ERRATUM

In the article **"*Translation and validation of the perceived locus of causality questionnaire (PLOCQ) in a sample of portuguese physical education students*"**, published in volume 24, number 2, 2018: DOI: 10.1590/S1980-6574201800020007 and identification: e1018162.

In the page 1:

Where it was written

This study suggests that PLOCQ with five factors and 18 items has good psychometric proprieties and can be used to assess contextual motivation towards PE in the Portuguese context.

Should read:

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This instrument was initially developed by Goudas, Biddle and Fox[13] through an adaptation of the Self-Regulation Questionnaire developed by Ryan and Connel[14].

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In the page 2, section Method, subsection Participants:

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Two independent samples of PE students were used in this study to ensure the robustness of the measurement instrument in a sample of the same population.

The first set of participants consisted of 699 students and represented the calibration sample, with ages comprised between 12 and 23 years old (M=15.49; SD=1.93), and enrolled in two PE classes/week (135 min total). The validation sample was composed of 655 students, with ages between 12 and 23 years old (M=15.47; SD=1.88), and had the same amount of PE/week than previous sample. The global sample comprised 652 boys (M=15.4 years; SD=1.90) and 702 girls (M=15.47 years; SD=1.95).

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Physical education students of four Lisbon public schools were invited to participate in this study. The students were enrolled in the 3rd cycle (7th, 8th and 9th grades) and secondary cycle (10th, 11th and 12th years) Study information and permissions were sent to the schools direction board and parents. After obtaining the study permissions, the students were debriefed about the study aims and their participation previous to the questionnaires delivery. The PE teachers were informed of the requirements necessary to apply the questionnaires. A calm and peaceful environment were provided in

a class room to the students before the class starts, in order to read, fill and ask any doubts regarding the questionnaires. No dropouts were reported in this stage.

Two independent samples of PE students were used in this study to ensure the robustness of the measurement instrument in a sample of the same population.

The first set of participants consisted of 699 students and represented the calibration sample, with ages comprised between 12 and 23 years old (M=15.49; SD=1.93), with 332 males and 367 females, enrolled in two PE classes/week (135 min total). The validation sample was composed of 655 students, with ages between 12 and 23 years old (M=15.47; SD=1.88), 312 males and 343 females, with the same amount of PE/week than previous sample. The global sample comprised 644 boys (M=15.4 years; SD=1.90) and 710 girls (M=15.47 years; SD=1.95), were 650 students were enrolled in the 3rd cycle (ages 12 to 17 years) and 704 in secondary cycle (ages 17 to 23 years).

In the page 3:

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A primary analysis of the data revealed that there were[10] multivariate outliers (i.e. six in the calibration sample; four in the validation sample) (D2 = p1 < 0.01; p2 < 0.01). These participants were removed prior to conducting any further analysis, as postulated by several authors[21,22].

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In Table 2, it is possible to see that the initial model (i.e., five factor and 20 items) did not have a good adjustment to the data. An analysis of the residual values between items and the modiication indexes, allowed the identiication of some fragilities. The model was readjusted with the elimination of two items (see final models in table 2; see Figure 1), and relected an improvement in the adjustment indexes, being in line with the values adopted in the methodology for each of the analyzed samples (i.e. calibration, validation and gender).

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In the page 4, Table 2:

Where it was written

Table 2 Fit indices of the measurement models of PLOCQp (including existing versions)

Models	χ^2	df	p	SRMR	NNFI	CFI	RMSEA	90% CI
PLOCQ[1]	971.83*	320	-	.090	.950	.960	.080	.070-.080

Initial Model Calibration	915.351	160	<.001	.067	.861	.883	.082	.951-1.224
Final Model Calibration	542.004	125	<.001	.061	.908	.925	.069	.063-.075
Final Model Validation	491.473	125	<.001	.062	.908	.924	.067	.061-.073
Male Model	449.601	125	<.001	.051	.917	.933	.063	.405-.604
Female Model	560.320	125	<.001	.068	.904	.921	.070	.065-.076
Engagement[2]	7413.507	91	<.001	.043	.913	.932	.069	-

Note. χ^2 = chi-squared; * values reported by the authors concerning the Satorra-Bentler correction of χ^2 (S-Bχ^2); df = degrees of freedom; SRMR = Standardized Root Mean Square Residual; NNFI = Non-Normed Fit Index; CFI = Comparative Fit Index; RMSEA = Root Mean Squared Error of Approximation; 90% CI = confidence interval of RMSEA; Final Model - five factors and 18 items; [1]Lonsdale, Sabiston, Taylor, Ntoumanis[12]; [2] in preparation by others

