

Antecedents of Educational Goal Commitment: An Experimental Investigation of the Role of Goal Abstraction, Integration, and Importance

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Abstract

This study investigated the antecedents of educational goal commitment regarding the transition from high school to college among 702 high-school students. A theoretical model based on assumptions from the expectancy-value framework (Eccles & Wigfield, 2002) and the hierarchical goal structure (Carver & Scheier, 1998) was tested. This model is composed of one proximal antecedent—goal importance—and two distal antecedents—goal abstraction and integration. The distal antecedents were experimentally manipulated. The results showed that (a) goal commitment is influenced by goal abstraction and integration, and (b) goal importance is a mediator of this effect. In addition to theoretical implications, a suggested pragmatic outcome is the development of a tool to guide students in the more effective structuring of their educational goals.

Students' commitment to their educational goal at the end of high school has been shown to be an important predictor of choice actualization, commitment to the chosen field of study, and academic adjustment in higher education. These factors are in turn predictive of college students' academic achievement (Germeijs & Verschueren, 2007). However, we know much less about the factors that influence this commitment. Identifying these factors is crucial to guiding students in the construction of their

educational goals and helping them achieve their plans.

Educational goals are the goals that students pursue when choosing their program of study. Goal commitment is defined as the extent to which a particular goal is associated with a strong sense of determination and with the willingness to invest effort in attaining it (Brunstein, 1993; Hollenbeck & Klein, 1987). The antecedents of goal commitment have mainly been investigated for assigned goals in the framework of goal-setting theory (Hollenbeck & Klein, 1987). Research is needed to explore how commitment to personal goals develops. A theoretical model of the factors influencing the commitment to personal (educational) goals has been suggested by Boudrenghien, Frenay, Bourgeois, Karabenick, and Eccles (submitted). The present study is aimed at empirically testing most of the assumptions of this model. They are presented below.

Goal commitment is hypothesized to be directly influenced by goal importance. This assumption is supported by several theoretical and empirical arguments. The expectancy-value model assumes a direct impact of attainment value (i.e., the personal importance of doing well at a given task) on task choice (i.e., the decision of whether or not to begin or continue to invest effort in the task) (Eccles & Wigfield, 2002). Several empirical studies have applied this assumption to the study of goals and confirmed that goal commitment is influenced by goal

value or goal importance (Boudrenghien, Frenay, & Bourgeois, 2011; Klinger, Barta, & Maxeiner, 1980).

Two distal antecedents are postulated to indirectly influence goal commitment, through their impact on goal importance. Carver and Scheier (1998) suggest that the importance of a goal is influenced by its position within an individual's goal hierarchy, which is determined by its degree of integration and level of abstraction. We define the degree of integration of a goal as the extent to which the goal is linked to other goals within the hierarchy. A goal that is linked to other goals is supposed to be more important than an isolated goal (Carver & Scheier, 1998; Sheldon & Kasser, 1995). Moreover, a goal that is formulated at a high level of abstraction concerns being a particular kind of person (a *be-goal*), whereas a goal that is formulated at a low level of abstraction concerns completing a particular kind of action (a *do-goal*) (Carver & Scheier, 1998). A *be-goal* is represented in the higher levels of the hierarchical goal structure and generally applies for a long time, whereas a *do-goal* is represented in the lower levels of the structure and generally applies for a short time. Carver & Scheier (1998) argue that *be-goals* are more fundamental to the over-riding sense of self and are therefore intrinsically more important than *do-goals*.

Abstraction level and degree of integration have rarely been empirically studied with reference to the model developed by Carver and Scheier



(1998). Other theories have been empirically tested, but these studies have focused on only one of the two dimensions (Emmons, 1992; Sheldon & Emmons, 1995; Sheldon & Kasser, 1995; Vallacher & Wegner, 1989). To the best of our knowledge, only one study has investigated both dimensions (Boudrenghien et al., 2011). This study showed a mediation of the impacts of goal abstraction and integration on goal commitment, by goal importance. However, its correlational design did not allow causal relationships to be tested.

