreciation is concerned. Besides SDT needs, *Self-esteem through Teaching* might relate to the desire for Self-esteem, a basic need according to Maslow (1943). Finally, *Contribution to Progress by Research* relates straightforwardly to *Meaning*, a basic psychological need for Frankl (1963).

Relative time-allocation.

According to Latham and Pinder, motivation at work initiates work-related behaviour and determines 'its form, direction, intensity and duration' (2005, p. 486). Based on this premise, it was assumed that motivation could predict involvement in academic activities. Our results confirmed that IAPM motives could partially explain belonging to time-allocation profiles. Motives of *Teamwork in Teaching* seemed to drive participants away from the *Teaching*

Profile, which might appear paradoxical. However, *team working hopefully* saves time and enables redirecting efforts towards research or collective tasks.

The two Autonomy-related motives were involved in the explanation of all profiles. Only two other motives contributed to Time-Allocation Profiles. This apparent prominence of autonomy is in agreement with SDT: 'even optimal challenges will not engender intrinsic motivation or flow unless people experience themselves as autonomous in carrying them out' (Deci & Ryan, 2000, p. 261).

Taken together, the link between IAPM motives and well-known psychological needs, and the capacity of ~~these~~ motives to explain relative time-allocation confirm IAPM motivational status. Nevertheless, we acknowledge that one might still question the direction of causality. Our data are only correlational. Motivation was not manipulated. For example, when obliged to spend time doing something unwanted, one could feel frustration but could also discover some unexpected features and become progressively interested in the task. Manipulating intrinsic motives is not an easy task, especially when such motives relate to characteristics developed after years of practice, as it is the case when academics' job motivations is studied.

From motives to well-being

In agreement with our hypothesis, IAPM motives explained 40 to 52% of the variance of the five PERMA elements of well-being. Four motives contributed to both time-allocation membership and well-being elements. All motives positively influenced PERMA elements with two notable exceptions. The items used to measure positive relations loaded two factors, positive relations but also a "linking factor". Surprisingly, *Self-esteem through Teaching* negatively loaded "linking". It seems that the more academics got job

appreciation from the self-esteem provided by teaching, the less they felt positively linked to others. This is a point that deserves further investigation. The other exception is an inhibition of linking: People whose job appreciation stems from their *Contribution to Progress by Research* tended to report less linking to their peers. Remarkably, this motive positively loaded the engagement dimensions of cognitive absorption and job involvement, two subscales that could be associated to a *lesser* degree of relationship with colleagues. Job involvement, for example, directly amounts to the quantity of energy one puts in tasks (see items in Table 6). Academics are often alone to process research subtasks such as reading, writing, or thinking. They might also have dispositions towards isolation (see Baron-Cohen et al., 2001, for results suggesting increased autism trends in scientists).

The previous empirical tests of the PERMA framework in the context of positive education by Kern et al. (2014) and Coffey et al. (2016, Study 1) did not retain meaning as a final component of well-being. Possibly, their participants were too young. The 'meaning' component could be found in adult participants (Coffey et al., 2016, Study 2). The present study nevertheless offers a new contribution to the study of work activities related to meaning. The theoretical link from job meaning to well-being is not straightforward, though. Those who attach high meaning to their work can experience opposite effects depending on whether they are happy at work or not (Bassi et al., 2013). If meaning depends on connecting to something 'bigger than the self' (e.g., Seligman, 2011), *Contribution to Progress by Research* provides meaning because the scientific progress is arguably bigger than the Self. Even bigger than any individual's lifetime. Unsurprisingly, *Contribution to Progress by Research* was one of the four predictors of the *Meaning* element of PERMA. *Positive*

Relationships with Students and *Collaboration* also enhanced *Meaning*, probably because relationships and collaboration can provide a feeling of connectedness with something external to the self.

Limitations

Confounding variables. This study focused on psychological determinants but many other variables can modulate well-being and time-allocation and it is difficult to avoid confounding. For example, "organizational characteristic" such as institutional type, resources and unit size could have an impact on the quality of work life (Clot, 2008).

Further studies could take into account the fact that some activities are more stressful than others, which might impact the level of well-being at work (Cerclé, Gadea, Hartmann, & Lourel, 2008), particularly for some patterns of time-allocation.

Extrinsic motivations. Seligman (2011) posited PERMA as a 'theory of uncoerced choice', thereby associating well-being elements to intrinsic motivation. However, motivations may also be shaped by situational interactions, and particularly by constraints on rewards. Arguably, academics may also be extrinsically motivated, even though Lawrence, Ott and Bell (2012) found no significant effect of salary on "organizational commitment" nor on time-allocation between the three types of activities. To investigate this question one might use general scales of motivation at work. Such scales have recently been developed under the SDT framework, and predict well-being or ill-being to some extent (e.g., Gagne et al., 2015; Longo et al., 2016). The Multidimensional Work Motivation Scale focuses on the intrinsic/extrinsic motivation continuum (Gagne et al., 2015). Clearly, a thorough theoretical and empirical examination of the relationships between IAPM and more general motives such as those studied by SDT will be needed.

Causality direction. At a methodological level, all the models presented here were directional, with motivation being the cause and well-being the effect. The fact that autotelic activities foster intrinsic motivation (Csikszentmihalyi & Massimini, 1985) suggests that well-being enters into feedback loops and should be studied accordingly (e.g., Fredrickson & Joiner, 2002). For example in people who invest time into deliberate practice to develop their expertise, total work time may affect resulting performance, which in turn would modulate the constraint/competence ratio. This ratio determines the flow experience (a PERMA element of well-being) which enhances intrinsic motivation... which facilitates deliberate practice.

Absolute vs. relative time-allocation. Lawrence, Ott and Bell reported the absolute times which the average sampled faculties allocated weekly to teaching, research, and "institutional service" (2012, Table 1). In the present study, to avoid potential strategic biases, we chose not to ask academics' absolute work times but only relative times among work activities. The cost is that we ignore the total amount of work time. Note that the relative time-allocation we can compute from Lawrence, Ott and Bell' absolute values (46.3%, 37.9%, and 15.8%) for teaching, research and collective activities are very similar to those of our *Teaching-Research Profile* (44.1%, 40.0%, and 15.9%), the modal one (Figure 3). Deviations from this modal pattern are accounted for by the other profiles, which in turn are explained by our motive inventory, IAPM.

Perspectives

The inventory of motives developed here could be useful to predict which activities academics are likely to engage in but it will require the use of methods that enable to prove causality. Recording absolute times will also be needed because more time spent on an activity can leave room for

more deliberate practice that can improve performance and, subsequently, symbolic rewards from this activity. It may lead to positive feedback loops, with potential productivity gains. Other studies are needed to confirm this assumption. With regard to time-allocation, we also started another study in order to understand the relationship between "absolute time allocation" (i.e., the number of hours allocated during a standard week to research, teaching and collective tasks) and work-life balance. Because nonprofessional life may compete with professional activities, this approach might help us to understand academics' career evolution (Campbell & O'Meara, 2014).

