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Nathalie Huet, Ladislav Motak, Jean-Christophe Sakdavong

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Huet, N, Motak, L., Sakdavong, JC

Title: Motivation to seek help and help efficiency in students who failed in an initial task

Abstract

In the present study, we investigated whether help-seeking behaviors differ in their respective links to motivational variables such as achievement goals, help-seeking perceptions and self-efficacy. Eighty-two students who had failed to solve an initial word-processing task were invited – but not forced – to choose help before engaging in a comprehension task. While 19 of them did not seek help of any kind, 63 students opted for help. Taken together, our results suggest that i) those who refused to seek help did not differ from those who agreed to seek help on either motivational variables (except for self-efficacy), but ii) those who succeed on the comprehension task after using help were those who showed higher self-efficacy. The implications of these results for future research on the help-seeking process in interactive learning environments are discussed.

Keywords: help-seeking, motivation, self-efficacy, learning, technology

Motivation to Seek Help and help efficiency

1. Introduction

In the literature, the appropriate use of help is regarded as a self-regulated learning (SRL) strategy that enhances students' learning (Newman, 1991, 2000; Puustinen, 1998; Ryan & Pintrich, 1997; Ryan, Pintrich, & Midgley, 2001; Skaalvik & Skaalvik, 2005; Zimmerman & Martinez-Pons, 1988). As well as allowing learners to resolve a problem they cannot resolve by their own means, this strategy enables them to improve their learning (e.g., Mäkitalo-Siegl, Kohnle, & Fischer, 2011; Renkl, 2002) and to work more efficiently (Nelson-LeGall, 1981; Nelson-LeGall & Resnick, 1998). However, despite the value of help seeking as a SRL strategy, many students fail to use help appropriately and efficiently. Some of them do not seek help even though (i) that help is available (Huet, Escribe, Dupeyrat & Sakdavong, 2011), (ii) they would objectively benefit from that help, and (iii) they may actually be aware of their need to be helped (Butler, 1998; Marchand & Skinner, 2007; Newman, 2000; Ryan et al., 2001).

Finally, while some of those who ask for help perform more efficiently after being helped, others do not (i.e., they fail again when faced with the same type of problem). Nonadaptive help seeking (especially help avoidance when needed) and/or inefficiency of the use of help have been detected both in the classroom (Good, Slaving, Hobson-Harel, & Emerson, 1987; Newman, 1991; Newman & Goldin, 1990) and in Computer-Based Learning Environments (CBLEs; Aleven, Stahl, Schworm, Fischer, & Wallace, 2003; Clarebout & Elen, 2009b).

According to the original help-seeking model (Nelson-LeGall, 1981; Newman, 1994), a learner's decision to seek help is filtered through an affective system that includes

motivational variables (Newman, 1994). In line with this initial assumption, most of the research on help-seeking found a relationship between motivational factors (such as achievement goals; self-efficacy) and at least help-seeking intentions (Arbreton, 1998; Cheong, Pajares, & Oberman, 2004; Karabenick, 2003, 2004; Pajares, Cheong, & Oberman, 2004; Roussel, Elliot, & Feltman, 2011).

In the present study, we therefore set out to show that nonadaptive help seeking and inefficiency of the use of help are influenced by students' motivational profiles. The novel contribution of this study was to go beyond help-seeking intentions and to propose one of first studies into links between motivational factors and help-seeking behavior operationalized here by the decision to select or not an help and the efficiency of using it on subsequent task. Thus, the aim of this study was to examine differences in motivational profiles between (i) students who use vs. avoid help, and between (ii) students who use help efficiently (i.e., who benefit from the help on offer) and those who do not.

After discussing the help-seeking literature, we review empirical research on the relationship between each of the motivational variables and help-seeking behaviors. We conclude with an overview of the present study.

1.1. Help Seeking

Researchers have argued that help seeking can take a number of forms that differ in the extent to which they promote learning and mastery, namely executive help seeking, instrumental help seeking and help-seeking avoidance (Butler & Neuman, 1995; Karabenick, 1998). Executive help seeking occurs when learners seek readymade answers rather than trying to solve a problem on their own. This help-seeking strategy is not regarded as adaptive for learning, as it relies on superficial cognitive processing (Arbreton, 1998; Nolen &

Haladyna, 1990). Researchers have argued that only one kind of help can promote learning: the instrumental help. Instrumental help seeking refers to a situation where learners seek the minimum amount of information needed to perform the task on their own. For example, students ask for hints, but find the solution to the problem by themselves (Karabenick & Knapp, 1991). This help-seeking strategy is adaptive for learning because the students are actively involved in the problem solving and the help merely serves as extra input for deep processing (Nolen & Haladyna, 1990). Finally, help-seeking avoidance refers to students who are aware that they need help, but do not seek it. This type of behavior prevents them from improving their learning (Karabenick & Knapp, 1991; Newman, 1990).

These types of help seeking are generally assessed via self-reports (Huet et al., 2013) or other-reports (Ryan & Shin, 2011) and are usually operationalized as help-seeking intentions instead of real help use. The advantage is that they can be fairly reliably and satisfactorily measured via a questionnaire consisting of several items per scale (Pajares, Cheong, & Oberman, 2004); some doubt persists, however, regarding its external validity given the often attested gap between intentions and real behaviors (e.g. Gollwitzer, Sheeran, Michalski, & Seifert, 2009; Sheeran, 2002). Moreover, in addition to being extremely scarce (for a review, see Huet et al., 2013), evidence on help-seeking behaviors either does not distinguish between the above mentioned types of help (Stahl & Bromme, 2009) or else only bears on help seeking in young children (Nelson-LeGall, DeCooke, & Jones, 1989; Puustinen & Winnykamen, 1998). Although instrumental help-seeking intentions have been found to be positively correlated with grade and negatively correlated with nonadaptive help-seeking (Kitsantas & Chow, 2007), results on actual help-seeking behavior are somewhat different. Some authors have failed to find any association between increased use of help and improvements in performance (for a review, see Clarebout & Elen, 2006), whereas others

have found a positive relationship between help use and performance (Jiang, Elen, & Clarebout, 2009). These divergent results only serve to emphasize the complexity of the help-seeking process and the need to deepen our understanding by taking into account the real behaviors. Indeed, a learner's decision to seek help depends on motivational variables (e.g., Arbreton, 1998).

