A KNOWLEDGE MAPPING OF STRAIN THEORY RESEARCH: BIBLIOMETRIC ANALYSIS

Fowokemi Ogedengbe[1], Yurita Yakimin Abdul Talib [2] and Fariza Hanim Rusly[3]

[1]Doctoral Research Scholar in accounting information systems in Universiti Utara Malaysia, . E-mail: Ogedengbe_fowokem@oyagsb.uum.edu.my
[2]Lecturer in Tunku Puteri Intan Safinaz School of Accountancy, Universiti Utara Malaysia 06010 UUM Sintok, Kedah, Malaysia.E-mail: Yurita@uum.edu.my
[3]Lecturer in Tunku Puteri Intan Safinaz School of Accountancy, Universiti Utara Malaysia 06010 UUM Sintok, Kedah, Malaysia. E-mail: hanim@uum.edu,my

Abstract - This study aims to explore the knowledge base on strain theory using science mapping by examining the study areas available that have built upon the Merton's strain theory. The analysis was based on all the articles that were generated by the search "Strain Theory" on SCOPUS database. After data screening, this study managed to get a total of 772 articles which were used for further analysis. Tools such as Microsoft Excel was used to conduct the frequency analysis, VOSViewer for data visualization and Harzing's Publish or Perish for citation metric and analysis. Based on the findings, most of the subject areas which used strain theory include psychology, social sciences and medicine. authors and institutions from the United States ranked the highest in publications and citations. Finally, areas such as delinquencies and victimizations were addressed by strain theory as well as the influences of the structural imbalances on people behaviours such as the self-destructive which include depression, suicide, and societal destructive behaviours which include crimes, abuse and bullying. Some areas which can be addressed using strain theory are lacking in publications such as employees deviant behvaiors. Future studies can also conduct researches in African and Asian/Arab context, as these countries have few publications based on strain theory.

Index Terms: strain theory; general strain theory; bibliometric analysis: deviant behaviours.

1. INTRODUCTION

This study is an attempt to reveal the general overview of the existing publications on general strain theory otherwise called the strain theory. The strain theory posits that the imbalance in the societal structures is the main motivation for various forms of deviant behaviors of people. This article therefore reveals the overview of strain theory according to publications on Scopus database. The analysis of this study reveals the top authors who have contributed to this theory chiefly among them are Agnew, Zhang, Piquero, Cullen's and several others as reveals in the section four of this article. Hence, interested researchers who wishes to study about strain theory may check the publications by these authors, as they have published in-depth research works. Also, this study reveals the institutions with the highest publications

and citations index on publications that focused on this area. Top among these are the United States institutions. Hence, students and researchers who wish to research on human deviant behaviors and societal imbalances may consider studying in one of the institutions and countries listed by this study. Moreover, the terms which can be researched when studying on strain, deviant behaviours have been shown by this study, these are based on the previous publication's keywords. Some of these terms include victimization, crimes, discrimination, abuse, depression, police, prison, and many other terms as revealed by the section of this study.

Furthermore, this study shows the subject areas which have been studied by the prior publications on strain theory. Most of these subject areas include the medical science, the psychological and social sciences. Hence, studies can diversify on examining other areas such as organizations and employees deviant behaviors based on strain theory. This study also reveals the countries un which research works have been carried out to validate the theory, but, most of the countries in Africa, and Asia have not published any articles using the strain theory. Hence, researchers can examine this theory in the various countries context and comparison can later be made, in understanding the various behaviours of people from various country and ethnic backgrounds. This will help the society in reducing crimes and other societal deviant behaviors and also, help in reducing discrimination and social ostracises.

Over the last few decades, there has been increased interest in applying the strain theory to understand the motivation for deviant behaviours since the theory provides valuable implications in predicting and managing people's behaviours, and also in explaining how the society influences these behaviours. It explains how the likelihood of deviant behaviours can be motivated by certain strains called stressors. These strains or stressors leads to negative emotions, such as anger and frustrations. In response to these negative emotions, people tend to resort to corrective actions. Behaviours which stands in deviance to societal approved ways of life are some of these corrective actions. Crimes, terrorism, suicide and bullying are some of the possible response. For example, an unemployed person may resort to scamming to obtain a source of living.

Through the years, the strain theory has evolved. This evolution is what enabled it to be relevant to the present-day systems. The foundation for the present-day strain theory can be traced to the work of Durkheim, which focused on suicide (Durkheim, 1897). Merton's classic strain theory was the offshoot of Durkheim (Merton, 1938), and it came to dominate the criminology studies in the mid-20th century (Merton & Ashley-Montagu, 1940). Just like other theories, which are subjected to criticism and the need for an upgrade, many researchers have built on the Merton's strain theory (Agnew et al., 1996; Bao et al., 2004; Baron, 2007; Broidy & Agnew, 1997; Hoffmann, 2019; Piquero & Sealock, 2010). Prominent works are Cohen's delinquent study (Cohen, 1955, 2019), Cloward and Ohlin differential opportunity study (Cloward & Ohlin, 1960) and Robert Agnew general strain theory (Agnew, 1992). Through the years, the strain theory has been one of leading theories of crimes and

had been applied to a wide range of topics from corporate crimes and delinquencies, to psychological disorders, especially in the field of social sciences, psychology and medical sciences. (Agnew et al., 1996; Bao et al., 2004; Baron, 2007; Broidy & Agnew, 1997; Hoffmann, 2019; Piquero & Sealock, 2010).

Bibliometric analysis is a research method based on knowledge used to compare the performance of publications in a dataset by using indicators that shows the characteristics of the publications. Based on the past data from the academic data-bases, there is no existing bibliometric analysis on the strain theory. Hence, this study attempts to bridge the gap through this study by using Scopus database in an-alysing existing literature on strain theory. Moreover, Moreover, owing to the long history of the strain theory and based on the huge number of scholarly works related to it, it is imperative to examine its knowledge base by examining the bibliometric indicators on past studies on strain theory. This includes comparing the performance of studies that used strain theory as their theoretical background, by analysing their trends over the years, the citation index and the publication productivity analysis. The trends in publication shows a positive publication trends over the years. This reveals that strain theory is still relevant and will be relevant in the foreseeable future, as the publications are increasing over the years moreover, the theory have been applied in different fields and areas such as the medical sciences to explain the mental health of people as a result of societal and structural strains.

Moreover, strain theory has been applied in the psychology to explain the motivation for emotional and psychological behaviours of strained people. These includes the victims of bullying, discriminations and ostracizations. Some of the behaves includes suicidal thoughts, depressions, and suicides. Also, strain theory explains the motiva-tions for some actions of strained individuals such as the reasons for crimes and criminal behaviours, the motivation for bullying others and physical abuses of people. Another area which has been extensively addressed by strain theory is the social sciences aspects which deals with the behaviour of individuals as a social being. The bibliometric analysis also shows the big picture of what past studies have done on strain theory in different fields and provide analysis that will help in contributing to future research in this area. This bibliometric analysis addressed the following research questions:

(1) What is the intellectual structure of strain theory literature?
(2) What areas involving strain theory need additional study?

This paper is organized as follows: after the introduction (Section 1), the literature review is explained in section 2, and the materials and methodology are presented in Section 3. Section 4 presents co-word analysis and discusses the hot research themes and evolution trends from the theme perspective. Section 4 also presents cluster analysis from a different perspective and explores the interrelationship between the themes as well as the evolving trends in the studies on strain theory.

Section 5 discusses the important findings, summarizes the conclusions, and proposes suggestions for future research.

2. LITERATURE REVIEW

2.1   Strain Theory Overview

Strain theory focus on the explanation of the disparities that exist between the societal definition of success and the societal approved legal means of achieving those successes (Robert Agnew, 1992; Baron, 2006; Burton Jr. et al., 1994; Hay, 2003). Modern strain theory can be traced to Durkheim Emile text on "Suicide: A Study in Sociology" (Durkheim, 1897). Durkheim's work was not precisely focused on crime or deviant behaviour. Instead, the study focused on suicide, and the strained caused by the social and environmental expectations, which contributed to the rate of suicide in the society.

On this, Merton developed works relating to deviant behaviours, strain and society (Agnew, 1999, 2018; Featherstone et al., 2003; Merton, 1938; Rosenfeld, 1989). Merton used the strain theory to explain the impact of anomie situation on the societal influence of behaviour by questioning the status-quo of the ideal cultural ways of wealth creation and the disparities within the societal structures which makes it impossible for equal wealth distribution within the societal hierarchies. Merton postulates that people may either accept the societal system by conforming to them or create adaptation strategies which stand in deviance to the societal structures. These deviant adaptation strategies include rejection and replacing of the system through the innovation of new strategies, ritualism, retreating from the society and rebelling against the systems. According to Merton's, crimes and all forms of deviance behaviours that improve financial standing falls within these categories.

In improving on Merton's work, Agnew postulated that societal wealth creation is not the only motivation for crimes and other deviance behaviours, rather, it's more on the satisfaction of human mental ego. Agnew viewed this from the human psychology and mental science perspective. Agnew theoretically explained the mental science of human deviant behaviours and used the medical term "Stressors" as coined by the mental health scholars (Robert Agnew, 2015; Baron, 2007). Stressor here is described as the hostile environmental factors that lead to negative emotional reactions and other negative behaviours (Thoits, 2007). Agnew explained that the emotional, mental and psychological effect of societal imbalance are the motivations for deviance behaviours. Many studies have used the modified strain theory by Agnew as the basis of describing the criminal, delinquencies and other deviant behaviours of people in the society. (Baron, 2019; Carson et al., 2009; C.-K. Cheung et al., 2007; Sharp et al., 2005).

2.2   Bibliometric Analysis

Bibliometric analysis is a research method based on knowledge used to compare the performance of publications in a dataset by using indicators that shows the characteristics of the publications (Yin, 2013). Bibliometric Analysis is described to

follow seven steps (Moosa & Shareefa, 2020). These steps include the data retrieval process, the pre-processing, network extraction, normalization, mapping, analysis and visualization. These steps are inter-dependent one of the other, and they are inter-connected. Some of these steps are carried out concurrently by the software used in the bibliometric analysis, such as the VOS Viewer and Harzing's POP. Aside from the data retrieval and pre-processing stage, the analysis applications perform the network extraction, the normalization, mapping, analysis and visualization since most of these step are performed concurrently to get the bibliometric results. (Moosa & Shareefa, 2020).

Many studies have used bibliometric analysis in various fields and subject areas. Most of the past bibliometric studies used either Scopus or Web of Science as the database for generating the dataset (Li et al., 2020; Ramalho et al., 2021; Tang et al., 2021; Wang et al., 2021). Moosa and Shareefa, (2020) used Scopus database in analysing the 100 most cited articles on workplace learning, and Si et al. (2019) also used the Scopus database in the bibliometric analysis of past literature on the theory of planned behaviour. Moreover, some studies have also published bibliometrics in the area of psychology (Guilera et al., 2013; Krampen et al., 2011; Navarrete-Cortes et al., 2010)

Some other studies used the Web of Science as the database for the bibliometric analysis (Ahmi et al., 2020; Li et al., 2020; Wang et al., 2021; Yin, 2013). While Yin (2013) made a historical review of grey system theory, Ahmi et al. (2020) used the bibliometrics in analysing Fintech trends. Other studies used more than one database in generating their datasets (Fogaça et al., 2018; Ramalho et al., 2021). while Fogaça et al. (2018) conducted its analysis on job performance based on selected journals of business, management and psychology, Ramalho et al. (2021) used artificial intelligence for its clinical coding automation.

3. METHODOLOGY

3.1 Identification of Sources

The data used for this study was obtained from the Scopus database in August 2020. Scopus database was used for the dataset because it is claimed to be the largest citation and abstract database of peer-reviewed scientific literature with wider coverage than Web of Science (Moosa & Shareefa, 2020; Si et al., 2019).

The document type during the search was undefined, hence journal articles, conference papers, book chapters and editorials contributed to the dataset used for this bibliometric analysis for robust data, as shown in table 1. Additionally, we did not specify the time frame for the Scopus search, hence, allowing them to identify the earliest papers.

The study adopted PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) for identification of sources for the review. The search string "strain theory" OR "general strain theory" was used in obtaining relevant articles during the

literature search. The articles searched with the search string was based on article Title, Abstract and keywords. Based on the initial search, 2047 articles were yielded (see Figure 1). Many of these articles are not related to the subject area of the study such as engineering, earth science, planetary science, material science, chemistry, biology and physics, hence, excluded for further analysis. This reduced the dataset to 773 articles after the subject filters were applied. After going through the articles one by one, the researcher removed an irrelevant article which belongs to chemistry but was not removed during subject filters. Hence, the database was finally reduced to 772 documents.

3.2   Data analysis

This study used three applications for the bibliometric review of the 772 Scopus-indexed documents. The first application is Microsoft Excel, used for the frequency calculation of the publications in the dataset. Moreover, the Microsoft Excel was also used in designing some of the tables, charts and graphs used for this study. The second software used for data analysis is VOSViewer (www.vosviewer.com). VOSViewer is used in constructing and designing the bibliometric networks such as co-occurrence, co-citation and co-authorship. The third software used for this bibliometric Analysis is Harzing's publish or perish software (POP). This is used in calculating the citation metrics as well as the h and g index.

