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Review and forecast on research emphases and research trends (Part-II)

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Assessment of global law and psychiatry research in the period of 1993-2012

Review and forecast on research emphases and research trends (Part-II)

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Abstract

Purpose – The purpose of the present study is to analyze highly cited articles and global research emphases and trends of law and psychiatry (L&P) research during the period of 1993 to 2012 from the Web of Science (WOS) database. Besides the analysis of highly cited articles to learn about the classic articles and intellectual base of the L&P research domain, an attempt is made to detect research emphases and trends of the study field.

Design/methodology/approach – The present study applies quantitative analyses of citations of scientific publications to find highly cited articles and summarizes research hotspots and trends on L&P research articles from WOS during 1993-2012 using statistical analysis of words in titles, KeyWords Plus, author keywords and co-keywords.

Findings – The top 21 highly cited articles of research on L&P were found; most of the highly cited papers used survey research to measure patterns of violence of psychiatric patients. This present study identified forensic psychiatry, mental health and criminal offenders were the continuing mainstream topics in the L&P field and risk assessment, risk factors and risk management of violent behavior, legislation for sexual offences, mental health courts, recidivism and expert testimony were recent research emphases and trends of the study field. On the contrary, psychiatric hospitalization, psychiatrist-patient, community and services were not mainstream topics in the study field and were of decreasing importance and popularity in L&P research. Additionally, the topics of violent behavior and risk assessment have developed to a significant subgroup of L&P research. Finally, research emphases and trends in the L&P field were found based on the co-keywords cluster map and density map.

Originality/value – This is the first study to quantify and detect research emphases and trends in L&P from the WOS during 1993-2012, which may provide the groundwork for future studies of the L&P research domain, and offer some important suggestions and implications for professional researchers, specialists, publications' editors and public policy makers concerned with the domain.

Keywords Data analysis, Research trend, Collaboration, Bibliometrics, Information resources management, Co-word analysis, Research emphases

Paper type Research paper



Introduction

Law and psychiatry (L&P) research provides an interdisciplinary exploration between L&P. L&P has become more important today; however, there are few comprehensive categorization analyses and studies to detect the research hotspots of this domain. According to the prior study (Lv, 2017), data analysis of publication outputs demonstrated that research in L&P has attracted more and more attention in scientific communities lately and is now an important field of cross subject research. Therefore, it is necessary to detect research emphases and trends of the study field. The purpose of the present paper is to provide a quantitative analysis of L&P research emphases and trends from 1993 to 2012 using Web of Science (WOS) database. Specifically, this paper aims to identify highly cited articles and summarize global research hotspots and trends based on analysis of title-words, KeyWords Plus and author keywords, which may serve as a potential guide for future related research.

Literature review

There is a great diversity of methods and techniques that may be used for summarizing research hotspots and trends. Crawford *et al.* (2003) applied qualitative research methods in general medicine and psychiatry to analyze publication trends in medical journals 1990-2000. Igoumenou *et al.* (2014) examined publication characteristics and citation practices in articles published in 50 psychiatric and relevant clinical neurosciences journals indexed in WOS. Zhang *et al.* (2015) drew on the keywords network and its spatial structure of major research topics and paradigms by using K-core of SNA, co-word analysis, MDS and the functions of software UCINET 6.0 and NetDraw. Munoz-Leiva *et al.* (2015) visualized conceptual sub-domains and identified the most salient themes within integrated marketing communications research through combining co-word analysis and science mapping. Wang *et al.* (2015) explored the evolution of social network in marketing research by analyzing the co-occurrence index and network structures of keywords. A co-word analysis was conducted to examine research patterns and trends of recommendation systems in China (Hu and Zhang, 2015). Zhuang *et al.* (2015) revealed research trends and hotspots in soil erosion using keyword analysis. Xie *et al.* (2008) provided world aerosol research trends and recent hotspots by contrastive analysis of author keywords, words in title and KeyWords Plus. Co-words analysis, hierarchical cluster analysis, strategic diagram and social network analysis were adopted to reveal the characteristics and status on social media research in China (Gan and Wang, 2015). In addition to co-keywords research method analysis to identify scientific research hotspots and trends, the co-citation analysis method can also be used to extract research themes and trends. Serenko and Dumay (2015) analyzed research trends according to citation classics published in knowledge management journals. Citation network analysis methodology is used to identify major research trends in fuel cell technologies (Ho *et al.*, 2014). In addition, Citespace software was used to study international anticancer research trends via document co-citation visualization analysis (Xie, 2015). Fava and Ottolini (2004) disclosed international trends in psychiatric research by citation analysis.