1.2. Motivational Variables

Among motivational variables acknowledged to have an effect on help-seeking intentions are namely achievement goals, (e.g., Dweck, 1986; Elliot & Church, 1997; Elliot & Harackiewicz, 1996), help-seeking perceptions (e.g., Ryan & Pintrich, 1997) and self-perceptions as a learner (Bandura, 1977). However, there is much less evidence regarding the link between these motivational variables and real help-seeking behaviors.

1.2.1. Achievement Goals

Achievement goals, that is, the intentions or reasons behind undertaking an academic task (Dweck, 1986), are classically divided into two main categories. *Mastery goals* lead learners to focus on the task and on progress through developing skills and mastery (Ames, 1992). *Performance goals* (divided further into approach- or avoidance-oriented goals; see, for example, Elliot & Church, 1997; Elliot & Harackiewicz, 1996), on the other hand, lead learners to focus on the self and to demonstrate their skills relative to others. *Performance-approach goals* involve achieving or maintaining a positive outcome or state (e.g., by gaining favorable judgments of one's skills or outperforming others). *Performance-avoidance goals* involve moving or staying away from a negative outcome or state (e.g., by avoiding unfavorable judgments of one's skills or avoiding failure; Elliot & Harackiewicz, 1996).

1.2.2. Achievement Goals and Help-Seeking Behavior

There are divergent results concerning the relationships between achievement goals and help-seeking behaviors. Unlike studies exploring help-seeking intentions (e.g., Arbreton, 1998; Bong, 2008, 2009; Cheong, Pajares & Oberman., 2004; Middleton & Midgley, 1997; Pajares, et al., 2004) many studies have failed to find a link between mastery goals and actual help seeking operationalized, as in this paper, by decision to seek help (Bartholomé, Stahl, Pieschl & Bromme 2006; Huet, Escribe, Dupeyrat, & Sakdavong, 2011; Martinez-Miron, Harris, du Boulay, Luckin, & Yuill, 2005, Nelson-LeGall & Jones, 1990; Stavrianopoulos, 2007). However, a handful of studies conducted in computer-based learning environments, have shown that the more mastery oriented students are, the less help they use (Clarebout & Elen, 2009a, 2009b; Experiment 3). Globally, one of the most important findings between achievement goals and actual help-seeking behaviors are that results are divergent concerning the relationship between Mastery goals and help-seeking behavior.

Similarly, results concerning performance goals were not convergent. No link has been found between the frequency of help-seeking behavior and performance goals in some studies (Bartholomé et al., 2006; Clarebout & Elen, 2009a; Jiang, et al., 2009; Martinez-Miron, et al., 2005; Nelson-LeGall & Jones, 1990; Stavrianopoulos, 2007). In other studies, a negative relationship was found between performance goal and help-seeking (e.g., Huet Escribe et al., 2011). The available data do not allow us to discern any factor that could systematically account for these differences.

Current evidence also suggests that links found between achievement goals and help-seeking behaviors might depend on the type of help that is sought; although, even here, some divergence persists. From the few studies analyzing the relationship between achievement goals and the type of help that is sought, mastery goals would not appear to be associated with

a particular kind of help-seeking behavior (executive or instrumental) (Huet, Escribe et al., 2011). Evidence suggests mixed results dependent on the type of performance goal which is considered. No link has been found between performance approach goals and executive help-seeking behavior (Baker, Roll, Corbett, & Koedinger, 2005). On the other hand, either no relationship at all (Huet, Escribe et al., 2011) or a relationship that is positive (Vaessen, Prins, & Jeuring, 2014) has been found between executive help-seeking behaviors and performance avoidance goals.

Finally, both types of performance goals were negatively related to instrumental help-seeking behavior (Huet, Escribe, et al., 2011). Concerning performance avoidance-oriented learners, the more performance avoidance-oriented they are, the less they actually seek instrumental help (Huet, Escribe, et al., 2011). However, performance-avoidance goals are not systematically related to help-seeking behavior (Huet, Escribe et al., 2011). Concerning performance-approach goals, instrumental help-seeking behavior has been found to be negatively associated with performance-approach goals (Huet, Escribe et al., 2011), while no significant relationship has been found for executive help-seeking behavior.

To sum up so far, as suggested by Jiang et al. (2009), current findings indicate that goal orientation has an unstable relationship with help-seeking behaviors even if one takes into account different kinds of help (instrumental or executive), and other motivational variables, such as help-seeking associated perceptions, might matter.

1.3. Help-Seeking Perceptions

1.3.1. Several types of help-seeking perceptions

Several studies have shown that learners' perceptions or attitudes toward the benefits and costs of seeking help influence their actual help seeking. These beliefs, attitudes, and

expectations are major cognitive determinants of learners' behavioral intentions, as well as their actual behavior (e.g., Ajzen & Fishbein, 1980). The way that learners perceive the benefits of seeking help depends on whether they recognize that help seeking is a useful strategy that promotes learning (e.g., Newman, 1990; Ryan & Pintrich, 1997). Two perceived costs of help seeking have been studied in the classroom: its threat to self-esteem (or perceived threat) and its threat to autonomy (or autonomous orientation) (Butler, 1998; Deci & Ryan, 1987). Help seeking can be viewed by learners as a threat to their self-esteem, in that for them, seeking help indicates low ability to resolve the problem on their own (e.g., Butler, 2007; Butler & Neuman, 1995; Good, et al., 1987; Newman, 1990). Consequently, they do not seek help because they want to maintain an impression of ability and avoid negative judgments. Help seeking can also be negatively perceived if learners regard it as a dependent behavior that conflicts with their personal need for autonomy (Deci & Ryan, 1987) or for independent mastery and self-reliance (Markus & Kitayama, 1991; Van der Meij, 1988). In other words, they do not seek help because they want to achieve the task without any external help.