All these software are inter-dependent one on another and are used concurrently for the analysis. For example, the data from Harzing's POP serves as input for Microsoft Excel in order to come out with the tables, charts and graphs. The output derived from these applications were used in answering the research questions.
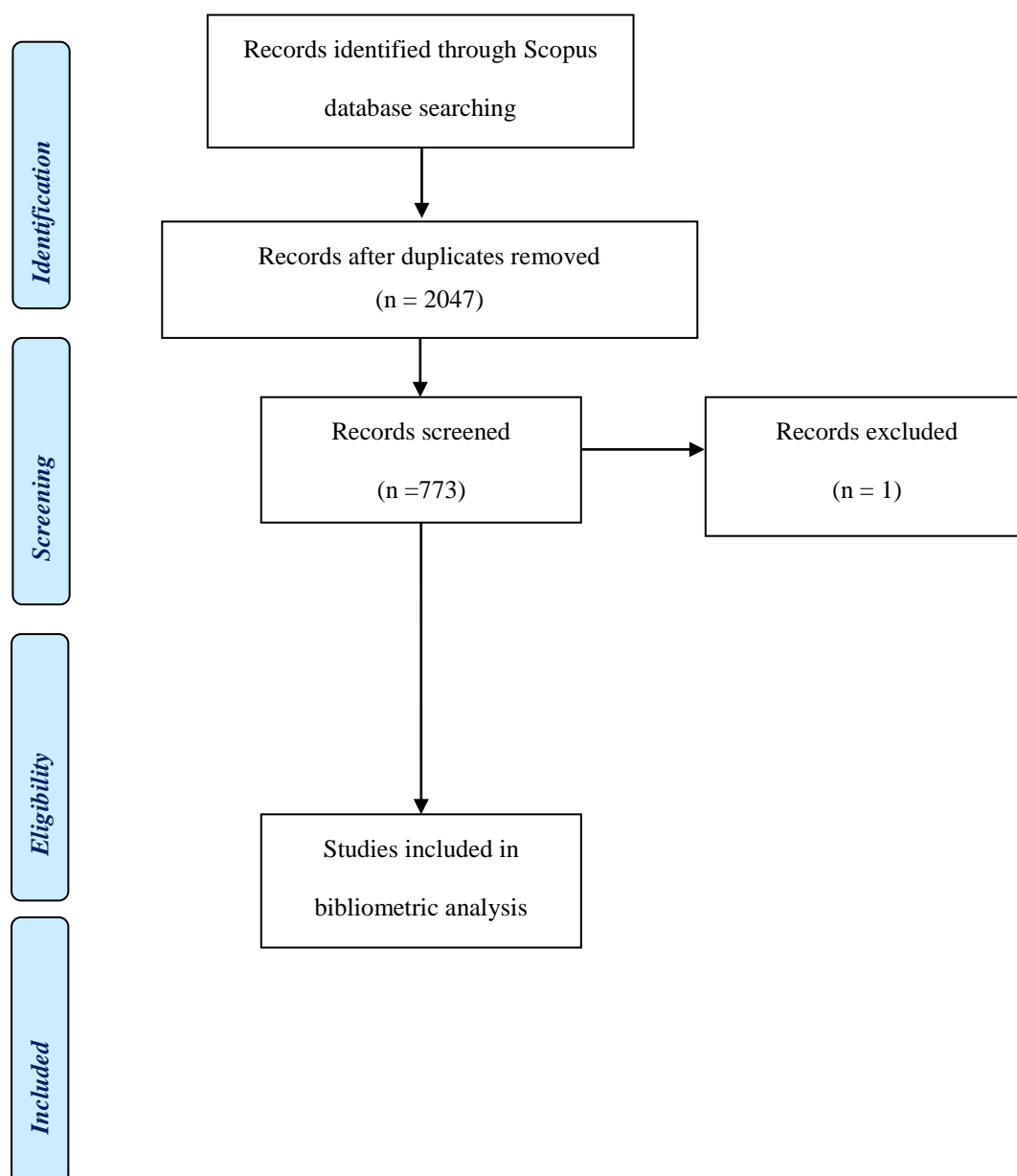
Figure 0-1: PRISMA Flow Chart used in the Identification of sources for the Strain Theory review

4.   RESULTS

This study analysed the bibliometric characteristics based on the dataset obtained from the Scopus database. These attributes include the year of publication and yearly growth trends, document type, document source, publication language, country of productivity, institution affiliated with authors and several other indicators.

These are shown in number and figures, percentages and frequencies, as generated from the Harzing's POP and excel. The VOSviewer shows the result in the form of mapping. This includes indicators such as co-occurrence, co-citation, co-authorship and others. This section presents these results.

4.1 Document and Source Types

The document and source of the dataset are shown in table 1 and 2. Table 1 shows the document type, and it is revealed that 85.8% of the available literature on strain theory is article. While the rest falls within book chapter, review, conference paper, books, editorial and 5 undefined literature. The source of these documents includes 92.5% of Journal, while the rest are books, conference proceedings and book series. These shows that over the period of the years, most of the publications on strain theory are mainly academics publications which consists of journals, articles, book chapters and conference papers.

Table 1: Document Type

DOCUMENT TYPE	Total Publication	Percentage (%)
Article	662	85.8%
Book Chapter	44	5.7%
Review	43	5.6%
Conference Paper	11	1.4%
Book	3	0.4%
Editorial	3	0.4%
Note	1	0.1%
Undefined	5	0.6%
Total	772	100%

Table 2: Source Type

Source Type	Total Publications (TP)	Percentage (%)
Journal	714	92.5%
Book	47	6.1%
Conference Proceeding	8	1.0%
Book Series	3	0.4%

Total	772	100.0

4.2 Evolution of Published Studies

The evolution of published studies revealed the trends in publication of articles relating to strain theory. The dataset used for this analysis includes articles which were published between the years 1980 and 2020. Figure 4.1 shows the graphical illustration of the document publication by year. it can be seen that the rate of publication between 1980 and 2005 was somehow constant, while after 2005, there was significant growth in literature. All these are revealed in table 3 and figure 4.1. The largest number of publications, as shown in table 3, was in 2019. Hence, it is expected that the number of publications will increase in subsequent years. This reflects that there had been significant yearly publications using strain theory and it shows that many researchers are focusing more on the theory, and using it to explain human deviant behaviours in the society. The usage of the strain theory is also growing annually which reflects that the theory is getting more relevant and will not be obsolete in the foreseeable future, seeing its global acceptance and usage, especially, by high ranking journals.

Results also indicate that the highest total citation was recorded in 1992, with a total citation of 2701. The h and g index of the publications citations metrics are also shown with the year 2009 having the highest h-index of 21 and g index of 35. The highest citation per paper was in 1992, with 385 citations. This shows that the there is an article published in 1992 which made a landmark in the studies on strain theory and whose significance is still as relevant as ever. This article was published by Robert Agnew titled "Foundation for a general strain Theory of Crime and Delinquency". The full overview of the forty years for this dataset is shown in table 3 below, and the growth in literature trends is shown in figure 4.1. the overview shows positive growth in publications and citations of strain theory articles. Also, from 1982, there have been constant publications of articles that used strain theory.

Table 3: Year of Publications

Year	Total Publica-tion	Percent-age (%)	Cumm. Per-centage	NCP	TC	C/P	C/CP	h	g
1980	1	0.1%	0.3%	1	85	85	85	1	1
1982	1	0.1%	0.4%	1	130	130	130	1	1
1984	2	0.3%	0.6%	2	54	27	27	2	2
1985	3	0.4%	1.0%	3	648	216	216	3	3
1986	1	0.1%	1.2%	1	58	58	58	1	1
1987	4	0.5%	1.7%	4	84	21	21	2	4

Year	Total Publica-tion	Percent-age (%)	Cumm. Per-centage	NCP	TC	C/P	C/CP	h	g
1988	5	0.6%	2.3%	5	115	23	23	5	5
1989	3	0.4%	2.7%	3	152	50.67	50.67	3	3
1990	3	0.4%	3.1%	3	12	4	4	2	3
1991	1	0.1%	3.2%	1	25	25	25	1	1
1992	7	0.9%	4.1%	7	2701	385.86	385.86	5	7
1993	4	0.5%	4.7%	4	809	202.25	202.25	3	4
1994	5	0.6%	5.3%	5	476	95.2	95.2	5	5
1995	4	0.5%	5.8%	4	218	54.5	54.5	4	4
1996	5	0.6%	6.5%	5	325	65	65	4	5
1997	11	1.4%	7.9%	11	1240	112.73	112.73	8	11
1998	5	0.6%	8.5%	5	446	89.2	89.2	4	5
1999	7	0.9%	9.4%	6	600	85.71	100	6	7
2000	12	1.6%	11.0%	12	1255	104.58	104.58	11	12
2001	14	1.8%	12.8%	12	1549	110.64	129.08	11	14
2002	6	0.8%	13.6%	5	655	109.17	131	5	6
2003	12	1.6%	15.1%	11	915	76.25	83.18	11	12
2004	11	1.4%	16.6%	11	862	78.36	78.36	10	11
2005	10	1.3%	17.9%	10	428	42.8	42.8	8	10
2006	14	1.8%	19.7%	14	880	62.86	62.86	12	14
2007	19	2.5%	22.1%	18	821	43.21	45.61	14	19
2008	26	3.4%	25.5%	26	915	35.19	35.19	18	26
2009	40	5.2%	30.7%	39	1250	31.25	32.05	21	35
2010	38	4.9%	35.6%	36	1215	31.97	33.75	20	34
2011	31	4.0%	39.6%	29	784	25.29	27.03	15	27
2012	39	5.0%	44.6%	34	757	19.41	22.26	18	27
2013	44	5.7%	50.3%	41	816	18.55	19.9	15	27
2014	50	6.5%	56.8%	46	612	12.24	2.37	14	22
2015	45	5.8%	62.6%	40	519	11.53	12.98	13	20

Year	Total Publica-tion	Percent-age (%)	Cumm. Per-centage	NCP	TC	C/P	C/CP	h	g
2016	35	4.5%	67.1%	31	342	2.77	11.03	11	17
2017	50	6.5%	73.6%	45	414	8.28	2.78	11	17
2018	66	8.5%	82.1%	51	325	4.92	6.37	8	14
2019	75	9.7%	91.8%	43	140	1.87	3.26	6	7
2020	63	8.2%	100.0%	18	28	0.44	1.56	2	3
TOTAL	772	100.00							

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.
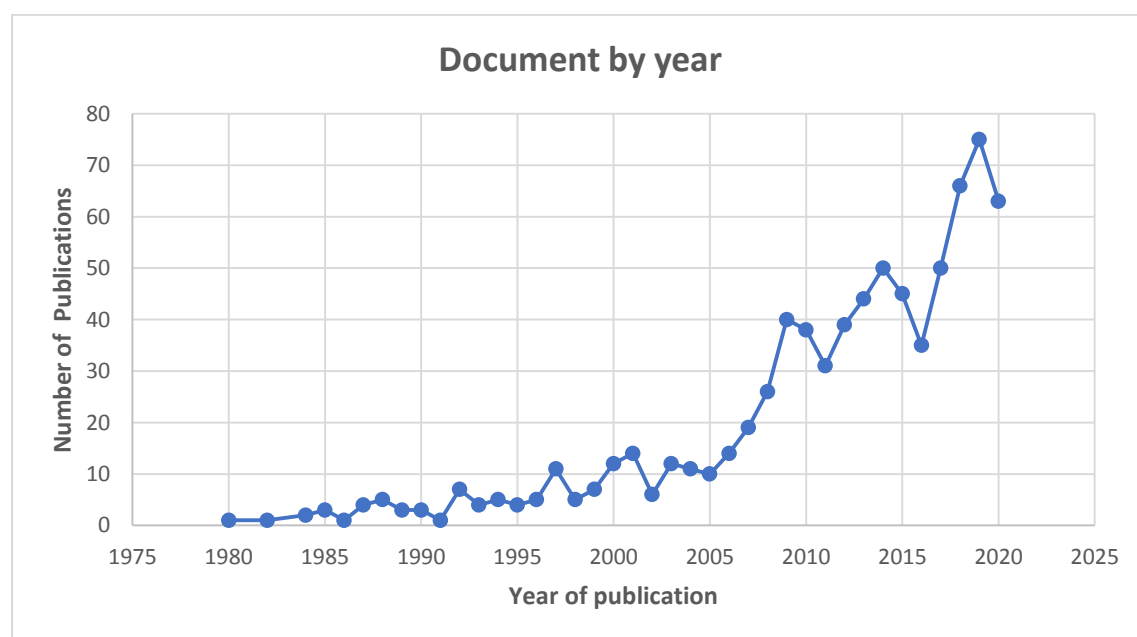

Figure 4-1:Document by year

4.3   Subject Area

Table 5 shows the subject areas where studies on strain theory have been published. This reflects the areas in literature where the strain theory have been applied. Most of the works were published in social sciences, psychology and medicine, with social sciences having 44.3% of the total publications, followed by psychology and medicine with 24.6% and 18.9% total publication respectively. These areas can be justified for, given the nature of strain theory as a theory that explains the psychological and mental motivation for the deviant behaviour of individuals within a system. There are many studies in social sciences which used the strain theory in justifying the explanations for human deviant behaviour as a social being (Sameer Hinduja & Patchin, 2013). This include the relationship between human and the   society, and the relationship between human and human. Most of these studies explained that human engages in behaviours that deviate from social norms as a result of the structural imbalances in the social systems (Baron & Hartnagel, 2002; Mazerolle et al., 2000; Menard et al., 2015). This include the expectations of the society, the societal definition of success and the ways of achieving them and the negative response of humans to the society when they cannot cope with the societal structures and rules. Moreover, strain theories on psychology explains the mental response of people to the societal imbalances. these includes the mental strain as a result of societal stress on people (Lin et al., 2014; Zhang & Lv, 2014). Also, humans experience mental breakdown which affect their judgement and ability to reason logically. the ostracizations experienced by people give the mental and emotional feeling of being unwanted like a nuisance to the society. All these influences the deviant behaviour of people in the society. The other studies also focused on the medical area (Barbieri et al., 2019; L. Liu et al., 2020; Torres et al., 2020; Walker & Holtfreter, 2016; Yilmaz et al., 2015) . Most of these study examine the impact of the structural imbalances on the human health (Acosta et al., 2020; Botchkovar & Hughes, 2010; Ford et al., 2014; Miller et al., 2014). Most of these studies examined medical conditions which stemmed from societal strain such as depression, suicide, and addition. The results are shown in Table 5 below.

