Revista Española de Pedagogía

Revista Española de Pedagogía (REP)
ISSN: 0034-9461
e-ISSN: 2174-0909

Cyberbullying in scientific research: A bibliometric analysis of its intellectual, social, and conceptual structure in Web of Science

Ciberacoso en la investigación científica: un análisis bibliométrico de su estructura intelectual, social y conceptual en Web of Science

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Abstract

Background: cyberbullying, a form of violent aggression in digital environments, has become increasingly relevant due to its impact on society and the rise of social media. This study analyses how recorded scientific output on cyberbullying has evolved over the last decade, using the Web of Science index, along with bibliometric indicators and techniques. Method: Using a search equation designed to retrieve relevant information, bibliometric indicators and techniques were used to perform a multidimensional analysis of the topic and identify trends and patterns. Results: a growing trend was found in the production and citation of studies on cyberbullying, with 1058 journals contributing to the field. Research is mainly concentrated in the United States and Europe, with limited participation from Latin America. The conceptual structure showed the research dynamics from the mapped terms, and the coupling and co-citation techniques determined the relevance of journals and authors as the intellectual foundation of the subject. Conclusions: the results provide an overview of the trends and practices in cyberbullying research, providing the scientific community with information to explore the subject in greater depth and suggest future lines of research.

Keywords: cyberbullying; bibliometrics; bibliometric indicators; bibliometric mapping; scientific output.

Resumen

Antecedentes: el ciberacoso, como forma de agresión violenta en entornos digitales, ha ganado relevancia debido a su impacto en la sociedad y al auge de las redes sociales. Este estudio analiza cómo ha evolucionado la producción científica registrada sobre ciberacoso en la última década utilizando el índice Web of Science e indicadores y técnicas bibliométricas. Método: mediante una

Date of receipt of the original: 08/07/2025
Date of approval: 19/12/2025
Please, cite this article as follows: Peñalva Vélez, A., Gregorio Chaviano, & O., Recio Moreno, D. (2026). Cyberbullying in scientific research: A bibliometric analysis of its intellectual, social, and conceptual structure in Web of Science [Ciberacoso en la investigación científica: un análisis bibliométrico de su estructura intelectual, social y conceptual en Web of Science]. *Revista Española de Pedagogía*, 84(294), 425-448. https://doi.org/10.9781/rep.2026.397

ecuación de búsqueda diseñada para recuperar la información pertinente, se aplicaron indicadores y técnicas bibliométricas para realizar un análisis multidimensional del tema y determinar tendencias y regularidades. Resultados: se encontró una tendencia creciente en la producción y citación de estudios sobre ciberacoso, con 1058 revistas contribuyendo en el campo. La investigación se concentra principalmente en Estados Unidos y Europa, con una participación limitada de Latinoamérica. La estructura conceptual mostró las dinámicas de investigación a partir de los términos mapeados y las técnicas de acoplamiento y cocitación determinaron la relevancia de las revistas y los autores como base intelectual del tema. Conclusiones: los resultados proporcionan una panorámica de las tendencias y prácticas en la investigación del ciberacoso, ofreciendo a la comunidad científica información para profundizar en el conocimiento del tema y sugerir futuras líneas de investigación.

Palabras clave: ciberacoso; bibliometría; indicadores bibliométricos; mapeo bibliométrico; producción científica.

1. Introduction

Cyberbullying is identified as the manifestation of violent behaviour in the digital environment (Arruabarrena *et al.*, 2018), and includes everything from sending degrading messages to the dissemination of offensive images or videos on social media (Garaigordobil, 2015). It is, therefore, defined as intentional and repeated bullying carried out by one or more individuals through the use of digital technologies (Slonje & Smith, 2008; Smith *et al.*, 2008). From a conceptual perspective, cyberbullying involves the participation of different roles, among which we can distinguish cyber-victimisation, associated with those who receive the bullying; cyber-aggression, linked to those who perpetrate it; and cyber-bystanding, referring to those who witness the situations without directly intervening. From a more recent perspective, cyberbullying is situated in a broader context of intensive digitalisation of everyday life, closely linked to problematic use of the internet and social media, with important implications for the development, well-being and mental health of children and adolescents (Garaigordobil, 2025). Its current importance is due, among other things, to its social impact and the effects it generates in different areas of society. It is a phenomenon of global concern, as it is highly prevalent due to multiple factors, such as the lack of definition of its spatial and temporal boundaries, limited adult supervision, and the very nature of the internet (Barlett *et al.*, 2021; Li *et al.*, 2020; Lozano-Blasco *et al.*, 2020). It is identified as a social aspect that is particularly important because of the psychological consequences it can have on both victims and perpetrators, especially in childhood and adolescence (Garaigordobil, 2011; Modecki *et al.*, 2014). The impact of this problem varies significantly depending on the study consulted and the instrument it used (Cross *et al.*, 2015; Romera *et al.*, 2016; Selkie *et al.*, 2016; Zych *et al.*, 2016). Different research in different countries addresses the study of cyberbullying, providing significant data on its prevalence (Fahy *et al.*, 2016; Quintana-Orts & Rey, 2018; Vale *et al.*, 2018; Chen *et al.*, 2019). In this study, cyberbullying is analysed exclusively as peer-to-peer violence, differentiating it from other forms of online violence, such as hate speech or cyber abuse in romantic relationships.

In the educational context, the study of cyberbullying is crucial, not only because of the impact it has on the emotional and psychological well-being and balance of all those involved, but also because it has more serious consequences on the mental health of victims than those attributed to traditional bullying (Brailovskaia *et al.*, 2018; Koyanagi *et al.*, 2019). It shares key features with bullying, such as the fact that it is intentional, repeated over time, and there is a power imbalance between the victim and the perpetrator (Olweus, 2012; Smith, 2015). However, its analysis and approach must consider the particular characteristics that make it

a specific type of bullying (del Rey *et al.*, 2018), in which elements such as the anonymity of the perpetrator, the dissemination of bullying through technological means (del Rey & Ojeda, 2018; Smith, 2015) or the absence of physical contact between the victim and the perpetrator (Patchin & Hinduja, 2006) are identified. Recent studies point to the coexistence between bullying and cyberbullying among peers (Cuadrado Gordillo *et al.*, 2019; Lozano-Blasco *et al.*, 2023; Gómez Tabares & Correa Duque, 2022). This overlapping of issues is reinforced by the perpetration of cyberbullying in the digital environment, where the risks associated with internet use can intensify the exposure and vulnerability of children and adolescents (Gámez-Guadix & Machimbarrena, 2025).

