On The Relationship Between Perceived Competence, Physical Performance And Motivation of 13 - 15-Year-Old Students: A Bootstrapping Method Analysis

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Abstract: *This article aims to (i) analyze the relationship between academic performance, motivation and the feeling of competence; (ii) check whether the perception of school capacity of different student types was different and; check if boys and girls are distinguished at this level. To tackles this issue, we used a data for 95 Tunisian students analyzed through the principal component analysis (PCA) and a Bootstrapping methods. We find that, from the seventh year of basic education, there is a relationship of self-concept between school performance in physical education and motivation. In addition, they also indicated that boys positively perceive their skills in physical education whereas girls are rather satisfied with academic achievement.*

Keywords: *Perceived competence, physical performance, motivation, Bootstrapping method analysis.*

I.   Introduction

Nowadays, success at school is the concern of school environments as well as the field of educational research. Therefore, the study of its facilitating or hindering factors seems important. In fact, previous research has identified three factors that are related to academic success: These factors are socio-environmental (cultural, social, familial and school background), pedagogical (school curricula, teaching methods) and behavioral (various student characteristics).

Our research focuses mainly on the pupil's characteristics. This is due to the fact that emotions and perceptions play an important role in the learning process. Several studies examined the relationships between the actual and cognitive dimensions. However, the variable that has received much attention of researchers is that of self-concept. In fact, over the last few decades, the relationship between this variable and school performance has been the subject of much research leading to the result that the self-concept has an important role in academic success.

This study was not limited to examine the concept of self-esteem as a variable of students who attend the college for the first time, but especially that of the seventh grade until the ninth year basic education. Therefore, we tried to establish a link between the perception of competence and the academic performance of the student either through motivation at school or through other digital tools. On the other hand, in spite of the extensive research on this topic, there is not much knowledge about this category of students. Thus, the objective of this study was to check whether students at this age are distinguished at the level of self-concept.
It should be noted that self-concept is multidimensional with a general dimension and several other specific dimensions. Self concept, one of these sub-dimensions, seems to be linked with academic performance as well as other criteria.

All these dimensions are organized and prioritized into a coherent entity around structures. Moreover, L'Ecuyer (1990) stipulates that this hierarchical organization varies and evolves with age due to the effect of progressive differentiations called steps or stages, which are related to everyday experience. For this reason, our present research mainly focuses on the feelings of competence (Wylie, 1979; Song and Hattie, 1984).On the other hand, Raynor and McFarlia, (1986) believe that self-concept refers to the perceptions of an individual's skills, values, choices, objectives and aspirations. This concept has therefore a dynamic function insofar as it controls students' behavior (Cantor et al., 1986). Similarly, Markus (1980) states that self-concept is the knowledge of self-structures. In fact, it organizes the individuals' interpretations about their experiences and shapes their behaviors.

The terms of self-concept and self-esteem are used differently in literature. Therefore, it is very important to differentiate them to understand how self-concept motivates people's behavior. On the other hand, the term self-esteem refers to the emotional judgments that an individual has about himself (Raynor and McFarlia, 1986). In other words, it is the way through which an individual feels about his various capabilities. Consequently, relying on what we have just stated, a student's self-concept is formed through the interaction of several factors. The first important factor is the perception of the student's personal skills (cognitive) in the educational field.

In fact, going to school is crucial for a child. For the first time in his life, he will perform and be evaluated by other people other than his parents. As a consequence, everything he learns from his teachers will complete what he has already learned from his parents, which will enable him to have more sources of information that will help him build perceptions about himself. However, Altman and Dupont (1989) try to check if school self-concept is a good indicator of school performance. This study was conducted on a sample of 198 pupils in the third and the sixth graders primary education. They find that only school self-concept is significantly correlated with the students' academic performance.

When considering the analysis of gender in relation to self-concept, the children's age is also taken into account as another variable. Therefore, we will refer to the work that dealt with age and its relationship with self-concept whereas the sex variable was not much discussed. The works that dealt with gender and self-concept will be analyzed without focusing on age.

Accordingly, it can be noted that all the works dealt with the impact of the students' age on the level of their academic skills perception. In fact, the results showed that self-concept varies with age going from a concrete description of skills to more confused constructs. Hence, the gender and age impact or the interaction impact on the overall self-concept is insignificant while their effect on the school self-concept is significant.

However, it seems that self-perception was not properly taken into account in schools. In fact, priority is given to learning over the students' emotional development. This dimension is about such variables as self-concept, causality attributions, motivation, attitude towards school, interest in materials, curiosity, temper, social skills and creativity. These variables are of great importance for the understanding of the learning process itself. What stimulates our interest to deal with the feeling of competence in this study is the construction of this concept that involves several variables other than the perception of personal skills, such as the expectations about performance, motivation in front of a task as well as causality attribution.

The rest of this article was structured as follows. The second section discussed the objectives, the survey presentation and the used methods. Section three presented the factorization and estimation results. The final section was dedicated to the conclusion.

II. Objectives and data presentation

This research study had two main objectives: the first was to check the moderating impact of the competence feeling on the link between motivation and academic performance, while the second tried to see if this moderating impact itself is modified by the participants' age and gender. All the hypotheses connected to these two objectives were examined through a cross estimation.

The first hypothesis assumes that academic motivation and perceived competence are expected to positively predict the students' average performance in physical education. The second states that motivation and competence feelings of students in physical education are expected to improve the link between motivation and academic performance. As a consequence, the impact of motivation on academic performance would be more important among students who feel a sense of competence than those who display a feeling of low competence.

