



A thematic study of creativity research in Spain within the social sciences and psychology

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Título: Un estudio temático de la investigación en creatividad en España en las ciencias sociales y psicología.

Resumen: La creatividad se está convirtiendo en una habilidad necesaria en un mundo donde los robots superan cada vez más a las personas en las rutinas diarias. Para desarrollar eficientemente el campo de investigación de la creatividad, los académicos necesitan saber dónde están. Este artículo utiliza un enfoque bibliométrico para estudiar temas y características de la investigación en creatividad en España. Los resultados indican que la producción ha ido creciendo durante las últimas décadas. En comparación con la psicología, la creatividad en las ciencias sociales parece ser un área poco citada, local y endogámica. Para las ciencias sociales, los temas motores en la última década fueron a) la creatividad en niños y estudiantes en un entorno educativo, b) la innovación y creación de conocimiento en un entorno laboral, y c) las ciudades creativas. Los temas motores en psicología han sido a) las características individuales para generar conocimientos (por ejemplo, habilidades, improvisación, funciones ejecutivas) y b) la inteligencia emocional. Sugerimos algunos temas para futuras investigaciones, como la colaboración creativa en un entorno virtual, la co-creación de valor, y cómo las máquinas pueden ayudar a los humanos a impulsar su creatividad.

Palabras clave: Creatividad. Análisis bibliométrico. Análisis temático. Análisis de palabras clave. SciMAT.

Abstract: Creativity is becoming one necessary human skill in a world where robots increasingly outperform people in daily routines. In order to efficiently develop creativity as a research field, scholars need to know where they are. We employed a bibliometric approach to study themes and characteristics of creativity research in Spain. The results indicated that publication production in the field has been growing during the last decades. Compared to psychology, creativity in the social sciences seemed to be an undercited, local, and endogamic area. For social sciences, motor themes in the last decade were a) creativity in children and students in the educational environment, b) innovation and knowledge creation in a working environment, and c) cities and creativity. The motor themes in psychology were a) individual characteristics for generating insights (e.g., skills, improvisation, executive functions) and b) emotional intelligence. We suggest some themes for future research, such as creative collaboration in virtual environments, value co-creation, and how machines can help humans boost their creativity.

Keywords: Creativity. Bibliometric analysis. Thematic analysis. Keywords analysis. SciMAT.

Introduction

As robots and algorithms will overcome the human species' skills in most aspects, we are bound to develop other competitive capacities. One of the most important is creativity. More than twenty years ago, Amabile et al. (1996) suggested that in an environment of growing turbulence, competition, and unpredictable changes, creativity gives a competitive advantage to individuals, employees, and organizations. There is a growing recognition of the importance of creativity as it has been shown to contribute positively in many areas of life, from scholastic performance (Fanchini et al., 2019) to overall life success (Sternberg, 2002). However, creativity is a relatively new area of research. To understand where the research currently is and foresee developments of the field, we administered a thematic analysis with bibliometric methods. This analysis allows organizing information to present the evolution of a field and its main themes by delving into its products (i.e., publications).

Few studies have used bibliometric methods for creativity so far. Castillo-Vergara et al. (2018) studied creativity in the field of business economics. They found that creativity evolved from being considered an individual skill to becoming a relevant factor in the development of business organizations. At present, research is more focused on applied areas and relationships of creativity with individuals, organiza-

tions, and the environment. In their view, the research on creativity should focus on two main areas. Since creativity impacts organizations, the first area taps into studying creativity in terms of training professionals; the second area pertains to the measurement of creativity performance within organizations.

Long and al. (2014) studied leading journals' research productivity and performance between 1965 and 2012. They found that journals increased their impact over the years, even though 30% (578 of 1,891) of the publications were never cited. Recently, Hernández-Torrano and Ibrayeva (2020) found that the amount of research on creativity and education had grown exponentially since the 2000s. They consider creativity in education is an interdisciplinary field that emerges from knowledge produced in the educational sciences and psychology and identify four main themes developed during the last 45 years: a) teaching and learning of creativity; b) psychoeducational correlates of creativity; c) the role of creativity in organizations; and d) cognitive and affective processes that influence creativity.

Since research on creativity in Spain has not been summarized yet, the scholarship's situation remains unclear. The present study aims at closing this gap in the literature. It provides an overall picture of the development of creativity studies in Spain and the current status of research for the fields of social sciences and psychology.

Bibliometric Analysis

Bibliometrics is a set of methods used to study texts and data quantitatively, especially in big datasets (Cobo et al.,

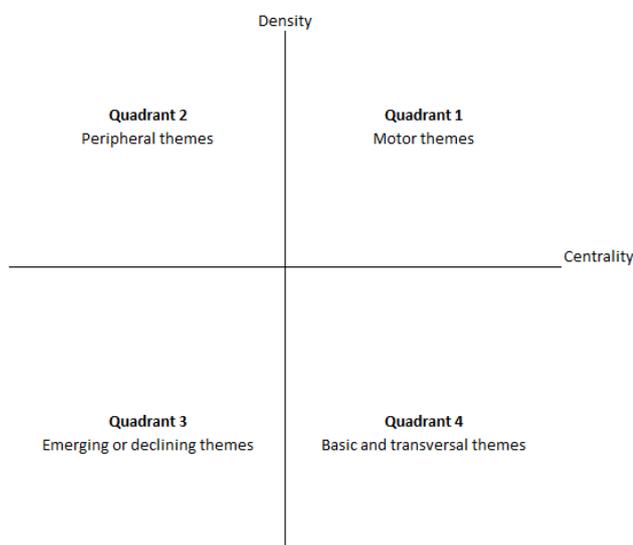
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2011). It often examines academic production through science mapping and performance analysis (van Raan, 2005). Science mapping is a spatial representation of how disciplines, fields, specialties, and individual papers or authors are related (Small, 1999) and how they evolve (Börner et al., 2003). Performance analysis helps to evaluate agents such as countries, journals, or papers, and assess their activity's impact.

