



## **Bibliometric Insights into Anger and Aggression Research**

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Received: August 11, 2024; Revised & Accepted: September 22, 2024

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### **Abstract**

**Background:** Anger and aggression are central constructs in psychology, sociology, and behavioral sciences, affecting mental health and social interactions. Despite extensive research, there is a need to map the trends and focal points of studies in this area, particularly to understand how themes like mental health disorders, developmental psychology, and social dynamics interconnect with aggression. **Objective:** This study aims to conduct a bibliometric analysis of global research on anger and aggression, identifying key trends, influential authors, leading research areas, and interdisciplinary approaches. The goal is to provide insights into the trajectory and focus of scholarly work in this field. **Methods:** Using bibliometric techniques, including co-occurrence mapping and citation analysis, data from relevant research articles were extracted and analyzed through VOSviewer. Key terms, authorship networks, and publication patterns were examined to uncover thematic clusters and research trajectories. **Findings:** The analysis highlights several prominent themes in the literature on anger and aggression, including their links to psychological disorders (e.g., depression, stress), behavioral development in children and adolescents, and the influence of family and social environments. The co-occurrence analysis also points to growing interest in therapeutic interventions,



cognitive and neurological underpinnings of aggression, and biological factors, such as brain injury. Authors such as Richard Tremblay, David Farrington, and Manuel Eisner have emerged as influential figures in this research domain. **Conclusion:** This bibliometric study reveals that research on anger and aggression is characterized by interdisciplinary approaches, integrating psychology, neuroscience, and social sciences. The focus on mental health and therapeutic interventions highlights the practical applications of this research in clinical settings. The increasing interest in the neurological and biological dimensions of aggression also suggests a broadening of the research agenda. **Novelty:** This study provides a comprehensive overview of the intellectual landscape of anger and aggression research through a bibliometric lens, offering new insights into the evolving trends, collaboration networks, and thematic directions in the field. It is one of the first studies to integrate a co-occurrence analysis with citation data to map both psychological and biological dimensions of aggression research.

**Keywords:** Anger, Aggression, Bibliometrics, Mental Health, Psychological Disorders, Intervention, Co-occurrence Analysis, Social Dynamics

## **Introduction**

Anger is a fundamental emotion common to human beings and is usually marked by feelings of resentment, frustration, or the urge for revenge (Neupane & Lourdasamy, 2024; Smits & Kuppens, 2005). It is a reaction that results when one is threatened or has encountered some type of injustice. Anger is a feeling fluctuating from a slight irritation to extreme rage. Aggression is somewhat different from an emotional state; it is one form of outward behavior often displayed due to negative feelings such as anger. It is universally observed in diverse cultures and leads to dangerous behaviors targeted towards oneself, others, or objects (Garofalo & Spantidaki Kyriazi, 2024). The combination of anger and aggression has become a great source of concern for psychological and behavioral research as the emotions are closely related to many problems that affect individuals and society.

Anger and aggression can be associated with various physiological and psychological symptoms. Indeed, studies have established that at one time or another in life, individuals, especially females, may have elevated anger during periods like the premenstrual stage, after childbirth, and during menopause (Neupane, Pant, & Bhattarai, 2023; Neupane D. , 2018). The tendency to become aggressive and experience anger is also a common phenomenon among psychiatric patients, which tends to aggravate other underlying psychiatric disturbances. These feelings do not occur in isolation; they often co-occur with other mental health conditions, influencing distress and creating a problem in treatment (Neupane D. , 2019). These issues only became more urgent in the time of COVID-19 infection, when people suffered from stresses, social isolations, and health anxieties unprecedented in human history, contributing to an uptick in anger and aggressive behavior across demographics (Neupane & Khanal, 2017).



One of the most important concerning features of anger and aggression is its linkage with suicide. Anger and aggression are recognized as critical personality attributes that can make individuals prone to suicidal ideation and behavior. Anger that is left unmanaged leads to impulsivity, and aggression might result in self-harm or harm to others. Anger and aggression also became significant risk factors in studies of both suicide attempts and completions. These emotions have adverse consequences on the individual himself, the family, community, and health systems. The understanding of the dynamics of anger and aggression is very critical in the development of effective prevention strategies and interventions that will decrease risk for suicide.