Another potential line of research relates to the initial process by which students become Faculty members. A preliminary study suggested several differences in the levels of motivation and well-being between tenured vs. non-tenured French academics (Inigo & Raufaste, 2016). Recent researches determined that temporary contracts negatively influence Faculty staff enjoyment (Waaiker et al., 2016). Thus, the co-development of professional motivations and time-allocation to specific subtasks during career trajectories is an important topic that probably deserves more attention.

Conclusion

In this article, the IAPM, an inventory of motives specific to Faculty members was designed. At an applied level, the IAPM provides a new tool to evaluate academic staff' motivation at work. The present study also provides support for the use of PERMA elements of well-being with adults in a professional context. We also proposed an original tool for time-allocation measurement. The results provided here suggest that IAPM might be useful to predict relative time-allocation and well-being. Elucidating the diversity of time allocation profiles is also relevant to account

for how a wide range of academics can find well-being and motivation in their profession. The study provides three contributions: an original inventory of the structure of Faculty members' motives; a first use of the PERMA model for the measurement of academics well-being; and a new tool for measuring differential involvement in academic activities.

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References to figures

Figure 1.

ENGLISH: A screenshot of the Activity-Involvement Measurement tool.

All cursors were initially set to 0%, validation required that the three cursors summed up to 100%.

Figure 2.

Structure of the motivation inventory (Standardized Loadings) Only significant relationships are represented. ProgresR: *Contribution to Progress by Research*. TeamT: *Teamwork in Teaching*. SelfsT: *Self-esteem through Teaching*. AutoR: *Autonomy in Research Activities*. RelStuds: *Positive Relationships with Students*. AutoT: *Autonomy in Teaching*. RelPeers: *Collaboration*.

Figure 3.

Time-Allocation Profiles in a sample of French lecturers.

Profiles inducted by k-means analysis ($k=6$) on the relative allocation time data.

Figure 4.

POSITIVE EMOTIONS (P in PERMA) explained by 3 IAPM motives.

Positive Relationships with Students (RelStuds), *Autonomy in Research Activities* (AutoR), and *Collaboration* (RelPeers, $N=216$). SPANEp: positive emotions, SPANEn: negative emotions.

* $p < .05$. For all other relationships, $p < .01$.

Loadings and errors are standardized.

Figure 5

ENGAGEMENT (E in PERMA) by 5 IAPM motives.

Autonomy in Research Activities (AutoR), Collaboration (RelPeers), Contribution to Progress by Research (ProgrsR), Teamwork in Teaching (TeamT), and Positive Relationships with Students (RelStuds, N=214).

Absorp: Cognitive absorption (Flow, Heutte et al., 2014). Autotel:

Autotelic experience (Flow, Heutte et al., 2014). Involv: Involvement (May et al., 2004).

Loadings and errors are standardized. Only significant relationships are represented ($ps < .05$)

Figure 6

RELATIONSHIPS (R in PERMA) explained by 3 IAPM motives.

Collaboration (RelPeers), Self-esteem through Teaching (SelfsT), and Contribution to Progress by Research (ProgrsR, N=220).

PosRel: Positive professional relationships. Linking corresponds to 'not feeling alone' items.

Loadings and errors are standardized. Only significant relationships are represented (all $ps < .01$).

Figure 7.

MEANING (M in PERMA) explained by 4 IAPM motives.

Contribution to Progress by Research (ProgrsR), Autonomy in Research Activities (AutoR), Positive Relationships with Students (RelStuds), and Collaboration (RelPeers, N=210).

* $p < .05$, ** $p < .01$. All loadings and errors are standardized.

Figure 8.

ACHIEVEMENT (A in PERMA) explained by 3 IAPM motives.

Contribution to Progress by Research (ProgrsR), *Autonomy in Research Activities* (AutoR), and *Collaboration* (RelPeers, $N = 216$).

All $ps < .01$. All loadings and errors are standardized.

Correlations between predictors are not represented.

Tables

Table 1

Descriptive statistics of respondents

	Total (%)
Literature	41 (18%)
Political Studies	
Economics	32 (14%)
Humanities	100 (45%)
Social sciences	
Sciences	45 (20%)
Medicines	
Biology	
Females	128 (58%)
Males	94 (42%)
With HDR	33 (15%)
Without HDR	189 (85%)
Total	222 (100%)

Table 2
Motivational factors (PCA with equamax rotation, N=222)

Item	F1 ^a	F2 ^b	F3 ^c	F4 ^d	F5 ^e	F6 ^f	F7 ^g
	ProgresR	TeamT	SelfsT	AutoR	RelStuds	AutoT	RelPeer
y1	.866	.090	.033	.244	.113	.075	.142
y2	.881	.022	.008	.174	.077	.124	.183
y5	.824	.076	.028	.194	.075	.139	.145
y6	.127	.882	.079	-.012	.151	.032	.114
y8	.053	.881	.054	-.105	.044	.000	.238
y10	-.007	.904	.124	-.039	.013	.038	.141
y11	-.036	.122	.895	.047	.151	.133	-.019
y12	-.002	.123	.929	.066	.117	.067	.019
y13	.098	.014	.878	.050	.137	.132	.063
y16	.192	-.084	.110	.883	-.044	.171	.061
y17	.210	-.031	.090	.874	.021	.217	.088
y34	.244	-.066	-.033	.699	.247	.184	.200
y20	.094	.068	.146	-.028	.833	.208	.096
y21	.094	.066	.127	.051	.885	.162	.047
y24	.062	.081	.152	.137	.860	.073	.142
y27	.057	-.023	.142	.254	.128	.845	.105
y28	.109	.161	.066	.115	.174	.810	.147
y29	.177	-.067	.156	.194	.157	.819	.103
y30	.048	.187	.087	-.084	.141	.219	.733
y31	.163	.228	-.026	.161	.095	.009	.842
y32	.272	.092	-.004	.279	.035	.123	.780
M	5.19	3.76	4.72	5.48	6.13	5.65	4.99
(SD)	(1.13)	(1.46)	(1.33)	(1.26)	(0.94)	(1.10)	(1.30)
Eigenvalue	2.62	3.05	6.20	1.44	1.72	1.11	1.02
Variance (%)	12.45	14.54	29.54	6.85	8.19	5.26	4.83

^aF1: *Contribution to Progress by Research* (ProgresR); ^bF2: *Teamwork in Teaching* (TeamT); ^cF3: *Self-esteem through Teaching* (SelfsT); ^dF4: *Autonomy in Research Activities* (AutoR); ^eF5: *Positive Relationships with Students* (RelStuds); ^fF6: *Autonomy in Teaching* (AutoT); ^gF7: *Collaboration* (RelPeers);

Table

3

Items of the positive scale of Academics' motives

Factor	Text	Item
F1	I can participate in the advancement of knowledge thanks	y1
	My research works contribute to the development of	y2
	I can build knowledge to serve the community	y5
F2	The educational teams that I lead bring me elements to	y6
	I lead an educational team that helps me developing my	y8
	The educational teams that I lead bring me elements to improve my courses	y10
F3	Teaching allows me to assert myself	y11
	Teaching helps me build my self-confidence	y12
	In teaching, to lead a group of students provides me with good self-esteem	y13
F4	I feel myself autonomous in driving my researches	y16
	I decide which path to take in my researches	y17
	I have the control over my research work	y34
F5	Providing my help to students motivates me	y20
	I appreciate interactions with students	y21
	Interactions with students are sources of satisfaction	y24
F6	I am autonomous in my teaching missions	y27
	I can decide teaching contents to favor students'	y28
	I control the way I run my courses	y29
F7	I appreciate relationships with my teacher colleagues	y30
	I can work on a collaborative basis with my research	y31
	Research allows me to create collaborative relationships with my peers	y32

