

Negative Emotional Experiences in Design: A Theoretical Approach to the Literature in Design Studies

Experiencias emocionales negativas en el diseño: una aproximación teórica a la literatura en estudios de diseño

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Abstract:

In recent years, there has been a significant amount of literature on design, design thinking, and the design process. Many researchers have conducted studies to describe and explain the essence and mechanisms of the design process, as well as the unique nature of design thinking. However, this research aims to systematically review the literature in the field of design studies and related fields on the subject of negative emotional experiences as perceived in these studies, striving to present a comprehensive content and theoretical framework for previous studies. The study of this topic is significant due to its potential to enhance our understanding of how designers' function during the creative design process and the effects of these emotions on them. This research serves as a foundation for more precise analyses of these negative emotional experiences, which can lead to the development of effective and structured design approaches.

The study utilizes descriptive and analytical methods, conducting a thorough review of library and documentary information. It identifies articles from reputable international scientific sources that have addressed the topic of negative emotional experiences in design. The findings reveal that various negative emotional experiences, such as fear, stress, and anxiety, have been examined and analyzed in different contexts, including design, architectural design, and art. These studies highlight the significance of safety and environmental effects in architecture, the impact of negative emotions on the creative process in art, and the importance of the design process and user experience in design.

Keywords: Design, design thinking, emotional design, design stress, design anxiety, negative emotions.

Resumen:

En los últimos años, ha habido una cantidad significativa de literatura sobre diseño, pensamiento de diseño y el proceso de diseño. Muchos investigadores han realizado estudios para describir y explicar la esencia y los mecanismos del proceso de diseño, así como la naturaleza única del pensamiento de diseño. Sin embargo, esta investigación tiene como objetivo revisar sistemáticamente la literatura en el campo de los estudios de diseño y campos relacionados sobre el tema de las experiencias emocionales negativas tal como se perciben en estos estudios, esforzándose por presentar un contenido integral y un marco teórico para estudios anteriores. El estudio de este tema es importante debido a su potencial para mejorar nuestra comprensión de cómo funcionan los diseñadores durante el proceso de diseño creativo y los efectos de estas emociones en ellos. Esta investigación sirve como base para análisis más precisos de estas experiencias emocionales negativas, que pueden conducir al desarrollo de enfoques de diseño estructurados y eficaces.

El estudio utiliza métodos descriptivos y analíticos, realizando una revisión exhaustiva de la información bibliográfica y documental. Identifica artículos de fuentes científicas internacionales acreditadas que han abordado el tema de las experiencias emocionales negativas en el diseño. Los hallazgos revelan que diversas experiencias emocionales negativas, como el miedo, el estrés y la ansiedad, han sido examinadas y analizadas en diferentes contextos, incluido el diseño, el diseño arquitectónico y el arte. Estos estudios resaltan la importancia de los efectos ambientales y de seguridad en la arquitectura, el impacto de las emociones negativas en el proceso creativo en el arte y la importancia del proceso de diseño y la experiencia del usuario en el diseño.

Palabras claves: Diseño, pensamiento de diseño, diseño emocional, estrés por diseño, ansiedad por el diseño, emociones negativas.

1. INTRODUCTION

Today, there is a vast amount of literature on design, design thinking, and the design process. Many researchers have undertaken studies and research to describe and delineate the essence and mechanisms of the design process and the unique nature of design thinking (Lawson, 2005: 9). However, the focus of the current research is on the literature in the field of design studies and related study areas that have addressed the topic of negative emotional experiences as perceived by designers and their impact on the design profession, the design process, designers, and their performance. Studies have shown that the accurate measurement of cognitive processes in designers, especially concerning mental stress, is crucial for constructing a functional design model. According to the Yerkes-Dodson law, the relationship between performance and mental stress is an inverted U-curve, indicating how a design approach can affect the level of stress. A suitable design methodology can help reduce mental workload and thereby increase the mental peace of the designer. However, if this methodology does not align with the usual cognitive and work

methods of designers, it may lead to frustration. Therefore, it is important that design methods maintain mental stress at an optimum level to enhance the designer's performance. This underscores the importance of accurately modeling the relationship between mental stress and designer performance (Petkar, Dande, & Zeng, 2009). Other research has also quantitatively examined the relationship between information gathering strategies and designers' mental stress. Quantifying mental stress aids in better understanding the creative and innovative processes of design (Zhao & Zeng, 2019). The use of Recurrent Object Modeling (ROM) as a tool for representing the mental state of the designer at each stage of the conceptual design process enables the examination of the impact of various information-gathering strategies on design creativity. These studies illustrate how these strategies, by influencing mental stress, can affect design creativity. These findings are based on theoretical analyses that explore the reciprocal relationship between the design process and the mutual impact of creativity and mental stress, confirming the following of the inverted U-curve of the Yerkes-Dodson law (Wang, Nguyen, & Zeng, 2015).