1.3.2. Help-Seeking Perceptions and Help-Seeking Behavior

To our knowledge, very few studies have examined the relationship between help-seeking perceptions and actual help-seeking behavior. Huet, Escribe et al. (2011) found that (i) perceptions of benefits were positively related to the use of instrumental help, and (ii) perceptions of a threat to self-esteem or autonomy were not related to the type of help sought (instrumental vs. executive). In the classroom, Butler (1998; study 2) observed that students who perceived help seeking to be a threat to their autonomy requested more instrumental help in a math problem than those who perceived it to be a threat to their ability. Moreover, the

latter sought to copy the answers instead of trying to find the solution themselves, which is akin to seeking executive help.

To sum up the most important findings so far, the actual use of instrumental help is positively related to the perception of help seeking as beneficial. Concerning perceptions of the threat posed by help seeking to self-esteem or autonomy, the sparse results show that perceived threat is not related to the type of help sought (instrumental or executive help-seeking behavior) or if anything, that the perceived threat to self-esteem can be positively related with executive help. However, more studies should be carried out for improving our understanding of the relationship between perceptions of seeking help and help-seeking behavior. Besides, other motivational factors that might affect help-seeking are self-perceptions.

1.4. Self-Perceptions

1.4.1. Expectations

The individual's perceptions of her or his own abilities to achieve a concrete task – dubbed self-efficacy (Bandura, 1977) or perceived ability (Green & Miller, 1996) – have been found to be highly positively correlated with help seeking. Individuals who exhibit high self-perceptions about their academic abilities are less likely to attribute their need for help to a lack of ability, and therefore tend to seek help more frequently (Newman & Goldin, 1990; Pintrich & Schunk, 1996; Ryan, Gheen, & Midgley, 1998). Three hypotheses have been developed to account for the relationship between self-perceptions and help seeking.

According to the *vulnerability hypothesis* (Tessler & Schwartz, 1972), students who lack confidence in their skills do not seek help because they want to maintain an impression of ability. In other words, students with low self-perceptions seek less help than students with

high self-perceptions. According to the *consistency hypothesis* (Tessler & Schwartz, 1972), students with high self-perceptions are less likely to seek help than those with low self-perceptions, because admitting that they need help is not consistent with their perceptions (Butler, 1998; Nelson-LeGall, 1985; Nelson-LeGall & Jones, 1990). According to the *inverted U-curve hypothesis* (Rosen, 1983), students who have either very high or very low self-perceptions (extreme values) are unlikely to seek help. Those who seek help the most are therefore those who have moderate self-perceptions (Butler & Neuman, 1995; Karabenick & Knapp, 1988).

1.4.2. Self-Perceptions and Help-Seeking Behavior

To our knowledge, there has been very little research on the relationship between self-efficacy and students' actual help-seeking behavior. Researchers have mostly found support for the consistency hypothesis, reporting that a high self-efficacy was related to a low use of help (Butler, 1998; Nelson-LeGall, 1985; Nelson-LeGall, DeCooke, & Jones, 1989; Nelson-LeGall & Jones, 1990; Nelson-LeGall, Kratzer, Jones, & DeCooke, 1990; Puustinen & Winnykamen, 1998; Williams & Takaku, 2011). Furthermore, Puustinen and Winnykamen (1998) found that children with low self-efficacy asked more instrumental questions than executive ones. Additionally, those who exhibited low self-efficacy levels and who sought help asked for more instrumental help, and achieved the same level of performance as those with high self-efficacy levels. Moreover, those who asked for more help displayed enhanced self-efficacy in subsequent problems. To sum up, the handful of studies that examined the relationship between self-perceptions and help behaviors mostly support the consistency hypothesis adding that, in turn, self-perceptions may evolve as a result of help-seeking process (Puustinen & Winnykamen, 1998).

1.5. The present study and hypotheses

The main aim of this study, conducted in an interactive learning environment (ILE), was to investigate whether achievement goals, help-seeking perceptions and self-perceptions might explain the differences in both the actual help seeking (i.e., observable behaviors) and the efficiency of help-seeking behavior. From an applied perspective, the question is to find out why some learners who need help did not seek for it and why some learners continue to fail after seeking help, whereas others do not. What differentiate these types of learners? Do they differ on motivational variables?

In the light of previous studies (Bartholomé et al., 2006; Clarebout & Elen, 2009a; Jiang, et al., 2009; Huet et al., 2011; Martinez-Miron, et al., 2005; Nelson-LeGall & Jones, 1990; Stavrianopoulos, 2007), we expected help-seeking behavior to be not influenced by mastery achievement goals. In line with Huet, Escribe et al. (2011), we expected that those who select instrumental help-seeking behavior should score low on performance-avoidance goals; and unrelated to perceptions of threat to self-esteem or autonomy, but should score high on the perception of the benefits and low in self-efficacy.

Concerning those who selected executive help, we expected that no significant relationship with achievement goals should be found; no relationship with perceptions of help seeking as a threat to ability or as benefit (Huet, Escribe et al., 2011).

Concerning self-perceptions, and supporting the consistency hypothesis, we expected that high self-efficacy should be associated to a low use of help (Butler, 1998; Nelson-LeGall, 1985; Nelson-LeGall, DeCooke, & Jones, 1989; Nelson-LeGall & Jones, 1990; Nelson-LeGall, Kratzer, Jones, & DeCooke)

Also, we will explore whether an efficient use of help was related to a motivational profile. The efficiency of using help will be assessed by examining whether the error

committed in an exercise 1 followed by help consultation concerning exercise 1 will be not repeated on a subsequent exercise similar to exercise 1. This aim concerns the issue of transfer. According to Belenky & Nokes-Malach (2013), very little is known about the relationship between a student's achievement goals and what is learned from a learning task, as well as whether or not that knowledge will transfer to a new exercise or task (Pugh & Bergin, 2006). Are some achievement goals better predictors of knowledge transfer and future learning than others?

To achieve these aims, we set out to measure help-seeking behaviors and motivational variables all in the same design featuring a single type of task. This task included a phase in which participants learned how to apply and create style sheets using a word-processor, followed by applied exercises where feedback was provided after each response. The task was complex enough to allow many mistakes: The correct procedure was generally consisting in modifying/creating the style using the "Style" menu item in the "Format" menu (which was a rich dialog interface) and then applying this style to specific paragraphs; but there were many possible mistakes that we identified in the previous experiment: Applying direct formatting to the paragraphs (without using styles), creating/modifying styles without applying them, not being able to deal with the format dialog interface of the style menu item, ...

