Revista Latinoamericana de Psicología

https://revistalatinoamericanadepsicologia.konradlorenz.edu.co/

REVIEW

A bibliometric analysis of comparative psychology and animal behaviour research in Hispanic America

Pilar Herrera-Aroca [a,b], **Laura María Velásquez-Díaz** [a], **Francisca Droguett** [a], **Felipe I. Varas** [a], **Jonathan Badilla** [a], **Vanetza E. Quezada-Scholz** [a], **Gonzalo Miguez** [a], **Mario A. Laborda** [a,*]

[a] *Department of Psychology, University of Chile, Santiago, Chile*
[b] *Department of Ecological Sciences, University of Chile, Santiago, Chile*

Received 18 June 2024; ***accepted*** 25 November 2024

Abstract | **Introduction:** This study aimed to quantify and analyse scientific activity in Comparative Psychology and Animal Behaviour across the 19 Spanish-speaking countries in Latin America. This was achieved by examining articles published in journals indexed in the Web of Science Core Collection from 1975 to 2024 by authors affiliated with institutions in these countries. **Method:** A bibliometric analysis was conducted using 26 journals specialised in Comparative Psychology and Animal Behaviour, covering aspects such as historical production, authorship analysis, manuscripts, citations, countries, affiliations, and funding sources. The most relevant keywords, thematic mapping, thematic trends, and most frequently studied species were also identified. **Results:** A total of 1,971 articles were found. Most of the research output from Spanish-speaking countries in Latin America was concentrated in Mexico (35.1%), Argentina (21.6%), and Panama (12.8%). The contributions were mainly from authors associated with the Universidad Nacional Autónoma de México (16%), the Smithsonian Tropical Research Institute (14%), and the Universidad de Buenos Aires (8%). Additionally, it was identified that animal welfare and sexual selection are central themes in the field. Further indicators are presented to reflect the status of comparative psychology and animal behaviour research in this region. **Conclusion:** The primary limitations and gaps in the region are discussed, highlighting areas for improvement in the field.

Keywords: Bibliometric, comparative psychology, Hispanic America, animal behaviour, behavioural ecology

© 2025 Fundación Universitaria Konrad Lorenz. This is an open access article under the CC BY-NC-ND license (https://creativecommons.org/licenses/by-nc-nd/4.0/).

Análisis bibliométrico sobre la producción científica en psicología comparada y el comportamiento animal en Hispanoamérica

Resumen | **Introducción:** El objetivo de este artículo es cuantificar y analizar la actividad científica en Psicología Comparada y Comportamiento Animal en 19 países hispanoamericanos, estudiando los artículos publicados en revistas indexadas en Web of Science Core Collection entre 1975 y 2024, por autores y autoras firmantes con dirección en estos países. **Método:** Se realizó un análisis bibliométrico ocupando 26 revistas especializadas en Psicología Comparada y Comportamiento Animal incluyendo los siguientes índices: producción histórica, análisis de autoría, manuscritos, citaciones, países, afiliación y fuentes de financiamiento. También se identificaron las palabras clave más relevantes, mapa temático, tendencia temática y especies más utilizadas. **Resultados:** Se encontraron un total de 1971 artículos. La mayoría de la producción

* Corresponding author.
E-mail: mariolaborda@u.uchile.cl

https://doi.org/10.14349/rlp.2025.v57.1
0120-0534/© 2025 Fundación Universitaria Konrad Lorenz. This is an open access article under the CC BY-NC-ND license (https://creativecommons.org/licenses/by-nc-nd/4.0/).

en países hispanoamericanos se concentra en México (35.1 %), Argentina (21.6 %) y Panamá (12.8 %). Los aportes son realizados, principalmente, por autores y autoras asociadas a la Universidad Nacional Autónoma de México (16 %), al Smithsonian Research Institute (14 %) y la Universidad de Buenos Aires (8 %). También, se identificó que los temas de bienestar animal y selección sexual son centrales para el área. Se presentan más indicadores para reflejar el estado de la Psicología Comparada y el Comportamiento Animal en esta región. **Conclusión:** Se discuten las principales limitaciones y brechas en la región, destacando aspectos por mejorar en el campo.

Palabras clave: Bibliométrico, psicología comparada, Hispanoamérica, comportamiento animal, ecología comportamental

© 2025 Fundación Universitaria Konrad Lorenz. Este es un artículo Open Access bajo la licencia CC BY-NC-ND (https://creativecommons.org/licenses/by-nc-nd/4.0/).

Comparative Psychology fundamentally aims to document the similarities and differences in behaviour and its underlying mechanisms across various species (Papini, 2009). By seeking to understand the evolutionary pressures that shape behaviour, this field has played a crucial role in elucidating the general characteristics of psychological constructs based on a phylogenetic perspective (Marston & Maple, 2016). Comparative Psychology dates back to the late 18th century, with John Gregory's 1765 work comparing human and animal behaviour. However, the term itself was first used by Michael Hissmann in 1778 and gained traction in the early 19th century, especially in medical sciences. This early development shows that Comparative Psychology is one of the oldest branches of organised psychology (d'Isa & Abramson, 2023).

Regarding research, Vonk (2021) notes that Comparative Psychology has exhibited some of the most significant growth within the various domains of the discipline. This growth is attributed to the increasing diversity of species studied over recent decades, the advancement of innovative methodological techniques, and the expansion of research objectives. Abramson (2022) highlights that this field substantially impacts others, such as neuroscience, and there is a growing emphasis on incorporating training in this subdiscipline within educational settings (Abramson, 2015). This focus arises from the historical significance of animal studies in Psychology and their ongoing contributions to Human Evolutionary Psychology, which are considered fundamental aspects of the discipline (Zucker, 2018).

Latin America has historically been characterised as a region somewhat isolated from international advancements in Psychology, primarily due to a lack of scientific orientation and, at times, conflicts related to political activism (Ardila, 2018). However, Gutiérrez and Landeira-Fernández (2018) affirm that Latin America is experiencing rapid growth in research, as evidenced by an increase in publications, collaborative efforts, and the establishment of doctoral programmes, aligning it with other regions of the world. Countries such as Argentina, Brazil (see Abramson & Wincheski, 2021), Chile, Colombia, and Mexico are now demonstrating prolific and expanding scientific output in Comparative Psychology, supported by a longstanding tradition of cooperation and international publication (Gutiérrez & Landeira-Fernández, 2018).

A critical factor in this regional transformation has been the increasing application of bibliometric research, a method for analysing and exploring large volumes of scientific data. Among the main benefits of bibliometric research is the ability to reveal evolutionary changes within a particular field while also allowing visualisation of emerging topics within the specific area analysed (Donthu et al., 2021). Bibliometric studies in Psychology have been identified as fruitful areas of research in Latin America, as they allow for a detailed characterisation of the development of the psychological discipline (Gutiérrez & Landeira-Fernández, 2018). Since the early 20th century, psychologists have systematically tracked their publication output, significantly contributing to the advancement and historical understanding of the discipline (Godin, 2006).

Extensive efforts from Ibero-America in bibliometric research across various branches of Psychology are evident. Gallegos et al. (2020) catalogued 81 studies covering General Psychology, Psychopathology, Clinical Psychology, and other specialised fields. However, these studies have yet to specifically address Comparative Psychology despite its significant influence and relevance in the global context of Psychology (Dettmer & Bennett, 2021). Given this, coupled with the productive proliferation of research in Hispanic America, it is relevant to explore and analyse the development of this sub-discipline within Spanish-speaking countries. Therefore, we aimed to perform a bibliometric analysis of the scientific production in Comparative Psychology and Animal Behaviour across Hispanic America using journals indexed in the Web of Science Core Collection.