Table 4: Subject Area

Subject Area	Total Publications (TP)	Percentage (%)
Social Sciences	568	44.3%
Psychology	315	24.6%
Medicine	242	18.9%
Arts and Humanities	64	5.0%
Business, Management and Accounting	21	1.6%
Economics, Econometrics and Fi-	16	1.2%

Subject Area	Total Publications (TP)	Percentage (%)
nance		

4.4 Top 20 Productive Journals

The most productive journal in our dataset is Deviant Behaviour. Deviant Behaviour journal accounts for 51 publications (6.6%) with a total of 945 citations, followed by the Journal of criminal justice with 47 articles which accounts for 6% of the dataset, and a total of 2024 citations and Justice quarterly which accounts for 3% of the total dataset with the total citation of 1821. The highest cited Journal is Criminology with a total citation of 4189 citations and 16 publications, followed by Journal of Research in Crime and Delinquency with 2573 total citations and also, 16 publications. Figure 4.2 below reflects the graphical representation of the citation and publication details of the top twenty most productive journals in strain theory literature. This shows that in order to examine areas such as human deviant behaviours, structural imbalances, and strain theory, some source journals can be specifically examined by researchers. Examples include deviant behaviours, journal of criminal justice, justice quarterly, journal of criminology, youths and society, journal of drug issues as well as the journals in figure 4.2 should be considered. Moreover, most of these journals have high index ranking and they have produced sound academic journals that addresses human deviant behaviors in the society. Also, for researchers looking for the best journals to publish topics that are addressed by strain theory, they may consider publishing in some of the journals in figure 4.2, since these journals, according to our analysis are the top and best journals which addressed strain theory while focusing on human deviant behaviors.
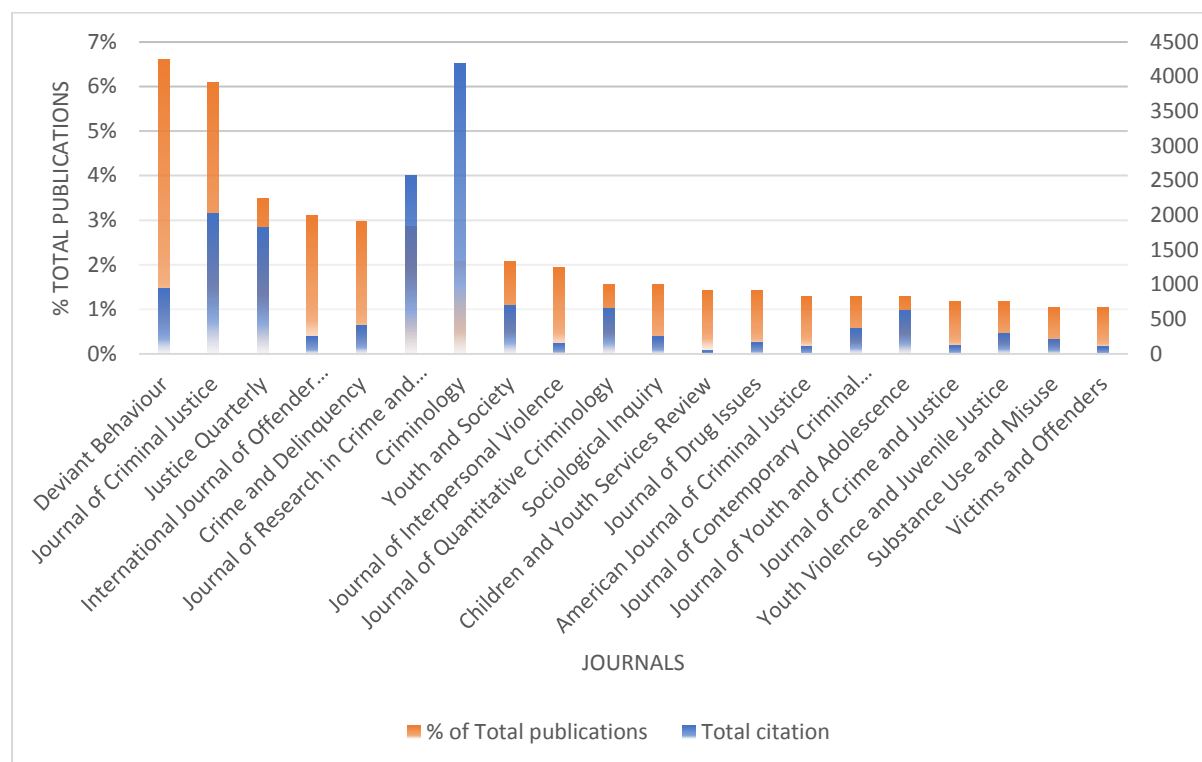
Figure 4-2: Top 20 Productive Journals

4.5 Keywords Analysis

This study generated keyword analysis using word sift. Word sift was used to ana-lyse the keywords of abstracts from Microsoft Excel. These keywords show the whole overview of strain theory coverage. As explained in the introductory section, strain theory deals with delinquencies and tries to proffer explanations for human deviant behaviours in society. Hence, the keywords that were generated are mostly social and psychological words that describe human and relate to their deviant behaviours within society. These words include strain, victimization, delinquencies, psychological, negative, bullying, juvenile and others. The word cloud of the authors' abstracts are shown in figure 4.3

This shows the general topics that were addressed by the articles which have been published on strain theory. Also, the topics linked with strain theory. The topics include the human deviant behaviours such as delinquencies, crime, abuse, bullying, discrimination, juvenile among others. It also reflect the mental condition of the strained people in the society such as anger, disorder, depression, suicide among others. It also include some self-destructive behaviors such as substance, alcohol, and drug. Aside this, it reflects the justice systems such as criminology, prison, and police. These are terms that can be searched when relating to strain theory. Also, these shows that strain theory have been used to explain these terms.
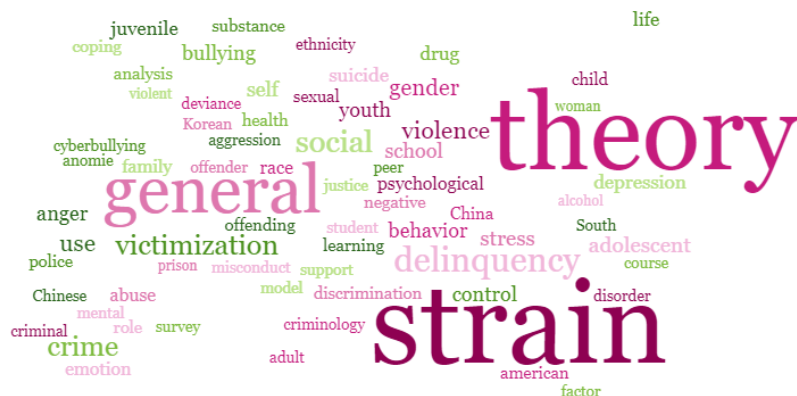
Figure 4-3: word cloud of the author's abstract

4.6   *Geographical Distribution of Publications*

Many countries in all the continents have contributed to publications of literature on strain theory. Table 8 below shows the data in relation to each of the countries that have contributed to the literature used in this dataset. Moreover, the citation of the publications of each country is shown as well as the h and g index. While the h index measures the productivity, and impact of the publications of each country, the g index serves as an improvement on the h index by measuring the weight and performance of the citations.

The United State ranks highest with 552 total publications, 18,933 citations, h index of 66 and g-index of 121. This is followed by China with 48 publication which accounts for about 6% of the total publications and 675 citations. Next to china is the United Kingdom with 29 publications and 482 citations. This reflects that more than 70% of the publications on strain theory were published in the United States. From table 8, it can be seen that a total number of 49 countries have contributed to the articles used for this dataset.

This shows that United States ranks the highest among the countries that have produced academics literatures based on the strain theory. Moreover, the United States have also supported the production of many articles that addressed the human strain, causating factors and the behavioural response to structural strain in order to create a more balanced society (De Soto & Tajalli, 2020; Kuptsevych-Timmer et al., 2019; L. Liu et al., 2020; Torres et al., 2020). Other countries such as China, the United Kingdom, and Australia are also producing academic journals that addressed the issues of societal strain, deviant behaviors, discrimination, and the factors that are reflected in the word sift in figure 4.2 (Bishopp et al., 2020; Lisa Broidy et al., 2017; Sigfusdottir et al., 2013; Zhang, Huen, et al., 2020).

Moreover, this serves as a call to other countries. Countries which have not examined the influence of societal strain some human beings should endeavour to do so. Some of the countries which needs to adapt strain theory includes African countries, as, only South Africa and Nigeria are African countries with more than one publications (Monsurat, 2020; Nwachukwu, 2014). The rest such as Ghana and Ethiopia only have one publication each to their credits. Aside Africa, several Asian countries are also lagging behind in publications, such as Arabic countries. Examining this area especially in country contexts will help in understanding structural strains within the society, means of coping with structural strain, balancing people's emotions and hence, reducing deviant behaviors in the society

Table 8: All Countries that contributed to the publications

Country	TP	NCP	TC	C/P	C/CP	*h*	*g*
United States	552	479	18933	34.3	39.53	66	121
China	48	41	676	14.08	16.49	13	25
United Kingdom	29	23	482	16.62	20.96	11	21
Australia	24	20	678	28.25	33.9	9	24
Canada	24	21	570	23.75	27.14	10	23
Hong Kong	18	16	272	15.11	17	7	16
Belgium	16	13	187	11.69	14.38	7	13
South Korea	15	10	311	20.73	31.1	7	15
Netherlands	14	11	152	10.86	13.82	7	12
Israel	9	8	49	6.13	5.44	5	6
Italy	9	8	155	17.22	19.38	6	9
Germany	8	3	33	4.13	11	2	5
Turkey	8	6	53	6.63	8.83	3	7
France	6	3	40	6.67	13.33	2	6
Iceland	6	6	278	46.33	46.33	6	6
Malaysia	6	3	44	7.33	14.67	3	6
Sweden	6	4	63	10.5	15.75	3	6
Brazil	5	2	33	6.6	16.5	1	5
Macao	5	3	6	1.2	2	2	2
South Africa	5	1	2	0.4	2	1	1

Country	TP	NCP	TC	C/P	C/CP	*h*	*g*
Switzerland	5	2	26	5.2	13	2	5
Taiwan	5	5	52	10.4	10.4	5	5
Finland	4	4	32	8	8	3	4
India	4	2	3	1.5	0.73	1	1
Japan	4	4	195	48.75	48.75	2	4
Norway	4	4	53	13.25	13.25	3	4
Austria	3	2	28	9.33	14	2	3
Iran	3	3	30	10	10	2	3
Poland	3	0	0	0	0	0	0
Croatia	2	1	3	1.5	3	1	1
Denmark	2	1	3	1.5	3	1	1
Nigeria	2	1	3	1.5	3	1	1
Pakistan	2	2	26	13	13	2	2
Philippines	2	1	4	2	4	1	2
Russian Federation	2	0	0	0	0	0	0
Saudi Arabia	2	1	15	7	15	1	2
Thailand	2	2	13	6.5	6.5	2	2
Argentina	1	1	10	10	10	1	1
Colombia	1	0	0	0	0	0	0
Czech Republic	1	1	8	8	8	1	1
Ethiopia	1	0	0	0	0	0	0
Ghana	1	1	2	2	2	1	1
Jordan	1	1	1	1	1	1	1
Kiribati	1	1	4	4	4	1	1
Kuwait	1	1	19	19	19	1	1
Mexico	1	1	2	2	2	1	1
Qatar	1	1	1		1	1	1
Singapore	1	1	8	8	8	1	
Spain	1	0	0	0	0	0	0

Country	TP	NCP	TC	C/P	C/CP	*h*	*g*
Undefined	29	26	2540	87.59	97.69	16	29

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

4.7 Authorship and Co-Authorship Analysis

4.7.1 Author's Count

The author's count refers to the number of authors who produced each of the documents used for this dataset. It reflects the publications that were single-authored as well as those that were published by more than one author. A total of 209 (27.1%) documents were single-authored while 273 documents were dual-authored. The dual-authored documents account for a little above 35% of the publications used for this dataset, which is the highest. Next is the triple-authored documents which account for 165 (21.4%) of the dataset.