The present study is aimed at experimentally investigating the impact of goal abstraction and integration on goal commitment and importance. In addition to the positive main effect of each of these distal antecedents, we postulate an interaction effect. Based on the well-known assumption that distal goals result in lower motivation than proximal ones (e.g., Locke & Latham, 2002; Schunk, 1990; Zimmerman, 1989), we suggest that be-goals do not always enhance goal commitment. The interaction effect we postulate takes into account these two contradictory assumptions concerning the impact of abstraction on motivation. We hypothesize that the positive impact of abstraction on goal commitment (assumed by Carver and Scheier, 1998) appear when the goal is perceived as highly integrated. This interest in combining high levels of abstraction and integration is in line with Bandura's (1986) assumption that we need to combine distal aspirations (i.e., be-goals) with proximal self-guidance (i.e., integration with other goals, including concrete ones) to obtain the best personal development. However, we hypothesize that, in circumstances of low integration, we will observe the negative impact of abstraction assumed by Locke and Latham (2002). When there is not much integration, the focus on a be-goal, which is too far off to undertake actions in immediate situations, is not (sufficiently) compensated for by an awareness of the concrete hierarchical paths to progress toward this goal. On the contrary, the focus on a do-goal compensates for this lack of integration by giving a clearer idea of the actions which need to be

completed. This reasoning suggests that, when the goal is rather isolated, the lower the level of abstraction, the greater the commitment.

We formulated three hypotheses, one for each main effect and one for the interaction effect. The combination of these hypotheses within the same theoretical model (Boudrenghien et al., submitted) implies that the positive impact of abstraction when integration is high should be stronger than its negative impact when integration is low. The main effects as well as the interaction effect are assumed to be mediated by goal importance.

Hypothesis 1. The higher the level of abstraction of a goal, the greater the commitment to this goal, because of the increased goal importance.

Hypothesis 2. The higher the degree of integration of a goal, the greater the commitment to this goal, because of the increased goal importance.

Hypothesis 3. When a goal is highly integrated, the higher the level of goal abstraction, the greater the commitment to this goal, because of the increased goal importance. When a goal is not much integrated, the higher the level of goal abstraction, the lower the commitment to this goal, because of the decreased goal importance.

Method

Design and Participants

This study employed a 2 (abstraction level: high or low) x 2 (degree of integration: integrated or unintegrated) between-participants design. Data were collected from March to May 2008 in nine French-speaking high schools in Belgium. The sample consisted of 702 Grade 12 students enrolled in a comprehensive education program. Participants were randomly assigned to one of four conditions: 175 students, to condition *a* (high level of abstraction plus integration); 175 students, to condition *b* (high level of abstraction but unintegrated); 179 students, to condition *c* (low level of abstraction plus integration); and 173 students, to condition *d* (low level of

abstraction and unintegrated). Some 49.7% of the participants were female and 44.7% were male (39 missing values); 68.9% of them had their eighteenth birthday in 2008 (4.8% were younger and 21.8%, older) (31 missing values).

Procedure

Data were collected in class, during 50-minute sessions. Each student received a document including all the instructions, measures, and manipulations. Four documents were developed, one for each condition. In each class, we randomly gave out the four types of documents, which were not distinguishable from their cover page. In all four documents, the experiment proceeded in three steps and took approximately 40 minutes. First, the participants completed a self-report questionnaire. They were asked to imagine that they had to pick a program of study at college now, and to write down the educational goal they were pursuing by choosing this program. Students provided information concerning this goal, which allowed us to collect baseline measures. Second, goal abstraction and integration were manipulated (see below). Finally, a second self-report questionnaire was administered. It again asked the students to give their educational goal, and then measured goal commitment and its antecedents. At the end of the study, the participants were debriefed.

The objective of the manipulation of the abstraction level was to make students adopt either an abstract expression of their educational goal (worded in terms of a be-goal) or a concrete expression (worded in terms of a do-goal). Students were asked to select the one that suited them best from three expressions of educational goals. Depending on the condition to which the participant had been assigned (high or low level of abstraction), the expressions among which he/she had to choose were either all worded in terms of a be-goal or all worded in terms of a do-goal. Students assigned to the high level of abstraction condition were presented with the three following be-goals: "to be a person working in this domain" "to be competent in this



domain”, and “to be recognized by people working in this domain”. By contrast, students assigned to the low level of abstraction condition had to choose between the following do-goals: “to attend courses in this domain”, “to train myself in this domain”, and “to study in this domain”.

condition to which the participant had been assigned. Students in the integrated condition were told that most people perceived their goals as highly linked, and were given some examples of this perception (e.g., in order to become competent in medicine, it is of course necessary to succeed in high

related to this goal on the hierarchical diagram represented on Figure 1 (be-goals in Line 1 and do-goals in Line 2). To be consistent with the manipulation of abstraction level, if they had been assigned to the condition of a high level of abstraction they were asked to write their educational goal in Line 1, whereas if they had been assigned to the condition of a low level of abstraction they were asked to write it in Line 2.

