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A Visual and Bibliometric Overview of the Hedonic Hunger Literature

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ABSTRACT

Aim: This study sought to provide an overview of the hedonic hunger research community using bibliometric data. Material and methods: The Web of Science (WoS) Core Collection was searched for all current and highly cited hedonic hunger research articles published in English between January 1, 1970 and July 31, 2024 for this bibliometric study. Using abstracts and full texts when necessary, the titles that were found were evaluated for eligibility. In addition to journals, authors, and countries of eligible articles, it was also identified keywords categories to track publication trends. On the basis of published data, the number of citations for each eligible article was compared to the expected number. Results: A total of 1,966 articles from various fields make up the dataset. Nutrition and dietetics (41.506%), behavioral sciences (24.364%), and psychology (23.093%) are important fields. Publications started in 1992 increased after 2009, reaching a peak of 178 with 9,022 citations in 2021. Contributors also include Yale University (2.95%), Oregon Research Institute (3.001%), and Maastricht University (3.357%). The United States (901 documents, 43,113 citations), England (302 documents, 13,226 citations), and Germany (185 documents, 7,282 citations) are the top three nations. Conclusion: This study shows a dynamic research landscape in the area of hedonic hunger that reflects cross-disciplinary cooperation and a worldwide perspective. The increase in publications and citations, significant works, and active collaborations all highlight the value of global cooperation in furthering scholarly work.

Keyword: Bibliometric, Hedonic hunger, Publication, Web of Science, Nutrition.

INTRODUCTION

Hedonistic hunger (or hedonic hunger) is defined as an increase in appetite that occurs in the absence of metabolic needs as a result of a desire to eat despite the lack of available foods and an expectation of eating pleasure [1, 2]. Other defination is the term used to describe a person's obsession with and desire to eat foods for pleasure and in the absence of physical hunger. The emergence of hedonic hunger is significantly influenced by food stimuli [3]. Individuals develop hedonic hunger as a result of the looks, flavor, and aroma of food, which makes them look for enticing foods to satiate their need for pleasure [4].

Hedonistic hunger can be affected by mental processes like ideas, feelings, and motivations, as well as by the widespread availability of appetizing foods and regular exposure to food-related cues. Even in the absence of impending or ongoing dietary intake, this is still visible. While most people eat when they are not homeostasically hungry, some people have a persistent obsession

with palatable food that is known as hedonic hunger [3-5]. The consumption of food is now influenced by environmental nutritional cues as well as physiological needs. The abundance of low-cost, delicious, and energy-dense food in today's society encourages people to consume these items not only to meet their nutritional needs but also to relieve stress, enjoy themselves, or control overbearing desires [6, 7]. Because hedonic and homeostatic structures interact with one another to regulate body weight, much of this interaction goes unnoticed, making it challenging to restrict oneself in a world where there is an abundance of food. This complexity also extends to the mechanisms used to treat and/or prevent obesity. Some people are much more sensitive to environmental food cues than others, even though many people have experienced hedonic hunger. It has been demonstrated that a person's sensitivity can vary depending on their gender, level of physical activity, dietary preferences, and food cravings. This study is the first to demonstrate how impulsivity and self-esteem, psychological variables not previously seen in published studies, also affect motivation for food intake and hedonic hunger. Foods that are overly appetizing and have cultural norms that make them "psychologically accessible" are abundant in the environment [6]. Also, social media and virtual platforms, whose use has grown significantly in recent years, cause hedonic hunger because of the visual stimuli they provide [8].

In order to measure hedonic hunger quantitatively, the Power of Food Scale (PFS) was created in 2009. Since then, the PFS has been used in over 50 published studies to forecast outcomes related to appetite, including neural, cognitive, behavioral, anthropometric, and clinical measurements [3].

In order to objectively analyze all knowledge, bibliometrics, a mathematical and statistical tool, has been used to evaluate trends in distributions, collaboration, citation, keywords, hotspots, and frontiers [9, 10].