The highest number of authors that co-published a document is 14 authors, who co-authored one document, followed by five publications each of which were published by 11 authors and three documents, each of which were published by ten authors. The authors' information regarding two publication were unknown. The information regarding the authors' count is shown in figure 4.4 below.

This shows that majority of the publications on strain theory range between single authored, dual authors to triple authors. The number of articles produced four and above authors are quite few, in comparison with the others.
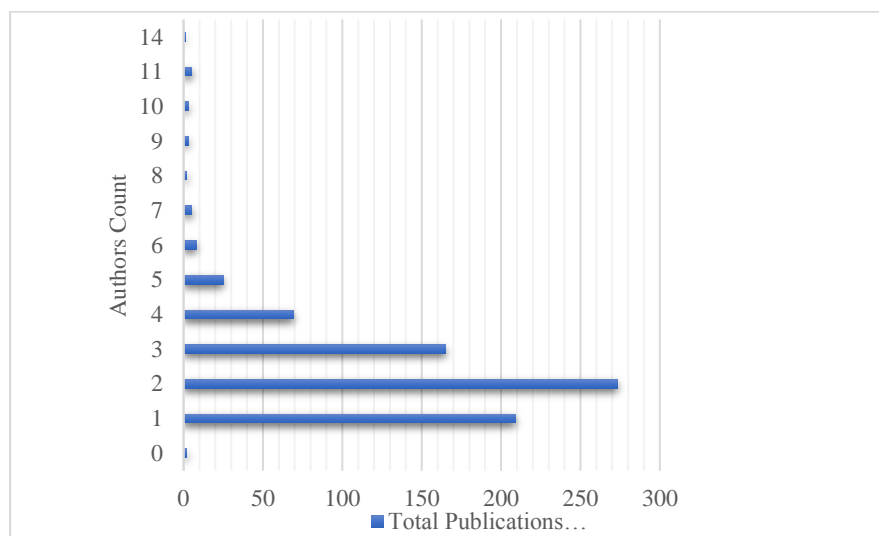

Figure 4-4: Number of authors per publication

4.7.2 Most Productive Authors

The total number of authors who published documents relating to this dataset on strain theory is 427. Out of this number, eleven most productive authors who have published more than ten articles were identified. Robert Agnew of Emory University top this list with forty-one publications and more than 3770 citations. The h and g index of his publications are 25 and 41 respectively. Next to Agnew are Cullen and Zhang, each with sixteen publications. From the dataset, the United States ranks high as nine out of the eleven top authors domiciled in the US, followed by two from Canada.

The author's h and g index were derived using the Harzing Publish or Perish. They both serve as indicators to measure the author's metrics. While the h index measures the number of publication and citations, the g-index, as described earlier, measures the global citation performance of the authors. The names of the authors, the number of their publications used in this dataset, number of citations, h and g index, as well as their affiliations, are shown in table 6.

This shows that, in order to get high ranking articles in academic research, re-searchers should examine and study the notable works of these productive authors in order to have vast and deeper understanding of the strain theory. Moreover, these authors metrics are high, as shown by the index used in the metrics measurements. Agnew have the highest author's metrics, followed by Zhang and Piquero N.L. also, these three authors have the highest citations. Agnew have more than 3770 citations followed by Zhang with more than 1200 citations. These shows that the publications by these authors are relevant, accessible and professional. Also, the metrics reflect the acceptability of these authors works and their contribution to the strain theory literature over the decades. Researchers and students studying about human deviant behaviors can therefore study the publications of these top authors. Their names, details and metrics are shown in the table 6.

Table 5: Most Productive Authors

Author's Name	Affiliation	Country	TP	NCP	TC	C/P	C/CP	*h*	*g*
Agnew, R.	Emory University, Atlanta, United States	United States	41	37	3772	92	101.95	25	41
Cullen, F.T.	University of Cincinnati, Cincinnati, United States	United States	16	14	197	12.31	10.07	9	14

Zhang, J.	Buffalo State College, State University of New York, Buffalo	United States	16	15	1216	76	81.07	13	16
Piquero, N.L.	University of Texas at Dallas, Richardson, United States	United States	15	13	882	58.8	67.85	12	15
Piquero, A.R.	University of Texas at Dallas, Richardson, United States	United States	13	12	461	35.46	38.42	10	13
Brezina, T.	Georgia State University, Atlanta, United States	United States	12	12	986	82.17	82.17	9	12
Mazerolle, P.	University of New Brunswick, Fredericton, Canada	Canada	11	11	1446	131.45	131.45	11	11
Baron, S.W.	Queen's University, Kingston	Canada	10	9	432	43.2	48	7	10
Hoffmann, J.P.	Brigham Young University, Provo	United States	10	9	720	72	80	7	10
Jang, S.J.	Baylor University, Waco, United States	United States	10	9	554	55.4	61.56	7	10
Moon, B.	The University of Texas at San Antonio, Department of Criminal Justice, San	United States	10	10	421	42.1	42.1	10	7

Antonio

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

4.7.3 Network Visualization of the co-authorship

Co-authorship reflects the connections between the authors of articles used in this dataset. These are the popular authors that have published literature that focused on strain theory. By using the VOSViewer, the researcher created a mapping showing the networks that exist between the authors that have published a minimum of three articles in the dataset which is shown in the 4.7 below.

This shows the linkage between the authors in the dataset. Some of them are from different countries and different institutions. the networks shown in table 4.7 puts Agnew, Piquero, Cullen and Mazerolle in the center and how they are connected to the other authors.
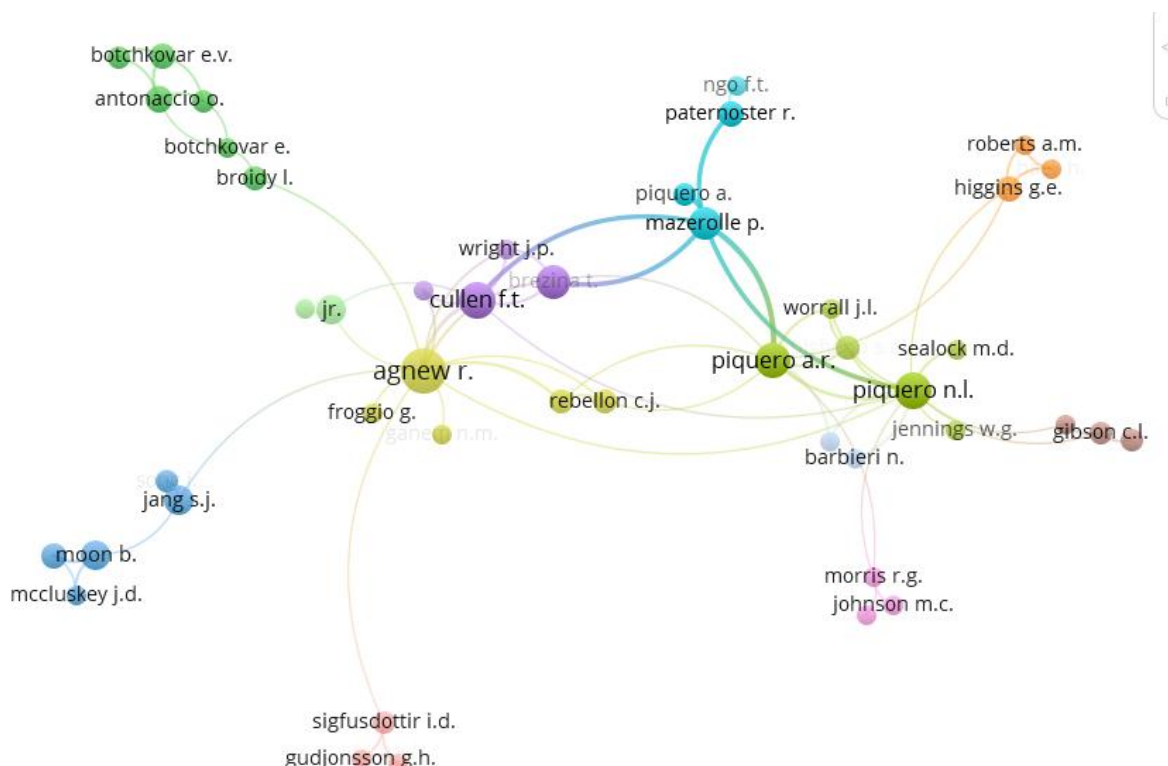
Figure 4-4:Network visualization map of the co-authorship

Unit of analysis = Authors

Counting method: Full counting

Minimum number of documents of an author = 3

Minimum number of citations of an author = 0

4.7.4 Most Influential Institutions

This section describes the information relating to the institutions affiliated with a minimum of five publications in the strain theory field. There are 35 institutions which fell into this category, based on the dataset used for this bibliometric analysis. The top university in this field is Emory University in the United States with thirty-nine publications and 4685 citations, followed by the University of Cincinnati with twenty-three publications and 1716 citation and Florida State University with twenty publications and 792 citations. All these 35 institutions are located in the United States except four institutions which include Shandong University in China with 16 publications, the Chinese University of Hong Kong with 11 publications, Universiteit Gent with nine publications and Queen's University, Kingston, Canada with eight publications.

This reflects the institutions that have produced articles relating to strain theory. Hence, this will serve as directions for students and researchers who wish to study and learn about human deviant behaviors. They may decide to study in these institutions which may give them opportunity for grants and research supports. The mapping of the citation and publications of these institutions are shown in figure 4.8 below.
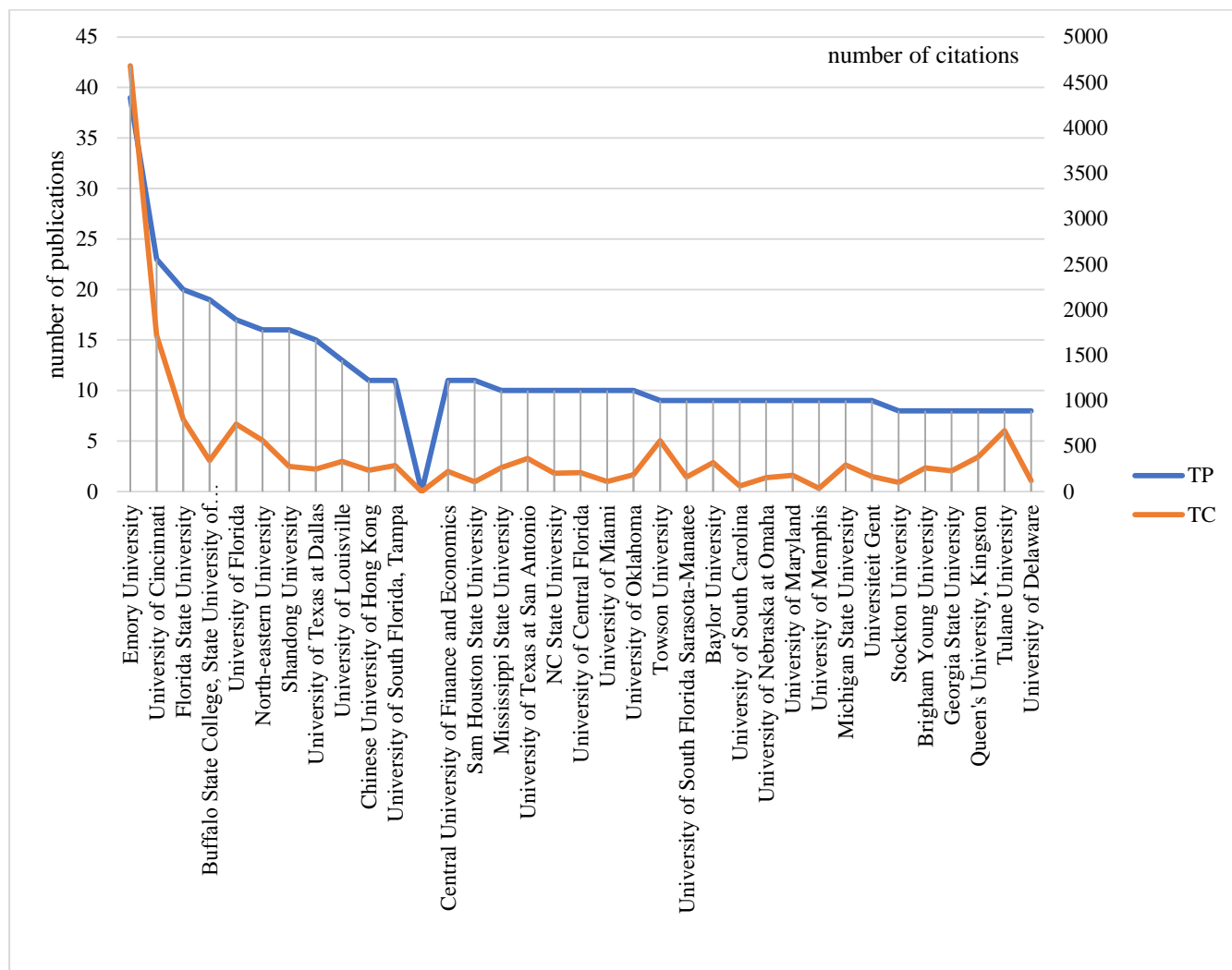
*Figure*e 4-8: Most influential institutions with a minimum of five publications

4.8   Citation Analysis

This section examines the general citation analysis of the total documents used for this dataset as well as the citation metric for the top-cited publications. These publications can be referred to as the publications which have contributed immensely to the strain theory development over the years.