Data sources and methodology

The data for this present paper are retrieved from WOS provided by Thomson-Reuters. WOS is considered to be a reliable and stable source (Khan, 2013). Web of Science Category (WC) is a field tag of WOS and can be used in advanced search (as the "WC" = field tag) to narrow the search to specific fields of study. According to previous research (Lv, 2017), a total of 2,852 publications related to L&P in WOS were retrieved using the following

advanced search query in the WOS database: WC = Psychiatry and WC = Law and Timespan = 1993-2012, and Databases = Science Citation Index Expanded, Social Sciences Citation Index, Arts and Humanities Citation Index, Conference Proceedings Citation Index-Science and Conference Proceedings Citation Index-Social Science and Humanities. The category of psychiatry covers resources that focus on the origins, diagnosis and treatment of mental, emotional or behavioral disorders and category of law covers resources from both general and specialized areas of national and international law. The database retrieval data was December 18, 2013. This paper focuses on 1,864 academic journal articles in the following study, whereas all others document types were discarded. The WOS times cited count (TC) from the WOS database was used for finding highly cited articles (Ho, 2014; Ho and Kahn, 2014). The VOSviewer (version 1.5.5) was used for constructing and viewing bibliometric science maps (Waltman *et al.*, 2010; Van Eck and Waltman, 2011; Van Eck *et al.*, 2010).

Results and discussion

Highly cited articles

One of two well-known applications of quantitative analyses of citations of scientific publications is determination of the scientific impact of publications, especially journal articles (Elsinghorst, 2005). Information on the most cited papers in a topical field provide important data on the development of the field (Konur, 2011). Bibliometric analysis of highly cited papers can provide interesting insights concerning authors, institutions, collaboration patterns and even useful recommendations for future research policy (Chuang and Ho, 2015; Ho, 2013, 2014; Ho and Kahn, 2014). In addition, analysis of highly cited articles can help researchers to discover the classic articles and intellectual base of a specific research domain, and these articles have laid the groundwork for future studies of research on L&P. Therefore, the top 21 highly cited articles which were cited more than 50 times were determined through the same citation tool. The citation details for these papers are given in Table I in the decreasing order of WOS TC.

According to the Table I, it was found that Browne *et al.* (1999) takes the first place with the most citations (119). Browne *et al.* (1999) demonstrated that violence across the lifespan for women incarcerated in the general population of a maximum security prison is pervasive and severe. Rasmussen *et al.* (2001) wrote on a similar topic and was highly cited with 51 cites. Kessler *et al.*'s (2001) paper, the second most highly cited paper (118), reported patterns and mental health predictors of domestic violence in the USA based on results from the National Comorbidity Survey. The two most highly cited papers are also the longest.

Monahan *et al.* (1995) has been cited 101 times and ranks third. In terms of cited reference counts, this article ranked first with 78. The article addressed a prior and more basic empirical issue in the study of mental hospital admission: coercion as a dependent variable. Three other highly cited papers had a similar research focus (de Girolamo and Cozza, 2000; Hiday *et al.*, 1997; Hoge *et al.*, 1997). These are also the important documents of mental hospital admission in this research field. In addition, these three top-cited articles have been cited more than 100 times together and were all published in *International Journal of Law and Psychiatry*.

There are several other sub-specialty research topics covered among the top 21 highly cited articles in Table I, namely, adolescent and child neuropsychiatric disorders (Kimonis *et al.*, 2008; Rogers *et al.*, 1997; Siponmaa *et al.*, 2001), schizophrenia (Buckley *et al.*, 1995; Buckley *et al.*, 1997; Kienlen *et al.*, 1997; Rice and Harris, 1995), treatment for offenders (Smith and Burger, 1997; Hollin, 1999; Wilson *et al.*, 1995), assessment and prediction of

Rank	TC	Author(s)	Year	Journal name	Page count	Cited reference count
1	119	Browne <i>et al.</i>	1999	<i>Int. J. Law Psychiatr.</i>	22	57
2	118	Kessler <i>et al.</i>	2001	<i>Int. J. Law Psychiatr.</i>	22	74
3	101	Monahan <i>et al.</i>	1995	<i>Int. J. Law Psychiatr.</i>	15	78
4	89	Kienlen <i>et al.</i>	1997	<i>J. Am. Acad. Psychiatry Law</i>	18	16
5	84	Rice and Harris	1995	<i>Int. J. Law Psychiatr.</i>	10	39
6	83	Appelbaum	1997	<i>J. Am. Acad. Psychiatry Law</i>	15	31
7	82	Serin and Amos	1995	<i>Int. J. Law Psychiatr.</i>	8	26
8	81	Buckley <i>et al.</i>	1995	<i>Bull. Amer. Acad. Psychiat. Law</i>	5	24
9	75	Kimonis <i>et al.</i>	2008	<i>Int. J. Law Psychiatr.</i>	12	69
10	64	Hoge <i>et al.</i>	1997	<i>Int. J. Law Psychiatr.</i>	15	19
11	63	Hollin	1999	<i>Int. J. Law Psychiatr.</i>	12	75
12	59	Hiday <i>et al.</i>	1997	<i>Int. J. Law Psychiatr.</i>	15	59
12	59	Smith and Burger	1997	<i>J. Am. Acad. Psychiatry Law</i>	7	22
12	59	Wilson <i>et al.</i>	1995	<i>Int. J. Law Psychiatr.</i>	9	16
15	58	Buckley <i>et al.</i>	1997	<i>J. Am. Acad. Psychiatry Law</i>	9	34
16	57	Mulvey and Lidz	1995	<i>Int. J. Law Psychiatr.</i>	15	68
17	56	Siponmaa <i>et al.</i>	2001	<i>J. Am. Acad. Psychiatry Law</i>	7	43
18	53	de Girolamo and Cozza	2000	<i>Int. J. Law Psychiatr.</i>	18	70
19	52	Rogers <i>et al.</i>	1997	<i>J. Am. Acad. Psychiatry Law</i>	11	40
20	51	Poythress <i>et al.</i>	2002	<i>Int. J. Law Psychiatr.</i>	17	31
20	51	Rasmussen <i>et al.</i>	2001	<i>J. Am. Acad. Psychiatry Law</i>	8	41