Hedonic hunger research is an intriguing subject of study in the field of nutritional and psychological studies. This fascinating topic explores the complex interrelationships between rewards, pleasure, and food consumption. The prevention of obesity, the treatment of eating disorders, and the encouragement of improved eating habits all benefit greatly from understanding the mechanisms that underlie hedonic hunger. The depths of hedonic hunger study are explored in this article, along with its significance, major discoveries, and possible implementations [1-8]. But no similar bibliometric research published on hedonic hunger. The goal of this study is to assess the state of hedonic hunger research through July 31, 2023, and to provide a summary of highly cited papers that have significantly advanced the field. Researchers' work will be better positioned as a result.

MATERIAL AND METHODS

Data Collection

The data source for this investigation was chosen to be Web of Science core collection (WoSCC). Many academics have recognized WoSCC as the best database for literature analysis since it is a top-notch digital literature resource [11]. On August 8, 2023, each article was retrieved from every index in the WoSCC database. To avoid any prejudice brought on by database upgrades, the search was finished that day. A thorough search was done using pertinent keywords

including in the Topic of the search engine:"hedonic hunger", OR "pleasure-driven eating," OR "food reward,", OR" Hedonistic hunger" OR "hedonic eating", and related words on a major academic database (WoSCC) to conduct this bibliometric study. Articles that had been published as of July 31, 2023 were excluded from the search. After that, bibliometric approaches were used to examine the generated dataset.

The categories of publications were restricted to "articles" in order to assure the representativeness of the included studies. There was language restriction as only English. The "full records and cited references," which were downloaded and saved in plain text document format, comprised the content of the literature records.

In this study, the distribution of publications and citations over the years, the most publishing institutions, countries and collaborations between countries/institutions, and the most important keywords were investigated. This study also analyzed the top 5 most cited papers on hedonic hunger.

Search Criteria

Results for hedonistic hunger, food reward, pleasure-driven eating, and hedonic hunger combined 13,099 entries in the Web of Science Core Collection. The diversity of findings indicates a rising interest in and study effort to comprehend the subtleties of these ideas and their ramifications in a variety of disciplines, including psychology, neurology, and nutrition. To be specific, we solely looked at articles in the area of nutrition for this study. The Citation Topics Meso section's subtopic 1.44 Nutrition & Dietetics was chosen as a result. Since it was desired to concentrate only on articles among these, the type of publication was narrowed down to articles. Finally, 1966 research articles constituted the sample of the study. The data set of these publications in plain text format was downloaded to the computer and analysed with VOSviewer bibliometric tool.

Bibliometric and Statistics Analyses

Nees Jan van Eck and colleagues created VOSviewer, which is mostly used for bibliometric network graph research (20). Visual studies of country distribution, institution distribution, international collaborations, and keyword analyses were performed using VOSviewer 1.6.19. The grouping was carried out automatically using the similarity matrix and VOS mapping approach, and the authors inserted the necessary labels based on the content. Bibliometric method used in similar bibliometric studies (21-26). Advanced statistical analysis was not used. data were given as percentages and frequencies. The Web of Science graphics were also used.

Ethical Consideration

Since all of the raw data used in this investigation came from public databases, no ethical assessment was necessary.

RESULTS

Main Information

A total of 1,966 articles across research fields are included in the data that is being made available. It is noteworthy that Nutrition Dietetics has the most representation among 61

research areas, with 816 entries (41.506%), followed by Behavioral Sciences with 479 entries (24.364%), and Psychology with 454 entries (23.093%). Psychiatry is represented by 275 items (13.988%), and Neurology by 282 entries (14.344%) in the category of Neurosciences. Additionally, there are sections on Endocrinology and Metabolism (223 articles, 11.34%), Public Environmental and Occupational Health (106 entries, 5.39%), Science Technology Other Topics (73 entries, 3.71%), and Food Science Technology (57 entries, 2.899%). Radiology Molecular Imaging 49 items (2.492%) come from the field of medical imaging. In 1992, the first publications appeared. Only a few articles had been released before 2008, at most. After 2009, the number of papers published annually began to rise, never falling below 50. The year with the most publications was 2021, with a total of 178 articles released. In addition, 2021 received the most citations with 9022. Figure 1 from the Web of Science platform displays the publication and citation data from 1992 to 2023.