During the COVID-19 pandemic, the societal burden of anger and aggression has been magnified. The pandemic certainly contained a unique set of stressors that resulted in global responses of anger and aggression. (Karki, Mahat, & Kandel, 2021; Adhikari D. B., Ghimire, Neupane, & Dhakal, 2018). Lockdowns, economic difficulties, health worries, and social isolation further heightened these negative emotions, lowering interpersonal interaction and mental health outcomes. Already strained families saw increases in incidents of domestic violence, child abuse, and other types of aggression. Healthcare and mental health services were stretched to their limits, and this factor evidenced further mechanisms for dealing with or preventing anger (Mahat, Karki, Neupane, Shrestha, & Shrestha, 2024). The world is slowly recuperating from the pandemic, but it is now increasingly evident that there is an acute requirement to consider the emotional aftermath of the pandemic, and it is regarding anger and aggression.

Studies to explain the underlying mechanisms have greatly increased in view of the effects of anger and aggression on welfare at individual and social levels. Anger is caused by biological, psychological, and environmental factors combined. Neurologically, distinct parts of the brain have been implicated in regulating anger, including the amygdala and prefrontal cortex. On the other hand, hormonal imbalances, especially those concerned with testosterone and cortisol, may lead to changes in aggression. At times, anger and aggression relate to psychological problems emanating from learned behaviors or traumatic experiences (Ghimire & Neupane, 2022; Acives, Kong, Fuller, & DiGiuseppe, 2011). These findings have subsequently led to the development of various management strategies ranging from CBT to mindfulness techniques to pharmacological interventions.

While there is an enormous amount of research with regard to the mechanisms of, and the management of, anger and aggression, there is a limited scientometric analysis of research on these topics. Scientometrics encompasses the quantitative analysis of scientific literature and forms a basis for useful insights on research trends, influential publications, and collaborative networks of researchers (Abaş & İşleyen, 2024; Lamichhane & Neupane, 2023). Although anger and aggression are one of the established fields of inquiry, to date, only a limited number



of comprehensive bibliometric appraisals charting the trajectory in the growth of research evidence covering these twin areas have been conducted. This is a surprise given the increasing prevalence of the anger-related disorders and, as a result, the areas of mental health and behavioral science becoming highly attractive. In fact, there is an increasing need to have a better understanding of the research landscape in this area with the interest in finding out the emergent trends in order to direct further studies.

Bibliometrics, first coined in 1969, has, through the time, evolved to become one of the important ways of conducting scientific literature analysis. Bibliometric analysis permits following key research hotspots, tracking evolution, and assessing scientific inquiry by qualitative and quantitative means. It also permits the understanding of the distribution of research across various countries, regions, authors, and journals (Abyrne & Cullen, 2024; Angus, Schutter, Terburg, Van Honk, & Harmon-Jones, 2016). Bibliometrics enables the mapping of the most popular research areas in the field of anger and aggression, leading countries, and even the journals publishing the most influential studies in the context of research into anger and aggression. This kind of analysis can be of high value not only for researchers but also for policy makers and mental health professionals in their pursuit of evidence-based interventions.

VOSviewer is a software tool developed for visualizing relationships between scientific publications in the field of bibliometrics. VOSviewer generates maps that visualize the structure of research fields by means of co-authorship networks, keyword co-occurrences, and citation analyses. Application of VOSviewer to the study of anger and aggression has the effect of allowing researchers to conceptualize more succinctly those works that are proving to be most influential, while key collaborations and research gaps also become more apparent. This tool has recently been used in several disciplines such as psychology, medicine, and behavioral sciences with the intention of monitoring the research trends and indicating further directions. In the context of anger and aggression, VOSviewer can be used to identify the emergent dominant themes and methodologies that have emerged over the last 10 years.

This work aims to conduct a deep bibliometric analysis of anger and aggression research over the last 25 years with the application of tools like VOSviewer. It will map the main research hotspots, the collaborations, and the development trends this area has taken. It also tends to help in furnishing useful insights into both basic research and clinical practices, such as prevention and treatment of anger-related disorders. This study, in this respect, will add to the emerging literature on anger and aggression and provide a foundation for further research and mental health interventions. It will provide a critical milestone in the development of deeper understanding regarding how to study anger and aggression, and will thereby improve strategies for managing such difficult emotions both clinically and at the social level.



## **Methodology**

### Data Source

Platform: The research platform on which the bibliometric analysis is conducted is Lens.org, which allows access to a huge database of scholarly articles and patents\_(Penfold, 2020). Because of its powerful search possibilities and comprehensiveness in covering academic publishing, Lens.org is chosen for this study\_(Neupane & Lourdusamy, 2024).