^aF1 : *Contribution to Progress by Research* (ProgresR); ^bF2 : *Teamwork in Teaching* (TeamT); ^cF3 : *Self-esteem through Teaching* (SelfsT); ^dF4 : *Autonomy in Research Activities* (AutoR); ^eF5 : *Positive Relationships with Students* (RelStuds); ^fF6 : *Autonomy in Teaching* (AutoT); ^gF7 : *Collaboration* (RelPeers);

Table 4
Correlations between motivation subscales (N=222)

Factors	TeamT	SelfsT	AutoR	RelStuds	AutoT	RelPeers
ProgresR	.155*	.096	.492**	.242**	.324**	.415**
TeamT		.198**	-.061	.190**	.098	.380**
SelfsT			.154*	.326**	.291**	.105
AutoR				.213**	.459**	.327**
RelStuds					.377**	.273**
AutoT						.334**

* $p < .05$; ** $p < .01$

Table 5

Time-Allocation Profiles regressed on motivational scales

Profile	Motivation	B	(SE)	P	Exp(B)
Balanced	AutoR	-.536	(.26)	.043	.585
	ProgresR	.417	(.25)	.099	1.518
Teaching	AutoR	-.956	(.25)	.000	.384
	AutoT	.496	(.25)	.045	1.642
	TeamT	-.324	(.15)	.029	.723
Collective tasks	AutoR	-1.551	(.43)	.000	.212
Research	AutoR	.583	(.35)	.094	1.791
	ProgresR	.732	(.32)	.023	2.08
	AutoT	-.816	(.29)	.005	.442
Teaching- Collective	AutoR	-.652	(.26)	.013	.521

Only predictors with $p < .10$ (two-tailed) are reported. Reference profile: *Teaching-Research* Profile

Table

6

Items to measure PERMA elements

CONSTRUCT	ITEM	LABEL
POSITIVE EMOTIONS	see the SPANE Scales ^a	
ENGAGEMENT		
Cognitive absorption ^b	I feel I am able to meet the high demands of the situation	f11
	I feel that what I do is under my control	f15
	I know what I have to do at every step of the task	f19
Autotelic experience ^b	I have the feeling of living a moment of excitement	f14
	This activity makes me happy	f18
	When I talk about these activities, I feel a strong emotion and I want to share it	f112
Involvement ^c	I really put my heart into my job	w1
	I exert a lot of energy performing my job	w5
	I stay until the job is done	w6
RELATIONSHIPS		
Positive relationships	I have good relationship with my colleagues ^f	r2
	My colleagues stand by me ^f	r6
	I believe that my co-workers appreciate who I am ^d	r13
	My co-workers and I have mutual respect for one another ^d	r15
Linking ^f	I often feel alone because I have few professional relations to share my interests and my concerns with	r1
	It seems to me that most of my colleagues have more friends than me	r5
	At work I didn't live a lot of warm and confident relationships with others	r7
MEANING ^c		
	The work I do on this job is very important to me	m1
	My job activities are personally meaningful to me	m2
	My job activities are significant to me	m3
	The work I do on this job is worthwhile	m4
	The work I do on this job is meaningful to me	m5
	I feel that the work I do on my job is valuable	m6
ACHIEVEMENT		
	How much of the time do you feel you are making progress towards accomplishing your professional goals? ^d	a1
	How often do you achieve the important professional goals you have set for yourself? ^d	a2
	How often do you feel a sense of accomplishment from what you do professionally ^e	a4
	How often have you been pleased about completing something that was hard to do professionally ^e	a5

Origin of the items: ^aDiener et al. (2010); ^bEduFlow (Heutte et al., 2014), Item f112, "this activity" replaced by "these activities"; ^cMay et al. (2004). ^dAdapted from the PERMA scale (Positive Psychology Center, 2013); ^eAdapted from Kern et al (2014). ^fItems specifically designed for the study;

Table 7
Psychometric properties of motivational and well-being scales

Construct	Scale	Items	n	M	SE	α	Min	Max	Skew	Kurtosis
MOTIVATIONS	Contribution to Progress by Research	3	222	5.19	0.08	.90	1.00	7.00	-0.54	0.80
	Teamwork in Teaching	3	222	3.76	0.10	.90	1.00	7.00	-0.16	-0.69
	Self-esteem through Teaching	3	222	4.72	0.09	.92	1.00	7.00	-0.59	0.17
	Autonomy in Research Activities	3	222	5.48	0.08	.86	1.00	7.00	-0.91	0.45
	Positive Relationships with Students	3	222	6.13	0.06	.88	2.33	7.00	-1.34	2.17
	Autonomy in Teaching	3	222	5.65	0.07	.86	2.00	7.00	-0.98	0.94
	Collaboration	3	222	4.99	0.09	.80	1.00	7.00	-0.79	0.66
PERMA										
Positive emotion	SPANE-P	3	216	5.05	0.06	.94	2.00	7.00	-0.98	0.94
	SPANE-N ^a	3	216	3.80	0.08	.87	1.33	7.00	-0.79	0.66
Engagement	Cognitive Absorption	3	214	4.68	0.08	.78	1.33	7.00	-0.24	0.18
	Autotelic experience	3	214	4.68	0.08	.80	1.33	7.00	-0.78	0.68
	Job Involvement	3	214	6.06	0.06	.77	2.00	7.00	-1.37	2.53
Relationships	Positive relationships	4	220	4.91	0.09	.90	1.38	7.00	-0.85	0.03
	Linking	3	220	4.86	0.09	.69	1.00	7.00	-0.37	-0.05
Meaning	Meaningfulness	6	214	5.92	0.07	.92	1.50	7.00	-1.52	2.80
Achievement	Willing	4	216	5.22	0.06	.86	2.00	7.00	-0.74	0.22

Origin and wording of the items: see Table 6.

Conflict of interest: none

Figures

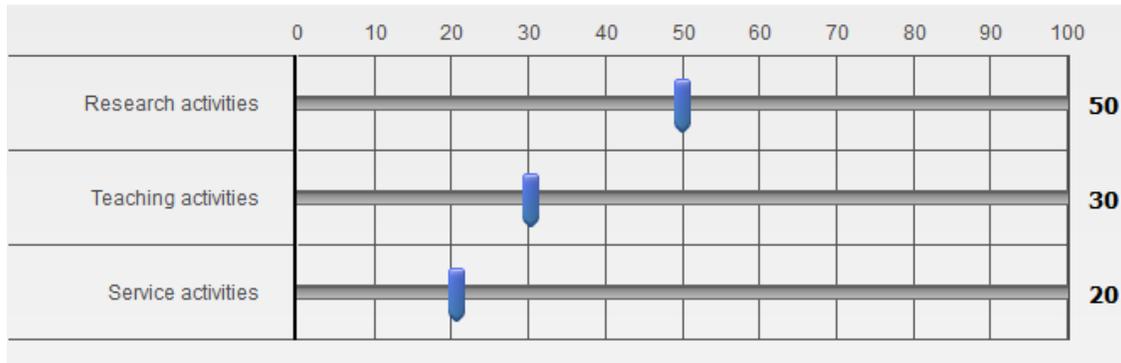


Figure 1. A screenshot of the Activity-Involvement Measurement tool. All cursors were initially set to 0%, validation required that the three cursors summed up to 100%.