Keywords analysis is called *thematic analysis* (Cobo et al., 2011). It allows detecting the most relevant, productive, and high-impact themes in a period, as well as the thematic evolution of a given research field (Chen & Xiao, 2016). In the SciMAP software (Cobo et al., 2012), strategic diagrams result from the analysis and represent conceptual groups of topics treated by the research field. These diagrams present clusters grouped using a simple centers algorithm in a graph where the x-axis represents centrality, and the y-axis represents density values. Each quadrant has a meaning (Figure 1). The upper-right quadrant 1 represents themes that are well developed and relevant for the structure of the field, known as *motor themes*. They are related to concepts applicable to other themes and are conceptually closely related to one another. The upper-left quadrant 2 shows *peripheral themes*. Clusters within quadrant 2 have well-developed internal ties, but weaker external links. Therefore, they are specialized but isolated and play a limited role in the field. The lower-left quadrant 3 shows themes that are both weakly developed and marginal. These themes are either disappearing or emerging. Finally, the lower-right quadrant 4 shows themes called *basic*. These are transversal themes and, therefore, important to a research field, but remain underdeveloped (Cobo et al., 2011).

Figure 1

In the SciMAP Software, a Strategic Diagram Represents Conceptual Groups of Topics Within the Field.



Method

To analyze the current state and progress in studies of creativity in Spain, we first defined the eligibility criteria for inclusion of the study records; then, we run the searches. Later on, we filtered and merged the results, configured the analysis software, and analyzed and discussed the findings.

Eligibility Criteria

This study included records that a) could impact the research and knowledge on creativity, b) had appeared in two leading international and multidisciplinary databases, Scopus and Web of Science (WoS), c) had been published by scholars affiliated with Spanish institutions, d) had been published until November 2020, e) had been written in any language, and f) fit within the area of social sciences.

Searches

Two searches were run late in October 2020 and early November 2020. The first search included a generic term *creati** (e.g., “creativity”, “creativity”, “creative”, “creatively”, “creativity”, “creation”) extracted from the authors’ keywords and the system-generated keywords. The search was limited to documents assigned to the social sciences section in Scopus and the corresponding fields in WoS (see Appendix for details). The second search focused on the titles of the articles that included the word fragment *creativ** (Figure 2). In so doing, the search may have missed articles relevant to creativity that did not mention the word and its derivatives. Instead, such missed articles could use in the title and keywords terms such as ‘divergent thinking’, ‘insight’, or ‘cognitive flexibility’ as synonyms of ‘creativity’.

Data Filtering

We erased 1,141 duplicates, five book reviews, three editorials, 17 editorial materials, one letter, and 296 conference or proceedings records from the data retrieved in the first search. We then screened titles and abstracts of the remaining records and erased 1,268 records whose research theme was not focused on the creativity area of research.

In the second search, we erased 449 duplicates, 174 conference or proceedings papers, 64 book reviews, 21 editorial materials, ten conference or meeting abstracts, and three notes. We also excluded two documents for not being related to creativity.

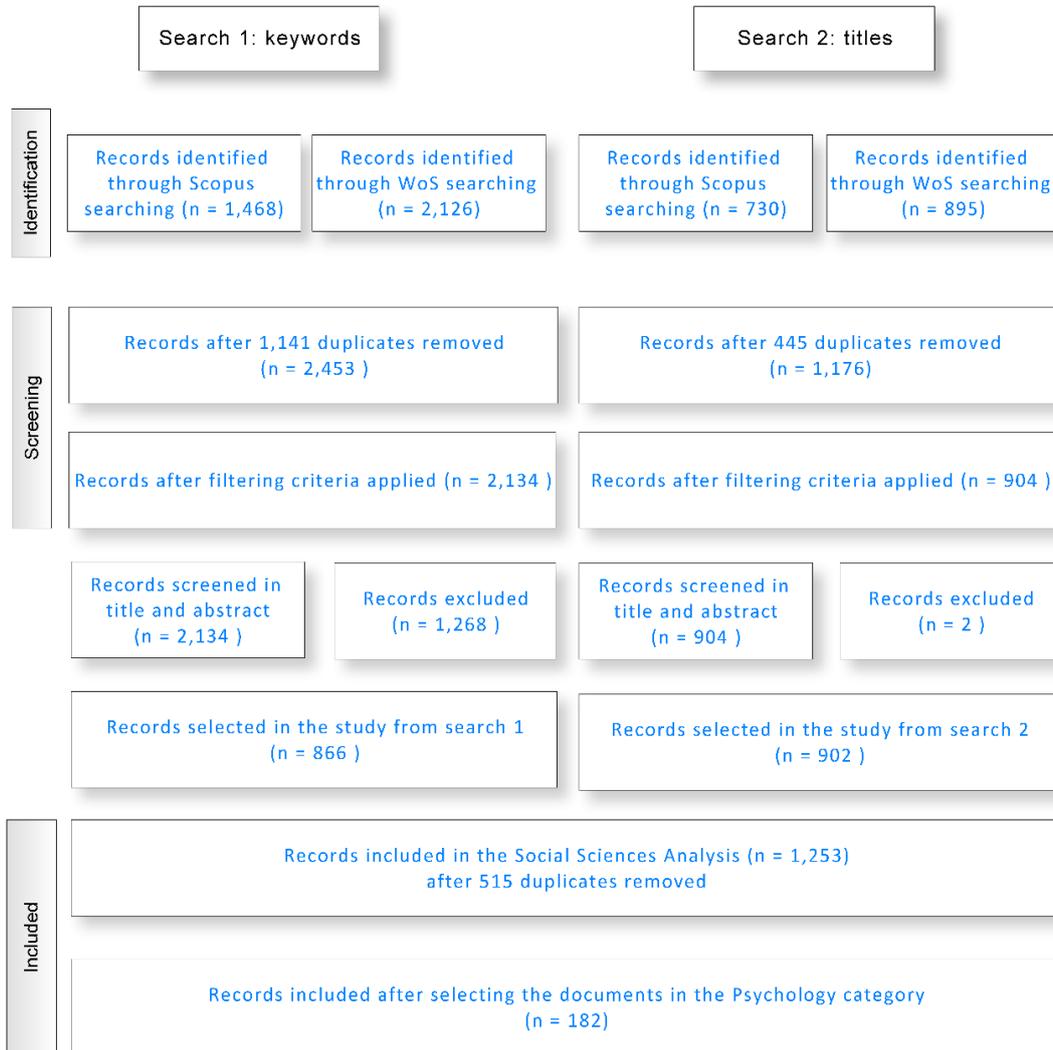
Afterward, we merged the two datasets and then eliminated 515 duplicates. When the duplicates had come from both Scopus and WoS, we erased those from Scopus only, since WoS had included a classification of research areas for each record. The remaining 1,253 records were used for the analysis of social sciences.

