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## ORIGINAL ARTICLES. PHYSICAL EDUCATION

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### Physical activity and sports science in Italian scientific research products

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#### Abstract

**Purpose.** This study aims to measure the number of scientific production of Italian researchers, as framed on academic disciplines of Physical training and methodology (code M-EDF/01) and Sports science and methodology (code M-EDF/02), afferents to the academic recruitment field of Exercise and sports science (code 06/N2) and Didactics, special education and educational research (code 11/D2).

**Material and Methods.** The sample consisted of the entire population of full professors (n=30) belonging to the two academic disciplines of Physical training and methodology and Sports science and methodology, plus a proportional representation of the two academic recruitment fields with at least one associate professor per university, for a total of 124 researchers. The titles of the first ten scientific products in terms of more citations from the Google Scholar database were analysed for each researcher. The full consistency of the title with the scientific statement of the two academic disciplines was assessed, identifying the number of articles afferent to sports and physical activity, biomedical and Psycho-pedagogical domains. One-way ANOVA was used to compare the two academic disciplines of the two academic recruitment fields with the three domains.

**Results.** The aggregate data showed a prevalence of the biomedical domain over the sport and physical activity ones in both the academic disciplines, in the academic recruitment field of Exercise and sports science. On the other hand, in the academic recruitment of Didactics, special education and educational research, there was a prevalence of the sport and physical activity domain over the biomedical ones. In addition, modest Psycho-pedagogical and biomedical scientific production were found in the academic recruitment fields of Exercise and sports science and Didactics, special education and educational research, respectively.

**Conclusions.** The problem of the different coherence of the scientific profiles of the researchers concerning the relevant academic recruitment field and possibly also to the two academic disciplines was confirmed.

**Keywords:** academic disciplines, sports science, physical education, health, well-being, academic recruitment field



## Анотація

**Франческа Д'Елія, Тіціана Д'Ісанто, Джованні Еспозіто, Гаєтано Альтавілья, Гаєтано Райола. Фізична активність і спортивна наука в продуктах італійських наукових досліджень**

**Мета.** Це дослідження має на меті виміряти кількість наукової продукції італійських дослідників, що стосується академічних дисциплін фізичного виховання та методика (код M-EDF/01) та науки та методика спорту (код M-EDF/02), що стосується академічних дисциплін галузь рекрутингу Фізичні вправи та спортивні науки (код 06/N2) і Дидактика, спеціальна освіта та освітні дослідження (код 11/D2).

**Матеріал і методи.** Вибірка складалася з усієї сукупності повних професорів (n=30), які належали до двох академічних дисциплін «Фізична підготовка та методика» та «Спортивна наука та методика», плюс пропорційне представництво двох наукових сфер набору з принаймні одним доцентом на університет, загалом 124 дослідники. Для кожного дослідника проаналізовано назви перших десяти наукових робіт за кількістю цитувань з бази Google Scholar. Оцінено повну відповідність назви науковому положенню двох навчальних дисциплін, визначено кількість статей, що стосуються спорту та фізичної активності, біомедичної та психолого-педагогічної областей. Односторонній дисперсійний аналіз використовувався для порівняння двох навчальних дисциплін двох академічних полів набору з трьома областями.

**Результати.** Зведені дані показали переважання біомедичної сфери над спортом і фізичною активністю в обох навчальних дисциплінах, у галузі набору академічних вправ і спортивної науки. З іншого боку, в академічному наборі дидактики, спеціальної освіти та освітніх досліджень спостерігалось переважання сфери спорту та фізичної активності над біомедициною. Крім того, скромна психолого-педагогічна та біомедична наукова продукція була виявлена в академічних галузях набору вправ і спорту та дидактики, спеціальної освіти та освітніх досліджень відповідно.

**Висновки.** Була підтверджена проблема різної узгодженості наукових профілів дослідників щодо відповідної академічної галузі набору та, можливо, також щодо двох академічних дисциплін.