The third hypothesis predicts that the moderating effect of competence feeling on the relationship between motivation and physical education performance is expected to be moderated by the students' size, weight, age and sex while taking account the residential background. In other words, this moderating effect of competence feeling is expected to be lower among girls and older students. This study is based a 95- pupil sample with 50.5% boys who were arbitrarily selected from a larger sample. A questionnaire was answered by the students of our sample and consisted in collecting data relative to students aged between 13 and 15 years who attended 6 schools in the Sfax region. In fact, the sample has established a classification on the basis of the socio-economic environment where these students live (rural and urban). As a result, schools in under privileged backgrounds have been assigned low ranks compared to those from more privileged backgrounds. For this reason, we took into account only the respondents who provided valid responses in our sample.

2.1. Measures

It should be no surprise that multi-factorial methods generate graphical representations that make up the best possible synthesis of information contained in a large table of collected data. This means that we should admit a lack of information that researchers need to look for and find out to improve intelligibility and clarity.

Examining each variable separately gives some information that suffers many gaps as the procedure does not provide the links between the information elements which are often the essential study topic. Multifactor statistics correctly intervenes here to analyze the data as a whole, while retaining all of the related variables. Furthermore, the "Principal Component Analysis" (PCA) is, from this point of view, a good method to review the multi-dimensional data, when all the observed variables are numerical, preferably in the same units, especially when it comes to the relationship between the variables.

In this paper, we tried to factorize the three basic concepts of (competence feelings, performance and motivation) using the ACP to identify the factors on the basis of a number of "qualitative and quantitative variables" measuring the degree of learners' attraction to different elements.

Most of the variables that include the sense competence feeling are assessed using a scale derived from the multidimensional scale for academic learning (Gurtner, Monnard and Ntamakiliro 1999). Such an assessment should be given on a five-point Likert scale. Actually, in all the analyses, the Cronbach alpha is used to measure the questionnaire reliability. In addition, Bartlett's sphericity test and the sampling of suitability measures are also used before the PCA.

Moreover, we decided to produce the KMO (Kaiser-Meyer-Olkin) index and Bartlett's sphericity test. The KMO index is very useful because it helps evaluate how all the selected variables are a consistent set for the definition of a relevant solution in conceptual terms. The higher this index, the more the factor solution is satisfactory. Bartlett's sphericity test is used to check whether all the correlations are equal to zero. All the correlations will not be accepted unless they are equal to zero if the significance index (risk) is lower than 5%. However, this test is very sensitive to the number of cases. In fact, it is almost always significant when we have a great number of cases which makes it unreliable.The semi-parametric estimation approach (two-step method) was used to study the type of relationship. The literature dealing with this topic used the statistician's toolbox and mainly jackknife's replication methods to carry out stress testing attempts on the data. In practice, these methods will bring out of the sample the entities that represent the very influential points in the determination of the envelope curve. In the current inferential statistics approaches, the corrections through the approximation of the confidence intervals are approximated by "bootstrap" replications. This led to a debate between those who hold to the Gaussian inference to study the distribution of effective solutions such as Banker and Natarajan (2004), on the one hand, and those who reject it owing to the non-independence between the observations made in technology and close management arrangements, like Simar and Wilson (2007) , on the other hand.

2.2. The data

To find a causal link between the competence feeling, physical performance and motivation, we conducted a survey consisting of a total of 35 items organized in three main variables defining competence, performance and motivation, respectively. Each variable was broken down into sub-variables to better identify its characteristics. Table 1 summarizes all the variables and sub-variables.

Table 1 Items description.

Variables	Sub-variables	Name	Designation
		representative	A representative of pupils in each governorate
		Age	Pupil's age
		Gender	Pupil's gender
		Size	Pupil's size
		Weight	Pupil's weight
		Town	Where the pupil lives
		Governorate	Governorate
		Residence	Residence (urban or rural)
Feeling of competence	School absenteeism	V1101	Since the beginning of the school year, how many days have you missed the physical education session?
		V1102	What were the reasons for these absences?
	school anxiety	V1201	Are you worried about the idea of failure in sports?
		V1202	Are you afraid of practising sports activities ahead your friends?
		V1203	After your sports exercises, you feel:
	Intention of dropping out	V1301	Have you ever seriously thought about giving up sports?
		V1302	When you establish sporting objectives, is it rare that you reach them?
		V1303	Have you been able to overcome the physical problems?
		V1304	When you try to learn a few things again, do you give up quickly?
		V1305	Have you been appreciated by your friend because you have good qualities in sports and physical activity?
		V1306	If you meet someone interesting in your sport specialty, will you find it is difficult to establish a friendship, do you avoid him/her?
		V1307	Do you ask questions when you have some notions beyond your understanding in physical activity and sport?
		V1308	When you find an answer to a problem, do you just reply or look for other solutions?
Performance	School Achievement	V2101	When thinking about your grades, how do you rank yourself compared to others?
		V2102	During this school year, what are your grades?
	Students' involvement in education	V2201	Do you spend part of the evening to improve your sports skills?
		V2202	Can't you provide great efforts in sport and physical activity at school?
		V2203	When you exercise a sporting activity at school, do you make it perfectly?