To run an analysis on the psychology field, only records belonging to the WoS subject category of *psychology* were se-

lected ($n = 125$). Since Scopus does not classify items by subject categories, we added 32 records published in journals either named with the word “psychology” or known as specializing in psychology (e.g., “Psicothema”, “Psicooncología”). Finally, we scanned the titles and abstracts of the re-

maining records from Scopus. We gave special attention to the records authored by at least one scholar affiliated with a school of psychology. After this procedure, we retained 182 records for subsequent analysis.

Figure 2
The Records Selection Procedure.



Data Preparation

Keywords, journal names, categories, and affiliations of the selected articles were manually revised. We scrutinized for regrouping keywords with three or fewer letters of difference. Thus, we merged singulars and plurals (e.g., children-child, program-programs) as well as words within the same semantic field (e.g., marketing-marketers). We ended up with a total of 3,946 keywords included in the study.

To analyze the temporal progress of the field, we segmented the data into three partitions: a) from the first publi-

cation until the year 2000, b) from 2001 to 2010, and c) from 2011 to 2020. We merged journals identified as being the same, and 696 journals were finally included in the study.

Software

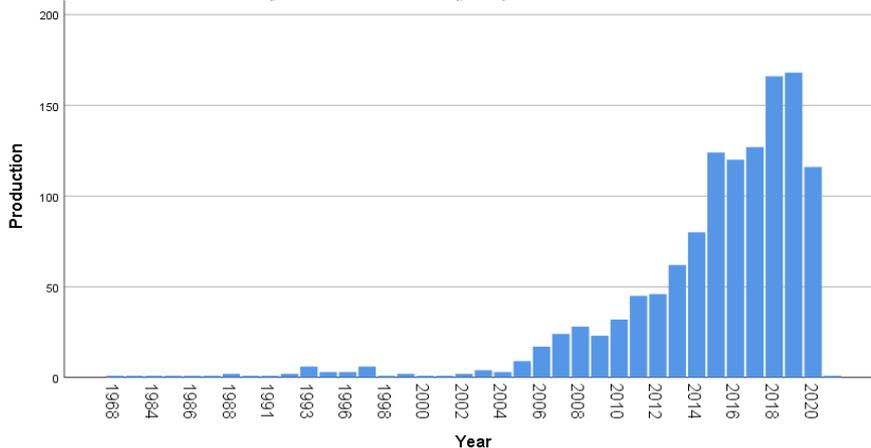
SciMAT is an open-source (GPLv3) software tool developed to perform science mapping analysis. It maps through clustering and runs network analysis, performance, and quality analysis. It analyzes data longitudinally through co-word analysis in order to detect different themes treated by

the research field across a given period (Cobo et al., 2012). We analyzed keywords, source (Scopus or WoS), number of citations, journal names, years of publication, and WoS subject categories.

Results and Discussion

We consecutively analyzed the results for the social sciences and then those for the psychology field.

Figure 3
The Annual Growth in the Number of Publications on Creativity in Spain



At the same time, the annual number of citations has not increased over the last 15 years (Figure 4), which may pro-

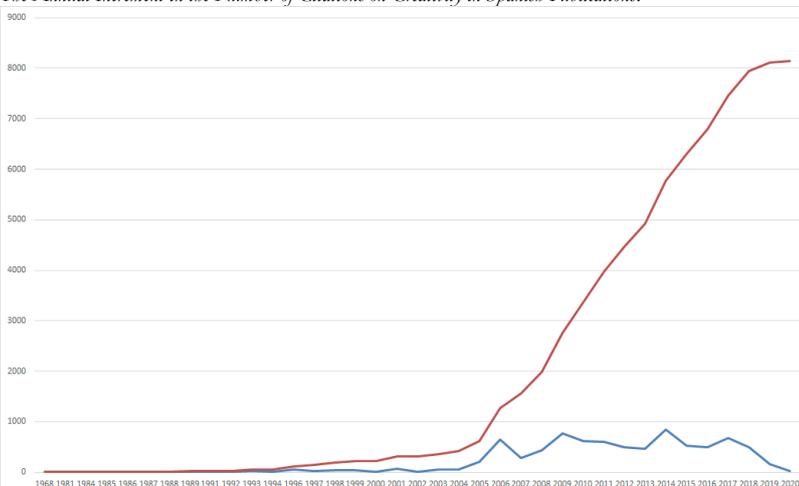
Social Sciences

Descriptive Analysis

Figure 3 shows that the number of published articles on creativity in Spain has increased over time with a growth that seems exponential, although there was a decrease during 2020¹. During the last decades, scholars in Spain have felt increasing pressure to publish (Noll, 2019). Therefore, most areas of research, including that of creativity, should have seen a growing number of publications.

vide evidence that research in creativity in Spain is not part of a well-structured and interconnected research network.

Figure 4
The Annual Increment in the Number of Citations on Creativity in Spanish Publications.



Note: Blue line are citations; red line are cumulative citations

Table 1 presents the 15 most frequent areas of research, according to WoS. Education and business research represented one-fourth of the creativity research, and psychology

added another 10%. These three areas concentrated 35% of all the research in creativity.

¹As the data were retrieved at the beginning of November 2020, many articles published in 2020 may not have been included.

