



Article

The Effects of COVID-19 on Family Climate: A Fuzzy Clustering Approach to Examine Spanish Households

Juan Carlos Martín-Quintana ¹, Juan Carlos Martín ^{2,*}  and Pedro F. Alemán ³

¹ Department of Education, University of Las Palmas de Gran Canaria, 35004 Las Palmas de Gran Canaria, Spain; juancarlos.martin@ulpgc.es

² Institute of Tourism and Economic Sustainable Development, Department of Applied Economic Analysis, University of Las Palmas de Gran Canaria, 35001 Las Palmas de Gran Canaria, Spain

³ Department of Psychology, Sociology and Social Work, University of Las Palmas de Gran Canaria, 35004 Las Palmas de Gran Canaria, Spain; pedro.aleman@ulpgc.es

* Correspondence: jcarlos.martin@ulpgc.es

Abstract: Spain was one of the countries in which more severe lockdown policies were imposed during the second term of 2020 to mitigate the unprecedented health crisis. The measures restricted citizens' mobility, obliging families to stay confined at homes for 99 days since 15 March 2020. The measures created a number of challenges that affect the family climate. This paper aims to empirically analyse how the family climate in Spain has been affected by COVID-19. The family climate assessment was based on an online questionnaire answered by 2034 citizens. A multi-criteria decision-making method rooted in fuzzy logic and TOPSIS, and a fuzzy clustering method, are applied to analyse the effects of the COVID-19 on the family climate. The fuzzy clustering method reveals that there are three different family climate profiles, namely (1) extreme positive, (2) extreme negative, and (3) intermediate. Our results show that some traits affect having a more or less positive family climate. The authors discuss the main contributions and the policy implications that could provide insights into future measures.

Keywords: COVID-19 pandemic; fuzzy logic; triangular fuzzy numbers; TOPSIS; fuzzy clustering; lockdown measures



Citation: Martín-Quintana, Juan Carlos, Juan Carlos Martín, and Pedro F. Alemán. 2022. The Effects of COVID-19 on Family Climate: A Fuzzy Clustering Approach to Examine Spanish Households. *Social Sciences* 11: 239. <https://doi.org/10.3390/socsci11060239>

Academic Editor: Nigel Parton

Received: 11 March 2022

Accepted: 24 May 2022

Published: 27 May 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The World Health Organization (WHO) declared “COVID-19” as a global pandemic on 11 March 2020 (WHO 2020a). On 1 April 2020, the European region accounted for three-quarters of the total deaths registered in the world (40,598) (WHO 2020b). The report recommended several measures at the individual and general public levels to slow the spread of the disease. Social and physical distance, frequent handwashing, and cough etiquette were endorsed at the individual level. Social distancing consists of substituting the family and community interaction by virtual means. At the general public level, the recommended measures include teleworking, online learning, avoiding all crowded events, closures of non-essential facilities and services, lockdowns, and providing shields and protection for vulnerable groups. Nevertheless, it was urgent to reorganize the healthcare system and social services to protect the hospitals and all the health professionals.

As a human tragedy, the COVID-19 outbreak has been compared with other human suffering events, such as wars, genocides, or other pandemics (Lebow 2020), but COVID-19 is showing its effects worldwide, and the spread through the interconnected world has already caused seven different waves in some countries as of January 2022. As of 23 January 2022, the WHO reported nearly 50,000 new deaths, over 346 million confirmed cases, and over 5.5 million deaths worldwide (WHO 2020c). The pandemic is causing devastating effects on the economy and society, and concerned voices claimed that

totalitarian and authoritarian politics could be exerted in many countries in response to the pandemic (Fetzer et al. 2020).

In this context, the family is significantly affected at the individual level and, notably, at the group level in the relationship between its members (Prime et al. 2020). Confinement was a socio-sanitary measure to control the pandemic in the spring of 2020. Under this measure, educational centres were closed, and face-to-face workplace attendance was limited. The measure produced the desired effect of reducing social contacts outside the family context and increasing the time spent together at home. Ultimately, new conditions were created for family relationships, where parents became almost the only ones responsible for caring for their children. Sometimes, the parents' stress was increased, aggravated by the inadequate conditions of the home and the few positive coping mechanisms of its members (Aznar et al. 2021). With the development of digital technology and its educational, work, and leisure applications, the time spent on screens increased with decreased physical activity, sleep quality, or food intake diet (Dunton and Wang 2020; Wang et al. 2020). It even increased gender inequalities, with domestic work falling even more on women than in the past (Collins et al. 2021), worsening the chances of reconciling their work and family life (Lagomarsino et al. 2020).

Therefore, it is observed that the family relationship was affected by external conditions, such as limited mobility and typical internal conditions due to family reorganization. For this reason, family cohesion was one of the main factors for the well-being of the family, and, specifically, the conditions created in the relationship between its members are important determinants in the family climate formation. It also highlights the relationship between climate and family well-being. The coping of family members with the consequences of the pandemic depends on personal resources and the family members' attitudes. As Langmeyer et al. (2022) argue, family well-being depends on positive family processes during confinement. If the previous family conditions were adverse, the family welfare would be unfavourable.

From this perspective, family climate conditions in Spain were particularly affected by the special anti-COVID measures taken by the Spanish Government, which decreed a severe national lockdown in response to the state of alarm on 14 March 2020, for the entire national territory regardless of the regions. This state measure entailed a restriction on going out of the home, except for some relevant necessities, such as the purchase of food, medicines, or health services, among others. It also meant a change in the labour situation with the entry of temporary employment regulation files (ERTEs in Spanish), and the closure of all catering and hotel services. Parliamentary activity was even suspended. These new social, economic, and health measures conditioned the experience and daily life of families (parents stayed at home, with a continuous coexistence, with the closure of educational centres, with tele-education for some, and teleworking for others). Other European countries, such as France, Belgium, and the United Kingdom subsequently adopted similar but less severe measures. The state of alarm national decree was renewed for seven additional periods. These lasted until 10 May. The present study collected the information during the period when the most restrictive measures at the beginning of the pandemic in Spain were held.

The present study aims to provide empirical evidence of the effects of the current pandemic on the family climate experienced in Spain, one of the EU countries in which the measures taken by the government were more restrictive regarding mobility. The paper is based on a quantitative method grounded in fuzzy logic theory, a multi-criteria decision making model and a fuzzy clustering method with the following aims: (1) obtain a synthetic index that measures the family climate, named as the family climate synthetic index (FCSI), which is based on a well-known scale of 24 items; (2) analyze each of the individual items with the help of the crisp values obtained by a defuzzification method and the ideal solutions in order to determine whether some items present a different behaviour in the index; (3) analyze FCSI and how the index changes with respect to some item for some population groups, such as those who are finding that during the lockdown the

family climate has been affected; (4) segment each respondent without assuming that they belong to only one segment capturing the essence of the fuzzy clustering approach; (5) analyze whether the weights associated to each of the family climate classes (extreme positive, extreme negative, and intermediate) vary according to some socioeconomic and experiential traits. Thus, the current study contributes to a better understanding of a field that has not been sufficiently analyzed, and the interest is justified because COVID-19 is affecting all our lives, and family climate is an aspect that needs to be investigated.

2. Literature Review

From the ecological theory of Bronfenbrenner (1979), and starting from the individual characteristics of people, the family environment microsystem constitutes one of the primary contexts for the development of the individual (Bronfenbrenner 1992; Shelton 2018). During the pandemic, and with the socio-sanitary measure of confinement, the relationships between family members and those with other contexts were substantially transformed. Different challenges appeared in the family relationship, organisation, and daily life management. It also meant changes in the relationship with other contexts (mesosystem), such as teleworking or temporary employment regulation files, or the increased use of digital technology in training (educational). At the same time, the social and cultural system (exosystem) was modified by the important role of beliefs, values, and social and cultural factors (macrosystem). Finally, the chronosystem contributed to creating a new historical time characterised by the radical transformation of social relations, which affected and still affects all families in all countries.