Search Terms: The key words used for this study will be the terms "anger," "aggression," and the combined phrase "anger AND aggression." These terms have been selected because they provide a wide scope of topics related to emotional and behavioral responses in a wide array of disciplines, ranging from psychology and psychiatry to social sciences.

### Filters:

To refine the search and make it relevant, limits were placed on specific criteria. The filter for Publication Type was "Journal articles," excluding other formats like books or conference proceedings in order to focus on just peer-reviewed research. This filter will ensure high-quality academic studies are included.

### Publication Year:

For this review, the analysis period has been set from 2014 to 2023 to make sure that the prevailing developments and trends within the subject are accurately captured with a view to giving an overview of the contemporary state of research in the field of anger and aggression.

### Data Collection

File Format: The records have been downloaded from Lens.org in CSV or RIS format. These formats are selected because they are compatible with bibliometric software. In addition, data processing is easier in these formats. CSV is one of the most common file formats. Simple in structure, these types of files can easily be opened in most applications that support spreadsheet file formats. RIS format is suitable for imports into reference management tools for easier organization and analysis of bibliographic data.

The database contains a very complete set of fields that may be of interest for bibliometric purposes: titles of the articles; authors and affiliations; the abstract of the contents describing the research work; keywords, representing the main topics the research has dealt with. Moreover, it gives publication dates to outline when the research was published, journal titles where the publications have been made, and citation counts quantifying the impact and influence of the respective articles. Detailed information of this nature, therefore, permits trend analysis, identification of key contributors, and dissemination of research findings regarding the domain under review, Anger and Aggression.



### Data Preparation

Data preparation involves cleaning up the dataset that is collected to make it accurate and consistent for the bibliometric analysis. Cleaning includes removal of duplicate records. Duplicates come perhaps because several entries of the same article were made, or there was some variation in those entries. Standardization of the authors' names is considered important, since proper credit needs to be given to the respective authors. On the other hand, standardization will also help avoid dispersing their citation counts among variations of an author's name. Also, standardizing keywords and journal titles ensures homogeneity for finer keyword analysis and identification of research trends. This guarantees reliability in the dataset as ready for deep analysis, hence enhancing the accuracy of the bibliometric insights.

### Co-authorship Analysis: Mapping Collaborations Among Authors

The application of the co-authorship analysis by VOSviewer enables researchers to visualize and map the collaborative relationship of authors in either one particular field or many disciplines. Important researchers and research groups are identified through the data analysis in co-authorship, the structure of the research community comprehended, and probable collaborators spotted. VOSviewer produces the network of co-authorship relations based on bibliographic data, where the nodes are the authors and the edges symbolize the links of co-authorship. Each link has a strength that is representative of frequency or intensity of collaboration. This kind of analysis enables the identification of highly influential authors and the detection of collaboration patterns that may serve important functions for stimulating further research collaborations and improving academic productivity.

### Co-occurrence Analysis: Keyword Relationship Visualization

Co-occurrence analysis in VOSviewer is a method of visualizing the relationship of keywords that appear in scientific literature. Keyword co-occurrence in various articles allows a researcher to identify the most important topics or trends in a given research area. As a matter of fact, this approach provides a way for one to find those keywords which occur often and belong or link to each other. The resulting visual map shows word clusters that repeatedly appear together in texts, hence referring to related subfields or research themes. This form of visualization provides significant insight into the conceptual nature of a given area of study, thus allowing the scholar to spot areas of interest, trace gaps within the literature, and demonstrate possible ways towards future work.

### Citation Analysis: Identifying Influential Papers and Authors

VOSviewer provides the facility for citation analysis in the identification of highly influential papers and authors in the concerned field. Based on the citation data obtained, VOSviewer plots a network of citations showing how often certain papers and authors are cited by others. With the help of such an analysis, important works or key contributors might be identified as having given significantly toward the advancement of the subject area. Citation network visualizations





can also help in identifying the centrality and influence of particular papers and authors by highlighting those that are highly cited and which papers provide links that are critical parts within a citation network. The information is important to understand how the growth of a field came about and what the contribution by leading researchers has been.

#### Longitudinal Visualization and Interpretation

VOSviewer provides detailed visualization, hence interpretation of complex bibliometric data becomes easier. Each of these is a different explicit mapping-density maps, overlay maps, network maps-providing again different views of the data. For example, in the case of density maps, the distribution of items in a network highlights where its most concentrated activities are. Similarly, overlay maps can show temporal trends by demonstrating how specific keywords or citation counts change over time. On the other hand, network maps have something to do with showing relations among various items. The visualizations come out to be interactive in nature, in that it is possible to zoom in on an area of interest, changing parameters, and looking from different angles in order to increase understanding and interpretation of the research landscape.