Table 1*The 15 Most Frequent Areas of Research: Social Sciences.*

WoS category	Frequency	Percentage
Education & Educational Research	177	14.1
Business & Economics	140	11.2
Psychology	120	9.6
Social Sciences - Other Topics	58	4.6
Art	56	4.5
Communication	53	4.2
Arts & Humanities - Other Topics	45	3.6
Linguistics	30	2.4
Literature	21	1.7
Environmental Sciences & Ecology	18	1.4
Sociology	17	1.4
Geography	15	1.2
Government & Law	13	1.0
Philosophy	13	1.0
Education & Educational Research// Music	10	.8

Table 2*The 15 Most Cited Articles: Social Sciences.*

Title	Source	Year	Citations	Category
Team-level predictors of innovation at work: a comprehensive meta-analysis spanning three decades of research	Journal of Applied Psychology	2009	582	Psychology
Developing creativity in tourist experiences: a solution to the serial reproduction of culture?	Tourism Management	2006	364	Environmental Sciences & Ecology
Entrepreneurship in Russia and China: the impact of formal institutional voids	Entrepreneurship Theory and Practice	2010	329	Business & Economics
Research on workplace creativity: a review and redirection	Annual Review of Organizational Psychology and Organizational Behavior	2014	207	Psychology
The impact of entrepreneurship education in higher education: a systematic review and research agenda	Academy of Management Learning & Education	2017	188	Business & Economics
Leveraging the innovative performance of human capital through HRM and social capital in Spanish firms	International Journal of Human Resource Management	2011	139	Business & Economics
Do creative industries cluster? Mapping creative local production systems in Italy and Spain	Industry and Innovation	2008	136	Business & Economics
Information technology as a determinant of organizational learning and technological distinctive competencies	Industrial Marketing Management	2006	134	Business & Economics
An individual business model in the making: a chef's quest for creative freedom	Long Range Planning	2010	102	Business & Economics
Knowledge-based human resource management practices, intellectual capital and innovation	Journal of Business Research	2017	96	Business & Economics
The impact of team atmosphere on knowledge outcomes in self-managed teams	Organization Studies	2005	93	Business & Economics
Managing innovative work behavior: the role of human resource practices	Personnel Review	2014	83	Business & Economics
The influence of perceptions on potential entrepreneurs	International Entrepreneurship and Management Journal	2011	79	Business & Economics
The evaluation of regional innovation and cluster policies: towards a participatory approach	European Planning Studies	2001	77	Environmental Sciences & Ecology
Knowledge-based resources and innovation in the hotel industry	International Journal of Hospitality Management	2014	77	Social Sciences - Other Topics
Torrance test of creative thinking: the question of its construct validity	Thinking Skills and Creativity	2008	74	Education & Educational Research
Empathy in children aged 10 to 12 years [empatía en niños de 10 a 12 años]	Psicothema	2006	64	Psychology
Customer participation and citizenship behavior effects on turnover intention	Journal of Business Research	2015	58	Business & Economics
Value co-creation and university teaching quality consequences for the European Higher Education Area (EHEA)	Journal of Service Management	2012	57	Business & Economics
Disentangling competences: interrelationships on creativity, innovation and entrepreneurship	Thinking Skills and Creativity	2015	57	Education & Educational Research

Table 2 presents the list of the most cited articles in social science. All of them were reviews or meta-analyses.

Almost half of the records (45.9%) were never cited. This number exceeded our expectations, based on the results by Long et al. (2014). This may be an outcome of including research fields where the citations are scarce (e.g., art) or unstructured research.

The 10 Most Cited Articles in Social Sciences during the last 5 years.

Title	Source	Year	Citations	Category
The impact of entrepreneurship education in higher education: A systematic review and research agenda	Academy of Management Learning & Education	2017	188	Education & Educational Research
Knowledge-based human resource management practices, intellectual capital and innovation	Journal of Business Research	2017	96	Business & Economics
Customer participation and citizenship behavior effects on turnover intention	Journal of Business Research	2015	58	Business & Economics
Disentangling competences: Interrelationships on creativity, innovation and entrepreneurship	Thinking Skills and Creativity	2015	57	Education & Educational Research
Co-creation and open innovation: Systematic literature review	Comunicar	2018	55	Communication
Living labs: Implementing open innovation in the public sector	Government Information Quarterly	2017	51	Public Administration
Exploring the relationship between co-creation and satisfaction using QCA	Journal of Business Research	2016	45	Business & Economics
Frontline employees' collaboration in industrial service innovation: routes of co-creation's effects on new service performance	Journal of the Academy of Marketing Science	2016	45	Business & Economics
Micro-geographies of creative industries clusters in Europe: From hot spots to assemblages	Papers in Regional Science	2015	40	Geography
Impact of information technology infrastructure flexibility on mergers and acquisitions	MIS Quarterly	2018	37	Computer Science

Table 3 shows the journals that have published the largest number of documents written by Spanish scholars on creativity in the social sciences. Sixty-five percent of the journals were published in Spain, which may indicate a tendency toward localism or endogamy.

Table 3

List of the 15 Sources That Most Published on Creativity in the Social Sciences in Spain.

Source	Number of articles
Arte Individuo y Sociedad	25
Thinking Skills and Creativity	22
Anales de Psicología	22
Sustainability (Switzerland)	21
Opcion	17
Electronic Journal of Research in Educational Psychology	17
Frontiers in Psychology	15
Reidocrea-Revista Electronica de Investigacion y Docencia Creativa	14
Comunicar	12
Creativity Research Journal	11
Arbor-Ciencia Pensamiento y Cultura	11
Revista Latina de Comunicacion Social	10
International Entrepreneurship And Management Journal	10
Journal of Business Research	9
Historia y Comunicacion Social	9

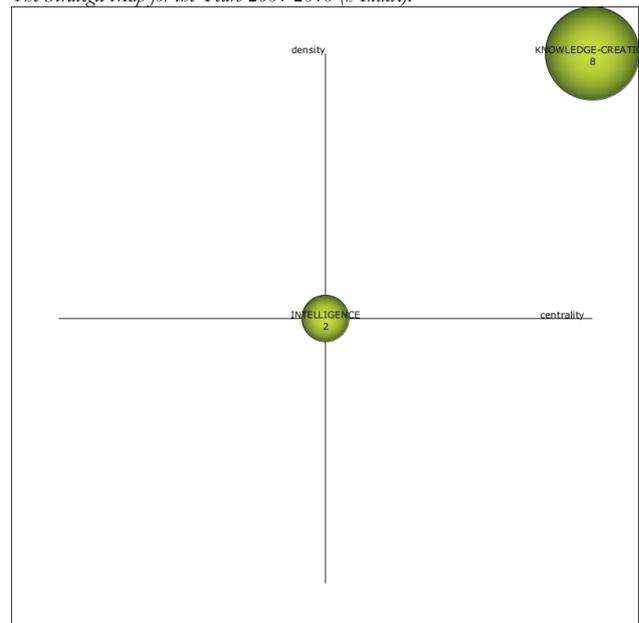
Thematic Analysis

Before the year 2000, creativity studies in Spain had been sparse which precluded establishing a network. Strategic maps (Figure 5) revealed two major clusters of creativity research from 2001 to 2010. The first cluster was formed by studies on *knowledge creation*. It was a motor theme with strong centrality and high density (Cobo et al., 2011). This cluster studied the application and benefits of creativity in business organizations (for example, the cluster included

terms like “firm” or “innovation”), and the implementation of creativity in organizations (e.g., “knowledge management”, “learning”, “capabilities”, “dynamic capabilities”). The second cluster was *intelligence*, which studied creativity as a skill related to intelligence and thinking.