4.8.1 Citation Metric

The citation years for this dataset runs between 1980 and 2020, that is, 40 years. The total number of citation is 23,660. The average authors per paper are 2.42, and the average cites per author are 14,448 citations. This shows the relevance of the strain theory over the years has not diminished, rather, the theory is still useful till date. Moreover, the citation over the years have been increasing as well as the

number of publications. This shows that the strain theory is still relevant and will continue to be relevant in the foreseeable future. The other information regarding the average cites by year, cites per paper cites by author, paper per author are all found in the citation metrics table below.

Table 6: Citations Metrics

Metrics	Data
Publication years	1980-2020
Citation years	40
Papers	772
Citations	23660
Years	40
Cites per Year	591.5
Cites per Paper	30.69
Cites Author	14448.55
Papers Author	426.76
Authors Paper	2.42

4.8.2 Highly cited articles

Based on our database, Robert Agnew, (1992) top the list as the most cited literature in strain theory, with 2117 citations and average of 75.61 yearly citations. The details regarding the 20 most cited articles in this dataset are shown in the table below. Five of Robert Agnew's publications top the list as the most cited publications. His shows that Robert Agnew contribution to Strain Theory over the years have been appreciated and his works are academically sounds and brilliant works of literature. The details include information regarding the article such as the source journal, total citations and the average yearly citations.

Table 7: Highly cited articles

No.	Authors	Title	Source	Year	Cites	Cites per year
1	Robert Agnew	Foundation for A General Strain Theory of Crime and Delinquency	Criminology	1992	2117	75.61

No.	Authors	Title	Source	Year	Cites	Cites per year
2	Robert Agnew,	Building on the foundation of general strain theory: Specifying the types of strain most likely to lead to crime and delinquency	Journal of Research in Crime and Delinquency	2001	748	39.37
3	Haddon	Chemistry of the fullerenes: The manifestation of strain in a class of continuous aromatic molecules	Science	1993	744	27.56
4	Broidy & Agnew	Gender and crime: A general strain theory perspective	Journal of Research in Crime and Delinquency	1996	459	19.96
5	Robert Agnew & White	An Empirical Test of General Strain Theory	Criminology	1992	442	15.79
6	Robert Agnew, R	A revised strain theory of delinquency	Social Forces	1985	370	10.57
7	R. Agnew, T. Brezina, J.P. Wright, F.T. Cullen	Strain, personality traits, and delinquency: Extending general strain theory	Criminology	2002	343	19.06
8	T. Brezina, R. Agnew, F.T. Cullen, J.P. Wright	The Code of the Street: A Quantitative Assessment of Elijah Anderson's Subculture of Violence Thesis and Its Contribution to Youth Violence Research	Youth Violence and Juvenile Justice	2004	326	20.38
9	L.M. Broidy	A test of general strain theory	Criminology	2001	320	16.84
10	R.H. Aseltine Jr., S. Gore, J.	Life stress, anger and anxiety, and delinquency: An	Journal of Health and Social	2000	318	15.9

No.	Authors	Title	Source	Year	Cites	Cites per year
	Gordon	empirical test of general strain theory	Behaviour			
11	J. Belknap, K. Holsinger	The Gendered Nature of Risk Factors for Delinquency	feminist criminology	2006	301	21.5
12	R. Paternoster, P. Mazerolle	General Strain Theory and Delinquency: A Replication and Extension	Journal of Research in Crime and Delinquency	1994	295	11.35
13	R. Agnew	A general strain theory of community differences in crime rates	Journal of Research in Crime and Delinquency	1999	244	11.62
14	R. Agnew	Experienced, vicarious, and anticipated strain: An exploratory study on physical victimization and delinquency	Justice Quarterly	2002	229	12.72
15	S.J. Jang, B.R. Johnson	Strain, Negative Emotions, and Deviant Coping among African Americans: A Test of General Strain Theory	Journal of Quantitative Criminology	2003	213	12.53
16	N.L. Piquero, M.D. Sealock	Generalizing general strain theory: An examination of an offending population	Justice Quarterly	2000	212	10.6
17	J.P. Hoffmann, S.S. Su	The conditional effects of stress on delinquency and drug use: A strain theory assessment of sex differences	Journal of Research in Crime and Delinquency	1997	202	8.78
18	T. Brezina	Adapting to strain: An examination of delinquent coping responses	Criminology	1996	201	8.38

No.	Authors	Title	Source	Year	Cites	Cites per year
19	C. Hay, R. Meldrum	Bullying victimization and adolescent self-harm: Testing hypotheses from general strain theory	Journal of Youth and Adolescence	2010	195	19.5
20	N.L. Piquero, M.D. Sealock	Gender and general strain theory: A preliminary test of Broidy and Agnew's gender/GST hypotheses	Justice Quarterly	2004	190	11.88

4.8.3 Network visualization of citation

The network visualization on citation from the VOSViewer analysis is found in figure 4.9 and 4.10. Figure 4.9 shows the network visualization of citation per country which reveals the linkage between the countries in which a minimum of five articles by authors has been cited. The country with the highest citation is the United States. Figure 4.10 reveals the network of publications citations of articles linkage with regards to strain theory. This includes the name of the author as well as the year of publication. This reveals that United States have contributed immensely to the academic works on strain theory, and the publications are useful to students and researchers. The other countries include Australia, United Kingdom, China, France and Malaysia, among others. Most of the publication citations are authored by Agnew, Brezina, Broidy and several others as shown in the figure 4.10.
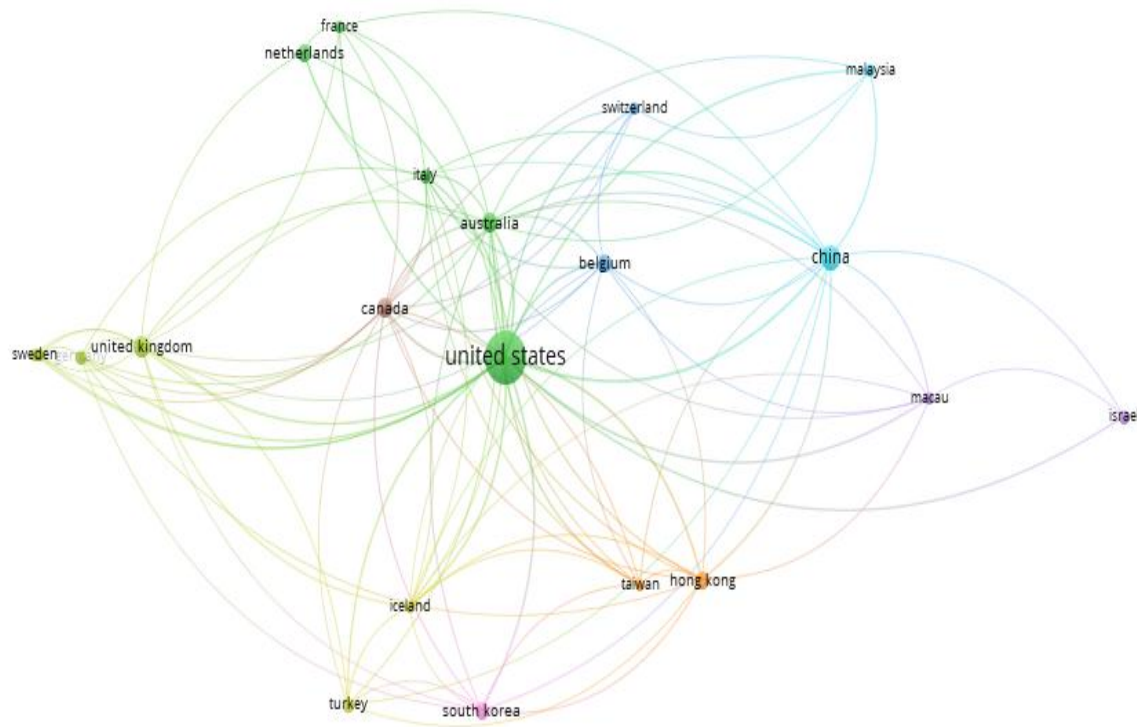
Figure 4-9: Network visualization map of the citation by countries

Minimum number of documents of an author = 5

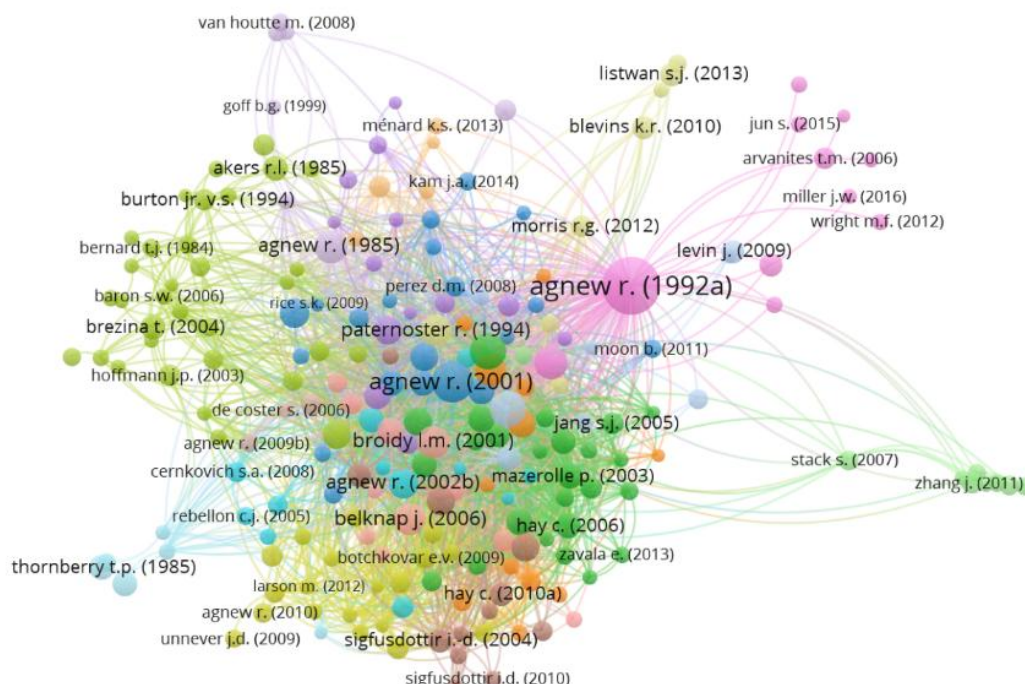Minimum number of citations of an author = 5

Figure 4-10: Network visualization map of the citation by documents

Minimum number of citations of a document = 20

5.   DISCUSSION AND INTELLECTUAL STRUCTURE OF STRAIN THEORY

This section summarizes the evolution of strain theory from Merton's classic strain theory to the current Agnew Revised/General strain theory. Also, this section summarised the areas that have been examined by strain theory as addressed by previous researchers. Chiefly among these are the behaviours that held negative impact on self and society. Behaviours such as suicide, delinquencies, victimizations and marginalization.

5.3 Evolution of Strain Theory

Strain theory has gone through major revisions since Merton promulgated it. Due to these, the strain theory remains one of the leading theories of crime. Through all revisions, one thing is constant, which is the imbalances in the structural systems which influence people's behaviours. The criticisms of Merton's classic strain theory were met with other researchers in the bid to improve the theory. These include Cohen (1955), who addressed the criticism regarding juvenile adolescence and delinquencies (Cohen, 1955, 2019). (Cloward & Ohlin (1960) addressed the concept of legitimacy and established that accessibility to illegitimate opportunities influences deviant behaviours more than the inaccessibility to legitimate opportunities. and Agnew revised/general strain theory that included the mental impact of structural imbalance such loss of positive stimuli and presentation of negative stimuli.

From the database used for this analysis, 28 studies examined or used the Merton's strain theory. Most of the studies that used the Merton's strain theory focused on financial aspirations. For example, Monsurat (2020) examined the prevalence of cyber-scam in Nigeria using Merton's strain theory. This is directly in line with Merton's notion of financial delinquency. Hughes et al. (2018) also used the Merton's theory to examine financial delinquency in Russia.