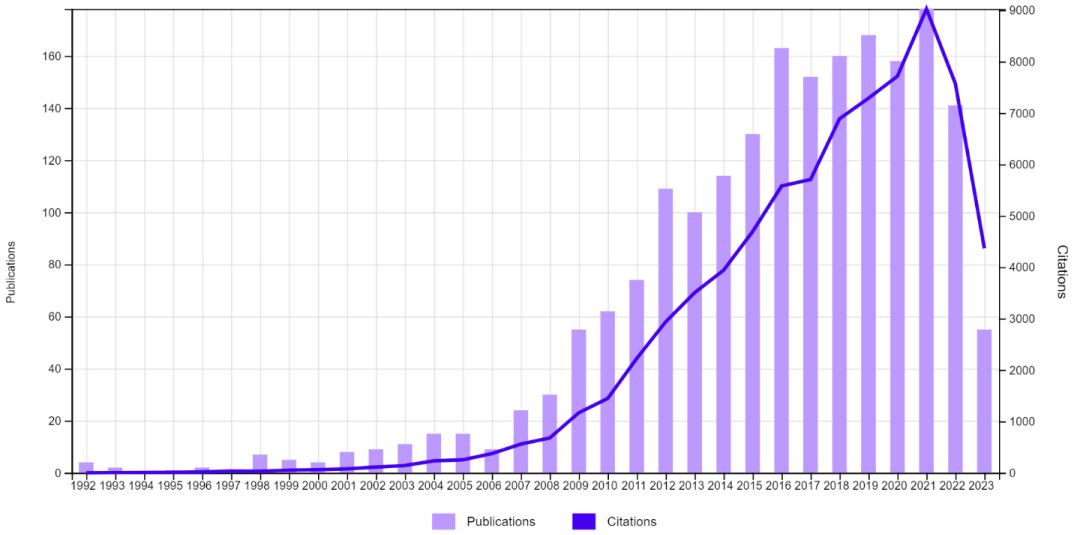

Figure 1: Times Cited and Publications Over Time

Top Organisations

This body of literature includes contributions from 1,826 organisations in total.

The information provided emphasizes associations found in the 1,966 research articles. The University of California System, with 90 articles (4.578%), is the top affiliation, followed by the University of Leeds with 82 articles (4.171%), and the Pennsylvania Commonwealth System of Higher Education PCSHE with 75 articles (3.815%). 66 documents (3.357%) are contributed by Maastricht University, and 59 (3.001%) are contributed by Oregon Research Institute. 58 documents (2.95% of the total) are attributed to the National Institutes of Health NIH USA and Yale University, respectively. Harvard University and the University of London each had 45 documents (2.289%) and 46 articles (2.340%) respectively. Furthermore, 44 publications (2.238%) are authored by University of California, San Diego scholars.

Top Countries

The publications' overall author count is 7,031, with authors from 70 countries represented.

The analyzed data with VosViewer identifies a small group of nations, each with more than 50 documented occurrences, that have significantly contributed to the corpus of articles under evaluation. With a noteworthy 901 documents and a significant 43,113 citations, the United States appears as a noteworthy participant. The same may be said for England, which has 13,226 citations and 302 documents. A total of 185 documents and 7,282 citations are included in Germany's intellectual production, whereas 176 documents and 7,177 citations are included in the Netherlands' output. 145 documents in Australia have received 4,141 citations, whereas 134 documents in Canada have received 5,259 citations, demonstrating intellectual activity. The academic output of France is highlighted by its 78 documents and 2,115 citations. 746 citations are generated from 69 papers presented by the People's Republic of China. Spain establishes its academic presence with 54 documents and 1,507 citations, while Italy's scholarly environment includes 60 documents with 2,354 citations.

Number of Citations and Highly Cited Articles

According to the data given, the included articles have been referenced a total of 76,684 times. When self-citations are taken out of the equation, there are a total of 63,249 times in these citations. This results in an average of about 39.01 citations per item.

The article titled "Brain Dopamine and Obesity" by Wang, et al. [12], which appeared in Lancet in 2001, had the most citations. A total of 1371 citations were made to this article, demonstrating its great influence on the topic of obesity research. The study presumably explores the relationship between brain dopamine and obesity, providing important insights into the neuronal mechanisms driving this intricate health issue.