	V23011	How much time do you run a 40 m race?
Measurement of physical skills	V23012	How much time do you run a 60 m race?
	V23021	How long do you achieve in Long Jump?
	V23022	How far do you throw at launch weight?
	V2303	You favourite sports :
	V2304	Is it true that one of your problems is that you cannot be physically present as it is required?
	V2305	Do you like generally regulations?
Motivation — Quantitative assessment of students	V3101	How were you informed of the existence of the sporting activity association?
	V3102	What are the objectives provided in your institution underlying the creation of these associations?
	V3103	Did you follow a training course?
Qualitative assessment of students	V3201	Will you make a performance test?
	V3202	If you have done this test, what are the emerging key points?
	V3203	Will you make a comparative assessment of skills with other students?
	V3204	Do you think you are a valuable person?
	V3205	Are you able to do things as well as the majority of your friends?
	V3206	If you fail something the first time, do you keep trying until you make it?
	V3207	Do you like to know if you have a chance to win a new game?

Table 1 shows that there are 8 general variables identifying the student and his social environment, such as age, sex, weight, size and place of residence. The 3 basic variables are organized in 35 items that required factorization using the Principal Component Analysis.In fact, the competence feeling was split into three groups: the first deals with school absenteeism (2 items), the second with school anxiety (3 items) and the third with the intention to drop out of school (8 items). The performance variable was also divided into three groups: the first group deals with the Academic Performance (2 items), the second with the school investment (3 items) and the last with the measurement of physical competences (7 items). Finally, the last variable deals with motivation through two groups: the first group deals with the students' quantitative evaluation (3 items) whereas the second handles the students' qualitative evaluation (7 items).

2.3. Data graphic and descriptive analysis

The univariate descriptive techniques are those that offer the maximum graphical opportunities. If the variable is qualitative, the proportions of the different modalities of the variable of interest (pie chart, for example) are presented without any calculations.

Some bivariate techniques help to measure the relationship quality between two quantitative (correlation) or qualitative (Chi-square test of independence) variables. There are many types of tests, some of which are applicable to numerical variables and others to qualitative ones. They do not generate graphical representations as the problem is rather to know whether the descriptive graphical statistics on a sample may represent other samples or the entire population.

For the case of Sfax region, we presented the statistical results of the items measuring the physical skills and additional variables. For the "physical skill Measure" variable that includes seven items, different descriptive statistics are presented in Table 2 for a sample of 95 students. It was found that the modes are of different magnitudes because under this sub-variable, both of quantitative items ("How much time do you make in 60 meters" ...) and qualitative items ("You prefer sports"…) were analyzed.

Table 2 Descriptive analysis of the physical skill measurement.

Designations		Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7
N	Valid	95	95	95	95	95	95	95
	Missing	0	0	0	0	0	0	0
Mean		11.074	14.116	4.558	4.047	.85	3.47	.45
Median		10.000	14.000	5.000	4.000	1.00	3.00	.00
Standard deviation		2.896	3.417	1.041	1.042	.356	1.413	.500
Variance		8.388	11.678	1.084	1.085	.127	1.997	.250
Asymmetry		-.255	-.089	-.836	-.359	-2.022	-.361	.193
Flattening		1.417	2.599	2.429	.826	2.132	-1.126	-2.005
Minimum		0.0	0.0	0.0	0.0	0.0	1	0
Maximum		19.0	25.0	6.0	6.0	1;0	5	1
Percentile	25	9.000	12.000	4.000	3.000	1.00	3.00	.00
	50	10.000	14.000	5.000	4.000	1.00	3.00	.00
	75	13.000	17.000	5.000	5.000	1.00	5.00	1.00

For example, for the first item "In how much time do you run 40 meters" we record an average of 11.07 seconds with a standard deviation type of 2.9 seconds. The distribution of this item is not symmetric, as it is spread out to the left. Moreover, it is more acute than a normal law, therefore, it is leptokurtic. On the other hand, the third item, "how many meters do you jump length", presents an average equal to 4.56 meters with a

standard deviation equal to 1.04 meters. Similarly, its distribution is spread to the left (Skewness = -0.83), but it is leptokurtic compared to the normal distribution (Kurtosis = 2.42).

Table 3 Inter-item correlation matrix: physical skill Measurement.

Designations	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7
How much time do you run a 40 m race?	1.000	.919	-.345	-.484	-.062	.010	-.060
How much time do you run a 60 m race?	.919	1.000	-.308	-.399	-.117	.030	-.118
How long do you achieve in Long Jump?	-.345	-.308	1.000	.801	-.034	.010	.061
How far do you throw at launch weight?	-.484	-.399	.801	1.000	-.024	-.153	.020
You favourite sports :	-.062	-.117	-.034	-.024	1.000	.140	-.159
Is it true that one of your problems is that you cannot be physically present as it is required?	.010	.030	.010	-.153	.140	1.000	-.006
Do you like generally regulations?	-.060	-.118	.061	.020	-.159	-.006	1.000

According to the correlation matrix (Table 3), there are good linear correlations between the two items that can achieve 0.92 and 0.80. Yet, there are also weak correlations which will certainly affect this sub-variable factorization.Regarding the control variables (age, height, weight and sex), statistics show that the average age is 14.11 years with a low standard deviation of 0.80 years. The modal age is 15 years while the median age is 14. Indeed, the age distribution is skewed (skewness= - 0.20) spread out to the left, besides, it is platykurtic (kurtosis = - 1.43).