Figure 5

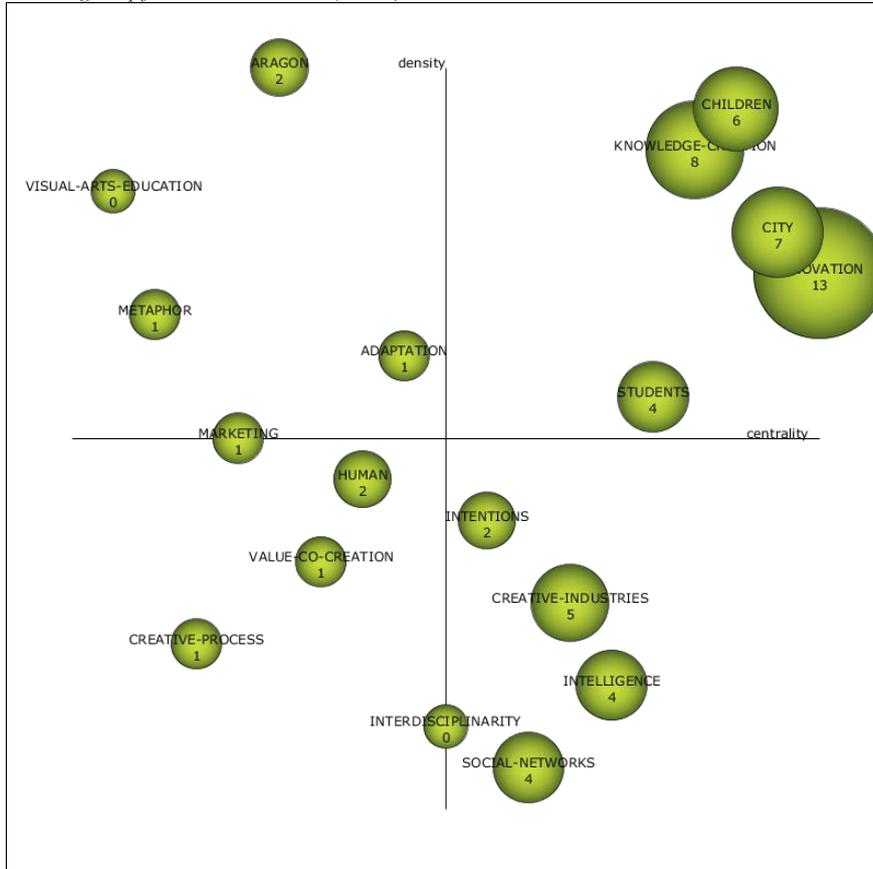
The Strategic Map for the Years 2001-2010 (h-Index).



Over the last decade (Figure 6), new lines of research have been started, and the map has increased in complexity. There were five motor themes: a) creativity in students with a particular emphasis on children (i.e., *children* and *students* clusters); b) the clusters of *knowledge creation* and *innovation*; and c) the *city* cluster.

Figure 6

The Strategic Map for the Years 2011-2020 (b-Index).



The evolution map indicates that early 2000-2010 intelligence studies set the stage for research on children and intelligence in the next decade. Intelligence had been a transversal theme, but it lost momentum in the next decade (2011-2020). The children's network included many different topics that seem to be related to both school education (e.g., school, physical education, adolescents, arts education) and mental abilities (e.g., cognitive performance, achievement, executive functions, style, thinking). The students' network includes topics related to individual competencies (e.g., skills, curriculum, design, competencies, learning), emotional intelligence (e.g., emotional intelligence, perception), and different ways of learning (e.g., learning, digital storytelling), technology, and questionnaire development. This network probably includes new teaching strategies.

Knowledge creation and innovation were central themes with high density and centrality in the 2011-2020 period. They both derived from the knowledge creation cluster of the previous period. To this moment, the knowledge creation network evolved into organizational efficiency (e.g., collaboration, organizational learning) with a comprehensive view of the organization (e.g., organizational performance, knowledge management, organizational context, strategy). Knowledge creation was especially relevant for the business

field, but it also developed toward student research. The dense innovation studies cluster included topics related to the individual (e.g., entrepreneurship, capabilities, leadership, human resource management, perspective), but also to the macro environment (e.g., organizations, systems, industries, the environment, firm, industrial district).

The last motor theme over the 2011-2020 period was *city*. This new and relevant theme included research on culture in society (e.g., cultural economy, creative city, economy, policy, workshops, culture) and art (e.g., art, artists, discourse). It was related to the search for improving the cities as a living cultural space.

The lower-right quadrant represents four transversal themes, still underdeveloped. The *intelligence* cluster was a continuation of the previous period and evolved into the themes of bilingualism, behavior, assessment, Torrance tests, and experience. *Intentions* was a new cluster with a network formed by the study of attitudes and family in different contexts. The *social networks* cluster was associated with teams and collaborative behavior. *Creative industries* were another transversal theme. It included artificial intelligence, knowledge base, cultural industries, and business with a search for complementarity among them. This cluster may

represent a growing theme with a high potential for development.

The lower-left quadrant represents themes that may be either growing or vanishing. *Interdisciplinarity* is a new cluster whose network is formed by emotions and musical education. Another new cluster, *creative process*, establishes a network with the concept of *the performer*. The *value co-creation* cluster makes a network with co-production, and this may be a theme worth researching in the near future.