However, existing studies analysing family and COVID-19 have focused primarily on risk analysis rather than family relationships themselves (Salin et al. 2020). The family climate, understood as the environment perceived and interpreted by the members of the family (Moos et al. 1984), allows the development of capacities to create independent relationships that resolve conflicts efficiently (Moos and Trickett 1989). Its importance allows for an understanding of the consequences of confinement as a social and health measure against COVID-19 in the family relationship. In this sense, the family climate is one of the most important causes of the evolution of individuals and their personalities. However, it is also an indicator of the interpersonal relationships of a survival-oriented social institution, interpersonal or socioeconomic relationships, and parenting. Focusing the analysis on social relations implies keeping in mind personal and family adaptation resources.

In general, the family climate has been studied from different areas of interest, such as its relationship with bullying (Cerezo et al. 2018), school adjustment in the educational environment (Kurdek et al. 1995), substance use (Hernández-Serrano et al. 2021; Iacopetti et al. 2021), disability (Miniguanco et al. 2021), or work and the company (Björnberg and Nicholson 2007; Michel et al. 2011; O'Neill et al. 2009). Specifically, and in the socio-sanitary context of the pandemic caused by COVID-19, the studies by Menacho-Vargas et al. (2021) on resilience and family climate stand out, or that of Pozzoli et al. (2021) on their relation to distance learning.

Finally, the family climate makes visible the cohesion that exists between the members of the group. In crisis contexts such as the one produced by the pandemic, family cohesion has been seen as a resource to reduce the negative influence produced by life stressors (Hobfoll and Spielberger 1992). Its value is so significant that the family climate, as an indicator of cohesion in disaster contexts, helps the development of young people (Sprague et al. 2015).

3. Data and Variables

This empirical study analyses the data obtained through an online and self-administered survey designed to provide anonymous answers that guarantee the privacy of the respondents. It included the assessment of the family climate in Spain during the COVID-19 confinement. The fieldwork was conducted between 27 March and 27 April 2020, collaborating with 758 family associations, educational centres, and other social entities in Spain.

A total of 2034 surveys were obtained for the state territory. The sample has a margin of error of 3% at a confidence level of 99%.

The investigation was carried out during the first month of confinement after the state of alarm was declared by the Government of Spain. Data collection began on 27 March 2020, when there were already 64,059 notifications and 4858 deaths due to the coronavirus in Spain. One month later, coinciding with the completion of the fieldwork and still in confinement, the reported cases of infection were 209,465 people and 23,521 deaths. Spain was the country with the highest number of reported cases in Europe, and the second highest number of deaths. Under the state of alarm, all the competencies were assumed by the national government, which for the first time under democracy took over the power from the governments of the autonomous communities. Therefore, all the measures affected all Spaniards equally regardless of the community in which they lived.

The questionnaire was structured in two parts. The first part included questions about the sociodemographic profile of respondents, of family, and a sort of social and political assessment with 18 variables distributed as follows: (1) sociodemographic variables such as gender, age, autonomous community, educational level, and type of family; (2) perception of the family relationship during confinement, which includes the discovery of new aspects of the family, the importance of the family, the ease of spending time with the family, or the deterioration of the family relationship; (3) prospective perception of improvement, with the assessment of society in general, of the health system and the educational system; (4) assessment of political management, including the state government and the government of the autonomous community; and (5) modification of routine. The second part included the family climate scale adapted from the Moos family social climate scale (Moos et al. 1984). Specifically, the relationship subscale includes the dimensions of cohesion, expressiveness, and conflict using a total of 27 items. The dichotomous measurement model was adapted to a 5-point ordered semantic scale according to (1) never, (2) rarely, (3) sometimes, (4) often, and (5) always. The scale was validated using the exploratory-confirmatory factorial analysis, determining a total ordinal alpha of 0.97 for a solution of 4 factors collected in 24 items with optimal adjustment indices (RMSEA = 0.05; CFI = 0.98; TLI = 0.97 and SRMR = 0.026). Factor 1 measures cohesion climate; factor 2 measures the climate in which there are difficulties expressing feelings and opinions. Factor 3 is the conflictive climate, and factor 4 is the violent climate. The alphas of each factor ranged between 0.93 and 0.75.

In this study, the total scale score can be calculated as the sum of all individual item scores ranging from 24 to 120. Higher scores indicate better family climates, as some items are reverse coded for that purpose. Table 1 shows the list of the 24 items included in question 23 to measure the family climate synthetic index (FCSI). It can be seen that 16 attributes are reverse coded, because the sentence uses a negative aspect of the family climate. For example, it seems clear that the family climate is not good if family members fight a lot.

Table 1. Items included in the scale of family climate.

Item	Description
1	In my family no day goes by without an argument (*)
2	In my family, we get very close when one of us has a problem
3	Usually, in my family, it is difficult to express freely what we think (*)
4	In my family when we argue we end up hitting each other (*)
5	In my family, there is always a lot of trouble (*)
6	In my family, there is a strong feeling of togetherness
7	In my family, it is difficult to express our opinions frequently and spontaneously (*)
8	We all put a lot of effort into what we do at home
9	When we get angry, family members sometimes throw objects at each other to hurt us (*)
10	In our family, we quarrel a lot (*)

Table 1. Cont.

Item	Description
11	People in my family really support each other
12	In my family, it is very difficult to pay attention when one of us talks about his problems (*)
13	In my family, we usually yell at each other when we are angry (*)
14	We really get along with each other in my family
15	My family members almost never openly show their anger and prefer to keep it to themselves (*)
16	In my family, we sometimes get so angry that we hit or break something (*)
17	In my house, we discuss our personal problems to help and support each other
18	In my family, it is difficult to tell our problems (*)
19	If there is disagreement in the family, we all strive to smooth things over and maintain peace
20	At home, we talk openly about what we think or want
21	In my family we often argue (*)
22	In my family, we really support and help each other
23	In my family, we usually solve problems by arguing (*)
24	When something has to be done at home, we all collaborate

* These items were reverse coded.

4. Methodology

The family climate scale covers multiple dimensions of different areas of family functioning that are rooted in different disciplines, such as psychology, sociology, and economy (Björnberg and Nicholson 2007). The answers given to the items included in the scale have a subjective and inaccurate nature because it is difficult for respondents to discern between qualitative quantifiers, such as rarely, sometimes, and usually. Researchers have developed various methods to analyze this type of information. In this study, a fuzzy hybrid multi-criteria decision-making approach that integrates fuzzy logic and the technique of similarity to ideal solutions TOPSIS is employed. This method has been successfully used in different fields (Cantillo et al. 2021; Leon and Martín 2020; Martin et al. 2021).

The methodology is derived from the studies previously mentioned, in which the answers provided in the questionnaire are transformed into triangular fuzzy numbers (Table 2), handling the vague information provided in the semantic ordinal scale. The TFNs are still the most commonly used fuzzy sets in empirical applications, and they are triplets of real numbers (a, b, c) , with b being the most likely value. In Table 2, it can be seen that all the consecutive intervals overlap to express that the information is not precise.

Table 2. 5-point semantic scale conversion to TFNs.

Semantic Scale	TFN ¹
Never	(0, 0, 30)
Rarely	(20, 30, 40)
Sometimes	(30, 50, 70)
Often	(60, 70, 80)
Always	(70, 100, 100)

¹ (0, 1) interval for the universe is also common.

Then, the algebra of fuzzy numbers permits the calculation of the average TFN value that represents the information for each group of research interests, such as total, gender, autonomous community, educational level, age, or household type, among others. It is worth remarking here that the mean TFN could be calculated for each individual item included in the family climate scale. Thus, the average TFN (\tilde{A}) for a category s that corresponds to the population group p and is related to an item q , can be calculated as follows:

$$\tilde{A} = (a_{s,p,q}, b_{s,p,q}, c_{s,p,q}) = \left(\frac{\sum_{i=1}^n a_{i,s,p,q}}{n}, \frac{\sum_{i=1}^n b_{i,s,p,q}}{n}, \frac{\sum_{i=1}^n c_{i,s,p,q}}{n} \right), \tag{1}$$

where $s : 1, \dots, s$; $p : 1, \dots, p$ and $q : 1, \dots, q$, and i denotes each of the respondents.

Following (Chen 1996), the TFN information matrix obtained by Equation (1) is clarified by a method that transforms TFNs into crisp values (CVs). The CVs are obtained according to Equation (2) and provide information about how each group has experienced the items q included in the scale.

$$CV_{s,p,q} = (a_{s,p,q} + 2 \times b_{s,p,q} + c_{s,p,q}) / 4, \tag{2}$$

where $s : 1, \dots, s$; $p : 1, \dots, p$ and $q : 1, \dots, q$.

