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Exploration of explanatory factors underlying teachers' perception of learning difficulties in mathematics in interaction with student performances

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ABSTRACT

This study project contributes to documenting the subject of learning difficulties in mathematics [1-4]. In this research, we aimed to verify what are the main explanatory factors underlying teachers' perception of learning difficulties in mathematics and in relation to student performance in a problem-solving test. To meet the objectives of the study, we implemented a correlational quantitative data analysis devise with the participation of 262 primary school students. Regression analyzes were performed. The results of the analyzes show that the performance in solving a written mathematics questionnaire is explained mainly by socio-demographic variables associated with the students and by factual variables relating to the conditions for taking the questionnaires. Moreover, the teacher's perception of student performance in mathematics is mainly explained by variables directly related to the student or to the teacher's vision of the student's potential for success at school.

Keywords: Mathematics, Elementary School, Learning Difficulties, Screening, Anthropo-Didactic Approach, Explanatory Perspectives

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Introduction

Contrasting perspectives for interpreting learning difficulties

In the field of mathematics, scientific literature relates principally to two distinct explanatory perspectives for interpreting difficulties in mathematics in primary school students (Rajotte, et al. 2014a). The first perspective is essentially centred on the identification and description of the dysfunctions specific to the student (Giroux, 2010). Relying mainly on the work of researchers working in the fields of neuropsychology, cognitive psychology as well as developmental psychology (Martin and Mary, 2010; Author et al., 2014a), the proponents of this perspective attribute the learning difficulties directly to the student. By adopting this point of view, learning difficulties arise from the functional and cognitive characteristics of the learner (Lemoyne and Lessard, 2003) and can be measured through standardized assessment instruments (Giroux, 2010). This evaluation method consists of assigning a diagnosis (such as dyscalculia) or highlighting specific cognitive characteristics (such as executive functions) by targeting students who deviate from the average established according to their age (Houle, 2019). As reported by Barallobrès (2018) and Monnin (2010), this view concerning the nature of difficulties in mathematics, as well as the ideology underlying the normalization of students' cognitive processes, opens the door to the medicalization of education.

On the other hand, research relating to the second explanatory perspective is related to the domain of mathematics didactics (Roiné, 2009). By adopting this second perspective, learning difficulties are presented as being the result of the student's interaction with the school system as well as of the interpretation of the phenomena that result from this interaction (Perrin-Glorian, 1993, Rajotte et al., 2014). Consequently, the proponents of this perspective suggest intervening with students by simultaneously considering the specificity of knowledge, the students' knowledge in mathematics as well as the nature and the quality of the relationship between the teacher and the learner (Martin and Mary, 2010).

Regard at the evolution of legislation and policies specific to special education reveals that the guidelines promoted by the Ministry of Education relates to the first explanatory perspective (Rajotte, 2014). This positioning emerges from the Policy of Special Education (MEQ, 1999) which aims to reframe the main orientations of the last Quebec reform with regard to the particular needs and specific characteristics of students with handicaps or learning disabilities (SHLD). As mentioned by Giroux (2013), this policy includes a ministerial injunction on teachers to adapt their pedagogy to the characteristics and needs of those students. Moreover, it is difficult for teachers to apply these schemes of the adaptation of the intervention to pupils in difficulty since there is little scientific data allowing showing the particular characteristics relating to this category of students (Houle, 2019. In addition, teachers do not have didactic tools and theoretical support to make this type of adaptation (Rajotte et al., 2020).

On this subject, Houle (2019) adds that this type of focus on students' difficulties can lead to neglecting the taking into account of the didactic conditions necessary for learning. Thus, the help provided to pupils in difficulty then consists of simplifying tasks and aiming for success without taking into account the knowledge specificity engaged by the pupils (Houle, 2019).