Method

Search strategy

A bibliometric analysis was conducted on articles published by authors from Hispanic America regarding Comparative Psychology and Animal Behaviour research from 1975 to May 2024, indexed in the Web of Science Core Collection. We identified journals potentially relevant to Comparative Psychology, Experimental Psychology, Zoology, and Veterinary Sciences, excluding non-experimental and purely human experimental areas, resulting in an initial list of 458 journals. Using the expertise of two authors (M. L. and P. H.), we refined this list to 26 journals specialising in Animal Behaviour and Comparative Psychology. We then cross-referenced these journals with the 19 Hispanic American countries or territories (Argentina, Bolivia, Chile, Colombia, Costa

Rica, Cuba, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Dominican Republic, Uruguay, and Venezuela).

Study selection and eligibility criteria

We conducted the search on June 1st, 2024, exclusively retrieving articles, filtering out reviews, conference papers, and other non-primary research documents. The full records retrieved comprised detailed document, authorship and journal information, cited references, keywords, funding information, and citation counts.

Data collection and analysis

We used VOSviewer (van Eck & Waltman, 2010), the *bibliometrix* package of R (Aria & Cuccurullo, 2017), and the *Analyse results* function in Web of Science. The results extracted from the data are organised as follows:

1) Historical production: Accounts for annual growth.
2) Authorship analysis: The top 25 male and 25 female authors were ranked by the number of articles published. The following indices were calculated: General Productivity Ranking (GPR) shows each author's position by total articles published, H-index indicates citation impact and productivity (Hirsch, 2005), total citations, and the Dominance Factor measures, as the proportion of first authorship in co-authored publications (Kumar & Kumar, 2008). Additionally, a collaboration network was constructed to illustrate co-authorship.
3) Country production: We identified the most productive countries by the number of records, acknowledging that a manuscript may include multiple countries due to multi-author manuscripts. Additionally, we present a collaboration network to illustrate international co-authorship.
4) Affiliation and funding agencies: We compiled data on the most productive institutions based on author affiliations. Funding agencies that supported most projects were manually coded to account for variations in how their names were reported.
5) Journal and citation analysis: Data for the most prolific journals is presented, and the ten most cited articles were tabulated.
6) Thematic and taxonomic overviews: We compiled information on Web of Science categories, identified the most frequently used author keywords, and created a thematic map to highlight core and emerging themes. We also generated a trend topics graph to show how the focus on specific themes has evolved. Additionally, we calculated the percentage of different taxa and identified the most common species used.

Results

Historical production

The search yielded 1,971 results showing an upward trend with an annual growth rate of 6.41%. Figure 1 denotes a notable acceleration in production beginning around 2005. Since then, published articles have increased from approximately 25 per year to over 100. In the last 15 years, 1,316 articles have been published, corresponding to more than 60% of the total production. Notably, 2021 has the highest number of publications to date.

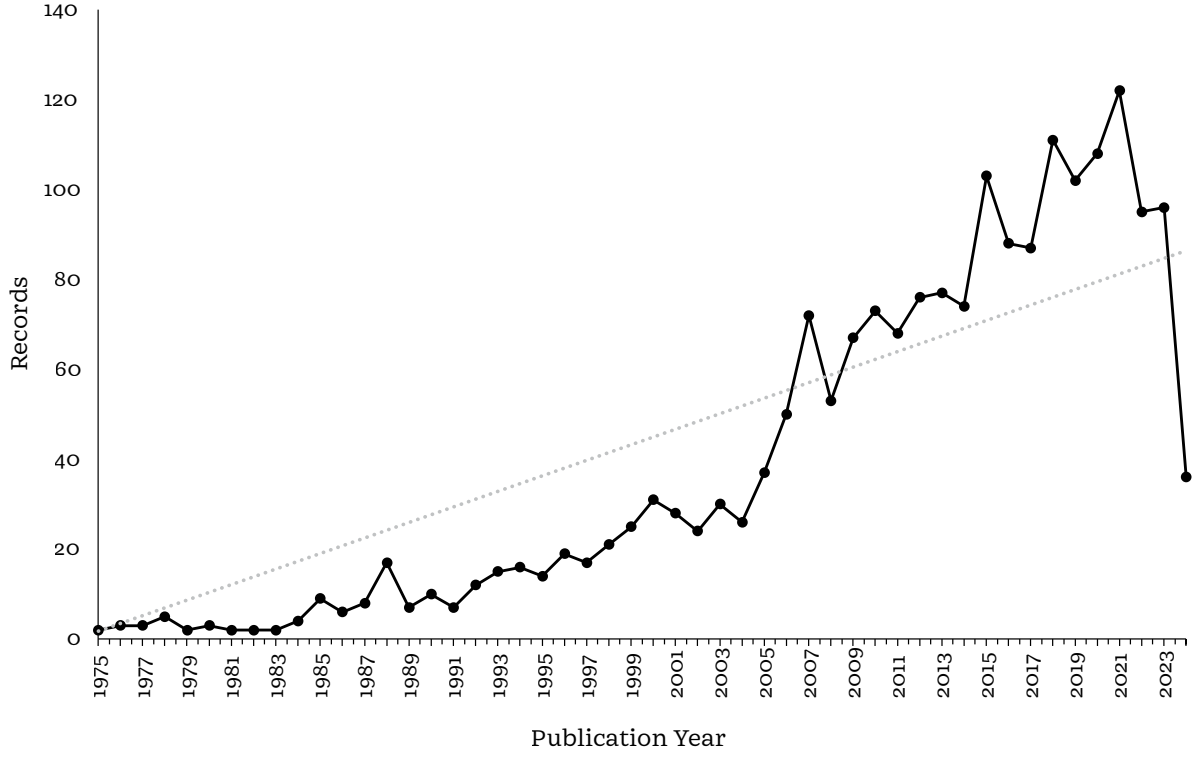


Figure 1. Articles published per year

Authorship analysis

Table 1 presents the indicators for the 25 most productive male authors. Michael Ryan from the Smithsonian Tropical Research Institute is the most prolific author. Hugh Drummond contributes another 2% of the published articles. Juan Carlos Reboreda is in third place, accounting for 1.9% of the total articles. These authors present low dominance, meaning they rarely are the first authors in coauthored publications, which implies a collaborative role, specialised contribution, and frequency in leadership (Kumar & Kumar, 2008). However, it is worth mentioning that many researchers with long trajectories prefer to be the last and corresponding authors rather than taking the first authorship in their publications; thus, this result should be considered carefully.

Table 2 presents the indicators for female authors. Robyn Hudson is the most productive woman, account-

Table 1. Data analysis: Male authors

GPR	Name	Affiliation	Record count	H-index	TC	DF	PY start
1	Ryan, Michael J.	Smithsonian Tropical Research Institute	49	24	1775	0.06	1982
2	Drummond, Hugh	Universidad Nacional Autónoma de México (UNAM)	41	18	1186	0.325	1983
3	Reboreda, Juan Carlos	Universidad de Buenos Aires (UBA)	38	14	658	0.037	1997
4	Ungerfeld, Rodolfo	Universidad de la República de Uruguay (UdelaR)	36	8	186	0.366	2005
5	Ebensperger, Luis A.	Pontificia Universidad Católica de Chile (PUC)	35	16	1025	0.466	1998
7	Orihuela, Agustín	Universidad Autónoma del Estado de Morelos	32	11	335	0.206	1995
10	Córdoba-Aguilar, Alex	UNAM	26	12	585	0.142	2003
11	Eberhard, William G	Smithsonian Tropical Research Institute	25	15	579	0.333	1983
12	García, Constantino Macías	UNAM	24	9	238	0.3	1989
13	Papini, Mauricio R	UBA	24	13	471	0.238	1985
14	Peretti, Alfredo V	Universidad Nacional de Córdoba	22	8	194	0.2	2005
17	Orduña, Vladimir	UNAM	20	5	117	0.437	2007
18	Rand, Austin Stanley	Smithsonian Tropical Research Institute	20	17	1107	-	1988
20	Costa, Fernando G	Instituto de Investigaciones Biológicas Clemente Estable	19	11	338	0.058	2003
21	Farina, Walter M	UBA	19	14	548	0.111	1991
22	Szenczi, Peter	National Institute for Psychiatric Studies Ramón de la Fuente	19	7	134	0.263	2015
23	Christy, John H	Smithsonian Tropical Research Institute	18	13	726	0.4	1988
24	Laborda, Mario A	Universidad de Chile (UCH)	17	6	166	0.142	2011
25	Vásquez, Rodrigo A	UCH	17	1	107	-	2002
26	Penna, Mario	UCH	16	9	327	0.866	1996
31	Galindo, Francisco	UNAM	15	1	8	0.071	2020
32	Muzio, Ruben	UBA	15	1	15	0.272	2015
33	Aureli, Filippo	Universidad de Veracruz	14	9	261	0.071	2009
34	Fernandez, Gustavo J.	Universidad Nacional del Comahue	14	4	106	0.250	1997
35	Nieto, Javier	UNAM	14	6	89	0.153	2013