Certainly, the size variable is heterogeneous among the various students in our investigation; however, it can be seen that there is a vast range of size values that would be gathered in a table containing the size classes which range from 1.49 meter to 1.69 meter. In fact, on the whole, the size is characterized by an average of 1.6 meter with a standard deviation of 0.04 meter. The distribution is asymmetric (skewness = - 0.5) spread out to the left, and is leptokurtic (kurtosis = 0.09).

Table 4 Descriptive analysis of the additional variables.

Designation		Age	Size	Weight	Gender
N	Valid	95	95	95	95
	Missing	0	0	0	0
Mean		13.97	1.5968	56.779	.51
Median		14.00	1.6000	57.000	1.00
Mode		13	1.61	56.0	1
Standard Deviation		.818	.04408	5.4366	.503
Variance		.669	.002	29.557	.253
Asymmetry		.059	-.509	-.026	-.021
Flattening		-1.503	.092	-1.051	-2.043
Minimum		13	1.49	46.0	0
Maximum		15	1.69	66.0	1
Amount		1327	151.70	5394.0	48
Percentile	25	13.00	1.5800	52.000	.00
	50	14.00	1.6000	57.000	1.00
	75	15.00	1.6200	61.000	1.00

It is also clear that the variable weight is again heterogeneous between the students in our survey. Actually, in the overall sample, weight is characterized by an average of 56.8 kg with a standard deviation of 5.4 Kg. The distribution is slightly asymmetric (skewness = - 0.026) spread out to the left. Besides, it is platykurtic (kurtosis=-1.05).

The maximum weight is 66 kg while the minimum is estimated at 46 kg, which gives an extent of 20kg assumed to be a large gap that affects both the students' performance and feelings. In fact, the weight increase can negatively affect the students' performance in physical education, for example in the jump length or the speed of the exercise.

In general, gender is a Boolean variable that takes 1 for "masculine" and 0 for "feminine". Therefore, having an average equal to 1 indicates that the number of boys is slightly greater than that of girls as previously reported (Mode = 1). In general, this asymmetrical distribution (skewness = - 0.21) spreads out to the left, besides, it is platykurtic (kurtosis = - 2.04).

To better evaluate the difference between the different variables, figure 1 shows the distributions relative to the normal distribution.
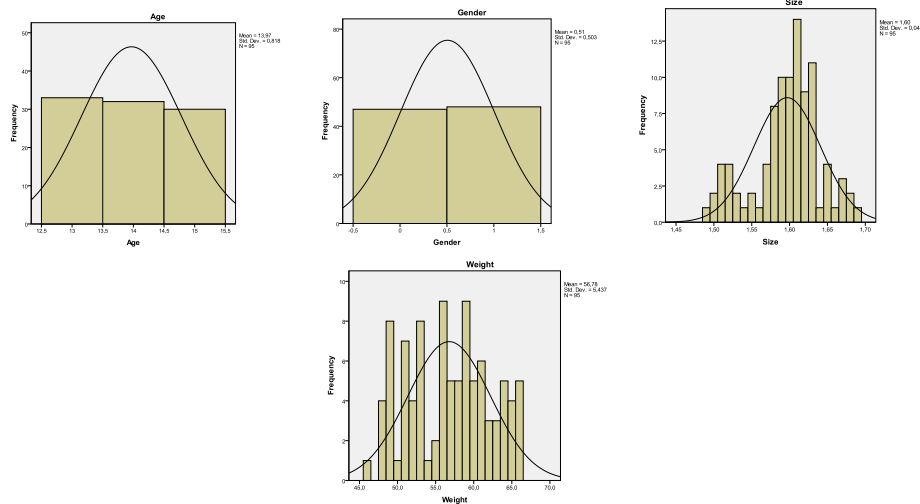
Fig.1. Distribution of the control variables

III.   The Principal Component Analysis (PCA)

The principal Component Analysis (PCA) is a well known exploratory technique with different ways to apprehend. Here's a very simplified one: "starting from a database having quantitative "n" comments and "p" variables, we try to summarize the available information using some synthetic variables called factors".

This section contains a description of two quality analysis indicators that are directly available in the most well-known commercial software of Statistical Package for the Social Sciences (SPSS 20 and R). Actually, we dealt with both Bartlett's test and "KMO index" (Kaiser-Mayer-Olkin) which measure the adequacy of the sample selected in this study.

3.1. Factorization of the competence feeling variable

The question raised in this sub-section dealt with multidimensional data processing techniques. These are the factor analyses that enable a more effective treatment of a large amount of data, both in terms of considered individuals (n=number of rows) and the variables characterizing these individuals (p= number of columns).It is possible to proceed with a rotation of the axes, where the component matrix [i.e. the matrix defining new dimensions (axes) = matrix of coordinates of initial variables on axes], can not formally distinguish which variable comprises which dimension. We often resorted to a rotation of the axes to change the coordinates of the variables with respect to the axes. As a first step, however, we did not proceed with such rotation; we rather started with a basic analysis without rotation. Regarding the Sfax region and through the use of a data matrix with n = 95 and p = 13, the factorization of the first variable "competence feelings" using the PCA led to the results displayed in table 5. According to this table, the factorization of the first variable resulted in a first factor explaining 85.4% of the total information with an average validity (KMO = 0.5) and a high reliability ($\alpha = 0.83$).

Table 5 Factor analysis of the feeling variable.

