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A Bibliometric Analysis of Positive Mental Health Research and Development in the Social Science Citation Index

Petrayuna Dian Omega[1], Joniarto Parung[1,*], Listyo Yuwanto[1] and Yuh-Shan Ho[2,*]

[1]Faculty of Psychology, University of Surabaya, Surabaya, 60293, Indonesia

[2]CT HO Trend, Taipei City, 105611, Taiwan

*Corresponding Authors: Joniarto Parung. Email: jparung@staff.ubaya.ac.id; Yuh-Shan Ho. Email: dr_ysho@hotmail.com

ABSTRACT

Background: This study aimed to conduct a bibliometric analysis of positive mental health, focusing on citation performance, article title, abstract, author keywords, *Keyword Plus*, and their development trends. The novelty of this study is a pioneer within the field of positive mental health. Therefore, it delivered new ideas for researchers and practitioners who had concerns about positive mental health in terms of trends research which covered recommended articles and the research focus in recent years. **Methods:** The data were retrieved on 30 April 2024 from the Social Sciences Citation Index (SSCI) of Clarivate Analytics' Web of Science Core Collection for studies published between 1992 and 2023. **Results:** The distribution of keywords in the article title and keywords chosen by the authors were used to assess research trends. 1391 documents in SSCI were found during the search; 1221 of these were document-type "articles." 524 journals published these publications. The most frequently used keywords by the writers, according to the articles' analysis, are "depression," "resilience," "COVID-19," "anxiety," and "social support." Kristin D. Neff wrote the most frequently cited paper in 2003. Most articles came from Europe (five countries), America (two countries), Asia (two countries), and Oceania (one country), and were published in English. The majority of the research in the field of positive mental health is conducted in Europe and America, two regions where English is the primary language. The main research topics in positive mental health were related to adolescents, children, and college students. **Conclusion:** Trends research through bibliometric analysis by using data from Web of Science Core Collection should be followed by manual inspection to avoid errors. Therefore, scientists need more careful data examination in bibliometric analysis.

KEYWORDS

Bibliometric citation analysis; mental well-being; positive mental health; scientometrics; study trends

Introduction

Positive mental health had a long history in the field of mental health. Positive mental health has synonym terms such as subjective well-being [1]. Since there was confusion connecting the utilization of the term "mental health" to explain services for individuals with mental illness, phrases such as mental well-being and positive mental health have been synonymous and can be used interchangeably [2]. Professionals focused on mental health diagnosis according to The Diagnostic and Statistical Manual of Mental Disorders-II (DSM-II) [3] during the twentieth century. The absence of mental illness has come to be almost the synonymous with mental health [4,5]. There were changes in mental health conception that it was not only the absence of mental illness [6], or a comprehensive mental health condition should incorporate both the absence of mental illness and a strong sense well-being, at the very least [7]. Therefore, there was a shift toward mental health as positive functioning in life and symptoms of positive feelings [8,9].

Moreover, the World Health Organization (WHO) defined that "mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community" [10,11]. Although it has been known that well-being is crucial for health, attempts to conceptualize well-being as a study outcome have only recently been undertaken [12]. Mental well-being usually covered two main point of views, including theories used in the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS): (1) the hedonic perspective, including satisfaction of life and the happiness subjective experience (affect); and (2) the eudaimonic perspective, including self-realization, good relationship with others, and positive psychological functioning [2,13–16]. The WEMWBS is a commonly used tool for evaluating mental well-being [17–21] and in certain countries, mental well-being, as determined by a shortened version of WEMWBS (Short WEMWBS or SWEMWBS), is a key indication of overall health [22,23]. The goal of the SWEMWBS is to emphasize the positive facets of well-being [24]. Moreover, subjective well-being had two traditions, e.g., one which concerned with feeling about life (hedonic, emotional well-being [EWB]) and the other one which focused on life functioning (eudaimonic) [25]. Furthermore, the hedonic tradition related to minimizing the duration of negative feelings and maximizing the duration of positive feelings which reflected in searching for EWB while eudaimonic related to capacities and expertise towards more totally functioning individuals [1]. The eudaimonic can be assessed through social well-being (SWB) [26] and psychological well-being (PWB) [27] that showed their function in life. The EWB, PWB and SWB constructed the positive mental health theory from Keyes as well as its scale Mental Health Continuum (MHC) [8]. The MHC, particularly the Short Form (MHC-SF), is a mental health measure that can be used to assess overall well-being [28–33]. From the two different scales above, it can be concluded that both assessment tools for positive mental health covered the perspective of hedonic and eudaimonic in the theories.

Bibliometric analysis in psychology, particularly positive mental health, is still limited. Bibliometric analysis in the Social Science Citation Index's (SSCI) psychology-related Web of Science categories has a long history. In 1985, a review entitled "The Literature of Educational-Research in Israel: A bibliometric Survey 1971–1981" [34] was published in Hebrew in the category of biological psychology. A classic article with 1000 citations or more from the Web of Science Core Collection [35] entitled "Bibliometric Methods in Management and Organization" [36] from Slovenia was published in the group of applied psychology. In those publications, the authors suggested some principles for carrying out the science mapping of management and organization research streams. Additionally, the bibliometric study in the field of psychology also used SSCI [37,38].

The authors need to focus on positive mental health trends since there are benefits to individuals with mentally healthy conditions and free of mental illness which is called flourishing; for instance, the flourishing prevalence in the US adult population is about 20%, therefore it needs

promotion on positive mental health to intercept and manage mental illness [39]. Positive mental health is a national policy and science focus nowadays [40]. Reviews concluded that in healthy populations, there is a potential link between a lower level of life satisfaction and a lower level of positive emotions (like pleasure and happiness), which is part of positive mental health, and a higher risk of all-cause death [41]. According to the previous gap, the authors focus on trend research on positive mental health and make further development.

This study aimed to do a bibliometric analysis which covered trends and properties of publication, including achievement in citations in the study theme of positive mental health by means of title of the articles, author keywords, abstracts, and *Keyword Plus*. This study offered trends in the topic of positive mental health for researchers and practitioners.

Materials and Methods

An accurate bibliometric analysis focus on the reputable journals and published papers. Therefore, authors did not include unpublished literatures since not all of them are available and they are not reviewed by blind peer reviewer in reputable journals which make them have less quality. Addition of unpublished literatures in the bibliometric analysis will produce inaccuracies which become publication bias in the result. Instead, the Clarivate Analytics Web of Science Core Collection, an SSCI online version, provided the data utilized in this study (data updated on 30 April 2024). A total of 3534 journals are classified into 58 Web of Science categories in SSCI, based on the most recent Journal Citation Reports (JCR) published by Clarivate on 20 June 2024.

Authors used quote marks (" ") and the Boolean operator "OR" to every search phrase in the ten SSCI categories related to psychology from 1992 to 2023 entered in the topic (TS) field (*Keywords Plus*, author keywords, abstract, and title). This ensured that the search was comprehensively covered. "Positive mental health," "positive mental well-being," and "positive mental well-being" were the search phrases entered. A total of 1488 documents including 1455 documents (98% of the 1488 documents) were published between 1992 and 2023. Microsoft 365 Excel was used to get the full records of papers from the SSCI, and the accompanying citation counts for every year. Manual coding was done to improve the data analysis process even more [42,43]. The journal citation reports released in 2024 provided the journal's impact factors (IF2023). In 2023, the JCR incorporated four indexes: the Science Citation Index Expanded (SCIE) with 178 groups and 9471 journals, the Social Science Citation Index (SSCI) with 58 categories and 3534 journals, the Arts & Humanities Citation Index (AHCI) with 28 categories and 1744 journals, and the Emerging Sources Citation Index (ESCI) with 250 categories and 8246 journals.

In order to maximize search strategy, previous study [44] offered the "front page" including title, abstract, and author keywords while utilizing the terms of Topic (TS) in the Web of Science Core Collection for the bibliometric study [44].

For bibliometric analysis, the "front page" filter can help prevent the introduction of irrelevant articles. A total of 1391 documents, or 96% of the 1455 documents, were found when the search was delivered for documents with the search terms included in their "front page".

The authors have opted to refer to the reprint author as "corresponding authors" because they are listed as so in the Web of Science Core Collection database [45]. According to previous study [44], in single-author, single-institution, and single-country publications of unknown authorship, the first author, corresponding author, corresponding country, and corresponding institution were all present. In multi-corresponding author publications, all corresponding authors, institutions, and countries were taken into account [46]. When corresponding authors' addresses in SSCI articles were found to be missing affiliation names, they were replaced with affiliation names [46,47].

Affiliations in Wales, Scotland, North Ireland, and England were redefined as coming from the United Kingdom (UK) [48]. Prior to 1997, affiliations in Hong Kong were incorporated with China [49]. Furthermore, associations in Turkiye were classed as Turkey and marked as such [50].

Bibliometric analysis
The analysis of this bibliometric ranked authors and articles using the following citation indicators: a) throughout a specific year, b) from the year of publication to the end of the most recent year, and c) based on the typical amount of citations for each article.

Therefore, a) the citation indicator throughout a specific year (C_{year}) is equal to the quantity of citations obtained from the Web of Science Core Collection during a year (e.g., C_{2023} indicates the quantity of citations for 2023) [51]; b) According to, the citation indication running from the publishing year to the end of the last year (TC_{year}) is the total quantity of citations obtained from the Web of Science Core Collection between the year of publication and the end of the most recent year (2023 in this study; TC_{2023}) [52]; and c) based on the

average quantity of citations for each article (CPP_{year}), the citation indication is equal to the average number of citations per publication ($CPP_{2023} = TC_{2023}/TP$), where TP stands for the total quantity of publications [53]. Using C_{year}, TC_{year}, and CPP_{year} is preferable to the quantity of citations directly from the Web of Science Core Collection because of their invariability and guaranteed repeatability [54].