**Ключові слова:** навчальні дисципліни, спортивна наука, фізичне виховання, здоров'я, благополуччя, галузь набору академічних кадрів

## Аннотация

**Франческа Д'Элия, Тициана Д'Исанто, Джованни Эспозито, Гаэтано Альтавилла, Гаэтано Райола. Физическая активность и спортивная наука в продуктах итальянских научных исследований**

**Цель.** Это исследование направлено на измерение количества научной продукции итальянских исследователей, основанной на академических дисциплинах физического воспитания и методологии (код M-EDF/01) и спортивной науки и методологии (код M-EDF/02), связанных с академическим набор в области физических упражнений и спортивной науки (код 06/N2) и дидактики, специального образования и педагогических исследований (код 11/D2).

**Материал и методы.** Выборка состояла из всего населения штатных профессоров (n = 30), принадлежащих к двум академическим дисциплинам физической культуры и методологии и спортивной науки и методологии, плюс пропорциональное представительство двух областей академического набора, по крайней мере, с одним доцентом на университет. , всего 124 исследователя. Для каждого исследователя были проанализированы названия первых десяти научных продуктов с точки зрения большего количества цитирований из базы данных Google Scholar. Было оценено полное соответствие названия научному изложению двух академических дисциплин, выявлено количество статей, относящихся к спортивно-физкультурной, медико-биологической и психолого-педагогической областям. Однофакторный дисперсионный анализ использовался для сравнения двух академических дисциплин двух академических областей приема на работу с тремя областями.

**Результаты.** Совокупные данные показали преобладание медико-биологической области над областью спорта и физической активности как в академических дисциплинах, так и в академическом наборе в области физических упражнений и спортивной науки. С другой стороны, в академическом наборе дидактики, специального образования и педагогических исследований преобладала сфера спорта и физической активности над биомедицинскими. Кроме того, скромная психолого-педагогическая и биомедицинская научная продукция была обнаружена в области академического набора в области физических упражнений и спортивной науки и дидактики, специального образования и образовательных исследований соответственно.

**Выводы.** Была подтверждена проблема различной согласованности научных профилей исследователей в отношении соответствующей области академического набора и, возможно, также двух академических дисциплин.

**Ключевые слова:** учебные дисциплины, спортивная наука, физическое воспитание, здоровье, благополучие, академическое поле набора



## Introduction

The Italian academic system is structured on hierarchical levels. The model has four hierarchical levels: the Academic scientific discipline, the Academic recruitment field and the Group of academic recruitment field. They are structured in each of the 14 scientific areas of the Italian National University Council (CUN) [1]. This model is not similar to the European Research Council Panel Structure, so evaluating Italian research projects and finding grant funding is difficult. The basic level for physical and sports education is composed of 2 academic scientific disciplines. These are Physical training and methodology (code M-EDF/01) and Sports science and methodology (code M-EDF/02) that delimit the domain of research and training [2]. These academic disciplines are based on and characterised by bachelor's degrees, master's and doctoral degrees in Exercise and sports science. The transformation of the three-year degree courses (bachelor's degree) of the Higher Institutes of Physical Education (ISEF) into degree courses (master's degree) in Exercise and sports science took place, according to article 17, paragraph 115, of the law of 15 May 1997, n. 127 to develop research in physical activity and sports science field [3].

To help produce more expert coaches at the participation and performance levels, a number of governing bodies have established coach mentoring systems [4]. The aim is twofold. First, it is to advance the case for activity theory as a credible and alternative lens to view and research sports coaching. Second, it is to position this assertion within the wider debate about the epistemology of coaching [5]. Furthermore, with the sport's reform of 2021, the new professional profile of the kinesiologist was established, access to which is only allowed to graduate in sports science courses [6]. Therefore, the study plans of the three-degree courses, in addition to being consistent with the training objectives of the physical education teacher, also need to be compatible with the profile of the kinesiologist.

