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HAS MODERN SPORTS SCIENCE OVERCOME THE SAGAN EFFECT?

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Abstract. There has long been a view in the scientific community that scientists have a responsibility to foster greater interaction between science and society. Even though many scientists are actively involved in public life, a portion of the scientific community still expresses concern about the Sagan effect. Objective: to analyze the literature on the impact of the Sagan effect on the scientific performance of sports university employees. This study was conducted according to the PRISMA-S and PRESS literature search checklists. The literature search was conducted in PubMed, Google Scholar, Elibrary and Epistemonikos. The time frame of the search was 10 years. The search identified 13 references. The search did not identify any eligible studies that met our preselected inclusion criteria. In addition to examining the Sagan effect as a professional stigmatization of scientists, a more in-depth study of public bias towards scientists who present scientific knowledge to a wider audience is warranted.
Keywords: Sagan effect, sports science, PR projects, advertising, information projects, sports management.

Introduction. In 1991, an American astronomer and science communicator Carl Sagan was nominated for membership in the National Academy of Sciences. Despite the effort of some strong supporters, including the Nobel Prize winner Stanley Miller, who argued passionately for Sagan's admission to the Academy, the nomination failed. Sagan was eliminated on the first voting round, resulting in a full debate and vote by the Academy members. He then received less than 50% of the affirmative votes in the final round, a far cry from the two-thirds required for admission. Sagan's biographers argue that Sagan's rejection by the Academy and Harward's prior rejection of this tenure were a direct consequence come to be known as the "Sagan Effect": popular, visible scholars are worse academicians than those who do not participate in public discourse [1]. Later on, Sean Carroll, a science writer and freelance researcher of the California Institute of Technology, wrote a popular blog post wittily titled "How To Get Tenure at a Major Research University", drawing in part on his own failed attempt to get tenure at the University of Chicago [2]. He gave 13 pieces of advice, about half of which are straightforward and even obvious: "Do good research", "Make an impact in the field", "Bring in grant money". The others mostly do not make sense: "Don't be too well known outside the field", "Don't write a book", "Choose your hobbies wisely". Carroll argued that scientists are suspicious of colleagues who have too high a public status. Not out of envy, but because there are concerned that public scientists care more about their media presence than their findings. According to this point of view, the ideal researcher devotes themselves exclusively to the search for knowledge and related work in the laboratory, without outside interference. However, this common belief has been repeatedly questioned in a number of studies aimed at quantifying the academic performance of scientists (number of articles published by them since the beginning of their career, average number of publications per year and number of citations received (i.e. Hirsch index, etc.)). The fact that scientists who interacted with society were actually more academically active than the average scientist was a surprising finding. Rather, greater activity in publicizing scientific information was correlated with higher performance and vice versa, inactivity in science popularization was correlated with lower performance [2]. The most active communicators tend to be the more experienced scientists, which are particularly

visible in the media [4]. Perhaps this is the reason why the Sagan effect is irrelevant for modern astronomers. A global survey of astronomers conducted by Marta Entradas and Martin Bauer and published in Nature Astronomy shows a picture of a scientific community most of whose members are enthusiastically involved in public communication, with 87% of astronomers regularly participating in public events and media activities, and half of them taking part in at least 9 such events per year [5]. Also, a recent study on scientists‘ social media activity found a positive correlation between scientists' participation in scientific discussions on social media and an increase in their citations [6]. And what is happening in sports science right now? Do public scientists really show a lack of effectiveness in scientific work? If not, has the modern academic environment overcome the Sagan effect? Taking into account the analysis of the problem, data of modern scientific literature and requests of sports university employees, the objective of the study was identified.

Objective: to analyze the literature on the impact of the Sagan effect on the scientific performance of sports university employees.

Methods and organization. The study took place at the Department of Sports Medicine, Russian University of Sport "GTSOLIFK", Moscow. This study was conducted according to the PRISMA-S [7] and PRESS (Peer Review of Electronic Search Strategies) literature search checklists [8]. The literature search was conducted in PubMed, Google Scholar, Elibrary and Epistemonikos with the following keywords: "Sagan effect" AND (sport OR "physical culture"). The time frame of the search was 10 years. No language barrier was set in this study and no research design restrictions were applied in the search.