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Female Model	560.320	125	<.001	.068	.904	.921	.070	.065-.076
3rd cycle	409.633	125	<.001	.055	.925	.939	.060	.054-.067
Secondary cycle	625.733	125	<.001	.075	.900	.912	.075	.070-.081
Engagement[2]	7413.507	91	<.001	.043	.913	.932	.069	-

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In the page 7, Table 3:

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Table 3 Internal reliability, convergent and discriminant validity and average variance extracted – Calibration and Validation samples

Factors (calibration)	CR	AVE	AM	ER	IJ	ID	IM
AM	.79	.49	1	-	-	-	-
ER	.72	.39	.34*	1	-	-	-
IJ	.78	.54	.01*	.22*	1	-	-
ID	.83	.54	.20*	.02*	.27*	1	-
IM	.84	.64	.18*	.05*	.14*	.97*	1
Factors (validation)	CR	AVE	AM	ER	IJ	ID	IT
AM	.79	.50	1	-	-	-	-
ER	.67	.34	.36*	1	-	-	-
IJ	.73	.56	.02*	.36*	1	-	-
ID	.82	.53	.15*	<.001*	.31	1	-
IM	.70	.57	.13*	.13*	.19*	.97*	1

Note. Composite Reliability (CR); Average Variance Extracted (AVE); AM= amotivation; EX: external regulation; IJ: introjected regulation; ID= identified regulation; IM= intrinsic motivation; * (r2).

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ER	.72	.39	.34*	1	-	-	-
IJ	.78	.54	.01*	.22*	1	-	-
ID	.83	.54	.20*	.02*	.27*	1	-
IM	.84	.64	.18*	.05*	.14*	.97*	1
Factors (validation)	CR	AVE	AM	ER	IJ	ID	IT
AM	.79	.50	1	-	-	-	-
ER	.67	.34	.36*	1	-	-	-
IJ	.73	.56	.02*	.36*	1	-	-
ID	.82	.53	.15*	<.001*	.31	1	-
IM	.70	.57	.13*	.13*	.19*	.97*	1

Note. Composite Reliability (CR); Average Variance Extracted (AVE); AM= amotivation; EX= external regulation; IJ= introjected regulation; ID= identified regulation; IM= intrinsic motivation; * (r^2).

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Table 4 Fit indices for the invariance of the measurement model of the PLOCQ in the Portuguese sample across

	χ^2	**df**	**$\Delta\chi^2$**	**Δdf**	**p**	**CFI**	**ΔCFI**
CS - VS							
Configural Invariance	1033.476	250	-	-	-	.925	-
Measurement Invariance	1052.619	263	19.144	13	.119	.924	.001
Scale Invariance	1063.991	278	30.515	28	.339	.925	.000
Residual Invariance	1113.033	296	79.557	46	.002	.922	.003
M - F							
Configural Invariance	1009.917	250	-	-	-	.927	-
Measurement Invariance	1038.488	263	28.571	13	.008	.925	.002
Scale Invariance	1060.637	278	50.720	28	.005	.924	.003
Residual Invariance	1082.785	296	72.868	46	.007	.924	.003

Note. χ^2 = chi-squared; df = degrees of freedom; $\Delta\chi^2$ = differences in the value of chi-squared; Δdf = differences in the degrees of freedom; CFI = Comparative Fit Index; ΔCFI = differences in the value of the Comparative Fit Index

Should read:

Table 4 Fit indices for the invariance of the measurement model of the PLOCQ in the Portuguese sample across samples, gender, 3rd cycle and secondary cycle

	χ^2	**df**	**$\Delta\chi^2$**	**Δdf**	**p**	**CFI**	**ΔCFI**
CS - VS							

Configural Invariance	1033.476	250	-	-	-	.925	-
Measurement Invariance	1052.619	263	19.144	13	.119	.924	.001
Scale Invariance	1063.991	278	30.515	28	.339	.925	.000
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Scale Invariance	1060.637	278	50.720	28	.005	.924	.003
Residual Invariance	1082.785	296	72.868	46	.007	.924	.003
3rd cycle – secondary cycle							
Configural Invariance	1035.353	250	-	-	-	.924	-
Measurement Invariance	1063.099	263	27.746	13	.010	.923	.001
Scale Invariance	1107.665	278	72.312	28	<.001	.920	.004
Residual Invariance	1147.077	296	111.723	46	<.001	.918	.006