In today's complex world, where science and knowledge are constantly evolving and changing, achieving a comprehensive and deep understanding of previous research has become especially important. The review and reevaluation of past research outcomes, whether in the form of articles, books, or theses, play a vital role in identifying achievements, theories, and various approaches. This process, grounded in the careful examination of research models, scientific methods, and research tools employed in conducted studies, enables researchers to establish a solid foundation for their future research. These reviews also aid in identifying gaps and new opportunities for investigation, thereby underlining the importance of using systematic reviews of published articles in terms of subject matter and methodology as a powerful method in the research process to create a unified and fundamental perspective in any scientific field (Hay & et al., 2017). However, it is observed that some areas, especially design, architecture, and art, have been less impacted by systematic reviews and meta-analyses of existing literature. The insufficient attention to these fields compared to other study areas highlights the absence of comprehensive and precise reviews. Stress, anxiety, worry, dread, negative emotions, and similar negative feelings, as psychological factors affecting creative and innovative design processes, can have varying effects on professional and specialized design activities across different branches and orientations. Based on this, the present research aims to systematically examine the literature in the field of design studies and related study areas on the topic of negative emotional experiences as perceived by designers and their impact on the design profession, design process, designers, and their performance. It strives to provide a comprehensive content and theoretical framework for the studies conducted. This allows researchers to not only compare and synthesize methodologies and existing results through a qualitative review of the research conducted but also to identify new opportunities to address this topic in

the field of design studies. Therefore, the present study endeavors to systematically review the research conducted in this area and subject it to examination and analysis. This review includes categorizing research based on content and different approaches, determining the thematic classification of studies, and evaluating the extent to which existing research focuses on each of the emotions, sentiments, and negative states. This study not only helps identify knowledge gaps but also introduces new areas for future research and provides guidelines for addressing these issues. This research attempts to answer questions such as: What is the thematic classification of most studies conducted? Which negative emotions have received more attention from researchers? What emotional experiences have been the focus of existing research in the field of design studies and related study areas?

2. METHODOLOGY

This research was conducted with the goal of achieving a broader understanding of the negative emotional experiences perceived in the field of design studies and related areas. This study is theoretical, employing a content analysis approach, utilizing descriptive and analytical methods to gather library and documentary information. It identifies articles that address this topic by referencing reputable international scientific sources. In this methodology, special emphasis is placed on precise and systematic searches in scientific databases to select articles directly related to the study topic. It then proceeds to examine and analyze the content of the collected data, attempting to classify the existing literature based on content and different approaches and to evaluate the extent of their focus on each of the emotions, sentiments, and negative states. This theoretical and analytical approach provides the possibility of meaningful interpretation and inference from a wide range of primary data, which in turn can offer new insights into the challenges and opportunities in the field of design. Therefore, this research provides

valuable information for professionals and enthusiasts in the field of design and helps fill knowledge gaps in this area.

3. DESIGN

Design is an activity aimed at generating innovative solutions and ideas in pursuit of transforming the world, rather than simply reproducing existing ideas and solutions. It strives to go beyond mere repetition of existing thoughts and approaches (Ashari & Shah Hosseini, 2023). The term "design" is derived from the Latin word "Designare," meaning to describe, define, and draw (Erlhoff, 2008: 195). A wide range of professional specialties and skills such as product design, service design, graphic design, architectural design, interactive design, and more fall within the professional fields of design, which are defined based on the results they deliver (Faragh & Ashari, 2023). There is no single definition of design that is accepted by all experts and researchers; its meaning varies across professions, disciplines, and design contexts (Abhigyan et al, 2021: 4). The traditional concept of design dates back to the 19th century, associated with the movement of applied arts and indus-