The two academic disciplines are numerically autonomous, thanks to the contribution of biomedicine and psycho-pedagogy disciplines. However, these last have contributed to dividing the two academic disciplines of Physical training and methodology (code M-EDF/01) and Sports science and methodology (code M-EDF/02) into two

academic recruitment fields with different declaratory for evaluating the different scientific profiles of researchers through the selection procedures for recruitment [7]. These two recruitment fields are named Exercise and Sport Sciences (code 06/N2) and Didactics, Special Education and Educational Research (code 11/D2) [1]. Therefore, the existing dichotomy between formation and research, on the one hand, and the selection of scientific profiles, on the other hand, entails divisive consequences depending on whether the researchers refer to one of the two academic recruitment fields [8-10]. This dichotomy also creates the misunderstanding that the two academic disciplines, in effect, are only one for academic recruitment fields: 1- educational-didactic-sports for the discipline of Physical training and methodology in the recruitment field of Didactics, Special Education and Educational Research; 2- performance-evaluative-sports for the discipline of Sports science and methodology in the recruitment field of Exercise and Sport Sciences [11,12]. Finally, this dichotomy also generates local repercussions regarding didactics for the dual educational soul, perpetuating the ambiguity with which the new generations of graduates in exercise and sports science are formed. For these problems, a preliminary examination should be carried out on the entire scientific production of the professors in the two academic disciplines, with aggregated data for the academic recruitment field and disaggregated for academic discipline within the academic recruitment field [13,14].

Although observation and other data sources have been given some attention in the mixed methods research literature, few researchers have applied accurate observational research methods [15-17]. In recent years, however, there has been a surge in empirical studies involving the application of mixed methods research designs rooted in systematic observation in the field of Exercise and sports science [18,19]. A preliminary study is first required on a representative sample and using appropriate procedures to verify its feasibility.

Therefore, this study aims to verify the coherence of the scientific production of the Italian researchers assigned to the two academic disciplines and academic recruitment fields by quantifying scientific products in the Sport and Physical Activity, Biomedical and Psycho-pedagogical domains.



## Material and Method

### Study participants

The sample was made up of the entire population of full professors (n=30) of Physical training and methodology (code M-EDF/01) and Sports science and methodology (code M-EDF/02), plus a proportional representation of the two academic recruitment fields (the academic recruitment field of Exercise and sports science had seven times more professors than the academic recruitment field of Didactics, Special Education and Educational Research), with at least one associate professor per university in the disciplines of Physical training and methodology, and Sports science and methodology, for a total of 124 researchers.

### Procedures

For each unit of the sample, the titles of the first ten products with major citations from the Google Scholar database were analysed to assess the full coherence of the titles with the scientific statement of the two academic disciplines. This analysis made it possible to identify the number of articles related to Sports and Physical activity, Biomedical and Psycho-pedagogical domains. The

The analysis of scientific products of researchers from the disciplinary field of Physical training and methodology related to the recruitment field of Exercise and sports science using analysis of variance.

Statistical indicators	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1513.440	2	756.720	121.471	0.001
Within Groups	1027.893	165	6.230		
Total	2541.333	167			

Table 1

Bonferroni Post Hoc test for comparing g between and within groups.

(I) Domain [Articles]	(J) Domain [Articles]	Mean Difference (I-J)	Std. Error	Sig.
Biomedical	Sport and Physical activity	5.44643*	0.47169	0.001
	Psycho-pedagogical	7.00000*	0.47169	0.001
Sport and Physical activity	Biomedical	-5.44643*	0.47169	0.001
	Psycho-pedagogical	1.55357	0.47169	0.085
Psycho-pedagogical	Biomedical	-7.00000*	0.47169	0.001
	Sport and Physical activity	-1.55357	0.47169	0.085

Table 2

use of the Google Scholar database is justified by the automatism with which all scientific products on the net are immediately hooked up with relative citations.

### Statistical analysis

The normality distribution was initially verified with the Shapiro-Wilk test ( $P > 0.05$ ). Subsequently, one-way ANOVA with the Bonferroni post hoc test was used to compare the two academic disciplines of the two academic recruitment fields with the three domains to highlight the data's greater, average and lesser significance. Data analysis was performed using Statistical Package for Social Science software (IBM SPSS Statistics for Windows, version 27.0. Armonk, NY).

## Results

For the academic discipline of Physical training and methodology (code M-EDF/01) in the academic recruitment field of Exercise and sports science (code 06/N2), a significant difference was recorded only in the Biomedical/Sport and Physical activity domains ( $p = 0.001$ ) and in the Biomedical/Psycho-pedagogical domains ( $p = 0.001$ ). A detailed description is reported in Table 1 and Table 2.