If they answered correctly, participants moved onto a similar exercise, but if they answered incorrectly, they were offered help and were free to accept the executive one, the instrumental one, or to decline any help at all. A similar exercise was then administered. Help-seeking effectiveness was then assessed on the basis of whether or not the learners made the same mistakes as before. Because help was only provided after failure feedback, we focused on participants who had failed.

By contrast to most of the ILE, we were identifying learners' typical errors in order to propose an adapted help by contrast to a generic help. This identification was done by a

specific multi-agent computer system. In other words, the helps provided were adapted to the error done. Moreover the similar exercise was necessary for assessing the efficiency of using help because if the participant selected an executive help, it is not possible to make this efficiency assessment because the executive help is the right answer.

Beyond the type of chosen help (executive, instrumental, or avoidance), there is another indicator of individual's help-seeking behavior, that is, the efficiency of help-seeking. Helps can be accessible during task execution that is the learner can use it when he or she wants (e.g., Huet et al., 2011) or after a wrong answer feedback (e.g., Huet et al., 2011). In this latest case, feedback can be also considered as a kind of help if the feedback aims to help the learner for correcting the answer (Narciss, 2006) either for example on the same exercise or to a similar exercise. When a feedback of a wrong answer is provided to the learner, suggestions of instrumental helps are available and the learner may use one of them and either correcting the error or doing a similar exercise without committing the previous error. This behavior will show that the learner was efficient in the use of help because he or she found by him or herself the right solution without help in the similar exercise. Whatever the moment for help availability (before or after a feedback given by a teacher or the system), motivational variables are supposed to influence help behavior.

2. Method

2.1. Participants

We recruited 107 students (male/female ratio: 37/88, $\chi^2 = 20.81$, $p < .001$) from the University of Toulouse 2. Most of them were in their fourth year of social science studies (mean age: 22.44 ± 2.57 years) and were familiar with the use of word processing but not with the advanced functionalities. Participants' levels of prior knowledge in working with the

word-processing software were assessed by a questionnaire of knowledge including formatting characters/paragraphs attributes and modifying/making word processor style sheets. Results showed that the mean global score was of 50 percent of correct answers (SD= 24.7) but on the items assessing declarative knowledge about the use of style sheets more than 77 % of the sample produced incorrect answers.

2.2. Instructional setting and tasks

Instructional setting. The CBLE was intended for word processing-related learning. A set of experimenter-paced screencasts was produced especially for this study, inspired by an environment that had previously been used in a pilot project with 80 students (Sakdavong, Adreit, & Huet, 2009). The screencasts were designed so as to enable participants to learn how to use word-processor formatting and style sheets. They consisted of audio explanations featuring both declarative and procedural knowledge, and were accompanied by either still or moving video examples. The screencasts lasted approximately half an hour, and participants were not allowed to curtail the sequence.

The tasks. The tasks consisted in Word processing-related exercises. After the learning phase, the set of CBLE screencasts was replaced (in order) by an initial task, help where relevant, and finally a comprehension task. A previous exploratory study (Sakdavong et al., 2009) had yielded a classification of the most common and recurrent errors in word-processing tasks. Based on this pilot analysis, the most difficult exercises were chosen for both the initial and the comprehension tasks.

Figure 1 shows the initial task as it was displayed in the CBLE. The upper window contained the instructions (e.g., “You have to modify the ‘default’ style so that the font is 10-point Times New Roman in italics and the paragraphs are justified”) and a self-efficacy

assessment. The lower window was a fully functional generic word processor in which the instructions had to be carried out (here on a short text by Molière). Each time participants validated an answer, they had to rate their confidence in the accuracy of that answer, and were then given feedback. If their answer was right, participants went on to the comprehension task. If it was wrong, they were given an opportunity to seek help, which they could either accept or refuse. Participants were given help, if requested. Then, all participants proceeded to the comprehension task.

This comprehension task differed from the initial task in that no help or feedback was on offer. It served two purposes: if a participant had failed the initial task, the comprehension task tested whether that participant was able to transfer the knowledge gained from the requested help; if a participant had successfully performed the initial task, the comprehension task tested whether she or he really knew how to answer the question or had simply guessed. Great care was taken to match the subparts of the two tasks, to ensure that they were of equivalent difficulty.

To achieve a relevant error detection and help, the multi-agent system used the classification built during exploratory study (Sakdavong et al., 2009). While the participants were doing the task, the software agents were recording and analyzing all the actions in order to identify wrong procedures or errors.