Students in the unintegrated condition were told that most people perceived their goals as isolated, as belonging to different life spheres. Some examples of this perception were given (e.g., that the goal of becoming competent in medicine has got nothing to do with other goals pursued in life, such as to be a good parent). Then, these students were asked to indicate which of the goals they had selected from the two lists were different from their educational goal and belonged to other life spheres than the study/work sphere. Finally, these participants were presented with a diagram showing five life spheres (Figure 2), and asked to write their educational goal in the study/work sphere and their other (different) goals in the other spheres as appropriate.

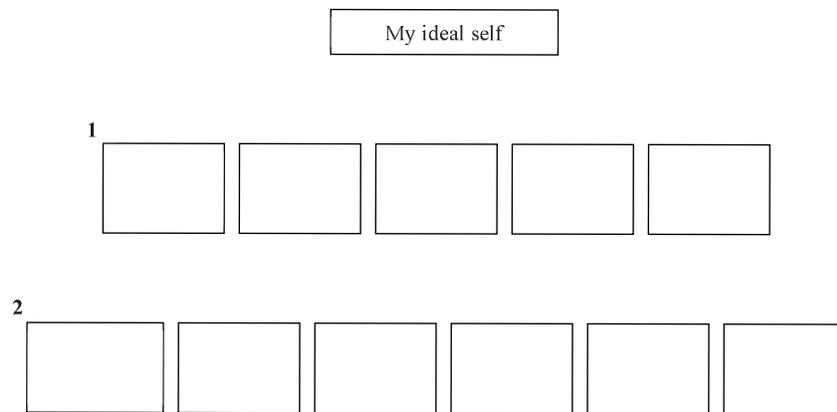


Fig. 1 Hierarchical diagram used for manipulation in the integrated condition

The objective of the integration manipulation was to encourage students to perceive their educational goal as either linked to, or isolated from, other goals in their life. All the students were asked to select the goals they pursued in their life from a list of 30 be-goals and a list of 30 do-goals. The next three steps were different depending on the

school, but it could also be important to do a student job, for example in the medical domain). Then, these students were asked to indicate which of the goals they had selected from the two lists were related to their educational goal. Finally, these participants were asked to write down their educational goal and the other goals that were

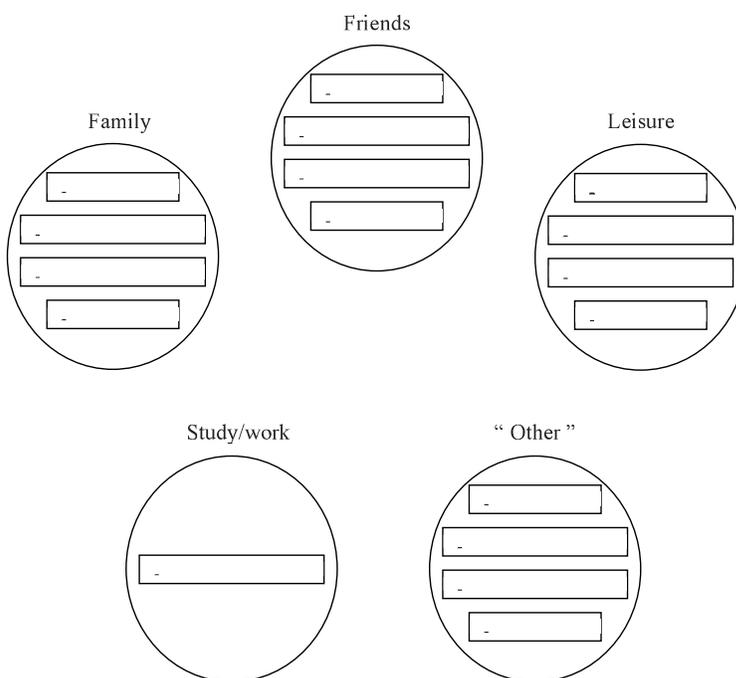


Fig. 2 Life-spheres diagram used for manipulation in the unintegrated condition

Measures

Most items on the self-report questionnaires were rated on 5-point Likert-type scales, from 1 (*strongly disagree*) to 5 (*strongly agree*). The exceptions are presented below.

Abstraction level.

As explained above, before and after the manipulations, participants were asked to state their educational goal. The expressions students used to formulate their educational goal were coded for their level of abstraction on a scale from 0 to 2. Code 2 was attributed to an expression that relates to being a certain kind of person (high level of abstraction). Code 0 was attributed to an expression that relates to doing a certain kind of thing (low level of abstraction). If the expression mixes characteristics from both levels of abstraction, it was coded 1. This coding was conducted by the first author using a blind procedure (i.e., without knowing the experimental



conditions in which the expressions were formulated). An index of inter-rater agreement was computed for a random sample of 50 goals. The intraclass correlation coefficient reached the value of .83 ($p < .001$), which indicates a very high inter-rater agreement. Some examples of abstraction level coding are presented in Table 1.

manipulations, this item referred to the educational goal written in the first questionnaire; after the manipulations, it referred to the goal in the second questionnaire.