The article by Adam, et al. [13], "Stress, Eating, and the Reward System," is the second-most-cited piece. A 2007 issue of Physiology & Behavior featured the article. The fact that it has received a total of 1060 citations indicates the importance of its contribution to our understanding of the relationship between stress, eating habits, and the brain's reward system. The research likely sheds light on the intricate connection between psychological stress, eating habits, and the underlying neurological systems that underlie reward-based behaviors.

"Dopamine D2 receptors in addiction-like reward dysfunction and compulsive eating in obese rats," by Paul M. Johnson and Paul J. Kenny, is the third-most-cited article [14]. The article was published in 2010 in Nature Neuroscience. The relevance of dopamine D2 receptors in the setting of reward dysregulation and compulsive eating behavior in obese rats is explored in this paper, which has gotten a total of 985 citations.

"Changes in brain activity related to eating chocolate - From pleasure to aversion," written by Small et al. [15], is the fourth-most cited article. In 2001, it appeared in BRAIN. This article, which has received 807 citations, probably looks into how consuming chocolate changes the brain's activity from happy feelings to possible dislike.

The paper by Kent C. Berridge, "'Liking' and 'Wanting' Food Rewards: Brain Substrates and Roles in Eating Disorders," is the fifth most cited article [16]. In 2009, PHYSIOLOGY & BEHAVIOR published it. The focus of this article, which has 701 citations, is probably on comprehending

the neural processes that underlie the concepts of liking and desiring food rewards, especially in the context of eating disorders.

Keyword Analysis with Vosviewer

There are 3,150 different keywords in these articles, and 286 of them have been encountered at least five times. The most frequently used keywords are listed below: "obesity" appeared 368 times, with a total link strength of 1072, "reward" 174 times, "Functional magnetic resonance imaging (fMRI)" 165 times, "children" 88 times, with a total link strength of 210, "food" 88 times, a total link strength of 283, "food reward" 83 times, and "eating behavior" 77 times. Table 1 summarises the most frequently used keywords and total link strengths. Additionally, Figure 2 illustrates an overlay analysis of the mentioned keywords. The term "overlay analysis" refers to a visual depiction that shows the connections or interactions between many items, frequently by superimposing them on top of one another. In the case of keywords, overlay analysis can entail putting the keywords in a visualization and highlighting their connections, interconnections, or patterns through the way they are arranged or connected. This kind of analysis reveals information about how keywords are related to one another within a certain context, such as a dataset or a particular topic of study.

Table 1: Keyword analysis with Vosviewer

Keyword	Number of occurrences	Total link strength
obesity	368	1072
reward	174	568
Functional magnetic resonance imaging (fMRI)	165	527
children	88	210
food	88	283
food reward	83	241
eating behavior	77	202
anorexia nervosa	75	212
binge eating	74	213
food addiction	73	205
eating disorders	70	200
appetite	65	216
neuroimaging	54	193
hunger	52	179
food intake	51	177
liking	51	166
overweight	51	149
adolescents	46	122
dopamine	43	126
stress	42	138
diet	41	117
eating	41	147
reward sensitivity	41	124
wanting	41	135

bulimia nervosa	40	114
hedonic hunger	40	92
satiety	40	139
binge eating disorder	39	120
motivation	39	120
weight loss	38	126
ımpulsivity	38	115
bariatric surgery	37	106
food cues	37	102
childhood obesity	35	66
bmı	34	106
feeding practices	34	77
addiction	32	114
craving	32	113
emotional eating	32	75
food choice	31	77
nutrition	30	75