Results and discussion. The search identified 13 references (Pubmed=0, Scholar Google=13, Elibrary=0, Epistemonikos=0). The search did not identify any eligible studies that met our preselected inclusion criteria. Therefore, there is currently no direct evidence of the influence of the Sagan effect on the scientific performance of sports university employees. However, contrary to the increasing relevance of scientific collaboration, there still seems to be a prevailing bias among researchers that social engagement may have a negative impact on their scientific credibility and professional development. In a recent study, Chen et al [9] confirmed the existence of the Sagan effect based on a nationwide survey of 8 533 scientists. The observed effect was a consequence of negative experience that indirectly influenced the development of individual behavioral norms by suppressing the researchers' desire to present the results of their research to the wider audience. Today, most scientists have no experience communicating via social media or blogs. Meanwhile, young scientists are more adept at using new media tools and therefore may be in a better position to interact with an audience that is increasingly seeking scientific data online [10]. The development of social media has led to a shift in the way scientists approach awareness-raining activity, revealing discrepancies between traditional communication channels and new platforms. Although social media gives scientists more control over the content [11], this may lead to a so-called "public relations nightmare", which in turn can have a negative impact on public trust and perceptions of the scientific activity's legitimacy [12]. Thus, an in-depth study is highly relevant in the context of social media. Rodder in her study from 2012 [13] identified the reasons for the ambiguous attitude of the academic environment to scientific communication, outlining the factors that determine whether it is acceptable or unacceptable to popularize it. Having analyzed 55 interviews with leading and young researchers involved in human genome projects in four countries, the author concluded that the scientific community recognizes a scientist's publicity as acceptable only if three conditions are met:

1. Scientific contribution credibility: the research must be credible;

2. Reference to institutional role: public visibility is expected from heads of institutes or presidents of large academic communities;

3. Passive nature of interaction with the media: visibility is acceptable if journalists

approach the scientists, not if the scientist initiates it.

Consequently, the academia tolerates and, if the aforementioned conditions are met, even encourages interaction with the press [14]. The discussion raised requires a pragmatic, business thinking approach. Techniques for creating public visibility of an individual (a scientist in our case) and promotion in the information space of scientific projects, programs, events and organizations are developed, tested and implemented on the basis of audience requests, requirements and wishes of scientific technology customers, as well as on the basis of problems requiring their solution (including the prompt ones) [15]. Specialists who promote a scientific project or a scientific figure do not act for the sake of their presence in the "information space". Publicity of a scientist, their presentation and self-advertisement (their status, services and projects) should be considered and used as tools for solving numerous topical field and state tasks and issues. Sports science specialists, their projects, methods and research data are a product of scientific activity. They are subject to the same requirements as any other type of product and utilize universal principles of promotion via PR (public relations) and advertising. Lack of participation channels, time, energy, funding, skills and institutional support (e.g. incentive mechanisms, policies and training) has been identified as major obstacles for scientists' participation in public work [16].

Before implementation of comprehensive PR projects of scientific organizations and societies, the managers do the following:

– conduct research on the needs of different audiences in science or the needs of the scientific product's "customer";

– take into account trends in the information services and event management markets, advertising and communication industries;

– use data from STEP analysis that examines various processes of society to identify the needs of different audiences and institutions;

– rely on data on the competitive environment, its strengths and weaknesses in its activity, which are obtained in the SWOT analysis;

– choose traditional and develop innovative marketing strategies for selling the scientific product, branding tools for scientists and scientific organizations.

All of these actions allow choosing a proper "roadmap" for realizing the set tasks and solving problems related with science, scientific knowledge and an individual acting in the scientific "field". Meanwhile, active informational policy and demanded PR-projects of scientific organizations and their representatives (scientists, specialists) allow:

– scientific organizations and scientific communities to attract additional funding (grant money from different foundations, sponsors, patrons, advertisers);

– scientific environment representatives to receive additional income due to their involvement as experts in various media, master class speakers at the request of organizations, lecturers of commercial, professional development and retraining courses.

A subject of science (an individual or a community), which status, experience, technologies are consistently and properly positioned and advertised (and therefore it is more visible in the information space), does not only create publicity for itself, but also inspires more trust, more often and more strongly stimulates the "feedback" reception, is more quickly remembered, forms a positive attitude towards itself, i.e. in essence, becomes a brand. By taking advantage of fame, positive image and reputation, it allows to receive more preferences, to "sell" scientific knowledge (we are talking about an active form of science popularization) and scientific products (technologies, methods, marketing data and scientific data for marketing, scientific events, etc.). However, branding and advertising in science are complicated due to the lack of resources: personnel, methodological, informational and financial. The lack of budget for active information support and PR support of scientific activity (with the involvement of scientists as well), inactivity of scientists and their organizations in terms of implementing

media projects leads to the fact that:

