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Original article

The impact of different sources of social support on academic performance: Intervening factors and mediated pathways in the case of master's thesis

L'influence de différentes sources de soutien social sur la réussite universitaire : facteurs intervenants et processus dans le cas du mémoire de fin d'études

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ABSTRACT

Introduction. – Academic failure and dropout are pervasive challenges at all levels of the education system. Research so far pointed out different aspects of this large phenomenon. On the one hand, some scholars have argued that social support is a key factor to foster learning and persistence. On the other hand, some other scholars have rather highlighted the role of student motivation and engagement itself in improving performance on academic tasks. In this article, we tested theoretical models that combine the two approaches in a whole process.
Aims. – We aimed at clarifying (1) the specific contribution of several sources of perceived social support to academic performance, and (2) the mediation role of motivation and engagement in the relationships between perceived social support and performance.
Method. – The sample consisted of 226 last year university students. Structural equation modeling analyses were used to test the hypothesized associations.
Results. – Structural equation modeling analysis revealed that institutional and supervisor support were associated with motivation, which in turn predicted greater behavioral, cognitive and emotional engagement. Further, behavioral engagement was the unique contributor of academic performance at the master's thesis.
Conclusion. – The results clarify the specific contribution of different sources of perceived social support and underline the importance of the supervisor and the institution. They also underline the importance of considering different sources of perceived social support at the same time. Finally, theoretical assumptions concerning the mediational role of motivation were confirmed.
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RÉSUMÉ

Introduction. – L'échec et l'abandon des étudiants sont des défis importants pour de nombreux systèmes éducationnels. La recherche a mis en évidence différents aspects de ce large phénomène. D'un côté, certains chercheurs ont proposé que le soutien social soit un facteur clé pour favoriser l'apprentissage et la persistance. De l'autre, d'autres chercheurs ont souligné le rôle de la motivation et de l'engagement des étudiants dans l'amélioration de la performance dans des activités d'apprentissage. Dans cet article, nous avons testé des modèles théoriques qui combinent les deux approches dans un même processus.
Objectifs. – Nos objectifs étaient de clarifier (1) la contribution de différentes sources de soutien social sur la performance et (2) les effets médiationnels de la motivation et de l'engagement dans les relations entre le soutien social et la performance.
Méthode. – L'échantillon était composé de 226 étudiants en dernière année à l'université. Des analyses en équations structurelles ont été utilisées pour tester les associations supposées du modèle.

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Résultats. – Les analyses ont révélé que le soutien institutionnel et celui du superviseur étaient associés aux facteurs motivationnels qui, à leur tour, prédisaient un plus grand engagement comportemental, cognitif et émotionnel. En outre, l'engagement comportemental était le contributeur unique de performance académique au mémoire de fin d'études.
Conclusion. – Les résultats ont clarifié les contributions respectives de chaque source du support social, ont mis en évidence le rôle important de l'institution et du superviseur et ont confirmé les postulats quant aux effets médiateurs de la motivation et l'engagement.

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Academic failure and dropout are pervasive challenges at all levels of the education system in most countries (OCDE, 2013). Research so far pointed out different aspects of this large phenomenon. On the one hand, some scholars have argued that social support is a key factor to foster learning and persistence; indeed these authors have found that when students perceive support from peers, family, institution, and teachers, they tend to display higher motivation and achieve good academic accomplishments more easily (Fass & Tubman, 2002; Feldman, 2007; Mattanah, Lopez, & Govern, 2011; Robbins, Oh, Le, & Button, 2009). On the other hand, in consistence with the opinion of many teachers, some other scholars have rather highlighted the role of student motivation and engagement itself in improving performance on academic tasks, and collected empirical findings supporting this (Schunk, Pintrich, & Meece, 2008; Skinner, Furrer, Marchand, & Kindermann, 2008). These evidences highlighted one aspect at the time then. However, if we look at theoretical models approaching this topic, they tend to be more inclusive and postulate that the provision of social support nurtures students' motivation and engagement, which in turn facilitate performance (Connell & Wellborn, 1990; Skinner et al., 2008; Wentzel, 1998) in a whole process.

Nowadays questions remain about (1) the specific contribution of several sources of social support to academic performance, and (2) the mediation role of motivation and engagement in the relationship between perceived social support and performance. Are some sources of social support more important than others for achievement? In order to reduce academic failure, is it more important to intervene on social support or on student motivation? Or could student motivation be sustained by fostering social support? Understanding these processes may help to identify the relevant targets for effective interventions. The purpose of the present study is to move forward in this direction by testing a conceptual inclusive model of the relations between student perception of support from family, peer, teacher and institution, motivation, engagement and academic performance. In the next sections, a closer look is given on these specific associations and on variables implicated.

1. Perceived social support and academic performance

While working on a learning task, students interact and/or work with different social partners: peers, family, supervisor/teacher and the institution in which the task is realized. Perceived social support corresponds to the simple perception that these actors are supportive. According to Weiss (1974), different types of support may be derived from relationships with others: guidance (advice and information), reliable alliance (tangible aid), attachment (expressions of caring and love), reassurance of worth (respect for abilities and personal qualities), and social integration (mutual interests). Consequently, social support is supposed to be a valuable resource for to cope with stress but also to achieve school or university requirements.

In another research field, motivational theorists (Connell & Wellborn, 1990; Wentzel, 1998) have suggested that perceived social support directly promote motivation and subsequent engagement in learning activities. According to them, supportive social partners favor the adoption of socially valued goals and objectives that motivate students to succeed and to behave in socially appropriate ways in educational contexts. In addition, Bandura (1997) suggested that social partners, through acts of verbal persuasion, increase students' motivation.

Regardless their theoretical backgrounds, two decades of research in academic contexts have found a consistent association between perceived social support on the one hand, and student motivation, engagement, or academic performance on the other hand (Connell, Spencer, & Aber, 1994; Finn, 1993; Skinner & Belmont, 1993; Wentzel, 1998). Here follows a brief summary of these findings and some of their limitations.

1.1. Perceived supervisor/teacher support

The supervisor/teacher's support includes behaviors such as positive feedbacks, the provision of structure, and dedication of resources. Previous studies conducted at both high school and university level showed that perceived support from the teacher foster students' engagement in learning activities (Dupont, Galand, Hospel, & Nils, 2014; Midgley, Feldlaufer, & Eccles, 1989; Roeser, Midgley, & Urban, 1996; Williams & Deci, 1996). In addition, teachers' provision of accurate feedback and suggestions, increase students' perceived ability and the performance in the end (Bandura, 1997) as well as intrinsic motivation (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009).

1.2. Perceived family support

Supportive families provide students with positive schemata regarding oneself. According to Sarason, Sarason, and Pierce (1990), perceived family support provides a secure context that allows active participation, exploration, and experimentation in a wide range of life experiences, including learning experiences, resulting in the acquisition of skills and self-confidence. Studies have shown that perceived family support increases students' perceived ability (Mattanah, Lopez, & Govern, 2011; Schunk & Pajares, 2009; Torres & Solberg, 2001), students' positive value attributed to learning tasks, their engagement (Reynolds & Clements, 2005) and their achievement during undergraduate studies (Cutrona, Cole, Colangelo, Assouline, & Russell, 1994).