Afterwards, the ideal solutions are obtained per each item q according to Equation (3). It can be seen that the logic of the positive-ideal (CV_q^+) and negative-ideal (CV_q^-) vectors resides in observing the maximum and minimum figures that can be obtained in the sample, according to the group or individual segmentation.

$$CV_q = \{CV_{1,1,q}, \dots, CV_{s,p,q}\} \text{ where } CV_q^+ = \max_q(CV_q) \text{ and } CV_q^- = \min_p(CV_q), \tag{3}$$

where $s : 1, \dots, s$; $p : 1, \dots, p$ and $q : 1, \dots, q$.

The ideal solutions present an overall performance of the best and worst family climate that can be found in the sample using a virtual observation that might not exist in reality. These two vectors will be used as the reference points when TOPSIS is subsequently applied, as it can be seen in Equation (4). Thus, it is possible to calculate the Euclidean distances of each category s of the group p with respect to the ideal solutions. Afterwards, the relative distance from each category can be calculated using Equation (5) to obtain the family climate synthetic index (FCSI). The FCSI can be used to rank the family climate of each category of research interest, as higher figures mean that the observation is closer to the positive ideal solution and further from the negative ideal solution.

$$d_{s,p}^+ = \sqrt{\sum_{q=2}^q (CV_q^+ - CV_{s,p,q})^2} \text{ and } d_{s,p}^- = \sqrt{\sum_{q=2}^q (CV_{s,p,q} - CV_q^-)^2} \tag{4}$$

where $s : 1, \dots, s$ and $p : 1, \dots, p$.

$$FCSI_{s,p} = \frac{d_{s,p}^-}{d_{s,p}^+ + d_{s,p}^-} \text{ with } s : 1, \dots, s \text{ and } p : 1, \dots, p \tag{5}$$

Finally, following D’Urso et al. (2016), a fuzzy clustering method is applied to the individual data, considering a three-cluster solution in which our interest is focused on those respondents who have good, bad, and intermediate family climates. For that, a membership function is obtained for each respondent. The profiles for each of the clusters are obtained according to the FCSI using the maximum, minimum, and median to represent the extremely positive, the extremely negative, and the intermediate family climate, respectively. The fuzzy cluster algorithm is shown in Equation (6).

$$\left\{ \begin{array}{l} \min : \sum_{i=1}^n \sum_{c=1}^C u_{ic}^m d_F^2(\tilde{x}_i, \tilde{p}_c) = \sum_{i=1}^n \sum_{c=1}^C u_{ic}^m [w_2^2 \|a_2^i - p_2^c\|^2 + \\ \quad + w_1^2 (\|a_1^i - p_1^c\|^2 + \|a_3^i - p_3^c\|^2)] \\ \text{s.t. } m > 1, u_{ic} \geq 0, \sum_{c=1}^C u_{ic} = 1, \\ \quad w_1 \geq w_2 \geq 0, w_1 + w_2 = 1 \end{array} \right. \tag{6}$$

where, $d_F^2(\tilde{x}_i, \tilde{p}_c)$ represents the squared fuzzy distance between the i th respondent and the profile of the c th cluster; the $\tilde{x}_i \equiv \{\tilde{x}_{ik} = (a_{1ik}, a_{2ik}, a_{3ik}) : k = 1 \dots K\}$ denotes the TFN vector for the i th respondent obtained from the observation of the K items included in the family climate scale; $\tilde{p}_c \equiv \{\tilde{p}_{ck} = (p_{1ck}, p_{2ck}, p_{3ck}) : k = 1 \dots K\}$ represents the fuzzy profile

of the c th cluster; $\|a_2^i - p_2^c\|^2$ is the squared Euclidian distances between the centres of the TFN vectors of the i th respondent and profile of the c th cluster; $\|a_1^i - p_1^c\|^2$ and $\|a_3^i - p_3^c\|^2$ are the squared Euclidian distances between the left and right extreme components of the TFN vectors of the i th respondent and profile of the c th cluster, respectively; $w_1 \geq w_2 \geq 0$ are suitable weights for the center and extreme components for the fuzzy distance considered; $m > 1$ is a weighted exponent that controls the fuzziness of the obtained partition; and u_{ic} gives the membership degree of the i th respondent in the c th cluster that can be used to analyse to what degree the individual's family climate is more or less similar to each of the cluster profiles.

5. Results

5.1. Descriptive Statistics

Table 3 shows the socio-demographic profile of the total sample of respondents for a number of variables, namely gender, autonomous community, education, age, household type, whether the respondent was studying online or teleworking, and whether the family climate during the lockdown improved or deteriorated with respect to before the confinement. It can be seen that (1) females are more represented than males; (2) the most representative autonomous communities are Andalusia and the Canary Islands; (3) the sample is overrepresented by those who have a university degree; (4) the group of 60 years or older are less represented than the rest of the age groups; (5,6) Around 40 and 50 percent of the sample were studying online or teleworking, respectively; and (7) the family climate during the lockdown was worse or much worse than before for only a six percent of the sample.

Table 3. Respondents' sociodemographic profile.

Variable	Categories	N	Perc.
Gender	Female	1560	76.70
	Male	474	23.30
Autonomous Community *	Andalusia	288	14.16
	Aragon	52	2.56
	Balearics	118	5.80
	Canary Islands	1104	54.28
	Castile and Leon	67	3.29
	Valencian Community	54	2.65
	Madrid	113	5.56
	Basque Country	47	2.31
	Other	191	9.39
Education	Primary	36	1.77
	Secondary	103	5.06
	High School	321	15.78
	University	1574	77.38
Age	18–29 years old	485	23.84
	30–39 years old	420	20.65
	40–49 years old	531	26.11
	50–59 years old	444	21.83
	60 or older	154	7.57

Table 3. Cont.

Variable	Categories	N	Perc.
Household type	Alone	142	6.98
	Only with my roommates (friends or students)	32	1.57
	Only with one of my parents	94	4.62
	Only with both parents	102	5.01
	With my parents and siblings	225	11.06
	With my partner of the other sex and without children	405	19.91
	With my partner of the other sex and children	732	35.99
	With my partner of the same sex and without children	42	2.06
	With my partner of the same sex and with children	18	0.88
	Only with my children, without partner	154	7.57
	Blended family	43	2.11
Only with other relatives (grandparents, uncles, cousins)	45	2.21	
Online studies	Y	781	38.40
	N	1253	61.60
Teleworking	Y	1104	54.28
	N	930	45.72
The family climate during lockdown was	Much worse than before	14	0.69
	Worse than before	115	5.65
	As before	1196	58.80
	Better than before	578	28.42
	Much better than before	131	6.44

* In Spain, there are 17 autonomous communities and 2 autonomous cities, but it was decided to leave only those observations with more than 2 percent of the total sample, aggregating the rest of the observations into the "other" category.

It is important to highlight that the current study is based on a convenience sample. The confinement conditions prevented a face-to-face design. In the same way, the increase in the use of technology meant that the implementation of the questionnaire was self-administered. For this reason, there is a greater presence of young people in the sample, which coincides with this intensive use of digital technology. There is also a greater representation of women, as they tend to show a greater predisposition to participate in family functioning studies. However, although there is an over-representation of certain socioeconomic groups, the sample size is adequate to analyse the differences at the level of the diversity of family typologies collected.

It should be noted that the difference in regional responses may be associated with the social interest that existed as a result of the coronavirus. In this regard, the first confirmed case of COVID-19 in Spain was a German tourist on the island of La Gomera (Canary Islands) on 31 January 2020. This condition was, for the islands, a factor of important sensitivity as to the reality of the pandemic. In addition, in the regions of the Canary Islands and Andalusia, the economy is mainly focused on the tourism sector, creating a greater state of attention to the conditions of national confinement (reduction of mobility or conditioning of direct or indirect employment contracts in the tourism sector), which could lead to greater participation in the research.