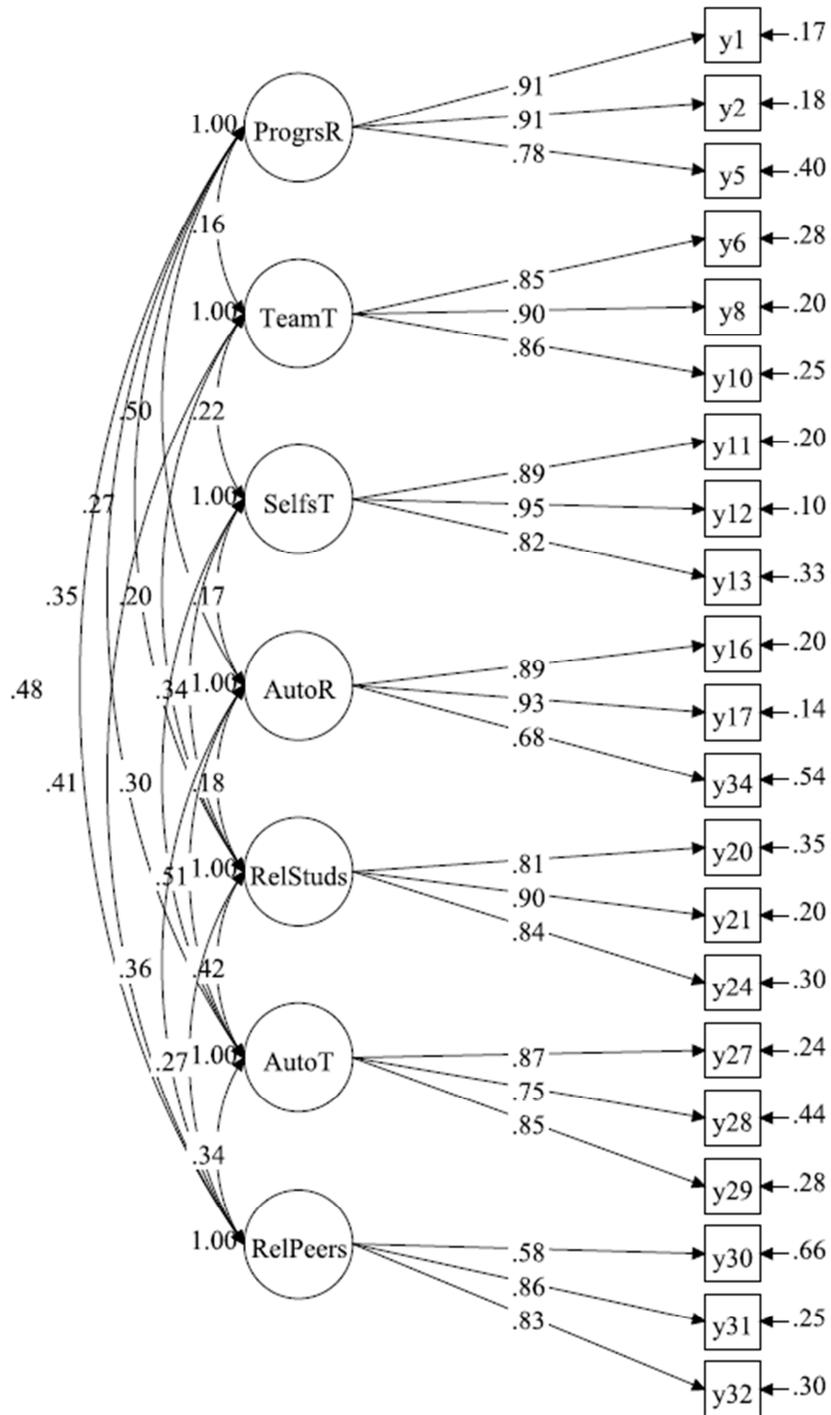


Figure 2. Structure of the motivation inventory (Standardized Loadings)
 Only significant relationships are represented. ProgrsR: Contribution to Progress by Research. TeamT: Teamwork in Teaching. SelfsT: Self-esteem through Teaching. AutoR: Autonomy in Research Activities. RelStuds: Positive Relationships with Students. AutoT: Autonomy in Teaching. RelPeers: Collaboration.

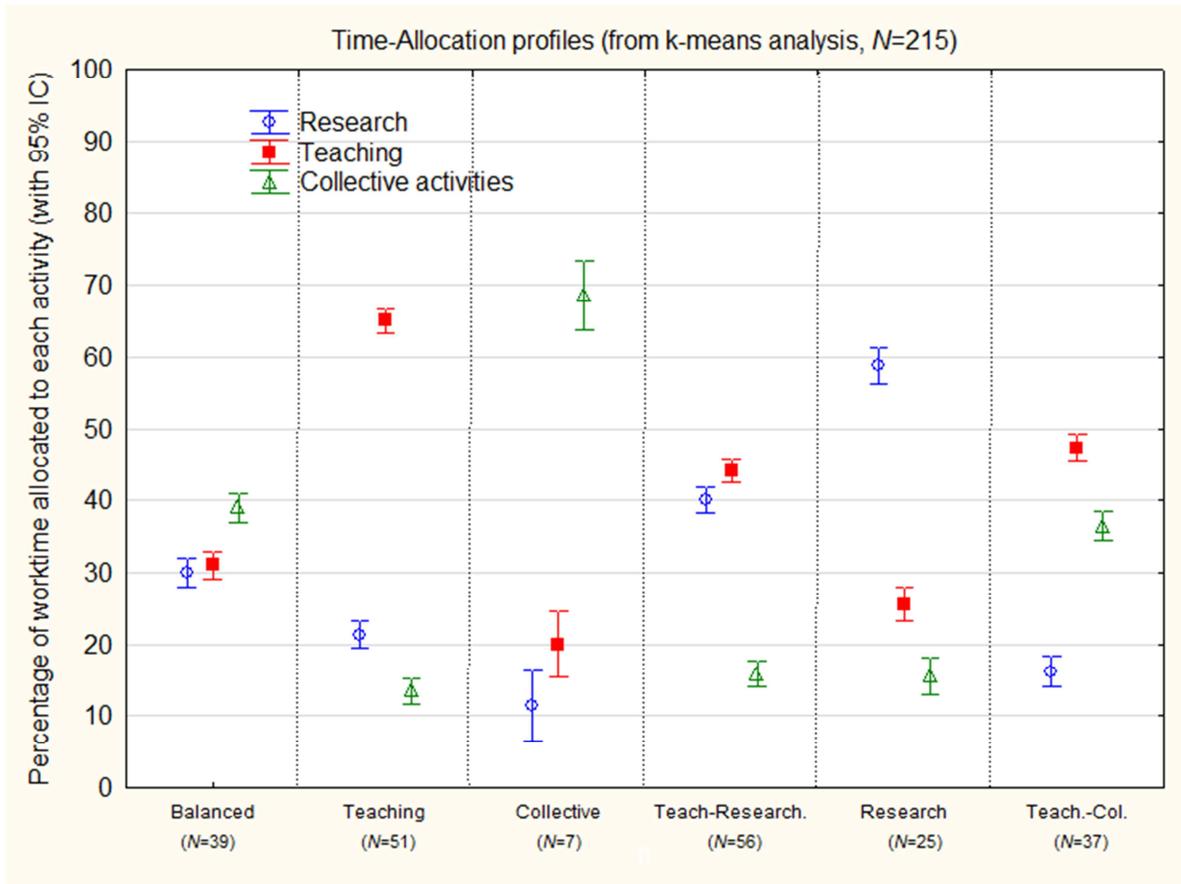


Figure 3. Time-Allocation Profiles in a sample of French lecturers.