Absolute importance.

As suggested by Bardi, Lee, Hofmann-Towfigh, and Soutar (2009),

(nine-point Likert-type scale from 1 [*strongly disagree*] to 9 [*strongly agree*]).

Relative importance.

Another of Sideridis's (2001) items asked students if they agree that top priority should be given to their educational goal in a classification of the various things they try to be or to do in their life: "Working towards this goal is the most important thing for me" (nine-point Likert-type scale).

Absolute commitment.

The same distinction between absolute and relative has been introduced into our measure of commitment. Thirteen items, adapted from Brunstein (1993), and Hollenbeck, Klein, O'Leary, and Wright (1989), asked students to estimate their commitment to their educational goal without any comparison to their other goals ($\alpha = .85$). An exploratory factor analysis showed that the thirteen items loaded on a unique factor. Six of the thirteen items (e.g., "I am strongly committed to pursuing this goal") were used before the manipulations ($\alpha = .76$), and the other seven (e.g., "It wouldn't take much to make me abandon this goal" (reversed item)) were used after it ($\alpha = .79$).

Relative commitment.

Three of the items measuring absolute commitment were also used, in a slightly adapted form, to ask students to estimate their commitment to their

Table 1
Examples of Educational Goals and their Abstraction Level Index

Low level of abstraction ^a : do-goals (code = 0)	Medium level of abstraction ^b : (code = 1)	High level of abstraction ^c : be-goals (code = 2)
1. To study at the School of Management.	1. To study something that I love and in which I could be useful later.	1. To be recognized in my job.
2. To attend math classes.	2. To be happy in my job while earning a good living.	2. To be a civil engineer.
3. To study one of the various branches of medicine.	3. To help other people, to be a part of their life.	3. To become an important person.
4. To work hard for the subjects that I love.	4. To be a doctor working abroad for a humanitarian organization.	4. To be totally fulfilled in my job.
5. To develop my language skills.	5. To work hard in a job that allows me to be useful to others.	5. To become an open-minded person.

^a an expression that relates to doing a certain kind of thing
^b an expression that mixes characteristics of the low and high levels of abstraction
^c an expression that relates to being a certain kind of person

Degree of integration.

One item, developed from definitions of the degree of integration (Carver & Scheier, 1998; Sheldon & Kasser, 1995), was used to measure goal integration before and after the manipulations: "I see clearly how certain other goals in my life will help me achieve this goal". Before the

we distinguished between absolute and relative importance, and investigated the impact of this distinction in an exploratory way. One item taken from Sideridis (2001) asked students to estimate the importance of their educational goal without any comparison to their other goals: "This goal is extremely important to me"

Table 2
Descriptive Statistics and Correlations between Scales

Variables	M	SD	1	2	3	4	5	6	7	8	9	10
1. Abstraction level (BM ^a)	0.59	0.78	1.00									
2. Abstraction level (AM ^b)	0.85	0.86	.28***	1.00								
3. Degree of integration (BM)	3.49	0.94	.01	.03	1.00							
4. Degree of integration (AM)	3.63	0.91	-.03	.04	.47***	1.00						
5. Absolute importance (AM)	7.29	1.66	.05	.07	.16***	.20***	1.00					
6. Relative importance (AM)	5.79	2.07	.06	.08*	.14***	.17***	.57***	1.00				
7. Absolute commitment (BM)	4.04	0.58	.15***	.09*	.32***	.28***	.44***	.29***	1.00			
8. Absolute commitment (AM)	3.91	0.60	.11**	.05	.25***	.25***	.53***	.41***	.62***	1.00		
9. Relative commitment (BM)	3.85	0.90	.09*	.06	.23***	.23***	.28***	.21***	.29***	.33***	1.00	
10. Relative commitment (AM)	3.51	0.94	.07	.08*	.11**	.10**	.34***	.38***	.34***	.47***	.23***	1.00

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

^a before manipulation
^b after manipulation



educational goal in comparison to other goals. An exploratory factor analysis showed that the three items loaded on a unique factor. One of these three items (“I am ready to put in more effort into achieving this goal than into achieving my other goals”) was used before the manipulations. The other two items (e.g., “I am more determined to pursue other goals than this one” (reversed item)) were used after the manipulations ($\alpha = .71$).

Results

Eight participants had some outliers (± 3 standard deviations from the mean) and were excluded from the analyses. The descriptive statistics and correlations are presented in Table 2.