Note. Authors presented may be currently affiliated with additional institutions. GPR = General Productivity Ranking; TC = Total citations; DF = Dominance Factor ("-" in DF represents a value less than 0.030); PY Start = Publication year start.

Table 2. Data analysis: Female authors

GRP	Name	Affiliation	Record count	H-index	TC	DF	PY start
6	Hudson, Robyn	UNAM	32	11	434	0.068	1997
8	Page, Rachel A.	Smithsonian Tropical Research Institute	30	11	413	0.040	2008
9	Bentosela, Mariana	UBA	29	12	532	0.095	2000
15	Mustaca, Alba E	UBA	21	9	335	0.222	1988
16	Aisenberg, Anita	Instituto de Investigaciones Biológicas Clemente Estable	20	9	270	0.294	2005
19	Banszegi, Oxana	UNAM	19	7	130	0.027	2015
27	Freitas-de-melo, Aline	UdelaR	15	6	86	0.461	2014
28	Kalko, Elizabeth KV	Smithsonian Tropical Research Institute	15	14	757	0.071	1998
29	Torres, Roxana	UNAM	15	10	406	0.142	2003
30	Zenuto, Roxana Rita	Universidad Nacional de Mar del Plata	15	6	129	0.142	2002
36	Biondi, Laura Marina	Universidad Nacional de Mar del Plata	13	5	200	0.833	2010
37	Fiorini, Vanina D	UBA	13	10	325	0.307	2006
38	Labra, Antonieta	UCH	13	10	258	0.333	2002
42	Albo, Maria J.	UdelaR	12	7	172	0.666	2007
50	Barrera, Gabriela	Universidad Nacional del Litoral	11	7	294	0.5	2008
51	Bernal, Ximena E.	Smithsonian Tropical Research Institute	11	8	394	0.363	2006
52	Bo, Maria Susana	Marine and Coastal Research Institute (INVEMAR)	11	4	65	-	2008
53	Pérez-Staples, Diana	Universidad de Veracruz	11	8	272	0.444	2006
58	Chaverri, Gloriana	Universidad de Costa Rica	10	7	219	0.444	2007
59	Tassino, Bettina	UdelaR	10	6	94	-	2010
60	Urrutia, Andrea	UNAM	10	5	73	0.333	2016
68	Dzik, Marina Victoria	UBA	9	3	22	0.333	2020
69	Knörnschild, Mirjam	Smithsonian Tropical Research Institute	9	4	132	0.4	2013
81	Quirici, Veronica	Universidad Nacional Andrés Bello	8	6	213	0.5	2008
90	Cavalli, Camila	UBA	7	4	37	0.666	2019

Note. Authors presented may be currently affiliated with additional institutions. GPR = General Productivity Ranking; TC = Total citations; DF = Dominance Factor ("-" in DF represents a value less than 0.030); PY Start = Publication year start.

ing for 1.6% of the total articles, and she is the sixth most productive author, according to the GPR. Rachel Page has published 1.5% of the total articles and is in second place for women. She is the eighth most productive author overall. Mariana Bentosela follows in third place, contributing 1.47% of the published articles and being the 9th most productive person in the GPR. Again, all of these authors showcase low dominance factors.

Following the presentation of these prominent authors, Figure 2 illustrates an author collaboration network. We included authors with at least five publications, resulting in a network based on 171 investigators. Despite several distinct clusters, these research groups are not highly interconnected, indicating a need for more collaborative work within the field. Nonetheless, the international co-authorship rate is 57.27%, suggesting robust international collaboration across the manuscripts.

Country production

In Hispanic America, production is concentrated in Mexico, Argentina, Panama, and Chile, totaling 80.8% of the output, with over 200 articles each. As for non-Hispanic countries, the USA, Germany, Spain, and England contribute 49.6% of publications. The most cited countries are the USA, Mexico, and Panama (see Table 3). A collaboration network (Figure 3) illustrates Comparative Psychology and Animal Behaviour research partnerships. Argentina, Mexico, Brazil, and Colombia are cen-

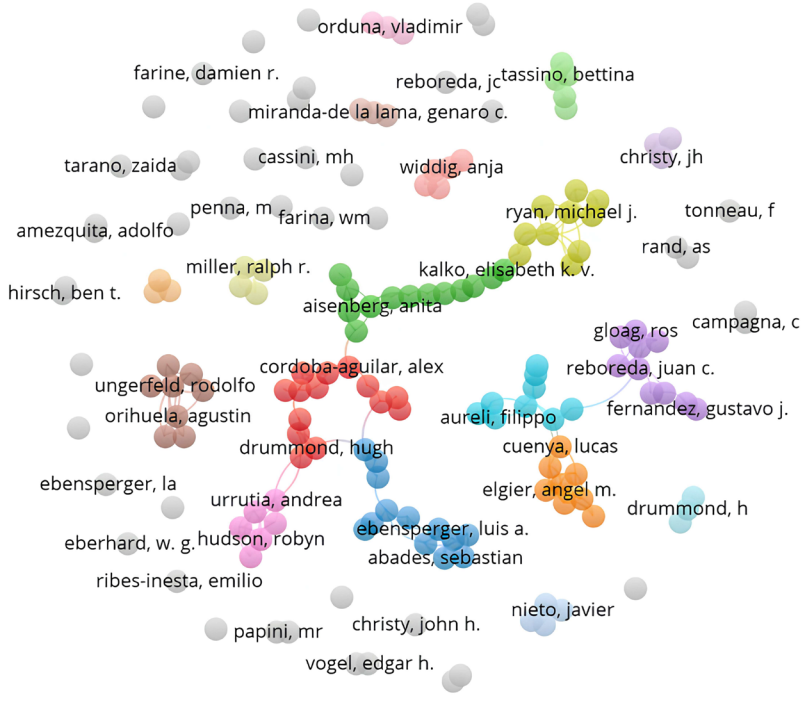


Figure 2. Author collaboration network

tral components, fostering cross-border collaborations. The network also highlights strong ties among European countries such as Germany, France, Italy, and Portugal and connections between Hispanic America and global partners such as the USA, Canada, and Australia.

Table 3. Most productive countries

Countries	Records	%	Total citations per country
Mexico	692	35.109	11,778
USA	596	30.238	16,142
Argentina	426	21.613	7,919
Panama	253	12.836	8,804
Chile	221	11.213	4,277
Germany	138	7.002	3,158
Uruguay	136	6.900	1,371
Spain	124	6.291	3,158
Colombia	120	6.088	1,371
England	119	6.038	3,386

Note. Countries that account for at least 5% of the articles are included. A single article may be attributed to two or more countries, meaning the percentages are not exclusive.

Affiliation and funding agencies

The most productive institutions are the Universidad Nacional Autónoma de México (UNAM), the Smithsonian Tropical Research Institute, the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) from Argentina, and the Universidad de Buenos Aires. These are also the institutions with the most significant impact regarding citation indicators, where the Smithsonian Tropical Research Institute is in first place (See Table 4).