Table I.
Top 21 highly cited
articles on L&P (1993
to 2012)

dangerousness (Mulvey and Lidz, 1995; Serin and Amos, 1995) and forensic psychiatry (Appelbaum, 1997; Poythress *et al.*, 2002).

Research emphases and trends: words in title, keyword plus and author keywords

Statistical analysis of words in title, KeyWord Plus and author keywords often contribute in the detection of research emphases and trends of science. The title of a paper always includes core information that authors would most like to express to their readers (Wang *et al.*, 2010). The words in title were statistically analyzed to discover information of the subjective focus and emphasis specified by authors. Recently, distribution of words in paper titles of different periods was applied to analyze research trends (Hsu and Chiang, 2015; Zhang *et al.*, 2010). All of the title words in L&P research-related articles (1,864) were statistically analyzed. The conjunctions, articles, prepositions and common words, such as “in”, “of”, “an”, “are”, “the” and “how” were excluded, as they were meaningless for further analysis of research emphases and trends. Meanwhile, to avoid overlapping and errors as much as possible, title words, such as offender and offenders; disorder, disorders and disordered; sexual, sexually and sexuality, were grouped into offender, disorder and sexual. The distributions and percentages of the top 28 words in title are presented in Table II. The most frequently used title words in the 20-year research period were “psychiatry” and “health”, whereas “mental” and “forensic” maintained a leading position across all periods, which indicated forensic psychiatry and mental health were the continuing mainstream topic in the study field. Several title words referring to offender matters, such as “criminal”, “sexual” and “violence”, showed twists and turns as an increasing trend in titles, whereas the terms “competency”, “commitment”, and “case” showed a decreasing trend in titles for all periods. It is noteworthy that “risk”, “assessment”, “court”, “offender” and “expert” have extremely high increasing rates in ranking of frequency, so themes, such as risk assessments for violence behavior, risk assessment of sex offenders, violence and risk

Title words	1993-2012 TPA	1993-2012 R (%)	1993-1997 R (%)	1998-2002 R (%)	2003-2007 R (%)	2008-2012 R (%)
Mental	333	1 (17.9)	2 (14.1)	1 (18.7)	1 (18.9)	1 (18.1)
Forensic	236	2 (12.7)	1 (20.7)	3 (11.9)	3 (10.4)	2 (11.5)
Psychiatry	191	3 (10.3)	3 (11.6)	2 (12.6)	2 (10.6)	5 (8.0)
Health	175	4 (9.4)	8 (6.5)	4 (9.1)	5 (9.3)	4 (10.8)
Offender	160	5 (8.6)	9 (6.2)	7 (6.9)	6 (8.3)	3 (10.9)
Treatment	138	6 (7.4)	4 (10.5)	12 (5.5)	4 (10.0)	11 (5.6)
Disorder	129	7 (6.9)	6 (7.3)	5 (7.1)	8 (6.8)	6 (6.8)
Criminal	105	8 (5.6)	9 (6.2)	10 (5.9)	19 (4.2)	8 (6.2)
Sexual	103	9 (5.5)	12 (5.1)	19 (4.3)	13 (5.3)	7 (6.6)
Law	96	10 (5.2)	27 (3.3)	12 (5.5)	9 (6.1)	14 (5.0)
Illness	95	11 (5.1)	32 (3.0)	5 (7.1)	11 (5.9)	18 (4.1)
Competency	92	12 (4.9)	15 (4.4)	12 (5.5)	7 (7.4)	31 (3.1)
Patient	88	13 (4.7)	6 (7.3)	12 (5.5)	14 (4.9)	31 (3.1)
Prison	85	14 (4.6)	46 (2.2)	18 (4.6)	19 (4.2)	10 (5.8)
Assessment	85	14 (4.6)	27 (3.3)	19 (4.3)	16 (4.5)	12 (5.3)
Personality	85	14 (4.6)	15 (4.4)	16 (5.0)	12 (5.5)	22 (3.7)
Psychiatric	83	17 (4.5)	11 (5.8)	8 (6.2)	44 (2.3)	16 (4.3)
Case	82	18 (4.4)	14 (4.7)	8 (6.2)	16 (4.5)	31 (3.1)
Expert	78	19 (4.2)	111 (1.1)	23 (3.9)	9 (6.1)	16 (4.3)
Violence	77	20 (4.1)	17 (4.0)	38 (2.5)	32 (3.0)	9 (6.1)
Risk	74	21 (4.0)	302 (0.4)	23 (3.9)	15 (4.7)	14 (5.0)
Hospital	67	22 (3.6)	5 (10.1)	36 (2.7)	32 (3.0)	71 (1.9)
Court	67	22 (3.6)	68 (1.8)	56 (2.1)	24 (3.6)	12 (5.3)
Rights	67	22 (3.6)	46 (2.2)	19 (4.3)	22 (4.0)	25 (3.4)
Evaluation	66	25 (3.5)	29 (2.9)	28 (3.4)	16 (4.5)	28 (3.2)
Commitment	65	25 (3.5)	17 (4.0)	11 (5.7)	32 (3.0)	58 (2.2)
Trial	61	27 (3.3)	46 (2.2)	30 (3.2)	23 (3.8)	25 (3.4)
Legal	60	28 (3.2)	21 (3.3)	30 (3.2)	44 (2.3)	19 (3.8)

