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Academic engagement: assessment, conditions, and effects—a study in higher education from the perspective of the person-situation interaction

Jesús Alonso-Tapia[1] · **Enrique Merino-Tejedor**[2] · **Juan Antonio Huertas**[1]

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Abstract
This study has three main objectives. The first is to know to which degree engagement, as a person variable, and each of its modalities—agency, behavior, cognition, and emotion—are affected by the interaction with several learning situations, listening to a lecture, carrying out practical tasks alone, reading a text while studying, working in groups, or participating in practical classes. The second is to test its relationships with potential moderator variables—motivation, self-efficacy, emotion self-regulation, and stress—and its potential effects on performance and satisfaction. Participants were 531 university students. They filled in a questionnaire that allowed testing alternative theoretical models on the person-situation hypothesis using confirmatory factor analyses. Results showed that if items refer both to engagement modalities and learning situations, the traditional hierarchical model that considers that engagement depends on a personal disposition with four components does not fit well. Instead, the multitrait model does. It shows that engagement, as a general disposition, is activated by the set of situations and that each of its components only plays a role in some of them. The hypotheses on the relationship between engagement and the rest of the variables received positive support. These results open new perspectives for studying and improving engagement.

Keywords Engagement · Motivation · Self-efficacy · Emotional self-regulation · Person-situation interaction

✉ Jesús Alonso-Tapia
jesus.alonso@uam.es

Enrique Merino-Tejedor
enrique.merino@uva.es

Juan Antonio Huertas
juanantonio.huertas@uam.es

[1] Facultad de Psicología, Universidad Autónoma de Madrid, C/ Ivan Pavlov, 6, 28049 Madrid, Spain

[2] Facultad de Educación de Segovia, Universidad de Valladolid, Departamento de Psicología, Campus María Zambrano, Plaza de la Universidad, 1, 40.005 Segovia, Spain

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In academic contexts, engagement seems to be a necessary condition for preventing students' dropout and favoring high levels of academic success (Lei et al., 2018). Because of this fact, the study of engagement has flourished exponentially during the last decade, as shown by recent meta-analyses (Boulianne & Theocharis, 2020; Jansen et al., 2019; Myint & Khaing, 2020; Young et al., 2018). Three groups of works were especially important for studying the processes underlying this construct. The first is the *Handbook of Research on Student Engagement* (Christenson et al., 2012). It consists of 39 contributions grouped around the concept definition and its potential relationships with motivation, contextual influences, conditions, effects, and measurement problems. The second is the 2015 monograph issue of *Educational Psychologist*, focused mainly on measurement problems. The third is the 2016 monograph issue of *Learning and Instruction*, a monograph that also includes papers on concept definition, causes, effects, and measurement. Finally, two contributors to the last two works (Azevedo, 2015; Eccles, 2016) point out that the *engagement* construct is one of the worst defined, making it difficult to evaluate it and progress in knowing its implications. For this reason, they propose that researchers define well the context and, within it, the criteria they use to assess the degree of engagement.

Students must engage in their academic work to succeed, and to favor their engagement, it is necessary to know the factors affecting it. Achieving this knowledge is the initial and general objective of this work. However, to concrete its specific objectives it is necessary to make explicit the concept, context, and criteria for assessing it, following Azevedo's (2015) and Eccles's (2016) suggestions.

Theoretical framework

The way people understand engagement may affect the educational practices adopted to influence it positively. Therefore, which are the main points to consider for achieving an adequate understanding of it?

First, it is essential to consider the nature of engagement. Researchers have achieved a significant consensus on the three-component engagement model, summarized by Fredricks and McColsKey (2012). These authors considered that *engagement* is a meta-construct that includes three types of components: (1) *behavioral engagement*: participation in social, academic, or other types of activity necessary for achieving good academic results and for avoiding dropping out; (2) *emotional engagement*: emotional reactions to academic activities, peers, teachers, or school; and (3) *cognitive engagement*: the amount of attention and strategic self-regulation spent to master academic knowledge and academic competences. However, authors such as Reeve and Tseng (2011) showed the need to add a fourth component, the agentic engagement, that is, "the students' constructive contribution into the flow of the instruction they receive" (p. 257). They supported their proposal with evidence showing that agentic engagement "is associated with students' constructive motivation, related to each of the other three aspects of engagement, and predicted independent variance in achievement" (p. 257).

Following the mentioned authors, Sinatra et al. (2015) considered that engagement implies four types of involvement, as shared by Reeve (2012), who develops an engagement model derived from the self-determination theory: (a) *Behavioral involvement*, manifested into three indicators: positive behavior, dedication of time, and attention to academic tasks—persistence, effort, attention, participation in discussions, etc.—and participation in extra-academic school activities; (b) *emotional involvement*,

which manifests into emotional reactions to academic subjects and activities, reactions that can be positive or negative and whose effects on behavior are complex; (c) *cognitive involvement*, which translates into efforts of one kind or another that the student makes to understand and learn, efforts that are closely linked to the self-regulation of the learning process, which makes it difficult to separate both concepts; and (d) *agency*, a characteristic manifested when students do not just react to context but contribute to the flow of instruction with their questions and comments, even modifying the teachers' approaches (Bandura, 2001). Since engagement includes different components, it is necessary to understand the separate and combined effects of emotional, cognitive, behavioral, and agentic engagement (Janosz, 2012). In fact, according to several works reviewed by this author, "cognitive and emotional engagement tend to evolve in synchronicity, while behavioral engagement seems to evolve differently" (p. 697).

Second, engagement is a construct close to "motivation." Therefore, to clarify its scientific status, it is necessary to consider the similarities and differences between the psychological processes to what each of these constructs refers. The study of motivation has been guided by different theories whose common objective is identifying the determinants of human action, determinants that can be rational, as goals and expectancies, or irrational, as needs (Weiner, 1992). According to this perspective, "determinants" and "action" are related but different. Following this initial distinction, several works reviewed by Martin (2012) and Fredricks and McColsKey (2012) have identified motivation and engagement within different psychological variables: first, motivation in the academic context with the personal—internal—reasons of action (goals, needs, self-efficacy expectancies), and second, engagement with the behavioral (effort, persistence), cognitive (self-regulation strategies, social on-task behavior), emotional (affect, mood, achievement, and social emotions), and agentic (students' contributions to the flow of instruction being active, not only reactive, in front of instructional environment characteristics) manifestations of action. If these suppositions are correct, then two questions arise: first, to which degree does engagement depends on motivation—goals orientations and self-efficacy? and, second, to which degree does engagement contribute to predicting learning and performance after deducting its dependence on motivation?