Moreover, six publication metrics were used in 2014 to assess the publication performance of nations and institutions [55,56]. These six publication indicators are described as follows: TP defined as the total quantity of articles; IP defined as the number of articles released by a single nation (IPC) or a single institution (IPI); FP defined as the number of works with first authors; RP defined as the number of articles with corresponding authors; SP defined as the number of works with a single author. Furthermore, six citation indicators (CPP_{2023}) associated with the six publication indicators were utilized to assess the influence of publications on nations and establishments [57].

Results

According to the objectives of this study, an inventive technique that included the article title, author keyword, abstract, *Keyword Plus*, and was used to accomplish this. The following sections provide the basis for the bibliometric analysis.

Characteristics of document types
In 2017, previous study used the average quantity of citations for each article to determine the attributes of different document categories ($CPP_{year} = TC_{year}/TP$) and the typical number of writers for each work ($APP = AU/TP$) as the fundamental data on document types related to a research topic [58]. The ten different document types contained 1391 positive mental health publications that were published between 1992 and 2023 (Table 1). With an APP of 4.6 authors, 1221 articles (88% of 1391 documents) make up

TABLE 1

Citations and authors based on the document type

Document type	TP	%	AU	APP	TC_{2023}	CPP_{2023}
Article	1221	88	5613	4.6	37479	31
Review	103	7.4	515	5.0	6873	67
Meeting abstract	42	3.0	155	3.7	4	0.10
Early access	31	2.2	186	6.0	55	1.8
Editorial material	16	1.2	25	1.6	154	10
Correction	6	0.43	34	5.7	0	0
Proceedings paper	5	0.36	17	3.4	224	45
Book chapter	2	0.14	8	4.0	51	26
Book review	2	0.14	2	1.0	0	0
Letter	1	0.072	2	2.0	0	0

Note: TP: total number of publications; AU: number of authors; APP: average quantity of authors per publication; TC_{2023}: total quantity of citations from Web of Science Core Collection since publication year to the end of 2023; CPP_{2023}: average quantity of citations per publication (TC_{2023}/TP).

this total publishing. With 103 papers, the review document type had the greatest CPP_{2022} of 67 citations which was found to be 2.2 times of the articles. The sole classic review [35] with a TC_{2022} of 1116 was labeled "A systematic review of empirical research on self-reported racism and health" [59].

The distinct document types have distinct contributions. The publications that were selected for additional analysis typically comprise an introduction, methodology, results, discussion, and conclusion [60]. 1221 articles about positive mental health were favorable and presented in six different languages. 91% (n = 1205 articles) were released in English, Spanish (n = 7 articles), Portuguese (n = 3), German (n = 3), French (n = 2), and Croatian (n = 3), respectively. Compared to non-English publications (CPP_{2023} = 3.9 citations), the CPP_{2023} of English articles had a substantially higher (CPP_{2023} = 31 citations). Meanwhile, compared to non-English publications (APP= 4.1 authors), the average quantity of authors for each article for English papers (APP = 4.6 authors) was only marginally more. Moreover, most document types are articles; therefore, it is chosen to be analyzed since they have similarities in the writing structure such as introduction or background, material and methods, result, discussion, and conclusion.

Characteristics of publication output

The authors employed a correlation to analyze the evolution of articles within a research domain by charting the connection between the average quantity of citations per publication (CPP_{year}) and the yearly count of articles (TP) [53]. The trajectory of article proliferation throughout time is seen in Fig. 1. There were more articles published significantly between 2008 and 2015. After that, there was a noticeable increase from 43 articles in 2016 to 182 in 2022, and then 161 articles in 2023.

Since the early development of positive mental health, scientists tried to build the constructs and theories about positive mental health. Strang in 1936 [61] introduced mental hygiene which is crucial for social program planning, involving the whole areas of way of behaving guiding to social adaptation and individual integration by way of positive mental health to avoid mental problems. On the other hand, Jahoda coined the term positive mental health as the virtuousness of mentally healthy people [6]. Moreover, Bradburn pioneered the positive affect theory [62] while Cantril proposed the life satisfaction theory [63]. The theories presented by the previous researchers stimulated more discussions among the scientists which in
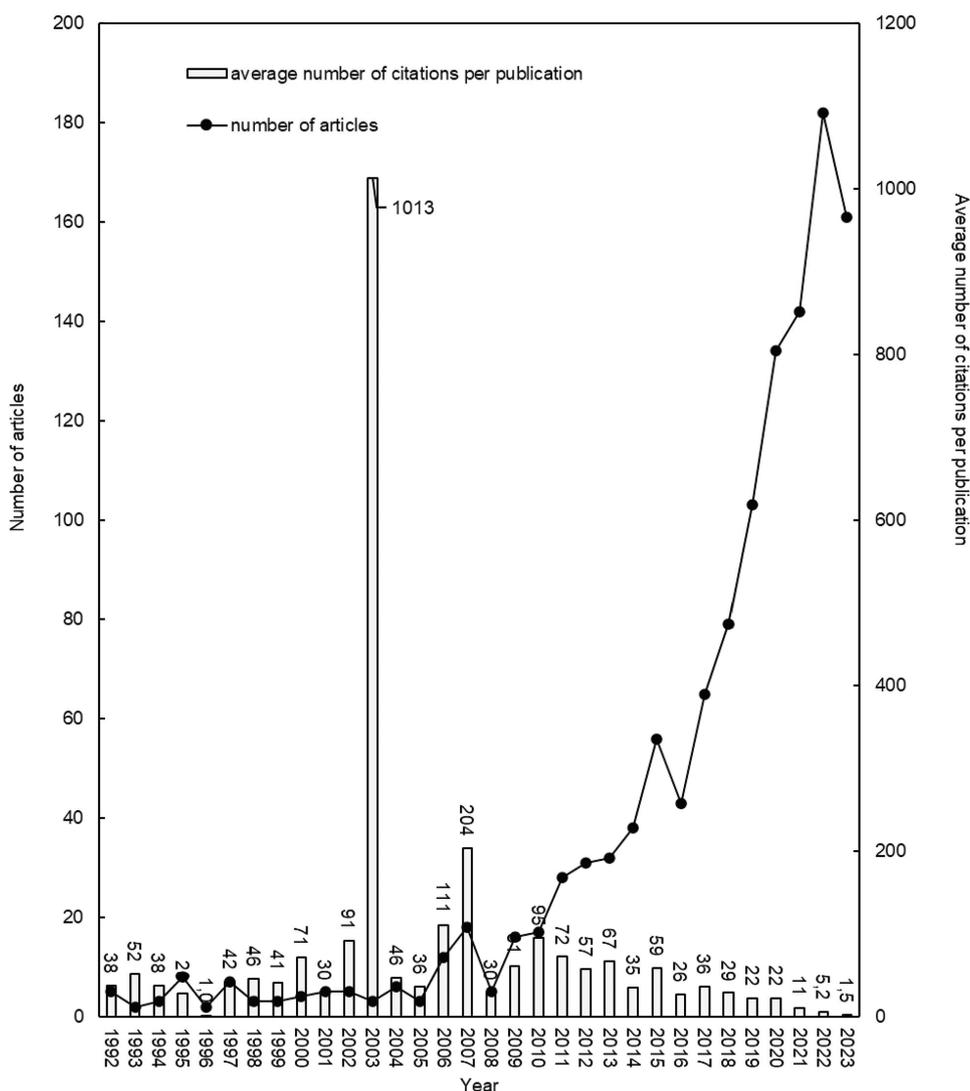
FIGURE 1. Number of positive mental health-related articles in the SSCI and average number of citations per publication by year.

turn made a development about the positive mental health concept. Meanwhile, during the 20th century, many scientists focused on mental health which related to the diagnosis of mental illness according to the DSM-II [3]. Therefore, positive mental health was not a priority in health research for some periods and it caused a low number of publications on the theme. However, more scientists developed positive mental health theories and their measurements in the latter period. For example, Ryff developed the PWB [27]. On the other hand, Keyes developed a positive mental health theory with its measurement entitled the MHC scale [8]. MHC from Keyes [8] consisted of some theories, e.g., positive affect theory [63] and life satisfaction theory [63] which became the foundation of EWB, then followed by PWB theory [27], and SWB theory [26]. MHC had a shorter version entitled Mental Health Continuum-Short Form (MHC-SF) [1]. Meanwhile, the University of Warwick and the University of Edinburgh also developed the theory on positive mental health and its measurement entitled The Warwick-Edinburgh Mental Well-Being Scale [2,64]. These developments showed significant progress in the field of positive mental health. The positive mental health theories became more robust because they were proved by the measurement that confirmed the theories [8,64]. Since more scientists relied on the WHO definition of health as "*the state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*" [65], therefore, more experts focus on the mental and well-being. This development stimulated more scientists to do research and publication on the positive mental health trends which resulted in publication inclined significantly in the recent years.

Among the positive mental health articles, three documents had the greatest CPP_{2023} of 1013 citations in 2003, which was accredited to the document entitled "The Development and Validation of a Scale to Measure Self-compassion" [66] by Kristin D. Neff from the University of Texas at Austin in the USA with a TC_{2022} of 2499 (ranked 1st) and a C_{2022} of 445 (ranked 1st).

Web of Science category and journal

Positive mental health was the subject of articles released in 524 journals throughout 46 Web of Science categories in the SSCI. Based on their CPP_{2023} and the *APP*, Ho's research team determined the attributes of Web of Science categories in 2021, offering essential insights into study subjects [67,57]. The top 10 Web of Science categories in terms of productivity are shown in Table 2. The category of public, environmental and occupational health, which includes 181 journals, published the greatest number of publications in 2022 (305, or 25% of 1221 articles). Psychiatry came in second with 272 articles published.