Table II.
Top 28 most
frequency title words
for five-year periods

Notes: TPA = total published articles in the 20 years, R (%) = ranking of publications (percentage of all articles published in those years)

assessment tools and models and violence risk factors and risk management, court for sexual offences and psychosocial disabilities, legislation for sexual offences, mental health courts, expert witness practice, expert testimony, expert evidence and expert bias might be identified as current L&P research hotspots. Several title words referring to treatment matters, such as “patient”, “treatment” and “hospital”, showed a decreasing trend in titles for all periods, which indicated that psychiatric hospitalization and psychiatrist-patient are not currently mainstream topics.

KeyWords Plus are index terms, which augments traditional keyword or title retrieval, created by the Thomson Reuters informatics teams, and are derived from the titles of articles cited by the author of the article being indexed (Garfield, 1990). Research emphasis and trends could be roughly found by KeyWords Plus with their rankings and percentages in different periods (Wen and Huang, 2012; Xie *et al.*, 2008). A total of 1,346 (72.2 per cent) articles in WOS from 1993-2012 included KeyWords Plus terms and were analyzed. Except for “behavior”, “offenders” and “violence”, the most frequently used keywords for all periods were “prevalence” and “schizophrenia”, which indicated serious violence behavior; criminal offenders and mental health were the mainstream topics in the study field, and this agreed with the mainstream topics of the analysis of title words. Similarly, to the results of title

words, “violence”, “offenders”, “illness”, “law”, “disorder(s)”, “crime”, “competence”, “risk” and “personality” also appeared in top 28 most frequently used KeyWords Plus (Table III). “Prevalence” and “validity” were popular topics across all years. It can be concluded that the prevalence of mental disorders, prevalence of violent behavior and validity of the violence risk assessment tools received additional spikes of attention. The topics of violent behavior and risk assessment appear to have developed as a significant subgroup of L&P research, and this agreed with the trend of analysis of title words. While “perceptions”, “posttraumatic-stress-disorder” (PTSD), “people” and “personality” all had rapid growth from 1993 to 2012, these KeyWords Plus terms were given more attention in the most recent five years and can thus be identified as current L&P research trends. The aforementioned keywords and the term “meta-analysis”, which is an analysis method of research, went from 0 per cent use during 1993-1997 to 4.4 per cent over the period of 2008-2012. In addition, “recidivism” had become a new focus, the percentage of which increased from 2.1 per cent in the period of 1993-1997 to 5.5 per cent in the past five years, whereas the general areas of recidivism risk and offender recidivism assessment have been receiving more attention in the field over the past 20 years. On the contrary, a decline in the percentage of the KeyWords