As presented on Table 5, the top positions for funding organisations from Hispanic America are held by Mexico's Consejo Nacional de Ciencia y Tecnología, Argentina's Ministerio de Ciencia, Tecnología e Innovación, which comprises relevant institutions such as ANPCYT and CONICET; and Chile's Comisión Nacional de Investigación Científica y Tecnológica. Additionally, the National Science Foundation is the foreign institution that funds the most research in the region.

Journal and citation analysis

Figure 4 shows the first ten journals according to the number of articles published. Leading with over 250 articles are the journals *Animal Behaviour, Behavioral Ecology and Sociobiology,* and *Behavioural Processes.* These top 10 journals account for 84% of the articles published in the 26 selected journals. Notably, most of these journals are not confined to specific disciplines but encompass behavioural studies from diverse disciplinary perspectives.

Among the most cited documents (see Table 6), Ramos-Fernández et al. (2004) is the most frequently referenced. This work integrates physics into biology to explore foraging strategies, using spider monkey move-

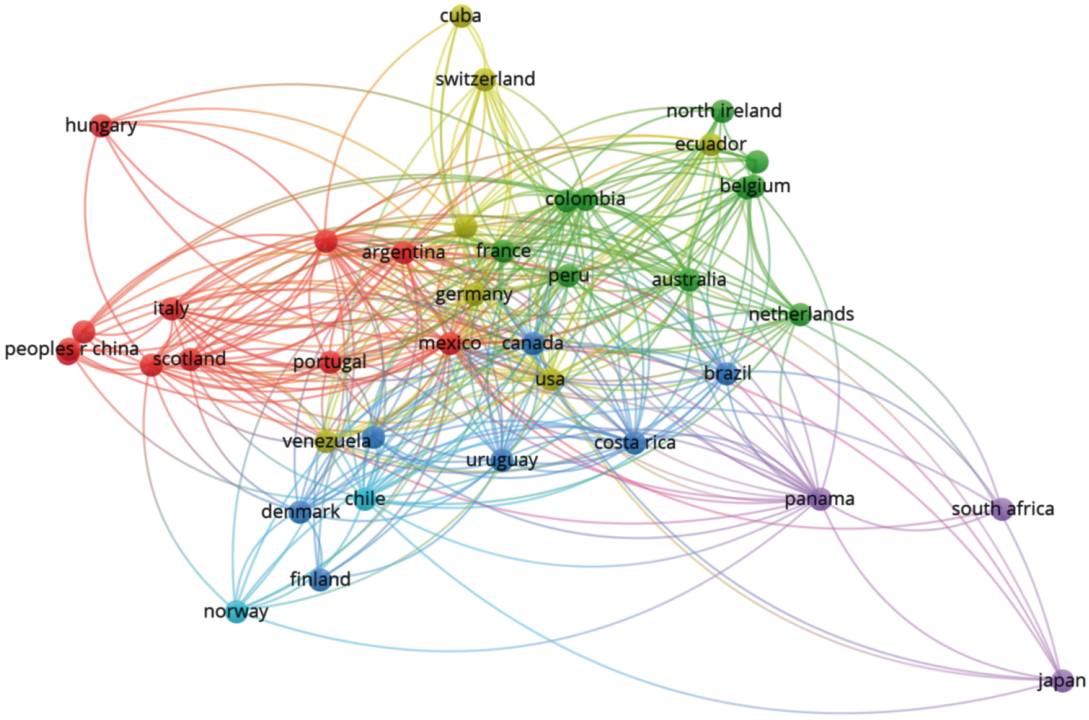


Figure 3. Country collaboration network

Table 4. Affiliations

Affiliations	Record count	%	H-Index	Times cited
UNAM	344	17.5	41	6,525
Smithsonian Tropical Research Institute	271	13.7	56	9,230
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)	264	13.4	34	4,126
UBA	163	8.3	33	3,266
UCH	102	5.2	23	1,747
UdelaR	94	4.8	15	854
University of California System	80	4.1	31	2,999
Universidad de Costa Rica	70	3.6	22	1,136
University of Texas	67	3.4	27	2,027
Universidad de Guadalajara	66	3.3	11	456
Pontificia Universidad Católica de Chile	62	3.1	22	1,469
Universidad de Veracruz	58	2.9	16	673
Instituto de Investigaciones Biológicas Clemente Estable	55	2.8	16	772
Instituto de Ecología de México	53	2.7	19	964
University of Puerto Rico	53	2.7	24	1,682
Universidad Nacional de Córdoba	47	2.4	15	622
Max Planck Society	45	2.3	19	997
Universidad Autónoma del Estado de Morelos	45	2.3	12	554
Universidad Nacional de Mar del Plata	43	2.2	17	755
Centre National de la Recherche Scientifique CNRS	39	1.9	18	824
Universidad Autónoma de Tlaxcala	38	1.9	13	620
Universidad Nacional del Comahue	37	1.9	11	314
University of Oxford	33	1.7	19	1,067
Consejo Superior de Investigaciones Científicas (CSIC)	31	1.6	17	1,283
University System of Ohio	31	1.6	13	674

Note. An article may be signed by authors from more than one organisation. Therefore, figures in the tabulation are not mutually exclusive.

Table 5. Funding agencies

Funding agency	Records	%
Ministerio de Ciencia, Tecnología e Innovación, Argentina (MINCYT)	292	14.8%
National Science Foundation (NFS)	274	13.9%
Consejo Nacional de Ciencia y Tecnología (CONACYT)	222	11.3%
Comisión Nacional de Investigación Científica y Tecnológica (CONICYT)	195	9.9%
Universidad Nacional Autónoma de México	156	7.9%
National Institute of Health (NIH)	131	6.6%
Spanish Government	115	5.8%
The Smithsonian Institution	113	5.7%

Note. Organisations that have funded at least 100 articles are presented. These categories are not mutually exclusive.

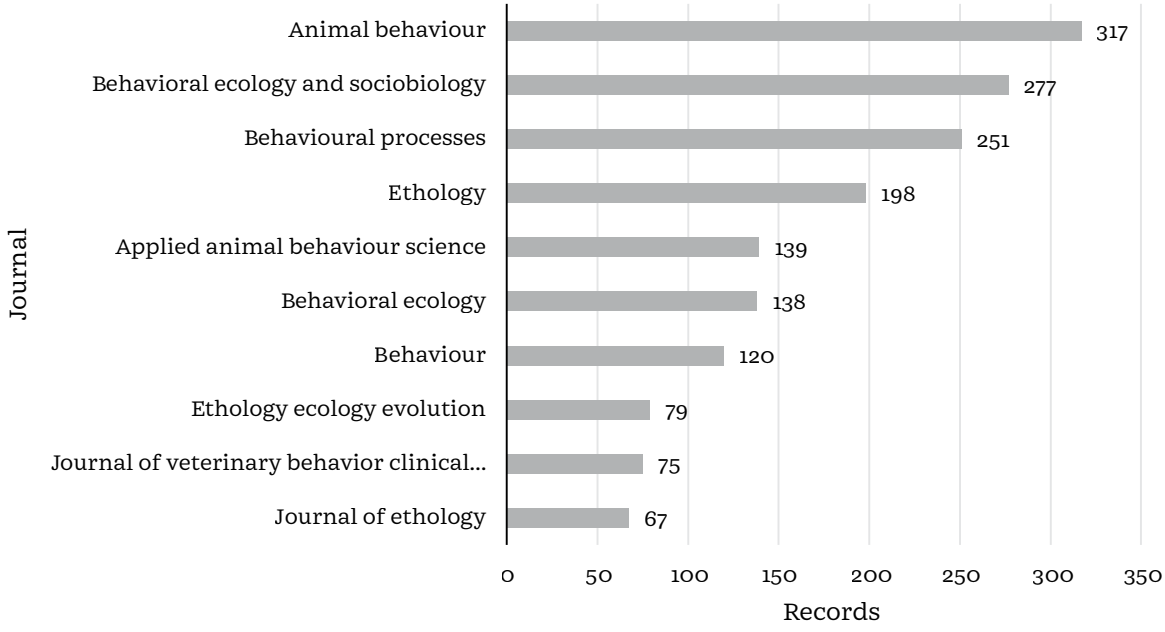


Figure 4. Source titles

ments as a model. Crozier and Dix (1979) are in second place and emphasises the importance of genetic factors in maintaining social structure in Hymenoptera. All these articles examine specific behaviours essential for survival and reproductive success, such as predator avoidance in frogs and efficient foraging in primates (Felton et al., 2009) and bats (Thies et al., 1998). Notably, all these manuscripts include a few Hispanic authors, and they are related to our data selection in two ways: either the sampling was conducted in Latin America, or at least one of the authors is Hispanic.