Variable		Sentiment		
	Sub-Variables	**School absenteeism**	**School Anxiety**	**Intention of dropping out**
Before Rotation	**Number of item**	2	3	8
	α of Cronbach	0.706	0.792	0.766
	KMO	0.5	0.5	0.654
	Explained variance	86.44	82.764	68.249
After Rotation	**Number of item**	2	2	3
	α of Cronbach	No	Yes	Yes
	KMO	0.828		
	Explained variance	0.5		
	Number of item	85.361		

Chart 2 shows the eigenvalues and the final presentation of the variables and individuals in the first factorial plan. It is clear that the feeling of students in this sample is strictly connected to the "School anxiety" and "Intention to drop out".
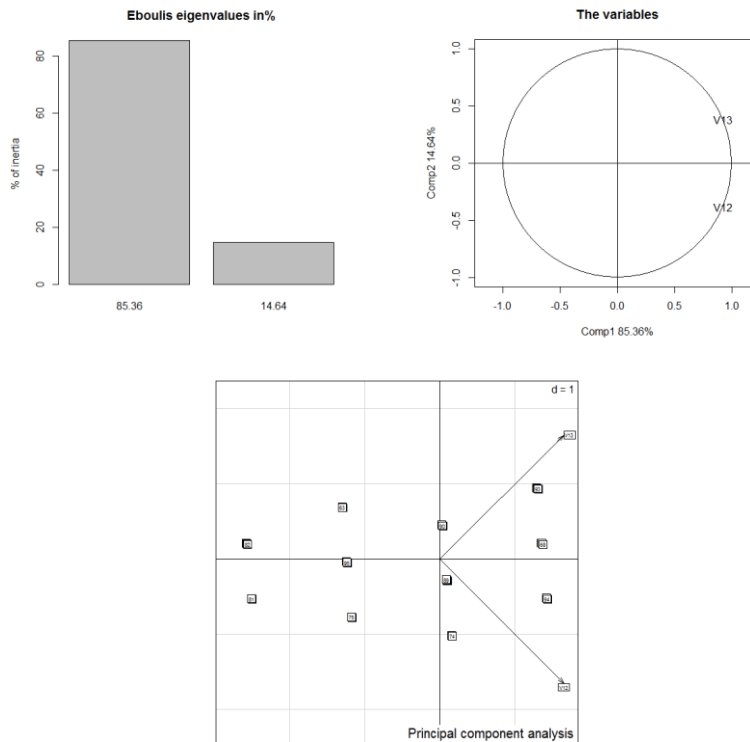
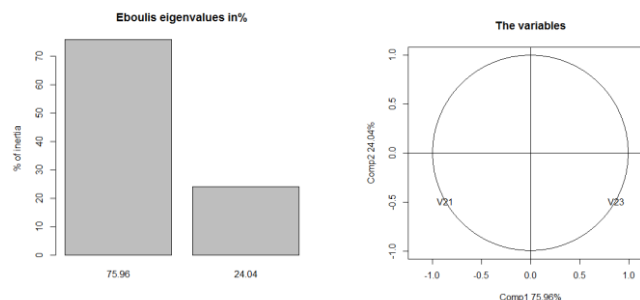**Fig.2.** Presentation of the eigenvalues, variables, and individuals: competence feeling

3.2. Factorization of the performance variable

Through the use of a data matrix with n = 95 and p = 12, the second "performance" variable factorization using the PCA generates the results shown in table 6. Indeed, the factorization of the second variable created a first factor explaining 76% of the total information with a mean validity (KMO = 0.5) and a high reliability (α = 0.86).

Table 6 Performance variable factor analysis.

Variable		Performance		
	Sub-Variables	School Achievement	Students' involvement in education	Measurement of physical skills
Before Rotation	Number of item	2	3	7
	α of Cronbach	0.817	0.758	0.711
	KMO	0.5	0.5	0.568
	Explained variance	86.586	80.602	65.865
After Rotation	Number of item	2	2	4
	α of Cronbach	Yes	No	Yes
	KMO	.859		
	Explained variance	0.5		
	Number of item	75.957		

Figure 3 shows the eigenvalues and the final presentation of the variables and individuals in the first factorial plan. It is clear that, in the case of the Sfax region, the students' feeling in this sample is strongly related to "Academic performance" and the "physical skills measure".
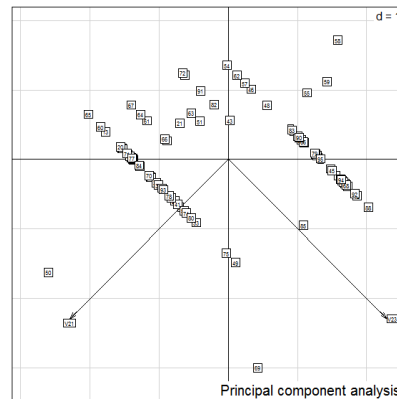
Fig. 3. Presentation of the eigenvalues, variables, and individuals: Performance variable**.**

3.3. The motivation variable factorization

Through a data matrix with p=10 and n=95, the factorization of the third "Motivation" variable using the PCA produces the results displayed in table 7.According to Table 7, the factorization of the third variable created a first factor explaining 50.5% of the total information with an average validity (KMO = 0.5) and a high reliability (α = 0.82). Figure 4 shows the eigenvalues and the final presentation of both variables and individuals in the first factorial plan. It is clear that the students feeling in this sample is somewhat connected to t "academic performance" and "measurement of physical skills" because the factorization has not generated strongly connected factors. This result can be explained by the heterogeneity of the responses at the level of this variable.

Table 7 The motivation variable factor analysis.