KeyWords Plus	1993-2012 TA	1993-2012 R (%)	1993-1997 R (%)	1998-2002 R (%)	2003-2007 R (%)	2008-2012 R (%)
Behavior	108	1 (8.0)	1 (9.5)	3 (5.6)	1 (6.5)	2 (9.6)
Offenders	100	2 (7.4)	5 (5.3)	2 (6.8)	6 (4.9)	1 (9.9)
Violence	100	2 (7.4)	2 (7.9)	1 (10.5)	4 (5.5)	3 (6.9)
Prevalence	70	4 (5.2)	37 (2.1)	6 (4.9)	3 (5.9)	4 (6.0)
Schizophrenia	68	5 (5.1)	16 (3.2)	8 (4.1)	1 (6.5)	6 (5.3)
Children	62	6 (4.6)	6 (5.3)	6 (4.9)	9 (3.7)	7 (4.8)
Illness	59	7 (4.4)	25 (2.6)	4 (5.3)	4 (5.5)	11 (3.9)
Recidivism	58	8 (4.3)	37 (2.1)	11 (3.4)	9 (3.7)	5 (5.8)
Law	48	9 (3.6)	23 (2.6)	11 (3.4)	13 (3.4)	10 (4.1)
Community	47	10 (3.5)	3 (5.8)	10 (3.8)	25 (2.8)	18 (3.0)
Care	47	10 (3.5)	23 (2.6)	4 (5.3)	9 (3.7)	19 (2.8)
Disorders	45	12 (3.3)	52 (1.6)	11 (3.4)	7 (4.6)	17 (3.2)
Meta-analysis	45	12 (3.3)	N/A	20 (2.3)	8 (4.3)	8 (4.4)
Risk	44	12 (3.3)	11 (4.2)	65 (1.1)	13 (3.4)	11 (3.9)
Validity	42	15 (3.1)	52 (1.6)	65 (1.1)	9 (3.7)	9 (4.3)
Perceptions	40	16 (3.0)	37 (2.1)	16 (2.6)	39 (2.2)	11 (3.9)
Abuse	40	16 (3.0)	23 (2.6)	31 (1.9)	18 (3.1)	15 (3.5)
Crime	39	18 (2.9)	23 (2.6)	11 (3.4)	18 (3.1)	25 (2.7)
Disorder	38	19 (2.8)	7 (4.7)	20 (2.3)	18 (3.1)	34 (2.3)
Competence	37	19 (2.8)	16 (3.2)	20 (2.3)	49 (1.9)	16 (3.4)
Women	36	21 (2.7)	23 (2.6)	16 (2.6)	25 (2.8)	25 (2.7)
USA	34	22 (2.5)	16 (3.2)	31 (1.9)	39 (2.2)	19 (2.8)
Follow-up	33	22 (2.5)	12 (3.7)	20 (2.7)	60 (1.5)	25 (2.7)
Ill	32	24 (2.4)	3 (5.8)	20 (2.7)	31 (2.5)	69 (1.2)
Posttraumatic-stress-disorder	32	24 (2.4)	76 (1.1)	65 (1.1)	13 (3.4)	19 (2.8)
People	32	24 (2.4)	76 (1.1)	31 (1.9)	110 (0.9)	11 (3.9)
Services	32	24 (2.4)	16 (3.2)	8 (4.1)	60 (1.5)	46 (1.8)
Personality	29	28 (2.2)	76 (1.1)	31 (1.9)	39 (2.2)	25 (2.7)

Table III.
Top 28 most
frequency of
keywords plus used
for five-year periods

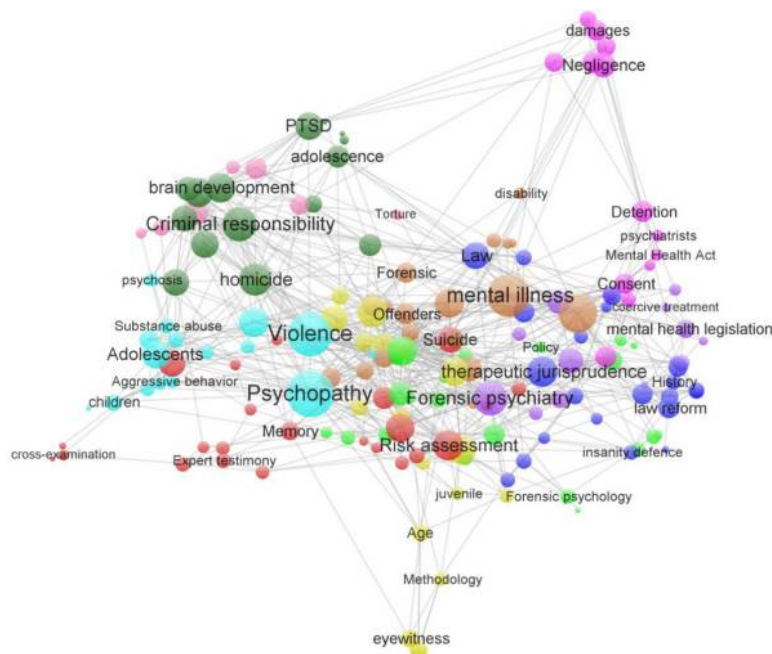
Notes: TPA = total published articles during the 20-year period, R(%) = ranking of publications (percentage of all articles published in the years), N/A = not available in the period

Plus terms “community”, “ill” and “services” was visible, which indicated their decreasing change in importance and popularity in L&P research. Finally, the ranking of KeyWords Plus terms, such as “children” and “women”, did not fluctuate distinctly, showing that children-related and women-related research has been relatively steady in the past 20 years.