On the other hand, limitations have also been highlighted regarding the application of the postulates underlying the second explanatory per-

spective, which essentially related to the domain of mathematics didactic (Rajotte et al., 2020). Indeed, although many works carried out by researchers relating to this perspective have documented the specificities of the teaching provided to the different categories of pupils in difficulty, it is important to mention that this type of research involves in-depth analyzes that imply a small sample of people. Consequently, the conclusions of research carried out in this research area rarely allow us to rely on evidence in order to generalize the results to a larger population of students (Giroux, 2013).

Faced with this observation, Giroux (2013) maintains that the difficulties in mathematics and that the problem of school failure are so complex that they require analytical tools from the social sciences. Furthermore, scientific writings relating to the social sciences in order to explain the nature of learning difficulties are scarce since these have been supplanted in recent years by research projects related to the cognitive sciences. On this subject, the relevance of considering the studies from the social sciences to explain students' difficulties was highlighted by the recent study by Rajotte et al. (2020). In fact, this research revealed that professionals from different sectors in education (elementary school teachers, remedial teachers, educational advisers) sometimes refer simultaneously to the postulates underlying the three perspectives (cognitive sciences, mathematics didactics and social sciences) when they take position on the postulates used to identify and interpret learning difficulties in mathematics.

Interpreting difficulties in mathematics: looking at postulates from the social sciences

In the line of the debates that have taken place in recent years between the proponents of the two main explanatory approaches, a third perspective has emerged from European studies focusing on learning difficulties in mathematics (Ahmad, 2014; Chopin, 2011; Rajotte et al., 2020; Roiné, 2012).

This perspective is essentially associated with social science and considers that the genesis of the difficulties is the result of a collective acculturation process (Roiné, 2015).

To interpret students' difficulties in mathematics, the approach used by the proponents of this third perspective refers to anthropo-didactics (Bergeron, 2017) which is located at the crossroads of anthropology and didactics (Sarrazy, 2001). According to this approach, teaching situations, and the difficulties that arise from them, are determined by the didactic conditions and by the non-didactic conditions (the backgrounds), which means that they are interpreted with regard to the habits and ways of doing of the teacher or the pupil in relation to the teaching of a specific mathematical content, but also according to the beliefs, desires, social values as well as the ideologies of the teacher, students and institutions (Bergeron, 2017). The anthropo-didactic approach emphasizes the importance of considering all of these factors in order to interpret the nature of interactions between students and teachers (Rajotte et al., 2020). This approach highlights the role of the educational and social background, as well as that of the pupil's educational status, as being a preponderant factor which helps to modulate the educational intervention implemented in certain categories of students (Bergeron, 2017).

Referring to the theories of Bourdieu (2002), the anthropo-didactic approach places educational inequalities and social positions in relation (Ayala and Roditi, 2014; Rajotte, 2018). Consequently, this approach is interested in the mechanisms by which the school institution acts as a system of reproduction of social inequali-

ties (Van Haecht, 2006) or, in other words, in the way in which the school institution transforms the social classification of students in school classification (Giroux, 2013). According to this point of view, school contributes to transforming social class differences into intelligence differences (Rajotte et al., 2018). In this way, over generations, this mechanism would lead to the upper classes to preserve their privileged status (Van Haecht, 2006). An explanatory track of this phenomenon has been mentioned by Rajotte(2014) who hypothesizes that the didactic contract, as well as the nature of the interactions between the environment, the pupils and the teacher, could be modulated in the primary classes according to subcategories of social classifications of learners.

Summary of the different interpretative perspectives and their postures

In order to describe the perspective adopted by the different disciplines that study learning difficulties in mathematics, Giroux (2015) has proposed a scheme for organizing these disciplines according to their purpose or their epistemological posture. As shown in Figure 1, this diagram makes it possible to reflect the purposes of the different disciplines on a transversal axis. On this axis, a movement to the left means a growing interest in the study of cognitive functioning and a focus on the characteristics of the student in order to explain his difficulties. Moreover, a movement to the right of the transverse axis represents a growing interest in the study of the functioning of knowledge in a teaching or learning situation as well as a look at the environmental causes likely to give rise to the difficulties.