1.3. Perceived peer support

Students may also receive support from their peers. According to Richardson and Skinner (1992), this support is provided when student belong to informal groups of study, when they share notes and experiences, and exchange advices and opinions about options to take, strategies to use, and so on. Studies have shown that perceived peer support was associated with students' motivation and engagement in learning activities and their performance (Robbins et al., 2004; Torres & Solberg, 2001). In addition, Tinto (1997) suggested

that when first-year university students help each other, they persist more in the academic tasks, they engage more, at the cognitive, emotional and behavioral level. This suggestion has been confirmed by some studies (Fass & Tubman, 2002; Friedlander, Reid, Shupak, & Cribbie, 2007). However, when controlling for family support, Cutrona et al. (1994) found that peers support was not a significant predictor of achievement outcomes anymore.

1.4. Perceived institutional support

In many universities, interventions are provided in order to help students to develop appropriate skills (e.g. study habits and learning strategies). These interventions (for example seminars) are specifically oriented toward the development of skills related to the ongoing task (Robbins et al., 2009) and thus differ from the other forms of support that focus more on affective sustain or feedbacks on the work already done. Studies have shown that perceived institutional support was associated students' perceived ability and task value, emotional, behavioral and cognitive engagement as well as academic performance (Robbins et al., 2009).

Some studies suggest that these various sources of social support (teachers, family, peer, institution) have an independent and direct effect (Furrer & Skinner, 2003; Vallerand, Fortier, & Guay, 1997) on motivation and engagement. Other studies found that teacher support is the most relevant source (Goodnow, 1993; Wentzel, 1998). However, no study has investigated simultaneously the impact of these four sources of support on motivational outcomes. Therefore, the influence of sources of perceived social support on motivation and dimensions of student engagement is still unclear. Moreover, most studies reviewed above assessed the associations between perceived social support on the one hand, and motivation or achievement on the other hand. The mediation effect of motivation between social support and achievement is usually not tested.

2. Student motivation and engagement as mediators of the effect of perceived social support on academic performance

According to motivational theories (Eccles & Wang, 2012; Eccles & Wigfield, 2002), the relationships between perceived social support and engagement are likely to be mediated by students' perceptions about themselves and the task at hand. Then, engagement is hypothesized to be the most proximal predictor of achievement. It is common experience that when people encourage us, guide us and advise us, we suddenly become more confident and also enjoy more the task. As a consequence we invest ourselves more in the task and also the ultimate performance can be much better (Skinner et al., 2008; Sierens et al., 2009). In this study, we focused on two indicators of motivation: perceived ability and perceived task value. Indeed students may develop different perceptions about themselves (e.g. "Am I able to do it?") and about the task itself (e.g. "Why do I work on this task?). These perceptions refer to internal processes whereby activities are sustained and energized (Schunk, Pintrich, & Meece, 2008). Skinner et al. (2008) defined them as private, unobservable processes that are facilitators of engagement. This refers to student's active involvement in learning activities and is represented by observable and public behaviors, cognitions and emotions that occur during the execution of a learning task (Skinner, Kindermann, & Furrer, 2009).

Perceived ability is defined as one's own perception about the ability to complete a task (Bandura, 1997). Research has shown that students who perceive themselves as competent engage more in learning activities and have better performance (De Clercq, Galand, Dupont, & Frenay, 2013; Pajares, 1996). More precisely, some authors have suggested that these students engage more "meaningfully and thoughtfully" and are more prone to mental effort than those who doubt about their abilities (Galand & Vanlede, 2004; Greene & Miller, 1996; Pintrich & De Groot, 1990); they are more likely to invest effort and to persist against difficulties and after failure (Pintrich & Schunk, 2002), they feel more enjoyment and interest, less stress, anxiety, and depression (Bandura, 1997; Pekrun, Goetz, Titz, & Perry, 2002).

Perceived task value consist in the subjective reasons for engaging in a task, that can be represented by its intrinsic value, that is the potential enjoyment in the task, the attainment value, which is the subjective importance of a good performance, and lastly the utility value, that corresponds to its usefulness to short-term and long-term goals (Eccles & Wigfield, 1995; Eccles & Wigfield, 2002). Pintrich and his colleagues (Pintrich, 1989; Pintrich & Garcia, 1991) showed in diverse studies that the overall task value (intrinsic, attainment and utility) was associated with the use of cognitive strategies such as rehearsal, elaboration and critical thinking. In addition, researchers showed that students who valued their learning task were more willing to display effort and spend time in these tasks; they also felt more enjoyment and were less likely to be distracted (Boudrenghien & Frenay, 2011; Wigfield & Eccles, 1994).

Other studies have indicated that student engagement is a robust predictor of students' learning and grades (Marks, 2000; Pirot & De Ketele, 2000; Richardson, Abraham, & Bond, 2012). It is also considered as a protective factor against school and university dropout (Appleto, Christenson, & Furlong, 2008; Fredricks, Blumenfeld, & Paris, 2004; Dupont, Meert, Galand, & Nils, 2013; Tinto, 1997, 2001). A consensus is emerging among scholars to consider that at least three dimensions of student engagement can be disentangled: emotional, cognitive and behavioral (Fredricks et al., 2004; Reeve, 2012). Emotional engagement refers to the students' affective reactions when they face an academic task (Pekrun, 2006; Skinner & Belmont, 1993). Cognitive engagement refers to the use of surface- and deep-processing strategies and self-regulation strategies (Marton & Säljö, 1997; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996). Finally, behavioral engagement refers to the students' effort and persistence during the initiation and execution of a learning task (Finn, Pannozzo, & Voelkl, 1995; Skinner et al., 2009).

Mixed findings have been reported concerning the influence of each dimension of student engagement on achievement outcomes. Some research suggested that all of the three dimensions are important (Fredricks et al., 2004). Other showed that behavioral engagement is the most important predictor of academic performance (Archambault, Janosz, Fallu, & Pagani, 2009; Wang & Eccles, 2012). In their meta-analysis about the psychological correlates of university students' academic performance, Richardson et al. (2012) showed that variables representing effort and time spent for studying were more proximal predictors of academic performance than emotions and deep approach to learning.

Theoretical models postulate that motivation mediates the relationships between perceived social support and dimensions of engagement (Connell & Wellborn, 1990; Dupont, Galand, & Nils, et al., 2014) and empirical studies have confirmed this assumption (Lam et al., 2012; Patrick et al., 2007; Skinner et al., 2008). In particular, two longitudinal studies have shown that perceived ability and interest in the task were mediators of the relationship between perceived teacher's support and both emotional and behavioral engagement (Connell et al., 1994; Skinner et al., 2008).

Moreover, theoretical models also postulate that engagement itself could mediate the relationship between motivation and academic performance (Ainley, 2012; Reschly & Christenson, 2012). Supporting evidence was collected by Reeve and his colleagues (Reeve, 2012; Reeve & Tseng, 2011) who have found, indeed, that all dimensions of engagement (cognitive, emotional and behavioral) partially mediate this relationship. Parts from those, other

mediations posited in the above models (Connell et al., 1994; Skinner et al., 2008) have not been tested yet. In particular, no evidence is yet available about the mediation role of motivation in explaining the relationships between other sources of perceived social support (from peers, family and institution) and engagement dimensions.

3. Aims of the study

In sum, the first aim of this study is to give a theoretical contribution extending previous research with regard to the associations between different sources of social support, motivation, student engagement and academic performance. From studies reviewed above, we developed a theoretical model (see Fig. 1) that specified direct paths from student perceptions of institutional, supervisor, peer and family support to both perceived ability and task value. The model also specified direct paths from perceived ability and task value to emotional, cognitive and behavioral engagement. Moreover, it specified paths from emotional, cognitive and behavioral engagement to academic performance. This model hypothesizes that the effect of perceived social support on academic performance is mediated by student engagement and that the effect of perceived social support on engagement is itself mediated by motivation. For all these analyses, students' prior performance was controlled, so as to determine which factors are significant predictors of academic performance rather than being merely an indirect reflection of past performance. The second aim is empirical and was to test this model in order to investigate the mediating role of motivation and student engagement in the relationships between perceived social support and academic performance, and the relative contribution of each dimension of engagement to performance.