A total of 524 journals in 46 Web of Science categories in SSCI published articles related to positive mental health. When comparing the top ten categories in Table 2, 52 papers published in the social psychology category had the highest CPP_{2023} (83 citations), whilst 52 publications in the nursing category had the lowest CPP_{2023} (12 citations). The maximum *APP* was 5.9 authors for articles published in the health policy and services category, compared to 2.9 authors for social psychology.

The development trajectories of the top four productive Web of Science categories with over 100 articles are compared in Fig. 2.

As fundamental data about the journals in a study field, it is suggested that the features of the journals based on their IF_{year}, CPP_{year}, and *APP* [57]. The top ten most prolific journals are displayed in Table 3. The *International Journal of Environmental Research and Public Health* had an IF_{2021} of 4614 but IF_{2023}, published the most with 53 articles, or 4.3% of 1221 total, followed by the *Frontiers in Psychology* (IF_{2023} = 2.6) in second place with 47 articles.

Sixteen articles published in *PLoS One* (IF_{2023} = 2.9) had the highest CPP_{2023} of 105 citations when compared to the top 10 productive journals in Table 3, but 16 articles published in *BMC Psychology* (IF_{2023} = 2.7) had a CPP_{2023} of only 2.6 citations. The number of writers in the *APP* varied from 6.8 in the *BMC Public Health* and 3.6 in the *Current Psychology*. Additionally, it was discovered that the *PLoS One*, which was categorized in the Science Citation Index Expanded

TABLE 2

Top 10 most productive Web of Science categories in the SSCI

Web of Science category	No. journals	TP (%)	APP	CPP_{2023}
Public, environmental and occupational health	305 (25)	180	5.1	27
Psychiatry	272 (22)	144	5.1	24
Multidisciplinary psychology	191 (16)	147	4.1	19
Clinical psychology	159 (13)	131	4.8	28
Developmental psychology	66 (5.4)	76	4.1	35
Health policy and services	64 (5.2)	87	5.9	63
Nursing	52 (4.3)	124	4.1	12
Social psychology	52 (4.3)	63	2.9	83
Gerontology	41 (3.4)	37	4.4	30
Interdisciplinary social sciences	39 (3.2)	110	3.7	41

Note: *TP*: total quantity of articles; %: percentage of articles in all articles; *APP*: average quantity of authors per paper; CPP_{2023}: average quantity of citations per publication ($CPP_{2023} = TC_{2023}/TP$).
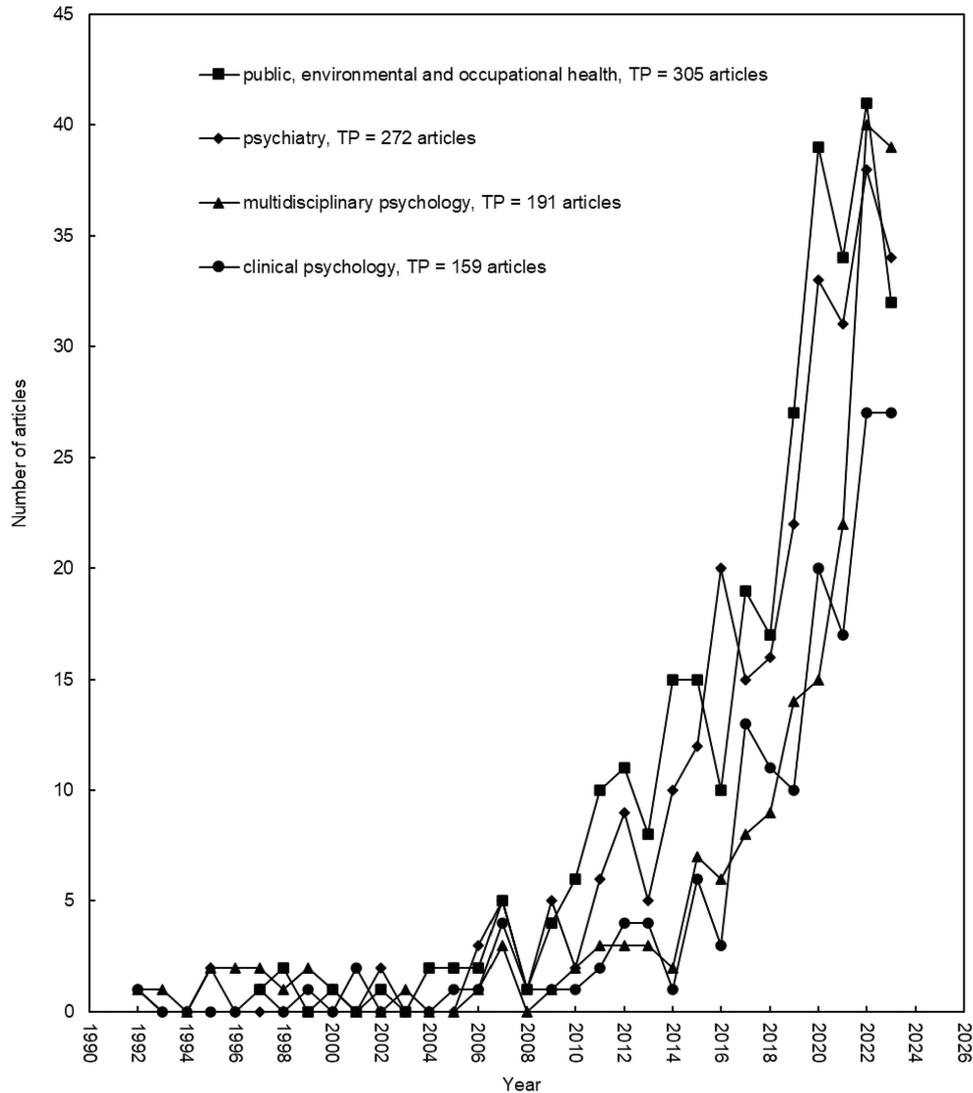
FIGURE 2. Development trends of the top four productive Web of Science categories.

TABLE 3

Top 10 most productive journals

Journal	TP (%)	IF$_{2023}$	APP	CPP$_{2023}$	Web of Science category in SSCI
International Journal of Environmental Research and Public Health	53 (4.3)	*2.468	5.5	21	Public, environmental and occupational health
Frontiers in Psychology	47 (3.8)	2.6	4.3	13	Multidisciplinary psychology
Journal of Affective Disorders	30 (2.5)	4.9	4.8	20	Clinical neurology psychiatry
BMC Public Health	23 (1.9)	3.5	6.8	38	Public, environmental and occupational health
Current Psychology	18 (1.5)	2.5	3.6	14	Multidisciplinary psychology
BMC Psychology	16 (1.3)	2.7	6.0	2.6	Multidisciplinary psychology
PLoS One	16 (1.3)	2.9	5.0	105	Multidisciplinary sciences
Aging & Mental Health	14 (1.1)	2.8	4.6	42	Gerontology psychiatry
Health Promotion International	14 (1.1)	2.3	5.4	52	Health policy and services public, environmental and occupational health
Mindfulness	14 (1.1)	3.1	5.7	22	Multidisciplinary psychology

Note: *TP*: total quantity of articles; %: percentage of articles in all articles; *IF*$_{2023}$: journal impact factor in 2023; *APP*: average quantity of authors per article; *CPP*$_{2023}$: average quantity of citations per publication ($CPP_{2023} = TC_{2023}/TP$); *: IF_{2021}.

(SCI-EXPANDED) but not in the SSCI, was biased in the SSCI. This was identified in the Web of Science category of multidisciplinary sciences.

Take IF_{2023}, the *World Psychiatry*, which boasts two articles and the highest IF_{2023} of 60.5. The journal was ranked first in the SSCI's Web of Science category of psychiatry, which included 146 journals, and the SCI-EXPANDED category, which included 157 journals. The SCI-EXPANDED and the SSCI have different numbers of journals in the psychiatry category. The *Journal of Clinical Oncology* (IF_{2023} = 42.1) ranked second with one article.

Publication performances: Countries and institutions
Six articles (0.49% of 1221 articles) in the SSCI have no affiliations. A total of 1215 articles totaling 897 single-country articles (74% of the total quantity of articles) released by authors from 51 countries with a CPP_{2023} of 32 citations and 318 internationally collaborative articles (26%) released by authors from 85 countries with a CPP_{2023} of 27 citations. The findings showed that global collaboration reduced the number of citations in the literature on mental health benefits. It is well known that a research article's first and corresponding authors are regarded as having made the greatest contributions [68]. Using six publishing measures and six associated citation indicators, Table 4 compares the productivity of the top 10 countries [57]. Europe accounted for five of the ten most productive nations, followed by America (two), Asia (two), and Oceania (one). South Africa was the most productive nation in Africa. It has 13th rank with 26 articles. With a TP 385 articles (32% of 1215 articles), an IP_C of 272 articles (30% of 897 single-country articles), a CP_C of 113 articles (36% of 318 internationally collaborative articles), an FP of 306 articles (25% of 1215 first-author articles), an RP of 306 articles (25% of 1216 corresponding-author articles), and an SP of 50 articles (46% of 108 single-author articles), the USA dominated the six publication indicators.

The Netherlands had the greatest CPP_{2023} of 57, 72, and 56 citations for total articles, globally collaborative articles, and first-author articles, respectively, when compared to the top ten prolific countries in Table 4, with a TP of 70 articles, a CPC of 26 articles, and an FP of 57 articles. The UK earned the greatest CPP_{2023} of 62 and 56 citations for single-country articles and corresponding author publications, respectively, with an IPC of 76 articles and an RP of 112 articles. The greatest CPP_{2023} of 90 citations for single-author publications were recorded in the USA, with an SP of 50 articles. Furthermore, across all six types of publications, Spanish papers received fewer citations.