5.2. Fuzzy Hybrid Model

Table 4 shows the TFNs and the defuzzified (crisp) values for the total sample of respondents, and the short names for the items are used (Table A1). The TFN triplets provide a clear meaning for fuzzy logic experts, but they might not be apparent for those unfamiliar with the method. It can be seen that all of the triplets overlap. The overlapping finding is the essence of the fuzzy logic method when dealing with vague information. The defuzzification method provides an intermediate step to calculate the crisp information matrix that facilitates the interpretation. The analysis of the crisp column serves to conclude that the most valued items are related to violent behaviour in the family from 89.79,

observed in “in my family, we sometimes get so angry that we hit or break something”, to 91.28 observed in “when we get angry, family members sometimes throw objects at each other to hurt us”. It is interesting that the items also correspond to reverse code items. Meanwhile, the least valued items correspond to “we all put a lot of effort into what we do at home” and “if there is disagreement in the family, we all strive to smooth things over and maintain peace” with crisp values of less than 61.

Table 4. TFN and crisp values. Total sample.

Item	TFN	Crisp
No arguments	(53.37, 71.28, 80.51)	69.11
Close when problems	(53.05, 72.10, 80.98)	69.56
Freedom of expression	(55.06, 76.04, 83.64)	72.70
No hitting	(69.05, 98.30, 98.87)	91.13
No troubles	(62.22, 85.42, 90.12)	80.80
Togetherness	(53.19, 73.12, 81.57)	70.25
Freedom of expression 2	(55.82, 77.40, 84.44)	73.77
Effort in home tasks	(44.45, 61.30, 73.22)	60.07
No objects thrown	(69.13, 98.47, 98.95)	91.25
No quarrels	(59.44, 80.71, 86.90)	76.94
Support	(54.61, 75.08, 82.94)	71.93
Pay attention	(58.02, 80.18, 86.37)	76.19
No yelling when angry	(55.31, 75.42, 83.13)	72.32
Get along	(56.19, 76.79, 84.15)	73.48
Show anger easily	(52.68, 71.51, 80.74)	69.11
No hitting. No breaks	(68.17, 96.61, 97.76)	89.79
Discuss problems to help	(46.35, 63.05, 74.14)	61.65
Easy to tell our problems	(58.34, 80.92, 86.96)	76.79
Smooth things for peace	(45.46, 61.63, 73.32)	60.51
Talk openly	(51.54, 70.34, 79.53)	67.94
No argue	(55.72, 74.89, 82.90)	72.10
Support and help	(54.90, 75.22, 83.13)	72.12
No arguing	(58.77, 79.91, 86.34)	76.23
Collaborate in home tasks	(46.51, 63.51, 74.82)	62.09

Table 5 shows the ideal solutions that were calculated according to Equation (4). The analysis of the ideal solutions reveals that, for some items, the positive ideal solution vector is represented by the highest mark, as, “in my family when we argue we end up hitting each other” and “when we get angry, family members sometimes throw objects at each other to hurt us”. In this case, it can be seen that for respondents living in blended families or only with one parent, the respondents have answered that these situations never occurred. The 2 minimum values observed in the PIS vector are higher than 70 for the items “if there is disagreement in the family, we all strive to smooth things over and maintain peace” and “when something has to be done at home, we all collaborate”. In this case, the representative group is characterized for respondents who consider that during the lockdown, the family climate is much better than before, and for those who think that the Spanish health system will be worse after the pandemic.

On the other hand, the analysis of the negative ideal solution is very different. The first observed difference is that there is no group for which all the respondents have answered any item at its minimum value. The second, and more important, is that for 12 items, the figures are lower than 50, so it can be concluded that for half of the items of the climate scale, there is at least one population group that sees the item as a failure. The last column shows the current increment between the values of the positive and negative ideal solutions, and it can be used to analyze whether some items are more or less heterogeneous than others. The results conclude that 3 items related to violence in families are the most homogeneous Items of the scale ranging from more to less homogeneous, 1 to 3, where: (1) “when we get angry, family members sometimes throw objects at each other to hurt us”; (2) “in my family when we argue, we end up hitting each other; and (3) “in my family, we sometimes get so angry that we hit or break something”.

Table 5. Ideal solutions.

Item	PIS	Group	NIS	Group	Incr.
No arguments	80.25	Alone	41.72	Worse than before	1.92
Close when problems	77.95	To spend more time with my family was very easy	38.04	Much worse than before	2.05
Freedom of expression	79.56	To spend more time with my family was very easy	52.86	Much worse than before	1.51
No hitting	92.50	Blended family	86.43	Much worse than before	1.07
No troubles	86.52	To spend more time with my family was very easy	54.29	Much worse than before	1.59
Togetherness	81.53	With my partner of the same sex and with children	39.82	Much worse than before	2.05
Freedom of expression 2	82.91	Blended family	56.43	Worse than before	1.47
Effort in home tasks	71.81	With my partner of the same sex and with children	45.73	To spend more time with my family was difficult	1.57
No objects thrown	92.50	Only with one of my parents	87.76	To spend more time with my family was very difficult	1.05
No quarrels	84.03	Alone	57.68	Much worse than before	1.46
Support	79.99	To spend more time with my family was very easy	38.04	Much worse than before	2.10
Pay attention	81.57	To spend more time with my family was very easy	59.98	Worse than before	1.36
No yelling when angry	80.40	Alone	45.36	Much worse than before	1.77
Get along	81.46	To spend more time with my family was very easy	32.32	Much worse than before	2.52
Show anger easily	76.80	Blended family	58.36	Only with my roommates (friends or students)	1.32
No hitting. No breaks	91.90	Education. It will be worse	78.75	Much worse than before	1.17
Discuss problems to help	76.67	With my partner of the same sex and with children	27.86	Much worse than before	2.75
Easy to tell our problems	83.54	To spend more time with my family was very easy	59.11	Much worse than before	1.41
Smooth things for peace	70.65	Much better than before	29.29	Much worse than before	2.41
Talk openly	77.92	With my partner of the same sex and with children	50.12	Alone	1.55
No argue	77.92	To spend more time with my family was very easy	41.07	Much worse than before	1.90
Support and help	82.78	With my partner of the same sex and with children	38.04	Much worse than before	2.18
No arguing	81.12	Secondary	55.89	Much worse than before	1.45
Collaborate in home tasks	70.75	Health System. It will be worse	47.14	Society. We will continue behaving exactly the same	1.50

Regarding the groups that represent the ideal solutions, interesting insights are obtained. First, PIS is more represented by some household type, because some respondents found it very easy to spend time with their families. On the other hand, NIS is overrepresented by the group characterized by having a much worse family climate during the lockdown than before.

Table 6 shows the FCSI obtained according to Equation (5) for the population groups already commented upon in Table 1. The results show the following: (1) females seem to have a better family climate than males; (2) in terms of autonomous community, residents in the Balearic Islands have the worst family climate in comparison with residents in the Valencian Community, who have the best family climate on average; (3) regarding education, respondents with primary studies have the worst family climate; (4) with respect to age, the youngest group (18–29 years old) has a worse family climate than the other generations; (5) regarding household types, there is a significant difference between the worst family climates observed for those who lived alone or only with both parents, and the best family climates experience by those who live with a partner independently of whether either they are homosexual or heterosexual, or whether they have or do not have children; (6) those who study online or telework have better a family climate than those who do not study online or do not telework; and (7) when the family climate during the lockdown was much worse than before determines the worst family climate in comparison with the other extreme, “was much better”, that achieves the best family climate of the groups with respect to this variable. Table 6 does not present the results of all of the groups (89) analyzed, but the recently analyzed groups, which present the lowest and the second higher FCSI of the whole set. It is interesting to remark that the highest FCSI is obtained for those who considered that spending more time with their family was very easy.

Table 6. Family climate synthetic index.