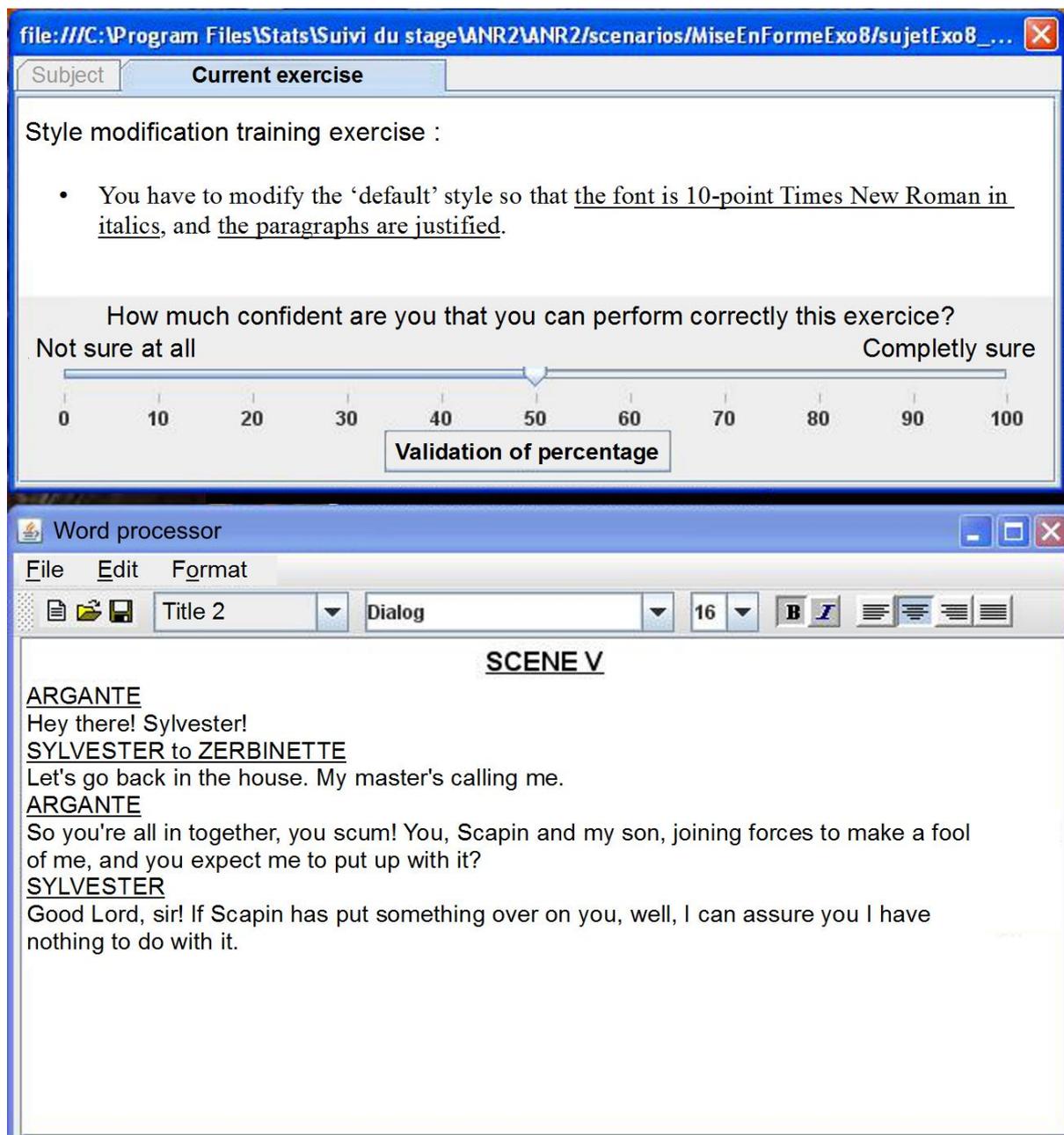


Fig. 1. A screenshot of the task including self-efficacy assessment and instructions

Help provided. If the participants agreed to receive help, they were invited to select one of four options: (1) “Go back to see the lesson relating to the error I made”; (2) “Read a text describing the error I made”; (3) “Read a text describing the general procedure for solving the exercise”; and (4) “Watch a video showing the correct solution to the exercise”. The participants could only choose one kind of help. Helps 1-3 represented instrumental help (Arbreton, 1998) and Help 4 executive help. Help 1 was a link to one of the first instructional

screencasts. Help 2 consisted of a short text identifying the error but not the way to overcome it. Help 3 took the form of an algorithm presenting a general procedure for answering the question. Help 4 was a screencast showing the solution.

2.3. Instruments Measuring Achievement Goals and Perceptions

Achievement goals and perceptions were assessed via questionnaires. Because all the questionnaires we selected were in English, in order to guarantee the accuracy of the French translated versions, we implemented Vallerand (1989)'s procedure. To measure achievement goals, and self-perceptions, participants rated their agreement on 6-point scales ranging from 1 (*Do not agree at all*) to 6 (*Agree completely*). Moreover, all the items related to the learning of word-processing skills. Scales reliability was measured by computing Cronbach's alpha for each scale.

Achievement goals questionnaire. Mastery, performance-approach, and performance-avoidance goals were assessed with items taken from the Patterns of Adaptive Learning Survey (PALS; Midgley et al., 2000) adapted to word processing. Five items assessed mastery goals (e.g., "It is important for me to learn a lot of new concepts in this environment") with $\alpha = .87$, five items assessed performance-approach goals (e.g., "It is important for me that other students think I am good") with $\alpha = .94$, and four items assessed performance-avoidance goals (e.g., "It is important for me that I do not look stupid") with $\alpha = .89$.

Help-seeking perceptions questionnaire. Three items adapted from Pajares et al. (2004) assessed perceptions of the benefits of seeking help (e.g., "Using help in this computer-based learning environment will help me to learn") with $\alpha = .81$. Four items adapted from Karabenick (2003) assessed the threat of help seeking to self-esteem (e.g., "Using help in this computer-based learning environment would be an admission that I am just not smart

enough to do the work on my own”) with $\alpha = .89$, and three items adapted from Butler (1998) assessed the perception of help-seeking as a threat to autonomy (e.g., “I would not use help in this computer-based learning environment because I would try to solve the problem by myself”) with $\alpha = .81$. The scales demonstrated good reliability. All the Cronbach’s alpha were above .70 as recommended by Nunnally (1978).

2.4. Self-perception and performance

Self-perception question. Self-efficacy was measured by asking participants to indicate how sure they were of being able to complete the task successfully on a scale ranging from 0 (*Not sure at all*) to 100 (*Absolutely sure*). In order to provide the participants with an overview of the task to be performed, this scale appeared in a window immediately after the instructions, alongside with another window indicating the text to which these word processing-related instructions applied (see Fig. 1). Two self-efficacy scores were allocated to the participant: one for the initial task and one for the comprehension task.

Performance was assessed in terms of success or failure. However, the effectiveness of help-seeking behavior was assessed by an analysis of the errors detected by the multi-agent system. If the participant corrected the error committed on the initial task, after help use on the comprehension task, then the help-seeking behavior was considered as efficient even though the overall performance might remain a failure. The participant thus might have committed other errors than the detected error for which a target help was proposed by the system but we still scored the proposed help as efficient as it helped the participant to overcome the initial caveat.

2.5. Procedure

The experiment lasted on average two hours on the same day. Firstly, all the participants signed an informed consent form. Secondly, they answered to a questionnaire of knowledge concerning advanced word processing functionalities. Thirdly, they did the learning phase by watching the videos related to word processing. The CBLE device was presented. Fourthly, after familiarizing themselves with the CBLE word-processing tool (familiarization exercise and helps) , the participants were invited to fill out the questionnaire assessing achievement goals and help-seeking perceptions. Fifthly, the statement of the initial task was presented and the self-efficacy was asked as success prediction. Then the participant performed the initial task and received feedback. If the solution was correct, the initial task was followed directly by the comprehension task (Fig. 2). As previously announced, we were only interested in participants who failed on the initial task. If it was incorrect, the participants had a choice of whether to accept or refuse help before continuing with the comprehension task. Those who accepted were given the help of their choice. Then, they were presented the comprehension task instructions followed by the self-efficacy assessment to succeed the comprehension task. Then, the participant was invited to do the comprehension task without help. All the participants' CBLE-related actions were recorded by the computer system.