Figure 1. Organization of the fields studying difficulties in mathematics

Neuropsychology	Cognitive psychology	Developmental psychology	Didactic of mathematics	Anthropo-didactics
Study of the brain and mental functions	Study of cognitive processes	Study of cognitive development	Study of teaching's condition and mathematics" learning	Study on didactics and non-didactics conditions

PSYCHOMEDICAL APPROACH
Regard for the individual

SYSTEMIC APPROACH
Regard for the external factors

In line of Giroux's comments (2015), it is possible to reveal that the proponents of the first perspective (cognitive perspective), which notably includes research from developmental psychology, neuropsychology and cognitive sciences, are on the left of the axis. This is justified by the fact that the explanatory framework for learning difficulties adopted by researchers working in this discipline is characterized by a focus on the individual characteristics of students. Moreover, the proponents of the second perspective, underlying the didactics of mathematics, are located at the centre right of the continuum since they centre their object of study in the interactions between the student and the didactic system. Finally, researchers who adopt the third explanatory perspective (social science perspective) position themselves on the far right of the continuum. This is justified by the fact that the proponents associated with this perspective explain the learning difficulties by looking simultaneously at the structure of mathematical knowledge and at the socio-cultural dimensions likely to contribute to the emergence of these difficulties.

Research objectives

Over the past decades, numerous studies have tested the first two explanatory perspectives of learning difficulties in mathematics. Moreover, the third explanatory perspective related to the field of social sciences has been the subject of a smaller number of research aimed to test its relevance and validity. Moreover, Giroux's initial diagram (2010) concerning the organization of disciplines interested in learning difficulties as an object of study did not take into consideration the work in the field of social sciences in regard to his contribution to the advancement of this research subject.

In an effort to test the perspective of the social sciences, the study of Rajotte et al. (2018), which was carried out in Abitibi-Témiscamingue, noted that the governmental indicators of deprivation (low-income cut-off line indicator (LICO) and socioeconomic environmental indicator (SEEI)) have a significant influence on the perception of the teachers of student performance in mathematics. Moreover, these indicators have less influence on the performance of students on a written ques-tionnaire requiring mathematical skills.

However, by involving participants from predominantly French-speaking and Caucasian communities, the study by Rajotte (2018) failed to identify the influence of certain social variables, such as ethnicity and mother tongue on teachers' perceptions. Consequently, the general objective of this present research is to test the explanatory perspective of the social sciences regarding the interpretation of the learning difficulties of students from urban centres characterized as cosmopolitan.

By considering a variety of social variables likely to influence teachers' perception of students' diffi-culties in mathematics, this study pursues two distinct objectives, namely:

1) Establish the influence of the socioeconomic level of primary students as well as the socio-demographic profile of their parents on the performance of solving a written mathematics ques-tionnaire;

2) Establish the influence of the socioeconomic level of students as well as the socio-demographic profile of their parents on teachers' perception of performance in mathematics;

Methodology

In order to realize this study, a descriptive correlational research design (Pelletier, Boivin and Alain, 2000) was implemented. In this type of design, the variables are studied and analyzed without being manipulated or controlled experimentally. More specifically, within the framework of this type of design, the researcher transposes data in the form of variables, assigns them a value and establishes the level of relationship between each of the variables using a correlation coefficient (Pelletier, Boivin and Alain, 2000).

Participants

In order to constitute the study sample, a non-probabilistic accidental sampling technique was used (Fortin, 2010; Voyer, Valois and Rémillard, 2000). Fourth grade, fifth grade and sixth-grade students from three separate primary school service centres were targeted (Centre de services scolaires des Navigateurs, Centre de services scolaires des Découvreurs et Centre de services scolaires de la Capitale). A total of 262 students from 14 different primary schools were interviewed (115 fourth graders, 54 fifth graders and 96 sixth graders). For each student participating in the project, data was also collected from the holders of parental authority through the parental consent form, which simultaneously aimed to collect socio-demographic data on the parents. In addition, for each of the participants, additional data was collected from the teachers who agreed to participate in the

study project.