Most of the studies in this database used the Agnew strain theory. From the dataset, 415 documents examined or used the Agnew revised/general strain theory. According to Agnew strain theory, societal imbalances result in emotional negative affective states such as anger, frustration, depression, and disappointments. These negative emotional feelings, according to Agnew, are the motivations for deviant behaviours (Agnew, 1999, 2017; Robert Agnew, 1992, 2015). The negative emotional response can be categorized into two. The first is externally directed emotions such as anger. These emotions tend to lead to delinquencies and criminality attitudes. The second is the self-directed emotions such as depression. These responses lead to self-destructive behaviours, such as suicides (Huck et al., 2012; Jang & Johnson, 2003). Therefore, findings from this bibliometric analysis indicate that the classic strain theory with the main premise of financial delinquency/breakthrough has undergone major development, and currently included the psychological perspective, of emotion/mental behaviour.

The country which raked highest in the publication is the United States and the subject areas which have been addressed most include the social sciences, psychology and the medical sciences. The social sciences publications explains the impact of structural imbalances on human beings as social beings. This include the inter-relationship between the society and an individual, the relationships between different individuals which birthed peer pressures, discriminations, bullying, victimizations and many social vices. The psychological studies examined the mental and psychological results of the social strains which include depression, suicidal behaviors, self-destructive behaviors and various forms of addictions. Moreover, the studies that addressed strain theory from the lens of the medical sciences shows the health implications of social and psychological strains. These include the health implications of addictions such as alcoholism, cigarettes, drugs, and physical abuses such as domestic abuses. The following sub-sections will explain some of the popular areas focused on by prior studies using strain theory.

5.1 Suicide

Forty-one studies in the dataset addressed suicide. The country which has the highest publication addressing suicide in our dataset is China (Lew et al., 2020; Y. Liu et al., 2019; Y. Song et al., 2019; Zhang et al., 2018). Next to China is South Korea (Baek et al., 2019; Joon Jang, 2020). Some of the empirical studies on suicide were based on suicide notes and responses from suicide survivors. The findings from these studies revealed that psychological strain (such as aspiration and deprivations) have a strong influence on suicide. Studies also show that social support

has a direct influence in decreasing the influence of psychological strain on suicidality (Lew et al., 2020; Y. Liu et al., 2019; Y. Song et al., 2019; Zhang et al., 2018; Zhang, Lester, et al., 2020).

Moreover, outer-directed negative emotions such as anger do not have a significant influence on suicide (Joon Jang, 2020). Rather, the inward-directed negative emotions such as depression directly influence on suicide (Baek et al., 2019). Therefore, it can be implied that suicide may be prevented if opportunities that enhance social supports and expression of emotions are created for strained people.

5.2   Delinquency

Another deviant societal behaviour addressed by researchers using strain theory is Delinquencies. One hundred eighty-two articles addressed the issues of delinquencies, and most of these studies focused on adolescents' delinquent behaviours. Delinquent behaviours were studied in various countries context such as Australia, USA, China, South Korea among others (Archer, 2019; Beato & Marinho, 2009; Chen & Cheung, 2020; Cho & Galehan, 2020; Glassner, 2020; Graham & Wood Jr., 2019; Hautala & Sittner, 2019; Hoffmann & Cerbone, 1999; J. Song, 2020; VanderPyl, 2019). According to these studies, delinquencies are the result of environmental aversions.

Environmental aversion is explained as an aversive situation in which people are not legally able to escape. These aversive situations are part of societal imbalances. The response to these aversions may include deep emotional negative response such as anger which later transcend to pain avoidance or goal-seeking behaviours. For example, a youth may decide to run away from home to avoid the pain of domestic violence, and another person may decide to cyber scam others for money. More so, delinquencies are deemed to be high in people that experienced childhood parental neglect and domestic abuse (Iratzoqui & Watts, 2019). Some of the delinquency may be risky behaviours such as drug use, alcohol use, physical bullying, victimization, cyberbullying, weapon carrying, homicide and sexual abuse (Beato & Marinho, 2009; Brady et al., 2019; Kim, 2019; Wood Jr. & Graham, 2020). Hence, it can be summarized that delinquencies thrives a result of childhood trauma and can be prevented by the creation of a healthy environment for children to grow.

5.3   *Victimization*

One hundred papers addressed victimization. Studies show that victimization and domestic maltreatment are the strongest forms of strain which may influence all forms of negative emotions and deviant behaviours (Glassner & Cho, 2018; Walters, 2020). Victimization can either be by traditional physical bullying or cyberbullying (Lin et al., 2011; McGrath et al., 2012; Patchin & Hinduja, 2011). Victimization can lead to all form of undesirable outcomes such as substance use, poor performances, low self-esteem, social incompetence's, illegal streams of income, deviant peers associations and suicidality (Ferguson et al., 2016; Glassner & Cho, 2018; Lee et al.,

2019; Walters, 2020). Hence, victimization is a form of delinquencies which influences both external and self-directed negative emotions.

5.4 Gender Differences

Another focus of this dataset is on gender differences in strain experienced and reactions. Sixty studies from the database talked about male or female response to strain. (Brady et al., 2019; Lopez et al., 2019). The studies explained that different genders are subjected to different strains. Most of these studies focused specifically on males. Males are more associated with strains related to societal views on masculine roles, the need to make money, crimes and harsher parental punishments for young males.

Weapon carrying, drug use, bullying and victimization have a higher significance with strain for males (Brady et al., 2019; Hoffmann & Ireland, 2004; Yang et al., 2018). The negative emotional response to strains by the male is more of anger. Hence, for male, anger is the emotional response that leads to deviant behaviours, while for females, it's more of both anger and depression. Females are more strained as a result of marriage, in-laws, societal views regarding marriages and role strain (N. W. T. Cheung, 2015; Moazam & Shekhani, 2018). Thus, it is interesting to extend studies on gender and strain and explore more on strains experienced by females and their behavioural tendencies when reacting to strain.

5.5 Marginalization

Some studies addressed marginalization. According to the studies, strains such as victimization and social isolation are experienced more by marginalized groups. Few of these studies addressed marginalized groups such as homosexuals and prostitutes (Bucher et al., 2015; Button & Worthen, 2014) while the rest examined issues such as racial marginalization.

Thirty-one studies examined racial issues and strain. Most of these studies were published in the United States, and they examined the effect of strain on marginalized races and their deviant behaviours (Estrada-Martínez et al., 2012; Jang & Lyons, 2006; Nicole Leeper Piquero et al., 2016; Unnever et al., 2009). Hence, more studies can explore this area and examined strain experienced by marginalized groups in various countries context.

Factors such as social disorganization, perceived injustices, ethnic-racial hate crimes, illicit drug use, anti-white bias, and coloured bias are the perceived behavioural effect of strain on marginalized races. Moreover, structural inequalities such as disparities in wealth distribution affect the rate of deviant behaviours among the   discriminated races. Exposures to financial stress and discrimination influences depressive behaviours and results in a high risk of violent behaviours (Estrada-Martínez et al., 2012).

Few studies addressed Cultural perception of deviant behaviours. These studies explained the role of culture in the exhibition of some perceived deviant lifestyles such as marijuana intake, tobacco and alcohol consumption (Akins et al., 2010;

Black & Joseph, 2014). Just like suicide strain theory was developed for studies on suicide, racialized general strain theory was developed to address deviant behaviours related to racial strains. From this, it can be implied that societal systems and values differences influence the perceived definition of deviant behaviours. Although some deviant behaviours can be globally accepted across cultures such as murder and genocide. Some other deviant behaviours are specific to a culture and are subject to their societal definition. Behaviours such as tobacco consumption, marijuana and alcohol consumption. It is hence imperative for studies to examine behaviours that are deviant to each society. This will provide opportunities for future studies to be able to make their comparison and analysis.

5.6   Employees

Finally, 18 papers addressed employees' deviant behaviours as a result of organizational strain. Most of these studies examined how organizational strains affect employees. Work psychological strains influence employees depressive symptoms and suicide rate (Lew et al., 2020; Y. Liu et al., 2019, 2020; Zhang et al., 2018). Emotional exhaustion at work caused by workplace strain results in cyberloafing and negative emotions (S Hinduja, 2007; Koay, 2018). Moreover, exposure to work stress influences domestic abuse, such as transfer of aggression on immediate family members (Anderson & Lo, 2011). In the bid to reduce employee strain, organizational innovation support is found to reduce employees work deviant behaviours, although, not every organization established this support system (Tenzer & Yang, 2020). Despite worrying implications of organization strain on employees' delinquency, there is still a lack of study assessing employees' deviant behaviours, which warrant further investigations.

6.   Conclusion

This study analysed 772 papers on the application of strain theory for the past 40 years using bibliometric analysis. The publication pattern was revealed through the analysis of yearly publications trends. The United States was revealed to be the most productive country in publications of articles relating to strain theory. The network distribution of publications was also revealed as well as the analysis of authors and affiliations contributions. The citation networks were identified through citation analysis which identifies the most influential papers, authors, and institutions and authors by mapping citation and co-authorship networks. Most of the subject areas in which strain theory has been used include social sciences, psychology and medicine. And, most of the publications on strain theory have focused on academic publications such as journal articles, book chapters and conference papers. Also, the United States have invested a lot in grants and research support in promoting works related to strain theory. These are works that focused on human deviant behaviors and societal imbalances. Moreover, most of the top authors, institutions and top citations are from the United States. This shows that students and researchers that

are anticipating to research on human deviant behaviors may get better chance in the United States. This include the change of getting access to research grants and supports. Moreover, many countries such as African and Arab countries have limited publications in this area. Researchers from these countries may decide to employ the strain theory to reflect these country's context.

Furthermore, the intellectual structure of the dataset was mapped out by identifying the most prominent themes using co-occurrence and co-citation analyses. Moreover, through a combination of bibliometric analysis and systematic literature review, this study provides a detailed and objective investigation of the literature under review. Most of the studies in the dataset applied the Agnew strain theory, which is believed to have taken into consideration the previous flaws and criticism in Merton's theory. Aside from this, most of the studies examined factors such as victimization, delinquencies and marginalization as the causating societal strain elements. Other factors such as external and self-directed emotions such and anger and depression were examined. Moreover, the deviant behaviours such as self-destructive behaviours (which include drug use, alcoholism and suicide) were examined, and externally directed deviant behaviours (such as violence, carrying of weapons, and bullying) were examined.

Subject areas such as gender strain and employee's behaviour have been under-studied using strain theory. It is hence, imperative for future studies to focus on the various employee's deviant behaviours towards oneself, co-employees and organization using the strain theory. There is the need to also examine organization imbalances and employees' psychological strains using the strain theory. Future studies should also focus on examining the gender differences in strain experienced and reaction to strain using the strain theory. The future studies can focus on the female gender behaviour, as most of the few studies addressing strain based on gender-focused more on males. Moreover, future studies may include other databases which were not covered by this study and use other analysis applications aside the ones used by this study. Finally, future studies may explore this field according to subject areas such as social sciences, psychological and medical subject areas.

REFERENCES

Ahmi, A., & Mohamad, R. (2019). Bibliometric Analysis of Global Scientific Literature on Web Accessibility. *International Journal of Recent Technology and Engineering*, *7*(6), 250–258.

Ahmi, A., & Mohd Nasir, M. H. (2019). Examining the Trend of the Research on eXtensible Business Reporting Language (XBRL): A Bibliometric Review. *International Journal of Innovation, Creativity and Change*, *5*(2), 1145–1167.

Acosta, L. M., Andrews III, A. R., Acosta Canchila, M. N., & Ramos, A. K. (2020). Testing Traditional Machismo and the Gender Role Strain Theory With Mexican Migrant Farmworkers. *Hispanic Journal of Behavioral Sciences*, *42*(2), 215–234. https://doi.org/10.1177/0739986320915649

Agnew, R. (1999). A general strain theory of community differences in crime rates. *Journal of Research in Crime and Delinquency*, *36*(2), 123–155. https://doi.org/10.1177/0022427899036002001

Agnew, R. (2001). Building on the foundation of general strain theory: Specifying the types of strain most likely to lead to crime ands delinquency. *Journal of Research in Crime and Delinquency*, *38*(4), 319–361. https://doi.org/10.1177/0022427801038004001

Agnew, R. (2017). Building on the foundation of general strain theory: Specifying the types of strain most likely to lead to crime and delinquency. In *Recent Developments in Criminological Theory: Toward Disciplinary Diversity and Theoretical Integration* (pp. 311–353). Taylor and Francis. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85083753806&partnerID=40&md5=3f6bcbcfce346e8267d3d3dd10febd03

Agnew, R, Cullen, F. T., Burton Jr., V. S., Davidevans, T., & Gregorydunaway, R. (1996). A new test of classic strain theory. *Justice Quarterly*, *13*(4), 681–704. https://doi.org/10.1080/07418829600093151

Agnew, Robert. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, *30*(1), 47–88.

Agnew, Robert. (2015). *Strain Theories*. *1938*. https://doi.org/10.1002/9781405165518.wbeoss265.pub2

Agnew, Robert, & White, H. R. (1992). An empirical test of general strain theory. *Criminology*, *30*(4), 475–500.

Ahmi, A., Tapa, A., & Hamzah, A. H. (2020). Mapping of Financial Technology (FinTech) Research: A Bibliometric Analysis. *International Journal of Advanced Science and Technology*, *29*(8), 379–392.