Psychology

Descriptive Analysis

Within the field of psychology, creativity studies has shown a steady increment in production (Figure 7).

Table 5 shows the most cited articles. The percentage of non-cited articles was 23.6, indicating that more articles were cited than expected, according to Long et al. (2014).

Table 4
Clusters for the Decade 2011-2020.

Cluster	Centrality	Centrality range	Density	Density range
Innovation	26.0	1.0	8.5	.7
City	13.3	.9	9.3	.8
Children	12.7	.9	16.2	.9
Knowledge creation	10.5	.8	14.1	.9
Students	7.4	.8	5.4	.6
Intelligence	6.2	.7	3.4	.2
Creative industries	4.6	.7	3.8	.3
Social networks	4.4	.6	2.36	.1
Intentions	2.2	.6	4.2	.4
Interdisciplinarity	.5	.5	3.1	.1
Adaptation	.4	.4	6.7	.6
Human	.3	.4	4.5	.4
Aragon (area)	.2	.3	33.3	1.0
Value co-creation	.3	.3	4.2	.3
Marketing	.1	.2	5.3	.5
Visual arts education	.0	.1	9.5	.8
Metaphor	.0	.1	7.1	.7
Creative process	.0	.2	3.7	.2

Figure 7
The Evolution of Production of the Creativity Topic in Psychology.

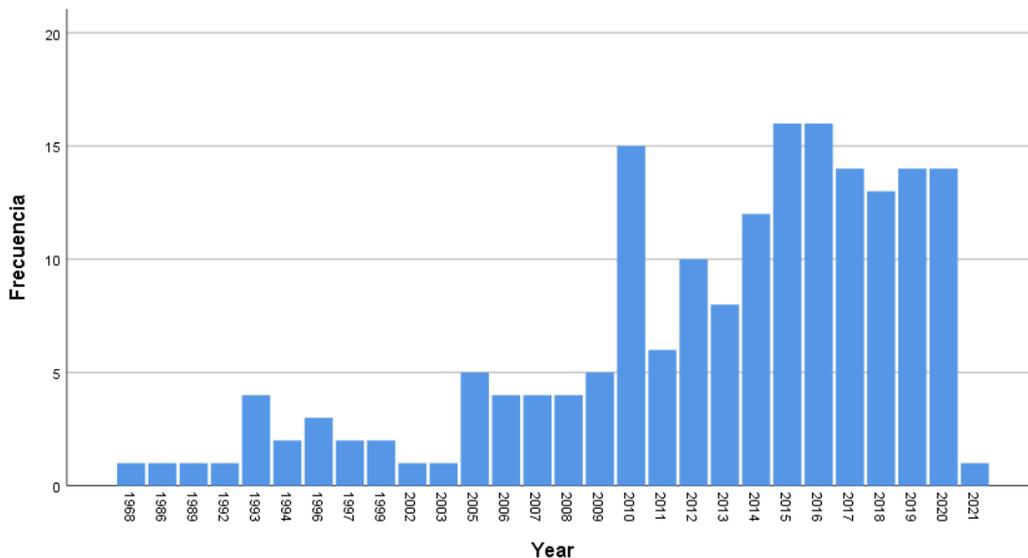


Table 5
List of the 15 Most Cited Articles on Creativity Published in the Psychology Field in Spain.

Title	Source	Year	Citations
Team-level predictors of innovation at work: A comprehensive meta-analysis spanning three decades of research	Journal of Applied Psychology	2009	582
Research on workplace creativity: A review and redirection	Annual Review of Organizational Psychology and Organizational Behavior	2014	207
Managing innovative work behavior: The role of human resource practices	Personnel Review	2014	83
Empathy in children aged 10 to 12 years [empatía en niños de 10 a 12 años]	Psicothema	2006	64
Multiculturalism and creativity: Effects of cultural context, bicultural identity, and ideational fluency	Social Psychological and Personality Science	2013	53
The relationship between trait emotional intelligence and creativity across subject domains	Motivation and Emotion	2011	49
New technologies and educational innovation	Revista de Psicodidactica	2009	41
Gender differences in creative thinking	Personality and Individual Differences	2007	39

Title	Source	Year	Citations
Personality and creativity	Personality and Individual Differences	1996	38
Creative benefits from well-connected leaders: Leader social network ties as facilitators of employee radical creativity	Journal of Applied Psychology	2014	35
Contributions of an artistic educational program for older people with early dementia: an exploratory qualitative study	Dementia	2013	35
Effects of a play program on creative thinking of preschool children	Spanish Journal of Psychology	2011	31
Intervention in creativity with children aged 10 and 11 years: Impact of a play program on verbal and graphic-figural creativity	Creativity Research Journal	2006	31
Discovering new ways of moving: observational analysis of motor creativity while dancing contact improvisation and the influence of the partner	Journal of Creative Behavior	2010	30
The possibilities of expressive movement and creative dance tasks to provoke emotional response	Revista de Psicología del Deporte	2011	30

List of the 10 Most Cited Articles on Creativity Published in the Psychology Field in Spain during the last five years

Creativity and emergence of specific dance movements using instructional constraints	Psychology of Aesthetics Creativity and the Arts	2015	21
Personal factors of creativity: A second order meta-analysis	Journal of Work and Organizational Psychology - Revista de Psicología del Trabajo y de las Organizaciones	2015	20
What makes creative teams tick? Cohesion, engagement, and performance across creativity tasks: A three-wave study	Group & Organization Management	2017	13
Creativity in middle childhood: Influence of perceived maternal sensitivity, self-esteem, and shyness	Creativity Research Journal	2016	13
Memory inhibition as a critical factor preventing creative problem solving	Journal of Experimental Psychology-Learning Memory and Cognition	2017	11
Happy-productive groups: How positive affect links to performance through social resources	Journal of Positive Psychology	2019	8
Creativity and psychopathology: Sex matters	Anuario de Psicología	2016	6
Creativity and personality across domains: A critical review	Anales de Psicología	2017	8
Divergent thinking and its dimensions: What we talk about and what we evaluate? [Pensamiento divergente y sus dimensiones: ¿De qué hablamos y qué evaluamos?]	Psicothema	2017	8
Medication and creativity in attention deficit hyperactivity disorder (ADHD)	Creativity Research Journal	2016	7

Publications on creativity from Spanish scholars have concentrated in four journals: *Anales de Psicología*, *Electronic Journal of Research in Educational Psychology*, *Frontiers in Psychology*, and *Creativity Research Journal*. Cumulatively, these outlets have issued 50% of the articles published in the 15 sources that most published on creativity in the psychology area in Spain (Table 6). Seven of 15 journals have been published outside Spain indicating that the field is not too local or endogamous.