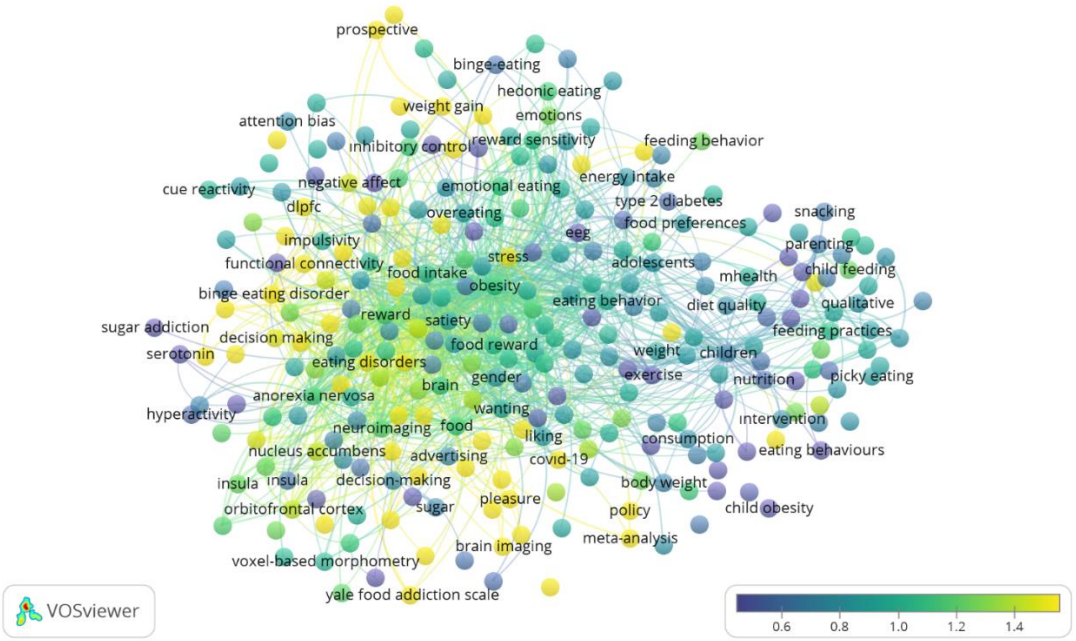

Figure 2: Overlay analysis of the keywords

International Collaborations

Figure 3 shows collaborations between the most profitable publishing organisations, whereas Figure 4 shows collaborations between the most active publishing countries.

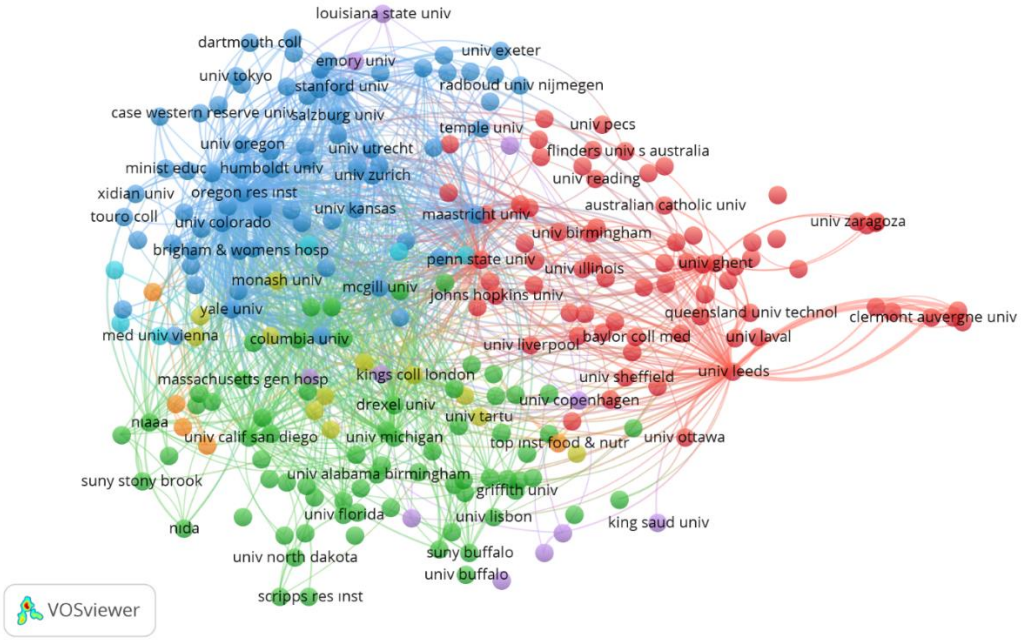

Figure 3: The collaborations between the most profitable publishing organisations.

