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## Bibliometric differences between funding and non-funding papers on substance abuse scientific research

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## Introduction

Substance abuse is considered a disease that creates serious social problems and significant health expenditure for research, prevention and treatment (Green et al, 2004). There are several worldwide research initiatives aimed at better understanding the problem and seeking solutions to mitigate it (Savic et al, 2017; Moulahoum et al, 2019).

The economic support of research projects is essential for the proper performance of the scientific system and especially in areas related to the health and welfare of the population, as it facilitates discoveries and the advancement of science (Fortin and Currie, 2013).

However, the funding of the drugs of abuse research and their impact are unknown. The aim of this work is to identify the relationship between the funding resources allocated to the study of four most used drugs of abuse (cannabis, cocaine, opioids and psychostimulants), and several other variables such as the annual trend, number of authors, international collaboration, subject area and the relation between funding and citation.

## Methods

A search strategy validated in a previous work (Khalili et al, 2018) and improved that combines general terms related with the abuse of substances or papers included in the research area "Substance abuse" and terms related to four specific drugs was used for the study. The search was performed on the Web of Science Core Collection (WoS) on 25 March 2019 and was restricted to the decade 2009-2018, as WoS only systematically records information on funding since 2008. Documents written in English and classified as article, review, letter and proceeding paper, were selected.

Several indices were determined to measure the relationship between the financing work and the type of drug, patterns of collaboration, subject research areas and citation. The number of citations per article has been calculated by dividing the number of citations by the number of years since their publication. We have used the "citation per paper" and the "citation difference" indices, defined by Zhao et al (2018). A bivariate analysis (Chi-square tests and tests of means) was used to determine whether there were statistically significant differences ( $p < 0.05$ ) between funded papers, international collaboration and number of citations received.

## Results

The total number of documents retrieved was 47,981, of which 24,589 (51.2%) dealt with opiate abuse, 13,255 (27.6%) with cocaine, 12,566 (26.2%) with psychostimulants and 11,578 (24.1%) with cannabis. 65.4% of the total number of papers was funded, with 2016 being the year with the highest percentage of funded papers.

Cocaine abuse has attracted a higher percentage of funded papers, followed by psychostimulants abuse (figure 1). The percentage of financed papers declined in recent years for all drugs except cannabis, which rose slightly. Statistically significant differences were observed with respect to the number of authors, the existence of international collaboration and the number of citations received between funded and non-funded papers. The funded papers showed a higher mean number of authors, a higher mean of international collaboration and a higher number of citations in the articles ( $p < 0.001$ ).

Funding was higher for research on cocaine abuse and psychostimulants abuse. The subject areas most funded (with at least 100 published documents) were Virology (90.6%), Multidisciplinary Sciences (88.6%), Neuroscience (86.3%), Behavioral Sciences (84.9%) and Psychology Biological (84.3%), while those that receive the lowest funding were Law (16.2%), Criminology and Penology (17%), Emergency Medicine (26.1%), Pathology (28.9%) and Legal Medicine (29.9%).

Figure 2 shows Citation per paper overall (CPP), Citation per paper in funded papers (CPPF), Citation in non-funded papers (CPPN) by type of substance. The CPP is higher in the funded papers cannabis and cocaine. The CD citation difference (CPPF/CPPN) is greater than 2.3 in all substances which means that funding increases citation.

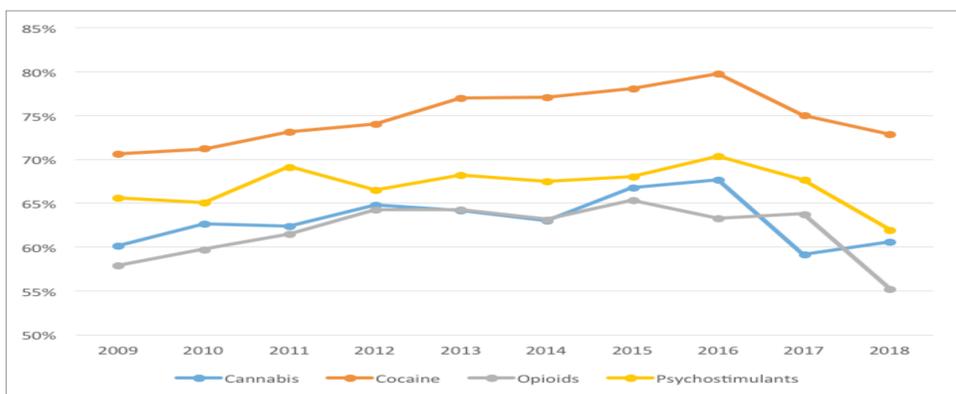


Figure 1. Annual evolution of funded papers according to type of drug of abuse

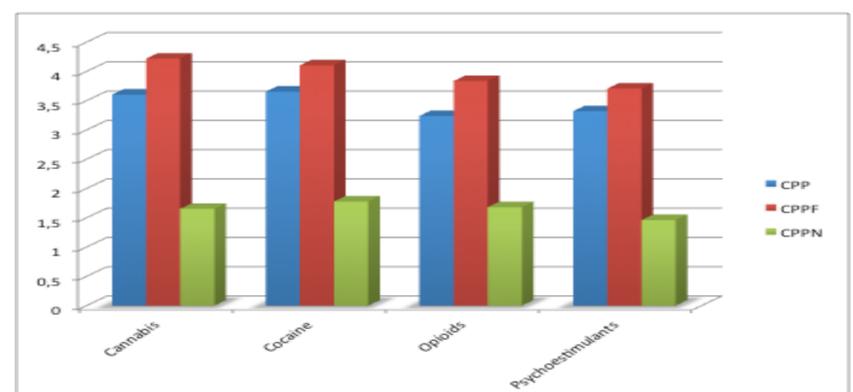


Figure 2. Citation per paper indexes by drug of abuse

## Conclusions

We have identified differences in funding of most drugs of abuse that affect the annual percentage of funded papers, number of authors, international collaboration and number of citations received between funded and non-funded papers.

One limitation is that the probability of receiving citations is higher in older papers, which has been corrected by dividing citations by the years since the papers were published. Future work must deepen the analysis of these indicators according to subject areas because substance abuse research is multidisciplinary.

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