Akins, S., Smith, C. L., & Mosher, C. (2010). Pathways to adult alcohol abuse across racial/ethnic groups: An application of general strain and social learning theories. *Journal of Drug Issues*, *40*(2), 321–352. https://doi.org/10.1177/002204261004000204

Anderson, A. S., & Lo, C. C. (2011). Intimate partner violence within law enforcement families. *Journal of Interpersonal Violence*, *26*(6), 1176–1193. https://doi.org/10.1177/0886260510368156

Archer, R. J. L. (2019). Sexual Assault Victimization, Fear of Sexual Assault, and Self-Protective Behaviors: A Test of General Strain Theory. *Victims and Offenders*, *14*(4), 387–407. https://doi.org/10.1080/15564886.2019.1608882

Baek, H., Roberts, A. M., & Higgins, G. E. (2019). The Impact of Negative Stimuli on Suicidality among Adulthoods: A Mediating Effect of Depression. *Deviant Behavior*, *40*(7), 778–790. https://doi.org/10.1080/01639625.2018.1438823

Bao, W.-N., Haas, A., & Pi, Y. (2004). Life Strain, Negative Emotions, and Delinquency: An Empirical Test of General Strain Theory in the People's Republic of China. *International Journal of Offender Therapy and Comparative Criminology*, *48*(3), 281–297. https://doi.org/10.1177/0306624X03258686

Barbieri, N., Clipper, S. J., Narvey, C., Rude, A., Craig, J. M., & Piquero, N. L. (2019). Assessing general strain theory and measures of victimization, 2002–2018. *Aggression and Violent Behavior*, *49*. https://doi.org/10.1016/j.avb.2019.06.005

Baron, S. W. (2006). Street youth, strain theory, and crime. *Journal of Criminal Justice*, *34*(2), 209–223. https://doi.org/10.1016/j.jcrimjus.2006.01.001

Baron, S. W. (2007). Street youth, gender, financial strain, and crime: Exploring Broidy and Agnew's extension to general strain theory. *Deviant Behavior*, *28*(3), 273–302. https://doi.org/10.1080/01639620701233217

Baron, S. W. (2019). Strain, Criminal Propensity, and Violence: Examining the Role of the Composite Moderator in Agnew's Extension to GST. *Crime and Delinquency*, *65*(6), 801–821. https://doi.org/10.1177/0011128718787511

Baron, S. W., & Hartnagel, T. F. (2002). Street youth and labor market strain. *Journal of Criminal Justice*, *30*(6), 519–533. https://doi.org/10.1016/S0047-2352(02)00174-5

Beato, C. C., & Marinho, F. C. (2009). Regional homicide patterns in Brazil. In *Criminality, Public Security, and the Challenge to Democracy in Latin America* (pp. 27–46). University of Notre Dame Press. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84902064500&partnerID=40&md5=d4284fac5482340ddeced537c847e18f

Bishopp, S. A., Piquero, N. L., Piquero, A. R., Worrall, J. L., & Rosenthal, J. (2020). Police Stress and Race: Using General Strain Theory to Examine Racial Differences in Police Misconduct. *Crime and Delinquency*. https://doi.org/10.1177/0011128720937641

Black, P., & Joseph, L. J. (2014). Still Dazed and Confused: Midlife Marijuana Use by the Baby Boom Generation. *Deviant Behavior*, *35*(10), 822–841. https://doi.org/10.1080/01639625.2014.889994

Botchkovar, E. V, & Hughes, L. A. (2010). Strain and alcohol use in Russia: A gendered analysis. *Sociological Perspectives*, *53*(3), 297–319. https://doi.org/10.1525/sop.2010.53.3.297

Brady, C. M., Baker, T., & Pelfrey Jr., W. V. (2019). Comparing the Impact of Bullying Victimization on Drug Use and Weapon Carrying among Male and Female Middle and High School Students: A Partial Test of General Strain Theory. *Deviant Behavior*. https://doi.org/10.1080/01639625.2019.1637405

Broidy, L, & Agnew, R. (1997). Gender and crime: A general strain theory perspective. *Journal of Research in Crime and Delinquency*, *34*(3), 275–306. https://doi.org/10.1177/0022427897034003001

Broidy, Lisa, Santoro, W. A., Broidy, L., & Santoro, W. A. (2017). General Strain Theory and Racial Insurgency : Assessing the Role of Legitimate Coping General Strain Theory and Racial Insurgency : Assessing the Role of Legitimate Coping. *Justice Quarterly*, *8825*(July), 1–28. https://doi.org/10.1080/07418825.2017.1327610

Bucher, J., Manasse, M., & Milton, J. (2015). Soliciting strain: Examining both sides of street prostitution through General Strain Theory. *Journal of Crime and Justice*, *38*(4), 435–453. https://doi.org/10.1080/0735648X.2014.949823

Burton Jr., V. S., Cullen, F. T., Evans, T. D., & Dunaway, R. G. (1994). Reconsidering strain theory: Operationalization, rival theories, and adult criminality. *Journal of Quantitative Criminology*, *10*(3), 213–239. https://doi.org/10.1007/BF02221211

Button, D. M., & Worthen, M. G. F. (2014). General Strain Theory for LGBQ and SSB Youth: The Importance of Intersectionality in the Future of Feminist Criminology. *Feminist Criminology*, *9*(4), 270–297. https://doi.org/10.1177/1557085114525988

Carson, D. C., Sullivan, C. J., Cochran, J. K., & Lersch, K. M. (2009). General strain theory and the relationship between early victimization and drug use. *Deviant Behavior*, *30*(1), 54–88.

https://doi.org/10.1080/01639620802050023

Chen, X., & Cheung, Y.-W. (2020). School Characteristics, Strain, and Adolescent Delinquency: a Test of Macro-Level Strain Theory in China. *Asian Journal of Criminology*, *15*(1), 65–86. https://doi.org/10.1007/s11417-019-09296-x

Cheung, C.-K., Ngai, N.-P., & Ngai, S. S.-Y. (2007). Family strain and adolescent delinquency in two Chinese Cities, Guangzhou and Hong Kong. *Journal of Child and Family Studies*, *16*(5), 626–641. https://doi.org/10.1007/s10826-006-9112-3

Cheung, N. W. T. (2015). Social strain, couple dynamics and gender differences in gambling problems: Evidence from Chinese married couples. *Addictive Behaviors*, *41*, 175–184. https://doi.org/10.1016/j.addbeh.2014.10.013

Cho, S., & Galehan, J. (2020). Stressful Life Events and Negative Emotions on Delinquency Among Korean Youth: An Empirical Test of General Strain Theory Assessing Longitudinal Mediation Analysis. *International Journal of Offender Therapy and Comparative Criminology*, *64*(1), 38–62. https://doi.org/10.1177/0306624X19873079

Cloward, R., & Ohlin, L. (1960). *Delinquency and Opportunity, Nueva York*. Free Press.

Cohen, A. K. (1955). *Delinquent boys; The culture of the gang.*

Cohen, A. K. (2019). *The Sociology of the Deviant Act : Anomie Theory and Beyond Author (s): Albert K . Cohen Source : American Sociological Review , Vol . 30 , No . 1 (Feb ., 1965), pp . 5-14 Published by : American Sociological Association Stable URL : https://www.jstor*. *30*(1), 5–14.

De Soto, W., & Tajalli, H. (2020). Gendered Patterns of Drug Use on a University Campus in the United States. *World Medical and Health Policy*, *12*(1), 32–46. https://doi.org/10.1002/wmh3.332

Durkheim, E. (1897). Suicide: A sociological study. *Paris, Alcan.*

Estrada-Martínez, L. M., Caldwell, C. H., Bauermeister, J. A., & Zimmerman, M. A. (2012). Stressors in Multiple Life-Domains and the Risk for Externalizing and Internalizing Behaviors Among African Americans During Emerging Adulthood. *Journal of Youth and Adolescence*, *41*(12), 1600–1612. https://doi.org/10.1007/s10964-012-9778-3

Ferguson, K. M., Bender, K., & Thompson, S. J. (2016). Predicting illegal income generation among homeless male and female young adults: Understanding strains and responses to strains. *Children and Youth Services Review*, *63*, 101–109. https://doi.org/10.1016/j.childyouth.2016.02.016

Fogaça, N., Rego, M. C. B., Melo, M. C. C., Armond, L. P., & Coelho, F. A. (2018). Job Performance Analysis: Scientific Studies in the Main Journals of Management and Psychology from 2006 to 2015. *Performance Improvement Quarterly, 30*(4), 231–247. https://doi.org/10.1002/piq.21248

Ford, J. A., Reckdenwald, A., & Marquardt, B. (2014). Prescription drug misuse and gender. *Substance Use and Misuse*, *49*(7), 842–851. https://doi.org/10.3109/10826084.2014.880723

Glassner, S. D. (2020). Bullying victimization and delinquent involvement: An application of general strain theory. *Children and Youth Services Review*, *116*. https://doi.org/10.1016/j.childyouth.2020.105099

Glassner, S. D., & Cho, S. (2018). Bullying victimization, negative emotions, and substance use: utilizing general strain theory to examine the undesirable outcomes of childhood bullying victimization in adolescence and young adulthood. *Journal of Youth Studies*, *21*(9), 1232–1249. https://doi.org/10.1080/13676261.2018.1461200

Graham, R., & Wood Jr., F. R. (2019). Associations between cyberbullying victimization and deviant health risk behaviors. *Social Science Journal*, *56*(2), 183–188. https://doi.org/10.1016/j.soscij.2018.05.005

Guilera, G., Barrios, M., & Gómez-Benito, J. (2013). Meta-analysis in psychology: a bibliometric study. *Scientometrics*, *94*(3), 943–954.

Haddon, R. C. (1993). Chemistry of the fullerenes: The manifestation of strain in a class of continuous aromatic molecules. *Science*, *261*(5128), 1545–1550. https://doi.org/10.1126/science.261.5128.1545

Hautala, D., & Sittner, K. (2019). Longitudinal Mechanisms Linking Perceived Racial Discrimination to Aggressive Delinquency among North American Indigenous Youth. *Journal of Research in Crime and Delinquency*, *56*(5), 694–735. https://doi.org/10.1177/0022427819834331

Hay, C. (2003). Family strain, gender, and delinquency. *Sociological Perspectives*, *46*(1), 107-135+139-140+143+146. https://doi.org/10.1525/sop.2003.46.1.107

Hinduja, S. (2007). Work place violence and negative affective responses: A test of Agnew's general strain theory. *Journal of Criminal Justice*, *35*(6), 657–666. https://doi.org/10.1016/j.jcrimjus.2007.09.002

Hinduja, Sameer, & Patchin, J. W. (2013). Social influences on cyberbullying behaviors among middle and high school students. *Journal of Youth and Adolescence*, *42*(5), 711–722.

Hoffmann, J. P. (2019). Nonlinear Strain Effects on Delinquent Behavior and Depressive Symptoms. *Journal of Research in Crime and Delinquency*, *56*(2), 213–253. https://doi.org/10.1177/0022427818800151

Hoffmann, J. P., & Cerbone, F. G. (1999). Stressful life events and delinquency escalation in early adolescence. *Criminology*, *37*(2), 343–374. https://doi.org/10.1111/j.1745-9125.1999.tb00489.x

Hoffmann, J. P., & Ireland, T. O. (2004). Strain and opportunity structures. *Journal of Quantitative Criminology*, *20*(3), 263–292. https://doi.org/10.1023/B:JOQC.0000037734.89980.57

Huck, J. L., Lee, D. R., Bowen, K. N., Spraitz, J. D., & Bowers, J. H. (2012). Specifying the dynamic relationships of general strain, coping, and young adult crime. *Western Criminology Review*, *13*(2), 36–45. https://www.scopus.com/inward/record.uri?eid=2-s2.0-84867604585&partnerID=40&md5=cd2dfd6741967aeb318690a997377974

Hughes, L. A., Antonaccio, O., & Botchkovar, E. V. (2018). Neighborhoods, Individuals, and Instrumental Crime in Russia and Ukraine: A Multilevel Test of Merton's Anomie Theory. *Journal of Quantitative Criminology*, *34*(4), 1019–1046. https://doi.org/10.1007/s10940-017-9364-7

Iratzoqui, A., & Watts, S. J. (2019). Longitudinal Risks for Domestic Violence. *Journal of Interpersonal Violence*, *34*(14), 2839–2862. https://doi.org/10.1177/0886260516663897

Jang, S. J., & Johnson, B. R. (2003). Strain, Negative Emotions, and Deviant Coping among African Americans: A Test of General Strain Theory. *Journal of Quantitative Criminology*, *19*(1), 79–105. https://doi.org/10.1023/A:1022570729068

Jang, S. J., & Lyons, J. A. (2006). Strain, social support, and retreatism among African Americans. *Journal of Black Studies*, *37*(2), 251–274. https://doi.org/10.1177/0021934705278781

Joon Jang, S. (2020). Prison Strains, Negative Emotions, and Deviance Among Prisoners in South Korea: A Latent-Variable Modeling Test of General Strain Theory. *International Journal of Offender Therapy and Comparative Criminology*. https://doi.org/10.1177/0306624X20928026

Kim, S. (2019). How Daily Strain Leads to Cyber Delinquency: a Focus on the Role of Self-Esteem and Anger. *Current Psychology*. https://doi.org/10.1007/s12144-019-00491-8

Koay, K. Y. (2018). Workplace ostracism and cyberloafing: a moderated–mediation model. *Internet Research*, *28*(4), 1122–1141. https://doi.org/10.1108/IntR-07-2017-0268

Krampen, G., Von Eye, A., & Schui, G. (2011). Forecasting trends of development of psychology from a bibliometric perspective. *Scientometrics*, *87*(3), 687–694.