4. Method

4.1. Participants and procedure

In this study, the proposed model was tested in the context of the master thesis. In many graduate programs, a thesis is required as a final step: students have to undertake, within a few months, an original work generally including a literature research, data collection, data analyses, and writing. In this context, students are expected to exhibit high level of critical thinking and to work in an autonomous manner. We considered this as the suitable field to investigate the above associations, as it involves all the variables of interest: perceived ability and task value, engagement in its different forms, as well as different social actors providing support, i.e. supervisor, institution, peers and family.

Participants were 226 (69% female) last year university students (master level), with an average age of 23.82 ($SD = 2.94$; minimum = 21, maximum = 35) who were enrolled in three graduate programs in a Belgian university: social sciences ($n = 154$), humanities ($n = 91$) and economy ($n = 23$). These faculties were selected because they shared many similar requirements for master thesis. Most Belgian university programs are organized around the successful completion of five successive academic years, leading to the award of a master's degree. In their last year of undergraduate studies, students have to complete a Final Dissertation (from October to September), which counts for a large proportion (about 50% in Belgium) of their final assessment.

In spring 2011, all the participants completed a survey during regular lecture time. Participation was voluntary and students were informed that data would be stored anonymously after the examination grade had been obtained. In autumn 2012, the three departments were asked to provide grades of master theses from students who participated to the study ($n = 226$).

4.2. Measures

The questionnaire was constructed on the basis of existing scales that were adapted to the specificity of the final dissertation. French versions of most of these scales had been used in previous research, showing adequate reliability and validity.

4.2.1. Social support

4.2.1.1. Perceived supervisor support. This scale included height items adapted from Galand and Philippot (2005) that tapped the perceived supervisor support (including availability, emotional support, informational support). Items included for example "My supervisor takes into account my ideas"; "It is easy to contact my supervisor", "My supervisor helps me to structure my master thesis".

4.2.1.2. Perceived peer support. This measure included four items adapted from Cabrera, Castaneda, Nora, and Hengstler (1992) and Galand, Raucent, and Frenay (2010) and assessed the students' perceptions of the helps and support they received from other students. Example item is: "I know I can rely on some students to help me in the completion of the master thesis".

4.2.1.3. Perceived family support. This measure included four items adapted from Galand and Hospel (2013) and assessed participants' perceptions of the help and support they received from their family. Example item is: "I know I can rely on my family to help me in the completion of the master thesis".

4.2.1.4. Perceived institutional support. This measure included four items from Dupont et al. (2013) and assessed the students' perception of training and guidance that they receive from their university program in order to realize the final dissertation. Example item is: "My program allowed me to learn the methodology in order to realize my master thesis".

4.2.2. Motivation

4.2.2.1. Perceived ability. This scale included six items adapted from Galand and Philippot (2002) and assessed the students' confidence in their ability to succeed in the various tasks required to complete the master thesis. Example item is: "I feel confident in my ability to write my master thesis".

4.2.2.2. Perceived task value. This measure was adapted from Galand (2004); it was composed by three subscales: intrinsic interest (three items, for example "I am interested in the topic of the master thesis"), perceived utility (three items, for example "My master thesis will be useful for getting my diploma"), and importance (three items, for example "It is important for me to finish the master thesis). Theoretical arguments and empirical results support the combination of those subscales into a global score of perceived task value (Eccles, 2006).

4.2.3. Engagement with the master thesis

4.2.3.1. Emotional engagement. This measure included three items from the PANAS-X (Watson & Clark, 1999) and was validated in French (Gaudreau, Sanchez, & Blondin, 2006). Students reported the frequency of their negative emotions (e.g., afraid, irritable, upset) while they were working on their master thesis.

4.2.3.2. Cognitive engagement. This scale included three items adapted from De Clercq et al. (2013). The items assessed the students' use of deep-processing strategies, including making links

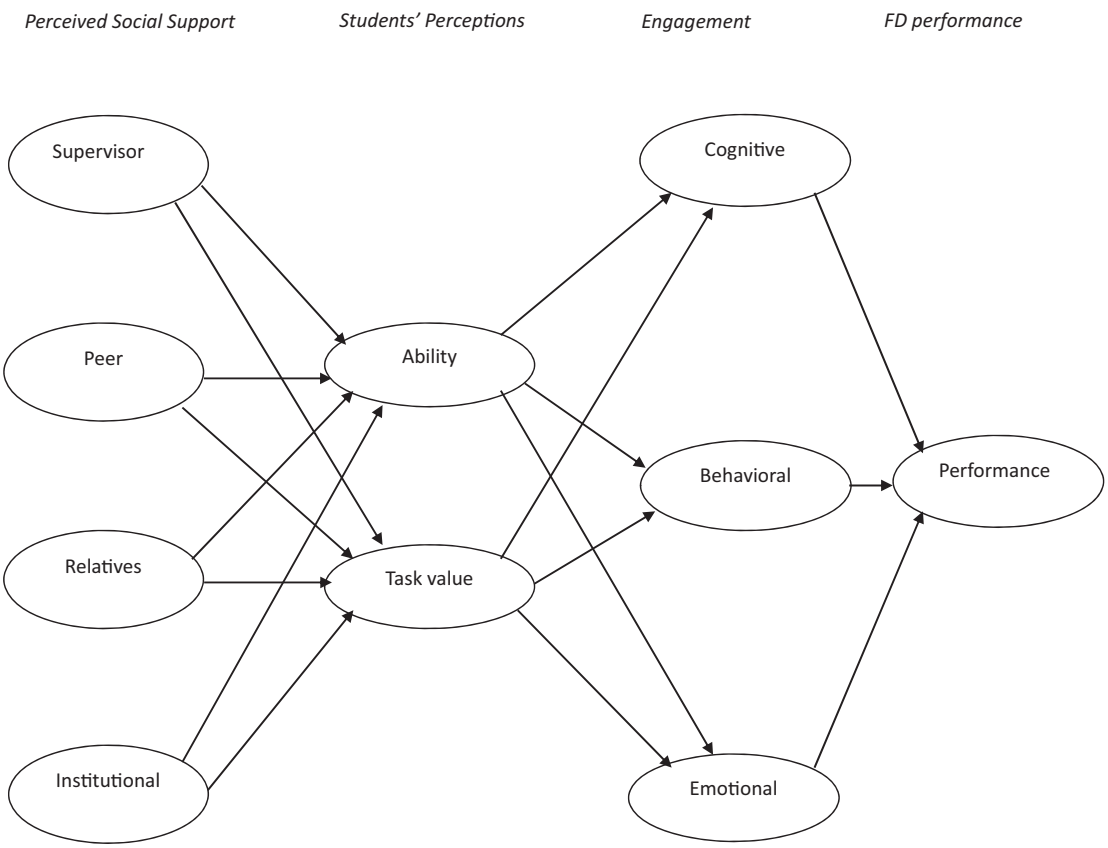


Fig. 1. Hypothesized model of the relations between the social support, motivation, student engagement and academic performance.

between different pieces of information and exploring the relevance of their learning material for real-life situations. Example item is: "When working on my master thesis I made links between my master thesis and my everyday life".