Regarding the constitution of the study sample, it is important to mention that we anticipated collecting data from more than 400 participants. To this end, several visits to schools were scheduled for spring 2020. However, the COVID-19 pandemic has resulted in the closure of primary schools over several weeks. Consequently, for public health reasons, the research team did not visit the school envi-ronment during the months of May and June 2020.

Variables and measurements

In order to operationalize the research project, for each participant in the study, data was collected from three distinct categories of participants: 1) the holders of parental authority over the students, 2) the students, 3) the teachers of each of those students. The next sections will detail the various variables collected from these three categories of participants as well as the measurement instru-ments used to collect the data.

Variables from the holders of parental authority over the students

By completing the consent form regarding participation in the study, holders of parental authority were invited to complete a questionnaire that aimed to collect data related to their socio-demographic profile and their family environment. Data was collected in relation to ten specific variables:

1) the level of education of the parents;
2) family income;
3) the birth language of the parent;
4) the parent's country of birth;
5) place of residence (urban or rural);
6) the ethnic group of belongings;
7) marital status;
8) the student's siblings (number of children in the family);
9) the assignment of a diagnosis to the student;
10) participation in a personalized intervention plan.

The following table presents a summary of the variables as well as an overview of the data collected.

Table.1 Summary of variables and overview of data collected from holders of parental authority

Variable	Example of data collected	Number of possible results
1) the level of education of the parents	Lower level - secondary not completed Highest level - Post doctorate	7 possible response categories
2) family income	Lowest level - less than $ 10,000 Highest level - $ 180,000 and more	9 possible response categories
3) the birth language of the parent	French, English, Spanish.	3 suggested response categories. Possibility to add another choice.
4) the parent's country of birth	Canada (or other).	2 answer options, either Canada or another country to be specified
5) place of residence (urban or rural)	Urban or rural.	2 answer choices
6) the ethnic group of belonging	Examples of choices: Caucasian-white, African, Asian.	6 answer choices. Possibility to add another choice.
7) marital status	Examples of choices: married, single, widowers.	6 answer choices. Possibility to add another choice.
8) the student's siblings (number of children in the family)	Sample responses: two or three children.	Order of magnitude to be indicated. No suggestion for an answer.
9) the assignment of a diagnosis to the student	Example responses: attention deficit disorder, learning difficulty.	8 answer choices. Possibility to add another choice or not to answer.
10) participation in a personalized intervention plan	Yes or no.	2 choices of answers. Possibility of indicating the presence of adaptation or modification measures present in the intervention plan.

Variables associated with primary school students

Various data were collected from elementary school students using a questionnaire administered by a member of the research team during school hours. The student's questionnaire included four distinct sections: individual data, their level of school motivation, their perception of teaching practices in the classroom as well as a mathematics performance test involving six problem statements developed by the research team. The problem-solving questions were adapted to the grade level of the students.

Regarding the individual data underlying the pupil, each participant had to enter his gender (boy or girl), his age, his month of birth as well as his rank in the family (eldest, youngest, youngest or only child). The various terms associated with rank in the family were explained by the research assistant before completing the questionnaire.

Then, the section concerning the level of school motivation consisted of twelve separate questions. These questions came from a test validated in Quebec by a team of psychological researchers (Vallerand et al. 1993). The different questions related to a Likert-type scale and involved four possible choices (1- strongly disagree; 4 - strongly agree). The scale of Vallerand et al. (1993) allows us to evaluate 4 subconstructs of academic motivation:

1) Amotivation, which consists of working hard and having no benefit;

2) Intrinsic motivation, which refers to carrying out an activity for the satisfaction and pleasure that one derives from it

3) Identified extrinsic motivation, which consists of the regulation of behaviour through the free choice of an individual who is able to identify the reasons justifying this choice;

4) introjected extrinsic motivation, which consists of the regulation of behaviour by sources of control internalized by the individual; these sources of control putting pressure on that person.