Several systematic reviews and meta-analyses (Chen *et al.*, 2017; Guo, 2016; Kowalski *et al.*, 2014) thoroughly examine risk and protective factors, and conclude that there is a need to address cyberbullying in classrooms in order to improve the school climate. This is also noted by different interventions carried out in Spain (Garaigordobil & Martínez-Valderrey, 2016; Ortega-Ruiz, del Rey & Casas, 2012) and elsewhere in the world (Cross *et al.*, 2015; della Cioppa *et al.*, 2015). Other studies (Coffey, 2013; Garmendia *et al.*, 2019; Waters *et al.*, 2012) show the relevance of addressing the issue from within the school environment in order to reduce the effect of bullying, improve the school climate, and thus achieve a positive impact on school coexistence. In this vein, prevention is essential to identify and reduce risk factors and to strengthen protective factors (Rey Alamillo & Espino Peñate, 2022), both individual and contextual (Zych *et al.*, 2021).

Bibliometrics, as an instrumental discipline, provides bibliometric methods and indicators that enable the study of the disciplines and the actors involved in the creation of new knowledge. Within bibliometrics, indicators, as essential tools, provide information on the trends and dynamics of research and scientific processes (Bornmann, 2020). There are a variety of indicators, mainly categorised as output, impact and collaboration indicators, as well as new generation metrics or *altmetrics*, which must address the objectives and contexts in which the research is carried out (González-Alcaide *et al.*, 2016; Glänzel, 2012). There are also techniques that support the study of disciplinary patterns and reveal insights related to the intellectual, conceptual and social structures of scientific areas (Arencibia-Jorge *et al.*, 2020). These include the bibliographic coupling proposed by Kessler (1963), which occurs when two documents refer to a third document jointly in their bibliographies and is used to analyse the structures of scientific domains. Co-citation is a co-occurrence relationship that occurs when two documents in the existing literature are cited together by a third party, indicating thematic similarity (Jarneving, 2005; Boyack & Klavans, 2010; Small, 1980). Co-citation represents the frequency with which two articles are cited together, and the degree of co-citation is defined by the number of identical citing documents (Small, 1973). It establishes the links between content and ideas (Arencibia-Jorge *et al.*, 2020), in addition to showing the intellectual structure of a domain and the organisation of scientific disciplines.

In both cases, their use makes it possible to study the bibliographic foundations of the disciplines, considering that they provide information on the core literature used (Glänzel & Czerwon, 1996). Social relations are visualised through collaboration networks and the way in which different actors group together to work (González-Alcaide and Gómez-Ferri, 2014). The co-words technique identifies, describes and represents the structures and evolution of scientific output, as well as conceptual or thematic links, based on the thematic mapping present in the research (Gálvez, 2018).

A reflection of the social importance of cyberbullying is the considerable amount of existing studies, as well as the wide variety of approaches present in their analyses (Barragán Martín *et al.*, 2021; Denche-Zamorano *et al.*, 2022; Kurniasih *et al.*, 2020). From a bibliometric perspective, research using bibliometric methods suggests that the study of cyberbullying is a developing area, given the increasing use of information and communication technologies in education (Cretu & Morandau, 2024). These studies also show the interdisciplinary nature of the conceptual approach and the growing number of journals that, as channels of communication, address this issue.

Studies on its behaviour are extensive, not only in number but also in the diversity of their approaches. Topics such as technology, psychological aspects or the effect of social media on young people are among the most discussed in the literature (Kurniasih *et al*., 2020). They provide descriptions of scientific output and of those who participate in the generation of new knowledge, as well as more complex analyses in which collaboration networks and citation analyses are presented, with results and conclusions that reveal an orientation towards Psychology and Education (González-Moreno *et al*., 2020). Other papers offer results on the types of cyberbullying, with an emphasis on the effect of social media and the need to implement educational programmes to reduce it (Watts *et al*., 2017). Similarly, the negative impact of cyberbullying on student well-being associated with the proliferation and rise of social media is evident (Fauzi, 2024).

Therefore, given the global impact of cyberbullying and its relevance at the different levels of the educational environment, a bibliometric analysis is carried out in order to ascertain the current state of research and to identify its main trends and patterns. The bibliometric approach adopted in this article does not merely quantify scientific output and its impact, but also aims to explore the conceptual evolution of the field over the last decade, to identify the main people involved in its study, and to understand how collaboration networks between researchers, institutions and countries are configured. This interdisciplinary perspective makes it possible to assess the levels of collaboration and integration between disciplines, thus fostering a broader understanding of cyberbullying and contributing to a transdisciplinary approach that addresses its complexity in an integrated way.

In this context, the overall objective of the study is to analyse the scientific output on cyberbullying during the period from 2012 to 2022 by using bibliometric techniques and output, impact and collaboration indicators, in order to identify the main trends and dynamics of its study.

Based on this overall aim, the following specific objectives are proposed:

- To identify authors, institutions, leading journals and relevant topics in cyberbullying research based on productivity and impact indicators.
- To analyse existing collaboration networks between institutions and countries in order to understand the dynamics of knowledge production on cyberbullying.
- To apply bibliometric techniques, such as coupling and co-citation, to examine the conceptual, intellectual and social structure of cyberbullying research.

2. Method

The Web of Science (WoS) database was used as the primary source of information for the study of trends and patterns in cyberbullying-related research using bibliometric techniques and indicators (Table 1). In the information search and retrieval process, the following search equation was used: ("ciber bullying" OR "cyber bullying" OR ciberbullying OR cyberbullying OR "ciber acoso" OR "ciberacoso").