Manipulation Checks

Goal abstraction.

A between-participants ANCOVA was conducted to check the effectiveness of the abstraction manipulation on the abstraction level after the manipulation, controlling for its level before the manipulation. More specifically, the two manipulations and their interaction were introduced as independent variables to check if there was only a main effect of the abstraction manipulation, or whether the other manipulation or the interaction had an effect. The results indicate a significant main effect of the abstraction manipulation ($F(1, 678) = 102.90$; $p < .001$; $\eta_p^2 = .13$), no main effect of the integration manipulation ($F(1, 678) = 0.80$; ns), and no interaction effect ($F(1, 678) = 2.48$; ns). After the manipulation, the goal expression was more abstract in the high level of abstraction condition ($M = 1.15$, $SD = 0.85$) than in the low level of abstraction condition ($M = 0.55$, $SD = 0.77$). Before the manipulation, the mean in the high level of abstraction condition ($M = 0.59$, $SD = 0.77$) and that in the low level of abstraction condition ($M = 0.58$, $SD = 0.78$) did not differ ($F(1, 684) = 0.03$; ns). We conducted two additional within-participant ANOVAs to improve our understanding of the abstraction manipulation's effect. In the high level of abstraction condition, the goal expression was more abstract after the

manipulation ($M = 1.15$, $SD = 0.85$) than before ($M = 0.59$, $SD = 0.77$) ($F(1, 338) = 120.98$; $p < .001$; $\eta_p^2 = .26$). However, in the low level of abstraction condition, the goal expression was not significantly less abstract after the manipulation than before ($F(1, 343) = 0.40$; ns). It therefore seems to be easier to lead students to express their educational goal more as an identity to develop, than to lead them to express their goal more as an action to complete. Having said that, the results confirm that the manipulation created two groups significantly different in terms of their abstraction level.

Goal integration.

A between-participants ANCOVA was conducted to check the effectiveness of the integration manipulation on the degree of integration after the manipulation, controlling for its level before the manipulation. Again, the two manipulations and their interaction were introduced as independent variables. The results indicate a significant main effect of the integration manipulation ($F(1, 670) = 4.91$; $p < .05$; $\eta_p^2 = .01$), no main effect of the abstraction manipulation ($F(1, 670) = 0.80$; ns), and no interaction effect ($F(1, 670) = 0.02$; ns). After the manipulation, students in the integrated condition perceived their goal as more integrated ($M = 3.69$, $SD = 0.92$) than students in the unintegrated condition ($M = 3.59$, $SD = 0.90$). The two conditions did not differ before the manipulation ($F(1, 678) = 1.21$; ns). We conducted two additional within-participant ANOVAs to improve our understanding of the integration manipulation's effect. Students in the integrated condition perceived their goal as more integrated after the manipulation ($M = 3.69$, $SD = 0.92$) than before ($M = 3.45$, $SD = 0.96$) ($F(1, 340) = 20.72$; $p < .001$; $\eta_p^2 = .06$). However, in the unintegrated condition, the goal was not perceived differently before ($M = 3.53$, $SD = 0.91$) and after the manipulation ($F(1, 333) = 1.71$; ns). It seems therefore to be easier to increase the perception of a goal as linked to other goals than to decrease this perception. Having said that, the results confirm that the manipulation

created two groups significantly different in terms of their perception of goal integration.

Impact of the Manipulations

Goal commitment.

Two between-participant ANOVAs tested the impact of the manipulations on the absolute and relative goal commitment. The first analysis did not show any main effect of the manipulations on the absolute commitment (manipulation of abstraction: $F(1, 683) = 0.08$; ns ; manipulation of integration: $F(1, 683) = 2.51$; ns). Nor was there an interaction effect ($F(1, 683) = 1.38$; ns).

The second ANOVA also showed no main effect of the manipulations on the relative commitment (manipulation of abstraction: $F(1, 676) = 0.01$; ns ; manipulation of integration: $F(1, 676) = 0.28$; ns). However there was a significant interaction effect ($F(1, 676) = 4.88$; $p < .05$; $\eta_p^2 = .01$). The relative commitment was highest in condition *a* ($M = 3.61$, $SD = 0.92$) and lowest in condition *b* ($M = 3.42$, $SD = 0.93$). It was intermediate in conditions *c* ($M = 3.45$, $SD = 0.92$) and *d* ($M = 3.57$, $SD = 0.99$). The scores of the students in the four conditions did not differ before the manipulations ($F(3, 682) = 1.40$; ns). A simple effects analysis was conducted to look at the effect of each manipulation at individual levels of the other manipulation. This revealed a significant difference between conditions *a* and *b* ($F(1, 677) = 3.75$; $p = .05$; $\eta_p^2 = .01$). The interaction effect of the manipulations on the relative commitment is presented in the top part of Figure 3.