Thematic and taxonomic structure

The Web of Science categorises records into various fields; a single manuscript can belong to multiple categories. With this, *Behavioural Sciences* leads with 1,908 records, making up 96.8% of the total records. *Zoology* follows with 1,635 records, accounting for 82.9%. Furthermore, *Psychology Biological* has 589 records, representing 29.8%, while *Ecology* has 415 records, comprising 21.1%. *Veterinary Sciences* includes 214 records, making up 10.9%. *Biology* and *Agriculture Dairy Animal Science* have 139 and 138 records respectively, constituting around 7% of the total. Similarly, *Psychology Experimental* also has 138 records, accounting for 7%.

Also, the keyword analysis reveals that *sexual selection* and *rats* are the most frequently mentioned terms (Figure 5), indicating a strong research focus in these areas. The thematic map (Figure 6) supports this, showing *sexual selection* and *mate choice* as central motor themes, reflecting their critical role and high development in the field (as can also be appreciated in Figure 5). Stress, *welfare,* and studies involving *sheep* also emerge as significant themes, highlighting the interest in these topics. In contrast, *rats* and *extinction* are noted as less prominent emerging themes. Despite its lower thematic

Table 6. Most cited articles

Article	Authors	Total citations	Source	IF journals
Levy Walk Patterns in the Foraging Movements of Spider Monkeys (Ateles Geoffroyi)	Ramos-Fernández et al. (2004)	419	Behavioral Ecology And Sociobiology	2.3
Analysis of Two Genetic Models for The Innate Components of Colony Odor in Social Hymenoptera	Crozier and Dix (1979)	279	Behavioral Ecology And Sociobiology	2.3
Northern Elephant Seal Development - Transition from Weaning to Nutritional Independence	Reiter et al. (1978)	253	Behavioral Ecology And Sociobiology	2.3
Protein Content of Diets Dictates the Daily Energy Intake of a Free-Ranging Primate	Felton et al. (2009)	220	Behavioral Ecology	2.4
The Roles of Echolocation and Olfaction in Two Neotropical Fruit-Eating Bats, Carollia Perspicillata and C-Castanea, Feeding on Piper	Thies et al. (1998)	188	Behavioral Ecology And Sociobiology	2.3
Boys' and Girls' Relational and Physical Aggression in Nine Countries	Lansford et al. (2012)	183	Aggressive Behavior	2.9
Wasp Predation and Wasp-Induced Hatching of Red-Eyed Treefrog Eggs	Warkentin (2000)	168	Animal Behaviour	2.5
Reproductive-Behaviour of Southern Sea Lions	Campagna and Le Boeuf (1988)	165	Behaviour	1.3
The role of synchronized calling, ambient light, and ambient noise, in anti-bat-predator behavior of a treefrog	Tuttle and Ryan (1982)	162	Behavioral Ecology And Sociobiology	2.3
Parent-Offspring Cooperation in The Blue-Footed Booby (Sula-Nebouxii) - Social Roles in Infanticidal Brood Reduction	Drummond et al. (1986)	159	Behavioral Ecology And Sociobiology	2.3

Note. IF=Impact Factor describes the frequency by which an average article is cited within a given period in the journal.

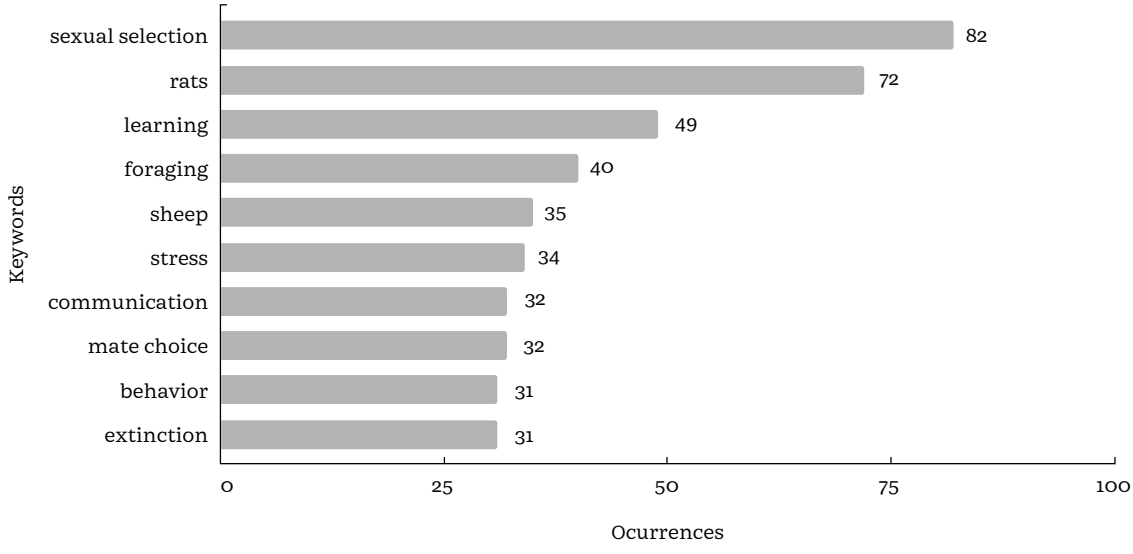


Figure 5. Most relevant keywords

development, rats' prominence as a keyword indicates their frequent use as a model organism in various studies. On the other hand, the thematic map indicates a growing but less central focus on *learning* and *behaviour,* signifying foundational yet diverse use in the field.

Figure 7 highlights the temporal evolution of keywords in the field. Recently, a growing focus has been on *animal welfare* and *stress*, indicating a concern for ethical considerations and animal health. Additionally, there is a rising trend in *urbanisation, memory, chemical*