Profiles induced by k-means analysis ($k=6$) on the relative allocation time data.

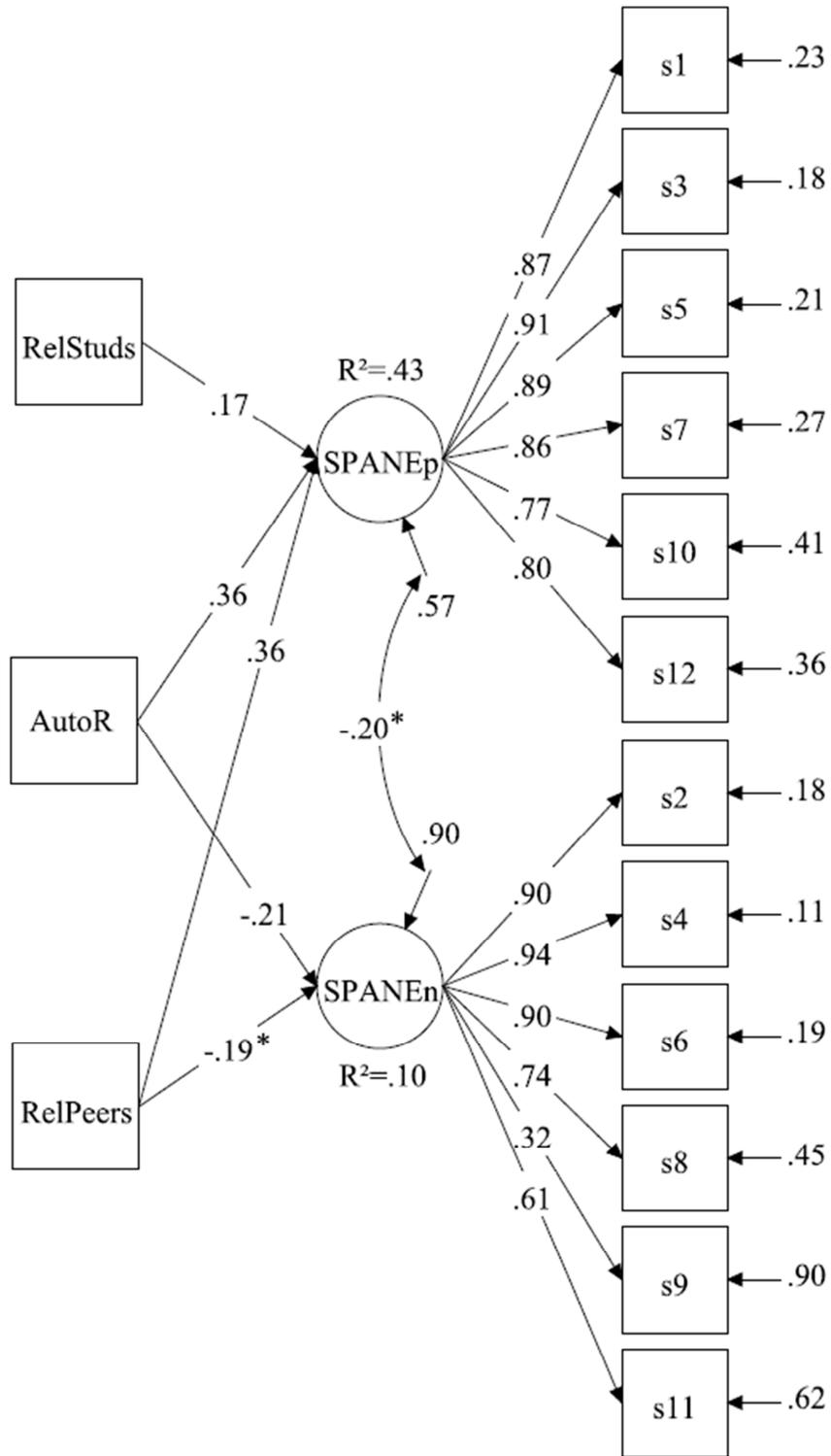


Figure 4. POSITIVE EMOTIONS (P in PERMA) explained by 3 IAPM motives. Positive Relationships with Students (RelStuds), Autonomy in Research Activities (AutoR), and Collaboration (RelPeers, N=216). SPANEp: positive emotions, SPANEn: negative emotions. * $p < .05$. For all other relationships, $p < .01$. Loadings and errors are standardized.