Variable	Categories	FCSI
	Total	0.744
Gender	Female	0.752
	Male	0.716
Autonomous Community *	Andalusia	0.733
	Aragon	0.730
	Balearics	0.694
	Canary Islands	0.732
	Castile and Leon	0.729
	Valencian Community	0.814
	Madrid	0.769
	Basque Country	0.801
Education	Other	0.807
	Primary	0.617
	Secondary	0.745
	High School	0.731
Age	University	0.749
	18–29 years old	0.607
	30–39 years old	0.802
	40–49 years old	0.798
	50–59 years old	0.772
Household type	60 or older	0.731
	Alone	0.569
	Only with my roommates (friends or students)	0.622
	Only with one of my parents	0.603
	Only with both parents	0.574
	With my parents and siblings	0.585
	With my partner of the other sex and without children	0.819
	With my partner of the other sex and children	0.815
	With my partner of the same sex and without children	0.828
	With my partner of the same sex and with children	0.804
	Only with my children, without partner	0.763
Blended family	0.775	
Only with other relatives (grandparents, uncles, cousins)	0.630	

Table 6. *Cont.*

Variable	Categories	FCSI
Online studies	Y	0.712
	N	0.764
Teleworking	Y	0.802
	N	0.675
The family climate during lockdown was	Much worse than before	0.072
	Worse than before	0.324
	As before	0.742
	Better than before	0.815
	Much better than before	0.890

* In Spain, there are 17 autonomous communities and 2 autonomous cities, but it was decided to leave only those observations with more than 2 percent of the total sample, aggregating the rest of the observations into the "other" category.

5.3. The Fuzzy Clusters

Table 7 shows the answers given to each item for the three representative profiles of each cluster. The authors present the semantic scale answers instead of the respective converted TFN for clarity and ease of exposition. For this reason, the table shows a vector of 24 values in the range from 1 to 5. The analysis of the profiles evidences the following selected name for the clusters: extreme positive family climate, extreme adverse family climate, and intermediate family climate. The first cluster is characterized by those respondents for which the FCSI synthetic indicator is closer to 1.

Table 7. Cluster representatives.

Item	Extreme Positive	Extreme Negative	Intermediate
No arguments	5	1	3
Close when problems	5	1	4
Freedom of expression	5	2	5
No hitting	5	3	5
No troubles	5	2	3
Togetherness	5	1	5
Freedom of expression 2	5	2	5
Effort in home tasks	5	3	4
No objects thrown	5	3	5
No quarrels	5	2	4
Support	5	1	4
Pay attention	5	3	2
No yelling when angry	5	2	3
Get along	5	1	4
Show anger easily	5	1	5
No hitting. No breaks	5	2	5
Discuss problems to help	5	1	5
Easy to tell our problems	5	1	5
Smooth things for peace	5	1	3
Talk openly	5	1	5
No argue	5	1	4
Support and help	5	1	5
No arguing	5	3	4
Collaborate in home tasks	5	1	4

On the other hand, the second cluster is characterized by those which are more similar to the representative of the cluster, which is characterized by a scale score of 40. It was evident that the family climate is undoubtedly harmful, with 13 items answered with the minimum value and the rest of the items divided in marks between 2 and 3. The intermediate cluster is characterized by respondents whose answers are similar to those shown in the fourth column of the table. Interestingly, the grey area between the other 2 extreme clusters is characterized by respondents with a scale score of 101, with maximum

values observed in 11 items of the scale. The cluster name can be changed to “positive family climate without paying enough attention to others” because the profile is characterized by maximum values in 11 items of the scale, with the minimum value observed in the “pay attention” item, which surprisingly is lower than in the case of the extreme negative cluster profile. Thus, it seems that the cluster borrows a lot from the extreme positive cluster, but with exceptions concerning attention to the other or yelling when angry. It seems that the family climate is overall good in the cluster, except at some moments in which the climate is considered a little more “explosive” and “stormy” (resulting in misunderstanding, disorder, even friction within the family).

Figure 1 shows the ternary plot of the whole sample of respondents. The ternary plots represent graphically how each respondent is distributed in the triangle according to the probability vector (weights) that characterizes the membership function that each one has to belong to each of the three clusters. The graph provides a very intuitive understanding of the distribution of respondents concerning their being or not being more similar to the representative respondent for each family climate cluster, such as extremely positive, extremely negative, and intermediate. At a simple glance, most respondents are located near the baseline that joins the extreme positive and intermediate family climates. The upper vertex characterizes the respondents with an extreme adverse family climate, and it can be seen that they are fewer in number. The average probabilities for each cluster provide an interesting summary for the graph, as follows: (1) 52.1% for the extreme positive family climate cluster; (2) 8.4% for the extreme negative family climate; and (3) 39.5% for the intermediate cluster. The summary concurs with the above comments about the respondents’ distribution. The authors conclude that the sample seems to be a mixture of respondents who have an extremely positive or intermediate family climate, and only a tiny fraction of respondents can be characterized as having extreme adverse family climates.

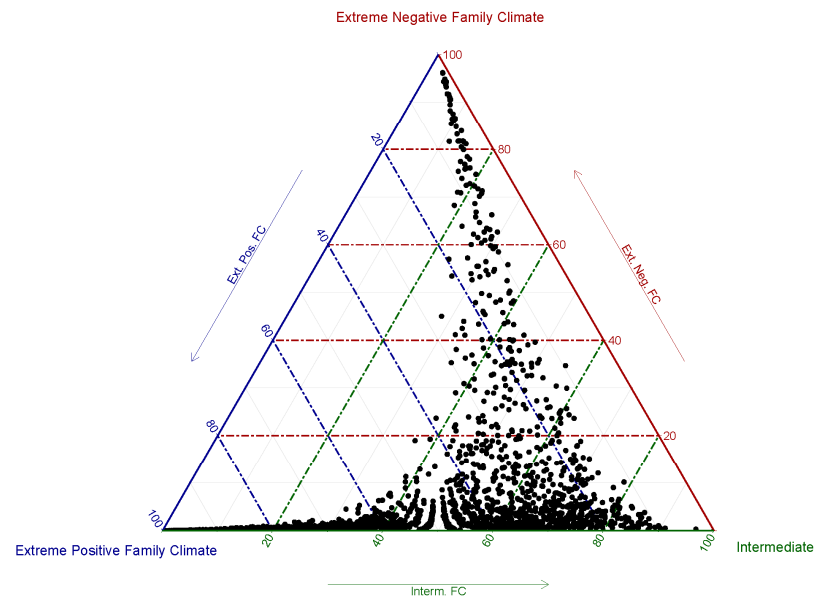


Figure 1. Fuzzy Clustering Ternary Graph.

This section ends with a final ANOVA analysis in which the socioeconomic variables used in the fuzzy hybrid method to form the groups will be studied. Thus, the membership function of the fuzzy clustering method is analysed to see if significant differences are observed. The analysis will be based on ANOVA and Tukey-Kramer coefficients, and 18 different socioeconomic and demographic variables have been used as factors to analyse the mentioned differences in the distribution of the following membership functions for each cluster: (1) gender; (2) age; (3) autonomous community; (4) education; (5) household type; (6) online studies; (7) teleworking; (8) neither online studies nor teleworking; (9) new

aspects of family members discovered during lockdown; (10) realisation during lockdown of whether the family is necessary or not; (11) difficulties or ease of spending more time with the family during the lockdown; (12) deterioration or improvement of the family climate during lockdown; (13) assessment of whether the society is going to behave worse or better after the pandemic; (14) assessment of whether the Spanish healthcare system is going to become worse or improve after the pandemic; (15) assessment of whether the Spanish public education system is going to become worse or improve after the pandemic; (16) assessment of whether the Spanish Government has managed the pandemic poorly or well; (17) assessment of whether the autonomous communities government has managed the pandemic poorly or well; and (18) assessment of whether daily routines were changed or not during the lockdown.

Interestingly, many of the 18 factors do not have a significant effect on the distribution of the membership function, namely gender, level of education, do not either study online or telework, discovering new aspects of family members, assessing changes in society, Spanish healthcare and public educational system, being satisfied with the Spanish and autonomous communities government's anti-COVID measures, and changing daily routines during the lockdown. Table 8 presents the ANOVA results and the discussion of the differences observed for those factors that have a significant effect on both the membership distribution for the extreme positive and negative family climate clusters. The factors are more intrinsically connected to personal affective feelings or individual characteristics and household types. The factors that do not significantly affect both mentioned membership functions are omitted from the table.

Table 8. ANOVA results.