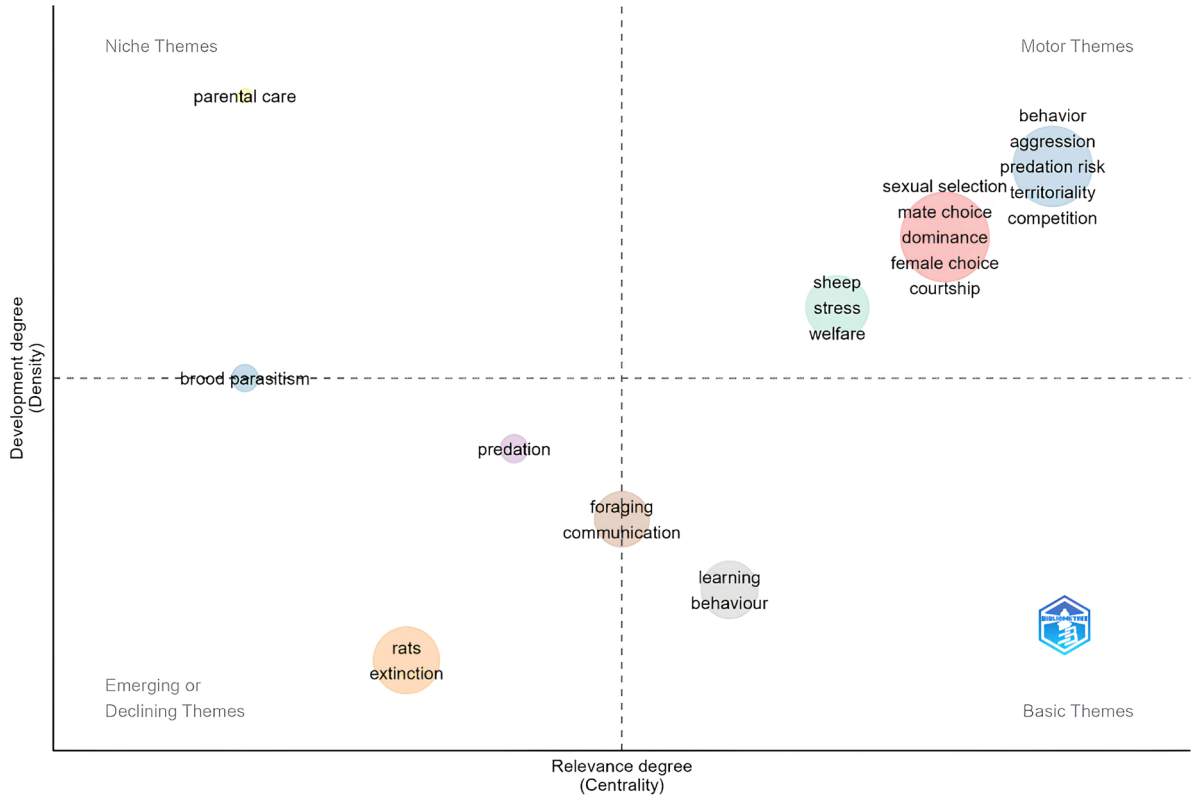


Figure 6. Thematic map

communication, and *parental care*, showing a considerable diversity of research themes. *Social* and *foraging behaviour* and *associative learning* have seen significant increases. Though less prominent, themes such as *echolocation, territoriality, extinction,* and *brood parasitism* remain significant, contributing valuable insights to the field.

Regarding the taxonomic classification of the animals used in all the articles in the dataset, chordates are the dominant group (74.5%), followed by arthro-

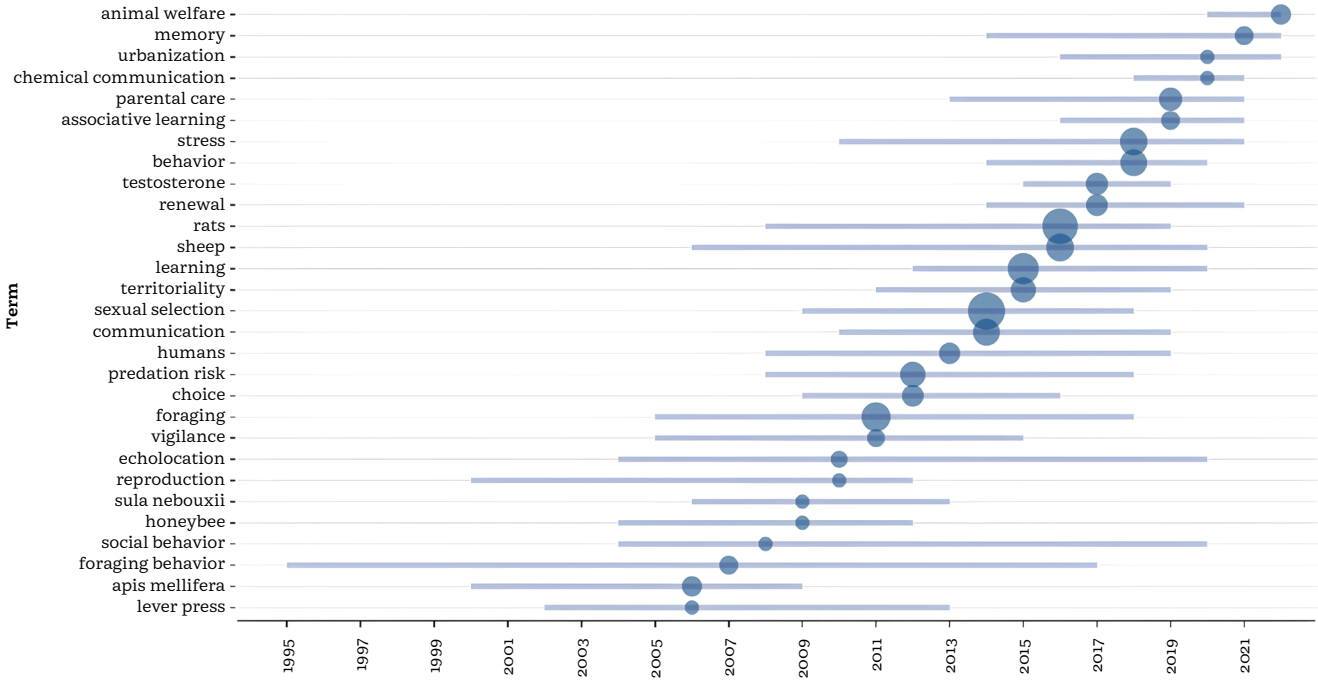


Figure 7. Trend topics

pods (25.2%), with mollusks being used less frequently (0.3%). In detail, Figures 8A and 8B illustrates the taxonomic classification of animals used at the class level. With regards to chordates (Figure 8A), the dominant groups are mammals, followed by birds, amphibians, Actinopterygii, and reptiles, and a minimum frequency of Chondrichthyes (cartilaginous fishes). Regarding arthropods (Figure 8B), most studies have focused on insects, followed by arachnids and, in less proportion, malacostracans (a class including crabs, lobsters, and shrimp). These findings indicate that mammals and insects are the most frequently studied groups within their respective phyla. In more detail, the most commonly utilised species (see Figure 9) are the Norway Rat (*R. norvegicus*), human (*H. Sapiens*), and sheep (*O.orientalis*). Other widely used species include dogs, cattle, honeybees, degus, and frogs. Nonetheless, various other species with lower frequencies indicate a diverse range of animals studied.