The developmental paths of the top-producing nations in positive mental health research are depicted in Fig. 3, which focuses on those that produce 90 articles or more. The USA has led this field, particularly in recent years. China has become a major player in positive mental health research, having started a significantly expanding trend after 2017 and rising to the third rank in 2023.

Bibliometric analysis with focus on the institution is important since it identified institution that has an outstanding publication in certain topic and gave reference to the readers for the next search, even it provided ideas for further collaboration between institutions. Six publication metrics and the corresponding CPP_{year} were put forth in 2021 to assess the number and caliber of publications produced by various institutions [57]. At the institutional level, the paper's original source or the basis of study may be identified institution of the corresponding author [51]. In terms of institutions, 822 articles (68%) were the result of inter-institutional cooperation with a CPP_{2023} of 30 citations, whereas 394 positive mental health articles (32% of 1216 articles) came from single institutions with a CPP_{2023} of 33 citations.

TABLE 4

Top 10 productive countries

Country	TP	TP (n = 1215)		IP$_C$ (n = 897)		CP$_C$ (n = 318)		FP (n = 1215)		RP (n = 1216)		SP (n = 108)	
		R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$
USA	385	1 (32)	40	1 (30)	43	1 (36)	31	1 (25)	43	1 (25)	41	1 (46)	90
UK	165	2 (14)	49	3 (8.5)	62	2 (28)	37	3 (8.5)	51	3 (9.2)	56	2 (17)	8.7
Australia	145	3 (12)	21	2 (10)	21	3 (18)	19	2 (10)	21	2 (11)	32	5 (4.6)	13
Canada	106	4 (8.7)	21	4 (7.2)	13	4 (13)	32	4 (6.7)	17	4 (7.1)	21	4 (7.4)	19
Germany	91	5 (7.5)	31	5 (6.2)	27	5 (11)	39	6 (5.9)	33	5 (6.3)	27	7 (2.8)	3.0
China	90	6 (7.4)	19	5 (6.2)	21	6 (11)	16	5 (6.3)	19	5 (6.3)	19	3 (12)	36
Netherlands	70	7 (5.8)	57	7 (4.9)	49	7 (8.2)	72	7 (4.7)	56	7 (4.7)	54	7 (2.8)	23
Spain	52	8 (4.3)	13	8 (3.0)	12	8 (7.9)	14	8 (3.0)	12	8 (3.1)	10	15 (0.93)	0
Sweden	35	9 (2.9)	29	10 (1.9)	37	10 (5.7)	22	12 (1.6)	35	12 (1.7)	24	N/A	N/A
Singapore	32	10 (2.6)	14	9 (2.0)	10	12 (4.4)	19	9 (2.1)	15	9 (2.1)	19	10 (1.9)	5.5

Note: TP: number of total articles; TP R (%): total number of articles and the percentage of total articles; IP_C R (%): rank and percentage of single-country articles in all single-country articles; CP_C R (%): rank and percentage of internationally collaborative articles in all internationally collaborative articles; FP R (%): rank and the percentage of first-author articles in all first-author articles; RP R (%): rank and the percentage of corresponding-author articles in all corresponding-author articles; SP R (%): rank and the percentage of first-author articles in all first-author articles; CPP_{2023}: average number of citations per publication (CPP_{2023} = TC_{2023}/TP); N/A: not available.
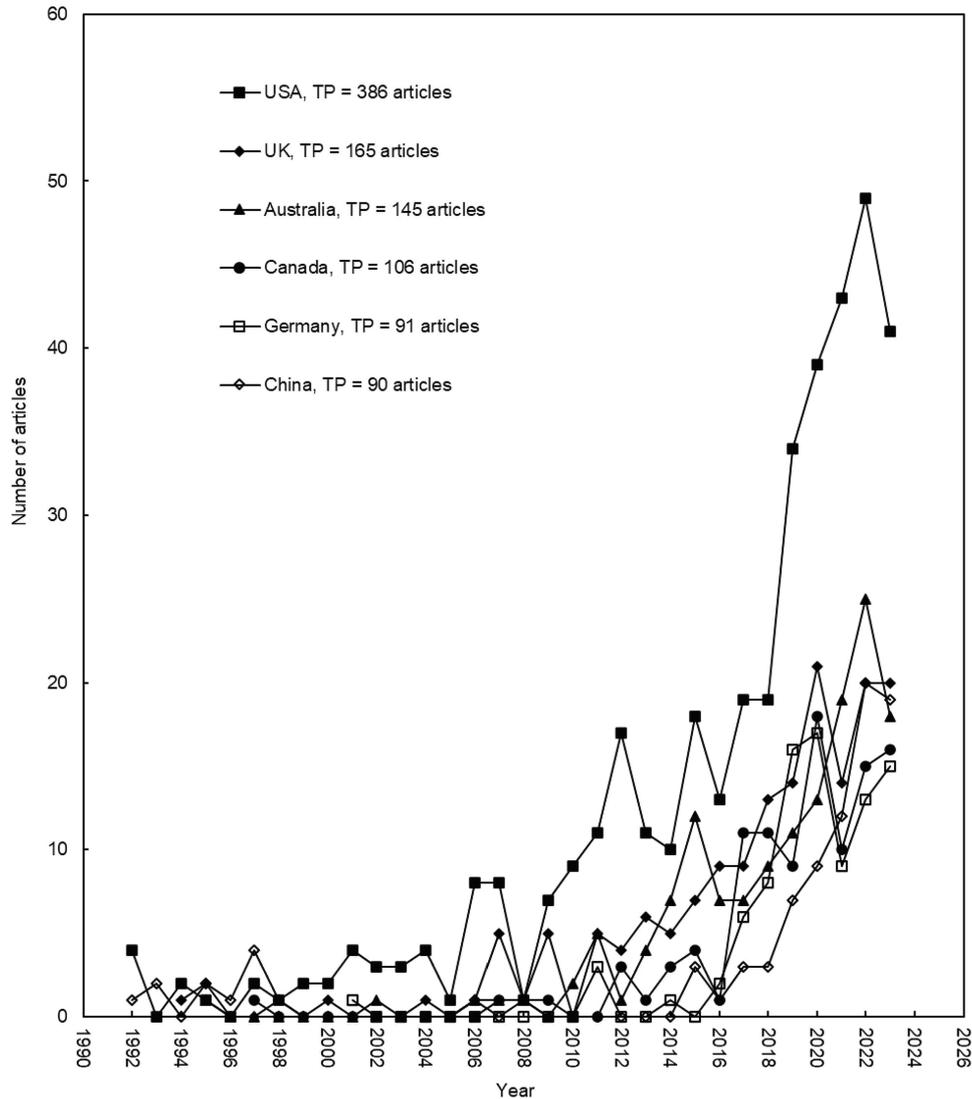
FIGURE 3. Development trends of the top four productive countries.

The findings demonstrated that citations in the positive mental health research declined because of inter-institutional collaborations. The top 10 producing institutions are listed in Table 5 together with their attributes [57]. Of the ten institutions, three were in Australia, two in the Netherlands, and one each in Singapore, Spain, the UK, the USA, and Germany. With a TP of 64 articles (5.3% of 1216 articles), an IP_I of 24 articles (6.1% of 394 single-institution articles), a CP_I of 40 articles (4.9% of 822 inter-institutional collaborative articles), an FP of 49 articles (4.0% of 1216 first-author articles), and an RP of 52 articles (4.3% of 1214 corresponding-author articles), Ruhr University of Bochum in Germany (RUB) ranked as first in five out of six publishing metrics. Additionally, with an SP of 11 publications (10% of 109 single-author papers), the Chinese University of Hong Kong in China released the greatest quantity of single-author articles.

The University of Warwick in the UK (U Warwick) had the highest CPP_{2023} of 164, 164, 641, and 515 citations for total articles, inter-institutional collaborative articles, first-author articles, and corresponding-author articles, respectively, when compared to the top 10 productive institutions in Table 5. U Warwick had a TP of 17 articles, a CP_I of 17

articles, an FP of four articles, and an RP of five articles. However, U Warwick had no single-institution and single-author articles. With an IP_I of two articles and an SP of eight articles, respectively, Emory University in the United States (Emory U) achieved the highest CPP_{2023} of 195 citations for single-institution and single-author papers.

Citation histories of the 10 most frequently cited articles
The Web of Science Core Collection's total citations are periodically revised. Using data directly from the database, the total number of citations from the Web of Science Core Collection from the publication year until the conclusion of the most recent year of 2023 (TC_{2023}) was utilized to decrease the bias in the bibliometric analysis [44]. Search terms are present in the titles, abstracts, and author keywords of a total of 231 articles (19% of 1221 articles), 1138 articles (93% of 1220 articles with abstracts in SSCI), and 243 articles (23% of 1075 articles with author keywords in SSCI), respectively. Just one of the top 11 and top 12 publications that are most frequently quoted, respectively, include search terms in the author or title fields. The ten most frequently cited articles overall are indicated in Table 6 and contain author or title search phrases. The citation