Thematic Analysis

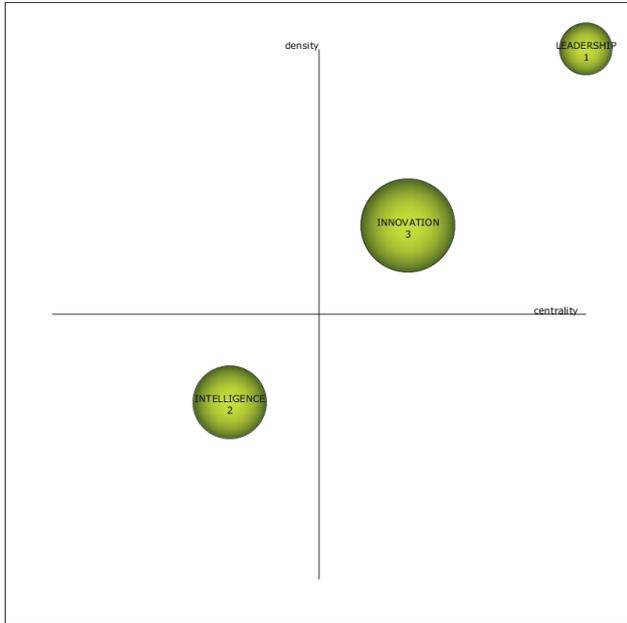
The thematic analysis has revealed no particular clusters before the year 2000. In the second period, 2001-2010, three clusters were uncovered: *innovation* and *leadership*, both representing motor themes, and *intelligence* (Figure 8). Innovation included conventional topics of behavior in organizations (e.g., *behavior*, *team*, *organizations*, *experience*) and a desire to summarize knowledge before moving to new topics (e.g., *review*, *meta-analyses*). The cluster of intelligence included themes of *thinking*, *achievement*, *intellectual ability*, and, a more isolated, *assessment*. Finally, a leadership cluster emerged which included three concepts: *human*, *children*, and *questionnaire*. The latter means that seeking measures of leadership in children may have dominated during that period.

Table 6

The List of 15 Sources That Most Published on Creativity in the Psychology Area in Spain.

Source	Number of articles
Anales de Psicología	22
Electronic Journal of Research in Educational Psychology	17
Frontiers in Psychology	15
Creativity Research Journal	10
Psicothema	7
Reidocrea-Revista Electrónica de Investigación y Docencia Creativa	7
Spanish Journal of Psychology	6
Perceptual and Motor Skills	5
Sustainability (Switzerland)	5
Estudios de Psicología	4
Handbook of the Management of Creativity and Innovation: Theory and Practice	4
Journal of Creative Behavior	3
Infancia y Aprendizaje	3
Psychological Reports	1
Revista Española de Orientación y Psicopedagogía	2

Figure 8
The Strategic Map of Creativity Themes in Spanish Psychology for the Years 2001-2010.



The 2011-20 strategic map (Figure 9, Tables 7 and 9) depicts a more complex map for psychology compared to the social sciences.

Figure 9
The 2011-20 Strategic Map of Creativity Themes in Spanish Psychology.

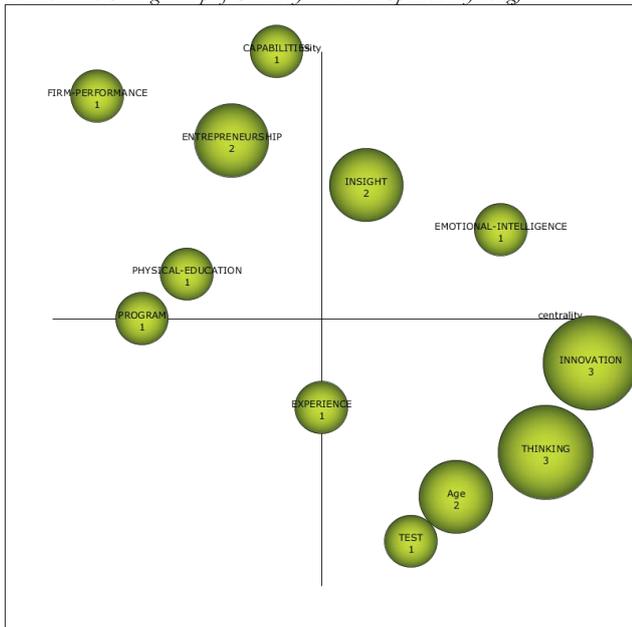


Table 7
The Clusters of Creativity Topics in Psychology Research in Spain Over the Decade 2011-2020.

Cluster	Centrality	Centrality range	Density	Density range
Innovation	52.4	1	44.6	.4
Thinking	40.1	.9	32.9	.2
Emotional-Intelligence	26.6	.8	55.9	.7
Age	23.1	.7	20.8	.2
Test	10.1	.7	11.1	.1
Insight	8.3	.6	56.2	.7
Experience	7.6	.5	37.5	.3
Capabilities	7.5	.4	100	1
Entrepreneurship	.6	.3	56.7	.8
Firm-Performance	0	.1	94.4	.9
Program	0	.2	50	.5
Physical-Education	0	.2	50	.6

Two motor clusters emerged during this period, namely, *insight* and *emotional intelligence*. The first cluster studied characteristics for creating insights (e.g., *skills, improvisation, and executive functions*). The emotional intelligence cluster was derived from the innovation and intelligence clusters of the previous decade. It included competencies (e.g., *design, learning, competencies, and symptom*) and emotional intelligence in adolescents (e.g., *behavior, achievement, adolescents, students*). This cluster may pertain to an interest in developing emotional intelligence in adolescents and students.

Clusters in the upper-left quadrant (i.e., *firm performance, entrepreneurship, capabilities, physical education, program*) were less linked to the remaining research topics and thus were supposed to be more peripheral.