Goal importance.

Two between-participant ANOVAs tested the impact of the manipulations on absolute and relative goal importance. The first ANOVA did not show any main effect of the manipulations on the absolute importance (manipulation of abstraction: $F(1, 683) = 0.08$; ns ; manipulation of integration: $F(1, 683) = 2.51$; ns); nor did it show an interaction effect ($F(1, 683) = 1.38$; ns).

The second ANOVA also showed no main effect of the manipulations on the relative importance (manipulation of abstraction: $F(1, 681) = 0.33$; ns ;



manipulation of integration: $F(1, 681) = 0.04$; *ns*). However it did display a significant interaction effect ($F(1, 681) = 4.98$; $p < .05$; $\eta_p^2 = .01$). The relative importance was the highest in condition *a* ($M = 5.99$, $SD = 2.03$) and the lowest in condition *c* ($M = 5.55$, $SD = 2.07$). It attained intermediate levels in conditions *b* ($M = 5.67$, $SD = 2.15$) and *d* ($M = 5.93$, $SD = 2.02$). The simple effects analysis revealed a significant difference between conditions *a* and *c* ($F(1, 682) = 4.01$; $p < .05$; $\eta_p^2 = .01$). The interaction effect of the manipulations on the relative importance is presented on the bottom part of Figure 3.

ANCOVA was conducted, with the two manipulations and their interaction as independent variables, the relative importance as a covariate, and the relative commitment as the dependent variable (Muller, Yzerbyt, & Judd, 2008). The impact of the relative importance on the relative commitment, controlling for the impact of the two manipulations, was significant ($F(1, 671) = 107.39$; $p < .001$; $\eta_p^2 = .14$). Importance and commitment were positively linked ($r = .38$; $p < .001$). The ANCOVA also showed that the impact of the interaction between the manipulations on the relative commitment disappeared ($F(1, 671) = 2.60$; *ns*) once the impact of the relative importance

below, three main conclusions can be drawn: (1) the representation students have of their educational goal can be changed; (2) goal commitment and importance are influenced by goal abstraction and integration; (3) the impact of goal abstraction and integration on goal commitment is mediated by goal importance.

With respect to the first conclusion, the representation students have of their educational goal (in terms of abstraction level and degree of integration) can be changed. However, although it could be made more abstract and more integrated, it could not be made less abstract or less integrated. Why? If it is easier to increase the abstraction level of an educational goal than to decrease it, this is probably due to the low mean level of abstraction before manipulation: most of the educational goals were coded 0 on the scale from 0 to 2. For most of the students in the low level of abstraction condition, it was therefore impossible to decrease their abstraction level further.

It has also been shown that it is easier to increase students' perceptions of the degree to which their goals are integrated, than to decrease them. One explanation for this asymmetrical effect of the integration manipulation may be that the perception of integration is at a higher level of complexity than that of isolation (Pascarella & Terenzini, 2005). Students who have already attained this level of complexity do not readily return to a less developed perception. Another explanation of this limit could lie in the integration measure. Goal commitment differed in conditions *a* and *b*, although these only varied on the integration dimension. Two explanations for this difference are possible. Either it is just due to an increased degree of integration in condition *a*, or it is due to both an increased degree of integration in condition *a* and a decreased degree of integration in condition *b*. If the second option is correct, then the non-significant effectiveness of the manipulation in the unintegrated condition may be due to the inability of our measure to detect the decrease in integration. This measure should be improved in future research. However, in the present study, the comparison between the four conditions still makes