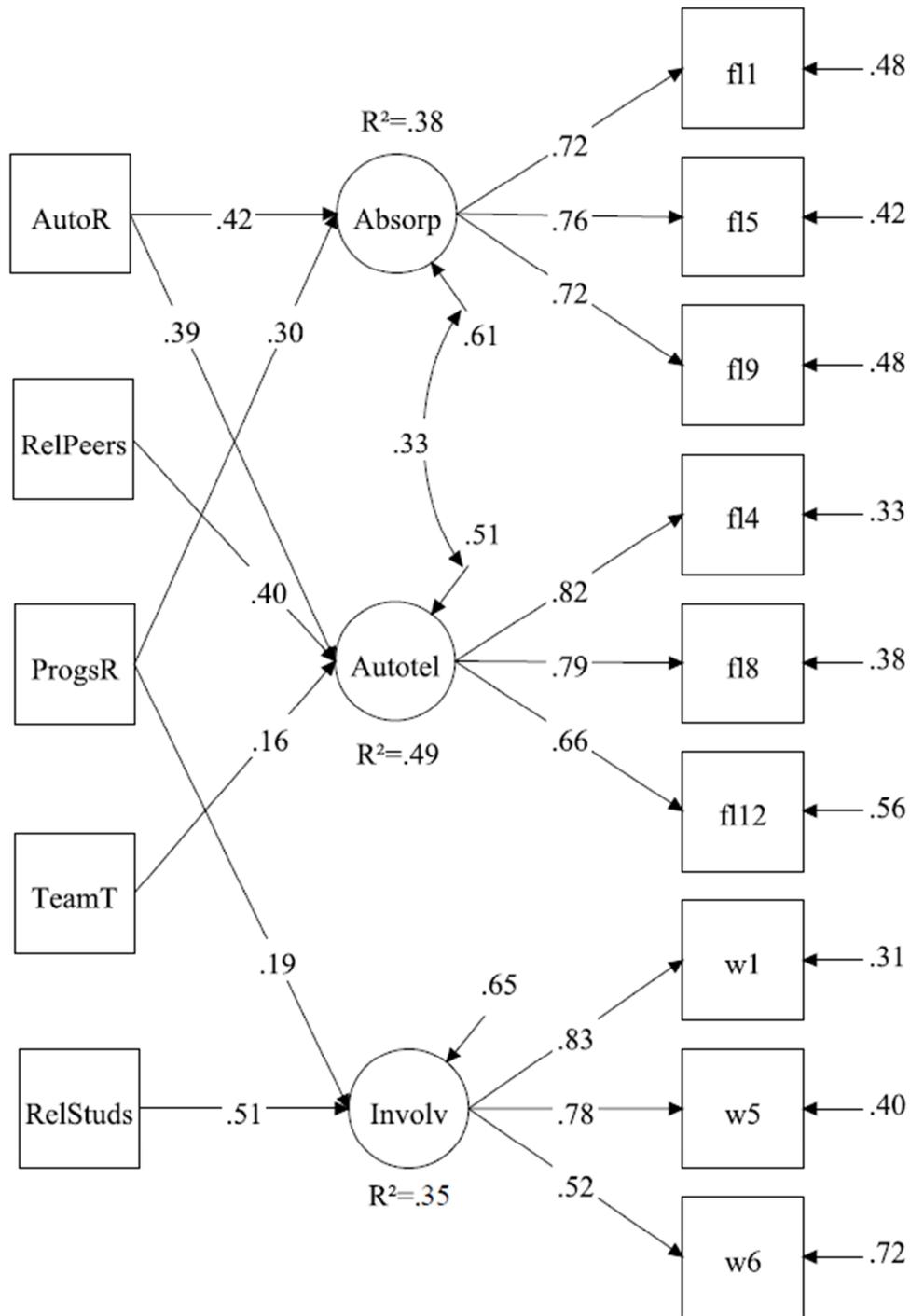


Figure 5. ENGAGEMENT (E in PERMA) by 5 IAPM motives.

Autonomy in Research Activities (AutoR), Collaboration (RelPeers), Contribution to Progress by Research (ProgsR), Teamwork in Teaching (TeamT), and Positive Relationships with Students (RelStuds, N=214). Absorp: Cognitive absorption (Flow, Heutte et al., 2014). Autotel: Autotelic experience (Flow, Heutte et al., 2014). Invol: Involvement (May et al., 2004).

Loadings and errors are standardized. Only significant relationships are represented ($ps < .05$)

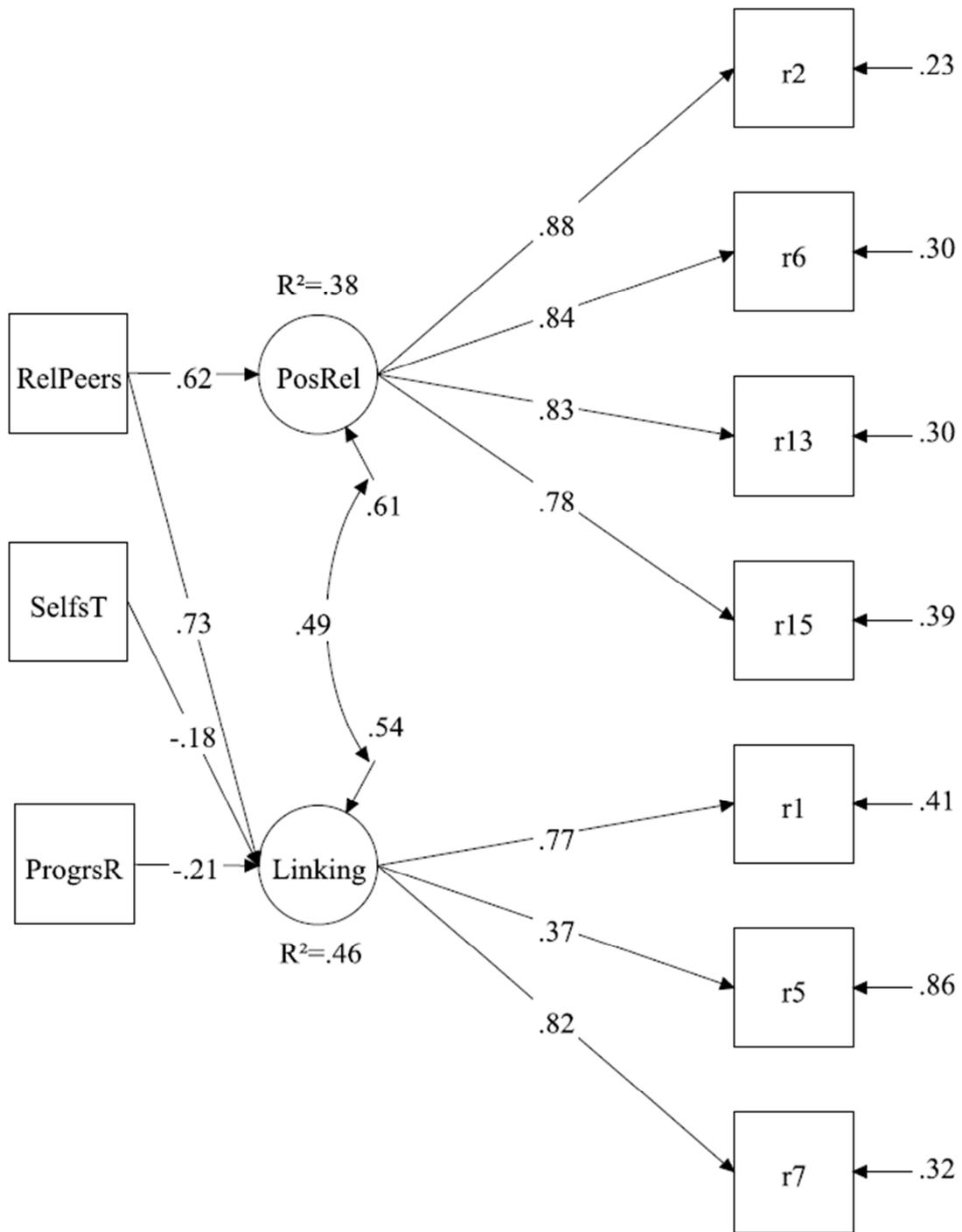


Figure 6. RELATIONSHIPS (R in PERMA) explained by 3 IAPM motives.

Collaboration (RelPeers), Self-esteem through Teaching (SelfsT), and Contribution to Progress by Research (ProgrsR, N=220).

PosRel: Positive professional relationships. Linking corresponds to 'not feeling alone' items.

Loadings and errors are standardized. Only significant relationships are represented (all $p < .01$).