To conduct the study, the research indexed in the Social Science Citation Index (SSCI) and Emerging Sources Citation Index (ESCI) was retrieved, with document types restricted to articles and reviews. Despite the known biases of the source, both in its geographical and disciplinary coverage, in the present research its use is justified owing to the relevance and international visibility of the subject discussed, which is widely recorded in high-quality journals of different profiles and approaches, and also to the quality of the metadata for its processing. The inclusion of the Emerging Sources Citation Index (ESCI) helped to reduce coverage limitations, even though the journals included in the source do not yet have the same quality as those included in the main indexes, but as of this year they now have an impact factor and quartile distribution.

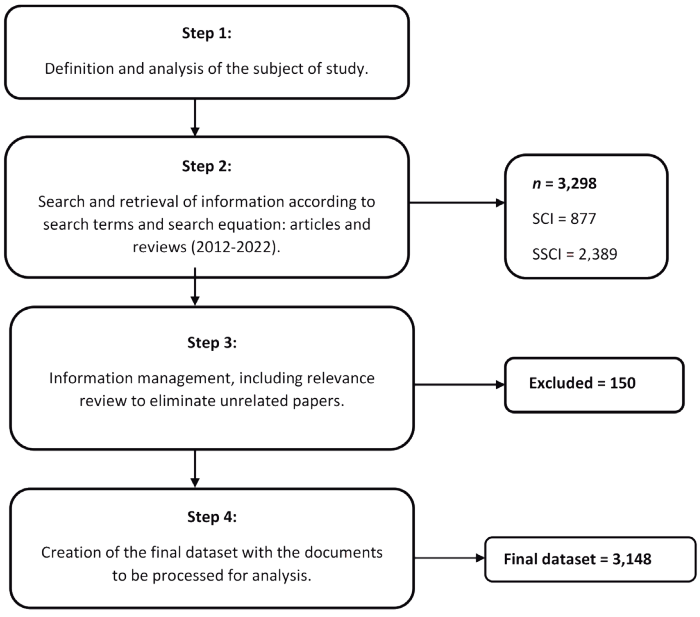
Table 1. Description of the bibliometric techniques and indicators used

Dimension analysed	Description of the bibliometric techniques or indicators
Output or activity indicators	The evolution of the annual output of documents on the subject studied and the journals with the highest number of contributions are shown.
Impact	The papers with the highest number of citations received are shown, as well as the distribution of citations per year, the *h*-index.
Techniques Intellectual structure Thematic structure Social structure	These were used to analyse different structures of cyberbullying. The coupling of documents and journals, together with the co-citation of authors and journals, provided insight into the intellectual influences of those involved in the generation of new knowledge and the intellectual foundation of the subject. The co-word analysis and concept mapping revealed the thematic clusters and the most representative terms.
Collaboration	The institutional collaboration network and country-level visualisation through maps revealed the relationships present in scientific output and the global communication flows.

The search was conducted in June 2023 and obtained 3,298 initial results corresponding to articles and reviews, which were used for the different analyses using bibliometric techniques and indicators and the subsequent description of the results (Figure 1). We excluded 150 results that were not related to the subject of study, thus reducing possible biases in the analysis. Therefore, the final dataset consisted of 3,148 documents.

The resulting bibliographic information was exported to *.txt* and *.bib* files, which in each case enabled the different indicators to be obtained, as well as network mapping and analysis using VOSviewer (van Eck & Waltman, 2010) and Biblioshiny software (Aria & Cuccurullo, 2017).

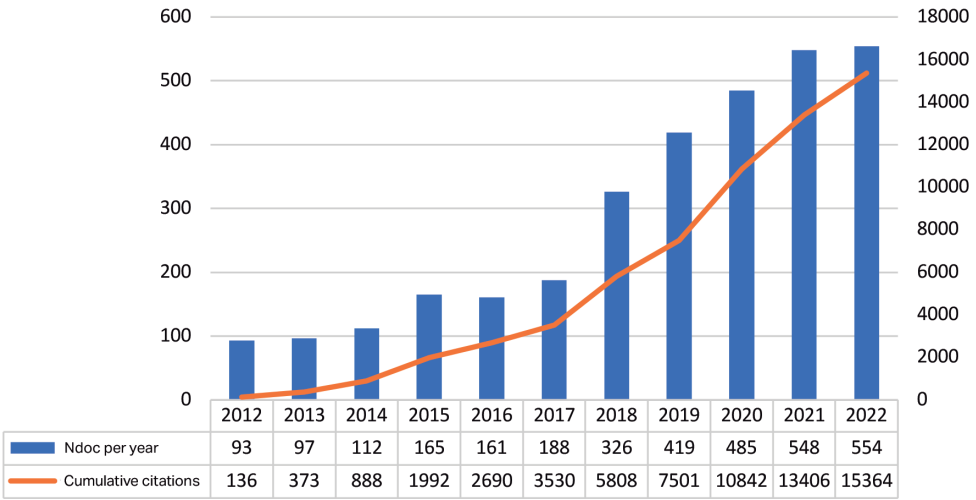
Figure 1. Graphic visualisation of the information search, retrieval and cleaning process



3. Results

Scientific activity on cyberbullying, published in Web of Science throughout the period 2012-2022, shows a growing trend regarding output and citations (Figure 2). The most recent period, from 2018 onwards, shows the highest number of documents (74% of the total), as well as an annual growth rate which in 2018 was 73% and remained above 10% in the following years. This upward trend coincides with the rise of social media and the emergence of the phenomenon, but, in addition, this behaviour may be due to the increase in the number of researchers addressing the subject, and even to science evaluation models, with an increased focus on research published in journals covered by the major citation indexes.

FIGURE 2. Annual behaviour of thematic output and citation



The information analysed is recorded in a total of 1,058 scientific journals from the selected indexes. Table 2 shows the 25 most productive, with 15 or more documents each. In relation to the journals that act as communication channels on the subject, *Computers in Human Behavior* (180 documents) and *International Journal of Environmental Research and Public Health* (154) are clear leaders with a considerably higher output than the rest. A second group of sources, with a smaller volume of contributions and mostly specialised in Psychology, Family Studies and Public Health, reveals a trend that reflects the wide-ranging research interest. It should also be noted that this group of journals with the highest number of contributions is positioned in the top 50% (of quartiles) in its respective categories.