Third, engagement is also a construct very close to "self-regulation." According to Wolters and Taylor (2012), there is almost a perfect overlap between both theoretical frameworks except for a few differences. Both constructs include cognitive elements (e.g., use of cognitive strategies such as organization, elaboration, and summarization), metacognitive control strategies (e.g., planning, goal setting, and monitoring), emotional experiences related to schoolwork (e.g., interest, excitement, and happiness), and similar forms of behavioral involvement (effort, persistence, and time on task).

The main differences between self-regulation and engagement frameworks have to do with the conceptualization of motivation and the role attributed to "agency." In the case of self-regulation, motivation conditions self-regulation, and self-regulation influences motivation (Alonso-Tapia et al., 2014), being processes highly integrated (Winne & Hadwin, 2008). Engagement researchers, for their part, tend to consider that motivation precedes engagement. In the case of "agency," researchers on self-regulation consider that students' initiated and goal-directed efforts are an essential characteristic defining the quality of self-regulated learners. This point only recently has begun to be considered by engagement researchers, some of whom have considered it necessary to include agency as a component of engagement (Sinatra et al., 2015). All these facts imply the need to clarify the relationships between motivation, self-regulation—especially

emotion and motivation self-regulation, which are the main point in which self-regulation and engagement researchers differ—and engagement.

Forth, according to Janosz (2012), engagement can be considered in the contexts of different nature: (a) the context of specific learning activities, (b) the classroom context, in which the students have to manage not only academic but also socio-emotional learning, and (c) the school context, which can be more or less learning-oriented (Alonso-Tapia et al., 2020). To these factors, it should be added a fourth one: whether the teaching context is face-to-face, distance, or virtual (Martin et al., 2022; Salas-Pilco et al., 2022). Therefore, the determinants and outcomes of engagement at each level can be different. For example, in the context of specific learning activities, Alonso-Tapia et al., (2018) have shown that the motivational orientations that are activated are different depending on the type of activity—listening to a lecture, carrying out practical tasks alone, reading a text while studying, working in groups realizing exams, or participating in practical classes. Consequently, if motivation influences engagement, it is probable that engagement varies. Nevertheless, a question arises: do the different components of engagement manifest differently depending on the academic situation? If this were the case, what would be the educational implications?

Fifth, at the university level, a meta-analysis carried out by Myint and Khaing (2020) has shown that engagement is associated not only with motivation but also with self-efficacy expectancies, a possible personal cause of engagement; lecturers' teaching styles, a contextual cause; and performance and academic satisfaction, two possible engagement outcomes. Paloș et al. (2019) have also found that engagement is negatively related to burnout, a state highly dependent on stress (Maslach & Leiter, 2016). Therefore, it is necessary to consider such variables to complete a picture of factors affecting and being affected by engagement.

To summarize, our objectives are to answer the following questions:

1) To which degree are engagement and each of its components affected by the person and situation interaction, being the situation defined by the specific learning activities the student has to confront? Based on the initial studies on the development of engagement revised by Janosz (2012) and on the effects of the interaction between person and situation in motivation found by Alonso-Tapia et al., (2018), it is hypothesized that engagement and its components are affected by the specific learning activities. Still, there is no evidence suggesting the particular direction of this effect. Testing the structural validity of the questionnaire specifically developed for this study will help answer the question posed. As suggested by Lam et al. (2012), pursuing this objective does not imply that other contextual factors are not necessary.
2) In which way and to what extent is engagement related to motivation? According to engagement researchers' suggestions, engagement is not the same as motivation but depends on it, especially on learning/mastery goal orientation (LO). Therefore, a positive correlation between these variables is expected, but not as high as to imply that both terms refer to the same psychological processes.
3) In which way and to what extent is engagement related to self-regulation? The main difference between these two processes suggested by researchers is that self-regulation focuses not only on learning but also on the emotional and motivational processes related to learning, whereas engagement focuses mainly on self-regulating learning strategies (Alonso-Tapia et al., 2014; Winne & Hadwin, 2008). Therefore, if such sup-

position is correct, it is expected that the relationship between emotional self-regulation on one side, and engagement on the other, will be positive but not very high. The reason is that engagement does not consider the regulation of the emotional and motivational processes—emotional self-regulation (ESR). Besides, it is expected that burnout, a negative emotional experience in response to stress, will be related negatively to engagement, especially if the capacity of positively self-regulating emotion is low.

4) How and to what extent is engagement related to self-efficacy, sense of progress, performance, and academic satisfaction? First, as described above, works focused on engagement determinants and outcomes suggest that self-efficacy expectancies are a motivational variable that influences engagement. Second, this last process positively influences the students' sense of progress, performance, and academic satisfaction and is negatively associated with burnout. Therefore, to have a picture more complete of the construct validity of the concept of engagement, it seems reasonable to test whether these suppositions are correct.

However, to achieve our research objectives, it is necessary first to design a measurement instrument for university students that allows comparing whether students' engagement varies or not depending on the specific academic situation. The reason is that most instruments allow assessing it only as a general personal disposition (Fredricks & McColsKey, 2012; Inman et al., 2020). Therefore, for strategic reasons, the first objective has been the development of such an instrument, as described below in the "Instruments" section.

Method

Sample

Five hundred thirty-one higher education students from 13 different universities in Spain participated in this study. The 73% were women; the mean age was 21.5 ($SD = 4.6$). Regarding the course, 14.9 were 1st, 56.3% 2nd, 12.4 3rd, 12.6% 4th, and 3.8% were doctoral students. They belong to 15 different careers, being the most represented "Teaching, Psychology, Economics, Tourism, and Business."

Procedure

The sample was chosen for convenience reasons. The questionnaires were given to be filled in through the Internet. Participants were informed about the study characteristics, and they were required to fill in the informed consent before answering. No gratification was given for voluntary participation. The Ethical Committee approved the study of the University of the Principal Researchers of the project (Reference number CEI-96–1763).

For the development of the questionnaire, the main types of learning situations at the university level were examined and reduced to five: carrying out practical tasks alone, listening to a lecturer, reading a text while studying, working in groups, and participating in practical classes. Then, it was considered the review of engagement self-reports that Fredricks and McColskey (2012) had carried out and the work of Inman et al. (2020). It was found that the items of such questionnaires neither include a reference to the five learning

situations chosen nor—obviously—relate them systematically to the different engagement components, including agency. Therefore, the content of our items was designed considering a learning situation and one engagement component (agency, behavioral, cognitive, and emotional engagement). Finally, the set of final items was chosen according to the agreement among three experts.