TABLE 5

Top 10 most productive institutions

Institution	TP	TP (n = 1216)		IP$_I$ (n = 394)		CP$_I$ (n = 822)		FP (n = 1216)		RP (n = 1214)		SP (n = 109)	
		R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$	R (%)	CPP$_{2023}$
RUB	64	1 (5.3)	27	1 (6.1)	33	1 (4.9)	24	1 (4.0)	30	1 (4.3)	29	N/A	N/A
UniMelb	28	2 (2.3)	65	15 (0.76)	4.3	2 (3.0)	72	12 (0.58)	16	7 (0.91)	16	13 (0.92)	0
U Twente	28	2 (2.3)	96	4 (1.8)	90	3 (2.6)	99	2 (1.6)	128	2 (1.6)	128	N/A	N/A
Emory U	22	4 (1.8)	134	30 (0.51)	195	4 (2.4)	128	8 (0.66)	176	11 (0.74)	156	8 (1.8)	195
Deakin U	20	5 (1.6)	78	15 (0.76)	21	5 (2.1)	88	7 (0.82)	142	9 (0.82)	140	N/A	N/A
IMH	19	6 (1.6)	12	2 (3.0)	14	36 (0.85)	10	2 (1.6)	12	2 (1.6)	12	N/A	N/A
RUN	19	6 (1.6)	22	30 (0.51)	35	5 (2.1)	21	6 (0.90)	28	5 (1.0)	26	N/A	N/A
UB	18	8 (1.5)	9.1	59 (0.25)	19	5 (2.1)	8.5	18 (0.49)	15	18 (0.49)	14	13 (0.92)	19
UQ	18	8 (1.5)	20	8 (1.0)	17	10 (1.7)	21	12 (0.58)	13	13 (0.58)	13	N/A	N/A
U Warwick	17	10 (1.4)	164	N/A	N/A	5 (2.1)	164	38 (0.33)	641	26 (0.41)	515	N/A	N/A

Note: *TP*: total number of articles; *TP R* (%): total number of articles and percentage of total articles; *IP$_I$ R* (%): rank and percentage of single-institute articles in all single-institute articles; *CP$_I$ R* (%): rank and percentage of inter-institutionally collaborative articles in all inter-institutionally collaborative articles; *FP R* (%): rank and percentage of first-author articles in all first-author articles; *RP R* (%): rank and percentage of corresponding-author articles in all corresponding-author articles; *SP R* (%): rank and the percentage of single-author articles in all single-author articles; *CPP$_{2023}$*: average number of citations per publication (*CPP$_{2023}$* = *TC$_{2023}$/TP*); N/A: not available. RUB, Ruhr University of Bochum, Germany; UniMelh, University of Melbourne, Australia; U Twente, University of Twente, Netherlands; Emory U, Emory University, USA; Deakin U, Deakin University, Australia; IMH, Institute of Mental Health, Singapore; RUN, Radboud University of Nijmegen, Netherlands; UB, University of Barcelona, Spain; UQ, University of Queensland, Australia; U Warwick, University of Warwick, UK.

histories of the ten works that are cited the most are displayed in Fig. 4. Article from Lamers' research team [69] gained a strong increase in citations from the year of publication, reaching 110 citations in 2023. Although it has declined recently, the citation trend for an article by Wood's research team [70] was comparable. The article by Lau's research

TABLE 6

The top ten most frequently cited articles with search keywords in their title or author keywords

Rank (TC$_{2023}$)	Rank (C$_{2023}$)	Title	Country	Reference
1 (674)	1 (110)	Evaluating the Psychometric Properties of the Mental Health Continuum-Short Form (MHC-SF)	Netherlands, USA	Lamers et al. (2011) [69]
2 (377)	3 (53)	Change in level of positive mental health as a predictor of future risk of mental illness	Hungary, UK	Keyes et al. (2010) [72]
3 (292)	2 (61)	Public green spaces and positive mental health: Investigating the relationship between access, quantity and types of parks and mental wellbeing	Australia	Wood et al. (2017) [70]
4 (236)	6 (29)	The relationship of level of positive mental health with current mental disorders in predicting suicidal behavior and academic impairment in college students	USA	Keyes et al. (2012) [73]
5 (228)	5 (30)	A dual-factor model of mental health: Toward a more comprehensive understanding of youth functioning	USA	Antaramian et al. (2010) [74]
6 (192)	12 (23)	To flourish or not: Positive mental health and all-cause mortality	USA, Netherlands	Keyes et al. (2012) [40]
7 (186)	16 (18)	Positive mental health-related impacts of the SARS epidemic on the general public in Hong Kong and their associations with other negative impacts	Denmark, USA, Germany	Lau et al. (2006) [71]
8 (155)	9 (24)	Why does positive mental health buffer against psychopathology? An exploratory study on self-compassion as a resilience mechanism and adaptive emotion regulation strategy	Netherlands	Trompetter et al. (2017) [75]
9 (141)	12 (23)	The Mental Health Continuum-Short Form (MHC-SF) as a measure of well-being in the Italian context	Italy	Petrillo et al. (2015) [76]
10 (129)	41 (9)	Can the 12-item General Health Questionnaire be used to measure positive mental health	USA	Hu et al. (2007) [77]

Note: Rank: rank in positive mental health-related articles with search keywords in their title or author keywords; *C$_{2023}$*: the number of citations of an article in 2023 only; *TC$_{2023}$*: the total number of citations from Web of Science Core Collection since publication year to the end of 2023.
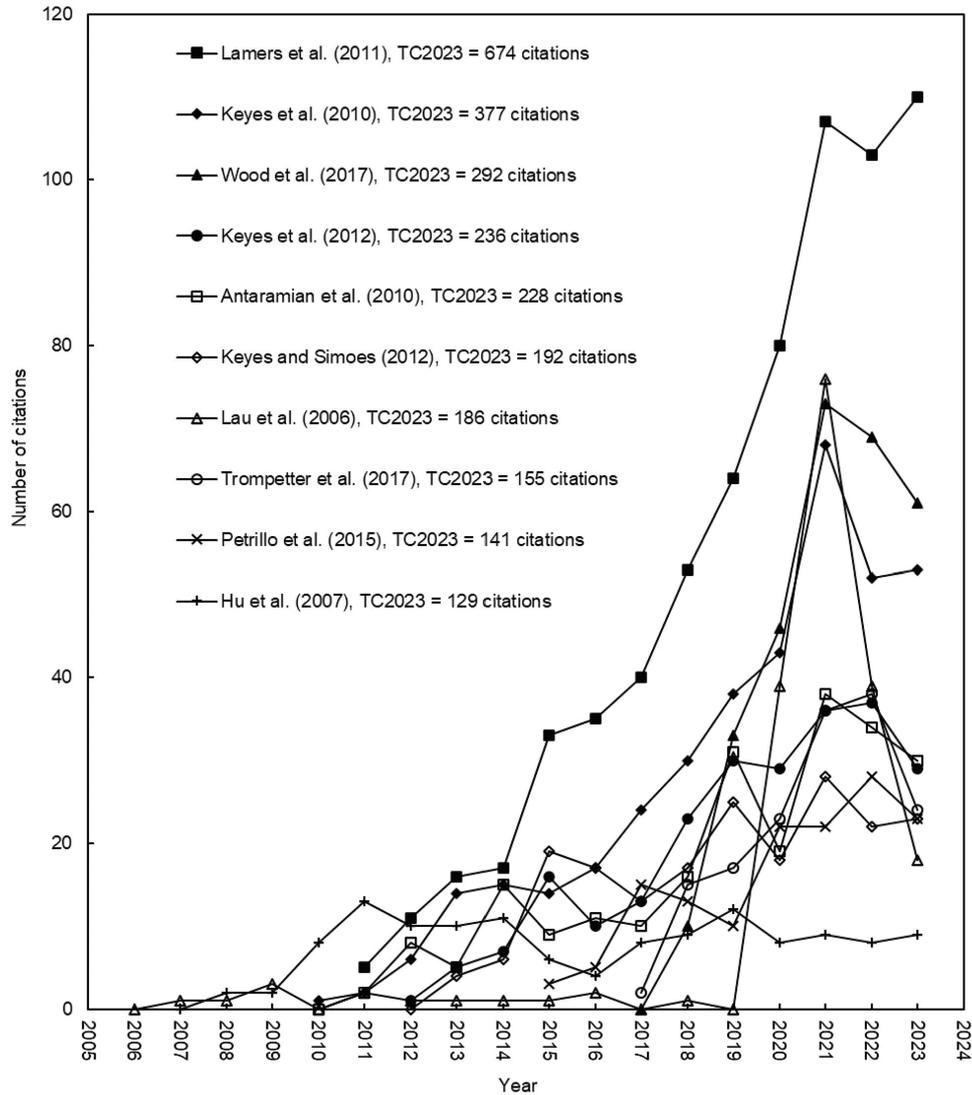
FIGURE 4. Citation histories of the ten most cited publications whose titles or authors contain search terms [40,69–77].

team [71] was only cited a few times in the fourteen years after it was published. It increased rapidly, peaked in 2021 with 76 citations, and then started to decline. A study topic was covered in highly referenced, incredibly powerful articles published in the most recent year [51]. Six items were listed in the top 10 of C_{2023} and TC_{2023}, respectively. In the most recent year of 2023, these articles were the most influential and often mentioned: their TC_{2023} score was 674 (ranked 1st) and their C_{2023} score was 110 (ranked 1st) [69]; their TC_{2023} score was 377 (ranked 2nd) and their C_{2023} score was 53 (ranked 3rd) [72]; their TC_{2023} score was 292 (ranked 3rd) and their C_{2023} score was 61 (ranked 2nd) [70]; their TC_{2023} score was 236 (ranked 4th) and their C_{2023} score was 29 (ranked 6th) [73]; their TC_{2023} score was 228 (ranked 5th) and their C_{2023} score was 30 (ranked 5th) [74]; their TC_{2023} score was 155 (ranked 8th) and their C_{2023} score was 24 (ranked 9th) [75].

Main research focus on positive mental health
Positive mental health drew attention to the sample of adolescents, children and college students in Fig. 5. The trends from 1992 to 2014 showed a low number of

publications in these areas, but in 2015 there was an inclination for their publication. Publication of positive mental health related to adolescents and children reached the top publication around 2021 and declined in the next two years. Meanwhile, publication on the sample of college students reached its peak of publication in 2020 and 2022 and then declined. However, the number of publications on positive mental health in the college student sample was lower than in the sample on children and adolescents. Moreover, the publication of positive mental health in the adolescent and children sample had high attention from authors that made both areas have more publications than on the college student sample. Therefore, regarding the trends, authors need to explore more research topics of positive mental health mainly on the sample of adolescents, children, and college students.