Variable	Categories	Ex. Positive ¹	Ex. Negative ¹	Interm. ¹	EP.p ²	EN.p ²	Ip ²
Age	18–29 years old	45.1%	15.1%	39.8%	0.0000	0.0000	0.3644
	30–39 years old	55.7%	6.4%	37.9%			
	40–49 years old	54.5%	6.1%	39.4%			
	50–59 years old	53.7%	6.6%	39.7%			
	60 or older	51.4%	6.2%	42.4%			
Household type	Alone	47.4%	14.4%	38.2%	0.0000	0.0000	0.0117
	Only with my roommates (friends or students)	51.2%	13.7%	35.1%			
	Only with one of my parents	44.1%	13.6%	42.3%			
	Only with both parents	42.1%	16.4%	41.5%			
	With my parents and siblings	42.4%	15.2%	42.4%			
	With my partner of the other sex and without children	58.6%	6.2%	35.2%			
	With my partner of the other sex and children	54.9%	4.9%	40.2%			
	With my partner of the same sex and without children	59.0%	5.4%	35.6%			
	With my partner of the same sex and with children	53.0%	3.6%	43.4%			
	Only with my children, without partner	51.2%	6.9%	41.9%			
Blended family	53.5%	5.5%	41.0%				
Only with other relatives (grandparents, uncles, cousins)	46.2%	13.0%	40.8%				
Teleworking	Y	55.5%	6.2%	38.3%	0.0000	0.0000	0.0201
	N	48.1%	11.1%	40.8%			
During COVID, I realized how important my family is	Not important	51.5%	10.5%	38.0%	0.0000	0.0000	0.0000
	A little bit important	44.7%	18.6%	36.7%			
	Something important	40.8%	15.2%	44.0%			
	Quite important	47.3%	9.0%	43.7%			
	Very important	59.1%	4.6%	36.3%			
Spending more time with my family during the lockdown was	Very difficult	32.2%	25.4%	42.4%	0.0000	0.0000	0.0000
	Difficult	29.9%	24.6%	45.5%			
	Neither difficult nor easy	39.9%	14.6%	45.5%			
	Easy	51.2%	4.6%	44.2%			
	Very easy	65.9%	2.9%	31.2%			
During lockdown the climate in my family was	Much worse than before	17.5%	40.5%	42.0%	0.0000	0.0000	0.0000
	Worse than before	23.4%	27.4%	49.2%			
	As before	52.4%	8.5%	39.1%			
	Better than before	55.4%	4.7%	39.9%			
	Much better than before	63.3%	4.4%	32.3%			

¹ The figures represent the average probabilities. ² The figures represent the probability value of the Tukey Kramer coefficient that can be used to determine the confidence level for which the differences in the probability values are observed.

The ANOVA results show that the family climate was more positive when (1) respondents' age was between 30 and 49 years old, (2) families were formed by heterosexual or homosexual couples with or without children, or were blended families, (3) respondents were teleworking, (4) the respondents realized during the COVID pandemic that their family is very important, (5) the respondents declared that spending more time with the family was very easy during the lockdown, and (6) they manifested that their family climate was much better during the lockdown than before. On the other hand, the family climate is worse for those who (1) were young, with an age between 18 and 29 years old, (2) lived alone, with parents and siblings, or only with both parents, (3) did not telework, (4) realized that during the COVID pandemic that the family is a little bit important, (5) found that spending more time with their family was difficult or very difficult, and (6) said that their family climate was worse or much worse during the lockdown than before.

6. Discussion

The objective of the study was to provide empirical evidence of the effects of the COVID-19 confinement on the family climate in Spain using a quantitative method based on fuzzy logic theory.

In general, the family climate is extremely positive or intermediate, as only 8.4% affirm that it is extremely negative. In adverse situations, such as those suffered during confinement by COVID-19, families implement one of the fundamental principles of positive parenting, such as affective bonds. In this sense, parental figures provide stable, safe and healthy bonds (Rodrigo López et al. 2010). Likewise, there is a certain emotional component regarding the family climate during confinement. Thus, the importance of the family, the facility to share time and the valuation of the climate are related to resilience. In fact, family support is in itself a resilient factor that allows for optimal responses to adversity such as confinement. The study by Menacho-Vargas et al. (2021) found that a better family climate is related to high levels of resilience. Despite this, when asked about the family, there is always a tendency to respond positively due to social desirability. People do not like to make conflictive situations that occur in the family context visible. Regardless of these results, it should be noted that family coexistence during confinement due to COVID-19 was, for a few families, an important factor that generated conflicts, caused by the increase in time spent together, in a limited space and in a stressful socio-health context (Behar-Zusman et al. 2020). For this reason, the very low percentage of people who report a violent climate in the family justifies the homogeneity in responses related to violent behaviour styles.

Although the synthetic index of the family climate identifies who shows a better or worse family climate, it is possible to categorize different types of families through the results of the ANOVA. Thus, only 6 of the 18 sociodemographic variables and family, social, and political assessment variables allow those families to be typified according to their perception of the family climate, namely age, type of family, teleworking, the importance of the family during confinement, ease in spending time with the family during confinement, as well as a general assessment of the family climate.

According to age, the results showed that young people (18–29 years old) perceive a worse family climate when they live with their parents during confinement and where the importance of the family is relative. Along the same lines are the results of Walper and Reim (2020) in Germany, where almost half of the adolescents state that there were negative changes in the family climate between confinement and the previous non-pandemic situation. This has generated conflictive situations in the families that have been perceived by all the members. In fact, Mireia Orgilés et al. (2020) also highlighted that 85.7% of parents perceived changes in their children's emotional state and behaviour, finding a more challenging family life in a study carried out between Spain and Italy during the quarantine. The stress that COVID-19 has caused in parents has been aggravated by the supervening responsibilities generated by them assuming new roles as educators and playmates, while at the same time having to find a balance between full-time care and their own stressful

changes at work, in the economic and social situation. This stress is very different when families have the necessary support.

The employment situation is also a relevant indicator that affects the family context during confinement. Employment influences family relationships because it is related to their quality of life. Hence, those who could not continue working online showed a more conflictive climate in the family. Lack of work activity became a negative factor that significantly influenced family life, facilitating conflictive or violent situations, similar to the results obtained by [Neyiřci et al. \(2021\)](#). Research by [Wang et al. \(2021\)](#) also showed that those parents who lost their jobs during the pandemic experienced increased conflict with their children.

In the same way, the adolescents from families facing economic difficulties and changes in employment perceived changes in the relationship with their parents that influenced their emotional well-being. Similarly, people who were able to telework reported a better family climate. In this sense, teleworking from one's own home represented a significant advantage by reducing travel, the risk of the contagion of diseases, and the greater ease of reconciling the work–family balance. However, according to [Duran Vila \(2020\)](#), for this to be effective, the involvement of all family members was necessary, so that they would be supportive throughout this process and contribute to a better coexistence during the working day. For this, all the family members needed to respect the spaces in which the work was carried out, and reach agreements to face this type of work.

Concerning the type of family, those who live alone, with one or two parents, regardless of their sexual orientation, stand out as having a more violent climate. The confinement coincides with a stage where young people who were studying, sharing a flat, and have begun their independence, have to return to the family where the increase in intergenerational authority caused by the pandemic causes conflictive and violent situations in the family ([Neyiřci et al. 2021](#)). Notably, there has been a significant increase in multigenerational households since the start of COVID-19. Above all, it affected the younger population, between 18 and 29 years old, who lived with a parent or grandparent, since young people, as we had indicated, had to leave cities with a high rate of COVID-19 and because they also suffered economic difficulties ([Cohen 2020](#)). This fact initially favoured more conflictive situations, since more family and care responsibilities had to be assumed, leading to higher health costs for the caregivers. According to [Park \(2021\)](#), long-term family caregivers experienced worse physical and psychological health in the early part of the pandemic compared to non-caregivers.

It is also worth noting the positive value in the continuity of studies in an online mode, which the synthetic index of family climate reflects as being an indicator of interest in the context of the pandemic caused by COVID-19. Thus, the findings are in line with the study by [Pozzoli et al. \(2021\)](#), which shows the relationship between a more positive family climate and the lower level of difficulty of distance learning, with individuals even better able to regulate their emotions in stressful situations.

It is also worth mentioning that the perception of family climate differs by gender. Women tend to report a better cohesive climate than men ([Morganstein and Ursano 2020](#)). However, they also tend to report a higher conflict climate. This paradox is explained by the influence of age and the degree of conflict in the family prior to COVID. In general terms, we have already mentioned that young people (18–29 years old) reported a more conflictive climate but, on the other hand, we must add the fact of being a woman living in a family context marked by a previous difficult coexistence.