TABLE 2. Journals with the highest number of contributions to the output on cyberbullying ($n > 15$)

Journals	Ndoc	JIF	Quartile	Category
Computers in Human Behavior	180	9.9	1	Psychology, Multidisciplinary
International Journal of Environmental Research and Public Health	154	-	-	Public, Environmental & Occupational Health
Frontiers in Psychology	86	3.8	1	Psychology, Multidisciplinary
Journal of Interpersonal Violence	72	2.5	2	Family Studies

Children and Youth Services Review	67	3.3	1	Family Studies
Cyberpsychology Behavior and Social Networking	63	6.6	1	Psychology, Social
Current Psychology	37	2.8	2	Psychology, Multidisciplinary
Aggression and Violent Behavior	35	4.6	1	Psychology, Multidisciplinary
Aggressive Behavior	35	2.9	2	Psychology, Multidisciplinary
Journal of School Violence	34	2.4	2	Psychology, Educational
Journal of Adolescence	33	3.8	1	Psychology, Developmental
Journal of Adolescent Health	24	7.6	1	Psychology, Developmental
Journal of Youth and Adolescence	24	4.9	1	Psychology, Developmental
IEEE Access	22	3.9	2	Telecommunications
BMC Public Health	21	4.5	2	Public, Environmental & Occupational Health
Personality and Individual Differences	20	4.3	2	Psychology, Social
Cyberpsychology: Journal of Psychosocial Research on Cyberspace	19	2.9	2	Psychology, Multidisciplinary
Plos One	19	3.7	2	Multidisciplinary Sciences
Sustainability	19	3.9	2	Environmental Studies
Violence and Victims	19	1.1	4	Criminology & Penology
Psicothema	18	3.6	2	Psychology, Multidisciplinary
European Journal of Developmental Psychology	17	2	3	Psychology, Developmental
New Media & Society	17	5	1	Communication
Psychology in the Schools	17	2	3	Psychology, Educational
Child Abuse & Neglect	16	4.8	1	Family Studies

Note: The *International Journal of Environmental Research and Public Health* has no data recorded for 2022. The JIF shows the average number of citations per document for each journal in the year analysed. The quartile indicates the position of the journal in its category.

In order to find out the descriptors with the highest occurrence, their group, the relationship between them and their relevance for the research, factor analysis was used through multiple correspondence analysis (MCA) for visual representation, based on the key words from the papers (Figure 3). Six subject areas are identified, of which three are well defined according to their connection and the relationships within each group or cluster. In the blue cluster, the central terms (central point) are cyberbullying, bullying, adolescents and aggression. The themes in this group relate to the central focus of the research, as this cluster constitutes the central thematic core of the field, considering its internal cohesion and the frequency of occurrence of its descriptors. Some of the representative papers in this cluster, widely referenced in the literature, are shown below:

- Kowalski *et al.* (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin.*

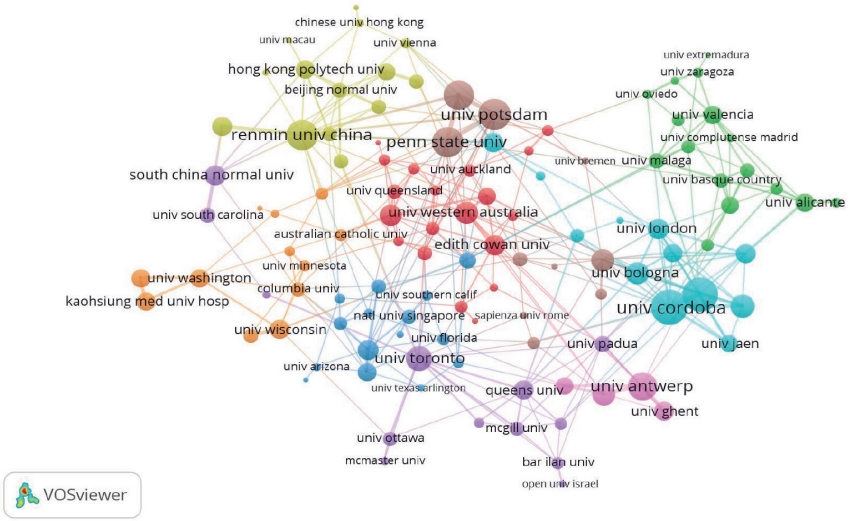
- Modecki *et al.* (2014). Bullying Prevalence Across Contexts: A Meta-analysis Measuring Cyber and Traditional Bullying. *Journal of Adolescent Health.*
- Kowalski & Limber (2013). Psychological, Physical, and Academic Correlates of Cyberbullying and Traditional Bullying. *Journal of Adolescent Health.*
- Best *et al.* (2014). Online communication, social media and adolescent wellbeing: A systematic narrative review. *Children and Youth Services Review.*

In the yellow cluster, words such as social media, internet, Facebook, Twitter, sexting and other terms close to the central theme of the study appear, while in the red cluster, emotional intelligence, school violence and cyber-victimisation stand out, that is, terms that are equally close, though the cluster itself is heterogeneous and diverse. In addition, other clusters with fewer terms, but equally close to the focus of the research, are identified, in which terms such as depression and anxiety (green), emotional intelligence and school violence (orange) are observed, which contributes to a better understanding of the phenomenon.