Research trends on mental illness and positive mental health
Mental illness trends such as depression and anxiety were two disorders that present in the middle of positive mental health trends in Fig. 6. Articles of mental illness reached their top publication around 2021 in the middle of the pandemic
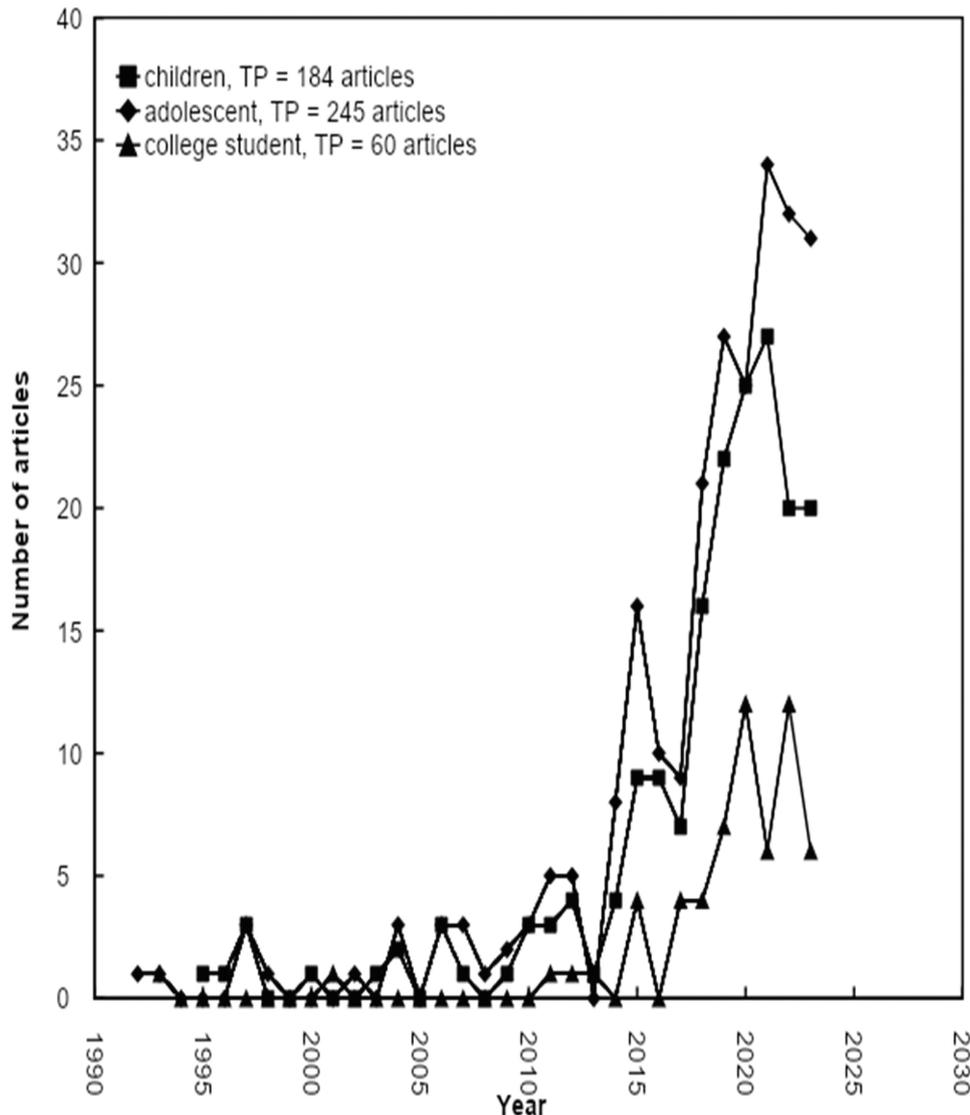
FIGURE 5. The development trends of three main research focus on positive mental health research.

COVID-19 and followed by a declined in the next two years. Meanwhile, research trends on positive mental health were not as high as the mental illness trends. The articles on resilience trends reached their peak around 2021 and then decreased in the next two years while the mindfulness and mental health literacy had low numbers in publications.

Research foci'
The most crucial information regarding the research is communicated by the paper title, author keywords, abstract and *Keywords Plus*. Word distribution analysis is therefore highly helpful for evaluating research area study focuses and their development patterns [78]. Previous studies suggested word distributions in author keywords, *Keywords Plus*, and publication titles and abstracts during the past ten years to identify study areas and trends in their development [78,79].

Except for search terms, Table 7 shows the most popular author keywords in the field of well-being research and how they were distributed over four sub-periods (1992–1999, 2000–2007, 2008–2015, and 2016–2023). The most often occurring author keywords in 113, 72, 62, 55, and 43

papers, respectively, were "depression," "resilience," "COVID-19," "anxiety," and "social support".

Discussion

The most popular keywords, according to the results of this original bibliometric analysis on positive mental health, are "depression," "resilience," "COVID-19," "anxiety," and "social support." These author keywords could be a sign of the future of this field's current and future research. Scientists can focus on these subjects to gain more new insights and citations. The majority of positive mental health studies are started in the United States and the United Kingdom, followed by Australia and Canada, as well as their publication. These nations use English as the primary language, therefore, their publication was produced in English that made articles about positive mental health over the globe mainly in English.

Characteristics of document types
Most publications on positive mental health were in English, with 91% (n = 1205) of all articles, followed by non-English
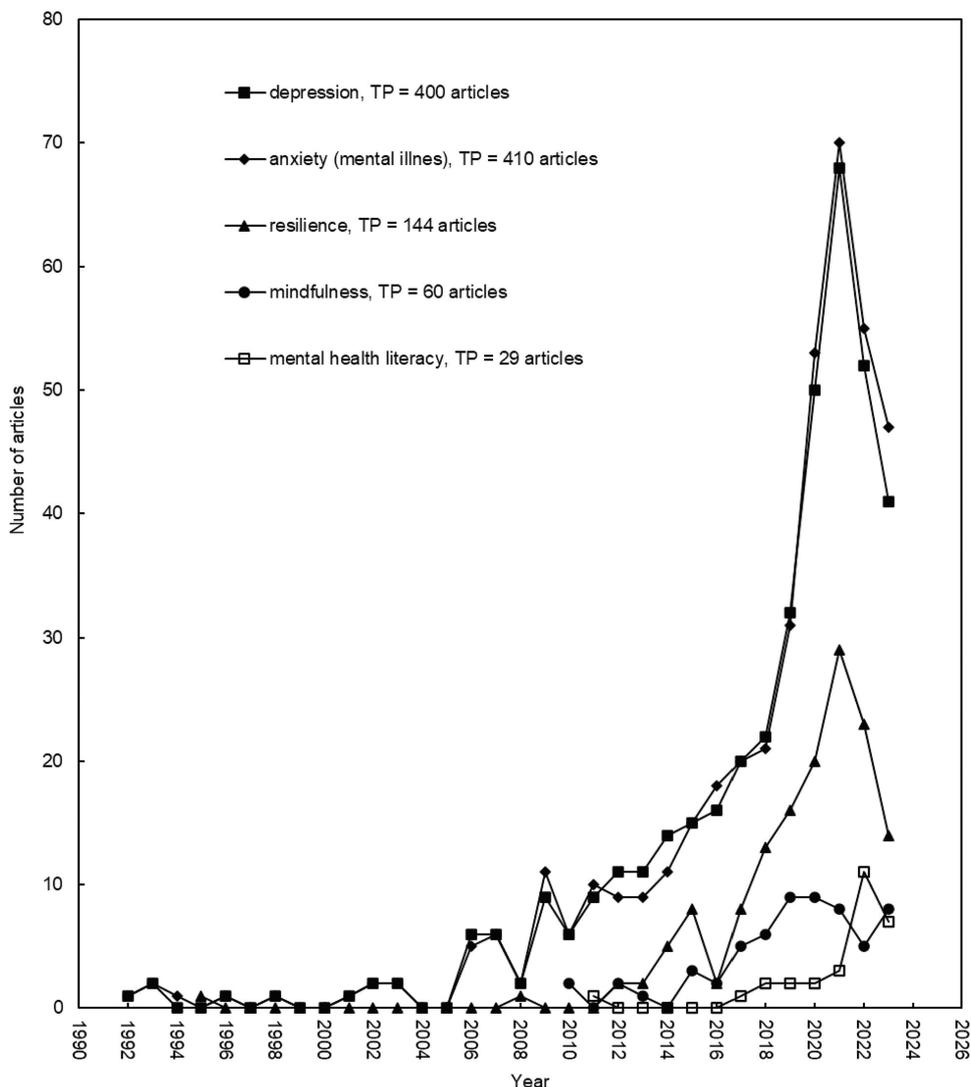
FIGURE 6. Research trends of mental illness (depression and anxiety) and positive mental health related (resilience, mindfulness, and mental health literacy).