4.2.3.3. Behavioral engagement. This scale was adapted from Skinner et al. (2009). Three items assessed students' effort and time spent on the master thesis. Example item is: "I put a lot of effort into my master thesis".

4.2.4. Achievement

4.2.4.1. Past performance. Participants were asked to indicate their grade point average during the previous academic year.

4.2.4.2. Performance. Master thesis grades were provided by the departments a few months after the questionnaire administration.

5. Results

5.1. Data analyses

Our analyses were conducted in three steps. First, we used confirmatory factorial analyses to test the relationship between the measured items and the respective latent variables. Second, structural equation modeling (SEM) was used to examine the direct and indirect associations between the students' perceptions of support from peers, family, supervisor and institution, perceived task value and ability, behavioral, emotional and cognitive engagement, and their academic performance. SEM allows to control measurement error and to test the fit of a complex pattern of relationships between a set of variables (Byrne, 2001). In this model, we also controlled for students' past performance and tested the proposed indirect effects.[1]

We conducted measurement and structural analyses using Amos (Version 16) and the maximum-likelihood estimation method. In order to evaluate the adequacy of the proposed model, a combination of fit indices was examined: the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the Chi^2 test statistics. For the CFI indices, values greater than .90 are typically considered as being acceptable, and values greater than .95 indicate good fit to the data (Byrne, 2001; Hu & Bentler, 1999). For well-specified models, an RMSEA of .06 or less reflects a good fit (Hu & Bentler, 1999). As a part of the structural model, we also statistically tested the proposed indirect effects. The significance of these indirect effects was determined by bootstrap methods using 95% confidence intervals (Mallinckrodt, Abraham, Wei, & Russel, 2006; Shrout & Bolger, 2002). Amos calculates confidence intervals for total indirect effects using the unstandardized mean beta weight and the associated standard error from 1000 bootstrap samples (Shrout & Bolger, 2002). The indirect effect is considered significant if the confidence interval does not include zero.

5.2. Step 1: measurement model

Before performing the confirmatory factorial analyses, we used parceling for the perceived supervisor support and perceived ability scales, as they were respectively composed by height and six items. This statistical technique allows estimating fewer parameters, improving model fit and reducing bias in the estimation

[1] Preliminary analyses showed no significant gender differences for most variables, except a small mean difference in emotional and cognitive engagement. Consequently, gender was not included in subsequent analyses.

of structural parameters (Bandalos, 2002). The two scales had high internal reliability and demonstrated unidimensionality in exploratory factor analyses yielding single factors (eigenvalues perceived supervisor = 4.53, perceived ability = 2.89). This unidimensionality is a requirement for parceling procedure. We then created four parcels for the perceived supervisor scale and three parcels for the perceived ability scale by combining together pairs of items that were correlated. In addition, utility, interest and importance were introduced in the analyses as observed measures of the latent construct task value. Empirical and theoretical argument supports this method (Eccles, 2006).

Then all the items as well as the parcels were entered into the same measurement model. The hypothesized model displayed an adequate fit to the data: χ^2 (398, $n = 226$) = 622.494, $p < .001$; RMSEA = 05; CFI = 912. The standardized parameter estimates of all observed variables loaded adequately on their respective latent variables (ranging from .51 to .89), apart for the third indicator of task value (.35) (i.e. Importance). This indicator was kept because of its theoretical importance. Then, we observed the modification indices. They suggested removing an item from the perceived institutional support scale ("i.e. In my graduate program, the general requirements about the final dissertation are clear"), and one item from the perceived family support scale ("i.e. my family is disposed to discuss problems that I encounter in my work"): they had modification indices exceeding 12.00. Indeed, these items did not referred exactly to institutional support (general requirements are not preparedness for the master thesis completion) nor family support (discussing is not the same as helping or supporting during the master thesis completion). A CFA was performed without these two items. The results indicated a better model fit (χ^2 (341, $n = 226$) = 497.576, $p < .001$; RMSEA = 045; CFI = .931). Descriptive statistics for all the measures are presented in Table 1. All the variables had adequate statistical characteristics.

The correlations among the latent variables are presented in Table 2. Results suggested no problems of multicollinearity: they indicate that peer support was positively related to family support ($r = .25$; $p < .05$) and supervisor support ($r = .14$; $p < .08$), supervisor support was positively related to family support ($r = .24$; $p < .05$) and institutional support ($r = .19$; $p < .05$). Past performance was positively related to family support ($r = .15$; $p < .05$). Finally, perceived task value was positively related to perceived ability ($r = .56$; $p < .001$). These results indicate the various sources of perceived social support included in this study were not redundant without being completely independent.

5.3. Step 2: structural model

The second step of the analysis included a test of the model proposed in Fig. 1. In this model, we also allowed free estimation of the covariance between the four exogenous latent variables (perceived supervisor, family, peer and institutional support), and between perceived ability and task value as they were found to be related in previous studies. We also specified paths from past performance to perceived task value, perceived ability, emotional, cognitive and behavioral engagement and academic performance, so as to control for its potential effect. Results showed that the hypothesized covariance structure displayed an adequate fit to the data, χ^2 (400, $n = 226$) = 559.419, $p < .001$, CFI = .932, RMSEA = 042. An alternative model in which all the non-significant paths were removed, keeping only the significant ones, was tested. This alternative model displayed an adequate fit: χ^2 (415, $n = 226$) = 566.222, $p < .001$, CFI = .934, RMSEA = 041. The Chi^2 value for this model did not significantly differ from the initial one, indicating that the deleted paths did not improve the fit of the model. Consequently, this final model was kept on the grounds of parsimony.

We also tested alternative models in which direct paths from perceived social support to engagement and academic performance and from motivational factors to academic performance were added to the previous model. First, direct paths from each source of perceived social support to the three dimensions of engagement were added. None of those paths were significant. Second, direct paths from each source of perceived social support to academic performance were included. Results indicated that only the path from perceived supervisor support to performance was significant ($\beta = .14$, $p < .05$). With the inclusion of this path, the fit of the model remained quite similar (χ^2 (412, $n = 226$) = 565.13, $p < .001$, CFI = .934, RMSEA = 041). Finally, direct paths from motivational factors to academic performance were added to the model. None of those paths were significant.

Table 1
Descriptive statistics for all the latent variables.

Variables	Range	*M*	*SD*	Cronbach's alpha
Social support				
1. Supervisor	1–5	3.96	.76	.88
2. Peer	1–5	3.65	.87	.79
3. Family	1–5	3.36	.94	.72
4. Institutional	1–5	3.21	.91	.78
Students' perceptions				
5. Ability	1–5	3.72	.61	.77
6. Task value	1–5	3.65	.69	.65
Engagement				
7. Behavioral	1–5	3.79	.94	.79
8. Cognitive	1–5	3.91	.63	.74
9. Emotional	1–5	2.54	.90	.76
10. Academic performance	0–20	14.08	2.11	
11. Past performance	1–5	3.4	.84	

$n = 226$.

Table 2
Zero-order correlations among variables in the measurement model after modifications of variables.