trial production of "Artifacts" (Niiniluoto, 2014: 12), transitioning from the modern era, which focused solely on the functional aspect of the product, to the post-modern era (Ghodusinejad, 2015: 74). However, the expansion of the concept of design across various scientific disciplines has led to new definitions of design that align with research in the field. Simon believed that the science of design comprises a set of analytical theories about the design process that possess intellectual robustness and are to some extent testable (Parsons, 2016: 55). Design can also be seen as the deliberate solution to a problem and the creation of designs for a new type of artifact, as well as a method for creating practical solutions to a problem, accepted as a research paradigm in various scientific disciplines (Ashari & Naeini, 2022).

In a comprehensive definition, design can be considered a type of exploratory process and a form of research (Lawson, 2005: 160). It is an activity that focuses on generating new ideas and solutions for changing the world, rather than simply repeating existing ideas and solutions (Chryssikou, 2020: 320). A clear idea that encompasses the elements of design, quality, shape, func-

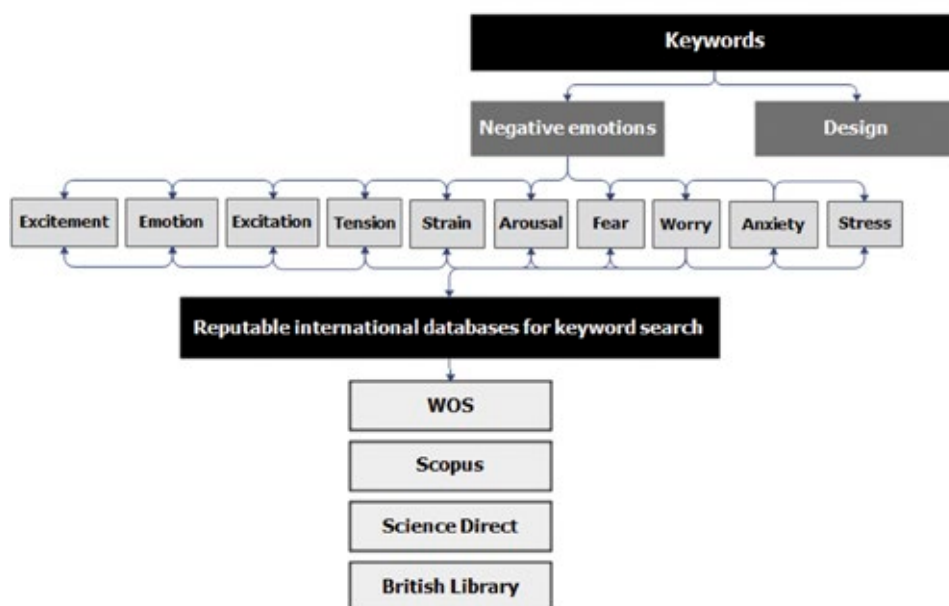


Figure 1. Initial Access to Conducted Studies: Selected Keywords in Two Areas: Design and Stress, and Reputable Scientific Websites for Keyword Search. Source: Authors

tion, form, materials, and other characteristics should prevail over all other ideas and encapsulate the main narrative of a product (Ashari & Shah Hosseini, 2023). In essence, design is a creative discipline that utilizes imagination; its subject matter consists of things that can exist. The main task in design involves considering the relationships, alignments, and conflicts among a multitude of factors and immersing oneself in the process of presenting imaginative responses based on them. The vital characteristic of this integrated process is its thinking and action, which connects motivations and tangible actions, marking the distinct role of design. When design is conducted through a combination of logical reasoning and creative expression, it can be referred to as thoughtful design or the act of designing, which is neither thought alone nor action alone but both together, forming an interconnected unit (Walker, 2017: 19).