The internal consistency level of the tool was established by the research team of Vallerand et al. (1993). The tool's Cronbach's alpha was set at 0.80.

Finally, the final section of the questionnaire aimed to assess the mathematics performance of el-ementary school students. The mathematical concepts covered varied according to the grade level of the students, but they related exclusively to the field of mathematics. This section consisted of six separate questions and had been pre-tested with two classes to ensure that the level of difficulty was appropriate for the grade level of the students.

Variables from elementary school children

Elementary school teachers were asked to comment on their perception of academic performance in relation to three distinct indicators: the level of reading competence, the level of competence in solving mathematical problems and the student’s risk of dropout. Using the method of Sovik, Frostrad and Heggberget (1999), teachers rated each student from 1 to 5 for each of these indicators (a score of 1 meant that the student's performance was significantly higher than expectations, while that a rating of 5 marked a performance significantly below expectations).

Using the method of Sovik, Frostrad and Heggberget (1999), teachers made an evaluative judgment regarding the level of risk of each student to drop out of the school system. To do this, five evaluation criteria were used: 1) none; 2) weak; 3) medium; 4) high; 5) very high.

Finally, it is important to mention that data was also collected in relation to the background of the elementary teachers. In fact, by referring to the governmental indicators of the level of deprivation of Quebec schools, it was possible to

create two additional variables, namely, the socioeconomic background index which is established on the basis of and socioeconomic environmental indicators (SEE) as well as the low-income cut-off (LICO) which corresponds to the proportion of families with children whose income is located near or below the low-income cut-off. In correspondence with the document indices of deprivation of public schools 2019-2020, published by the Government of Quebec (2020), a value has been assigned to each school referring to these two indicators.

Analyzes

Analyzes were performed using version 27 of the SPSS software. In order to meet the research objectives, stepwise regression analyzes were performed. The choice of this analysis comes from the fact that it allows, on the one hand, to relate a group of independent variables to a dependent variable and, on the other hand, to rank the various correlated variables according to their respective order of importance.

Operationalization of the experiment

Attributable to the fact that it is the same research assistant who piloted each of the 19 classes encountered, the experiment has always been the same way. The first stage of the experiment in-volved the holders of parental authority over the students. Within two weeks, those participants had to complete a parental consent form which simultaneously aimed to collect information on their so-cio-demographic data.

The second stage of the experiment, lasting 60 minutes, took place in the classroom. Only students who had received parental consent were able to participate. To begin, in order to make them aware of the importance of their participation, the research assistant approached the students with a discussion of the characteristics of research as well as the impact of research in the world of education. The research assistant then explained to the students each of the sections of the questionnaire that they had to complete. During the experiment, students were allowed to raise their hands and ask questions of the research assistant if they were needed or could not understand one or more words. However, since the information provided by the students was confidential and could sometimes affect their perceptions of their teacher's practices in the classroom, the teacher was not allowed to circulate with the students during the experiment.

Finally, the third stage, which took place simultaneously with the second stage previously mentioned, involved the elementary school teacher. This category of participants had to evaluate their perception of academic performance and make an evaluative judgment regarding the level of risk of each student to drop out.

Results

In order to meet the two research objectives, we implemented stepwise regression analyzes. The next section will present the analysis carried out in order to establish the influence of the socioeconomic level of elementary students as well as that of the socio-demographic profile of their parents on the performance in solving a written mathematics questionnaire. Then, by considering these same factors, we realized a second regression analysis which aimed at identifying the relative influence of these indicators with regard to the teachers' perception of the student's performance in mathematics.