	1	2	3	4	5	6	7	8	9	10
Social support										
1. Supervisor	–									
2. Peer	.14*	–								
3. Family	.24*	.24*	–							
4. Institutional	.19*	.10	.11	–						
Students' perceptions										
5. Ability	.19*	.05	. 07	57**	–					
6. Task value	.32**	.11	. 19*	.36**	56**	–				
Engagement										
7. Behavioral	.12	–.03	.10	.18*	.46**	.29**	–			
8. Cognitive	.06	.05	–.05	.31**	.49**	.49**	.29**	–		
9. Emotional	.11	.02	.02	.32**	.54**	.19*	.17*	.19*	–	
10. Academic performance	.22**	.10	.17*	.15*	.23**	.22**	.24**	.17*	.03	–
11. Past performance	.14*	.05	.16**	.13*	.19**	.23**	.19**	.06	.08	.50**

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

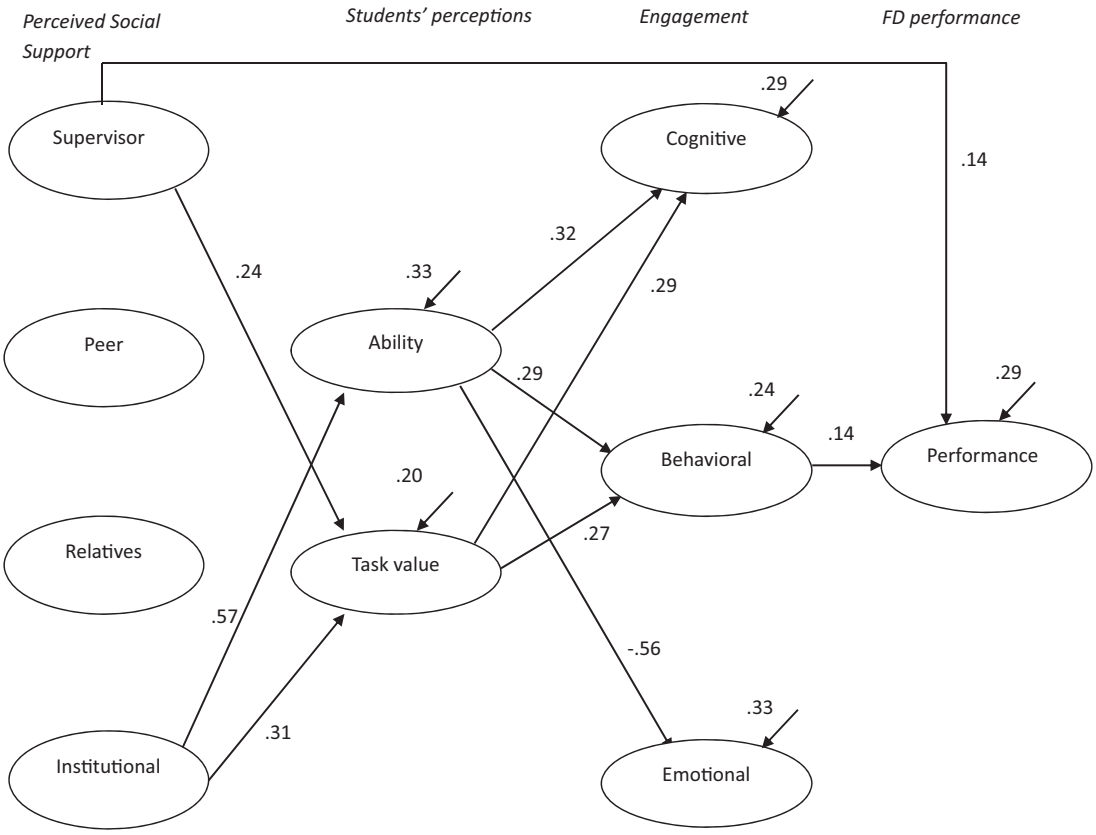


Fig. 2. Structural model controlling for past performance. Non-significant paths are not shown. All paths are significant at .001. Correlations between sources of support are presented in Table 2. $n = 226$.

The results of the final model (see Fig. 2) showed significant paths from perceived supervisor support to perceived task value ($\beta = .24$, $p < .05$) and to academic performance ($\beta = .14$, $p < .05$), and from perceived institutional support to perceived ability ($\beta = .57$, $p < .001$) and perceived task value ($\beta = .31$, $p < .001$). Contrary to our hypothesis, the paths from perceived supervisor support to perceived ability and from perceived peer and family support to either perceived task value or ability were not significant. Past performance was positively associated with perceived task value ($\beta = .15$, $p < .05$), emotional engagement ($\beta = .18$, $p < .05$) and academic performance ($\beta = .48$, $p < .001$).

Then, results showed significant paths from perceived task value to cognitive ($\beta = .29$, $p < .05$), and behavioral engagement ($\beta = .27$, $p < .05$), and from perceived ability to emotional ($\beta = -.56$, $p < .001$), cognitive ($\beta = .32$, $p < .05$), and behavioral engagement ($\beta = .29$, $p < .05$). Contrary to our hypothesis, the path from perceived task value to emotional engagement was not significant. Finally, behavioral engagement was associated with performance ($\beta = .14$, $p < .05$). Emotional and cognitive engagements were not directly associated with academic performance.

5.4. Step 3: indirect effects

Finally, we tested the significance of the indirect effects. As shown in Table 3, bootstrap confidence intervals revealed that perceived institutional support was positively associated with emotional, cognitive and behavioral engagement through perceived ability and task value ($\beta = -.32$, BC 95% CI = −.44, −.21; $\beta = .27$, BC 95% CI = .16, .40; $\beta = .25$, BC 95% CI = .13, .37), and with academic performance through behavioral engagement ($\beta = .04$, BC 95% CI = .01, .08). In other words, greater students' perception of institutional support was associated with greater perceived ability and task value. Then the motivational variables were associated with emotional, cognitive and behavioral engagement, which in turn, increased academic performance.

Perceived supervisor support was positively associated with cognitive engagement through task value ($\beta = .07$, BC 95% CI = .01, .17), but not with performance. Greater perceived supervisor support was associated with perceived task value, which in turn, was associated with cognitive engagement. Turning to motivational factors, results revealed that perceived ability was associated with academic performance through behavioral engagement ($\beta = .05$, BC 95% CI = .02, .12).

6. Discussion

The aim of this prospective study was to extend previous research with regard to the associations between different sources of perceived social support, student motivation, engagement and academic performance by testing the model presented in Fig. 1. More specifically, our purpose was:

- to clarify the effect of different sources of perceived social support on motivational factors, engagement dimensions and academic performance;
- to test whether motivational factors are mediators of the relationship between perceived social support and engagement;
- to test whether dimensions of students' engagement are mediators of the relationships between motivational factors and academic performance.

These analyses were conducted controlling for students' past performance and results are discussed in the next section.

Table 3
Test of significance of the indirect effects.

Independent variable	Mediating variable (s)	Dependent variable	Original sample: B standardized indirect effect	Bootstrap		
				Mean indirect effect	95% CI with bias correction (lower, upper)	Bias – corrected *p*
Perceived social support						
Institution	Task value, ability	Cognitive engagement	.27	.27	.16, .40	.001
Institution	Task value, ability	Emotional engagement	–.32	–.32	–.44, –.21	.001
Institution	Task value, ability	Behavioral engagement	.25	.25	.13, .37	.001
Supervisor	Task value	Cognitive engagement	.07	.07	.01, .17	.001
Institution	Task value, ability, behavioral engagement	Academic performance	.04	.04	.01, .08	.001
Students' perceptions						
Perceived ability	Behavioral engagement	Academic performance	.05	.05	.02, .12	.001

6.1. Specific contribution of sources of perceived social support

In line with motivational theorists (Connell & Wellborn, 1990; Wentzel, 1998), perceived social support directly promoted motivational factors and subsequent engagement in learning activities. However, our findings indicated that only supervisor and institutional support were directly related to motivational factors and student engagement in their master thesis. In line with Robbins et al. (2009), when students perceive that the institution has prepared them well enough for achieving a task, they consider it as more important, useful and interesting, and believe more in their abilities to achieve it. In addition, perceived institutional support was indirectly associated, through perceived task value and perceived ability, with the students' use of deep-processing strategies, less negative emotions, and higher academic performance. These results suggest that training students facilitates their engagement in the master thesis and their subsequent performance. Research on post-secondary studies so far neglected the role of this institutional influence when examining the impact of different sources of social support on school and academic performance.