4. ARTICLE IDENTIFICATION PROCESS

In the initial phase of identifying relevant previous studies, a search was conducted in reputable databases. To primarily access articles in the field of design studies related to the experience of negative emotions, specific keywords relevant to the proposed topic were determined for use in the existing literature search. Given that the present research is interdisciplinary between the fields of design studies and psychology, the keywords were categorized into these two thematic classifications (Figure 1). Keywords selected for the search in reputable scientific sites within the design studies field include "Design". Keywords related to the field of psychology that connect to negative emotional experiences include ten keywords: "Stress", "Anxiety", "Worry", "Fear", "Arousal", "Excitation", "Excitement", "Tension", "Strain", "Emotion", chosen for their search in reputable scientific sites. The reason for choosing these keywords is their highest similarity in terms of content load and semantic meaning. The selection of keywords like "Excitation", "Emotion", and "Excitement" is because they encompass negative emo-

tions and sentiments, thus being utilized in this search. Following the selection of keywords, they were searched within the titles and keywords of articles, theses, and books on reputable international scientific websites without a time limit from the year 1975 to 2023. The top foreign article and book search websites were reviewed, and among them, the Web of Science (WOS), Science Direct, Scopus, and the British Library were selected for keyword searches (Figure 1). These sites were chosen due to their thematic categorization, allowing for the classification of articles across various fields. On the WOS and Scopus websites, searches were conducted in the titles and keywords of documents, whereas the British Library website only allowed searches in document titles, not keywords. Additionally, on the Science Direct website, searches could be conducted simultaneously in titles, keywords, and abstracts, and searches were performed in these sections. Table 1 displays the search of these keywords on reputable international sites. In this table, the number of articles obtained from searching the keywords in the title, keywords, and abstract is listed separately for each of the four scientific websites (WOS, Science Direct, Scopus, and British Library), with the search time noted. Keyword searches were conducted in all documents and all articles, and their results are stated separately.

5. DISCUSSION

After searching for keywords in international scientific databases (WOS, Science Direct, Scopus, and the British Library), a collection of related documents was gathered. In this study, we will focus solely on examining articles, setting aside other types of documents. These articles have been recorded in Table 1 and then categorized into specific thematic classifications, which are presented in Table 2. In this table, articles are categorized based on different study areas and their connections to the selected keywords. Essentially, this table shows the most studies conducted (over fifty percent of the articles)

Table 1. Search for Keywords Related to Negative Emotional Experiences in Design Studies on Reputable Foreign Sites

	Keywords		Articles search websites								Articles obtained	Search time
			British Library		Science Direct		Scopus		WOS			
			Articles	Doc	Articles	Doc	Articles	Doc	Articles	Doc		
1	Design + Stress	Title	3144	3336	54268	59091	2570	4001	1961	2230	144	2022/11/01 – 2022/12/01
		Keywords	–	–			19901	81616	2293	2395		
		Abstract	–	–			–	–	–	–		
2	Design + Anxiety	Title	166	172	8208	9236	160	221	150	235	62	2022/11/01 – 2022/12/01
		Keywords	–	–			4008	5288	155	168		
		Abstract	–	–			–	–	–	–		
3	Design + Worry	Title	16	16	821	926	6	7	8	11	6	2022/11/01 – 2022/12/01
		Keywords	–	–			82	86	6	6		
		Abstract	–	–			–	–	–	–		
4	Design + Fear	Title	90	104	3300	3697	51	79	45	58	18	2022/11/01 – 2022/12/01
		Keywords	–	–			725	904	48	52		
		Abstract	–	–			–	–	–	–		
5	Design + Emotion	Title	345	377	3584	3968	209	615	172	204	94	2022/11/01 – 2022/12/01
		Keywords	–	–			2444	4185	318	342		
		Abstract	–	–			–	–	–	–		
6	Design + Excitement	Title	16	16	217	257	4	7	2	3	2	2022/11/01 – 2022/12/01
		Keywords	–	–			18	24	–	–		
		Abstract	–	–			–	–	–	–		
7	Design + Excitation	Title	837	845	9591	10219	804	1349	593	633	–	2022/11/01 – 2022/12/01
		Keywords	–	–			5375	9361	285	300		
		Abstract	–	–			–	–	–	–		
8	Design + Strain	Title	1571	1632	29927	32547	1183	1872	1136	1279	6	2022/11/01 – 2022/12/01
		Keywords	–	–			20513	31188	778	807		
		Abstract	–	–			–	–	–	–		
9	Design + Tension	Title	682	706	9784	10531	520	860	439	492	34	2022/11/01 – 2022/12/01
		Keywords	–	–			4884	7680	322	326		
		Abstract	–	–			–	–	–	–		
10	Design + Arousal	Title	20	20	2057	2213	16	20	18	23	20	2022/11/01 – 2022/12/01
		Keywords	–	–			491	641	20	21		
		Abstract	–	–			–	–	–	–		
		Keywords	–	–			59	85	2	2		
		Abstract	–	–			–	–	–			

Source: Authors.

in various study areas from each of the keywords related to design and negative emotional experiences, according to the thematic classification of reputable scientific sites. This categorization allows us to gain new insights into the study areas that focus most on examining negative emotional experiences and to find new pathways for research and development of methods and strategies for improving design approaches (Table 2).