FIGURE 3. Main concepts from papers related to cyberbullying

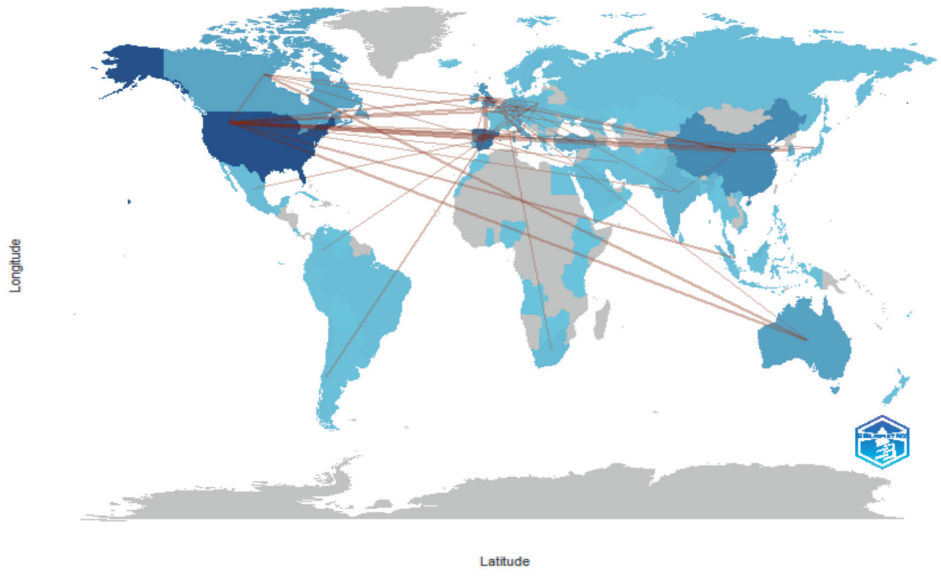
With regard to cooperation, the institutional collaboration network makes it possible to visualise the way in which institutions appear in the papers on cyberbullying (Figure 4). The leadership of a group of institutions stands out due to the size of the nodes within each cluster, with, for example, the University of Cordoba (Spain), the University of Pennsylvania, the University of Potsdam and the University of Western Australia identified as the leading institutions. The fact that the University of Cordoba appears in the group of those with the highest output and collaborates in the network with a large number of institutions helps place Spain on the international research scene, traditionally dominated by English-speaking countries, which is significant for the future of new projects and specialised studies.

FIGURE 4. Institutional collaboration network on cyberbullying



In turn, cross-country collaboration flows mainly reveal connections between the United States, Spain and China, as well as with some Northern European countries and Australia, which show a relevant, albeit less central, participation compared to the main collaboration hubs (Figure 5). The aforementioned Spanish leadership, through the University of Cordoba, stands out in this behaviour, which can be seen through the connecting lines and the intense colours on the map. In this context, an important detail is the low participation of Latin America in cyberbullying research, with limited presence of Chile, Mexico and Colombia, which collaborate mostly with Spain.

FIGURE 5. Collaboration flows between countries

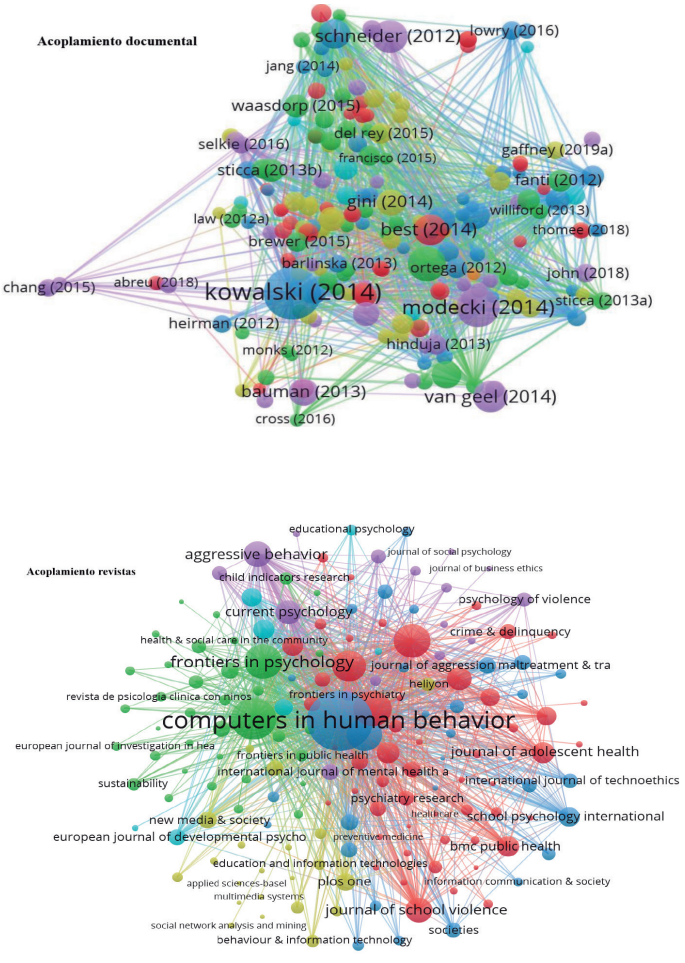


3.1. Coupling analysis

Given that coupling expresses the existing relationship between bibliographic items based on shared references, and makes it possible to understand the structures of scientific domains and the foundational bibliography of the disciplines, the coupling of documents and journals is presented and analysed as a resource for understanding the relevant bibliographic references on the subject (Figure 6). With regard to documents, those that have been most consulted and referenced in the published literature on cyberbullying are displayed. Relevant documents on the subject matter, such as those by Kowalski *et al.* (2014), Modecki *et al.* (2014) and Best *et al.* (2014) are of note, as they explore cyberbullying among young people, comparing prevalence in various contexts and examining the relationship between adolescent well-being, online communication and social media use.

With respect to the journals, the *Computers in Human Behavior* journal appears once again and, therefore, its importance in the discipline is clear, given that it appears in several of the analyses. Similarly, the set of journals that serve as sources of reference information or intellectual foundation for the generation of new knowledge shows a wide thematic diversity with journals in Psychology, Education, Medicine, as well as interdisciplinarity, which represents a significant contribution to research in the field.

FIGURE 6. Documentary and journal coupling map



3.2. Citation analysis

Considering that citations are an indicator of impact and recognition of the different actors in the scientific system, the papers with the highest number of citations received are presented with the purpose of contributing information to advance research on cyberbullying (Table 3). It is important to note that these papers were published in leading journals, including *Computers in Human Behavior*, *Journal of Adolescent Health* and *Aggressive Behavior*, which also appear in the co-citation and coupling analyses, thus denoting their relevance within cyberbullying research.