Results also indicated that perceived support from the supervisor is linked with the attribution of value to the task, which in turn boosts cognitive engagement. This finding is in line with studies conducted in both school and universities contexts (Midgley et al., 1989; Vansteenkiste et al., 2009) and is important given that deep-processing of information is often seen as a goal of higher education. Perceived supervisor support also had a direct effect on academic performance, which was not explained by its influence on motivational factors. These results may have practical implication in setting effective trainings for university professors or for teachers in general.

Contrary to the hypothesized model, the path from supervisor support to perceived ability was not significant. However this association was found in correlation analyses (Table 2), but since perceived ability was also correlated with institutional support, it might be that once institutional support is taken into account this association is largely reduced. This result showed the importance of taking into account different dimensions of perceived social support at the same time, so as to shed light on the unique and independent effect of each source of social support on motivation, engagement, and performance.

Also, perceived supervisor support was not directly associated with emotional and behavioral engagement in the final model. This apparently contrasts with results showing an impact of supervisor support on cognitive engagement. However, the particular nature of the task might explain why various patterns of relationships with some dimensions of engagement are found in different studies. The master thesis actually requires mainly independent work, and the supervisor only keeps an overview on students' work. Based on that, it is not surprising that supervisor support does not influence the effort they put into it and the emotions they feel, which might mainly depend on personal factors. On the other side, its observed association with cognitive engagement is comprehensible, as it may be explained by its expertise and critical attitude toward the students.

Such explanation is consistent with Bronfenbrenner (2005) theoretical proposal, who already pointed out the importance of the nature of the learning task in the relationships between perceived social support and engagement variables: "The form, content and direction of the proximal processes vary systematically as a joint function of the characteristics of the developing person, the environment – both immediate and more remote – in which the processes are taking place, the nature of the development outcomes under consideration (. . .)" (p. 798). At the same time, this explanation contradicts Connell and Wellborn (1990)'s hypothesis that the relationships between perceived social support, motivational factors and student engagement are context invariant.

By the same token, the absence of direct effect of family and peer support in the final model could be explained by their associations with other sources of social support or by the age of the participants. Indeed, least year university students enter in adulthood (our sample had a mean age of 24 years old) and so begin to assume more responsibility, are more socially independent and more autonomous in their work than first-year university students (Roberts, Caspi, & Moffitt, 2001).

6.2. Students' perceptions about the self and the task

Perceived task value and ability have been considered proximal predictors of engagement variables across several studies (Patrick, Ryan, & Kaplan, 2007; Skinner et al., 2008), and our study confirmed these assumptions. Looking at mediations, in line with previous studies (Lam et al., 2012; Patrick et al., 2007; Skinner et al., 2008; Tucker et al., 2002), perceived ability and task value were found to mediate the relationships between perceived support and dimensions of engagement. As expected, results also indicate that student engagement mediates the effect of motivation on performance

(especially behavioral engagement mediates the effect of perceived ability on academic performance).

6.3. Student engagement as a predictor of academic performance

Among engagement dimensions, our findings indicated that behavioral engagement was the only direct contributor to academic performance above past achievement. This finding is in line with previous research. Indeed the effect of behavioral engagement on performance is systematically observed, whereas the effect of emotional and cognitive dimensions are unstable and not always observed (see Marks, 2000; Richardson et al., 2012; Skinner, Wellborn, & Connell, 1990). Cognitive engagement was no longer associated with academic performance when behavioral engagement was taken into account. Future studies may investigate other facets of cognitive engagement, such as the use of self-regulation strategies, above all because the master thesis is a task that demands independent learning requiring abilities to regulate cognitions, emotions and motivation as well as the environment (Pintrich, 2003).

6.4. Limitations

Since our results are based on correlational data, at this stage it is impossible to infer causal relations among the variables in our model. Although the model was based on the theoretical propositions postulated by engagement theories, to provide more robust confirmation of the present results longitudinal design, involving data collection at multiple time points, is still necessary. In addition, this methodology would allow investigating the dynamic between the variables and would also allow having a more precise picture of students' experience of writing up the master thesis. For example, a longitudinal research Skinner et al. (2008) put in evidence that engaged students received more support from teachers.

6.5. Practical implications

The results of the present study clearly indicated that some sources of social support are more important for academic achievement than other. They suggest that the development of supervisor and institutional support could be a way to foster university student achievement. Moreover, they show that perceived support from those two sources is related to a higher level of motivation and engagement, which partially explain their effects on performance but is also valuable in itself as educational goals (self-confidence, higher order thinking. . .). Training programs aiming at improving supporting teachers' skills have already demonstrated their effect on students' academic performance, so we recommend future studies to test such interventions in the context of the master thesis. In addition, institutions have to take into account the importance of providing to students the required skills for the completion of the master thesis, given that such institutional strategies have positive consequences on motivation, engagement and final performance. Indeed, our results suggest that interventions do not have necessarily to arbitrate between social support and motivation but that developing some sources of support directly under the control of teachers could sustain both student motivation and achievement. Finally, the results also support the idea that the behavioral dimension of engagement could be a highly relevant indicator to monitor interventions and to target students more at risk of academic difficulties.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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References

Ainley, M. (2012). Students' Interest and Engagement in Classroom Activities. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 283–302). New York, NY: Springer Sciences. http://dx.doi.org/10.1007/978-1-4614-2018-7-13

Appleton, J. J., Christenson, S. L., & Furlong, M. J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools*, *45*, 369–386. http://dx.doi.org/10.1002/pits.20303

Archambault, I., Janosz, M., Fallu, J.-S., & Pagani, L. S. (2009). Student engagement and its relationship with early high school dropout. *Journal of Adolescence*, *32*(3), 651–670. http://dx.doi.org/10.1016/j.adolescence.2008.06.007

Bandalos, D. L. (2002). The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling. *Structural Equation Modeling*, *9*, 78–102. http://dx.doi.org/10.1207/S15328007SEM0901_5

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.

Boudrenghien, G., & Frenay, M. (2011). La transition de l'enseignement secondaire vers l'enseignement supérieur : Rôle des représentations et motivations à l'égard de son projet de formation [Transition from high-school to college: The role of representations and motivations towards one's educational goal]. *L'Orientation Scolaire et Professionnelle*, *40*(2).

Bronfenbrenner, U. (2005). *Making human beings human: Bioecological perspectives on human development*. Thousand Oaks, CA: Sage Publications.

Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Associates.

Cabrera, A. F., Castaneda, M. B., Nora, A., & Hengstler, D. (1992). The convergence between two theories of college persistence. *The Journal of Higher Education*, *63*(2), 143–164.

Connell, J. P., Spencer, M. B., & Aber, J. L. (1994). Educational risk and resilience in African-American youth: Context, self, action, and outcomes in school. *Child Development*, *65*, 493–506. http://dx.doi.org/10.1111/j.1467-8624.1994.tb00765.x

Connell, J. P., & Wellborn, J. G. (1990). Competence, autonomy and relatedness: A motivational analysis of self-system processes. In M. R. Gunnar, & L. A. Sroufe (Eds.), *The Minnesota symposium on child psychology* (22) (pp. 43–77). Hillsdale, NJ: Erlbaum.