Author keywords analysis has proven to be important for monitoring the development of science and the subject of a paper can be obtained from the author keywords by cluster analysis (Li *et al.*, 2009; Yao *et al.*, 2014). This study carried out an analysis of keywords and author co-keywords to gain insights into the emphases and trends of L&P research. Examination of author keywords in this study across all periods revealed that, altogether, a total of 1,616 author supplied keywords were used from the text-data set, among which 1,288 (79.7 per cent) appeared only once, and 159 (9.8 per cent) appeared twice. The high percentage of low frequency (at most appeared twice) author keywords might indicate a lack of research continuity in the study field. Another reason may be that these keywords might not be widely recognized between researchers, or there has a wide disparity in research interests between researchers. The three most frequently used keywords were “psychopathy”, “mental illness” and “forensic psychiatry”. Other highly-used keywords for all periods were “violence”, “human rights”, “therapeutic jurisprudence”, “mental health”, “aggression”, “risk”, “assessment”, “sex offenders”, “recidivism”, “assessment”, “mental disorder” and “prison”, which indicate that psychopathy-related, forensic psychiatry, mental health, risk assessment, sex offenders and recidivism were the research emphases in the study field. These foci topics agreed with the analysis result of title words and KeyWords Plus. However, the author keywords analysis was only for a total of 516 L&P articles with author keywords records, accounting for 27.7 per cent of the publications during the investigated 20-year period. Hence, the author keywords text-data corpus is only an approximate reflection of research emphases and trends of the study field. A total of 1,616 author keywords appearing in the collection papers were calculated, but only the top 169 author supplied keywords – those that occurred at least three times – had their occurrence frequencies computed. Although VOSviewer can display a map in three or four different ways, this study only uses the label and the density views to show research emphases and trends. Co-word cluster map of author keywords that occurred at least three times is shown with the label view in [Figure 1](#) based on author keywords co-occurrence relationships. By default, to avoid overlapping labels, only a subset of all of labels is displayed.

In [Figure 1](#), author keywords are indicated by their label and, by default, also by a circle. For each author keyword, the font size of the author keywords’ label and the size of the author keywords’ circle depend on the weight of the author keywords and links between different author keywords’ circle represent co-occurrence relationship. “Psychopathy”, “violence”, “mental illness”, “human rights”, “forensic psychiatry”, “criminal responsibility”, “homicide” and “risk assessment” appeared in the top eight weighted author keywords used. This is similar to the results of the title words and KeyWords Plus, which indicated these topics are mainstream topics in the study field. Each unique cluster is represented by a different color, and the distance between different author keywords represents similarities between them. According to [Figure 1](#), the top 169 author keywords were divided clearly into ten clusters that reflected the main research emphases in the L&P field over the past 20-year period as viewed through the WOS. The cluster distribution of the top 169 author keywords are presented in [Table IV](#):

- Cluster1 (red) defines risk assessment, sex offenders and expert testimony research emphasis with 23 author keywords. “Risk assessment”, “sex offenders”, “assessment”, “suicide”, “prevention”, “memory”, “public policy”, “expert testimony”, “evidence”,



Notes: Options dialog box of labels: No overlap check box is checked; both blurred background check box and Gradual appearance check box are not checked. Options dialog box of lines: use normalization check box is checked, lines can be displayed between any pair of items with non-zero link strength. Options dialog box of visualization: Items are colored based on the cluster colors

Figure 1.
The label view of co-words cluster map of author keywords that occurred at least three times

“preventive detention”, “child sexual abuse”, “expert evidence” and “expert witness” are the top 13 weighted keywords.

- Cluster2 (green) encompasses 22 author keywords and covers mental disorders, forensic psychology and PCL-R research. The top 13 weighted author keywords are “mental health”, “prisoners”, “mental disorders”, “sex offender”, “PCL-R” (short for psychopathy checklist-revised), “women”, “self-harm”, “schizophrenia”, “forensic mental health”, “epidemiology”, “forensic psychology”, “good lives model” and “offender rehabilitation”. The most extreme clusters are Cluster1 and Cluster2, which indicated that risk assessment, sex offenders, mental disorders and forensic psychology research were the most important subjects in L&P field. This result agreed with the mainstream topics of analysis of title words, KeyWords Plus and author keywords.
- Cluster3 (blue) is defined at the mental health law reform and psychiatry research focus and covers 21 author keywords. The top ten weighted author keywords are “therapeutic jurisprudence”, “law”, “ethics”, “law reform”, “community treatment orders”, “mental health law”, “psychiatry”, “guardianship”, “coercion” and “mental health court”.

Table IV.
Cluster distribution
of the top 169 author
keywords

Cluster	Author keywords
1	Risk assessment, sex offenders, assessment, suicide, prevention, memory, public policy, expert testimony, evidence, preventive detention, child sexual abuse, expert evidence, expert witness, research ethics, investigative interviewing, family court, reliability, sexual offender, cross-examination, sexual abuse, validity, malingering, child witnesses
2	Mental health, prisoners, mental disorders, sex offender, PCL-R, women, self-harm, schizophrenia, forensic mental health, epidemiology, forensic psychology, good lives model, offender rehabilitation, substance use, intimate partner violence, registration, policy, screening, depression, risk management, Megan's Law, forensic reports
3	Therapeutic jurisprudence, law, ethics, law reform, community treatment orders, mental health law, psychiatry, guardianship, coercion, mental health court, history, civil commitment, psychology, advance directives, insanity defense, diversion, child protection, procedural justice, mediation, confidentiality, Victims
4	Mental disorder, recidivism, treatment, sentencing, rehabilitation, offender, eyewitness, restorative justice, deterrence, age, lineup, culpability, arson, identification, gender, juvenile, fire-setting, methodology, youth, apology
5	Mental illness, human rights, prison, risk, offenders, personality disorder, personality, emotion, forensic, police, intellectual disability, criminal justice, disability, prisoner, crime, punishment, mental health courts, attitudes
6	Psychopathy, violence, aggression, adolescents, delinquency, children, female, substance abuse, conduct disorder, free will, psychosis, psychopathology, conduct problems, aggressive behavior, juvenile delinquents, eyewitness memory
7	Criminal responsibility, homicide, brain development, murder, trauma, PTSD, child abuse, forensic evaluation, attachment, adolescence, juvenile justice, cognition, impulsivity, terrorism, Prison bullying
8	Negligence, legislation, psychiatric injury, detention, consent, damages, causation, tort, mental harm, seclusion, restraint, Mental Health Act, psychiatrists, regulation
9	Forensic psychiatry, autonomy, capacity, mental health legislation, evaluation, involuntary treatment, violent offenders, decision-making, dangerousness, severe mental disorder, coercive treatment, patients' rights, mental health tribunals
10	Insanity, neuroscience, responsibility, mental impairment, irresistible impulse, psychologist, torture