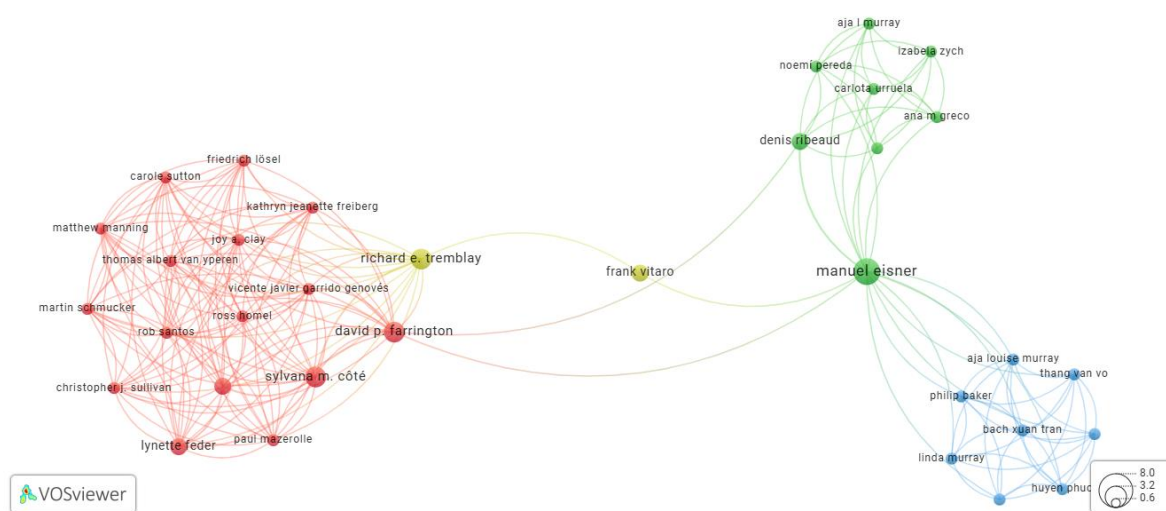
#### Visualization and Interpretation Tools: VOSviewer for Mapping and Visualization

VOSviewer is a software package specifically designed to map and visualize bibliometric networks\_(Neupane & Lourdasamy, Beyond Borders: The Accelerating Momentum of Domestic Violence Research Worldwide, 2024)\_(Mahat, Neupane, & Shrestha, Quantitative Research Design and Sample Trends: A Systematic Examination of Emerging Paradigms and Best Practices, 2024)\_(Wagle, Neupane, Nyaupane, & Timalseña, 2024)\_(Adhikari D. B., Ghimire, Neupane, & Regmi, 2018). This maps complex relationships typical in scholarly data into detailed maps and works well with large datasets. Several map types can be generated with VOSviewer, such as network visualizations, density maps, and overlay maps. These visualizations will help in interpreting the data by highlighting patterns and connections. For instance, network diagrams may visualize the structure of collaborations among authors, highlight relationships among cooccurring keywords, and present citation networks to learn about influential papers and authors. All these possibilities enhance the interpretability and usability of this tool by enabling customized visualizations-granularity, zooming in on clusters, color schemes.

Major VOSviewer outputs are network diagrams which can express a range of different kinds of bibliometric relationships visually. In the co-authorship analysis, for example, the network diagram shows cooperation between authors by nodes representing the authors and edges showing links when co-authorship exists. It can be set so that the size of the nodes becomes proportional to the number of publications or the number of times two authors have collaborated. The keyword co-occurrence network diagrams show the relationship of keywords where clusters give an overview of keywords that have frequently appeared together in

publications. This helps in the identification of key research themes and emerging trends. The network diagram represents the citation analysis of how papers cite each other, nodes represent the papers, and edges show citation links. These visualizations identify the seminal papers and influential authors since they locate the most highly cited with the central position in the network. In general, such visualizations help researchers to understand the structure and dynamics of academic research.

## Results



*Figure 1: Co-authorship Network Visualization*

### **Co-authorship Network**

The network of co-authorships, developed using VOSviewer, presents a mapping of the contribution made by researchers to the studies on the areas of Aggression and Violence. The colours used are different clusters of the authors, linked by their co-authorship patterns, which represent some of the important contributors in the same field.