Instruments

Person-Situation Academic Engagement Questionnaire for Adults (PSAE-QA)

This questionnaire, included in the Appendix, has been created and developed for this study. It includes 40 items to be answered on a 5-point Likert scale (totally disagree to totally agree). Their content was designed to cover each of the four components of engagement: agency, behavior, cognition, and emotion, ten items by category. Besides, two items of each category refer to one of the five learning situations mentioned above. Of each pair of items referred to the same situation and engagement components, one was positively worded and the other negatively. Each pair was combined to form a parcel because, according to MacCallum et al. (1999), this procedure allows estimating fewer parameters and reduces the chances of correlation between residuals and dual loadings. Besides, as Little et al. (2002) stated, parcels favor the specification of clear latent constructs. The combination was made after calculating the correlations between items in each pair (mean correlation: 0.31).

Situated Goals Questionnaire-University Form (SGQ-U) (Alonso-Tapia et al., 2018)

This questionnaire was selected to study the relationships between motivation—goal orientation—and engagement. It includes 30 items that allow measuring three-goal orientations: *Learning orientation* (LO) ($\alpha = 0.86$), *Performance orientation* (PO) ($\alpha = 0.87$), and *Avoidance orientation* (AO) ($\alpha = 0.83$). The items are answered on a 5-point Likert scale (totally disagree–totally agree).

Positive Emotional Self-Regulation Questionnaire (PEMSRQ) (López-Valle et al., 2018). This questionnaire was selected to study the relationships between emotional self-regulation (ESR) and engagement. It allows assessing the use of positive emotional self-regulation strategies while experiencing negative emotions such as sadness and worry. It includes 24 items, answered on a 5-point Likert scale (total disagreement–total agreement), referring to the two mentioned emotions and ten different positive emotional coping strategies. The reliability index MacDonald's ω of the general scale is very good: $\omega = 0.97$.

Generalized Self-Efficacy Scale (Schwarzer & Jerusalem, 1995) This scale, translated to 32 languages, was created to assess a general sense of perceived self-efficacy (SE). It was selected for studying the suppositions about the relationships between this variable and engagement. It includes ten items to be answered on a four-point Likert scale (not at all true–exactly true). Cronbach α, from samples of 23 nations, ranged from 0.76 to 0.90, with the majority above 0.80.

School Burnout Inventory University Form (SBI-U) (Boada-Grau et al., 2015) This questionnaire was included for testing the suppositions about the relationships between stress-burnout (ST) and engagement. It includes nine items to be answered on a six-point scale (total disagreement–total agreement). The Cronbach α reliability index of the global scale is 0.85.

Utrech Work Engagement Scale-University Form (Schaufeli et al., 2002) This questionnaire was included for studying the convergent validity of the new engagement questionnaire. The version used includes 14 items, including activities and experiences whose frequency must be declared on a seven-point scale (never-everyday). The Cronbach α reliability index of the global scale found in a Spanish sample was 0.91 (Merino-Tejedor et al., 2018) .

Self-Estimated Mean Grade Scale As getting direct information on students' grades was very difficult, following a procedure used in other studies, respondents were asked to indicate on a 5-point Likert scale their self-estimated mean grade (SMG) according to the description given for each point of the scale:

(1) Very insufficient (4 or more subjects to be passed in the second or third opportunity)
(2) Insufficient (2 or 3 subjects to be passed in the second or third opportunity)
(3) Normal (most scores are C and, at the most, one subject to be passed on later occasions)
(4) Good (at least a third of grades are B and no subjects to be passed on later occasions)
(5) Excellent (20% of A, 50% of B, and no subjects to be passed on later occasions)

Satisfaction level with the studies and perception of acquired competence Students were asked to indicate on a 5-point Likert scale, first, their degree of satisfaction (SAT) (1 totally unsatisfied–5 totally satisfied) with the studies and second their degree of personal competence (SAC) that they considered having acquired. These data provide two additional criteria for validating the effect of engagement.

Data analyses

Confirmatory factor analyses

Four alternative theoretical models were tested. First, a *mono-factor model* was conducted to test whether the meta-construct *engagement* was enough to explain the data variance. Second, a hierarchical model was tested with four first-order latent factors corresponding to the engagement dimensions or patterns commonly accepted by the researchers (agency, behavioral, cognitive, and emotional engagement) and a second-order factor—engagement. Third, to test the central hypothesis of this work, a multi-trait model was tested considering, on one side, the hierarchical structure of the second model and, on the other side, the five learning situations to which the items referred. Finally, another multi-trait model was tested based on Janosz's ideas (2012), according to which forms of engagement may be at least partially independent. It includes, on one side, a hierarchical model with five first-order latent factors corresponding to the different learning situations and a second-order factor—engagement—and, on the other side, the four types of forms of engagement described in the literature.

These analyses were carried out using the AMOS-26 statistical software. Estimates were obtained using the maximum likelihood method. Model fit was assessed through the indices $\chi 2$ y $\chi 2/df$, GFI (general fit index), CFI (comparative fit index), TLI (Tucker–Lewis index), RMSEA (root mean square error of approximation), and SRMR (standardized root mean squared residual), following standard criteria based on the degree of adjustment described by Hair et al. (2010) ($\chi 2/df \leq 5$: GFI, TLI, and CFI ≥ 0.90; RMSEA ≤ 0.08; SRMR ≤ 0.10). The AIC (Akaike information criterion) was also used to compare the quality of adjustment among different models,

Reliability and external validation analyses

The internal consistency of the SGQ scales was calculated using the Cronbach α and the McDonald ω (composed reliability) indices.

As for the external validation, two correlation analyses were realized. With the first analysis, we tested the discriminant validity of the main variables and whether the degree of association of each of them with engagement—as a general construct—and its components (agency, behavior, cognition, and emotion) was in line with our expectations. With the second, we tested whether the degree to which each situation manifests engagement is associated with differences in the variables that are supposed to affect it (goal orientations, self-efficacy, emotional self-regulation, and stress) or to be affected by it (satisfaction, learning subjective experience, and performance). The program SPSS-26 was used for all these analyses.