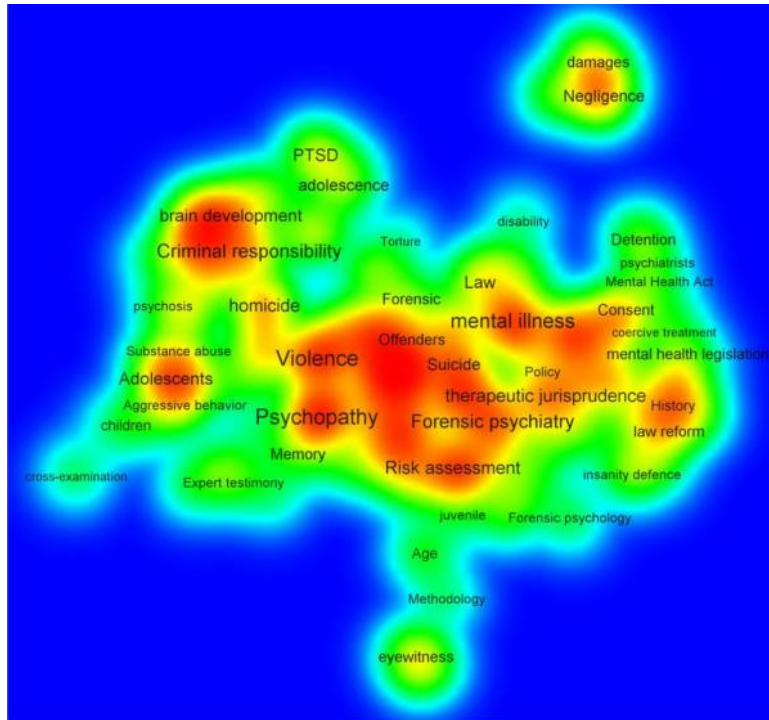
- Cluster4 (yellow) includes 20 author keywords encompassing the mental disorder offenders and recidivism research emphasis. "Mental disorder", "recidivism", "treatment", "sentencing", "rehabilitation", "offender", "eyewitness", "restorative justice" and "deterrence" are the top nine weighted keywords.
- Cluster5 (chocolate) incorporates personality disorder and mental illness prisoner research and includes 18 author keywords. The top nine weighted author keywords are "mental illness", "human rights", "prison", "risk", "offenders", "personality disorder", "personality", "emotion" and "forensic".
- Cluster6 (cyan) encompasses psychopathology and violence aggression behavior research, and includes 16 author keywords. The top eight weighted author keywords are "psychopathy", "violence", "aggression", "adolescents", "delinquency", "children", "female" and "substance abuse".
- Cluster7 (dark green) includes 15 author keywords and comprises the forensic evaluation and PTSD research focus. The top 12 weighted author keywords are "criminal responsibility", "homicide", "brain development", "murder", "trauma", "PTSD", "child abuse", "forensic evaluation", "attachment", "adolescence", "juvenile justice", "cognition" and "impulsivity".

- Cluster8 (magenta) defines the psychiatric injury and psychiatric legislation research emphasis and has 14 author keywords. The keywords are “negligence”, “legislation”, “psychiatric injury”, “detention”, “consent”, “damages”, “causation”, “tort”, “mental harm”, “seclusion”, “restraint”, “Mental Health Act”, “psychiatrists” and “regulation”.
- Cluster9 (purple) represents the forensic psychiatry and patient treatment research with 13 author keywords: “forensic psychiatry”, “autonomy”, “capacity”, “mental health court”, “evaluation”, “involuntary treatment”, “violent offenders”, “decision-making”, “dangerousness”, “severe mental disorder”, “coercive treatment”, “patients’ rights” and “mental health tribunals”.
- Cluster10 (hot pink) includes seven author keywords: “insanity”, “neuroscience”, “responsibility”, “mental impairment”, “irresistible impulse”, “psychologist” and “torture”. This cluster encompasses the insanity and neuroscience area.