**Red Cluster: Network of Richard E. Tremblay and David P. Farrington**

The red cluster is dominated by Richard E. Tremblay and David P. Farrington, two leading figures in research on aggression and violence. This dense cluster includes highly interconnected researchers such as Sylvana M. Côté, Lynette Feder, and Christopher J. Sullivan. The large number of their collaboration with many others indicates the leading positions of Tremblay and Farrington in establishing developmental criminology and longitudinal research on child and adolescent aggression. In particular, their work on risk factors for violent behavior has led to strategies for intervention and public policy in youth violence prevention. The nature of this network would suggest that these researchers also share some theoretical perspectives and methodological approaches, perhaps related to longitudinal





studies and evidence-based interventions. The close interconnections between cluster members suggest a strong collaboration culture that should support the elaboration of integrated frameworks for investigation and study of aggression and violence.

#### Green Cluster: Manuel Eisner's Network

The green cluster concentrates around Manuel Eisner, with prominent collaborators like Denis Ribeaud and Izabela Zych. Eisner is known for his cross-national studies on violence, especially the "Cambridge Study in Delinquent Development." This cluster represents a different methodological focus; scholars could be more interested in global perspectives and the social epidemiology of violence. The network of Eisner is less dense compared to the red cluster, perhaps this may indicate that his collaborations are more cross-disciplinary, not so condensed in only one theoretical framework but across different contexts of violence research. The connection between the group around Eisner with the wider violence research community may indicate that cross-discipline and transcultural approaches are on the rise. Anyway, the rare but strong connections between Eisner's network with others, for example Frank Vitaro and Richard E. Tremblay, suggest bridges between theoretically heterogeneous communities where value diversity plays an important role in understanding the phenomenon of aggression.

#### Blue Cluster: Aja L. Murray and Philip Baker's Network

It seems that the blue cluster focuses on very contemporary issues such as digital aggression, cyberbullying, and the nexus of technology with violent behavior. These issues are led by Aja L. Murray and Philip Baker. Research by Murray is widely recognized to explore the role of developmental and statistical models in understanding aggressive behavior, especially in light of recent societal challenges. This cluster is less interconnected than the red and green clusters, perhaps indicating newer collaborations or emerging areas of research in the field of aggression and violence. On the other hand, it might show growth in the field to include global health implications in the effect of violence across diverse populations with researchers such as Bach Xuan Tran and Linda Murray.

The overall structure of the network implies that the research on aggression and violence is characterized by both highly cohesive collaborative groups and looser interdisciplinary connections. In fact, the density of the red cluster can be used to illustrate just how the more traditional criminological research, based on developmental factors, has built a core of established partnerships. On the other hand, the green and blue clusters represent newer and more diverse lines of inquiry, such as the societal and global dimensions of violence, marking a shifting research landscape. One crucial observation would be the fact that, to a certain extent, there may be no integration between clusters, therefore indicating fragmentation of knowledge in the studies of aggression and violence. Whereas there are some prominent figures who bridge some gaps—such as Tremblay and Eisner—more integrative efforts could be made in order to facilitate knowledge transfer across subfields. The collaboration between traditional





often at the intersection of various disciplines, such as psychology, neuroscience, sociology, and criminology.

#### Dominant Themes: Age Groups

Two of the more important nodes strongly associated with "humans" are "adolescent" and "middle aged", suggesting that the research is rather strongly focused on these age groups. The large size of "adolescent" suggests, not surprisingly, a very strong focus on youth aggression, consistent with the developmental perspective on violence and aggressive behavior. These would likely study variables such as self-concept and externalizing behavior in relation to achievement, all of which are linked with the adolescent node. Such studies, in other words, focus on how identity formation and external influences combine to form aggression in young people. The nodes for "middle aged" and "aged" suggest that aggression and violence are studied across the lifespan; however, these are smaller nodes, which may indicate that research in these age groups is less than for adolescents.

#### Biological and Psychological Underpinnings

On the right side of the network, we can find several clusters dealing with biological and physiological issues related to aggression. Terms falling in this cluster-which are "dopamine", "serotonin", "brain", and "neuropsychological tests"-indicate an in-depth concern for neurological and biochemical pathways at the basis of aggressive behavior. Thus, a sizeable part of the literature seems concentrated on the physiological causes for aggression, including neurotransmitters and brain function. Related terms, like "impulsive behavior" and "self-control," reveal the psychological aspects of violence in terms of biological influences on violent and aggressive behaviors. For example, the connection of self-control with aggression could show studies on how deficits in self-regulation lead to violent behavior and would, therefore, be indicative of psychological and criminological conceptions of violence.