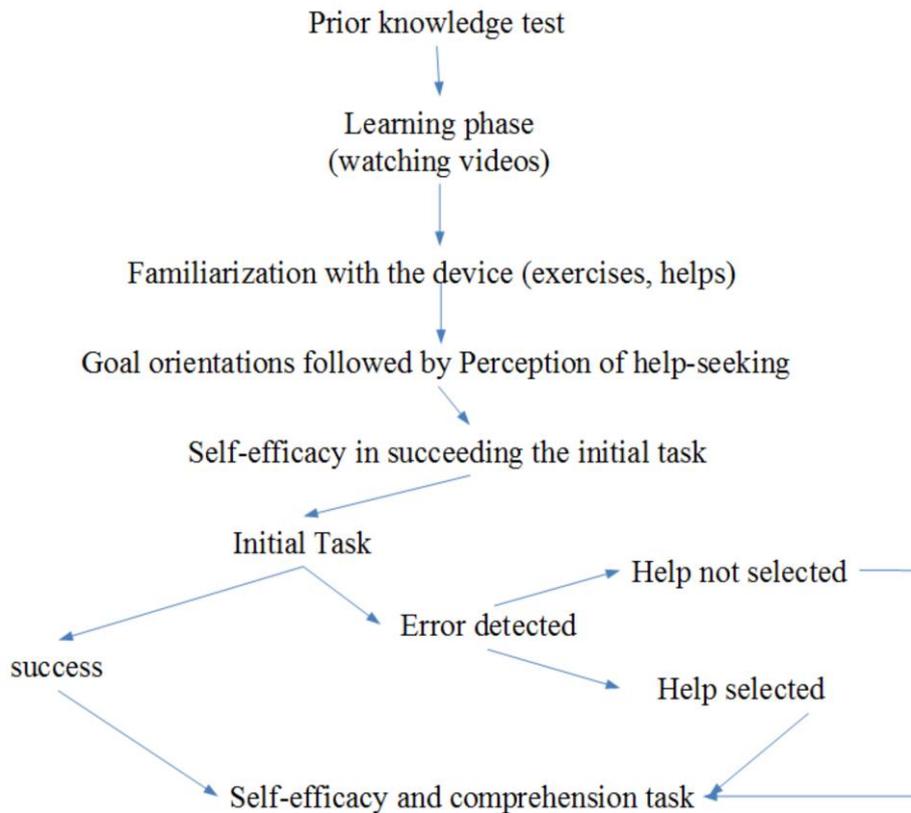


Fig. 2. Chronological sequence of the experiment

3. Results

Out of 107 participants, 25 succeeded and 84 failed to solve the initial task and were thus given the option of receiving help. Because only two students chose the executive help, we withdrew their data from the statistical analysis. The following analyses therefore only concern these 82 participants. After providing the descriptive data, we set out the results, divided into two main parts. The first part refers to actual help-seeking behaviors. The second part concerns the effectiveness of the actual help-seeking behaviors. In each part, the data are analyzed with respect to achievement goals, help-seeking perceptions, and self-efficacy. Missing data and the removal of outliers explain the existence of slightly differing degrees of freedom.

3.2. Descriptive Statistics

Table 1 sets out the mean values of the main variables for all 82 participants. A one-way within-participants analysis of variance (ANOVA), $F(2,162) = 112.60$, $p < .001$, $\eta^2 = .58$, revealed that participants declared mastery goals more than performance-avoidance goals, and both mastery and performance-avoidance goals more than performance-approach goals, all $ps < .001$ (Bonferroni correction applied). Concerning perceptions of help-seeking, results from the one-way within-participants ANOVA, $F(2,78) = 41.96$; $p < .001$, $\eta^2 = .52$, revealed that benefit-related help-seeking perceptions were more likely than autonomy-threat perceptions, and both benefit-related and autonomy-threat perceptions were more likely than ability-threat perceptions, all $ps < .001$ (Bonferroni correction applied). Globally, mean self-efficacy scores were $M = 61.45$, $SD = 23.54$ (range: 9-100) for the initial task and $M = 59.61$, $SD = 21.43$ (range: 0-100) for the comprehension task, $t(79) = .78$, $p = .22$.

Table 1

Mean values and standard deviations of achievement goals and help-seeking perceptions (n = 82).

Scales	Items	Mean	SD
<i>Goal orientation</i>			
Mastery goal	5	4.33	.94
Performance approach	5	2.56	1.28
Performance avoidance	4	2.88	1.34
<i>Perceptions of help-seeking</i>			
Perception of benefits	3	4.36	.82
Perception of a threat on self-esteem	3	2.59	1.12
Perception of a threat on autonomy	3	3.25	.91

3.3. Help-seeking behavior and its links to other variables.

Among the 82 students who failed to solve the initial task correctly 19 refused to take advantage of the help on offer (Refusal group, $n = 19$). All the remaining students chose one or other type of help (Acceptance group, $n = 63$).

Achievement goals. A 2 (group; between-participants) x 3 (achievement goals; within-participants) mixed ANOVA revealed an effect of goal, $F(1, 80) = 65.12, p < .001, \eta^2 = .45$, in that mastery goals were more pronounced than performance-avoidance goals, and mastery goals and performance-avoidance goals were more pronounced than performance-approach goals (all $ps < .001$, Bonferroni correction applied; Table 2). However, there was no effect of group, $F(1, 80) = 0.11, p = .74$, and no interaction effect, $F(1, 80) = 0.00, p = .99$. Thus, in contrast to both our expectations, the statistical analyses did not allow us to reach any conclusion about the links between achievement goals and actual help-seeking behavior.

Table 2

Mean values and standard deviations of achievement goals, and help-seeking perceptions for both refusal and acceptance groups.