The density visualization function of VOSviewer is particularly useful to get a quick overview of important areas of a map (Van Eck and Waltman, 2010). This study plotted the author keywords on a density view in Figure 2 using VOSviewer, which immediately reveals the general structure of the L&P research. Nodes are indicated by their label in a similar way as in the label view (Figure 1). In the density view (Figure 2), the larger the number of author keywords in the neighborhood of a point and the higher the weights of the neighboring keywords, the closer the color of the point is to red. According to Figure 2, the research areas of psychopathy, violence, mental illness, forensic psychiatry, risk assessment, criminal responsibility, brain development and adolescents, therapeutic jurisprudence, offenders, suicide, law reform and contributory negligence research areas turn out to be important. These areas are very dense, which indicates that overall the topics in the L&P field receive a lot of attentions in the period studied. Besides, it can also be seen that there is a clear separation between the different research topics of psychopathy, violence, forensic psychiatry, risk assessment, therapeutic jurisprudence, offenders, suicide, law reform and mental illness on the one hand and the different research topics of criminal responsibility, adolescents and contributory negligence research on the other hand. Emerging themes in the field have more and more attention paid through the time period studies. These fields are PTSD, homicide, policy, damages, aggressive behavior, substance abuse, eyewitness and expert testimony. In the future, these research topics might be standard or widely recognized by L&P researchers and may generate new research foci in the future.

Conclusion

To detect research emphases and trends in the field among professionals concerned with the interface of L&P and related disciplines, the present paper first conducted a quantitative study of the highly cited articles and summarized research emphases and trends on L&P articles from the WOS during the period 1993 to 2012. This study showed some significant points on research emphases and trends. The results of this study can help scientific researchers understand the research emphases and trends of L&P globally and recognize trends/directions for further research. For example, based on these findings, scientific research policymakers and project managers can understand the research emphases and trends of L&P research all over the world; thus, they can provide suggestions for directing L&P research and policy reform. In addition, with the help of these findings researchers can make informed decisions of their research directions or emphases. The key findings from this research are as follows:



Notes: Options dialog box of labels in action tab: No overlap check box is checked; Both Blurred background check box and gradual appearance check box are not checked. Options dialog box of lines in action tab: Use normalization check box is checked, lines can be displayed between any pair of items with non-zero link strength. Options dialog box of visualization in action tab: items are colored based on the cluster colors. This value of clustering resolution parameter is set equal to 0.85 On the map tab, the default normalization method (normalization method 1) as option of method parameter, and ignore self-links box is checked in the advanced parameters dialog box

Figure 2.
The density view of co-words map of author keywords that occurred at least three times

- The top 21 highly cited articles are shown in [Table I](#). These highly cited articles mainly focus on research topics, such as sexual victimization, mental hospital admission, patterns of violence of mental health predictors and psychiatric patients, adolescent and child neuropsychiatric, forensic psychiatry, schizophrenia, offenders' treatment, assessment and prediction of dangerousness.
- An analysis of the title words and KeyWords Plus showed that forensic psychiatry, mental health and criminal offenders were the continuing mainstream topics in the study field, and risk assessment, risk factors and risk management of violence behavior, legislation for sexual offences, mental health courts, recidivism and expert testimony were recent research emphases and trends of the study field; on the contrary, psychiatric hospitalization, psychiatrist-patient, community and services

had decreasing importance and popularity in L&P research. The topics of violent behavior and risk assessment might have developed to a significant subgroup of L&P research. Similarly, with the analysis result of title words and KeyWords Plus, psychopathy-related, forensic psychiatry, mental health, risk assessment, sex offenders and recidivism were the research emphases and foci in the study field by the author keywords analysis. Risk assessment, sex offenders, mental disorders and forensic psychology research were the most important subjects.

- According to the co-keywords cluster map (Figure 1), the top 169 author keywords were divided clearly into ten clusters are as follows: Cluster1 (risk assessment, sex offenders and expert testimony research), Cluster2 (mental disorders, forensic psychology and PCL-R research), Cluster3 (mental health law reform and psychiatry research), Cluster4 (mental disorder offenders and recidivism research), Cluster5 (personality disorder and mental illness prisoner research), Cluster6 (psychopathology and violence aggression behavior research), Cluster7 (forensic evaluation and PTSD research), Cluster8 (psychiatric injury and psychiatric legislation research), Cluster9 (forensic psychiatry and patients' treatment research) and Cluster10 (insanity and neuroscience research).
- Density visualization of the top 169 author keywords (Figure 2), especially psychopathy, violence, mental illness, forensic psychiatry, risk assessment, criminal responsibility, brain development and adolescents, therapeutic jurisprudence, offenders, suicide, law reform and contributory negligence research areas received a lot of attentions and turn out to be important during the period studied.
- Emerging themes in the field have more and more attention paid to them during the time period studies. These themes are PTSD, homicide, policy, damages, aggressive behavior, substance abuse, eyewitness and expert testimony; these research topics might be standard or widely recognized by L&P researchers and may generate new research foci in the future.

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