Cutrona, C. E., Cole, V., Colangelo, N., Assouline, S. G., & Russell, D. W. (1994). Perceived parental social support and academic achievement: An attachment theory perspective. *Journal of Personality and Social Psychology*, *66*, 369–378. http://dx.doi.org/10.1037/0022-3514.66.2.369

De Clercq, M., Galand, B., Dupont, S., & Frenay, M. (2013). Factors predicting achievement among 1st year university students: An integrative and contextualised approach. *European Journal of Psychology of Education*, *28*, 641–662. http://dx.doi.org/10.1007/s10212-012-0133-6

Dupont, S., Galand, B., Hospel, V., & Nils, F. (2014). Social context, self-perceptions and student engagement: A SEM investigation of the self-system model of motivational development. *Electronic Journal of Research in Educational Psychology.*, *12*(1), 5–32. http://dx.doi.org/10.14204/ejrep.32.13081

Dupont, S., Galand, B., & Nils, F. (2014). Factors predicting postponement of a final dissertation: Replication and extension. *Psychologica Belgica*, *54*(1), 33–54. http://dx.doi.org/10.5334/pb.ac

Dupont, S., Meert, G., Galand, B., & Nils, F. (2013). Postponement in the completion of the Final Dissertation: An Underexplored dimension of achievement in higher education. *European Journal of Psychology of education*, *28*, 619–639. http://dx.doi.org/10.1007/s10212-012-0132-7

Eccles, J.S. (2006). Motivation and academic decisions. Paper presented at the Doctor Honoris Causa Ceremony, Louvain-La-Neuve, Belgium.

Eccles, J. S., & Wang, M. (2012). Part I commentary: So what is student engagement anyway? In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (2012) (pp. 133–145). New York, NY: Springer Sciences.

Eccles, J. S., & Wigfield, A. (1995). In the mind of the actor: The structure of adolescents' achievement tasks values and expectancy-related beliefs. *Personality and Social Psychology Bulletin*, *21*, 215–225. http://dx.doi.org/10.1177/0146167295213003

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*, 109–132. http://dx.doi.org/10.1146/annurev.psych.53.100901.135153

Fass, M. E., & Tubman, J. G. (2002). The influence of parental and peer attachment on college students' academic achievement. *Psychology in the Schools*, *39*, 561–573. http://dx.doi.org/10.1002/pits.10050

Feldman, K. A. (2007). Identifying exemplary teachers and teaching: Evidence from student ratings. In R. P. Perry, & J. C. Smart (Eds.), *The scholarship of*

teaching and learning in higher education: An evidence-based approach (pp. 93–129). http://dx.doi.org/10.1007/1-4020-5742-3_5

Finn, J. D. (1993). *School engagement and students at risk*. Washington, DC: National Center for Education Statistics.

Finn, J. D., Pannozzo, G. M., & Voelkl, K. E. (1995). Disruptive and inattentive-withdrawn behavior and achievement among fourth graders. *Elementary School Journal*, *95*, 421–454.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, *74*, 59–109. http://dx.doi.org/10.3102/00346543074001059

Friedlander, L. J., Reid, G. J., Shupak, N., & Cribbie, R. (2007). Social support, self-esteem, and stress as predictors of adjustment to university among first-year undergraduates. *Journal of College Student Development*, *48*(3), 259–274.

Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, *95*, 148–162. http://dx.doi.org/10.1037/0022-0663.95.1.148

Galand, B. (2004). Le rôle du contexte scolaire et de la démotivation dans l'absentéisme des élèves [The effect of school context and motivation on student absenteeism]. *Revue des Sciences de l'Éducation*, *30*, 125–142. http://dx.doi.org/10.7202/011773ar

Galand, B., & Hospel, V. (2013). Peer victimization and school disaffection: Exploring the moderation effect of social support and the mediation effect of depression. *British Journal of Educational Psychology*, *83*, 569–590. http://dx.doi.org/10.1111/j.2044-8279.2012.02077.x

Galand, B., & Philippot, P. (2002). Style motivationnel des élèves du secondaire : Développement d'un instrument de mesure et relations avec d'autres variables pédagogiques [Goal orientations of secondary school students: Development of a measurement instrument and relationships with other educational variables]. *Canadian Journal of Behavioral Science*, *34*, 261–275. http://dx.doi.org/10.1037/h0087179

Galand, B., & Philippot, P. (2005). L'école telle qu'ils la voient : Validation d'une mesure des perceptions du contexte scolaire par les élèves du secondaire [School as they see it: Validation of a measure of students' perceptions of the school context]. *Canadian Journal of Behavioral Science*, *37*(2), 138–154. http://dx.doi.org/10.1037/h0087251

Galand, B., Raucent, B., & Frenay, M. (2010). Engineering students' self-regulation, study strategies, and motivational believes in traditional and problem-based curricula. *International Journal of Engineering*, *26*, 523–534.

Galand, B., & Vanlede, M. (2004). Le sentiment d'efficacité personnelle dans la formation : Quel rôle joue-t-il ? D'où vient-il ? Comment intervenir ? [Self-efficacy beliefs in education: What are its effects? Where does it come from? How to intervene?]. *Savoirs – Revue Internationale de Recherches en Education et Formation des Adultes*, *Hors-série n° 1 « Autour de l'oeuvre d'Albert Bandura »*, 91–116.

Gaudreau, P., Sanchez, X., & Blondin, J. P. (2006). Positive and negative emotional affective states in a performance-related setting: Testing the factorial validity of the PANAS across two samples of French-Canadian participants. *European Journal of Psychological Assessment*, *22*, 240–249.

Goodnow, C. (1993). Classroom belonging among early adolescent students: Relationships to motivation and achievement. *Journal of Early Adolescence*, *13*, 21–43.

Greene, B. A., & Miller, R. B. (1996). Influences on course performance: Goals, perceived ability, and self-regulation. *Contemporary Educational Psychology*, *21*, 181–192.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55.

Lam, S., Wong, B. R., Yang, H., & Liu, Y. (2012). Understanding Student Engagement with a Contextual Model. In S. Christenson (Ed.), *Handbook of Research on Student Engagement* (pp. 403–419). New York: Springer. http://dx.doi.org/10.1007/978-1-4614-2018-7-19

Mallinckrodt, B., Abraham, W. T., Wei, M., & Russell, D. W. (2006). Advances in testing the statistical significance of mediation effects. *Journal of Counseling Psychology*, *53*, 372–378. http://dx.doi.org/10.1037/0022-0167.53.3.372

Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal*, *37*, 153–184. http://dx.doi.org/10.3102/00028312037001153

Marton, F., & Säljö, R. (1997). Approaches to learning. In F. Marton, D. J. Hounsell, & N. J. Entwistle (Eds.), *The Experience of Learning*. Edinburgh: Scottish Academic Press.

Mattanah, J. F., Lopez, F. G., & Govern, J. M. (2011). The contributions of parental attachment bonds to college student development and adjustment: A meta-analytic review. *Journal of Counseling Psychology*, *58*(4), 565–596. http://dx.doi.org/10.1037/a0024635

Midgley, C., Feldlaufer, H., & Eccles, J. S. (1989). Student teacher relations and attitudes toward mathematics before and after the transition to junior high school. *Child Development*, *60*, 981–992. http://dx.doi.org/10.2307/1131038

Miller, R. B., Greene, B. A., Montalvo, G. P., Ravindran, B., & Nichols, J. D. (1996). Engagement in academic work: the role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology*, *21*(4), 388–422.