Table 3, continuing from the previous tables, provides a more general and conceptual classification of related studies, drawn based on the keywords used in various research efforts. This thematic categorization allows us to approach the studies on design and negative emotional experiences in different research areas from a broader perspective, showing which keywords and topics have attracted the most attention in the scientific community. Thus, these tables

Table 2. The Most Studies Conducted in Various Study Areas from Each of the Keywords According to the Thematic Classification of Reputable Scientific Sites

	Keywords	WOS	Scopus	British Library	Science Direct
1	Design + Stress	Materials Science Multidisciplinary - Mechanics - Engineering Mechanical - Engineering Civil - Engineering Electrical Electronic	Engineering	Mechanical engineering - Civil engineering - Electrical and Electronic Engineering	Engineering - Materials Science
2	Design + Anxiety	Psychiatry - Psychology Clinical - Psychology Multidisciplinary - Public Environmental Occupational Health	Medicine	Medicine - Pharmaceutical chemistry - Biotechnology	Medicine and Dentistry
3	Design + Worry	Psychiatry - Health Care Sciences Services	Medicine - Engineering - Psychology	Mechanical engineering - Civil engineering - Electrical and Electronic Engineering	Medicine and Dentistry
4	Design + Fear	Neuroscience - Psychiatry - Psychology - Art - Pharmacology - Environmental Studies - Psychology Multidisciplinary - Criminology Penology	Engineering - Social Sciences - Medicine	Engineering - Architecture and Planning	Medicine and Dentistry
5	Design + Emotion	Psychology Multidisciplinary - Education Educational Research - Art - Computer Science Information Systems - Social Science Interdisciplinary - Engineering Multidisciplinary - Management	Computer Science - Medicine	Engineering - Artificial intelligence - Design - Computers - Computer science	Medicine and Dentistry - Psychology
6	Design + Excitement	-	Medicine - Computer Science	Mechanical engineering	Medicine and Dentistry - Social Sciences - Psychology
7	Design + Excitation	Engineering Electrical Electronic - Radiology Nuclear Medicine Medical Imaging - Engineering Mechanical - Engineering Civil - Instruments Instrumentation	Engineering	Mechanical engineering - Civil engineering	Engineering
8	Design + Strain	Engineering Civil - Construction Building Technology - Materials Science Multidisciplinary - Engineering Mechanical - Physics Applied - Engineering Electrical Electronic - Biotechnology Applied Microbiology	Engineering	Mechanical engineering - Civil engineering - Electrical and Electronic Engineering	Engineering - Materials Science
9	Design + Tension	Engineering Civil - Construction Building Technology - Materials Science Multidisciplinary	Engineering	Engineering	Engineering
10	Design + Arousal	Ergonomics - Neuroscience - Business - psychiatry -Communication - Family Studies	Engineering - Psychology	Psychology - Social Sciences or Social Services - engineering	Medicine and Dentistry - Neuroscience

Source: Authors.

offer valuable information for researchers seeking a deeper understanding of negative emotional experiences in various study fields, enabling them to discover connections between different segments of this area and advance towards future research (Table 3).

The thematic categorization of the articles obtained in the previous table demonstrates the subject distribution of studies related to the keywords. This analysis also indicates the level of focus various scientific fields have on these topics. In Table 4,

our analysis is centered on articles from the fields of design, art, architecture, and ergonomics, gathered from four prominent scientific references including the Web of Science (WOS), Science Direct, Scopus, and the British Library. This table highlights the diversity and breadth of studies in these areas, enabling us to identify the extent of research focus each of these study fields has on keywords related to negative emotional experiences. A detailed examination of these articles leads us to a better understanding of the psychological impacts on these fields of study (Table 4).