Results

Model testing: confirmatory factor analyses

Figures 1, 2, 3 and 4 show the standardized estimates of the confirmatory models, and Table 1 shows the fit statistics. In M1-Monofactor, all the estimated factor loadings (l) were significant ($p < 0.001$). This fact implies that all items are measuring a common factor. However, as it can be seen, it has a bad fit, which implies that only one factor is not enough to explain the variance of data. The same happens with M2-Hierarchical, whose fit is very similar. M3-Hierarchical-A-Multitrait has a better fit but is not good enough, as CFI and TLI do not reach the standard levels to be accepted. Besides, though all the estimated factor loadings (l) corresponding to situations were significant ($p < 0.001$), this fact does not occur in the case of factor loadings corresponding to engagement types and the general factor. This possibility was expected according to the person-situation interaction suppositions. Finally, M4-Hierarchical-B-Multitrait has the best fit (only TLI fell slightly short of the standard levels of acceptance). Besides, the comparison between the AIC values corresponding to each model shows that M4 is the best. In this case, also as expected, though all the estimated factor loadings (l) corresponding to situations and the general factor were significant ($p < 0.001$), this fact did not occur in the case of factor loadings corresponding to engagement types. This lack of significance happens because the load (λ) of each variable on each specific engagement factor requires

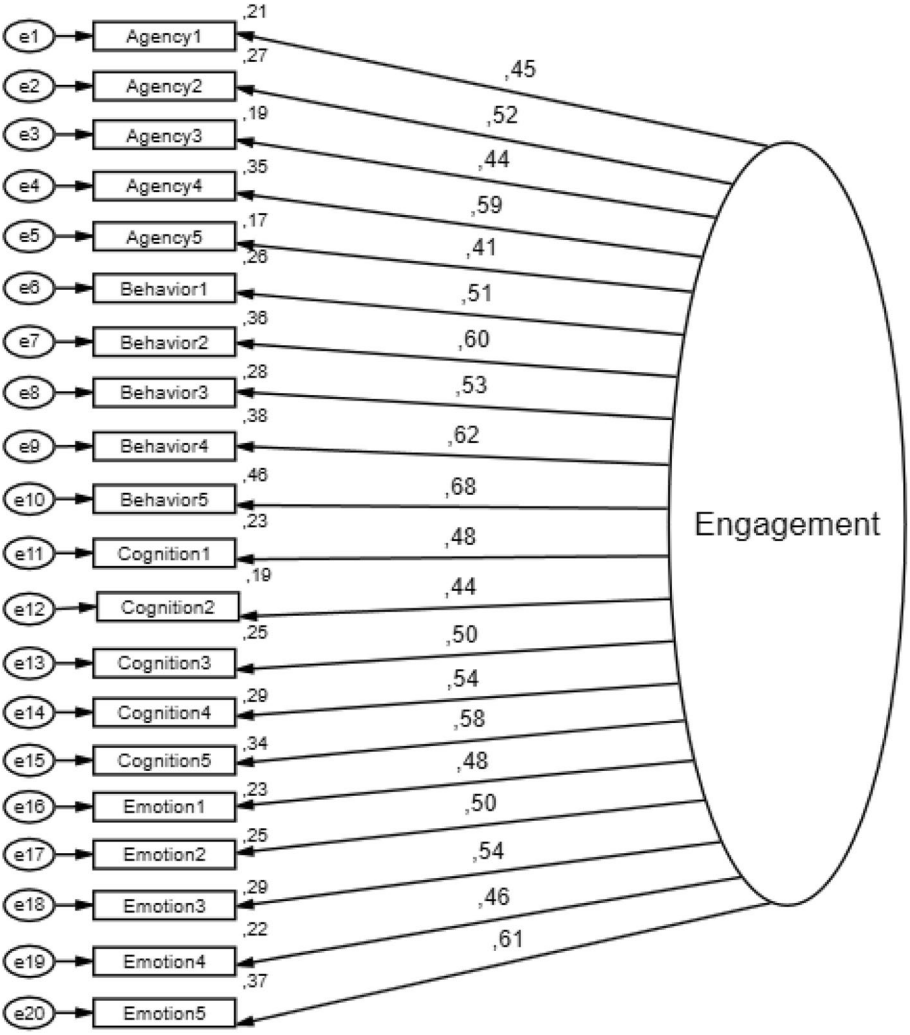

Fig. 1 Model 1: Monofactor. 20 variables, 1 latent factor. Standardized weights and variance explained

enough systematic variability to be significant, which has happened only in some cases that will be commented on in the discussion section.

The multigroup analysis carried out to test the factorial invariance of M4 between genres has shown that the fit is not the same for both genres, as some of the indices fell short of the standard levels of acceptance. However, fit does not decrease even restrictions are imposed for parameter equality between measurement weights ($D\chi 2 = 42.63$, $p = 0.08$), structural weights ($D\chi 2 = 46.79$, $p = 0.09$), and structural covariances ($D\chi 2 = 61.07$, $p = 0.06$). Therefore, the invariance between genres can be accepted.

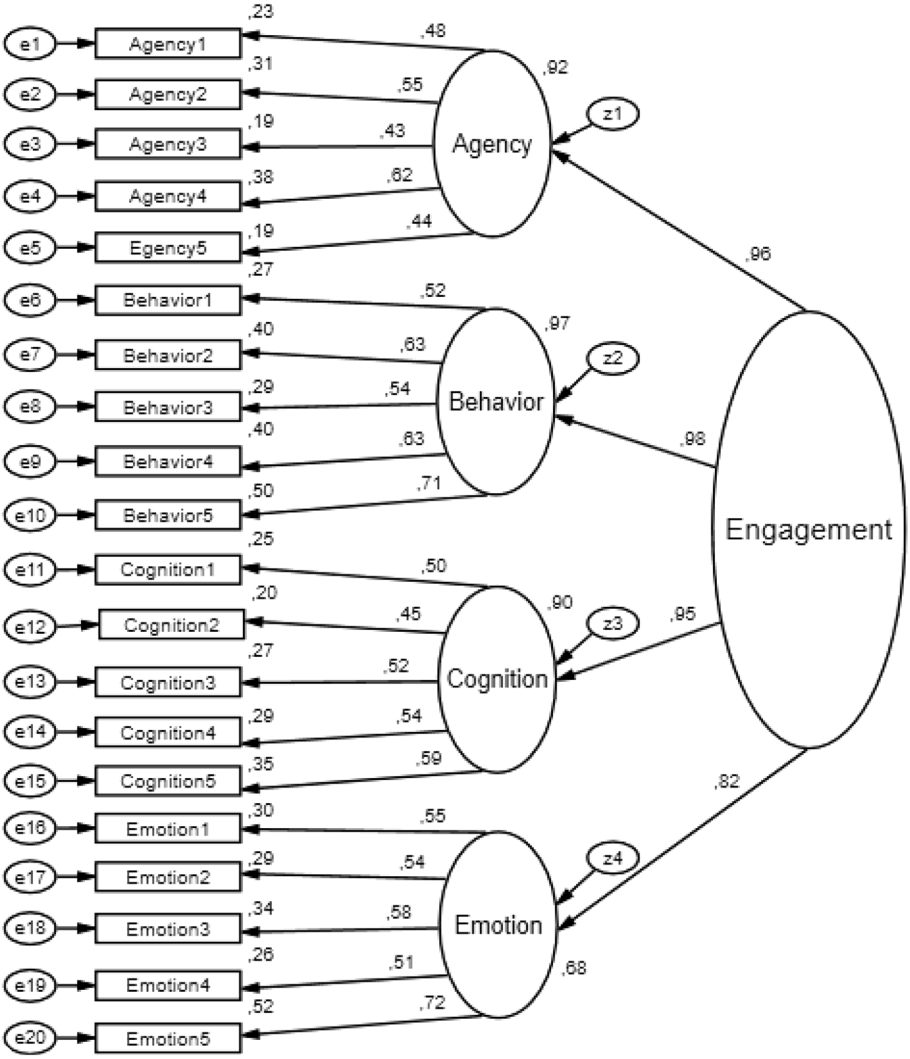

Fig. 2 Model 2: Hierarchical. 20 variables, 4 personal latent first-order factors and 1 s-order factor. Standardized weights and variance explained