#### Social-Environmental Factors

Terms such as "workplace violence", "domestic violence", and "hospitals/public" on the left-hand side of the network suggest that the literature places emphasis on environmental and situational contexts in which aggression occurs. The appearance of the term "workplace violence" infers that research goes beyond interpersonal aggression to take into consideration institutional and systemic contexts. Other studies present involve domestic violence, thus suggesting interest in family dynamics, power imbalance, and gendered violence-particularly intimate partner violence. The presence of "united states" as a strong node would suggest a powerful geographical focus on the U.S., though terms such as "Europe" and "global" would suggest that there is also a strong vein of cross-national studies.

#### Emerging Areas: Modern Challenges and Health Implications

A number of terms in this word cloud indicate developing challenges in the study of aggression and violence. An interesting node such as "climate change" reflects newer research on how

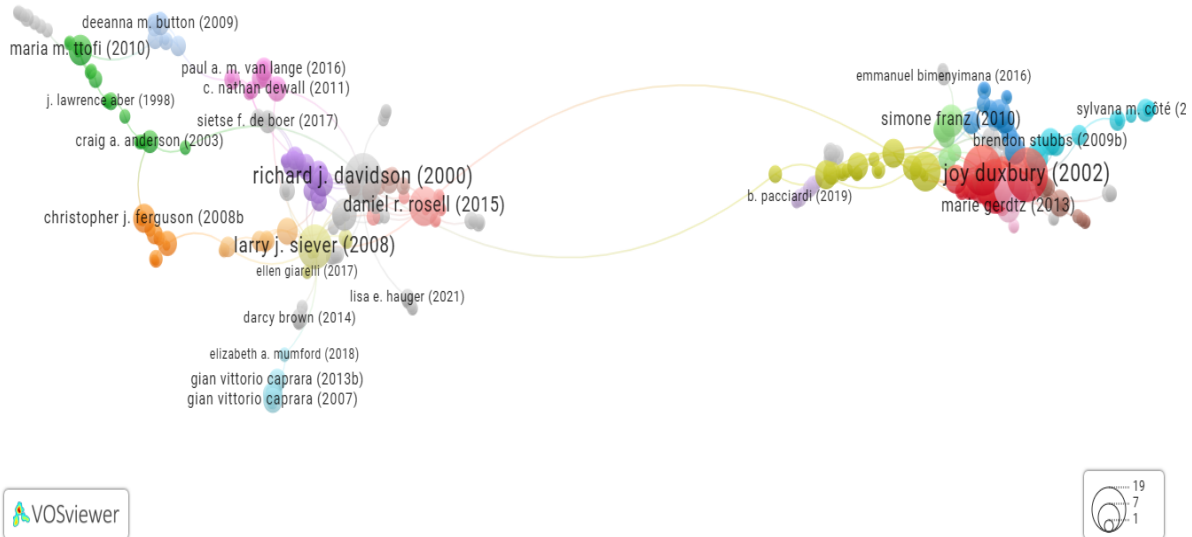


environmental stressors, including global warming and resource scarcity, may contribute to increased aggression. This is a modern twist on the more traditional stress-aggression hypothesis. The terms "anabolic agents/adverse effects" and "drug effects" reflect research into pharmacological mechanisms in aggression, such as the contribution of substances like anabolic steroids to violence. "Mental disorders/chemically induced" suggests a focus on how psychiatric conditions and their treatments share something in common with aggression—a factor perhaps crucial for developing therapeutic interventions.

#### Critical Observations and Gaps

While the network allows one to see the breadth of research in aggression and violence, several gaps and directions for further work stand out. For example, there is clearly an emphasis on adolescents and middle-aged persons, suggesting under-representation of studies in children and ageing populations, despite evidence that this is a lifespan issue. It also narrows down the predominance of biological and psychological terms in a way that less saliently sociocultural or structural causes of violence are pushed into the background, but in fact invites further elaboration of the societal level causes of violence based on inequality and systemic discrimination. Finally, although animals are present within the network, signifying either comparative studies or animal models in research related to aggression, this connection is relatively weak, hence underlining that there is a limited integration between human and animal studies regarding this context.

Thus, this co-occurrence network shows the breadth and complexity of research on aggression and violence, focused on substantial areas such as human biological mechanisms, developmental stages, and environmental ones. This calls into view the interdisciplinarity of such a field, as set between psychology, neuroscience, sociology, and criminology. The centrality of nodes, such as "adolescent" and "middle aged," indicates very active areas of research, whereas the child and elderly populations, in addition to the sociocultural perspectives, open opportunities for further work. Further development of the field should rely on integrating these multiple dimensions to enable comprehensive framework building in understanding and addressing aggression and violence.