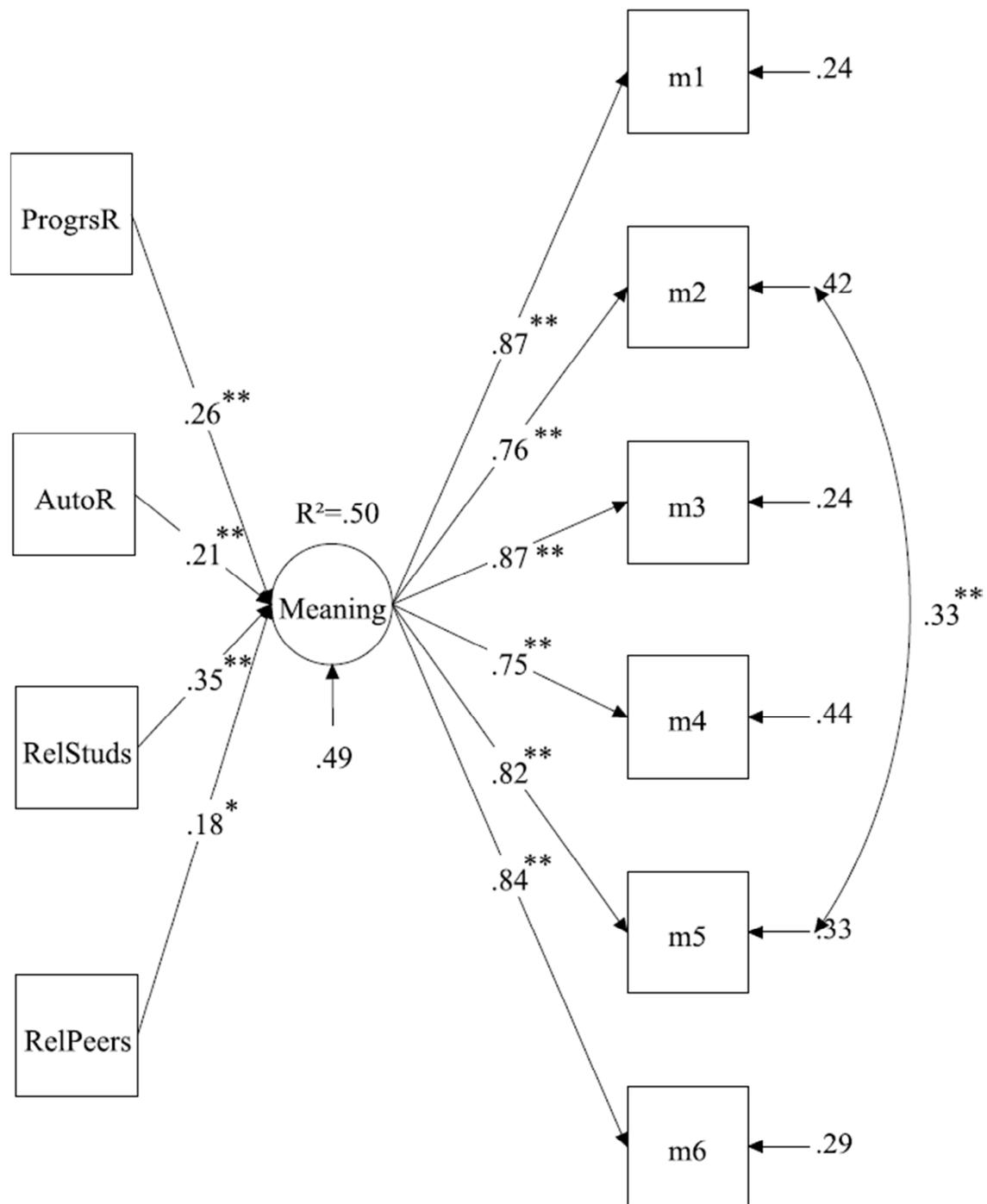


Figure 7. MEANING (M in PERMA) explained by 4 IAPM motives. Contribution to Progress by Research (ProgrsR), Autonomy in Research Activities (AutoR), Positive Relationships with Students (RelStuds), and Collaboration (RelPeers, N=210).

*p<.05, **p<.01. All loadings and errors are standardized.

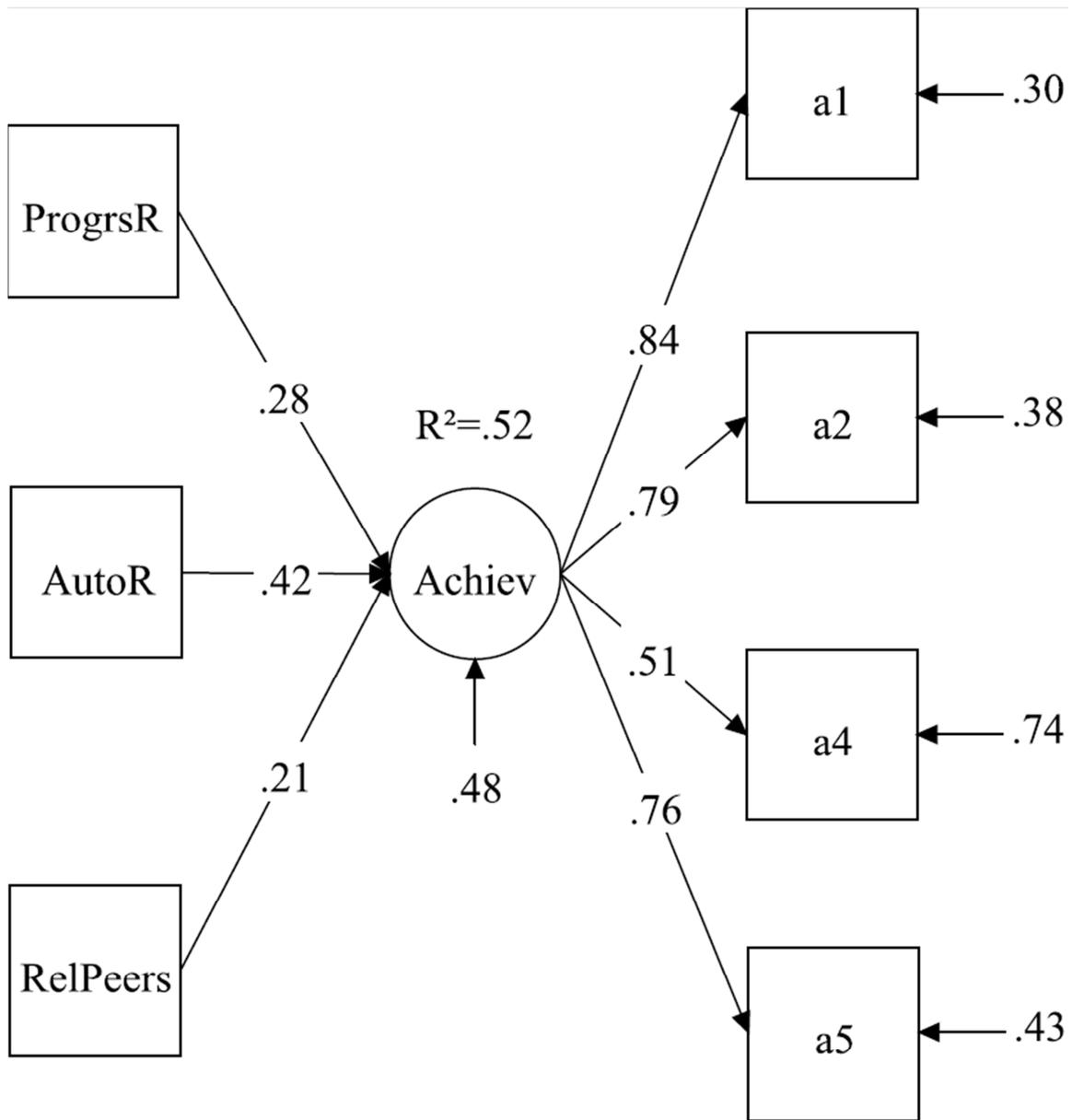


Figure 8. ACHIEVEMENT (A in PERMA) explained by 3 IAPM motives. Contribution to Progress by Research (ProgrsR), Autonomy in Research Activities (AutoR), and Collaboration (RelPeers, N= 216). All $ps < .01$. All loadings and errors are standardized. Correlations between predictors are not represented.