Reliability

Table 2 shows the reliability indices McDonald-ω (composed reliability) and Cronbach- α for Model-4 scales and Table 3 the descriptive statistics and the reliability indices for the variables used in the study. As can be seen in Table 2, the reliability of the global engagement scale is very good in both cases (> 0.90), and the indices of engagement scales corresponding to situations are acceptable (> 0.70). As for the indices corresponding to the different types of engagement, only the α-indices corresponding to behavioral and emotional engagement are adequate. On the other hand, McDonald-ω indices (composed reliability)

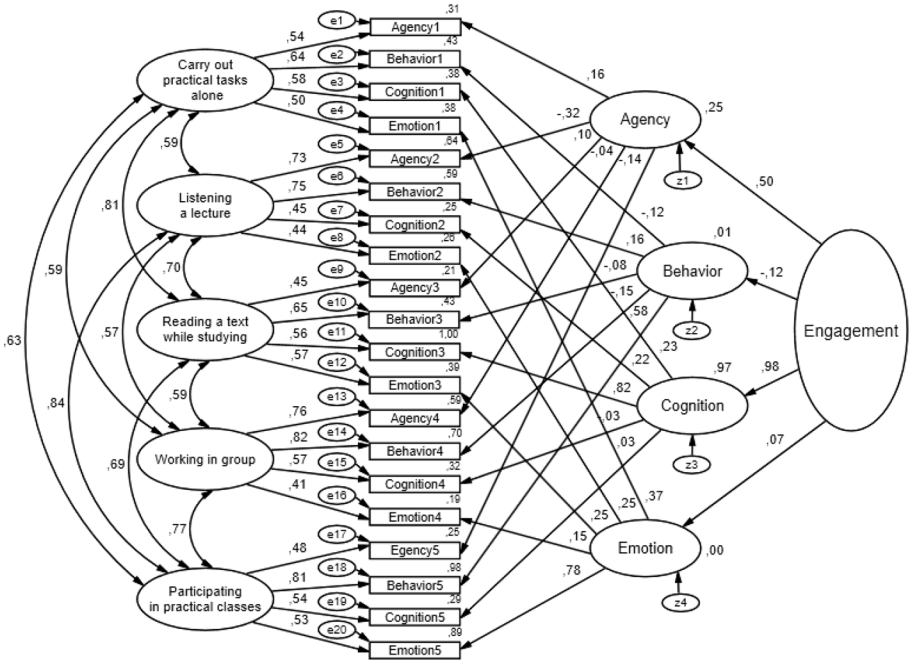

Fig. 3 Model 3: Hierarchical-A multitrait. 20 variables, 5 latent first-order situational factors on one side, 4 latent first-order personal factors, and 1 s-order factor on the other side. Standardized weights, variance explained, and correlations between factors

are inadequate. This inadequacy is explained by the fact that the engagement situations explain a significant part of the composed reliability, and the engagement patterns (dimensions) do not manifest to the same degree across the different situations.

Convergent, discriminant, and external validity

Table 3 shows the correlations between the variables in the study. According to Hair et al. (2017), if the correlation between two variables is lower than 0.708, those two variables are thought to assess different constructs since the proportion of shared variance (R2) is less than 50%. This result is the case for all measures. Therefore, their *discriminant validity* is adequate. However, the scores in the new engagement measure and the Utrecht Work Engagement Scale were expected to correlate greater than 0.708, as both scales are supposed to assess the same construct, but it was not the case. The correlation between both questionnaires is positive and highly significant ($r = 0.61$, $p < 0.001$), which implies a 37% of shared variance, a result that points to convergent validity, but it is a bit lower than expected, which implies that it does not reach the standard level required. However, such value is not higher likely due to the combination of two factors, the different situational context of each questionnaire—the workplace and the academic one—and their different structure. Besides, the fact that if contexts vary, the engagement manifestations also vary supports the idea that engagement should be studied from the perspective of the person-situation interaction.

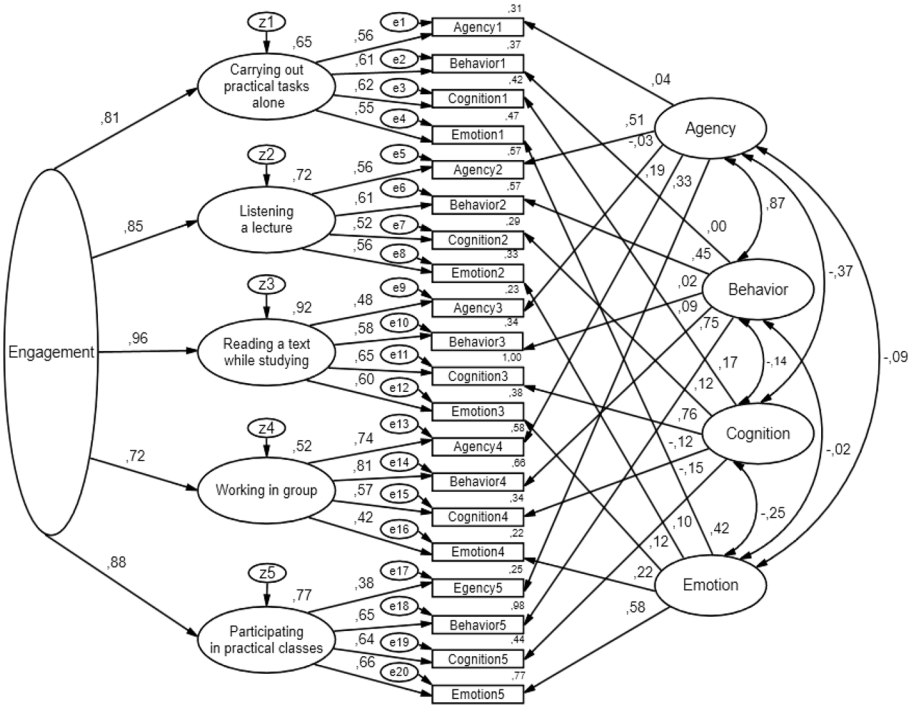

Fig. 4 Model 4: Hierarchical-B multitrait. 20 variables, 5 latent situational first-order factors and 1 s-order factor, on one side, and 4 personal correlated factors on the other side. Standardized weights, variance explained, and correlations between factors