TABLE 7

The top 20 author keywords in terms of usage

Author keywords	TP	1992–2023 Rank (%) n = 1075	1992–1999 Rank (%) n = 8	2000–2008 Rank (%) n = 35	2009–2015 Rank (%) n = 187	2016–2023 Rank (%) n = 845
Depression	113	1 (11)	N/A	N/A	1 (13)	1 (11)
Resilience	72	2 (6.7)	N/A	N/A	4 (4.3)	2 (7.6)
COVID-19	62	3 (5.8)	N/A	N/A	N/A	3 (7.3)
Anxiety	55	4 (5.1)	N/A	N/A	9 (3.2)	4 (5.8)
Social support	43	5 (4.0)	N/A	3 (5.7)	9 (3.2)	5 (4.1)
Stress	41	6 (3.8)	N/A	10 (2.9)	2 (5.9)	9 (3.4)
Adolescents	40	7 (3.7)	N/A	N/A	9 (3.2)	6 (4.0)
Adolescence	37	8 (3.4)	N/A	3 (5.7)	13 (2.7)	8 (3.6)
Physical activity	35	9 (3.3)	N/A	N/A	9 (3.2)	9 (3.4)
Mindfulness	34	10 (3.2)	N/A	N/A	22 (1.6)	7 (3.7)
Flourishing	33	11 (3.1)	N/A	10 (2.9)	4 (4.3)	11 (2.8)

(Continued)

Table 7 (continued)

Author keywords	TP	1992–2023 Rank (%) n = 1075	1992–1999 Rank (%) n = 8	2000–2008 Rank (%) n = 35	2009–2015 Rank (%) n = 187	2016–2023 Rank (%) n = 845
Positive psychology	32	12 (3.0)	N/A	10 (2.9)	4 (4.3)	12 (2.7)
Quality of life	27	13 (2.5)	2 (13)	3 (5.7)	4 (4.3)	19 (1.9)
Mental health promotion	23	14 (2.1)	N/A	N/A	3 (4.8)	24 (1.7)
Youth	23	14 (2.1)	N/A	N/A	13 (2.7)	15 (2.1)
Health promotion	21	16 (2.0)	N/A	N/A	22 (1.6)	15 (2.1)
Mental health literacy	21	16 (2.0)	N/A	N/A	N/A	13 (2.5)
Self-compassion	20	18 (1.9)	N/A	N/A	102 (0.53)	14 (2.2)
Children	19	19 (1.8)	N/A	N/A	44 (1.1)	18 (2.0)
Life satisfaction	19	19 (1.8)	N/A	3 (5.7)	102 (0.53)	19 (1.9)

Note: *TP*: quantity of articles; %: percentage in each periode.

articles with the rest percentage. This is not surprising because most research about positive mental health is delivered in English-speaking countries such as the USA. For example, one of papers related to positive mental health was from various institutions in the USA [73]. Moreover, non-English speaking countries such as Germany was among the highly productive nations with article publications in English since there is a connection between European identity and English as a lingua franca [80]. Furthermore, because English is the language of publication for international journals [81] scientists are compelled to publish in English in order to make their results that are more widely known and, consequently, cited by others. It is strengthened by the data that articles in English were cited more (CPP_{2023} = 31 citations) than non-English articles (CPP_{2023} = 3.9 citations).

Characteristics of publications outputs
Previous study [53] suggested displaying development trends and the influence of publications in their particular field of study utilizing the correlation between the yearly count of articles (*TP*) and the average quantity of citations per publication (CPP_{year}). Although there was no discernible pattern in the positive mental health research sector, there was a notable spike in publication between 2016 and 2022. An article by Wood's research team from 2017 indicated that positive mental health may be the reason for this rise [70]. This paper emphasized positive mental health can be correlated to other variables, e.g., public green spaces. Their TC_{2023} score was 292 (ranked 3rd) and their C_{2023} score was 61 (ranked 2nd). Another exploratory study revealed that resilience against psychopathology is demonstrated by the capacity for self-compassion, especially in people with high levels of excellent or positive mental health [75]. Their TC_{2023} score was 155 (ranked 8th) and their C_{2023} score was 24 (ranked 9th). A noteworthy discovery was that, despite just one publication in 2017, the TC_{2023} score was 292 (ranked 3rd) and was attributed to the article by Wood's research team [70]. This paper offered a more sophisticated account of positive mental health and public green spaces; therefore, it is reasonable to conclude that it is one of the most significant publications on the subject of positive mental health.

Web of Science category and journal
The attributes of a research topic in Web of Science categories are determined by CPP_{year} and *APP*, as previously explained [57,67]. As anticipated, "public, environmental and occupational health," "psychiatry," "multidisciplinary psychology," and "clinical psychology," accounted for 76% of all articles in the Web of Science category with the highest productivity, since positive mental health is closely related to psychiatry and clinical psychology.

The articles published in the four categories had a similar pattern, of which had a low number from 1992 to around 2014, but the publications increased significantly around 2015 until 2021. All categories, except clinical psychology, declined in the following years. Theories in social sciences usually were confirmed through their measurement tools. The inclination since 2015 could be gained from the previous findings of positive mental health measurement [1,64] that confirmed the theories about positive mental health or mental well-being. Therefore, the development of theories and measurement tools about positive mental health became the main source of references in the later publications.

Moreover, the journals with the greatest publications were the International Journal of Environmental Research and Public Health, Frontiers in Psychology, Journal of Affective Disorders, and BMC Public Health (which also explains why the writers selected those journals). Researchers can connect with both professional mental health care and the general public interested in the topic on positive mental health because of the reach of these periodicals.

Publication performances: country and institutions
Theories and scales related to positive mental health developed earlier in the USA and Europe. Its development stimulated more publications in both regions. Therefore, Europe and America, particularly the USA, led the publication in the field of positive mental health. Meanwhile, the highest publication on positive mental health in Africa is South Africa. One reason that made South Africa as the most productive nation in the publication of positive mental health issues was the publication of MHC-SF which was done in the context of

the South African sample. It motivated researchers in South Africa [82–84] to use the same measurement scale in various samples which resulted in more publications. Moreover, the MHC-SF cross-cultural studies of a 38-nation study demonstrated its fit structures and could be applied in many countries [85], which in turn stimulated more publications in many regions about positive mental health.

According to the country's citation performance, the Netherlands led the citation of publication in positive mental health. One of the publications from the Netherlands was Lamers' research team that was previously mentioned from the University of Twente which collaborated with Keyes from Emory University, USA, the author of MHC-SF. The study revealed a good evaluation of MHC-SF. Therefore, it gained remarkable achievement in its publication. Moreover, one of the publications about mental well-being from the UK was published by Tennant's research team [64] which involved collaboration among researchers from various institutions in the UK, which made its publication produce the greatest citations for single-country articles and corresponding-author publications in 2023. For single-author publications, the USA led the CPP_{2023} with 90 citations since Keyes as the author of MHC-SF is an American scientist who produced highly cited articles on positive mental health. Additionally, English papers received more citations since it is the number one language over the globe that could be understood easily by many readers compared to other languages such as Spanish.

Moreover, the USA was on the top publication with 386 articles that showed its pioneer and high concern in the issue of positive mental health. The theories and measurement of positive mental health developed in the USA [1,8] stimulated many publications. Furthermore, the UK was another pioneer in the field and had already produced theories and scales related to positive mental health [64], which in turn resulted in high publication. They were followed by Australia, Canada, Germany and China, respectively. This evidence revealed that all countries with the highest publications on positive mental health were developed countries that showed high awareness towards the field. Meanwhile, the developing countries were not top producers in positive mental health publications, which revealed that they lack awareness of this issue. Therefore, developing countries should learn from developed countries that produced high publications on positive mental health.

In terms of institution, RUB as the leader in the total publication came from its single institution publication and collaboration with another institution. Furthermore, authors from RUB led as the first author and corresponding author in their publication. It revealed that authors from RUB had the most contribution in their publication and became a key person for further research. Single institution should promote research and publication on positive mental health in their internal institution to gain more citations compared to collaboration with another institution. Institutions need to be independent in publishing articles to get more recognition. Meanwhile, the Chinese University of Hong Kong in China had the highest number of single-author articles which revealed that authors from the mentioned university preferred to do individual research. It influenced

the high publication tradition, including single-author articles in the field of positive mental health.

Furthermore, U Warwick had more collaboration and involved more authors in their publication which made their publication gain high recognition in four categories. The fundamental reason for its high citation was it produced a theory and measurement scale for mental well-being, e.g., the WEMWBS [64] that motivated authors from U Warwick to publish articles related to mental well-being or positive mental health. Meanwhile, Keyes as the author of the theory and measurement of positive mental health came from Emory U [8]. Therefore, Emory U was recognized among authors and gained high citations for both single-institution and single-author articles.

Citation histories of the 10 most frequently cited articles
The total quantity of citations was updated on a periodic basis by the Web of Science Core Collection. As a result, it is advised to utilize the Web of Science Core Collection's total quantity of citations from the year of publication till the conclusion of the latest year (in this case, 2023) directly from the database. In this analysis, there were summaries of six out of ten top studies. First, the purpose of the study by Lamers' research team [69] was to examine positive mental health scales, namely the MHC-SF based on discriminant validity, convergent validity, reliability, and structure. The MHC-SF is based on the theory of positive feelings (EWB), and positive functioning in both community life (SWB) and individual life (PWB) [1]. The study used 1662 Dutch respondents who drew from an online panel used for long-term online social science research (LISS panel of Center data in Tilburg, the Netherlands). The result of the Confirmatory Factor Analysis (CFA) supported discriminant validity that positive mental health and mental illness were correlated but distinct concepts while convergent validity was proved by the three subscales of MHC-SF that correlated. The study showed moderate test-retest and high internal reliability. Moreover, the CFA showed that MHC-SF has three-factor structures, e.g., psychological, emotional, and social well-being.

The study by Lamers' research team above is highly cited because it provided robust validation for the MHC-SF This paper can be highly cited because it proved the positive mental health theory through a shorter version scale e.g., MHC-SF. The measurement tool for positive mental health was still limited at that time. It stimulated many scientists from various countries interested in investigating the new assessment scale for positive mental health. Therefore, the study of Lamers' research team as the pioneer in investigating MHC-SF became one that is highly cited. Fig. 4 shows that the citation of Lamers' research team inclined significantly in 2015 that was several years after its publication and reached its peak in 2021, which implies that MHC-SF was confirmed as a good scale in the field of positive mental health, making this validation significant for researchers.