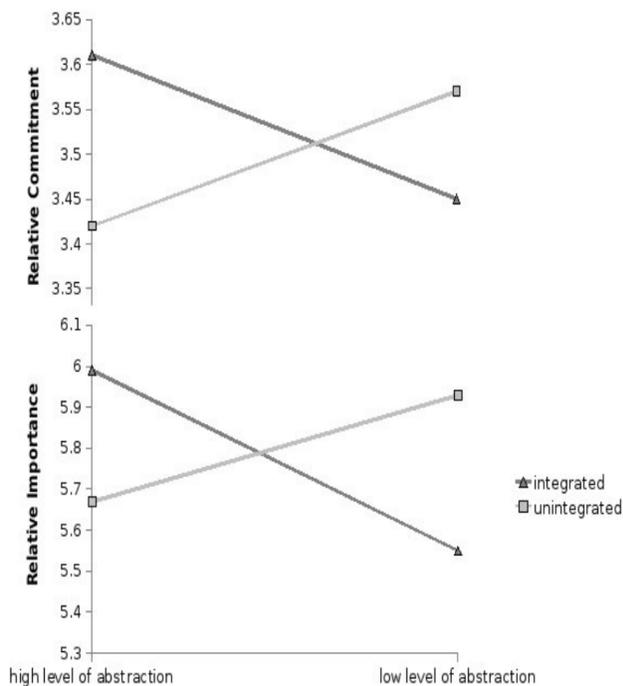


Fig. 3 The impact of the manipulations on goal commitment and goal importance

Mediational Analysis

Goal importance has been postulated as a mediator of the impact of abstraction and integration on goal commitment. The first two conditions for a mediational model (Baron & Kenny, 1986) were checked by investigating the impact of the manipulations. We found that the interaction between the two manipulations had a significant impact (1) on the relative commitment, and (2) on the relative importance. To complete the test of the mediation, a between-participant

had been taken into account. All four conditions for a full mediation were therefore satisfied.

Discussion

This study was, to the best of our knowledge, a first attempt to empirically test Carver and Scheier's (1998) assumptions about the hierarchical goal structure, and to experimentally investigate the antecedents of educational goal commitment. Although there are certain limitations, which will be discussed



sense given the significant differences observed in terms of abstraction and integration between the four conditions.

Our second conclusion is that the impact of the manipulations of goal abstraction and integration on goal commitment and importance has been confirmed. Three characteristics of this impact were consistent in the investigations of commitment and importance, which gives them additional weight. First, the manipulations only affected the commitment and importance attached to the educational goal in comparison to other goals. This may be because the relative dimension is more flexible than the absolute dimension (which is relatively stable). Therefore, the external influence of the manipulations was more easily reflected by the relative dimension.

The second consistent result is that only the interaction between the two manipulations had an impact on goal commitment and importance; neither of the manipulations was effective on its own. In other words, Hypotheses 1 and 2 were not supported, but we found an interaction that is exactly in line with Hypothesis 3. As assumed by this hypothesis, if the goal was perceived to be linked to other goals, goal commitment and importance increased when moving from a low to a high level of abstraction. However, if the goal was perceived as unintegrated, goal commitment and importance decreased when moving from a low to a high level of abstraction. If a goal was perceived as integrated, Carver and Scheier's (1998) hypothesis of a positive impact of be-goals is supported. This first part of the interaction is in line with Bandura's (1986) assumption that personal development is best served by combining distal aspirations with proximal self-guidance. However, if a goal is perceived in isolation, the results are more supportive of Locke and Latham's (2002) proposition that do-goals, which are generally more proximal, enhance motivation.

How can we explain the absence of any main effect? This is due to the cross-over interaction we found. The negative impact of abstraction when integration was low was approximately as strong as its positive impact when integration was high. We suggest that

this strong negative impact is due to the extremely low level of integration which students in the unintegrated condition experienced. These students were asked to complete a diagram representing their educational goal as totally isolated from their other goals. The representation to which students in condition *b* were therefore confronted (a be-goal alone, without any link to other goals) gives them no ideas on how to achieve their educational goal. This has a strong negative impact on their commitment. We suggest that, outside such an experimental setting, this totally isolated representation is quite rare. Students at a low degree of integration perceive few links between their educational goal and other goals. However, the few links they do perceive make the focus on a be-goal not as negative as in condition *b*.

The third consistent result is that students reached the highest level of both goal commitment and importance in condition *a*. Moreover, the simple effects analyses revealed this condition as having a significantly higher degree of commitment than condition *b*, and a significantly higher level of importance than condition *c*. In other words, commitment and importance were both significantly higher only if the two conditions were present together: the student was focused on a be-goal and this goal was perceived as linked to other goals in his/her life. This result brings a second support to Bandura's (1986) and Carver and Scheier's (1998) assumptions.

The participants in condition *d* reached a position just below those in condition *a* on both commitment and importance. The fact that this condition did not differ significantly from condition *a* is in line with Hypothesis 3. However, unlike condition *a*, condition *d* was not significantly different from either conditions *b* or *c*. A difference between conditions *d* and *b* would have brought a second support to Locke and Latham's (2002) assumption. The absence of a significant difference between it and the other conditions makes the position of condition *d* quite difficult to explain. Future research should include control conditions in a 3 (goal abstraction: high – low – control) x 3 (goal integration: integrated –

unintegrated – control) experimental design. This would reveal more about the specific impact of each condition on goal commitment and importance.