Variables	Refusal group		Acceptation group	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Achievement goals				
Mastery	4.26	0.89	4.36	0,96
Performance-Approach	2.49	1.22	2.63	1.31
Performance-Avoidance	2.81	1.26	2.90	1.37
Help-seeking perceptions				
Benefit	4.82	0.40	4.47	0,87
Autonomy threat	2.79	0.85	3.40	0.87
Competencies threat	2.84	1.03	2.63	1.28

Note: M = Mean; SD = Standard deviation.

Help-seeking perceptions. We observed a specific pattern of results for help-seeking perceptions. A 2 (group) x 3 (help-seeking perceptions) mixed ANOVA revealed an effect of help-seeking perception, $F(1, 80) = 39.34, p < .001, \eta^2 = .33$, in that students declared that they mostly perceived help as a benefit, and less as a threat to their autonomy and even less as a threat to their ability (all $ps < .001$; Table 2). Yet, here again, there was no effect of group, $F(1, 80) = 0.00, p = .98$, or of interaction, $F(1, 80) = 0.36, p = .55$, suggesting that there is no link between help-seeking perceptions and actual help-seeking behavior.

Self-efficacy. An independent two-sample t test revealed an effect of group on self-efficacy scores for the initial task, $t(78) = 2.40, p < .02, d = 0.60$, in that students in the refusal group provided higher self-efficacy scores ($M = 72.42, SD = 26.72$) than students in the acceptance group ($M = 58.03, SD = 21.58$). A t test performed on self-efficacy scores for the comprehension task failed to yield any difference between the two groups (refusal group: $M = 63.89, SD = 28.98$; acceptance group: $M = 59.25, SD = 19.16$; $t(80) = .82; p = .21$).

3.4. Effectiveness of Help-Seeking Behavior

Going beyond help-seeking behavior per se, we were interested in the extent to which the help the students chose proved effective, that is, how far it genuinely helped them to overcome their initial failure. Table 3 indicates the numbers of students in each group (refusal vs. acceptance) who committed each type of error (identical vs. another vs. success). Given that refusing the help on offer could also prove a successful strategy, our analyses included students from both the refusal and the acceptance groups.

For the purpose of this analysis, those who succeeded were combined with those who were able to overcome their initial failure, even though they committed another type of error in the process (efficient help-seekers; Table 3). The remaining students were those who committed the same error on the comprehension task as they had on the initial task (inefficient help-seekers).

Table 3

Distribution of students following both, whether they were efficient help-seekers (another error + success) or not, and the chosen help.

Help	Efficient Help-seekers	Inefficient Help-seekers	Total
Refusal	10 (5 + 5)	9	19
help 1	6 (3 + 3)	1	7
help 2	20 (14 + 6)	10	30
help 3	13 (3 + 10)	13	26
Total	49	33	82

Note. Help 1: lesson related to the error; Help 2: text about the error. Help 3: general procedure to solve the exercise.

A 2 (group: efficient vs. inefficient help-seekers) x 2 (initial vs. comprehension-related self-efficacy) mixed ANOVA revealed an effect of interaction, $F(1, 78) = 5.11, p = .03, \eta^2 = .06$. As can be seen in Figure 3, while accurate and inaccurate help-seekers did not differ on self-efficacy before using (or avoiding) help, that is, before they performed the initial task ($M = 60.91, SD = 22.08$, and $M = 62.21, SD = 25.82, t(78) = .24, p = .81$), the efficient help-seekers' self-efficacy scores on the comprehension task were higher than those of the inefficient help-seekers ($M = 63.45, SD = 16.54$, and $M = 54.15, SD = 26.23, t(80) = 2.16, p = .03$). The decrease in self-efficacy scores between the initial and comprehension tasks in the case of the inefficient help-seekers was significant, $t(32) = 2.07, p = .047$, but no statistic difference in self-efficacy scores for the efficient help-seekers, was found $t(46) = .90, p = .37$.

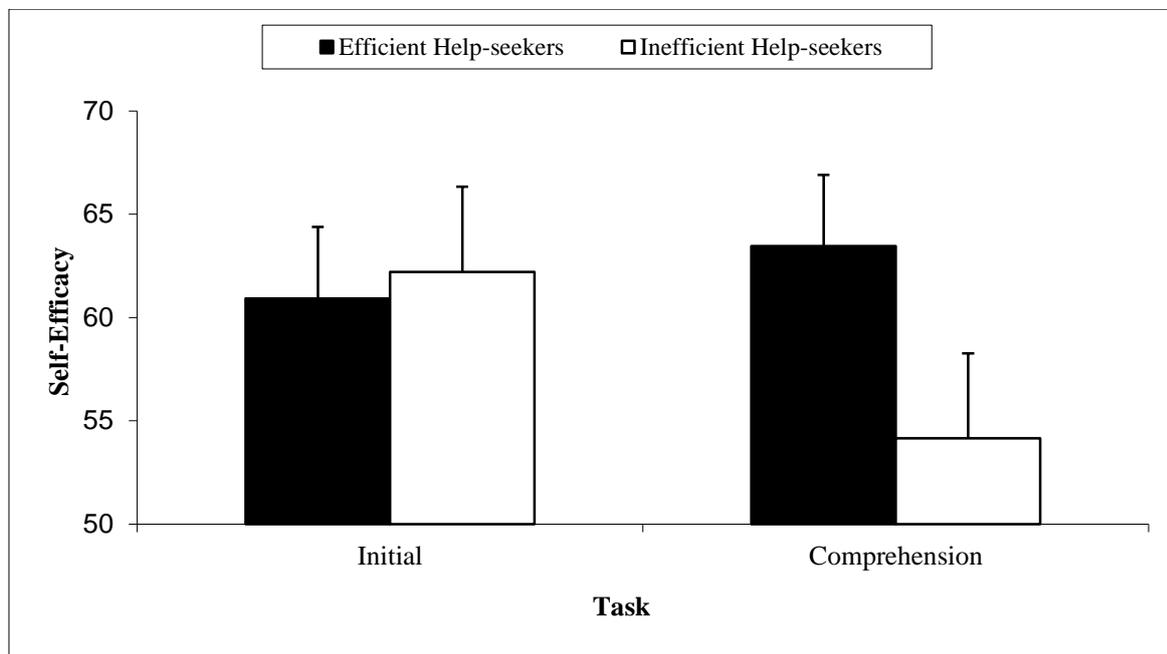


Fig. 3. Self-efficacy scores (on scales from 0 to 100) in initial and comprehension tasks for both, efficient and inefficient help-seekers.