Tables

Table 1

<i>Descriptive statistics of respondents</i>	
	<u>Total (%)</u>
Literature	41 (18%)
Political Studies	
Economics	32 (14%)
Humanities	100 (45%)
Social sciences	
Sciences	45 (20%)
Medicines	
Biology	
Females	128 (58%)
Males	94 (42%)
With HDR	33 (15%)
Without HDR	189 (85%)
Total	222 (100%)

Table 2

Motivational factors (PCA with equamax rotation, N=222)

Item	F1 ^a	F2 ^b	F3 ^c	F4 ^d	F5 ^e	F6 ^f	F7 ^g
	ProgresR	TeamT	SelfsT	AutoR	RelStuds	AutoT	RelPeers
y1	.866	.090	.033	.244	.113	.075	.142
y2	.881	.022	.008	.174	.077	.124	.183
y5	.824	.076	.028	.194	.075	.139	.145
y6	.127	.882	.079	-.012	.151	.032	.114
y8	.053	.881	.054	-.105	.044	.000	.238
y10	-.007	.904	.124	-.039	.013	.038	.141
y11	-.036	.122	.895	.047	.151	.133	-.019
y12	-.002	.123	.929	.066	.117	.067	.019
y13	.098	.014	.878	.050	.137	.132	.063
y16	.192	-.084	.110	.883	-.044	.171	.061
y17	.210	-.031	.090	.874	.021	.217	.088
y34	.244	-.066	-.033	.699	.247	.184	.200
y20	.094	.068	.146	-.028	.833	.208	.096
y21	.094	.066	.127	.051	.885	.162	.047
y24	.062	.081	.152	.137	.860	.073	.142
y27	.057	-.023	.142	.254	.128	.845	.105
y28	.109	.161	.066	.115	.174	.810	.147
y29	.177	-.067	.156	.194	.157	.819	.103
y30	.048	.187	.087	-.084	.141	.219	.733
y31	.163	.228	-.026	.161	.095	.009	.842
y32	.272	.092	-.004	.279	.035	.123	.780
M	5.19	3.76	4.72	5.48	6.13	5.65	4.99
(SD)	(1.13)	(1.46)	(1.33)	(1.26)	(0.94)	(1.10)	(1.30)
Eigenvalue	2.62	3.05	6.20	1.44	1.72	1.11	1.02
Variance (%)	12.45	14.54	29.54	6.85	8.19	5.26	4.83

^aF1: Contribution to Progress by Research (ProgresR); ^bF2: Teamwork in Teaching (TeamT); ^cF3: Self-esteem through Teaching (SelfsT); ^dF4: Autonomy in Research Activities (AutoR); ^eF5: Positive Relationships with Students (RelStuds); ^fF6: Autonomy in Teaching (AutoT); ^gF7: Collaboration (RelPeers);

Table3

Items of the positive scale of Academics' motives

Factor	Text	Item number
F1	I can participate in the advancement of knowledge thanks	y1
	My research works contribute to the development of	y2
	I can build knowledge to serve the community	y5
F2	The educational teams that I lead bring me elements to	y6
	I lead an educational team that helps me developing my	y8
	The educational teams that I lead bring me elements to improve my courses	y10
F3	Teaching allows me to assert myself	y11
	Teaching helps me build my self-confidence	y12
	In teaching, to lead a group of students provides me with good self-esteem	y13
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	I decide which path to take in my researches	y17
	I have the control over my research work	y34
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Table 4

Correlations between motivation subscales (N=222)

Factors	TeamT	SelfsT	AutoR	RelStuds	AutoT	RelPeers
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AutoT						.334**

* $p < .05$ ** $p < .01$

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Time-Allocation Profiles regressed on motivational scales

Profile	Motivation	B	(SE)	p	Exp(B)
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Research	AutoR	.583	(.35)	.094	1.791
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	AutoT	-.816	(.29)	.005	.442
Teaching-Service	AutoR	-.652	(.26)	.013	.521

Only predictors with $p < .10$ (two-tailed) are reported.

Reference profile: Teaching-Research Profile

Table 6

Items to measure PERMA elements

CONSTRUCT	ITEM	LABEL
POSITIVE EMOTIONS	see the SPANE Scales ^a	
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Cognitive absorption ^b	I feel I am able to meet the high demands of the situation	f11
	I feel that what I do is under my control	f15
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	My colleagues stand by me ^f	r6
	I believe that my co-workers appreciate who I am ^d	r13
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Linking ^f	I often feel alone because I have few professional relations to share my interests and my concerns with	r1
	It seems to me that most of my colleagues have more friends than me	r5
	At work I didn't live a lot of warm and confident relationships with others	r7
MEANING ^c		
	The work I do on this job is very important to me	m1
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	The work I do on this job is worthwhile	m4
	The work I do on this job is meaningful to me	m5
	I feel that the work I do on my job is valuable	m6
ACHIEVEMENT		
	How much of the time do you feel you are making progress towards accomplishing your professional goals? ^d	a1
	How often do you achieve the important professional goals you have set for yourself? ^d	a2
	How often do you feel a sense of accomplishment from what you do professionally ^e	a4
	How often have you been pleased about completing something that was hard to do professionally ^e	a5

Origin of the items: ^aDiener et al. (2010); ^bEduFlow (Heutte et al., 2014), Item f112, "this activity" replaced by "these activities"; ^cMay et al. (2004). ^dAdapted from the PERMA scale (Positive Psychology Center, 2013); ^eAdapted from Kern et al (2014). ^fItems specifically designed for the study;

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			3	222	4.99	0.09	.80	1.00	7.00	-0.79
PERMA										
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	SPANE-N ^a	3	216	3.80	0.08	.87	1.33	7.00	-0.79	0.66
Engagement	Cognitive Absorption	3	214	4.68	0.08	.78	1.33	7.00	-0.24	0.18
	Autotelic experience	3	214	4.68	0.08	.80	1.33	7.00	-0.78	0.68
	Job Involvement	3	214	6.06	0.06	.77	2.00	7.00	-1.37	2.53
Relationships	Positive relations	4	220	4.91	0.09	.90	1.38	7.00	-0.85	0.03
	Linking	3	220	4.86	0.09	.69	1.00	7.00	-0.37	-0.05
Meaning	Meaningfulness	6	214	5.92	0.07	.92	1.50	7.00	-1.52	2.80
Achievement	Willing	4	216	5.22	0.06	.86	2.00	7.00	-0.74	0.22

Origin and wording of the items: see Table 6.