For the academic discipline of Sports science and methodology (code M-EDF/02) in the academic recruitment field of Exercise and sports science (code 06/N2), a significant difference was recorded in the Biomedical/ Psycho-pedagogical

domains ( $p = 0.001$ ) and the Sport and Physical Activity/Psycho-pedagogical domains ( $p = 0.001$ ). A detailed description is reported in Table 3 and Table 4.

Table 3

The analysis of scientific products of researchers from the disciplinary field of Sports science and methodology related to the recruitment field of Exercise and sports science using analysis of variance.

Statistical indicators	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	513.167	2	256.583	33.107	0.001
Within Groups	891.274	115	7.750		
Total	1404.441	117			

Table 4

Bonferroni Post Hoc test for comparing g between and within groups.

(I) Domain [Articles]	(J) Domain [Articles]	Mean Difference (I-J)	Std. Error	Sig.
Biomedical	Sport and Physical activity	1.47632	0.63064	0.063
	Psycho-pedagogical	4.97632*	0.63064	0.001
Sport and Physical activity	Biomedical	-1.47632	0.63064	0.063
	Psycho-pedagogical	3.50000*	0.62250	0.001
Psycho-pedagogical	Biomedical	-4.97632*	0.63064	0.001
	Sport and Physical activity	-3.50000*	0.62250	0.001

For the academic discipline of Physical training and methodology (code M-EDF/01) in the academic recruitment field of Didactics, special education and educational research (code 11/D2), a significant difference was recorded in the

Biomedical/Sport and Physical activity domains ( $p = 0.001$ ) and the Sport and Physical Activity/Psycho-pedagogical domains ( $p = 0.001$ ). A detailed description is reported in Table 5 and Table 6.

Table 5

The analysis of scientific products of researchers from the disciplinary field of Physical training and methodology related to the recruitment field of Didactics, special education and educational research using analysis of variance.

Statistical indicators	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	224.000	2	112.000	23.171	0.001
Within Groups	116.000	24	4.8333		
Total	340.000	26			



Table 6

Bonferroni Post Hoc test for comparing g between and within groups.

(I) Domain [Articles]	(J) Domain [Articles]	Mean Difference (I-J)	Std. Error	Sig.
Biomedical	Sport and Physical activity	-6.66667*	1.03638	0.001
	Psycho-pedagogical	-1.33333	1.03638	0.632
Sport and Physical activity	Biomedical	6.66667*	1.03638	0.001
	Psycho-pedagogical	5.33333*	1.03638	0.001
Psycho-pedagogical	Biomedical	1.33333	1.03638	0.632
	Sport and Physical activity	-5.33333*	1.03638	0.001

For the academic discipline of Sports science and methodology (code M-EDF/02) in the academic recruitment field of Didactics, special education and educational research (code 11/D2), a significant difference was recorded in the Biomedical/Sport and

Physical activity domains ( $p = 0.001$ ) and the Sport and Physical Activity/ Psycho-pedagogical domains ( $p = 0.001$ ). A detailed description is reported in Table 7 and Table 8.

Table 7

The analysis of scientific products of researchers from the disciplinary field of Sports science and methodology related to the recruitment field of Didactics, special education and educational research using analysis of variance.

Statistical indicators	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	292.000	2	146.000	273.750	0.001
Within Groups	8.000	15	0.533		
Total	300.000	17			

Table 8

Bonferroni Post Hoc test for comparing g between and within groups.

(I) Domain [Articles]	(J) Domain [Articles]	Mean Difference (I-J)	Std. Error	Sig.
Biomedical	Sport and Physical activity	-8.00000*	0.42164	0.001
	Psycho-pedagogical	1.00000	0.42164	0.095
Sport and Physical activity	Biomedical	8.00000*	0.42164	0.001
	Psycho-pedagogical	9.00000*	0.42164	0.001
Psycho-pedagogical	Biomedical	-1.00000	0.42164	0.095
	Sport and Physical activity	9.00000*	0.42164	0.001



## Discussion

The aggregated data show a prevalence (1/3) of the biomedical scientific production over that of Sport and Physical activity, a modest Psycho-pedagogical and Biomedical scientific production was found in the academic recruitment field of Exercise and sports science and Didactics, special education and educational research, respectively. On the other hand, high scientific production was found in the domain of Sport and Physical activity in the academic recruitment field of Didactics, special education and educational research.