Finally, three limitations of the present study can be highlighted. First, concerning the sample's representativeness, only 6% affirm that the family climate is worse or much worse during confinement. However, like other studies on family climate, one of the limitations is social desirability, underestimating the frequency of violent behaviours because they are not socially accepted ([Ibabe 2015](#); [Moral Jiménez and Ovejero Bernal 2021](#); [Sugarman and Hotaling 1997](#)). Second, the study of family climate should not focus exclusively on negative factors, since family conditions in this context provide an opportunity to foster

the relationship between its members (Balenzano et al. 2020), so it will be of interest to delve into the positive effects of confinement on families. Third, it is true that any question asked about aspects related to the family may be answered differently depending on which person is finally answering. For a mother, the family climate may be optimal, but if we ask her adolescent child, her perception may be different. The research does not include dyadic or triadic responses (parents and children) who share the same family household, but it is also true that the perception of participants with a wide age range shows these differences in the perception of family climate according to age or family typology. It would be interesting for future research to analyse the household family climate variability according to different family typologies.

7. Conclusions

According to the study carried out, it is proven that not all families could face the consequences of confinement by COVID-19 in the same way. Age, family structure, and the value of the family are essential to promote positive family climates.

Our microsocial analysis of the Spanish family during confinement reveals that the family relationships manifested in the family climate are negative when the respondent is young (18–29 years old), lives with their parents, and considers that the value of the family has worsened in conditions of limited mobility. These results are of particular interest to establish measures that promote family development.

The study contributes to developing the fuzzy theory approach in quantitative research of a social nature. Thus, a closer interpretation of the data offers results that further delve into the development of families and their members.

Finally, this study also offers possible lines of future research, such as the analysis of the factors that influence the negative perception of young people towards the family in a situation of confinement, as well as differentiating to a greater extent the perception of the family climate from family diversity, in particular, from single-parent and reconstituted families that may have specifications concerning the traditional family. Likewise, it would be essential to relate the family climate during crises with coping strategies. Developing effective coping strategies will improve the way that the family faces these adversities and, thus, will have repercussions on the family climate.

Author Contributions: Data curation, J.C.M.-Q. and J.C.M.; Formal analysis, J.C.M.-Q., J.C.M. and P.F.A.; Investigation, P.F.A.; Methodology, J.C.M.; Writing – original draft, J.C.M.-Q., J.C.M. and P.F.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data that support the findings of the study are available from the corresponding author, [J.C.M.], upon reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Items denomination for tables of results.

Item 1.	Description	New Denomination
1	In my family no day goes by without an argument (*)	No arguments
2	In my family we get very close when one of us has a problem	Close when problems
3	Usually in my family it is difficult to express freely what we think (*)	Freedom of expression
4	In my family when we argue we end up hitting each other (*)	No hitting
5	In my family there is always a lot of trouble (*)	No troubles
6	In my family there is a strong feeling of togetherness	Togetherness
7	In my family it is difficult to express our opinions frequently and spontaneously (*)	Freedom of expression 2
8	We all put a lot of effort into what we do at home	Effort in home tasks
9	When we get angry, family members sometimes throw objects at each other to hurt us (*)	No objects thrown
10	In our family we quarrel a lot (*)	No quarrels
11	People in my family really support each other	Support
12	In my family it is very difficult to pay attention when one of us talks about his problems (*)	Pay attention
13	In my family we usually yell at each other when we are angry (*)	No yelling when angry
14	We really get along with each other in my family	Get along
15	My family members almost never openly show their anger and prefer to keep it to themselves (*)	Show anger easily
16	In my family we sometimes get so angry that we hit or break something (*)	No hitting. No breaks
17	In my house we discuss our personal problems to help and support each other	Discuss problems to help
18	In my family it is difficult to tell our problems (*)	Easy to tell our problems
19	If there is disagreement in the family, we all strive to smooth things over and maintain peace	Smooth things for peace
20	At home we talk openly about what we think or want	Talk openly
21	In my family we often argue (*)	No argue
22	In my family we really support and help each other	Support and help
23	In my family we usually solve problems by arguing (*)	No arguing
24	When something has to be done at home, we all collaborate	Collaborate in home tasks

* The reverse code items were denominated in positive sense to analyze good family climate.

References

- Aznar, Ana, Paul Sowden, Sarah Bayless, Kirsty Ross, Amy Warhurst, and Dimitra Pachi. 2021. Home-schooling during COVID-19 lockdown: Effects of coping style, home space, and everyday creativity on stress and home-schooling outcomes. *Couple and Family Psychology: Research and Practice* 10: 294–312. [CrossRef]
- Balenzano, Caterina, Giuseppe Moro, and Sabina Girardi. 2020. Families in the pandemic between challenges and opportunities: An empirical study of parents with preschool and school-age children. *Italian Sociological Review* 10: 777–800. [CrossRef]
- Behar-Zusman, Victoria, Jennifer V. Chavez, and Karina Gattamorta. 2020. Developing a measure of the impact of COVID-19 social distancing on household conflict and cohesion. *Family Process* 59: 1045–59. [CrossRef] [PubMed]
- Björnberg, Åsa, and Nigel Nicholson. 2007. The family climate scales—Development of a new measure for use in family business research. *Family Business Review* 20: 229–46. [CrossRef]
- Bronfenbrenner, Urie. 1979. *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge: Harvard University Press.
- Bronfenbrenner, Urie. 1992. Ecological systems theory. In *Six Theories of Child Development: Revised Formulations and Current Issues*. Edited by Roos Vasta. London: Jessica Kingsley, pp. 187–249.
- Cantillo, Javier, Juan Carlos Martín, and Concepción Román. 2021. A Hybrid Fuzzy Topsis Method to Analyze the Coverage of a Hypothetical Eu Ecolabel for Fishery and Aquaculture Products (Faps). *Applied Sciences* 11: 112. [CrossRef]
- Cerezo, Fuensanta, Cecilia Ruiz-Esteban, Consuelo Sánchez Lacasa, and Julián Jesús Areñse. 2018. Dimensions of parenting styles, social climate, and bullying victims in primary and secondary education. *Psicothema* 30: 59–65. [CrossRef]
- Chen, Shyi-Ming. 1996. Evaluating Weapon Systems Using Fuzzy Arithmetic Operations. *Fuzzy Sets and Systems* 77: 265–76. [CrossRef]
- Cohen, Felipe N. 2020. July Data Show 2.7 Million Extra Young Adults Living at Home. *Family Inequality (Blog)*, August 7. Available online: <https://familyinequality.wordpress.com/2020/08/16/july-data-show-2-7-million-extra-young-adults-living-at-home/> (accessed on 1 November 2020).
- Collins, Caitlyn, Liana Christin Landivar, Leah Ruppner, and William J. Scarborough. 2021. COVID-19 and the gender gap in work hours. *Gender, Work & Organization* 28: 101–12. [CrossRef]
- Dunton, Genevieve F., and Shirlene D. Wang. 2020. Early effects of the COVID-19 pandemic on physical activity and sedentary behavior in children living in the U.S. *BMC Public Health* 20: 1351. [CrossRef]
- Duran Vila, Nadia Iris. 2020. El Teletrabajo y la conciliación con el entorno de convivencia familiar durante la Pandemia COVID-19. *Revista de Investigación Psicológica ESPECIAL* 4: 68–72. [CrossRef]
- D'Urso, Pierpaolo D., Marta Disegna, Riccardo Massari, and Linda Osti. 2016. Fuzzy Segmentation of Postmodern Tourists. *Tourism Management* 55: 297–308. [CrossRef]