Note. χ^2 = chi-squared; df = degrees of freedom; $\Delta\chi^2$ = differences in the value of chi-squared; Δdf = differences in the degrees of freedom; CFI = Comparative Fit Index; ΔCFI = differences in the value of the Comparative Fit Index; CS = calibration sample; VS = validation sample; F = female sample; M = male sample

In the page 8:

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Psychometric analysis of the Portuguese version of the PLOCQ showed that the initial hypothesized model (ive factors / 20 items) did not it the pre-deined values adopted in methodology[21,22,23]. For this matter, individual parameters were analyzed, and two items (intrinsic motivation– 14; introjected regulation – 2) were removed because they showed associations with other factors (e.g., the item 2, "Because I want the PE teacher to think I am a good student" presented an association with external regulation).

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Psychometric analysis of the Portuguese version of the PLOCQ showed that the initial hypothesized model (five factors / 20 items) did not fit the pre-defined values adopted in methodology[21,22,23]. For this matter, individual parameters (through the modification indexes) were analyzed, and two items (intrinsic motivation - 14; introjected regulation - 2) were removed because they showed associations with other factors (e.g., the item 2, "*Because I want the PE teacher to think I am a good student" presented an association with external regulation*).

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Deci and Ryan[3,30] highlight this issue, emphasizing that the SDT constructs underlying the autonomous and controlled motivation types correlate highly among themselves. Several studies in different contexts have reported the same results: exercise[36,37] and Sport[33,34,35].

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Thus, considering the assumptions from operationalized multi-group analysis in the methodology[21,24], it is possible to afirm the following to both samples and gender: i) configural invariance is veriied as the same items group that explains the same factors group is maintained, independently of sample and gender; ii) the factorial weight of the items is equivalent for both samples and gender (measurement invariance), in other words, the items have the same importance regardless of the group; iii) the item intercepts are invariant (equivalents) in both samples and gender, consequently representing scale invariance (i.e., strong invariance). This type of invariance is the most important, because when this assumption is veriied, it means it is legitimate to make results comparisons in different groups, in this case across samples and genders, based on the behavioral regulation, underlying SDT[38]; iv) residual invariance was veriied, because the factorial weights, covariance and error of measurement model operate the same way across samples and genders[21,24]. Thus, these results support PLOCQp use in PE context, as the model presented cross-validation criteria and reveled to be gender invariant, supporting that the theoretical construct underlying the measurement model is interpreted in the same way between male and female students.

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Thus, we suggest that future endeavors should try to address this issue for the PE context; ii) in addition to cross-validation, future studies should focus in longitudinal invariance analysis (e.g., throughout the school year) in order to increase the robustness of the instrument; iii) analyze invariance across different age groups (e.g., middle school and high school), to understand if the instrument is interpreted in the same way despite age differences.

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This issue is particularly important as intrinsic motivation is among the most highlighted factors to the maintenance of behavior over time[39].

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38. Chen F. What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. J Pers Soc Psychol. 2008; 95: 1005-1018. doi: 10.1037/a0013193
39. Pannekoek L, Piek J, Hagger M. The Children's Perceived Locus of Causality Scale for Physical Education. J Teach Phys Educ. 2014; 33: 162-185. https://doi.org/10.1123/jtpe.2013-0095

Should read:

38. Monteiro D, Moutão J, Cid, L. Validation of the Behavioral Regulation Sport Questionnaire in Portuguese Athletes. Revista de Psicologia del Desporte, 2018; 27, 145-150

39. Clancy R, Herring M, Campbell M. Motivation Measures in Sport: A Critical Review and Bibliometric Analysis. Frontiers in Psychology, 2017; 8, 1-12. doi: 10.3389/fpsyg.2017.00348

40. Chen F. What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. Journal of Personality and Social Psychology. 2008; 95, 1005-1018. doi: 10.1037/a0013193

41. Pannekoek L, Piek J, Hagger M. The Children's Perceived Locus of Causality Scale for Physical Education. Journal of Teaching in Physical Education. 2014; 33, 162-185. https://doi.org/10.1123/jtpe.2013-0095