Disaggregated data show that the academic discipline of Physical Training and Methodology (code M-EDF/01) in the academic recruitment domain of Exercise and Sport Sciences has a significant difference from the biomedical domain and none between Sport and Physical Activity/Psycho-pedagogical domains. A significant difference was also observed between the Biomedical and Sport and Physical activity domains, with a prevalence of the latter. In contrast, there was no significant difference between Sport and Physical Activity and Psycho-pedagogical domains, despite being Sport and Physical activity prevalence.

As for the academic discipline of Sports science and methodology in the academic recruitment of Exercise and Sport Sciences, it was no observed significant difference between the Biomedical and Sport and Physical activity domains, even if there was a biomedical prevalence. In contrast, there was a significant difference between Sport and Physical Activity and Psycho-pedagogical domains, with a prevalence of the first domain.

On the other hand, a significant difference has been observed between the Biomedical and Sport and Physical activity domains, with a prevalence of the latter in the academic discipline of Physical training and methodology in the academic recruitment field of Didactics, special education and educational research. Finally, a significant difference has also been observed in the academic discipline of Sports science and methodology in the academic recruitment field of Didactics, special education and educational research between the two domains of Sport and Physical Activity and Psycho-pedagogy, with a prevalence of the first domain.

From these results, it was possible to appreciate an excess of scientific publications related to the biomedical domain, a moderate level of publications related to the Sport and Physical

Activity domain, and a lack of publications related to Psycho-pedagogical ones.

This study tried to identify methods, methodology, and epistemology adopted in the body of research carried out in the field of physical activity and sports science in the products of Italian scientific research. Since no previous studies have dealt with this specific topic in the field of sports science, no comparisons could be made. Beyond the original topic of this study, there is not a wide range of published research that has analysed research methods in Exercise and sports science. One of the most common is the study of Freire et al. [20], which aimed to identify methods, methodology and epistemology adopted in the body of research carried out on building values in physical education classes in schools during the decade 2000–2010. They asserted that more attention should be devoted to hermeneutic – phenomenological and critical – dialectical studies conducted in this area, investigating the beliefs and perspectives of the people studied and their actions in a school's real physical education environment.

Another similar research is that by Čustonja et al. [21]. They analysed the differences between and within the European and the USA departments, faculties or universities which offered a degree in human movement science studies according to their names. They recognised that we do not have one word accepted globally for the field of human movement studies. It is only a matter of academic and scientific consensus to accept kinesiology as a global and universal term for the science and profession in question. Finally, similar research conducted by Pang [22] delves into the sociocultural perspectives of health and physical education and physical activity in the lives of ethnic minority students in Westernised countries. The reflections add to the current discourse on general problematising health and physical education and physical activity research, particularly when researching the other.

## Conclusion

The existence of the different coherence of the scientific profiles of the Italian researchers concerning the relevant academic recruitment field and possibly also to the two academic disciplines was confirmed. The study showed that the scientific production of researchers from the academic disciplinary of Physical training and methodology (code M-EDF/01) and Sports science



and methodology (code M-EDF/02) related to the academic recruitment field of Exercise and sports science (code 06/N2) is more consistent than that of researchers afferents to the recruitment field of Didactics, special education and educational research (code 11/D2).

The limitation of this study is represented by the fact that the research survey was conducted considering only the titration of scientific products, thus not considering those articles that were not attributable to the domain of Sport and Physical Activity. In the second level of investigation, it will be necessary to consider these scientific articles, even though they do not have the corresponding title with the declaration of the two academic disciplines.

They can be analysed by comparing the keywords of scientific products, which represent the second identifying level of the topic that the article deals with, with the official keywords of the CUN, which deal with the specific fields to complete the academic disciplines' declarations. There is, therefore, a need to repeat the study with a more significant sample in terms of doubling the products to be analysed and increasing the number of researchers involved.

### Conflict of interest

No conflict of interest with any person, company, or institution.

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