Table 3. General Thematic Categorization of Each Keyword

	Keywords	Engineering	Materials Science	Medicine	Dentistry	Psychology	Psychiatry	Education	Chemistry	Biotechnology	Art	Architecture and Planning	Neuroscience	Pharmacology	Environmental Studies	Criminology Penology	Management	Social Sciences	Artificial intelligence	Design	Computers	Construction Building Technology	Health Care Sciences Services	Physics Applied	Business	Communication	Ergonomics
1	Design + Stress	•	•																								
2	Design + Anxiety			•	•	•	•		•	•					•												
3	Design + Worry	•		•	•	•	•																•				
4	Design + Fear	•		•	•	•	•				•	•	•	•	•	•		•	•								
5	Design + Emotion	•		•	•	•	•	•			•						•	•	•	•	•						
6	Design + Excitement	•		•	•		•											•			•						
7	Design + Excitation	•		•																		•					
8	Design + Strain	•	•							•												•		•			
9	Design + Tension	•	•																			•					
10	Design + Arousal	•		•	•	•	•						•					•							•	•	•

Source: Authors.

Table 4. Number of Articles Obtained from Searching Keywords in Reputable Scientific Sites with Subject Categorization in Design, Art, Architecture, and Ergonomics

	Keywords	Related field		WOS	Scopus	Science Direct	British Library
1	Design + Stress	Architecture (WOS)	Title	-	-	-	-
		Architecture and Planning (British Library)	Keywords	1	-		-
		Art (WOS) (British Library)	Title	-	37	-	-
		Arts and Humanities (Scopus) (Science Direct)	Keywords	-	595		-
		Ergonomics (WOS)	Title	18	-	-	-
			Keywords	18	-		-
Product Design (British Library)	Title	-	-	-	-		
2	Design + Anxiety	Architecture (WOS)	Title	-	-	-	-
		Architecture and Planning (British Library)	Keywords	-	-		-
		Art (WOS) (British Library)	Title	-	18	100	-
		Arts and Humanities (Scopus) (Science Direct)	Keywords	-	116		-
		Ergonomics (WOS)	Title	-	-	-	-
			Keywords	2	-		-
Product Design (British Library)	Title	-	-	-	-		
3	Design + Worry	Architecture (WOS)	Title	-	-	-	1
		Architecture and Planning (British Library)	Keywords	-	-		-
		Art (WOS) (British Library)	Title	-	-	-	1
		Arts and Humanities (Scopus) (Science Direct)	Keywords	-	4		-
		Ergonomics (WOS)	Title	-	-	-	-
			Keywords	1	-		-
Product Design (British Library)	Title	-	-	-	-		
4	Design + Fear	Architecture (WOS)	Title	-	-	-	8
		Architecture and Planning (British Library)	Keywords	-	-		-
		Art (WOS) (British Library)	Title	1	10	-	5
		Arts and Humanities (Scopus) (Science Direct)	Keywords	-	48		-
		Ergonomics (WOS)	Title	-	-	-	-
			Keywords	1	-		-
Product Design (British Library)	Title	-	-	-	-		
5	Design + Emotion	Architecture (WOS)	Title	-	-	-	-
		Architecture and Planning (British Library)	Keywords	9	-		-
		Art (WOS) (British Library)	Title	6	48	103	12
		Arts and Humanities (Scopus) (Science Direct)	Keywords	28	261		-
		Ergonomics (WOS)	Title	17	-	-	-
			Keywords	21	-		-
Product Design (British Library)	Title	-	-	-	32		
6	Design + Excitement	Architecture (WOS)	Title	-	-	-	2
		Architecture and Planning (British Library)	Keywords	-	-		-
		Art (WOS) (British Library)	Title	-	-	-	2
		Arts and Humanities (Scopus) (Science Direct)	Keywords	-	-		-
		Ergonomics (WOS)	Title	-	-	-	-
			Keywords	-	-		-
Product Design (British Library)	Title	-	-	-	-		