1. significant achievements of science, topical events, outstanding projects do not attract the attention of the public, media, potential partners, are unnoticed or lost in the media, which is characterized today by "information noise", the presence of a lot of "rubbish data", intense competition between events of different industries for audience and media attention, which distract attention from science and the results of its activity;

2. status of professional scientific activity is not validated in the information space by the facts of success, scientific activity is not positioned among the young (potentially ready for involvement in scientific activity) as demanded, trendy, interesting and profitable in society and in various spheres of life (including physical culture and sports);

3. pseudo-scientists, pseudo-scientific projects and superficial scientific data flood the information public space, which leads to a decrease in the level of education of society and its individual groups, to the undermining of the authority of fundamental science and the authority of the scientist;

4. a number of public/media scientists who are "headliners" of scientific projects and brands (and therefore ambassadors and "advertising faces" of science) is not growing, which, in turn, reduces a number of "imitators" of their information activity among future or young scientists;

5. in the competitive war to attract additional funding, the scientific organizations are "invisible" to potential commercial partners, who could consider science as a platform to promote their brands and advertise their services and products, and scientists as individuals who recommend them.

Technological and informational revolution, rapid development of digital technologies predetermines the need to create and promote information content. It is necessary to increase the volume and number of content formats about science and its representatives. This is facilitated by an increase in the number of information projects on various platforms:

– columns and podcasts on organizations' websites and industry, cross-field and mass-oriented internet portals;

– author's blogs and channels in social media and popular messengers;

– author's vlogs of scientists and video projects (documentaries, interviews, etc.) of organizations on video platforms;

– information products created and promoted in the media field in cooperation with the media, blogosphere representative and video hosting services

In turn, this change:

– increases requirements in the level of creativity of managers and scientists who popularize science;

– causes a need to create and promote original or popular content among various target groups, which, in conditions of "clip thinking", predisposition to "superficial way of thinking" and short-term information consumption, should be non-trivial, viral and interactive;

– makes quite serious demands on such scientist competences as: public speaking and acting skills; presentability (appearance, non-verbal ways to present information, communication with and influence on audiences); mental stability when "filming" – in interaction with different audiences in TV broadcasts and online conferences, when filming vlogs; teaching and presenting skills at public events (conferences, master classes, etc.); skills to write and eye-catching and selling text.

An increase in "media weight" (the amount of information accumulated through active informational policy, advertising and presentation campaigns, media projects, quickly found in the information space) and high-quality communicative activities of the subjects of science:

– increases the level of trust on the part of consumers and structures interested in solving their own tasks in and by means of science;

– allows to "step out of the competition" and become public opinion leaders;

– helps to overcome "obstacles" (mental, organizational, bureaucratic) more quickly when broadcasting their content, implementing scientific projects and selling scientific products;

– contributes to the rapid identification of active audience and important individuals interested in science, as well as the rapid creation and increase of the target audience's "core", involving it and its communication representatives on the topic of scientific knowledge, motivating it to receive, acquire scientific knowledge and request scientific data;

– causes the occurrence and strengthening of healthy competition between scientific schools, organizations and scientists, which leads to the development of scientific activity, the emergence of innovational and creative solutions in terms of promoting science as a demanded sphere of life.

Speaking about the existing opinions (commonly found in the business environment and the information space) regarding the fact that a media scientist or a media scientific community is less effective in the scientific field, we would like to note that they:

– are not a problem or a "mental brake" for scientific project managers and organizations, where active marketing and entrepreneurial activity take place;

– have formed, become a cultivated stereotype and "live" in subsidized scientific projects, where the receipt of proper resources for scientific activity is guaranteed and does not require promotion in a competitive environment;

– are supported by scientists who have obtained the proper status and well-being in their time, but are "afraid" and cannot withstand competition from the new generation of hyperactive and ageing, but advanced in terms of new technologies, scientists who successfully apply modern ways and relevant formats of promotion in the information space.