The main difference between the results on goal commitment and those on goal importance concerns the classification of conditions *b* and *c*. Based on Hypothesis 3, these conditions are assumed to be at a significantly lower level of goal commitment and importance than conditions *a* or *d*. However, only condition *b* was at a significantly lower level of commitment than condition *a*, and only condition *c* was at a significantly lower level of importance than condition *a*. The negative impact, observed in condition *b*, of a focus on an isolated be-goal on goal commitment is in line with Hypothesis 3. This difference between conditions *a* (an abstract goal integrated in a hierarchical structure of abstract and concrete goals) and *b* (an abstract goal isolated from other goals) can be viewed as an illustration of the distinction between reality-based goals and empty dreams and fantasies (Miller & Brickman, 2004). The educational goal in condition *b* appeared too far off and isolated to develop a high commitment to its achievement. However, students in condition *b* did not attach significantly less importance to their goal as postulated by Hypothesis 3. Although it is difficult for students to commit to an isolated be-goal, they do not necessarily attach less importance to this dream than to a reality-based goal.

The importance of the link to concrete goals or subgoals has been demonstrated for goal commitment. However, this conclusion should not overshadow the importance of the be-goals to which these subgoals are anchored (Bandura, 1986; Miller & Brickman, 2004). Our results show that the impact of the manipulations on importance in condition *c* was significantly less good than in condition *a*. This negative impact of an integrated do-goal on goal importance is in line with Hypothesis 3. It is difficult for students to attach a lot of importance to a concrete goal, expressed as an action to undertake. This is more specifically true when this do-goal is perceived as integrated with other goals. Indeed, in this case, the relative importance of the



goal is significantly lower because the concrete goal appears at the very bottom of a hierarchy and is only seen as a tool to reach other goals. However, students are not significantly less committed to this integrated do-goal as hypothesized by Hypothesis 3. The perception that working on this concrete goal can contribute to the attainment of more abstract goals probably helps them to maintain this commitment.

To sum up, our results offer strong support to Hypothesis 3. The cross-over interactions are in line with this hypothesis, and do not support the main effects we postulated. Additional support for Carver and Scheier's (1998) assumptions was provided by the simple effects analyses.

Our final conclusion concerns the role of goal importance within the impact of goal abstraction and integration on goal commitment. We showed that the higher the relative importance of a goal, the greater the relative commitment to that goal. This result supports the hypothesis that goal importance is a direct antecedent of goal commitment, which was mainly based on the expectancy-value model (Eccles & Wigfield, 2002). Moreover, the mediating role of the relative importance of the goal is supported. The interactive impact of abstraction and integration on relative commitment is completely mediated by the relative importance. The representation of a goal within the hierarchical goal structure influences its relative importance, and therefore, indirectly, the relative commitment to that goal.

Three limitations to the present study should be noted. First, goal integration and goal importance were both single-item measures. However, these measures were not aimed at investigating the constructs of integration and importance in all their complexity. Their aim was to analyze the change of the four experimental conditions in terms of (some aspects of) integration and importance. However, the measures do need further validation.

Second, although the impact of our manipulations has been demonstrated, their effect sizes were quite small. This was expected, given that these manipulations were performed during one short period of time. The aim of our

study was to investigate the causality of the link between goal commitment and its possible antecedents, not to develop a program to influence commitment in the long run. However, it would be interesting to develop an intervention study with this aim.

Third, our final dependent variable, goal commitment, was measured as an intention and not as a behavior. This study provided a snapshot of students' perceptions of and motivations towards their educational goal at the end of high school, before they had to choose their program of study and to commit to this choice by registering, attending courses, and taking examinations. The antecedents identified in this study are those of the students' intentions to commit to their goal. Although previous research has already shown a link between educational goal commitment and achievement-related behaviors (e.g., Germeijs & Verschuere, 2007), our results need to be completed by an investigation of the students' behavioral commitment to their goal after entry to college.

Because our study breaks new ground in the explanation of educational goal commitment, its practical implications remain tentative. Our results give rise to the development of a tool for counseling interventions. This tool would be an empty diagram representing the hierarchical goal structure (like Figure 1). The first purpose of such a tool could be to increase students' awareness of their own representation of their educational goal, by asking them to complete the diagram with their goals. This increased awareness of their own representation and its potential consequences on their commitment and on goal actualization may allow them to control these consequences better. A second aim of the tool could be to guide students in the development of their hierarchical goal structure. People vary in their knowledge of the paths they can take to achieve their long-term goals (Miller & Brickman, 2004). This tool could be a useful way of providing some information about possible routes between goals and subgoals, while leaving students free to draw their own diagram of their relevant goals and the paths between them.

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