Table 1 Goodness of fit statistics corresponding to confirmatory analyses of alternative models

	χ^2	*df*	*p*	χ^2/df	GFI	TLI	CFI	RMSEA	SRMR	AIC
M1 Monofactor	1172.7	170	< .001	6.90	.80	.66	.70	.105	.077	1252–70
M2 Hierarchical-A 20v-4pd-1ged	1115.9	168	< .001	6.64	.80	.68	.78	.103	.076	1199.92
M3 Hierarchical-B 5 s-20v-4pd-1ged multitrait	544.26	140	< .001	3.86	.90	.84	.88	.074	.067	682.26
M4 Hierarchical-C 1gs-5sd-20v-4pd Multitrait	473.90	142	< .001	3.33	.92	.87	.90	.066	.052	609.90
M4 MG by gender	785.91	286	< .001	2.37	.87	.84	.86	.051	.066	

20v, variables; 4pd, personal dimensions of engagement; 1gd, general engagement factor over personal dimensions; 1gs, general engagement factor over situations; 5sd, learning situations demanding engagement; MG, multigroup analysis

Table 3 also shows the correlations that answer the research questions 2 to 4 concerning engagement as a general construct and its components. As can be seen, engagement correlates significantly in the expected direction with all the variables that were

Table 2 Engagement questionnaire. Reliability indices McDonald-ω (composed reliability) and Cronbach- α for Model-4 scales

Scales	ω	α
Engagement general scale	.93	.90
Engagement situations		
Carrying out practical tasks alone	.69	.71
Listening a lecture	.69	.72
Reading a text while studying	.70	.70
Working in group	.75	.75
Participating in practical classes	.78	.74
Engagement types		
Agential engagement	.28	.59
Behavioral engagement	.46	.75
Cognitive engagement	.41	.65
Emotional engagement	.42	.71

Table 3 Correlations between the observed variables in the study, descriptive statistics, and reliability indices α (in the diagonal) in the present sample

	EPS	EU	LO	PO	AO	SE	ESR	ST	SAT	SAC	SMG
EPS	*.90*	.61**	.59**	−.30**	−.49**	.32**	.31**	−.35**	.41**	.37**	.30**
E-AG		*.46***	*.59***	*−.30***	*−.49***	*.32***	*.31***	*−.35***	*.41***	*.37***	*.30***
E-BEH		*.47***	*.45***	*−.22***	*−.40***	*.29***	*.23***	*−.22***	*.29***	*.31***	*.25***
E-COG		*55***	*.47***	*−.20***	*−.45***	*.39***	*.26***	*−.27***	*.32***	*.30***	*.29***
E-EM		*.56***	*.52***	*−.26***	*−.40***	*.20***	*.27***	*−.28***	*.35***	*.31***	*.25***
EU		*.89*	.57**	−.20**	−.30**	.19**	.31**	−.38**	.62**	.45**	.25**
LO			*.85*	−.16**	−.23**	.22**	.31**	−.20**	.35**	.26**	.19**
PO				*.84*	.54**	−.04	−.08	.22**	−.08	−.08	−.16**
AO					*.85*	−.27**	−.22**	.42**	−.26**	−.17**	−.23**
SE						*.89*	.45**	−.11*	.14**	.16**	.09*
ESR							*.84*	−.18**	.17**	.20**	.07
ST								*.85*	−.54**	−.37**	−.19**
SAT										.45**	.24**
SC											.17**
Mean	105.24	50.11	40.19	35.28	28.06	38.82	83.85	25.23	3.93	3.60	3.89
SD	14.54	9.53	5.65	6.50	7.91	6.23	14.16	8.33	.79	.84	.96

EPS engagement person-situation, *E-AG* engagement agency, *E-BEH* engagement behavior, *E-COG* engagement cognition, *E-EM* engagement emotion, *EU* Engagement Utrecht Scale, *LO* learning orientation, *PO* performance orientation, *AO* avoidance orientation, *SE* self-efficacy, *ESR* emotional self-regulation, *ST* stress, *SAT* satisfaction, *SAC* subjective academic competence, *SMG* self-attributed mean grade. *** = $p < .001$; ** = $p < .01$; * = $p < .05$

supposed *to influence it* (learning, performance and avoidance orientations, self-efficacy, emotion self-regulation, and stress) (questions 2 to 4). The same table shows the correlations between engagement, on one side, and the variables supposedly *influenced by it*: students' satisfaction with the studies, perception of personal competence acquired, and self-estimated mean grade (question 4). Again, all of them are positive and significant,

as expected. Furthermore, the same happens with each of its components, as could be expected.

Finally, the results in Table 4 show the correlations between the degree to which each situation manifests engagement and the variables that are supposed to affect it or be affected by it. Again, only some correlations are significant, which implies that each kind of situation is associated to a different degree with such variables.

Discussion and conclusion

Engagement in the context of person-situation interaction

The first objective of this work was to study whether engagement and its dimensions are affected by the specific learning activities the student has to confront. This possibility is suggested by human action models pointing out that it depends on the interaction between the characteristics of the person and the situation (Villasana et al., 2016; Mischel, 1984), as well as by the study by Janosz (2012) about the influence of different types of contexts on engagement. This possibility contrasts with the consideration of engagement as a general disposition of the student with several dimensions (Christenson et al., 2012). Concerning this objective, our results have shown that if items refer to the different learning situations the students have to confront, the traditional hierarchical engagement model (M2), according to which the different dimensions or patterns of engagement reflect a general disposition, does not fit well.