The lower-right quadrant comprised transversal clusters of *innovation, thinking, age, and test*. An innovation cluster emerged from the innovation and leadership clusters of the 2001-2010 decade. In psychology, innovation is related to organizations (e.g., *organizations, culture*), teams (e.g., *teams, social networks*), and to individual characteristics (e.g., *motivation, preference, curriculum, leadership*). Innovation assessment has attracted some attention of psychologists, too. *Thinking* was another remarkable transversal cluster of the 2011-2020 epoch. This cluster evolved from *intelligence*, as well as *leadership*, clusters coming from the previous period. Three main groups comprised this cluster: *children and creativity* (e.g., *creativity development and children creativity*), *collaboration* (e.g., *technology and collaboration*), and *intelligence* (related to the Torrance tests). *Art* and *bilingualism* were isolated secondary topics of the cluster. *Age* represented the third transversal cluster related to cognitive models of aging and creativity (e.g., *cognitive model, adult, human, artists*) as well as mental impairment (e.g., *dementia*). *Test* represented the fourth transversal cluster linked to *teachers* and *adaptation*.

Finally, *experience* was located between quadrants 3 and 4 and deemed to be an emerging group. The cluster was composed of computational creativity, co-production, and value co-creation. It may have stemmed from the 2001-2010 innovation cluster.

Conclusions

Based on two leading international databases, Scopus and WoS, this study provides an overall picture of the development of creativity studies in Spain and the current status of research in the fields of social sciences and psychology. The study, however, is limited in the sense that its search strategy may have left out some publications on creativity, including those of several tools for creativity assessment, which are not indexed by Scopus and WoS. For example, CREA (Corbalán-Berná et al., 2003) is a frequently used Spanish scale that has about 400 citations in Google Scholar, but the ranking presented in Table 5 did not include it because the scale was not published in an academic venue. The same happens with other relevant scales, such as PIC-J (Artola et al., 2008) and PIC-N (Artola et al., 2010).

In the social sciences area, the production of new publications has been growing during the last decades. However, the percentage of uncited documents was higher than expected and the sector of Spanish social science aimed at studying creativity was found to be quite local and endogamic. Conversely, in the psychology field, more documents than expected were cited at least once, despite a lack of production growth over the last few years, and the field was less local or endogamic.

In general terms, organizations and education have provided the most relevant research areas for creativity in Spain. Psychology also represents an important field that continually interacts with other areas of research.

No clusters of research prior to the year 2000 were found since, at that time, the research on creativity in Spain had been rather unstructured. For the social sciences, by the year 2020, the motor themes were a) creativity in children and students in an educational environment, b) innovation and knowledge creation in a working environment; and c) cities and creativity to integrate culture into the day-by-day life. The latest motor themes in psychology have been the means for creating insights (e.g., skills, improvisation, and executive functions) and emotional intelligence.

The results of studies in the 15 most frequent areas of research were coherent with the found clusters. Scholars from the education and educational research fields have possibly studied creativity in children and students, while business and economics researchers have preferably studied innovation and knowledge creation. Furthermore, scholars from the areas of communication, art, urban studies, geography, and environmental sciences / ecology may have focused on the city and creative industries.

In this paper, we have also presented a list of the journals that published articles on creativity most frequently as well as the most cited articles on creativity in the social sciences and psychology disciplines. These data can be useful for researchers to determine the most impactful topics in the area

over the last decades and, ultimately, to choose a venue for their future work.

Future Developments

One of the benefits of bibliometric studies is the broad vision that they give to a field. Bibliometric studies offer an opportunity to spot tendencies and propose new research themes. The following is a list of the themes that scholars could consider useful for their research.

Teleworking is a social change that has come to stay. There are many topics of research in creativity that could move toward the study of teleworking (e.g., knowledge management, creative styles, thinking, emotional intelligence, digital storytelling, new teaching strategies, organizational context, collaboration, environment). For example, a promising topic may be fostering creativity in the business environment when team members are physically separated.

Creativity in education will keep being a relevant topic for years to come, as it is arguably essential for the development of an individual and their long-term work life. Emotional intelligence and teaching strategies may also be high-potential topics for research. Other exciting research topics to investigate may be the value and the measurement of co-creation, or gamification and its relation to creativity.

Quadrant 3 of the 2011-2020 decade has provided three possible avenues for future research including co-creation between human and artificial intelligence. For instance, how can artificial intelligence help humans to be more creative? Which are the creative processes leading to better co-creation? Is there a single creative process only, or are there many different processes?

Social networks relate to teams and collaboration. Even though it had hardly been a central topic until recently, the SARS-CoV-2 (aka, Covid-19) pandemic crisis may have fostered its development. Thus, the line of research on how social networks relate to co-creation and creativity could cluster together with teleworking issues.

Creative industries is another transversal theme to be developed. This node includes artificial intelligence, cultural industries, and business while researchers are looking for complementarity among them. The focus of studies may further expand from cities as the only topic to rural areas and the environment in general.

To conclude, we hope that the present findings can help creativity scholars to get a broader view of the field and to focus their energies on those clusters that are drawing attention at present or are gaining momentum for development in the future.

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Appendix. List of Research Areas

Scopus

Arts and Humanities (ARTS), Business, Management and Accounting (BUSI), Decision Sciences (DECI), Economics, Econometrics and Finance (ECON), Psychology (PSYC), Social Sciences (SOCI).

Web of Science

Art OR Arts & Humanities Other Topics OR Archaeology OR Classics OR Literature OR History & Philosophy of Science OR History OR Philosophy OR Religion OR Film, Radio & Television OR Dance OR Music OR Theater OR Behavioral Sciences OR Area Studies OR Biomedical Social Sciences OR Business & Economics OR Communication OR Criminology & Penology OR Cultural Studies OR Demography OR Development Studies OR Education & Educational Research OR Ethnic Studies OR Family Studies OR Geography OR Government & Law OR International Relations OR Linguistics OR Mathematical Methods In Social Sciences OR Psychology OR Public Administration OR Social Issues OR Social Sciences Other Topics OR Social Work OR Sociology OR Urban Studies OR Women's Studies OR Anthropology.