Table 3. Articles with the highest number of citations received

DOI	Year	Local citations (LC)	Global citations (GC)	Country	Quartile	Cuartil
Kowalski, R.M., 2014, *Psychological Bulletin*	10.1037/a0035618	2014	837	1.285	United States	1
Slonje, R., 2013, *Computers in Human Behavior*	10.1016/j.chb.2012.05.024	2013	278	411	England	1
Schneider, S.K., 2012, *American Journal of Public Health*	10.2105/AJPH.2011.300308	2012	267	501	United States	1
Olweus, D., 2012, *European Journal of Developmental Psychology*	10.1080/17405629.2012.682358	2012	226	352	England	3
Mishna, F., 2012, *Children and Youth Services Review*	10.1016/j.childyouth.2011.08.032	2012	189	293	England	1
van Geel, M., 2014, *JAMA Pediatrics*	10.1001/jamapediatrics.2013.4143	2014	179	466	United States	1
Fanti, K.A., 2012, *European Journal of Developmental Psychology*	10.1080/17405629.2011.643169	2012	171	231	England	3
del Rey, R., 2015, *Computers in Human Behavior*	10.1016/j.chb.2015.03.065	2015	162	210	England	1
Ortega, R., 2012, *Aggressive Behavior*	10.1002/ab.21440	2012	129	194	United States	2
Barlett, C., 2014, *Aggressive Behavior*	10.1002/ab.21555	2014	124	197	United States	2
Brewer, G., 2015, *Computers in Human Behavior*	10.1016/j.chb.2015.01.073	2015	119	185	England	1

Chen, L., 2017, *New Media & Society*	10.1177/14614448 16634037	2017	112	174	England	1
Casas, J.A., 2013, *Computers in Human Behavior*	10.1016/j. chb.2012.11.015	2013	111	162	England	1
Bastiaensens, S., 2014, *Computers in Human Behavior*	10.1016/j. chb.2013.10.036	2014	110	172	England	1
Brochado, S., 2017, *Trauma, Violence, & Abuse*	10.1177/152483 8016641668	2017	105	135	United States	1
Wong, D.S.W., 2014, *Children and Youth Services Review*	10.1016/j. childyouth. 2013.11.006	2014	101	130	England	1
Ortega-Ruiz, R., 2016, *Psicología Educativa*	10.1016/j. pse.2016.01.004	2016	100	180	Spain	2
Perren, S., 2012, *European Journal of Developmental Psychology*	10.1080/17405629. 2011.643168	2012	98	171	England	3
Hamm, M.P., 2015, *JAMA Pediatrics*	10.1001/ jamapediatrics. 2015.0944	2015	94	194	United States	1
Whittaker, E., 2015, *Journal of School Violence*	10.1080/15388220. 2014.949377	2015	93	207	England	1
del Rey, R., 2012, *Psicothema*	Not available DOI	2012	92	118	Spain	2
Lee, C., 2017, *Computers in Human Behavior*	10.1016/j. chb.2016.11.047	2017	88	119	England	1
Olweus, D., 2018, *Current Opinion in Psychology*	10.1016/j. copsyc. 2017.04.012	2018	88	140	Netherlands	1
Heirman, W., 2012, *Psicothema*	Not available DOI	2012	87	145	Spain	2
van Cleemput, K., 2014, *Aggressive Behavior*	10.1002/ ab.21534	2014	87	122	United States	2

Note: LC: citations within the analysed corpus / GC: citations within the entire WoS database. The quartile indicates the position of the journal in its category.

3.3. Co-citation

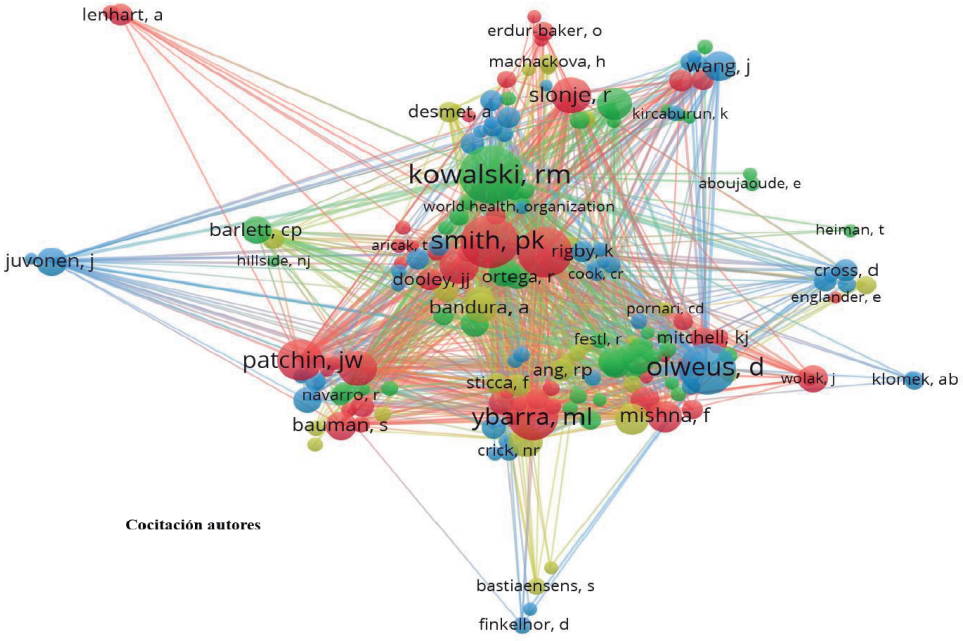
Figure 7 shows the co-citation relationships between authors and journals. In the case of authors, the size of the circle represents the co-citation strength, from which five clusters were identified, represented by different colours, grouping the most intellectually influential authors

within the analysed papers on cyberbullying. The size of the nodes indicates the number of times two authors are cited together. The network includes influential authors such as Kowalski (green cluster), already identified through factor analysis, along with others such as Smith and Ybarra (red cluster) and Olweus (blue cluster), who are mainly affiliated with universities in Europe and the United States, and whose research topics are mostly related to psychology.

In relation to the journals, and following the same conceptual dynamic referred to in co-citation, those that are most frequently cited together are displayed, indicating their significance in the subject area. *Journal of Adolescent Health*, *Computers in Human Behaviour*, *Aggressive Behavior*, journals already mentioned in other reviews, reinforce their relevance in this field. From the perspective of categories, approaches to Psychology, Health and Family Studies stand out, in addition to authors such as Kowalski (Clemson University/Western Carolina University), del Rey (University of Seville) and Ortega-Ruiz (University of Cordoba).