Analysis of the factors having an influence on the performance in solving a written math-ematics questionnaire

In order to determine to what extent different indicators relating to the socioeconomic level of students as well as the socio-demographic of

parents influence the performance of elementary students in solving a written mathematics questionnaire, we performed a first multiple regression analysis. The independent variables considered within this analysis pertained to both the students, the student's holder of parental authority as well as the primary school teacher. The various multiple regression models retained following the analysis are presented in Table 2 and the regression coefficient values are highlighted in Table 3.

Table 2. First analysis: R-squared and adjusted R-squared of the various multiple regression models retained

Model's summary				
Models selected	R	R^2	R^2 adjusted	Standard error of estimate
1	0,314[a]	0,098	0,095	0,83200
2	0,438[b]	0,192	0,186	0,78904
3	0,472[c]	0,223	0,214	0,77529
4	0,498[d]	0,248	0,237	0,76408
5	0,512[e]	0,262	0,248	0,75842

a) Predictors: (Constant), Teacher's perception of reading competence,

b) Predictors: (Constant), Teacher's perception of reading competence, School grades,

c) Predictors: (Constant), Teacher's perception of reading competence, School grades, Indizidual-ized service plan,

d) Predictors: (Constant), Teacher's perception
of reading competence, School grades, Indizidualized service plan, student gender,

e) Predictors: (Constant), Teacher's perception of reading competence, School grades, Indizidual-ized service plan, student gender, teacher perception of the student's risk of dropout.

Table 3. Standardized coefficients (beta), T test and degree of significance of the variables associated with the performance in solving a written questionnaire

Models		Standardized coefficients		
		Beta	T	Sig.
1	(constant)		25,242	,000
	Reading competence	-0,314	-5,358	,000
2	(constant)		24,580	,000
	Reading competence	-0,308	-5,542	,000
	School degree	-0,306	-5,515	,000
3	(constant)		25,221	,000
	Reading competence	-0,236	-4,009	,000
	School degree	-0,304	-5,566	,000
	Ind. service plan	-0,190	-3,220	,001
4	(constant)		21,240	,000
	Reading competence	-0,243	-4,176	,000
	School degree	-0,290	-5,373	,000
	Ind. service plan	-0,202	-3,467	,001
	Student gender	-0,160	-2,953	,003
5	(constante)		21,386	,000
	Reading competence	-0,190	-3,056	,002
	School degree	-0,306	-5,661	,000
	Ind. service plan	-0,149	-2,376	,018
	Student gender	-0,177	-3,252	,001
	Perc. of dropout risk	-0,150	-2,212	,028

The fifth regression model was retained because it allows us to consider the greatest number of variables having an influence on the performance in solving a written mathematics questionnaire. The results obtained reveal that five distinct independent variables influence the performance in solving a written mathematics questionnaire (F (5,259) = 18.412; p 0.001). In fact, the teacher's perception of reading skills (9.5%), school degree (9.1%), the child's participation in a personalized intervention plan (2, 8%), the student's gender (2.3%) as well as the teacher's perception of the student's risk of dropping out (1.3%) justify 24.8% of the performance in solving a written question-naire in mathematics.

Analysis of factors influencing the teacher's perception of student performance in mathe -matics

In order to determine the extent to which various indicators relating to the socioeconomic level of students as well as the socio-demographic of parents influence the teacher's perception of student performance in mathematics, we performed a second multiple regression analysis. The different multiple regression models retained following the analysis are presented in Table 4 and the regres-sion coefficient values are highlighted in Table 5.