Variable		Motivation	
	Sub-Variables	**Quantitative assessment of students**	**Qualitative assessment of students**
Before Rotation	**Number of item**	3	7
	α of Cronbach	0.63	0.83
	KMO	0.50	0.756
	Explained variance	62.399	67.551
After Rotation	**Number of item**	2	4
	α of Cronbach	Oui	Oui
	KMO	0.818	
	Explained variance	0.5	
	Number of item	50.45	

Facing his performance, the learner logically refers to his skills and activities, especially in the field of physical education, known as the strong indicator of his success development. Concepts, such as personal competence, awareness, motivation, information, creativity, power, values, cooperation, participation, dialogue and promotion, are all considered as concepts underlying the different definitions given to the company's factor analysis in this doctoral research.
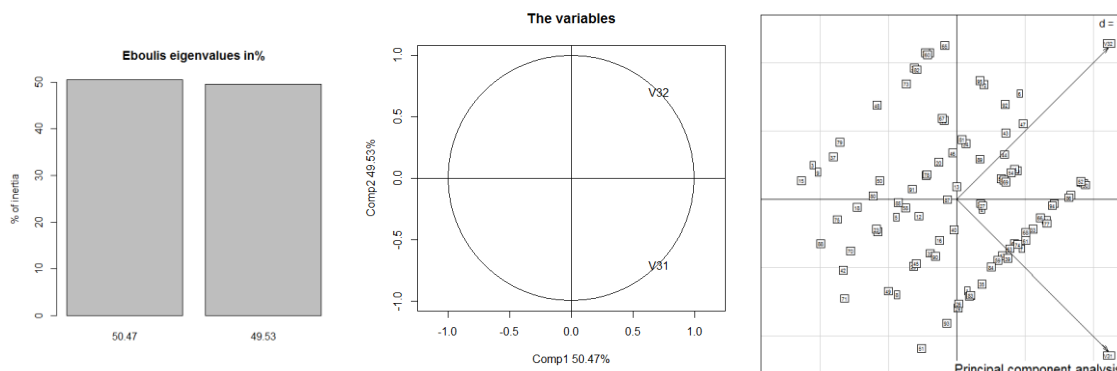

Fig. 4. Presentation of eigenvalues, variables, and individuals: Motivation

IV.   Study of the relationship type: Tobit versus Bootstrapping

In this part, we tried find the impact of the three variables on themselves while taking into account the effect of the auxiliary variables which measure the students' behavior (gender, age,...) by applying James Tobin's Tobit method and the Simar and Wilson's (2007) Boostraping.

Several studies have tackled the impact of the competence feeling on academic performance (Harter et al., 1992; Marsh et al., 2005, Montague and Applegat, 2001; Montague and Van Garderen, 2003; Shen and Tam, 2008). The competence feeling, as defined by these studies, is the ability of the student to evaluate his skills and capacities whether when he succeeds or fails in his studies. Actually, these studies revealed that there is a positive and significant relationship between the student's competence feeling and his academic performance. These studies came to the concluded that students who have a high competence feeling have the best results. In other words, these students are more motivated, have clearer goals, choose more difficult tasks, make more efforts, and focus more on their studies than their classmates with a weak competence feeling (Bandura, 1994; Jacobs et al., 2002).

Academic performance is, in fact, reflected by the competence feeling more than by the students' skills (Phillips, 1987). However, a feeling of low competence induces a low academic performance, less effort and thus a higher risk of dropping out school (Skinner, Zimmer-Gemberck and Connel, 1998). Moreover, students with a low competence feeling may find themselves unable to succeed. Although the tasks they are expected to achieve are often within their reach, these students see that the main cause for their lack of success is their low skills. These students will subsequently give up looking for solutions because they believe they cannot overcome these obstacles like their classmates who see themselves competent. Therefore, the competence feeling has an impact on academic performance whether in one direction or the other (Montadue and Plegate, 2001).

This section aimed at twofold objectives; the first was to check the moderating impact of the competence feeling on the link between motivation and academic performance, while the second attempted to find out if this moderating impact is itself altered by the participants' age and sex. All of the assumptions in relation to these two objectives have been checked through a cross-sectional estimate.

The first hypothesis states that academic motivation and competence feeling are supposed to positively impact the average students' performance in physical education. The second hypothesis asserts that motivation and the students' feeling of competence in physical education are expected to improve the relationship between motivation and academic performance. As a consequence, the impact of motivation on academic performance would be higher among students who have a feeling of competence than those with a weak one. However, the third hypothesis states that the moderating effect of the competence feeling on the relationship between motivation and performance in mathematics is itself expected to be moderated by the students' age and sex. In other words, this moderating effect of competence feeling is expected to be lower among girls and older students.

4.1. Impact on the competence feeling

According to Albert Bandura, self-efficacy beliefs are the key factor of human action. If a person feels unable to produce satisfactory results in a certain field, he will not dare try them. The beliefs of the individuals in their effectiveness affect virtually all of their activities: how they think, motivate themselves, feel and behave.

The feeling of effectiveness is not only to know what should be done and be motivated to do it, but also, to have a productive capacity in which cognitive, social, emotional and behavioral sub-competencies should be effectively organized and orchestrated to achieve many purposes. People often fail to get optimal performance even though they know very well what should be done and have the required skills to do it. In other words, the feeling of personal efficacy of an individual is not the number of skills he possesses, but what he believes he can do in various situations.