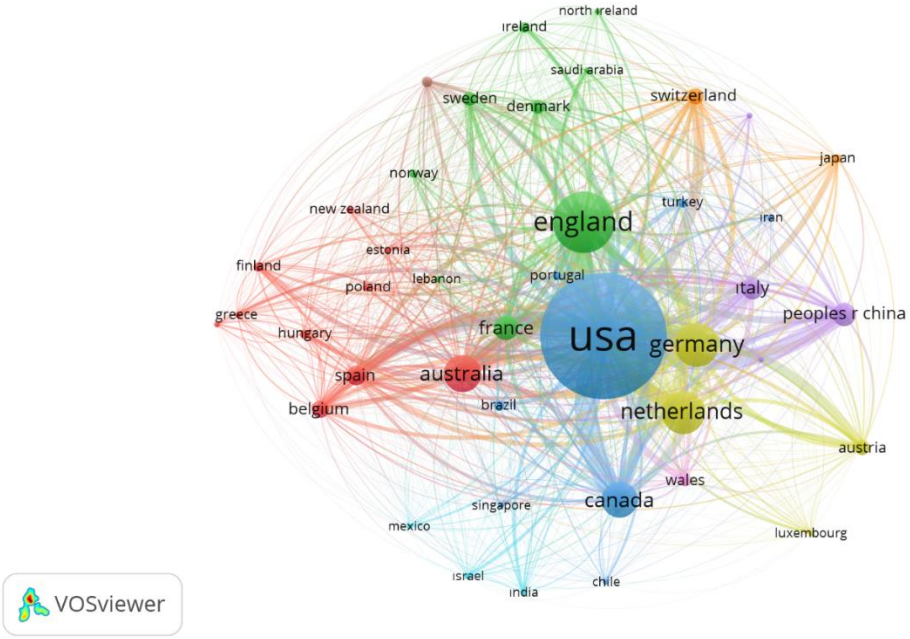

Figure 4: The collaborations between the most active publishing countries.

The University of Leeds is one of the notable organizations involved in effective inter-organizational cooperation, with 80 documents and 3,387 citations, for a significant total link strength of 84,936. With 65 documents and 2,460 citations, Maastricht University is next with a link strength of 99,930. With 59 documents and 4,996 citations, The Oregon Research Institute demonstrates active collaboration, adding up to a total link strength of 172,221. The University of California San Diego is represented by 42 papers and 2,437 citations, resulting in a total link

strength of 64,223, while Yale University has 48 documents and 4,572 citations, for a total link strength of 104,807 links. These organizations exhibit effective inter-organizational cooperation, which is demonstrated by the number of citations they exchange and the overall strength of their links.

Following are the nations that have the strongest international links for collaboration: The USA contributed 901 documents and 43,113 citations, yielding a significant total link strength of 589,220; England contributed 302 documents and 13,226 citations, leading to a total link strength of 266,961; Germany contributed 185 documents and 7,282 citations, producing a total link strength of 210,294; the Netherlands contributed 176 documents and 7,177 citations, producing a total link strength of 207,874; and Australia contributed 145 documents These nations exhibit active academic exchanges, as seen by the documents they share, the citations they exchange, and the general strength of their links.

DISCUSSION

The bibliometric analysis highlights the growing attention being paid to hedonic hunger as a crucial area of study in the field of eating behavior. The engagement of researchers from numerous disciplines, including as psychology, neuroscience, nutrition, and public health, demonstrates the multidisciplinary nature of this field. The identification of significant academics, organizations, and publications offers insightful information about the intellectual network guiding hedonic hunger research. The provided dataset covers a wide range of 1,966 research publications from various subjects and provides information on how these articles are represented across various research fields, organizations, nations, and countries, as well as information on their citations. Nutrition and dietetics holds the highest percentage of the 61 research topics, accounting for 41.506% (816 articles), followed by behavioral sciences (24.364%, 479 articles), and psychology (23.093%, 454 articles). Notably, the investigation crosses a number of research areas, sparking debates about how data accessibility are affecting other academic fields.