Indeed, according to our results, engagement results from a general disposition that manifests through the different learning situations considered, though not to the same degree. However, each specific engagement pattern does not manifest in the same way across the situations. For example, as shown by the variability and positive correlations implied in some regression weights and not in others, differences in "agency" manifest mainly when students listen to a lecture (Fig. 4: weight linking the agency factor to the variable "agency 2" = 0.51); differences in "behavior" manifest when students attend class, either if they are listening to a lecturer or participating in practical classes (Fig. 4: weights linking the behavior factor to the variables "behavior 2" = 0.45 and "behavior 5" = 0.75); differences in "cognition" appear if students are reading a text while studying (Fig. 4: weight linking the cognition factor to the variable "cognition 3" = 0.76); and, finally,

Table 4 Correlations between each situational manifestation of engagement and the variables supposedly influencing or being influenced by them

	LO	PO	AO	SE	ESR	ST	SAT	SAC	SMG
Doing alone practical tasks	.14**	−.04	.01	.05	.24**	.09*	.02	.13**	.01
Listening to a lecture	.20**	.16**	.11**	.12**	.18**	.09*	.06	.03	−.02
Reading while studying	.00	.07	.09*	.14**	.12**	.14**	−.14**	−.08	−.07
Working in group	.10*	.14**	.16**	.03	.13**	.06	−.02	−.05	.02
Participating in a practical class	−.02	.21**	.26**	−.05	.01	.26**	−.13**	−.08	−.12**

LO learning orientation, *PO* performance orientation, *AO* avoidance orientation, *SE* self-efficacy, *ESR* emotional self-regulation, *ST* stress, *SAT* satisfaction, *SAC* subjective academic competence, *SMG* self-attributed mean grade. ** = $p < .01$; * = $p < .05$

differences in "emotion" manifest mainly when students realize practical activities, either in the classroom or at home (Fig. 4: weights linking the emotion factor to the variables "emotion 1" = 0.42 and "emotion 5" = 0.58). So then, what does it mean that differences in each engagement pattern manifest as described? To answer this question, the following hypothetical considerations are proposed.

First, why do students differ in the degree they ask personal questions (engagement implying agency) or questions looking for clarification (behavioral engagement) during a lecture? It may be that it is not only a problem of "personal disposition," but also of how teachers react when some student asks a question, as the study of Lam et al. (2012) seems to suggest when pointing to the role of contextual factors. For example, when a teacher reacts to students' interventions and makes them feel that they are not clever, students with low self-esteem will not participate in class by asking questions, as implied by the "self-worth theory" (Covington, 2000). If this hypothesis were true, the degree of engagement based on agency or behavioral engagement would be the result of the interaction between the person's characteristics and the situation, and teachers could improve this type of engagement by modifying their way of reacting to students' questions.

Second, why do students differ in the degree to which they get absorbed (cognitive engagement) in trying to understand what they are reading while studying? Perhaps it depends again on the degree to which they are focused on learning or performance, a focus that, to some degree, also depends on contextual factors as suggested by the literature on classroom goal structures (Meece et al., 2006). If this were the case, cognitive engagement would result from the person-situation interaction, and teachers again could improve this type of engagement by increasing the degree to which they focus instruction on learning instead of assessment.

Third, why do students differ in the degree they experience positive emotions and look for them (emotional engagement) when implied in practical activities either in class or at home instead of trying to avoid them because they feel that such tasks are tedious? The experience of knowing how to do something can be very rewarding and grateful if a person focuses on achieving the competence to do something useful and not only on getting the knowledge necessary for passing examinations. However, students often focus on performance not only by the strength of this personal motivational orientation but also because of the classroom goal structures or motivational climate created by their teachers (Ames, 1992; Meece et al., 2006; Villasana et al., 2015). Therefore, differences in emotional engagement may depend once more on the interaction between motivational orientations and classroom goal structures. Furthermore, again, teachers could improve this type of engagement by modifying the classroom goal structure.

Personal characteristics potentially affecting engagement

The above considerations take us to the remaining research objectives, that is, to test the statistical dependence of engagement on motivational orientations, self-efficacy, positive emotional self-regulation, and stress. The result section shows that correlations and regression analysis results support our expectancies. All motivational orientations relate to engagement and each of its traditional facets in the expected direction. This relation gives plausibility to the hypotheses advanced to explain why engagement dimensions (patterns) differ depending on the learning situations considered, as most of them have to do with the interaction between contextual variables and motivational orientations. According to these relationships, engagement increases as learning orientation does and diminishes as

both performance orientation and especially avoidance orientation do. These effects may be stressed by classroom climate conditions, as suggested by Lam et al. (2012). As for the correlations between self-efficacy, positive emotional self-regulation, and stress with engagement, the results go in the same direction that those described in the meta-analysis realized by Myint and Khaing (2020) and in the study of Paloș et al. (2019). Nevertheless, the academic situation seems to moderate the above relations, as the association with LO, PO, AO, SE, ESR, and ST is significant in some situations but not in others. These results imply that academic situations are not neutral factors concerning engagement, which supports the conclusions described above concerning our first research objective.

Concerning the potential effects of engagement, the correlations between this variable, on one side, and performance, subjective feeling of acquired competence, and satisfaction with the studies have been positive and very significant, in line with previous results (Myint & Khaing, 2020; Paloș et al., 2019). However, when the different situations in which engagement manifests are considered, the relations vary, being non-significant in all cases except three, and in two of these cases are negative. Therefore, the predicted effects of engagement pointed to in the literature appear only when it is considered a general characteristic, without considering its association with different academic situations.

Finally, the relationship between both engagement questionnaires is positive as expected but does not achieve the level necessary for convergent validity. This fact is probably due not only to the difference in the general context to which each one refers—professional or academic—but also to the role played by the specific learning situations in the academic one.

Theoretical and practical implications

The results of our study have theoretical implications that point to future lines of research. The first has to do with the fact that the activation of engagement specific types—agentic, behavioral, cognitive, and emotional—does not manifest in the same way across learning situations. First, this fact has been shown by the different measurement weights and, second, by the lack of positive correlations between them (except between agency and behavior). However, this fact does not imply that such correlations should not be positive. For example, the correlation between agency and cognition could increase and be positive if students "ask themselves questions" (agency) before starting to look for information in texts and "concentrate while doing it" (cognition). It could also increase if they "ask themselves questions" before starting group work, practical work, or practical classes to guide its direction (agency) and "concentrate on the process" (cognition) that help the work advance in the selected direction. However, these possibilities may depend on how their teachers structure the teaching–learning process creating an adequate classroom climate (Ames, 1992; Meece et al., 2006; Villasana et al., 2015). Due to this fact, from a theoretical point of view, it would be necessary to look for the causes of the different activation of each specific type of engagement. Several hypotheses have been suggested that need to be tested, but other hypotheses are also possible. The second implication for research has to do with the educational level at which our engagement model has been tested. Our results correspond to university students, but the model should also be tested with secondary and high school students in the context of the educational activities carried out in vocational education and career adaptability, as suggested by the study by Merino-Tejedor et al., (2018).

As for the practical implications of this study, teachers should consider how to manage the interaction between the specific types of engagement and the learning situations,

perhaps testing through their teaching practices the hypotheses above advanced related to the role of classroom climate.