Kuptsevych-Timmer, A., Antonaccio, O., Botchkovar, E. V, & Smith, W. R. (2019). Scared or Attached? Unraveling Important Links in Strain–Crime Relationships Among School Students. *International Journal of Offender Therapy and Comparative Criminology*, *63*(8), 1175–1201. https://doi.org/10.1177/0306624X18814342

Lee, J. M., Kim, J., Hong, J. S., & Marsack-Topolewski, C. N. (2019). From Bully Victimization to Aggressive Behavior: Applying the Problem Behavior Theory, Theory of Stress and Coping, and General Strain Theory to Explore Potential Pathways. *Journal of Interpersonal Violence*. https://doi.org/10.1177/0886260519884679

Lew, B., Chistopolskaya, K., Liu, Y., Talib, M. A., Mitina, O., & Zhang, J. (2020). Testing the Strain Theory of Suicide - The Moderating Role of Social Support. *Crisis*, *41*(2), 82–88. https://doi.org/10.1027/0227-5910/a000604

Li, J., Lei, L., & Cheng, L. (2020). Mapping Evaluation, Appraisal and Stance in Discourse (2000-2015): A Bibliometric Analysis. *Glottotheory*, *10*(1–2), 31–55. https://doi.org/10.1515/glot-2019-0002

Lin, W.-H., Cochran, J. K., & Mieczkowski, T. (2011). Direct and Vicarious Violent Victimization and Juvenile Delinquency: An Application of General Strain Theory. *Sociological Inquiry*, *81*(2), 195–222. https://doi.org/10.1111/j.1475-682X.2011.00368.x

Lin, W.-H., Dembo, R., Sellers, C. S., Cochran, J., & Mieczkowski, T. (2014). Strain, negative emotions, and juvenile delinquency: The United States versus Taiwan. *International Journal of Offender Therapy and Comparative Criminology*, *58*(4), 412–434. https://doi.org/10.1177/0306624X13492656

Liu, L., Visher, C. A., & O'Connell, D. J. (2020). The Strain From Procedural Injustice on Parolees: Bridging Procedural Justice Theory and General Strain Theory. *Crime and Delinquency*, *66*(2), 250–276. https://doi.org/10.1177/0011128719839376

Liu, Y., Usman, M., Zhang, J., & Gul, H. (2020). Making Sense of Chinese Employees' Suicidal Ideation: A Psychological Strain—Life Meaning Model. *Psychological Reports*, *123*(2), 201–223. https://doi.org/10.1177/0033294118811096

Liu, Y., Zhang, J., Hennessy, D. A., & Zhao, S. (2019). Psychological strains, depressive symptoms, and suicidal ideation among medical and non-medical staff in urban china. *Journal of Affective Disorders*, *245*, 22–27. https://doi.org/10.1016/j.jad.2018.10.111

Lopez, V., Kopak, A., & Pasko, L. (2019). Substance Use Pathways Among Female Adolescent Offenders. *Crime and Delinquency*, *65*(3), 375–400. https://doi.org/10.1177/0011128718811930

Mazerolle, P., Burton Jr., V. S., Cullen, F. T., Evans, T. D., & Payne, G. L. (2000). Strain, anger, and delinquent adaptations specifying general strain theory. *Journal of Criminal Justice*, *28*(2), 89–101. https://doi.org/10.1016/S0047-2352(99)00041-0

McGrath, S. A., Marcum, C. D., & Copes, H. (2012). The Effects of Experienced, Vicarious, and Anticipated Strain on Violence and Drug Use among Inmates. *American Journal of Criminal Justice*, *37*(1), 60–75. https://doi.org/10.1007/s12103-011-9127-1

Menard, S., Covey, H. C., & Franzese, R. J. (2015). Adolescent exposure to violence and adult illicit drug use. *Child Abuse and Neglect*, *42*, 30–39. https://doi.org/10.1016/j.chiabu.2015.01.006

Merton, R. K. (1938). Social structure and anomie. *American Sociological Review*, *3*(5), 672–682.

Merton, R. K., & Ashley-Montagu, M. F. (1940). Crime and the anthropologist. *American Anthropologist*, *42*(3), 384–408.

Miller, R. N., Fagan, A. A., & Wright, E. M. (2014). The moderating effects of peer and parental support on the relationship between vicarious victimization and substance use. *Journal of Drug Issues*, *44*(4), 362–380. https://doi.org/10.1177/0022042614526995

Moazam, F., & Shekhani, S. (2018). Why women go to medical college but fail to practise medicine: perspectives from the Islamic Republic of Pakistan. *Medical Education*, *52*(7), 705–715. https://doi.org/10.1111/medu.13545

Monsurat, I. (2020). African insurance (spiritualism) and the success rate of cybercriminals in Nigeria: A study of the yahoo boys in Ilorin, Nigeria. *International Journal of Cyber Criminology*, *14*(1), 300–315. https://doi.org/10.5281/zenodo.3755848

Moosa, V., & Shareefa, M. (2020). *Science mapping the most-cited publications on workplace learning. 32*(4), 259–272. https://doi.org/10.1108/JWL-10-2019-0119

Navarrete-Cortes, J., Fernández-López, J. A., López-Baena, A., Quevedo-Blasco, R., & Buela-Casal, G. (2010). Global psychology: A bibliometric analysis of Web of Science publications. *Universitas Psychologica*, *9*(2), 553–567.

Nwachukwu, P. T. T. (2014). Conceptualizing assimilation of interactional justice within social justice ethical code application as exemplified at imo state, Nigeria: Widowhood and inheritance challenges. *Mediterranean Journal of Social Sciences*, *5*(23), 2137–2147. https://doi.org/10.5901/mjss.2014.v5n23p2137

Piquero, N L, & Sealock, M. D. (2010). Race, crime, and General Strain Theory. *Youth Violence and Juvenile Justice*, *8*(3), 170–186. https://doi.org/10.1177/1541204009361174

Piquero, Nicole Leeper, Sealock, M. D., & Piquero, N. L. (2016). *Gender and general strain theory : A preliminary test of Broidy and Agnew ' s gender / GST hypotheses G E N D E R AND G E N E R A L STRAIN THEORY : A P R E L I M I N A R Y TEST OF BROIDY AND AGNEW ' S G E N D E R /. 8825*(June). https://doi.org/10.1080/07418820400095761

Ramalho, A., Souza, J., & Freitas, A. (2021). The use of artificial intelligence for clinical coding automation: A bibliometric analysis. In *Advances in Intelligent Systems and Computing: Vol. 1237 AISC* (pp. 274–283). https://doi.org/10.1007/978-3-030-53036-5_30

Sharp, S. F., Brewster, D., & Love, S. R. (2005). Disentangling strain, personal attributes, affective response and deviance: A gendered analysis. *Deviant Behavior*, *26*(2), 133–157. https://doi.org/10.1080/01639620590522028

Si, H., Shi, J. G., Tang, D., Wen, S., Miao, W., & Duan, K. (2019). Application of the theory of planned behavior in environmental science: a comprehensive bibliometric analysis. *International Journal of Environmental Research and Public Health*, *16*(15). https://doi.org/10.3390/ijerph16152788

Sigfusdottir, I. D., Asgeirsdottir, B. B., Gudjonsson, G. H., & Sigurdsson, J. F. (2013). Suicidal ideations and attempts among adolescents subjected to childhood sexual abuse and family conflict/violence: The mediating role of anger and depressed mood. *Journal of Adolescence*, *36*(6), 1227–1236. https://doi.org/10.1016/j.adolescence.2013.10.001

Song, J. (2020). Patterns and explanations of delinquency among Korean youth using general strain theory. *Children and Youth Services Review*, *114*. https://doi.org/10.1016/j.childyouth.2020.105080

Song, Y., Bai, W., Wang, M., Liu, X., Zhang, L., Yu, W., Li, Y., Hua, W., Lew, B., Talib, M. A., & Kou, C. (2019). The association between psychological strain and suicidal behaviors among college students: A mental health survey in Jilin Province, Northeast China. *Journal of Affective Disorders*, *259*, 195–200. https://doi.org/10.1016/j.jad.2019.08.042

Tang, M., Hong, J., Guo, S., Liu, G., & Shen, G. Q. (2021). A bibliometric review of urban energy metabolism: Evolutionary trends and the application of network analytical methods. *Journal of Cleaner Production*, *279*. https://doi.org/10.1016/j.jclepro.2020.123403

Thoits, P. (2007). Stress , Coping , and Social Support Processes : Where Are We ? What Next ? Peggy A . Thoits Journal of Health and Social Behavior , Vol . 35 , Extra Issue : Forty Years of Medical Sociology : The State of the Art and Directions for the Future . (1995),. *Health (San*

Francisco), *35*(1995), 53–79.

Torres, C. E., D'Alessio, S. J., & Stolzenberg, L. (2020). The Effect of Social, Verbal, Physical, and Cyberbullying Victimization on Academic Performance. *Victims and Offenders*, *15*(1), 1–21. https://doi.org/10.1080/15564886.2019.1681571

Unnever, J. D., Cullen, F. T., Mathers, S. A., McClure, T. E., & Allison, M. C. (2009). Racial discrimination and Hirschi's criminological classic: A chapter in the sociology of knowledge. *Justice Quarterly*, *26*(3), 377–409. https://doi.org/10.1080/07418820802506180

VanderPyl, T. (2019). "I Want to Have the American Dream": Messages of Materialism as a Driving Force in Juvenile Recidivism. *Criminal Justice and Behavior*, *46*(5), 718–731. https://doi.org/10.1177/0093854819826235

Walker, D. 'A., & Holtfreter, K. (2016). Adolescent Motherhood, Depression, and Delinquency. *Journal of Child and Family Studies*, *25*(3), 939–948. https://doi.org/10.1007/s10826-015-0268-6

Walters, G. D. (2020). Unraveling the Bidirectional Relationship Between Bullying Victimization and Perpetration: A Test of Mechanisms From Opportunity and General Strain Theories. *Youth Violence and Juvenile Justice*. https://doi.org/10.1177/1541204020922874

Wang, X., Xu, Z., Su, S.-F., & Zhou, W. (2021). A comprehensive bibliometric analysis of uncertain group decision making from 1980 to 2019. *Information Sciences*, *547*, 328–353. https://doi.org/10.1016/j.ins.2020.08.036

Wood Jr., F. R., & Graham, R. (2020). "Safe" and "At-Risk": Cyberbullying Victimization and Deviant Health Risk Behaviors in Youth. *Youth and Society*, *52*(3), 449–468. https://doi.org/10.1177/0044118X18810943

Yang, X., Lau, J. T. F., Wang, Z., & Lau, M. C. M. (2018). Potential roles of masculine role discrepancy, discrepancy stress, and self-esteem in affecting addictive use of social networking sites among Chinese men: A random population-based study. *Journal of Behavioral Addictions*, *7*(3), 676–685. https://doi.org/10.1556/2006.7.2018.81

Yilmaz, M., Lo, C. C., & Solakŏlu, Ö. (2015). Cigarette Use by Turkish Adolescents and Its Links to Strain, Depression, and Anger. *Journal of Drug Issues*, *45*(4), 396–408. https://doi.org/10.1177/0022042615603201

Yin, M. S. (2013). Fifteen years of grey system theory research: A historical review and bibliometric analysis. *Expert Systems with Applications*, *40*(7), 2767–2775. https://doi.org/10.1016/j.eswa.2012.11.002

Zhang, J., Huen, J. M. Y., Lew, B., Chistopolskaya, K., Talib, M. A., Siau, C. S., & Leung, A. N. M. (2020). Depression, Anxiety, and Stress as a Function of Psychological Strains: Towards an Etiological Theory of Mood Disorders and Psychopathologies. *Journal of Affective Disorders*, *271*, 279–285. https://doi.org/10.1016/j.jad.2020.03.076

Zhang, J., Lester, D., Haines, J., Williams, C. L., Zhou, R., Qi, Q., Li, T., Liu, L., & Ma, W. (2020). Identifying Psychological Strains in Suicide Notes. *Omega (United States)*, *82*(1), 120–127. https://doi.org/10.1177/0030222818811466

Zhang, J., Liu, Y., Zhang, J., & Chen, C. (2018). Linking Psychological Strain and Suicide Ideation: A Test of the Mediating Effect of Self-Determination among Chinese Workers. *Journal of Nervous and Mental Disease*, *206*(5), 362–369. https://doi.org/10.1097/NMD.0000000000000809

Zhang, J., & Lv, J. (2014). Psychological strains and depression in Chinese rural populations. *Psychology, Health and Medicine*, *19*(3), 365–373. https://doi.org/10.1080/13548506.2013.808752