Moreover, the study by Keyes' research team [72] aimed to investigate whether changes in the level of mental health influenced mental illness. The study involved 1723 Midlife in the United States (MIDUS) which showed that mental

illness was at a low level if people had good mental health while mental illness increased if people experienced a decline in their mental health. This study used the Composite International Diagnostic Interview-Short Form (CIDI-SF) based on DSM, Fourth Edition Text Revised (DSM-IV-TR) to measure mental illness. On the other hand, mental health, particularly EWB, was measured by six items of the positive affect scale from Bradburn and by a single item of satisfaction in life from Cantril. Meanwhile, PWB from Ryff and SWB from Keyes were used to measure positive functioning. It can be concluded that the mental health measurement in this study had similarity to the original study Therefore, this study had great attention from many scientists and gained high citation.

Furthermore, Keyes' research team [72] were highly cited because it provided empirical evidence that good mental health can reduce the prevalence of mental illness, a significant finding in the field of mental health research. The similarity in measurement tools to those used in Keyes' research team in South African sample and Lamers' research team in Dutch sample allowed for comparative studies and cross-validation, further contributing to its high citation rate. The study's comprehensive approach, using well-established scales for assessing both mental health and mental illness, makes it a valuable resource for researchers in this field. Fig. 4 showed that the citation trends for this study are similar to those of Lamers' research team. Citations increased significantly around 2015, peaked in 2021, and then declined in subsequent years. This pattern suggested that the study gained substantial recognition and use in the research community over time, coinciding with the growing acceptance of the measures and findings related to mental health and illness.

The next highly cited article was Wood's research team [70]. The study aimed to evaluate the relationship between positive mental health and public green spaces. The study revealed that there was a correlation between them, with various results that were mostly significant ($p < 0.05$). The positive mental health was measured by WEMWBS which had theoretical roots from hedonic and eudaimonic. This theoretical foundation was also found in the MHC-SF. Theory of hedonic and eudaimonic had been used in the field of positive mental health during its development. Both scales, the MHC-SF and WEMWBS, had the same fundamental theoretical background in measuring positive mental health. Therefore, it can be one of the reasons that this publication attracted attention and had high citations. Moreover, the theory and the WEMWBS as the measurement tool for positive mental health have proved that it can be related to other variables e.g., public green spaces. Fig. 4 showed that this publication reached a significant increase in citations in the following years after its publication in 2017 and gained a peak in citations in 2021, but unfortunately, it declined a little bit in the next two years.

Another highly cited study was Keyes' research team [73]. The study revealed that the degree of positive mental health separates students with and without a current mental illness in terms of their risk of suicidal conduct and academic impairment. Students who were tested positive for

a mental disorder at this time, faced an increased chance of acting suicidally and experiencing difficulties in their studies. The study showed that MHC-SF as a measurement tool for positive mental health can be correlated with other measurements, e.g., Patient Health Questionnaire. The MHC-SF demonstrated that it was eligible to be used with other scales. Since measurement tools for positive mental health were still limited, it stimulated many scientists to cite and use the MHC-SF in their reference to measure positive mental health. Therefore, it gained much attentions and reached high citations. Fig. 4 revealed that during early of its publication in 2012 to 2017 this study earned low citations, but its citation inclined for the next five years until 2022, unfortunately, it slightly declined in the following year.

On the other side, the study by Antaramian's research team [74] highlighted that to fully assess a person's psychological adjustment, a dual-factor mental health model combines measurements of psychopathological symptoms with markers of positive subjective well-being (SWB). To ensure the best possible academic achievement, both positive well-being and the absence of psychopathology indications were required. These findings emphasized the significance of understanding the links between people's mental health and educational outcomes by taking into account both traditional negative determinants and positive measures of well-being. This study can be highly cited since it referred to subjective well-being theory, which was one of the fundamental theories in positive mental health. An individual's subjective well-being is a reflection of his or her overall life satisfaction and the general frequency of both happy and negative feelings [86]. The theory of subjective well-being had similarity to EWB which already attracted much attention from scientists from the previous explanation. Moreover, the study involved two different factors, e.g., psychopathology and positive mental health, which made the position of both factors clearer in the field of mental health. Additionally, this study involved many measurements that correlated with each other in particular which delivered insights for future studies. Therefore, many scientists referred to this study as their reference in the field of positive mental health. Fig. 4 revealed that during its early publication in 2010 until 2018, the citations were consistent in the low number, but it inclined significantly in 2019 and then decreased in 2020. However, the citations increased again in 2021 and slightly dropped in the following two years.

Additionally, the next exploratory study by Trompetter's research team [75] looked into whether self-compassion serves as a resilience mechanism and adaptive emotion regulation strategy that shields people with high levels of positive mental health against psychopathology because it consistently provides a kind, accepting, and situational context for negative experiences. Findings implied that self-compassion abilities were a sign of resilience against psychopathology, particularly in those with high levels of good or positive mental health. Moreover, MHC-SF was one of the instruments in the study that had already gained popularity in the field of positive mental health. Therefore, it attracted many scientists to cite this article. Fig. 4 showed that since its publication in 2017, the citations of this study

inclined significantly and reached its peak in 2022, but unfortunately, it slightly declined in 2023.

From the six articles above, most of them reached their peak of citations in 2021–2022, which was during the COVID-19 pandemic. The pandemic which influenced all people in the world seemed to draw the attention of many scientists towards positive mental health. It became trends research that developed the theories, measurement tools, and correlation towards some variables. Therefore, the citation trends remarked significant progress on positive mental health.

Main research focus on positive mental health
The research focus on positive mental health drew high attention among researchers from 2015 to 2021 in the sample of children and adolescents while in the sample of college students occurred between 2015 and 2022. The research trends dropped around 2021 and 2022 which happened coincidentally with the COVID-19 pandemic while other researchers focused on pandemic related research. Research articles on positive mental health in adolescents gained the top publication since this development stage is full of problems such as identity development [87] and stressful life events which influence identity development [88] that attracted many scientists to explore the issues. Furthermore, the second highest number of articles were documents with the sample of children since this development stage contains early life problems such as excessive screen time which is associated with developmental delay, behavioral and conduct problems, learning disability, *et cetera* [89]. Meanwhile, college students have more life skills to solve their own problems. For instance, in comparison to students who attended live online classes utilizing teacher-based approaches, Problem Based Learning (PBL) students demonstrated higher levels of learning attainment, problem-solving abilities, and live online class interaction [90]. Therefore, college students had fewer problems and drew less attention from researchers.

Research trends on mental illness and positive mental health
The number of mental illness and positive mental health-related research declined in recent years, probably it was influenced by the pandemic condition that limited researchers from doing offline surveys. Meanwhile, people had boundaries to meet other people during the pandemic COVID-19 which influenced their availability to become research participants. Moreover, research methods in positive mental health can be combined between surveys, Focus Group Discussions (FGD), interviews, and experiments. These methods could not be delivered during the pandemic that influenced research productivity. It was supported by the finding that significantly less non-COVID-19 research was published in tandem with a sharp increase in COVID-19 publications [91].

Research foci
According to Mao's research team [92], word cluster analysis was used to determine the main study focuses and their developmental trends. Using the results of word analysis as a base word bank, word cluster analysis was used to evaluate the main research emphases in the field of positive mental health.

The primary research foci within the field of positive mental health were assessed through word cluster analysis, utilizing the outcomes of word analysis including words in the title and abstract, author keywords, and *Keywords Plus*, as a foundational word bank. Three possible main research topics in positive mental health were found to be "children" supported by words, for example, child, childhood, and children. "Adolescent" is supported by words, for example, adolescent, adolescents, boy, boys, girl, girls, teen, teenager, teenagers, teens, youth, and youths. "College student" is supported by words, for example, college and colleges.

Study limitations
This bibliometric analysis only used SSCI of Clarivate Analytics' Web of Science Core Collection database which made the database limited while there are some other databases available (e.g., PsycInfo, PubMed, ProQuest, Scopus). WoS Core Collection tends to focus on English journals. Unfortunately, many journals in other languages can provide more databases. This study focused on articles-type documents while there are some other types of documents uncovered in this study such as theses, proceedings, or gray literature. Moreover, the time frame in this study was between 1992 and 2023 while some studies published before 1992. Notwithstanding all of these present drawbacks, the study offers perceptive observations regarding the state of affairs and future directions for this developing field.

Conclusions and Implications

Using data from the Web of Science Core Collection directly for a bibliometric study can lead to significant errors, as observed when checking publication years and applying the "front page" filter. The average number of citations for reviews was found to be about double that for articles. Therefore, scientists need to examine data carefully. Development trends for the top two productive categories, "public, environmental, and occupational health" and psychiatry, were similar. Articles were published in a wide range of journals within the SSCI. The USA dominated in publication volume, while China has emerged as a top productive country in recent years. The USA was a pioneer in the concept and measurement of positive mental health. Another country can learn to investigate positive mental health concepts and its measurement tools according to their own country to produce more publications. Moreover, international collaborative articles with the Netherlands garnered more citations, and the UK had the highest average number of citations per publication for single-country articles. The University of Warwick in the UK showed the highest impact in total articles, collaborative articles, first-author articles, and corresponding author articles. The Ruhr University of Bochum in Germany ranked the highest in five publication indicators, excluding single-author articles. University institutions can learn to produce more publications based on single-institution articles, inter-institutionally collaborative articles, first author articles, corresponding author-article, and single-

author articles. The interest in positive mental health has increased significantly in the last decade, with the most cited article published in 2003 [66] The most frequently cited positive mental health-related article was by Neff [66], while an article directly addressing positive mental health was authored by five researchers from the University of Twente in the Netherlands and Emory University in the USA [69]. The main research topics identified were children, adolescents, and college students. Therefore, scientists need to explore more on these issues.

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