In both cases, for those interested in research on cyberbullying, it is important to note that this analysis provides information on key actors in the field, namely authors and journals (Table 4 and Table 5). This information can contribute to better research management, facilitate the retrieval of scientific literature and support the selection of journals for publication. Since citations represent an indicator of impact and recognition within the scientific system, the papers that have received the highest number of citations are shown, together with their main characteristics.

FIGURE 7. Author and journal co-citation map



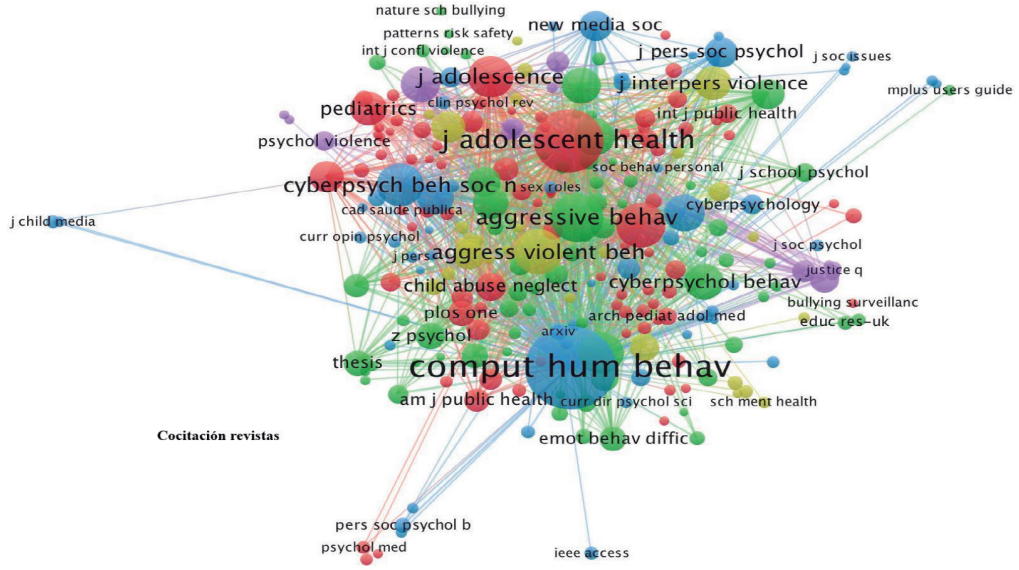


TABLE 4. Characterisation of the most co-cited authors

Author	Institution	h-index	Category
Kowalski, R.M.	Clemson University Western Carolina University	29	Psychology, Family Studies
Smith, P.K.	University of London	48	Behavioral Sciences
Hinduja, S.	Florida Atlantic University	23	Criminology & Penology Psychology
Olweus, D.	University of Bergen	30	Psychology, Behavioral Sciences
Ybarra, M.L.	Johns Hopkins Bloomberg School of Public Health	40	Psychology, Public, Environmental & Occupational Health
Patchin, J.W.	University of Wisconsin	23	Psychology Criminology & Penology
Slonje, R.	University of London	4	Psychology
Tokunaga, R.S.	University of Texas Austin	23	Psychology, Family Studies
Juvonen, J.	University of California Los Angeles	32	Psychology, Family Studies

Note: *h*-index: number of documents that have received at least a certain number of citations. In practice, an *h*-index = 10 indicates that the author has 10 papers that have received at least 10 citations each.

Table 5. Characterisation of the most co-cited journals

Journal	Category	JIF/quartile
Computers in Human Behavior	Psychology, Experimental	9,9/Q1
Journal of Adolescent Health	Pediatrics	7,6/Q1
Journal of Youth and Adolescence	Psychology, Developmental	4,9/Q1
Aggressive Behavior	Behavioral Sciences	2,9/Q2
Journal of Adolescence	Psychology, Developmental	3,8/Q1
Psychological Bulletin	Psychology	22,4/Q1
Aggression and Violent Behavior	Criminology & Penology	4,6/Q1
Cyberpsychology, Behavior, and Social Networking	Psychology, Social	6,6/Q1
Journal of Child Psychology and Psychiatry	Psychiatry	7,6/Q1
Children and Youth Services Review	Family Studies	3,3/Q1

Note: The JIF shows the average number of citations per document for each journal in the year analysed. The quartile indicates the position of the journal in its category.

4. Discussion and conclusions

The results of a bibliometric study vary according to the source of information used, its coverage, the search equation used, and the rigour in the process of information cleaning and standardising, as well as in data retrieval in general. In this case, the use of Web of Science, despite having a narrower coverage than Scopus, was based on its importance in scientific communication and its rigour in journal evaluation, despite the well-known biases that favour Basic and Applied Sciences to the detriment of Social Sciences and Humanities (Mongeon & Paul-Hus, 2016).

In order to cover a larger number of documents on the subject, we used a search equation with the main terms representing the subject, as well as a significant period of time was, which helped to identify trends and provide relevant information to the specialised scientific community. It is important to highlight that the inclusion of a wide variety of bibliometric techniques and indicators for analysis from a multidimensional perspective made it possible to obtain descriptive data on cyberbullying research and to generate evidence on the structure of the domain. A total of 3,148 results were analysed for the period 2012-2022, thereby enabling trend analysis and contributing to the development of future research.

The scientific output, in line with previous studies which have looked at wide-ranging time periods, shows a significant increase in the annual number of contributions, especially from 2017 onwards, when the largest output is concentrated, as well as a core of key actors and a substantial contribution from the United States and European countries (Cretu & Morandau, 2024). The most representative scientific journals in terms of output come, with a clear predominance, from fields such as Psychology and Family Studies, with their relevance in medical areas also standing out from the perspective of intellectual impact and influence. These results reinforce the need to address cyberbullying from a holistic and transdisciplinary perspective, taking into account the interaction between individual and contextual risk and protective factors.

Previous studies confirm the prevalence and variety of cyberbullying among young people (Álvarez-García *et al.*, 2017; Chen *et al.*, 2019; Fahy *et al.*, 2016; Larrañaga *et al.*, 2018; Lee & Shin,

2017; Quintana-Orts and Rey, 2018; Vale *et al.*, 2018), highlighting the global need to address this issue. The interest in research on cyberbullying reveals, in the results of this study, a diversity of topics such as bullying, aggression, adolescents and social media, highlighting its influence on other more topical issues such as the internet, social media, sexting, school violence, and emotional intelligence. All of these data highlight the importance of tackling a problem that manifests itself globally and affects the health and well-being of children and adolescents in different countries and cultures.