What we need today are programs for scientific projects and organizations that "nurture" their own presenters, opinion leaders and scientific representatives. They should take "burden" of science promoting and popularization from those scientists who, for various reasons, cannot or do not won to be public and are not ready to engage in the implementation of marketing programs, information projects, in building a personal brand aimed at wider audience. Programs are needed to promote a positive image of a scientist (a young scientist as well) to create a trend for scientific activity, to prove the prestige of scientific specialties, to demonstrate the applied value of scientific research and data for practice. For example, in the activity system of universities and scientific project organizing committees it is necessary to increase the amount of content (news, "selling", informative), which is prepared and distributed by specialized departments responsible for PR and service sales. Such departments should develop a content plan that includes the production and promotion of content about science and scientists who demonstrate their effective performance and achieve success (in science, in commercial activity related to science product sales). Universities should provide advertising modules for science projects in their printed and electronic presentation and advertising products, in journals and collections of scientific and methodological materials. To form scientific potential in the personnel and increase the number of young people engaged in science, it is recommended to delegate to student scientific societies the authority to provide active information support of the scientific life in the university. It is important to involve students from various university departments who are training in PR, advertising, marketing, journalism, event organization, preparing for academic and extracurricular internships based on scientific projects, organization and events to promote science and scientists. We can also note a demand for the implementation of additional long-term educational programs and local projects (courses, practical classes, master classes, methodological materials) that help to improve the skills of scientists in presenting and advertising themselves and/or their organizations and projects in the information space. Status, positive reputation, image of a scientist, their brand, their successful activity can be used in the advertising of universities and scientific organizations, events (films, videos, e-presentations, booklets, billboards on the university's territory, etc.) in the social media content (interviews, thematic expert opinions, author's

thematic section, etc.) These ways of promoting scientists and scientific knowledge influence both the "internal environment" of a scientific or educational organization (motivation of students and personnel to enroll in the master and post-graduate programs, their entry into scientific communities and participation in the scientific grant implementation, etc.) and the "external environment" (attracting attention of the media, grant founders, scientific product customers, etc.). It is necessary to utilize the resources of specialized media studios and media teams operating in universities and capable of creating:

– content that requires preliminary preparation and long processing (video sections, studio programs, talk shows, etc.);

– "fast" content (live streams, broadcasts, reports, reviews, interviews).

The events within the framework of which the brand of public/media scientists is formed and established include contests with various nominations on the science topic. Today, there is a need to increase the award options with original nominations: nominations for young scientists and for media scientists who implement media projects. The format of scientific conferences which are often held in an "academic" format and are not able to raise interest and motivate young people to join the rank of scientists, do not "produce" content that is worthy of active distribution in the information space also requires reimagining. It should be noted that this systematic approach to promoting scientists in the information space is logical and has a reason for implementation where:

– there is a culture of correct and loyal attitude to media scientists on the part of the scientific business community;

– marketing processes are set up and active entrepreneurial activities are carried out in the scientific field;

– an association of active media scientists has formed, proving the right to "exist" by the fact of creating information projects and results of their success (number of subscribers, views and reposts; a number and level of partner collaborations; involvement of industry and federal media in information projects, etc.).

A significant role in solving these problems and eliminating the issues associated with the tense relations between the new and "classic" scientists should be played by management personnel – specialists in the field of advertising, PR, and digital technologies, who should:

– propose algorithms for maintaining a certain balance in terms of the expenditure of scientists' personal resources on their professional activities and work in the media, allowing them to concentrate on their professional activities;

– provide comprehensive and long-term or prompt situational PR support for scientists' activities and the process of promoting scientific knowledge;

– develop solutions to stimulate scientists' activity in the media.

Conclusion. In conclusion, we did not find any suitable studies, hence, there is currently no direct evidence of the influence of the Sagan effect on the scientific performance of sport university employees. As academic sports institutes and universities focus too much on the "publish or die" game, this type of activity becomes the second most important (after research itself) for today's scientists. Unfortunately, this results in research and publication becoming the first priority, with public outreach and engagement taking only a minor place in the evaluation of scientists' performance [17]. However, most scientists understand and value the importance of communicating with the public [18-20]. Many of them believe that interacting with the media is not just desirable, but even essential for any researcher. It is a great opportunity to share one's findings with the world and contribute to the scientific literacy of society [14]. Despite this, there is concern that popularizing science may be at odds with a successful academic career, particularly for young scientists and post-graduate student. We suggest that universities should develop and implement comprehensive policies to minimize the Sagan effect in all areas of university activity. Scientific discoveries lose their value if they

remain unknown to the public. Scientists need to improve communication with the public in order to play an active role in relevant public debates. In addition to examining the Sagan effect as a professional stigmatization of scientists who present scientific knowledge to a wider audience, a more in-depth study of public bias towards such scientists is warranted. Analyzing public bias would identify and expand the range of possible stigma, encompassing both professional and public/social aspects. Further research in this area is required.

Conflict of interest. The authors declare no conflict of interest.

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