- Fetzer, Thiemo, Lukas Hensel, Johannes Hermle, and Christopher Roth. 2020. Coronavirus perceptions and economic anxiety. *Review of Economics and Statistics* 103: 968–78. [\[CrossRef\]](#)
- Hernández-Serrano, Olga, Maria Eugénia Gras, Mariano Gacto, Alicia Brugarola, and Silvia Font-Mayolas. 2021. Family climate and intention to use cannabis as predictors of cannabis use and cannabis-related problems among young university students. *International Journal of Environmental Research and Public Health* 18: 9308. [\[CrossRef\]](#) [\[PubMed\]](#)
- Hobfoll, Stevan E., and Charles D. Spielberger. 1992. Family stress: Integrating theory and measurement. *Journal of Family Psychology* 6: 99–112. [\[CrossRef\]](#)
- Iacopetti, Cinzia, Ilaria Londi, Valentino Patussi, and Fiammetta Cosci. 2021. Family climate in children living with parents who harmfully consume alcohol. *Clinical Psychology & Psychotherapy* 28: 1128–34. [\[CrossRef\]](#)
- Ibabe, Izaskun. 2015. Family predictors of child-to-parent violence: The role of family discipline. *Annals of Psychology* 31: 615–25. [\[CrossRef\]](#)
- Kurdek, Lawrence A., Mark A. Fine, and Ronald J. Sinclair. 1995. School adjustment in sixth graders: Parenting transitions, family climate, and peer norm effects. *Child Development* 66: 430–45. [\[CrossRef\]](#)
- Lagomarsino, Francesca, Ilaria Coppola, Rosa Parisi, and Nadia Rania. 2020. Care tasks and new routines for Italian families during the COVID-19 pandemic: Perspectives from women. *Italian Sociological Review* 10: 847–68. [\[CrossRef\]](#)
- Langmeyer, Alexandra N., Angelika Guglhör-Rudan, Ursula Winklhofer, Sophia Chabursky, Thorsten Naab, and Ulrich Pötter. 2022. Resources of Families Adapting the COVID-19 Pandemic in Germany: A Mixed-Method Study of Coping Strategies and Family and Child Outcomes. *Journal of Family Research* 34: 333–66. [\[CrossRef\]](#)
- Lebow, Jay L. 2020. Family in the Age of COVID-19. *Family Process* 59: 309–12. [\[CrossRef\]](#)
- Leon, Steven, and Juan Carlos Martín. 2020. A Fuzzy Segmentation Analysis of Airline Passengers in the U.S. Based on Service Satisfaction. *Research in Transportation Business & Management* 37: 100550. [\[CrossRef\]](#)
- Martin, Juan Carlos, Concepción Román, Pedro Moreira, Roberto Moreno, and Fernando Oyarce. 2021. Does the Access Transport Mode Affect Visitors' Satisfaction in a World Heritage City? The Case of Valparaíso, Chile. *Journal of Transport Geography* 91: 102969. [\[CrossRef\]](#)
- Menacho-Vargas, Isabel, Felipe Supo-Condori, Hugo Neptalí Cavero-Ayvar, Miriam Jesús Caloretti-Castillo, Ysela Lazo-Tafur, and José J. Guerrero-Rojas. 2021. Family climate and resilience in Peruvian students in times of global pandemic by COVID-19. *Turismo Estudios E Práticas* 1: 1–9.
- Michel, Jesse S., Lindsey M. Kotrba, Jacqueline K. Mitchelson, Malissa A. Clark, and Boris B. Baltes. 2011. Antecedents of work–family conflict: A meta-analytic review. *Journal of Organizational Behavior* 32: 689–725. [\[CrossRef\]](#)
- Miniguano, Anita Dalila Espín, Gioconda Lorena Chicaiza Romero, and Portero Castillo Aravelly Del Rocío. 2021. Family Climate and Self-Esteem in Persons with Visual Disabilities. *International Journal of Latest Research in Humanities and Social Science* 4: 79–96.
- Mireia Orgilés, Alexandra Morales, Elisa Delvecchio, Claudia Mazzeschi, and José P. Espada. 2020. Immediate psychological effects of the COVID-19 quarantine in youth from Italy and Spain. *Frontiers in Psychology* 11: 579038. [\[CrossRef\]](#)
- Moos, Rudolf H., and Edison J. Trickett. 1989. *Manual de la Escala Del Clima Social Familiar*. Madrid: TEA.
- Moos, Rudolf H., Bernice S. Moos, and Edison J. Trickett. 1984. *FES, WES, CIES, CES. Escalas de Clima Social*. Madrid: TEA.
- Moral Jiménez, María de la Villa, and Anastasio Ovejero Bernal. 2021. Adolescents' attitudes to bullying and its relationship to perceived family social climate. *Psicothema* 33: 579–86. [\[CrossRef\]](#)
- Morganstein, Joshua, and Robert Ursano. 2020. Ecological Disasters and Mental Health: Causes, Consequences, and Interventions. *Frontiers in Psychiatry* 11: 1–15. [\[CrossRef\]](#)
- Neyişi, Nilay, Şefika Ş. Erçetin, Şuay N. Açıkalin, Nilüfer Koçtürk, and Nihan Potas. 2021. Quality of Life, Family Climate, and Sense of Family Coherence During the COVID-19 Pandemic: Modeling of Triple-Serial Mediators. *Journal of Family Issues*. [\[CrossRef\]](#)
- O'Neill, John W., Michelle M. Harrison, Jeannette Cleveland, David Almeida, Robert Stawski, and Anne C. Crouter. 2009. "Work–family climate, organizational commitment, and turnover: Multilevel contagion effects of leaders. *Journal of Vocational Behavior* 74: 18–29. [\[CrossRef\]](#)
- Park, Sung S. 2021. Caregivers' Mental Health and Somatic Symptoms During COVID-19. *The Journals of Gerontology: Series B* 76: e235–e240. [\[CrossRef\]](#) [\[PubMed\]](#)
- Pozzoli, Tiziana, Gianluca Gini, and Sara Scrimin. 2021. Distance learning during the COVID-19 lockdown in Italy: The role of family, school, and individual factors. *School Psychology* 37: 183–89. [\[CrossRef\]](#) [\[PubMed\]](#)
- Prime, Heather, Mark Wade, and Dillon T. Browne. 2020. Risk and resilience in family well-being during the COVID-19 pandemic. *American Psychologist* 75: 631–43. [\[CrossRef\]](#) [\[PubMed\]](#)
- Rodrigo López, María José, María Luisa Máiquez Chaves, and Juan Carlos Martín Quintana. 2010. *Parentalidad Positiva Y Políticas Locales de Apoyo A Las Familias*. Madrid: FEMP.
- Salin, Milla, Anniina Kaittila, Mia Hakovirta, and Mari Anttila. 2020. Family coping strategies during Finland's COVID-19 lockdown. *Sustainability* 12: 9133. [\[CrossRef\]](#)
- Shelton, Lawrence G. 2018. *The Bronfenbrenner Primer: A Guide to Developmental Psychology*. New York: Routledge.
- Sprague, Caryll M., Maryam Kia-Keating, Erika Felix, Tamara Afifi, Gilbert Reyes, and Walid Afifi. 2015. Youth Psychosocial Adjustment Following Wildfire: The Role of Family Resilience, Emotional Support, and Concrete Support. *Child & Youth Care Forum* 44: 433–50. [\[CrossRef\]](#)

- Sugarman, David B., and Gerald T. Hotaling. 1997. Intimate violence and social desirability: A meta-analytic review. *Journal of Interpersonal Violence* 12: 275–90. [[CrossRef](#)]
- Walper, Sabine, and Julia Reim. 2020. Young People in the COVID-19 Pandemic: Findings from Germany. *International Society for Study of Behavioral Development Bulletin* 78: 18–20.
- Wang, Guanghai, Yunting Zhang, Jin Zhao, Jun Zhang, and Fan Jiang. 2020. Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet* 395: 945–47. [[CrossRef](#)]
- Wang, Ming-Te, Daphne A. Henry, Juan Del Toro, Christina L. Scanlon, and Jacquelin D. Schall. 2021. COVID-19 employment status, dyadic family relationships, and child psychological well-being. *Journal of Adolescent Health* 69: 705–12. [[CrossRef](#)]
- WHO (World Health Organization). 2020a. *WHO Director-General's Opening Remarks at the Media Briefing on COVID-19—11 March 2020*. Geneva: World Health Organization.
- WHO (World Health Organization). 2020b. *Coronavirus Disease 2019 (COVID-19) Situation Report—72*. Geneva: World Health Organization.
- WHO (World Health Organization). 2020c. *COVID-19 Weekly Epidemiological Update Edition 76, Published 25 January 2022*. Geneva: World Health Organization.