Article
Subjective and Objective Insecurity in Spanish Cities

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Abstract: This article related crime rates to social risk factors and to the feeling of insecurity in Spain. The first finding of this study, financed by National I + D Plan CSO2016-77549-P, AEI-FEDER, was the direct relation between crime rates and some sociodemographic factors such as population, unemployment, urban land area, and hotel occupancy, based on the question of which social risk factors correlate to crime rates. The second finding was that social factors drive citizens' feelings of insecurity, according to whether feelings of insecurity are linked to crime rates or perceived risk factors. The research was based on a quantitative methodology, using two data sources: reworked official statistics treated by HJ-Biplot analysis; a 2019 CATI survey with N = 3904, sample error between 5.2% and 3.7% according to territory, 95% confidence level. The main conceptual conclusion of the study was the link between well-being and security. The main methodological contribution was the application of HJ-Biplot analysis to the social sciences.

Keywords: security; feeling of insecurity; well-being; emotional intelligence; Spain; social risk factors; HJ-Biplot; uncertainty

1. Introduction

Developed Western societies live in a constant contradiction in terms of citizen security. Whereas these societies are currently enjoying the highest levels of objective security recorded, their citizens feel more insecure, threatened, and vulnerable than ever [1–3]. This discrepancy has continued to widen in recent decades [4–7].

The paradox manifesting in all advanced Western societies is that while crime rates (objective insecurity) are going down, feelings of insecurity (subjective insecurity) are going up, which is particularly apparent in Spain (http://ec.europa.eu/eurostat/web/crime/data/database accessed on 23 June 2021). Spain, in objective terms, is one of the safest countries in Europe, yet its citizens register feelings of insecurity that are above the European average [8]. The reasons for this could be general (Spain's welfare state is less advanced than other European countries), and specific (Spain does not include the development of emotional intelligence in the school curriculum as much as its continental neighbors). The debate on whether to train infant and primary school teachers in emotional intelligence is ongoing [9].

Insecurity, as in the absence of security, can be studied from an objective or subjective approach. Objectively speaking, this refers to objective security or objective insecurity, the opposite being a perception or feeling of the same, or subjective security or subjective insecurity. Improving emotional intelligence could be a good way to help offset feelings of subjective insecurity [10].

Many studies have attempted to explain the imbalance between the objective data on security and citizens' feelings of insecurity, yet there is still no unanimously agreed definition of what citizen security is, in Spain or worldwide [11,12].

This could be due to the fact that much research insists on identifying citizen security exclusively with objective security. Such research has steered clear of the issue of subjective

notions of security [13–20]. Another aspect of the issue that has been neglected is measuring the level of emotional intelligence deployed by people when they feel secure or insecure.

López [21] (p. 40) defined citizen insecurity as comparable to objective insecurity: "Objective insecurity considers the level of real risk". Here, Lopez omitted from the citizen insecurity concept the social and economic problems that can foster and enhance this feeling, if it exists. This consideration is neither new nor unique to López; in fact, a sizeable number of authors of all nationalities exclude these aspects from the criminal dimension.

Other researchers, and also in Spain, take the opposite view and emphasize the need to include social-urban aspects, e.g., unemployment, poverty, and exclusion, among others, to explain objective insecurity. These authors consider that all such aspects combine to form two interesting considerations: on the one hand, the fomenting of social uncertainty among residents of a certain area and, on the other, their belief that social-urban aspects, unemployment, poverty, and exclusion are indicators that explain objective citizen insecurity.

Morales-Bermúdez and Ruíz [22] emphasized that any study of objective insecurity must embrace a range of factors, including economic, demographic and educational factors, as well as the issues of drugs, human capital, policing, and incarceration, all of which influence criminality.

The conceptual framework of this present article described these economic and demographic factors, together with a range of social problems, as Social Risk Factors.

When these social risk factors create situations that threaten a person's quality of life, this generates uncertainty, understood to mean a perception of the future that is fearful and worrisome. The various forms of social inequality, when basic needs are not met, or when people are prevented from exercising their inherent social rights, enhance the feeling of uncertainty, and hence, the feeling of insecurity among individuals [23]. This feeling can be confronted as a limitation or as an opportunity, depending on the level of emotional intelligence or socio-economic skills of the individual.

Some of the works consulted for this work ignore social risk factors. Others refer to them in the context of objective insecurity. Both cases sidestep the relation between these types of socio-economic circumstances or social risk factors and subjective insecurity [3,24–30]. The conclusion drawn from the bibliographic search that informed this theoretical framework is that the concept of subjective insecurity is usually equated with only one of the constructs of subjective insecurity: fear of crime.

This article matches the feeling of insecurity to subjective insecurity, understanding it to be the sum of two parts, these being traditional subjective insecurity or fear of crime, and life's uncertainties (Figure 1) [1,3,31–33].
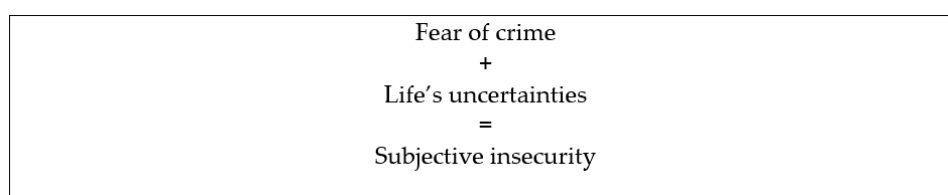
Fear of crime
+
Life's uncertainties
=
Subjective insecurity

Figure 1. Synthetic concept of subjective insecurity.