Organisation de Coopération et de Développement Économiques (OCDE). (2013). *Regard sur l'éducation, les indicateurs de l'OCDE*. Paris.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research*, *66*, 543–578.

Patrick, H., Ryan, A. M., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology*, *99*, 83–98. http://dx.doi.org/10.1037/0022-0663.99.1.83

Pekrun, R. (2006). The control-value theory of achievement emotions: assumptions, corollaries and implications for educational research and practice. *Educational Psychological Review*, *18*, 315–341. http://dx.doi.org/10.1007/s10648-006-9029-9

Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: A program of quantitative and qualitative research. *Educational Psychologist*, *37*(2), 91–105. http://dx.doi.org/10.1207/S15326985EP3702_4

Pintrich, P. R. (1989). The dynamic interplay of student motivation and cognition in the college classroom. In M. Maehr, & C. Ames (Eds.), *Advances in motivation and achievement: Motivation enhancing environments* (2nd ed., 2012, pp. 117–160). Greenwich, CT: JAI Press.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, *95*, 667–686.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*(1), 33–40. http://dx.doi.org/10.1037/0022-0663.82.1.33

Pintrich, P. R., & Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. In M. Maehr, & C. Ames (Eds.), *Advances in motivation and achievement: Goals and self-regulatory processes* (7) (pp. 371–402). Greenwich, CT: JAI.

Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: theory, research, and applications* (2nd ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Pirot, L., & De Ketele, J. M. (2000). L'engagement académique de l'étudiant comme facteur de réussite à l'université. Étude exploratoire menée dans deux facultés contrastées [Student's academic commitment as achievement factor at the university]. *Revue des Sciences de l'Éducation*, *26*, 367–394. http://dx.doi.org/10.7202/000127ar

Reschly, A. L., & Christenson, S. L. (2012). Jingle, Jangle, and Conceptual Haziness: Evolution and Future Directions of the Engagement Construct. In Sandra Christenson (Ed.), *Handbook of Research on Student Engagement* (pp. 3–19). New York: Springer.

Reynolds, A. J., & Clements, M. (2005). Parental involvement and children's school success. In E. N. Patrikakou, R. P. Weissberg, S. Redding, & H. J. Walberg (Eds.), *School-family partnerships for children's success.*. New York: Teachers College Press.

Richardson, R., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin*, *138*, 353–387. http://dx.doi.org/10.1037/a0026838

Reeve, J. (2012). A Self-determination Theory Perspective on Student Engagement. In S. Christenson (Ed.), *Handbook of Research on Student Engagement*. New York: Springer. http://dx.doi.org/10.1007/978-1-4614-2018-7-7

Reeve, J., & Tseng, C. M. (2011). Agency as a fourth aspect of students' engagement during learning activities. *Contemporary Educational Psychology*, *36*(4), 257–267.

Richardson, R., & Skinner, E. (1992). Helping first-generation minority students achieve degrees. In L. Zwerling, & H. London (Eds.), *First-generation students: Confronting the cultural issues* (New Directions for Community Colleges, No. 80) (pp. 29–43). San Francisco: Jossey-Bass.

Robbins, S. B., Lauver, K., Le, H., Davis, D., Langley, R., & Carlstrom, A. (2004). Do psychosocial and study skill factors predict college outcomes? A meta-analysis. *Psychological Bulletin*, *130*(2), 261–288.

Robbins, S. B., Oh, I., Le, H., & Button, C. (2009). Intervention effects on college performance and retention as mediated by motivational, emotional, and social control factors: Integrated meta-analytic path analyses. *Journal of Applied Psychology*, *94*, 1163–1184. http://dx.doi.org/10.1037/a0015738

Roberts, B. W., Caspi, A., & Moffitt, T. E. (2001). The kids are alright: Growth and stability in personality development from adolescence to adulthood. *Journal of Personality and Social Psychology*, *81*, 670–683. http://dx.doi.org/10.1037/0022-3514.81.4.670

Roeser, R. W., Midgley, C., & Urdan, T. C. (1996). Perceptions of the school psychological environment and early adolescents' psychological and behavioral functioning in school: The mediating role of goals and belonging. *Journal of Educational Psychology*, *88*, 408–422.

Sarason, B. R., Sarason, L. G., & Pierce, G. R. (1990). *Social support: An interactional view*. New York: Wiley.

Schunk, D. H., & Pajares, F. (2009). Self-efficacy theory. In K. R. Wentzel, & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 35–53). New York: Routledge.

Schunk, D. H., Pintrich, P. R., & Meece, J. L. (2008). *Motivation in education: Theory, research and applications* (3rd ed.). Upper Saddle River, NJ: Merill-Pentrice Hall.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and non-experimental studies: New procedures and recommendations. *Psychological Methods*, *7*, 422–445.

Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. (2009). The synergistic relationship of perceived autonomy support and structure in the prediction of self-regulated learning. *The British Journal of Educational Psychology*, *79*, 57–68. http://dx.doi.org/10.1348/000709908X304398

Skinner, E. A., Wellborn, J. G., & Connell, J. P. (1990). What it takes to do well in school and whether I've got it: A process model of perceived control and children's engagement and achievement in school. *Journal of Educational Psychology*, *82*, 22–32.

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology*, *85*, 571–581. http://dx.doi.org/10.1037/0022-0663.85.4.571

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic. *Journal of Educational Psychology*, *100*(4), 765–781. http://dx.doi.org/10.1037/a0012840

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*, 493–525.

Tinto, V. (1997). Classrooms as communities: Exploring the educational character of student persistence. *Journal of Higher Education*, *68*(6), 599–623. http://dx.doi.org/10.2307/2959965

Tinto, V. (2001). *Rethinking the First Year of College. Higher Education Monograph Series*. Syracuse University.

Torres, J. B., & Solberg, V. S. (2001). Role of self-efficacy, stress, social integration, and family support in Latino college student persistence and health. *Journal of Vocational Behavior*, *59*(1), 53–63. http://dx.doi.org/10.1006/jvbe.2000.1785

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology*, *72*, 1161–1176. http://dx.doi.org/10.1037/0022-3514.72.5.1161

Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009). Motivational profiles from a self-determination perspective: The quality of motivation matters. *Journal of Educational Psychology*, *101*, 671–688. http://dx.doi.org/10.1037/a0015083

Wang, M. T., & Eccles, J. S. (2012). Adolescent behavioral, emotional, and cognitive engagement trajectories in school and their differential relations to educational success. *Journal of Research on Adolescence*, *22*(1), 31–39. http://dx.doi.org/10.1111/j.1532-7795.2011.00753.x

Watson, D., & Clark, L. A. (1999). *The PANAS-X: Manual for the positive and negative affect schedule-expanded form*. University of Iowa, Department of Psychology. Web site: http://www.psychology.uiowa.edu/Faculty/Watson/Watson.html

Weiss, R. S. (1974). The provisions of social relations. In Z. Rubin (Ed.), *Doing unto others*. Englewood Cliffs, N.J: Prentice-Hall.

Wentzel, K. R. (1998). Social relationships and motivation in middle school: The role of parents, teachers, and peers. *Journal of Educational Psychology*, *90*, 202–209. http://dx.doi.org/10.1037/0022-0663.90.2.202

Wigfield, A., & Eccles, J. (1994). Children's competence beliefs, achievement values, and general self-esteem: Change across elementary and middle school. *Journal of Early Adolescence*, *14*, 104–138.

Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: a test of selfdetermination theory. *Journal of Personality and Social Psychology*, *70*, 767–779.