These articles' timelines show how the fields' respective areas of interest have developed through time. The earliest articles appeared in 1992, and after 2009, publishing increased significantly, peaking in 2021 and being followed by the most citations (9022). This pattern might reflect the developments that have facilitated research as well as the topic's growing importance.

The participation of many different organizations is a reflection of the teamwork that goes into academic research. In order to highlight their contributions to this body of literature, the University of California System (the USA), University of Leeds (England), and Pennsylvania Commonwealth System of Higher Education PCSHE (the USA) claim the top three ranks. The information also shows how influential organizations like Maastricht University (Netherlands), the Oregon Research Institute (the USA), and the National Institutes of Health in the United States have been in influencing academic discourse of hedonic hunger research. In other words, the most prevalent organizations in the primary literature on hedonic hunger were cutting-edge institutions in both the United States and Europe.

A country-by-country examination demonstrates the research area's international. Prominent participants include the United States, England, Germany, the Netherlands, Australia, and Canada. These countries demonstrate active academic relationships as seen by the number of citations, shared documents, and links they have. Such partnerships enable the exchange of concepts and methodologies, ultimately enhancing the overall research landscape. Also, collaborations between countries as well as organizations on a global scale enhance the value of this collected data. Organizations that actively collaborate with other organizations, such as the University of Leeds, Maastricht University, and Oregon Research Institute, promote the sharing of knowledge and ideas. Significant cooperation between nations including the USA, England, Germany, the Netherlands, and Australia are on display, demonstrating a dynamic international academic network.

The citation analysis sheds light on the significance of particular articles [17, 18]. Notably, Wang et al. (2001)'s publication "Brain Dopamine and Obesity" has the most citations (1,711), demonstrating its significance in the field of hedonic hunger research. Other publications with a lot of citations explore issues like stress and eating patterns, dopamine receptors in addictive behaviors, and changes in brain activity brought on by chocolate consumption. Collectively, these papers advance our knowledge of the intricate connections between behavior and brain function.

The identification of these articles' major subjects depends critically on their use of keywords [17]. A thorough investigation of brain pathways is at the core of hedonic hunger research. Researchers have discovered brain areas like the nucleus accumbens that are connected to pleasure and reward thanks to cutting-edge technology like functional magnetic resonance imaging (fMRI). According to studies, particular foods, which are frequently high in fat, sugar, and salt, activate these brain areas more strongly, which adds to the attractiveness of comfort foods [10, 19]. For both individual behavior and public health, understanding hedonic hunger has major ramifications. Finding effective interventions has become more important as obesity and eating disorders have become more common. Researchers are currently looking into ways to lessen the effects of hedonic hunger, including creating tactics to target particular neurological pathways or modifying the food environment to promote better choices [9, 20]. According to the results of this study, the keywords "obesity," "reward," "Functional Magnetic Resonance Imaging (fMRI)," "children," "food," "food reward," and "eating behavior" were the most commonly utilized. Understanding the popular topics within this study domain is made more straightforward due to this analysis.

LIMITATIONS

There are several limitations to this bibliometric analysis study. First off, the study only uses data from one database, which can result in an incomplete picture of the research environment. Second, the emphasis on a certain historical period could leave out prior pertinent contributions. The precision of data extraction and keyword assignment may also have an impact on how thorough the investigation is. The study does not take into account the papers' qualitative elements, such as the articles' content quality or research techniques. Finally, the analysis does not take into consideration potential differences in research methodologies between disciplines, which may have an impact on how results are interpreted.

CONCLUSION

This bibliometric study highlights the developing topic of hedonic hunger research and its effects on health in its conclusion. There are 1,966 papers, and they all show contributions from many fields like psychology, behavioral sciences, and nutrition. After 2009, publication rates skyrocketed, reaching a peak in 2021 with 178 papers and 9,022 citations. The intellectual network is strengthened by affiliations with 1,826 organizations, including well-known ones as the University of California System, the University of Leeds, and the Pennsylvania Commonwealth System of Higher Education (PCSHE). The USA, England, and Germany are at the forefront of international cooperation.

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