7	Design + Excitation	Architecture (WOS) Architecture and Planning (British Library)	Title	-	-	-	-
			Keywords	-	-	-	-
		Art (WOS) (British Library) Arts and Humanities (Scopus) (Science Direct)	Title	-	2	-	-
			Keywords	-	76	-	-
		Ergonomics (WOS)	Title	-	-	-	-
Keywords	-		-	-	-		
Product Design (British Library)	Title	-	-	-	-		
	Keywords	-	-	-	-		
8	Design + Strain	Architecture (WOS) Architecture and Planning (British Library)	Title	-	-	-	-
			Keywords	-	-	-	-
		Art (WOS) (British Library) Arts and Humanities (Scopus) (Science Direct)	Title	-	3	-	-
			Keywords	-	125	-	-
		Ergonomics (WOS)	Title	8	-	-	-
Keywords	5		-	-	-		
Product Design (British Library)	Title	-	-	-	-		
9	Design + Tension	Architecture (WOS) Architecture and Planning (British Library)	Title	1	-	-	-
			Keywords	2	-	-	-
		Art (WOS) (British Library) Arts and Humanities (Scopus) (Science Direct)	Title	4	24	-	-
			Keywords	2	84	-	-
		Ergonomics (WOS)	Title	4	-	-	-
Keywords	2		-	-	-		
Product Design (British Library)	Title	-	-	-	-		
10	Design + Arousal	Architecture (WOS) Architecture and Planning (British Library)	Title	-	-	-	-
			Keywords	-	-	-	-
		Art (WOS) (British Library) Arts and Humanities (Scopus) (Science Direct)	Title	-	1	-	-
			Keywords	-	35	-	-
		Ergonomics (WOS)	Title	-	-	-	-
Keywords	4		-	-	-		
Product Design (British Library)	Title	-	-	-	2		

Source: Authors.

Creating a frequency distribution chart based on the information gathered from the tables and the content mentioned provides a valuable tool for a more accurate and detailed analysis of the data derived from the most studies conducted in the thematic categories of each searched keyword (in the titles and keywords of previous articles) within the field of design studies and related study areas focusing on negative emotional experiences. This would be applicable across all four scientific web-

sites (WOS, Science Direct, Scopus, and the British Library). The design of this chart aims to facilitate researchers' access to the focal points of study areas and topics. It offers a general analysis of the obtained data, displaying at a glance the topics with the highest number of articles on the discussed subject (Chart 1).

Based on this chart, the keyword "Design + Stress" has the highest frequency of research in the field of Art and Humanities,

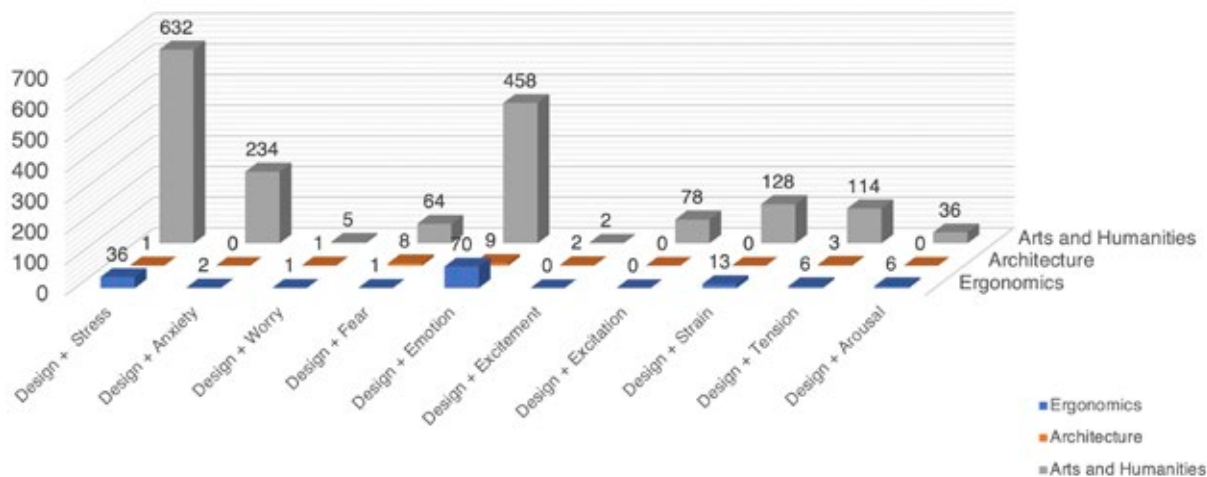


Chart 1. General analysis of the data obtained from the most studies conducted on each of the searched keywords in the fields of Art and Humanities, Architecture, and Ergonomics
Source: Authors