*Figure 3: Co-Citation Network of Authors*

### Co-Citation Network of Authors

This VOSviewer visualization provides the author co-citation network; that is, it shows the way in which different authors are jointly cited in the research literature on aggression, violence, and related areas. From the cluster, node size, and link strength of nodes we can obtain an idea about key researchers, subfields of research, and intellectual structure. The following central authors are key to shaping the intellectual landscape of the research on aggression and violence: In this network, the pivotal figures would be Richard J. Davidson (2000), Larry J. Siever (2008), and Daniel R. Rosell (2015). Large nodes and positioning would suggest that the authors in consideration are frequently cited through a wide range of studies. Such researchers may have considerable contributions to the understanding of biological, psychological, and neurobiological perspective about aggression and violence. For example, Richard J. Davidson's work generally investigates the emotional and neural mechanisms underlying human aggression; hence, he is a cornerstone in this area.

The fact that those authors are connected with several other nodes evidences their being cited within various contexts, reflecting the interdisciplinary nature of research in violence and aggression springing from neurobiology, psychology, psychiatry, and criminology.

### Clustering of Authors: Aggression and Violence Research Subfields

There are marked clusters in this network, each cluster representing a different subfield or at least closely related areas of investigation.



Cluster Red (Joy Duxbury 2002, Marie Gerdtz 2013): With Joy Duxbury as the core in this cluster, the research in this cluster most likely relates to psychiatric and clinical environments where violence and aggression have taken or do take place in nursing and healthcare contexts. Joy Duxbury researches the management of violence in mental health settings, and her high centrality indicates that her research is foundational for an understanding of how to handle aggression in institutional settings, such as hospitals or psychiatric wards.

Purple Cluster: Richard J. Davidson 2000, Larry J. Siever 2008, Daniel R. Rosell 2015 The cluster is centric in the network and probably represents the biopsychological and neurobiological perspective on aggression. It addresses the influence of the structure of the brain, neurotransmitters, and other biological factors on aggressive behavior. The work of Davidson and others has attempted to reveal the neural mechanisms of aggression, which places this cluster as centric in the study of the biological underpinnings of violence.

Green Cluster: Maria M. Ttofi, 2010; Paul A. M. Van Lange, 2016. Besides him, there is also Maria M. Ttofi, known for her work regarding methods of prevention with regard to school bullying and violence, while Paul A. M. Van Lange has a strong background in social psychology and aggressive behavior. The linking of the authors can be interpreted to mean that these authors have a common interest in researching aggression to better comprehend how it comes into being, from a behavioral and preventive point of view with a major emphasis on youth and their school settings.

Orange Cluster: Christopher J. Ferguson 2008b; Gian Vittorio Caprara 2007: Christopher J. Ferguson has written much on media violence and its psychological influence on aggression, while the work of Gian Vittorio Caprara focuses on personality traits and aggressive behavior. The clustering of these authors would reflect a focus on how external influences in media and individual personality factors influence violent behavior.

#### Temporal Dimension: Evolution of Research

The fact that there are years in parentheses after each author's name, such as Davidson 2000 and Siever 2008, identifies the year in which each of these authors published their most highly regarded work. This timeline offers an idea of the evolutionary process on the topic of aggression and violence. For example,

2000s: At the beginning of the 2000s, all interests were dominated by biological and psychological models of aggression. The works of such authors as Davidson (2000) and Siever (2008) formed the basis for interpreting the neural mechanisms of aggression. Thus, it can be judged that in these years, interest in the biological and psychological grounds of aggression began to grow.





2010s: Influential works on prevention strategies and social-psychological approaches to aggression, particularly in the context of youth and interpersonal violence, are done by such authors as Maria M. Ttofi (2010) and Paul A. M. Van Lange (2016). This reflects a greater emphasis on the translation of research findings into practical interventions and policy that target the reduction of aggression.

Recent Times (2020s): Fewer recent authors feature in the network, and their persistence of older work could suggest that foundational studies conducted during the 2000s and 2010s remain continuously influential, frequently cited in more recent research on aggression and violence.

#### **Bridging Authors: Cross-Disciplinary Links**

Joy Duxbury and Sylvana M. Côté are situated between different clusters. This indicates that the work of these authors connects different research fields. Duxbury, as was already mentioned, addresses the issues of violence in the sphere of healthcare; however, her affiliations to neurobiologically and socially psychologically-oriented clusters indicate that her work bridges several levels—from practical clinical management of aggression to theoretical models of its causes.