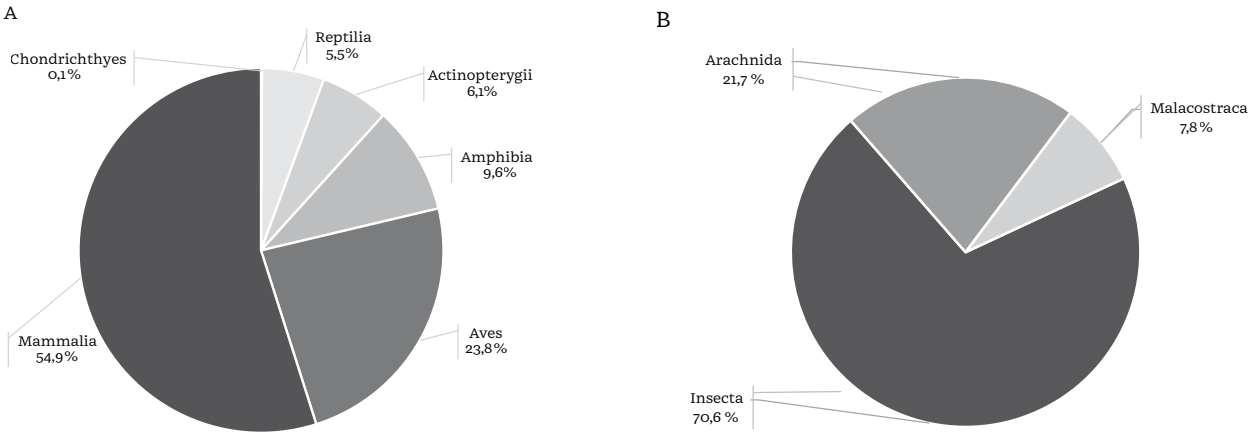


Figure 8. Taxonomic class distribution

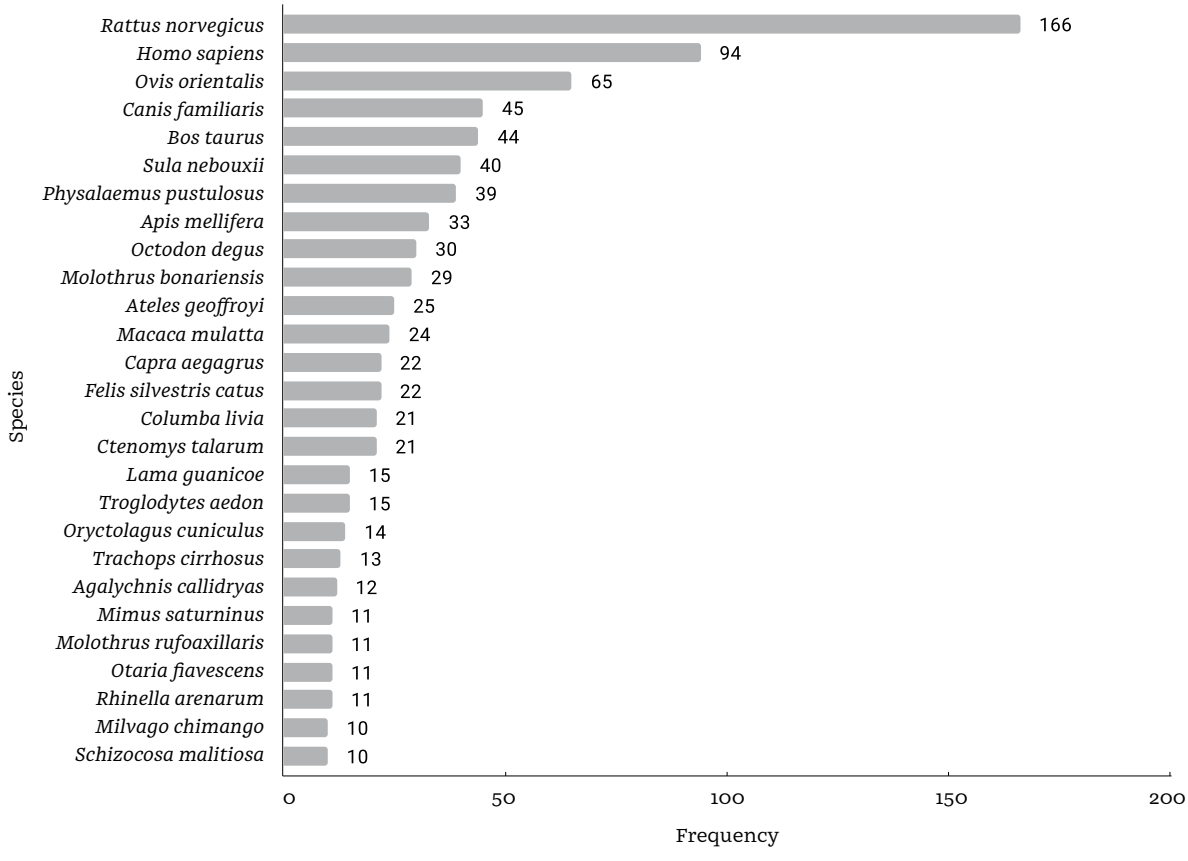


Figure 9. Main species distribution

Discussion

Hispanic America displays an increasing productivity and dynamic research landscape with a clear trend towards ethical, cognitive, and social dimensions of animal behaviour while maintaining a solid foundation in classical themes such as sexual selection and learning. The evolving prominence of these terms reflects the field's responsiveness to both emerging societal concerns and enduring scientific questions. As for the most relevant species, it is unsurprising that *R. norvegicus* is the most studied animal, given its status as one of the preferred mammalian models in research overall (Hulme-Beaman et al., 2021). Humans are also subjects of study, particularly in research on aggression, conflict and cooperation, and associative learning. Also, the majority of the most relevant wild species studied are native to the American continent, except for *M.mulatta*, a monkey originating from Asia that was transported to the Caribbean Primate Research Centre in Puerto Rico for research purposes (Testard et al., 2021). Other relevant species highlighted in the results are those closely related to humans, such as domestic, livestock, and production animals (dogs, cats, cows, sheep, bees, among others.).

The most productive institutions in the region, housing the most prominent researchers, are primarily the prestigious state universities of Latin America, such as the UNAM, the UBAs, the UCH, and the UdelaR, among others. The Smithsonian Tropical Research Institute in Panama is a significant funding source and productivity for research on tropical ecosystems. This U.S. government institution brings together over 1,400 scientists annually from around the world, with a substantial incidence of Hispanic American researchers (Smithsonian Tropical Research Institute, 2024). This portrays a highly intercultural and collaborative field, with many non-Hispanic countries contributing authors and institutions to Hispanic research.

Although the indicators studied do not allow for a detailed classification of the influence of psychologists in the study of Animal Behaviour, the mention of Biological and Experimental Psychology in the Web of Science categories indicates the presence of around 35% of this discipline in current research. Psychology's relevance can also be inferred from the analysis of keywords and thematic maps, which highlight concepts typically related to Psychology, such as behavioural science, associative learning, and extinction. However, most of the research is conducted by biologists, ecologists, or veterinarians from a behavioural ecology perspective, studying behaviour as an evolutionary adaptation to environmental selective pressures (Davies et al., 2012).

The current results highlight a disparity in the prominence of Hispanic researchers and institutions compared to international ones, which reveals the importance of increasing the visibility and contributions of Hispanic knowledge production. Additionally, the findings indicate the necessity for greater opportunities and support for Hispanic researchers, as there remains a considerable gap in the general ranking between men and women in this field. It is particularly concerning that the most prolific authors and institutions contributing to this body of knowledge are not native Hispanic speakers, pointing to a need for local academic and research communities to keep enhancing their engagement and output in the Animal Behaviour field. Despite this landscape, the prolific authors listed show low dominance, meaning they do not often appear as the first authors in their manuscripts. This suggests that they tend to be leaders of their respective teams and might be signing as corresponding authors, which is a limitation of the dominance analysis. Another limitation of this analysis is that by selecting only publications in specialised journals in comparative psychology and animal behaviour as our sample, many articles in this area of research are not included in our analysis, given that many articles are published in general and not specialised journals, creating a difference between our results and the net scientific production of the authors. We encourage other researchers to expand upon our findings and explore new methods to retrieve the information in further research.

As noted by Ardila (1987), areas such as comparative psychology and animal behaviour—continue to face hurdles in establishing a consistent and cohesive role across Latin American nations. This suggests that, while progress has been made, the ongoing need for increased visibility and opportunities for Hispanic researchers, as well as a more unified development across the region, remains crucial. We hope that this bibliometric analysis will help strengthen and highlight Comparative Psychology in Hispanic America by providing a comprehensive overview of current research trends, key institutions, and influential contributors. We aim to encourage further development and visibility of Comparative Psychology across the region, contributing to scientific advancement and practical applications in understanding Animal Behaviour.

Acknowledgments

The authors would like to thank the Agencia Nacional de Investigación y Desarrollo de Chile (ANID) for its support. PH was supported by ANID-Subdirección de Capital Humano/Magíster Nacional/2024-22241831, LMVD was supported by ANID-Subdirección de Capital Humano/Doctorado Nacional/2022-21220670, FIV was supported by ANID-Subdirección de Capital Humano/Doctorado Nacional/2024-21240564, JB was supported by ANID-Subdirección de Capital Humano/Doctorado Nacional/2024-21241310. Projects ANID-Fondecyt 1220797 and ANID-Fondecyt 1191619 partially supported GM, VEQ, and MAL. Inquiries concerning this research should be addressed to Mario A. Laborda, Department of Psychology, University of Chile; e-mail: mariolaborda@u.uchile.cl.