To address the phenomenon and its manifestations, it is important to implement educational and preventive actions (Aizenkot & Kashy-Rosenbaum, 2021; DeSmet *et al.*, 2018; Holfeld & Leadbeater, 2017; Vivolo-Kantor *et al.*, 2021), especially in the educational environment in order to ensure safe and respectful digital spaces. Classroom practice should include strategies not only to intervene in cases of cyberbullying, but also to prevent it from the very beginning. In this sense, effective prevention and intervention programmes have been developed both at national level, such as *Safety.Net* (Ortega-Barón *et al.*, 2021) and *Convivir en un mundo real y digital* [Living Together in a Real and Digital World] (Flores Buils *et al.*, 2020), and at international level, where the *KiVa* programme (Williford *et al.*, 2013) is of note. This is essential, since cyberbullying has a significant impact on victims' mental health, self-esteem, emotions, and academic performance. In this vein, recent studies have shown the relationship between cyber-victimisation and a lower health-related quality of life in adolescents (González-Cabrera *et al.*, 2022). Bibliometric studies reveal an exponential increase in research on this subject, which is evidence of significant growth in recent years. Therefore, focusing on primary prevention and education is vital to foster the well-being of children and adolescents in digital environments (Cuesta *et al.*, 2018).

From a practical perspective, the thematic clusters identified help to guide priorities for action in the field of education. In particular, the relevance of studies focusing on adolescents, aggression and social media suggests the need to reinforce education aimed at positive digital coexistence, while the presence of topics linked to emotional well-being highlights the importance of implementing preventive interventions that address the socio-emotional development of students.

Within this framework of analysis, it has been found that the journals that most prominently act as channels of communication on the subject are *Computers in Human Behavior* and the *International Journal of Environmental Research and Public Health*, mainly, and, on a less predominant level, journals mostly specialising in Psychology, Family Studies and Public Health. The latter trend reflects the interest in research from a broad, multidisciplinary perspective. The descriptors with the highest occurrence, according to the factor analysis carried out, indicate that the terms cyberbullying, bullying, adolescents and aggression present the highest levels of conceptual centrality. As related descriptors, topics such as social media, internet, Facebook, Twitter and sexting are found in a second cluster; and depression, anxiety, emotional intelligence and school violence are found in a third cluster. The topics linked to the first cluster concentrate the research and, as can be seen in the neighbouring clusters, are related to cross-cutting themes that open up new lines of interest for the study of cyberbullying.

One significant aspect is the connection and relationship, based on the analysis of the conceptual structure, of the central term with others such as adolescents, children, school, social media, internet, suicide, and violence. The co-occurrence of the aforementioned descriptors points towards research approaches that are mainly being developed in the period under study. The research ecosystem is progressively expanding towards addressing cyberbullying from social, medical and educational perspectives. Consequently, the collaboration network between institutions on cyberbullying is extensive; nevertheless, the University of Pennsylvania, the University of Potsdam and the University of Western Australia emerge as leaders. The leadership of the University of Cordoba, in terms of output and centrality, is also worthy of mention, as it places

Spain on the international research scene. As another matter of interest, the network of institutions, made up of over five clusters or groups, validates the growing interest in the subject, even though the collaborations are concentrated in two main geographical areas.

The collaboration networks demonstrated the participation of a large number of countries, despite the fact that there is a clear concentration of relations between the United States and Europe, a context where Spain maintains an important leadership position. In this context, the absence of relations with Latin America is an aspect that should be worked on, although the inherent coverage biases of the source used could be a determining factor in this behaviour. The leadership of the University of Cordoba among a group of institutions devoted to research on cyberbullying can be leveraged by other institutions, especially in Latin America, to initiate collaboration projects and relationships. However, this behaviour may be related to the very source of information used in the study, as well as the mostly higher quartile journals and which use English as the language of communication, results already found in previous studies (Peker & Yalçın, 2022).

The contribution offered by the analysis of the conceptual, intellectual and social structure of the domain made it possible to obtain information on the subject from different approaches. The citation and co-citation analysis showed both journals and authors relevant to the discipline, among which journals related to the fields of Psychology and Medicine are leading sources of information. Similarly, the large number and diversity of authors that form part of the disciplinary structure represent a bibliographic foundation for future research. An important result is the way in which the different analyses are complemented by techniques and indicators, showing journals and authors that appear as leaders in the different analyses, which strengthens the bibliographic selection and reinforces support for future research on cyberbullying.

The foregoing serves as a resource for researchers and teachers to search for, select and use information from different approaches to generate new knowledge, since the disciplinary structure represents a bibliographic foundation for future research.

The results found suggest the study of the subject from interdisciplinary perspectives, as observed in the results, in which both the analysis of the intellectual structure (coupling and co-citation) and that of the conceptual structure (subjects) show journals with different approaches and thematic perspectives including Psychology, Medicine and Society. A recommendation stemming from the above, in addition to addressing the results in new research by those who study cyberbullying-related issues, is to expand the collaboration framework towards Latin America with collaboration projects and the creation of lines of research that generate new knowledge output and constitute, at the same time, an opportunity to strengthen collaboration networks.

Contributions

Alicia Peñalva Vélez. Conceptualisation, investigation, methodology, formal analysis, writing (original draft), writing (review and editing).

Orlando Gregorio Chaviano. Investigation, methodology, data curation, formal analysis, visualisation, writing (original draft).

David Recio Moreno. Conceptualisation, investigation, methodology, formal analysis, writing (original draft), writing (review and editing), supervision.

All authors have read and approved the final version of the manuscript.

AI Statement

The authors state that they did not use artificial intelligence (AI) to prepare their article.

Funding

No specific funding was received for this research. However, one of the authors (David Recio Moreno) carried out this work in the framework of a Margarita Salas postdoctoral grant, funded by the European Union-NextGenerationEU, the Ministry of Science, Innovation and Universities of the Government of Spain, and the Universidad Pública de Navarra (UPNA), in the framework of the Recovery, Transformation and Resilience Plan.

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