indicating a significant focus of researchers in this area on the topic of stress. The number of studies using this keyword in the fields of Art and Ergonomics is much lower. Following this keyword, a considerable amount of studies in the fields of Art and Humanities relate to the keywords "Design + Emotion," likely examining both the positive and negative impacts of this emotional experience. The number of studies for this keyword in the field of Ergonomics is very low. Subsequently, keywords such as "Design + Anxiety," "Design + Strain," and "Design + Tension" have significantly fewer studies, which may indicate a new research opportunity in these areas. This chart represents the total number of published studies for each keyword in each field (Chart 1).

Table 5. The Majority of Articles Conducted in Design-Related Study Fields on the Topic of Negative Emotional Experiences

	Keywords	Related field
1	Design + Anxiety	Arts
2	Design + Fear	Architecture and Planning
3	Design + Emotion	Design
4	Design + Strain	Arts
5	Design + Arousal	Arts

Source: Authors

Considering the content, tables, and a thorough analysis of the data obtained from the frequency distribution table of articles, the five keywords that have yielded the most research are as follows: The majority of articles with the keywords Anxiety, Strain, Arousal are found in the field of Art; with the keyword Fear in the field of Architecture and Urban Planning; and with the keyword Emotion in the field of Design (Table 5). The keyword "Emotion" indicates that articles related to emotions have been primarily focused on in the field of design. This may be due to emotions being a crucial component in user experience and users' interactions with designed products. Research in these areas can improve how products are designed and enhance user experience. The keyword "Anxiety" has the highest frequency in studies related to the field of art. This might be because art is considered a space for exploration and expression of emotions, and studying Anxiety can lead to a better understanding of how these psychological states impact creative processes. The keywords "Strain" and "Arousal" have also been highlighted in the field of art, indicating an interest in examining the effects of psychological and physical pressures on artists. Research in these areas could help identify stress management strategies and promote well-being and mental health among artists. Finally, the keyword "Fear" has been particu-

larly focused on in the field of architecture and urban planning. This could mean that researchers in this field aim to understand how fear affects designers and users and how architecture can help reduce or manage these fears.

6. CONCLUSION

The research conducted in the field of design studies and related study areas concerning negative emotional experiences clearly demonstrates that these two subjects intersect in various ways and across different contexts. Reviews suggest that negative emotional experiences in the field of architectural and urban design studies are primarily focused under the theme of Fear, possibly due to safety challenges and environmental impacts on individuals. In the field of art studies, experiences associated with Anxiety, Strain, and Arousal have been more extensively examined, indicating the influence of these states on creativity processes and art production. Moreover, articles related to both positive and negative emotional experiences, Emotion, are generally concentrated in the field of design studies, highlighting the significance of user experience and users' emotional connection with products. A broader analysis of the data and charts shows that the fields of design, architectural design, and art each explore negative emotional experiences in their unique ways. Researchers in architecture tend to consider fear as a fundamental element in designing physical environments and emphasize it, while art researchers examine deep emotional and psychological impacts. Design researchers conduct studies focused on reducing stress, enhancing human efficiency, and comfort. These investigations underline the need for interdisciplinary approaches in examining negative emotional experiences, which could ultimately lead to the development of more comprehensive strategies for managing these experiences across various fields. Given the presented content, the limitations, challenges, and recommendations of this research are as follows:

Limited access to certain international databases and the high variability in study fields and related keywords pose challenges to the comprehensiveness and accuracy of research. The use of the keyword "design" in broad and general terms, especially in unrelated articles, can lead to the collection of incorrect data and increase complexity in data analysis. To counter these challenges, it is recommended to strengthen interdisciplinary collaborations to establish common definitions and models, laying the groundwork for integration and comprehensive outlooks in research endeavors. Furthermore, emphasizing the study of anthropological and psychological aspects, including negative and positive emotional experiences in design and its process, and their impacts on creativity, productivity, and the mental well-being of designers, can provide valuable insights. This research offers a foundation for future studies to specifically focus on addressing existing issues and leveraging the provided recommendations to enhance future research in areas related to negative emotional experiences such as stress and anxiety in design.

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