References

Abramson, C. I. (2015). A crisis in comparative psychology: Where have all the undergraduates gone? *Frontiers in Psychology*, *6*, 1500. https://doi.org/10.3389/fpsyg.2015.01500

Abramson, C. I. (2022). Why the study of comparative psychology is important to neuroscientists. *Frontiers in Behavioral Neuroscience*, *16*. https://doi.org/10.3389/fnbeh.2022.1095033

Abramson, C. I., & Wincheski, R. J. (2021). Integrating comparative psychology into the "Brasileiro" social science curriculum: Resources. *Parana Journal of Science and Education, 7*(3), 9-11.

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959-975. https://doi.org/10.1016/j.joi.2017.08.007

Ardila, R. (1987). Comparative psychology in Latin America. In E. Tobach (Ed.), *Historical perspectives and the international status of comparative psychology* (pp. 161-172).

Ardila, R. (2018). Panorama of psychology in Latin America. In R. Ardila (Ed.), *Psychology in Latin America: Current status, challenges and perspectives* (pp. 1-5). Springer. https://doi.org/10.1007/978-3-319-93569-0_1

Campagna, C., & Le Boeuf, B. J. (1988). Reproductive behaviour of southern sea lions. *Behaviour*, *104*(3-4), 233–261. https://doi.org/10.1163/156853988X00539

Crozier, R. H., & Dix, M. W. (1979). Analysis of two genetic models for the innate components of colony odor in social Hymenoptera. *Behavioral Ecology and Sociobiology*, *4*(3), 217–224. https://doi.org/10.1007/BF00297645

Dettmer, A. M., & Bennett, A. J. (2021). 100 years of comparative psychology advancing practice, policy, and the public—And what the future requires. *Journal of Comparative Psychology, 135*(4), 450-465. https://doi.org/10.1037/com0000299

Davies, N., Krebs, J. R., & West, S. A. (2012). *An introduction to behavioural ecology* (4th edition). Willey-Blackwell.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Drummond, H., González, E., & Osorno, J. L. (1986). Parent-offspring cooperation in the blue-footed boody (Sula nebouxii): Social roles in infanticial brood reduction. *Behavioral Ecology and Sociobiology*, *19*(5), 365–372. https://doi.org/10.1007/BF00295710

d'Isa, R., & Abramson, C. I. (2023). The origin of the phrase comparative psychology: An historical introduction. *Frontiers in Psychology, 14*,1174115. https://doi.org/10.3389/fpsyg.2023.1174115

Felton, A. M., Felton, A., Raubenheimer, D., Simpson, S. J., Foley, W. J., Wood, J. T., Wallis, I. R., & Lindenmayer, D. B. (2009). Protein content of diets dictates the daily energy intake of a free-ranging primate. *Behavioral Ecology*, *20*(4), 685–690. https://doi.org/10.1093/beheco/arp021

Gallegos, M., Pérez-Acosta, A. M., Klappenbach, H., López López, W., & Bregman, C. (2020). Los estudios bibliométricos en el campo de la psicología iberoamericana: una revisión metabibliométrica. *Interdisciplinaria: Revista de Psicología y Ciencias Afines*, *37*(2), 95-115.

Godin, B. (2006). On the origins of bibliometrics. *Scientometrics*, *68*(1), 109-133. https://doi.org/10.1007/s11192-006-0086-0

Gutiérrez, G., & Landeira-Fernández, J. (2018). Psychological research in Latin America: Current and future perspectives. In R. Ardila (Ed.), *Psychology in Latin America: Current status, challenges and perspectives* (pp. 7-26). https://doi.org/10.1007/978-3-319-93569-0_2

Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences of the United States of America*, *102*(46), 16569-16572. https://doi.org/10.1073/pnas.0507655102

Hulme-Beaman A., Orton D., & Cucchi T. (2021). The origins of the domesticate brown rat (Rattus norvegicus) and its pathways to domestication. *Animal Frontiers*, *11*(3), 78-86. https://doi.org/10.1093/af/vfab020

Kumar, S., & Kumar, S. (2008). Trends of collaborative research in journals of oilseeds research (India), 1993-2004. *Indian Journal of Agricultural Library and Information Services, 24*, 80-90.

Lansford, J. E., Skinner, A. T., Sorbring, E., Giunta, L. Di, Deater-Deckard, K., Dodge, K. A., Malone, P. S., Oburu, P., Pastorelli, C., Tapanya, S., Uribe Tirado, L. M., Zelli, A., Al-Hassan, S. M., Peña Alampay, L., Bacchini, D., Bombi, A. S., Bornstein, M. H., & Chang, L. (2012). Boys' and girls' relational and physical aggression in nine countries. *Aggressive Behavior*, *38*(4), 298-308. https://doi.org/10.1002/ab.21433

Marston, D. C., & Maple, T. L. (2016). *Comparative Psychology for Clinical Psychologists and Therapists: What Animal Behavior Can Tell Us about Human Psychology*. Jessica Kingsley Publishers.

Papini, M. R. (2009). *Psicología comparada. Evolución y desarrollo del comportamiento*. Manual Moderno.

Ramos-Fernández, G., Mateos, J. L., Miramontes, O., Cocho, G., Larralde, H., & Ayala-Orozco, B. (2004). Lévy walk patterns in the foraging movements of spider monkeys (Ateles geoffroyi). *Behavioral Ecology and Sociobiology*, *55*(3), 223–230. https://doi.org/10.1007/s00265-003-0700-6

Reiter, J., Stinson, N. L., & Le Boeuf, B. J. (1978). Northern elephant seal development: The transition from weaning to nutritional independence. *Behavioral Ecology and Sociobiology*, *3*(4), 337–367. https://doi.org/10.1007/BF00303199

Smithsonian Tropical Research Institute. (June 13, 2024). *About us*. https://stri.si.edu/about-us

Testard, C., Larson, S. M., Watowich, M. M., Kaplinsky, C. H., Bernau, A., Faulder, M., Marshall, H. H., Lehmann, J., Ruiz-Lambides, A., Higham, J. P., Montague, M. J., Snyder-Mackler, N., Platt, M. L., & Brent, L. J. N. (2021). Rhesus macaques build new social connections after a natural disaster. *Current Biology, 31*(11). 2299-2309. https://doi.org/10.1016/j.cub.2021.03.029

Thies, W., Kalko, E. K. V., & Schnitzler, H. U. (1998). The roles of echolocation and olfaction in two Neotropical fruit-eating bats, Carollia perspicillata and C. castanea, feeding on Piper. *Behavioral Ecology and Sociobiology*, *42*(6), 397–409. https://doi.org/10.1007/s002650050454

Tuttle, M. D., & Ryan, M. J. (1982). The role of synchronized calling, ambient light, and ambient noise, in anti-bat-predator behavior of a treefrog. *Behavioral Ecology and Sociobiology*, *11*(2), 125–131. https://doi.org/10.1007/BF00300101

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Vonk, J. (2021). The journey in comparative psychology matters more than the destination. *Journal of Comparative Psychology*, *135*(2), 156-167. https://doi.org/10.1037/com0000279

Warkentin, K. M. (2000). Wasp predation and wasp-induced hatching of red-eyed treefrog eggs. *Animal Behaviour*, *60*(4), 503-510. https://doi.org/10.1006/anbe.2000.1508

Zucker, E. L. (2018). Putting Comparative Psychology into a History and Systems of Psychology course. *International Journal of Comparative Psychology*, *31*, 1-8. https://doi.org/10.46867/ijcp.2018.31.01.02