Also, the work of Sylvana M. Côté falls under the category of developmental psychology, early childhood aggression, and thus could fall in connecting the biological grounds of aggression with its manifestation in the social settings and preventive strategies.

#### **Critical Observations and Gaps**

While the network brings forward influential authors and key research areas, there are some possible gaps which might be noticed or underrepresented topics. For instance:

**Geographical Focus:** This is mainly reflected in Western-centric research, as most of the key authors are from Europe and North America. This implies that as far as representation may be concerned with global perspectives on issues of aggression, especially in non-Western contexts where cultural and social causes of violence may be different, there is a lack of representation.

**Integration Across Disciplines:** While there is a strong biological, psychological, and clinical clustering, the links among those domains are relatively sparse. This implies an opportunity for more interdisciplinary work in combining the biological with the social-psychological approaches to examine how different factors in the development of aggression interact.

Thus, this co-citation network provides evidence of the many complexities and variations in studies on aggression and violence, with clusters that seem relatively distinct from subfields such as biological mechanisms, clinical management of aggression, and social-psychological perspectives. Key authors in this regard include Richard J. Davidson, Larry J. Siever, and Joy Duxbury, who are the central figures whose work is widely cited across domains. This network





manifestations and perceptions regarding aggressions could be seen through such words as "gender" and "social.". Also, the use of such words as "violence," "hostility," and "provocation" stresses the connection of aggression with more severe kinds of behavior and points out the general social concern of aggression as a factor in social violence and conflict.

Finally, there is a variety of research methods and interdisciplinary approaches, represented by such words as "study," "analysis," "review," and "systematic," which reflect the academic work involved in researching anger and aggression. Interest also lies in biological and neurological factors; as such, terms like "brain injury" and "cognitive" point out that there are studies exploring the physical or neurological underpinnings of aggressive behavior. This visual therefore provides an overview of the scholarly focus on the complex interplay among psychological, social, and biological factors with respect to the study of anger and aggression.

### **Summary, Conclusion and Recommendations**

**Summary:** This bibliometric analysis provides an in-depth examination of global research on anger and aggression, focusing on the trends, key authors, thematic clusters, and interdisciplinary collaborations. Through the use of co-occurrence mapping and citation analysis, we identified significant areas of focus within the literature, such as the link between aggression and psychological disorders, developmental psychology in children and adolescents, and the social factors influencing aggressive behavior. Mental health issues, particularly depression and stress, as well as interventions and therapies, were prominent areas of research. Key contributors in the field, such as Richard Tremblay, David Farrington, and Manuel Eisner, were recognized for their influence on the direction of the research.

**Conclusion:** The findings from this bibliometric study reveal that research on anger and aggression is highly interdisciplinary, bridging fields like psychology, sociology, and neuroscience. The prominent focus on mental health disorders and social dynamics underscores the complexity of aggression, its origins, and its implications. The results highlight that while psychological and behavioral factors remain central, there is an increasing interest in the biological and neurological aspects of aggression, pointing to the importance of a holistic approach in addressing this issue. The clustering of research themes around therapeutic interventions also suggests a growing emphasis on practical applications aimed at managing and reducing aggressive behaviors in clinical settings.

#### **Recommendations:**

1. **Encourage Interdisciplinary Collaboration:** Given the interconnected nature of psychological, social, and biological factors in aggression research, future studies should foster collaborations between psychologists, neuroscientists, sociologists, and healthcare professionals to further explore the complexity of aggression from multiple angles.
2. **Expand Research on Biological and Neurological Factors:** While there is increasing attention to the biological underpinnings of aggression, more in-depth research is



needed to fully understand the role of brain injuries, neurochemical imbalances, and genetic factors in the development of aggressive behavior.

3. **Focus on Early Interventions:** Since much of the literature highlights the role of developmental stages, particularly in children and adolescents, policies and research should prioritize early interventions to prevent the escalation of aggressive tendencies into adulthood.
4. **Enhance Cross-Cultural Research:** Given the global relevance of aggression as a social and psychological issue, cross-cultural studies should be expanded to understand how cultural norms, family dynamics, and social structures shape aggression in different societies.
5. **Invest in Mental Health Solutions:** As the research points to strong connections between mental health disorders and aggression, there is a need for increased investment in mental health services, particularly those offering therapeutic interventions for managing aggression in both clinical and non-clinical populations.

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