4. Discussion

The aim of this study was to investigate whether help-seeking behaviors differ in their respective links to motivational variables such as achievement goals, help-seeking perceptions and self-efficacy. Eighty two failed to solve the initial exercise. Before engaging in a comprehension task, these students were invited to choose help, or not to choose any help at all. While 19 students did not accept help of any kind, 63 students chose to seek instrumental help. Taken together, our results suggest that except for self-efficacy, those who refused to seek help did not differ from those who agreed to seek help on either motivational variables. Moreover, neither motivational variable (apart from self-efficacy) were linked to help-seeking effectiveness.

4.2. *To Seek or Not to Seek Help?*

Our results suggest that actual help-seeking behavior may be *without* any link to achievement goals or perceptions. In this study, students' refusal or acceptance of help was linked neither to their achievement goals nor to their help-seeking perceptions.

An analysis of the role of self-efficacy in help seeking based on help-seeking intentions would have led to the conclusion that the lower the students' self-efficacy, the more they tend to avoid seeking help as predicted according to the vulnerability hypothesis (Tessler & Schwartz, 1972). However, our analysis based on actual help-seeking behavior revealed the opposite pattern, as those with lower self-efficacy scores agreed to seek help, while those with higher self-efficacy scores refused to do so. In line both with previous research (e.g., Puustinen & Winnykamen, 1998) and with the consistency hypothesis (Tessler & Schwartz, 1972), these results not only indicate that self-efficacy may be the motivational factor that contributes to different help-seeking behaviors and to self-regulation in general (Moos & Azevedo, 2009) but also further emphasize the importance of behavioral measures in the field of help seeking.

4.3. *Help-Seeking Behaviors and Self-Efficacy*

This study also yielded interesting information regarding the link between help-seeking behavior and self-efficacy. Being more confident in one's abilities presumably leads one to engage in strategies that may be more difficult, but which yield more learning-related benefits (Ryan & Pintrich, 1997).

Importantly, however, those who refused to seek help exhibited the greatest self-efficacy (mean value; 70/100; see above). Thus, taken together, we argue that self-efficacy is not linked to actual help seeking in a linear fashion (see also Tessler & Schwartz, 1972), and that it plays different roles at different stages in the help-seeking process. Self-efficacy intervenes not only in the decision of whether or not to seek help, but also—providing the first answer is yes—in the decision about which type of help to seek.

Although help seeking appears to go through different stages (Nelson-LeGall, 1985; Van der Meij, 1989), evidence concerning the related changes in motivational variables is rather scarce, whether it concerns the actual process of help seeking (Puustinen & Winnykamen, 1998) or the SRL process in general (Moos & Azevedo, 2008). Our study clearly suggests that self-efficacy, at least, may both influence and be influenced by different levels of help seeking.

4.4. *Help-seeking effectiveness*

This study revealed that the only motivational variable linked to students' effectiveness in help-seeking was self-efficacy. At the initial measure of motivational variables, those who took advantage of the help on offer to avoid their initial failure did not differ from those who repeated the same failure. They did, however, differ in the self-efficacy for the comprehension task, such that those who avoided their initial failure felt more self-efficient than those who repeated the same failure. Interestingly, this may indicate that not only can self-efficacy be used as a metacognitive cue to decide whether or not to accept help (*monitoring affects control hypothesis*; Thiede & Dunlosky, 1999), but also that self-efficacy can change, that is, increase following successful recovery from an initial error (*control affects monitoring hypothesis*; Koriat, Ma'ayan, & Nussinson, 2006). This would require the

dynamic measure of variables such as self-efficacy, in order to establish if– and at which point in the learning process – certain motivational cues can become the consequence, rather than the cause, of help-seeking behaviors.

It is worth noting that those who benefited from the help on offer were more numerous as those who did not benefit. In line with rates of help-seeking effectiveness observed in other studies, this indicates that the help procedure we implemented was efficient (e.g., Mäkitalo-Siegl et al., 2011).

4.5. Limitations

The fact that the present study was conducted with young adults raises several developmental issues. Most of the initial HS models were based on observations of younger children (Butler, 1998; Good et al., 1987; Nelson-Le Gall, 1981, 1985), although some of the early studies also concerned adolescents (Karabenick & Knapp, 1991; Ryan & Pintrich, 1997; see also Roussel et al., 2011; Stavrianopoulos, 2007) or adults aged between 18 (Clarebout & Elen, 2009) and 50 years (Skaalvik & Skaalvik 2005; Zimmerman & Martinez-Pons, 1988). Contrary to expectations, however, virtually none of these models were found to contain developmental propositions. For instance, we could argue that HS–like other metacognitive skills–develops with age and achieves at least some degree of automaticity in the later stages of development (Veenman, Van Hout-Wolters, & Afflerbach, 2006). While the metacognitive and HS literature suggests that errors or failures cause automatic functioning to return to consciousness, thus eliciting either HS behavior or other self-regulatory activities, we can assume that by adolescence, some individual HS patterns at least are automatized. By contrast, we can assume that the motivational variables that are thought to determine children's HS, such as relatedness, autonomy and competence (Newman, 2002), are equally

valid predictors in the case of adolescents or adults (Deci & Ryan, 2000). We therefore think that while developmental issues represent an exciting avenue for future HS research, our findings are not necessarily impacted by this conceptual debate, and make a worthwhile contribution to the abundant HS literature (mainly concerning adults) that inspired our study (e.g., Karabenick, 2003, 2004).

5. Conclusion

While motivational variables seem to be highly predictive of help-seeking intentions, they are linked in a somewhat different manner to actual help-seeking behaviors. We therefore suggest that genuine, observable behaviors should be granted more importance than self-reported intentions in the help-seeking literature. Moreover, future research should investigate the related motivational variables in a more dynamic fashion, allowing for more finely tuned analyses to establish whether some motivational variables are the consequences, rather than the causes, of learners' help seeking.

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