Limitations

This study also has limitations. First, the instrument used to test the relationship between engagement and self-regulation allows assessing emotional self-regulation, but not cognitive self-regulation. No adequate instrument of the type needed was found before gathering data, though a questionnaire recently published by Panadero et al. (2021) could have served for achieving this purpose. Second, the sample is not wholly equilibrated by sex, course, and type of study, and third, self-attributed mean grade instead of actual grades was used as an index of performance. These limitations should be dealt with in future studies.

In conclusion, a new perspective on the factors that affect engagement, based on the consideration of the person-situation interaction, has been achieved. Engagement is an umbrella concept including different processes, but these are not activated in the same way across situations. Besides, this fact may depend partly on the teachers' way of configuring the learning situations, which opens new directions for research on the validity of the hypotheses proposed and suggests new strategies for designing interventions to improve the specific types of engagement. Finally, the statistical dependence of engagement on and difference from psychological processes such as motivation and emotional self-regulation has received the expected positive support.

Appendix. Person-Situation Academic Engagement Questionnaire for Adults (PSAE-Q)

Respondents have to show their degree of agreement with item content on a scale from 1 (total disagreement) to 5 (total agreement). Items followed by (-) need to be inverted before scoring.

A) *If what I have to do when I start studying at home or in the library are practical tasks—translations, problems, text comments, case analysis,* etc.:

1. Before starting the task, I try to take time to see what I can do to decide how to face it.
2. I tend to give up easily as soon as I experience that something is not working or is difficult for me. (-)
3. As I work on my homework, I tend to consider each step so carefully that I am not often distracting.
4. I usually find practical tasks boring and monotonous, and that makes me feel emotionally bad. (-)
5. If I cannot adapt the task to the way I work, I get discouraged. (-)
6. Normally, when I have difficulties and something does not go well, I work hard until I solve the problem.
7. While doing practical tasks, I am easily distracted. (-)
8. I have a good time doing practical tasks because they are a challenge that I like to overcome.

B) *When I am in class, and the teacher is explaining the subject:*

9. I often take the initiative and raise questions or problems that I find interesting.
10. If I have any questions, I usually keep quiet and do not ask, even if I have doubts. (-)
11. In general, I tend to be more aware of the explanation (without being distracted), than to take notes.
12. Even if a teacher explains well, I tend to get bored quickly. (-)
13. I tend to stay out of the discussions or comments that may arise in class without taking any initiative. (-)
14. If I do not understand something, it is normal for me to ask or write down the question to find the answer later.
15. It is usual for me to think about what interests me instead of what the teacher says. (-)
16. Unless the teacher explains badly, I like to follow the explanation for the satisfaction of learning.

III) *When I have to study by reading a text that I need to understand and learn:*

17. When I start reading, I am concerned about connecting what I read with those aspects that interest me, to make sense of it.
18. When I find it difficult to understand something, I usually give up and focus on something else or change my activity. (-)
19. I am often absorbed in thinking about what I try to understand without being distracted by anything.
20. In general, the texts that I usually read while studying are unattractive to me, I am not enthusiastic about them. (-)
21. I usually start reading without planning my intentions, without thinking about what I am looking for in reading. (-)
22. If I have a hard time understanding something, I usually do not give in until I understand it.
23. I often find that I am thinking of different things. (-)
24. Unless the text is not very relevant, I usually feel comfortable studying, even if I have difficulties, because learning is very rewarding.

IV) *When I have to do group work—solve problems, develop projects,* etc.*-:*

25. In the beginning, I usually get very actively involved in seeing how to define, plan, and face the problem.
26. When we encounter difficulties, I prefer other people to propose solutions. (-)
27. Often, I stay focused on evaluating the proposals of my colleagues.
28. I feel bad doing group work and having to agree with colleagues. (-)
29. I usually let other people take the initiative when planning the task. (-)
30. In the face of difficulties, I do not usually stay on the sidelines, I take the initiative and promote discussions that lead us to overcome them.
31. I am usually "absent" when the rest of my classmates make proposals. (-)

32. When everyone in the group is involved, I enjoy it because it is enriching to see other points of view.

E) *When I am in a practical class—case study, solution of new problems, project planning—guided or tutored by the teacher:*

33. Before starting, I insist that the teacher clarifies the task to be carried out, the process to follow, and what we are expected to learn.
34. I do not usually ask about the doubts that arise when listening to the teacher or classmates when doing the task. (-)
35. As we work on the task, I usually think carefully about the meaning and value of what is said, trying to see what it implies.
36. In these classes, I feel bad because I find them boring, and I do not see their meaning in the long run. (-)
37. Before starting, I do not usually insist that the teacher plan well the steps to follow. (-)
38. I tend to pay close attention to the teacher and what my classmates say to intervene if I do not understand or disagree.
39. I do not usually overthink about the meaning and implications of what those who speak are saying (-)
40. In general, I have a good time because I experience that I learn how to do things by applying the theory.

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Declarations

Conflict of interest The authors declare no competing interests.

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Jesús Alonso-Tapia He is Emeritus Professor at the Universidad Autónoma de Madrid. He is specialized in motivation, self-regulation, classroom and school climate, resilience, and psychological and educational assessment.

Current themes of research:

a) Development and validation of models and measurement instruments of School climate and of the different components of classroom climate: academic/motivational climate, discipline climate, socio-emotional climate and co-living climate.

b) Learning engagement, conditions and effects from the perspective of person-situation interaction.

Most relevant publications in the field of psychology of education:

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Enrique Merino Tejedor He is a full professor at the Faculty of Psychology of the Universidad of Valladolid (Spain). He is expert in career and vocational development, motivation and engagement in educational settings, psychological assessment, school psychology, and adolescent development.

Current themes of research:

Development and validation of models and measurement instruments of engagement.
Vocational development and Career adaptability.

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Juan Antonio Huertas Martínez He is a professor at the Faculty of Psychology of the Universidad Autónoma of Madrid. He specialized in motivation, emotion, and self-regulation.

Current themes of research:

Development and validation of models and measurement instruments of School climate and of the different components of classroom climate: academic/motivational climate, discipline climate, socio-emotional climate and co-living climate.

Analysis of different intervention strategies effects, in the academic context, for improving learning motivation, and cognitive and emotional self-regulation.

Most relevant publications in the field of psychology of education:

Alonso-Tapia, J., Huertas, J.A., & Ruiz Diaz, Miguel Angel. (2010). On the nature of motivational orientations: implications of assessed goals and gender differences for motivational goal theory. *Spanish Journal Of Psychology*. 13 (1), 231 -242. http://dx.doi.org/10.1017/S1138741600003814.
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