Our objective in this sub-section was to find out the significant impacts (positive or negative) of the various predefined variables on the feeling of competence. It should be noted that the estimates have been carried out using the Tobit and the Bootstrapping methods.

Table 8 Impact on the competence feeling.

Variables	Tobit		Bootstrapping	
	Model 1	Model 2	Model 1	Model 2
Performance	0.182***	0.189**	0.205***	0.212**
Motivation	-0.273***	-0.266**	-0.306**	-0.294**
Age	-	0.076	-	0.081
Gender	-	0.265	-	0.293
Size	-	2.095***	-	2.449***
Weight	-	-0.005*	-	-0.007*
Habitation	-	0.280*	-	0.319**
Constant	-	-1.704***	-	-2.002**
Sigma	0.94***	0.915***	1.002***	0.971***
Pseudo_R^2	0.085	0.059	-	-
N	95	95	95	95

Note**s**: *, ** and *** represent significance at 10%, 5% and 1%.

Table 8 shows very interesting results. In fact, regarding the impact on the competence feeling, both performance and motivation variables have positive and significant effects on either models (1 or 2). Moreover, there is a positive and significant effect of the size and housing on the competence feeling whereas the weight has a significant negative impact in the second model but with a low magnitude.

Similarly, we record almost similar effects of both approaches but with different significance degrees. In fact, performance is more significant with the (one step) Tobit model compared to the Bootstrapping (two steps) model of Simar and Wilson (2007) because the second approach fixes the bias of the estimation problem of the first approach.

A close relationship of motivation with the competence feeling was also deduced. Actually, the competence feeling plays a crucial role in motivation to achieve tasks. It is a key factor for learning, for the cognitive engagement in training activities and for academic and professional choices. Actually, Rbert Vallerand (1997) says that if a recreational activity gives a greater competence feeling to a participant, his motivation increases. However, if an activity makes him feel less competent, his motivation decreases.

The age variable presents a positive and significant effect in all the areas. It is clear that the students' progress over time helps them improve their feeling of competence. As for the gender variable, it negatively affects this feeling, especially if we take into account that girls outnumber boys in our sample. The feeling of competence is more developed in boys than in girls.

Similarly, if someone makes a free choice to be active and decides how to continue his activity, he is more likely to have a greater feeling of autonomy and, therefore, of intrinsic motivation. However, if self-determination is hindered by anything whatsoever, his intrinsic motivation will decrease. Moreover, it goes without saying that the more an individual feels competent in an activity, the more motivated he may be to practice it. The variables that make a person feel competent increase his self-determined motivation.

Finally, according to the self-determination theory, the failure of an individual leads in an achievement leads to increase his feelings of incompetence and decrease his intrinsic motivation regarding the performed activity. On the other hand, the one who succeeds is more intrinsically motivated since he improves his feeling of competence.Besides its importance in influencing the feelings of competence, motivation is believed to be associated with performance to the extent that it is difficult to achieve a convincing performance if motivation hardly exists or is totally absent. These early findings prove the fact that performance is a consequence of motivation since a motivated learner perseveres more and learns to use more learning strategies; this will certainly impact his performance. In the same context, it can be pointed out that low performance is a motivation source on the basis of which the subject will develop the perceptions of his own competence. Such perceptions are at the very origin of motivation.

4.2. Impact on performance

The concept of performance is defined as the judgment that an individual makes about his abilities to organize and perform a series of actions to achieve a given purpose. Therefore, self-efficacy is not about the person's skills and knowledge, but rather about how he considers his capacity to arrange and carry out actions in specific situations (Bandura, 1986).

The belief that individuals have about their capabilities determines their behavior, their way of thinking and their emotional reactions. As a consequence, a misjudgment of their skills significantly affects their actions. Moreover, the personal effectiveness would also impact the level of effort and perseverance in the task to be performed (Bandura, 1977). Another way of getting information on one's feeling of efficacy would be by observing others. Observing or visualizing the performance of people similar to themselves would have an impact on their own judgment of personal effectiveness. Finding a common ground with the observed person would allow the individual to evaluate his efficiency more easily.

Table 9 Estimation of the impact on Performance.

Variables	Tobit		Bootstrapping	
	Model 1	Model 2	Model 1	Model 2
Sentiment	0.196^{**}	0.209^{***}	0.204^{***}	0.216^{***}
Motivation	0.055^{*}	0.087^{**}	0.057^{**}	0.089^{**}
Age	-	-0.072^{**}	-	-0.074^{**}
Gender	-	0.122^{**}	-	0.126^{**}
Size	-	2.296^{***}	-	2.380^{***}
Weight	-	-0.022^{**}	-	-0.023^{**}
Habitation	-	0.081^{*}	-	0.083^{*}
Constant	-	-3.906^{***}	-	-4.053^{***}
Sigma	0.977^{***}	0.962^{***}	0.992^{***}	0.977^{***}
Pseudo_R^2	0.223	0.137	-	-
N	95	95	95	95

Notes: *, ** and *** represent significance at 10%, 5% and 1%.

Once again, we tried to find out the significant (positive or negative) impacts of the various predefined performance variables. When considering the performance variable, the Tobit model estimation brings a positive and significant effect of the competence feeling. In our sample, however, motivation acts in a positive and meaningful way. Moreover, the control variables, that is to say sex, size and urban housing positively act on performance. Contrastingly weight and age, negatively affect performance. It is worth noting that weight is a hindering indicator of the students' performance and is sometimes a handicap that may act too negatively on the student's feeling preventing him from improving his physical skills.