Table 4. Second analysis: R-squared and adjusted R-squared of the various multiple regression models retained

Model's summary				
Models selected	R	R^2	R^2 adjusted	Standard error of estimate
1	0,508[a]	0,258	0,235	1,009
2	0,625[b]	0,391	0,352	0,929
3	0,687[c]	0,472	0,419	0,879

Table 5. Standardized coefficients (beta), T test and degree of significance of the variables associated with the teacher's perception of student performance in mathematics

Models		Standardized coefficients		
		Beta	T	Sig.
1	(constant)		4,934	,000
	LICO indicator	0,508	3,334	,002
2	(constant)		1,413	,168
	LICO indicator	0,566	3,985	,000
	School degree	0,396	2,603	,014
3	(constant)		-0,066	,948
	LICO indicator	0,597	4,418	,000
	School degree	0,369	2,751	,010
	Month of test passation	0,287	2,150	,040

The third regression model was retained because it allows us to consider the largest number of var-iables having an influence on the teacher's perception of the student's performance in mathematics. The results obtained reveal that three distinct independent variables influence the teacher's percep-tion of the student's performance in mathematics (F (3.30) = 8.948; p 0.001). In fact, the low-income cut-off (LICO) indicator (23.5%), the school degree (11.7%), as well as the month in which the test was taken during the school year (6.7%) account for 41.9% of the variance in the teacher's perception of student achievement in mathe-

matics.

Interpretation

In light of the data obtained, it is possible to identify considerable differences in the nature of the variables that influence the performance in solving a written mathematics questionnaire compared to those that influence the teacher's perception of performance of the student in mathematics. This observation is reflected in the results of the regression analyzes which were carried out.

Indeed, the research results highlight the fact that the factors having an influence on the per-for-mance in solving a written mathematics questionnaire are essentially linked to the per-ception of the teacher about the child's potential of success at school(perception of the level of reading skills, per-ception of the student's risk of dropping out). The variable relatives to the student have also an in-fluence. Regarding this category of variables, the analyzes revealed that a student's participation in an individualized service plan explains part of the variance in the mathematical problem solving per-formance in a written questionnaire.

On the other hand, a look at the factors having an influence on the teacher's perception of the stu-dent's performance in mathematics leads us to consider other explanatory variables. In fact, the second regression analysis reveals that a main factor relating to the socio-demographic profile of the student helps to explain the teach-er's view of the student's potential for success in mathematics. In fact, the departmental low-income cut-off (LICO) indicator is the main in-fluencing variable ex-plaining the teacher's per-ception of the student's mathematics perfor-mance (23.5%). In addition, the fact that the month in which the questionnaire is revealed by the analysis leads us to think that teachers per-ceive that the cognitive maturation and the schooling process that occur toward a year are associated with the performance of the student.

Finally, it is important to mention that the stu-dent grade was retained in the two models of analysis. This means that the questionnaires that were administered to students at different school grades implied different levels of difficul-ty and that teachers perceived students' poten-tial for mathematics success differently depend-ing on their grade. In subsequent studies, it would be relevant to work with students relating to the same grade level.

Conclusion

Recent studies in the field of educational sci-ences have highlighted the importance of the teacher effect as the main lever for supporting the academic success of primary school stu-dents (Bis-sonnette, 2015). To this end, the re-sults of this study show that a factor relating to the socio-demographic profile of students, the ministerial indicator of the low-income cut-off (LICO), has a considerable influence on the teacher's perception in regard to student achievement in mathematics at school. In order to promote equality of opportunity between the different primary school pupils, we suggest that teachers carry out a reflective analysis of their practice in order to become aware of the factors relating to their cultural “background” that could potentially influence their perception of student performance as well as their pedagogical inter-ventions. Indeed, this awareness could avoid having teachers set up interventions relating to a didactic contract differentiated according to the socio-demographic profile of certain catego-ries of students.

At the same time, the results of the study did not allow us to identify any influence of the so-cio-demographic profile on the performance of students in solving a written mathematics ques-tionnaire. Considering that it is other variables,

in particular the perception of skill level in reading, that explain the student's performance in mathematics, it would be possible to consider adopting another angle of approach in order to prevent students' difficulties in mathematics. In this regard, we suggest that teachers aim to consolidate reading and writing skills in order to promote the development of the subject-specific skills of elementary students in mathematics.

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