Table 9 shows that, with different degrees of significance, the negative impact of age on improving the learner's performance. This can be explained by a decline of motivation accompanied by an increase of age making students less interested in improving their physical performance mainly when these skills are needed at sporting activities (sports baccalaureate) at school or elsewhere.

On the other half of the deal, the correction of the estimation problems by the means of the Bootstrapping approach has not changed the variables significance sign concerning performance. As a consequence, the interactions quality that a student had experienced would have impact his skills development. These interactions would affect his motivation and thus his evaluation of his personal skills. The student may adapt and control his behavior in response to the environmental requirements. According to Bandura's (1986) self-efficacy theory, the student is led to make a judgment on the basis of his school performance about his ability to plan and manage his actions according to his success objectives. Subsequently, he is able to regulate his behavior so as to make it more efficient and more profitable. Finally, the formation and consolidation of the student's individual perception in the school context is a dynamic process. In the same lines, Byrne (1984) proposed that academic self-concept interest comes from motivational properties which affect school performance. In the school context, motivation would be in continuous motion because the student's perceptions about himself interact with his environment, which drives him to select an activity in which he engages and perseveres.

4.3. Impact on motivation

One of the most important concepts in the educational sector is certainly that of motivation. The definitions of the motivation concept in the papers of psychology often refer to the behavior awakening phenomena as well as the subject's persistence and direction of his activity. The most sustainable motivations would be those which are simultaneously related to several aspects of the personality and that promote enrichment and a harmonious balance.Motivation can also be regarded as a process that maintains and regulates an activity oriented towards one objective more or less consciously followed. There are the direct motives, such as the basic physiological needs, and the indirect ones, learnt or gained through experience.

Table 10 Estimate of the impact on motivation.

Variables	Tobit		Bootstrapping	
	Model 1	Model 2	Model 1	Model 2
Sentiment	0.280^{**}	0.079^{*}	0.391^{**}	0.369^{**}
Performance	0.053^{*}	-0.269^{**}	0.071^{*}	0.102^{**}
Age	-	-0.244^{**}	-	-0.324^{**}
Gender	-	0.104^{**}	-	0.130^{**}
Size	-	4.281^{***}	-	6.008^{***}
Weight	-	-0.021^{**}	-	-0.025^{**}
Habitation	-	0.348^{**}	-	0.450^{**}
Constant	-	-4.776^{**}	-	-6.853^{**}
Sigma	0.951^{***}	0.921^{***}	1.110^{***}	1.063^{***}
Pseudo_R^2	0.117	0.068	-	-
N	95	95	95	95

Notes: *, ** and *** represent significance at 10%, 5% and 1%.

The question of the differences between girls and boys in the academic performance is of interest in almost all the Western societies. Regarding the crucial role of school motivation in the students' commitment and success, a better understanding of this issue requires focusing on their motivational profile dimensions.

In what follows, the causes that affect motivation for our sample, table 10, were discussed and explained. For motivation, model 1 shows the significant and positive impact of feelings and performance at 5% at least. The same effects were observed in model 2 with the significance of the variables sex, age, weight and size. Actually, gender (female sex), just like weight, has a negative impact on motivation. Therefore, in line with many previous different authors, boys are found to be more motivated than girls.

However, the boys were reported to have higher approach-performance goals and work avoidance purposes than girls. Chouinard et al. (1999) observe higher approach-performance goals among boys than girls, but only at the beginning of high school. Inversely, no differences were observed among young people at the

beginning of the secondary school regarding the control and avoidance goals, but in the end, the approach performance is weaker in boys while avoidance purposes are higher among girls. Pajares and Valiante (2001) notice that, in the writing field, boys have higher approach-performance goals than girls.

In a nutshell, according to the examined variables and the fields of academic functioning, the differences between boys and girls shift sometimes for the benefit of the formers and other times for the advantage of the latter. In fact, excepting the approach-performance goals which are generally higher among boys whatever the school subject is, the differences between boys and girls in the other motivational variables seem to be the function of this factor. The overall purpose of this study was to continue examining the gender differences effect on motivation as well as the academic functioning by focusing on the two specific objectives.

V.   Conclusion

The study aims to analyze the impact of the competence feeling among primary school students at both the general level and at that of sporting activities and the ways of motivating them to improve their physical education performance. The results of the exploratory factorial analyses show a three-dimensional structure indicating a clear distinction between the feeling itself, performance and motivation.

The research carried out in the context of physical education shows that environment set up by the teacher can play a role in the students' motivational process. The results show that an environment that meets the students' competence needs, autonomy and social belonging is required to foster a self-determined motivation. In addition, students need to meet their needs for competence to get a positive, sincere and precise feedback to act in an environment that lacks social comparison and competition so that they can interact with a teacher who is able to justify his choices and offer intrinsic purposes. Similarly, satisfying the students' need for autonomy, i.e. the need to feel oneself at the origin of one's actions, is facilitated when students are in the presence of an empathetic teacher who offers them the opportunity to express themselves, make choices, assume responsibility, and negotiates everything and at the same time supports them. Finally, the use of cooperative learning will help students' integration in the class or group, which satisfies the need for a social standing and stimulates each student in physical education.

The adoption of a more or less self-determined motivation is important as it determines the positive or negative behavioral, emotional and cognitive consequences that will affect the students. Among the beneficial effects, a positive relationship between the self-determined motivations and the intention to practice a physical activity outside school might be the fruit.

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