Figure 2 is a constitutive analysis of these two parts.

The "fear of crime" construct consists of two dimensions: "objective" fear of crime resulting from previous experiences of victimization [34,35], and "subjective" fear of crime [36], represented by fear of being a victim of a hypothetical crime [37,38]. The traditional scientific literature labels these two dimensions combined as subjective insecurity.

The second construct that defines subjective insecurity is the concept of life's uncertainties. Uncertainty is formed of two dimensions: "the insecurity generated in people by the context they inhabit; (.../...) and the situations experienced in their private lives" [39]. The uncertainties of context are determined by the socio-economic features of the individual's social environment. The uncertainties regarding personal quality of life are configured by the life circumstances that determine an individual's personal well-being. The keys to

managing individual uncertainties could be in the development of the socio-emotional competences that define an emotionally stable, confident, and socially efficient personality [40].
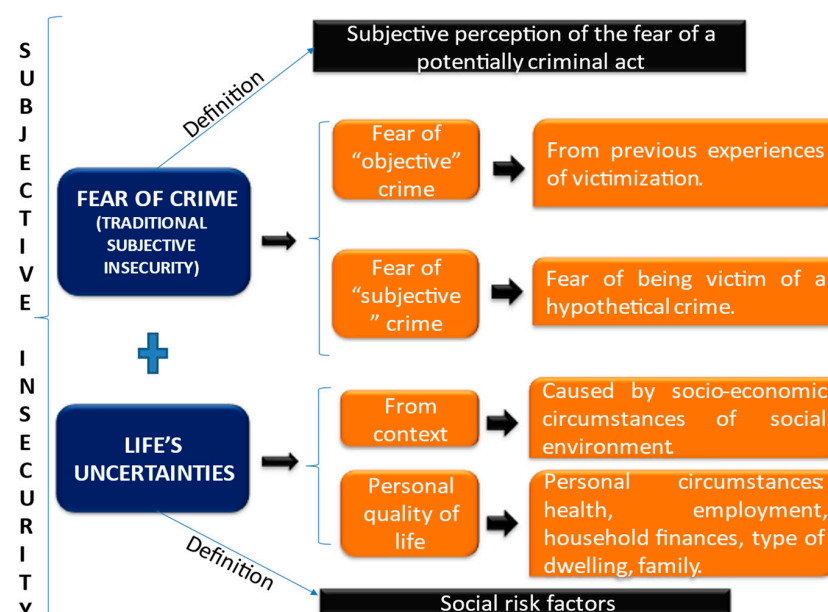

Figure 2. An analytical conceptualization of subjective insecurity analyzed constitutively. Sources: authors.

This article proposes a broadening of the perspective in research on citizen security to include the key socio-economic variables that foment insecurity in citizens, which is in line with the principles of human development set out in the UN's Agenda 30, and which emphasize human security as a key element for system sustainability.

The few empirical studies that measure the effects of social risk factors on people's sense of security in their own environments are rooted mainly in British or North American settings [41], where studies have been carried out on group behavior in small cities. In Spain, only a few investigations have centered on these settings [42]. This work aimed to examine the link between the feeling of insecurity (subjective insecurity), crime rates (objective insecurity), and social risk factors in the cities studied. The development of emotional intelligence skills could be a way to limit citizens' fear of potential negative consequences, and, in particular, a way to diminish the feeling of insecurity.

After conceptualizing the terms on which this article is based, and indicating this research's contributions to the fields of criminology, sociology, and academia in general, we present the results of this quantitative study on objective and subjective insecurity in some cities in Spain.

2. Objective and Hypothesis

Objective: to study the relation between objective insecurity, social risk factors, and subjective insecurity in some cities in Spain.

Hypothesis 1 (H1). *social risk factors have a variable relation to objective insecurity and a direct relation to subjective insecurity.*

3. Method and Materials

The results of this study were obtained by two quantitative analyses:

An HJ-Biplot analysis to study the characterization of objective insecurity in 52 Spanish cities, based on social risk factors.

A comparison using a relational analysis of the results of the initial mining of the data from a CATI survey designed to measure the feelings of insecurity among Spanish citizens.

3.1. HJ-Biplot Analysis

HJ-Biplot is one technique among the various interdependence methods; it was used here to enable us to classify and locate the cities and variables spatially in three-dimensional graphs.

These analyses were based on the following:

A. Sample: economic and sociodemographic data from Spain's provincial capitals (2017, 2018, 2019).
B. Sources: Spain's National Statistics Institute (INE), Ministry of the Interior (MI), and Ministry of Territorial Policy and Civil Service (MPTFP).
C. Study settings and variables:

○ Settings: Spain's provincial capitals: Albacete, Alicante, Almería, Ávila, Badajoz, Bilbao, Burgos, Cáceres, Cádiz, Castellón de la Plana, Ciudad Real, Córdoba, A Coruña, Cuenca, San Sebastián, Girona, Granada, Guadalajara, Huelva, Huesca, Jaén, León, Lleida, Logroño, Lugo, Málaga, Murcia, Ourense, Oviedo, Palencia, Palma de Mallorca, Las Palmas de Gran Canaria, Pamplona, Pontevedra, Salamanca, Santa Cruz de Tenerife, Santander, Segovia, Sevilla, Soria, Tarragona, Teruel, Toledo, Valencia, Valladolid, Vitoria-Gasteiz, Zamora, Zaragoza, Madrid, Barcelona, Ceuta, and Melilla.

○ Economic and sociodemographic variables: The selection of these variables was conditioned by the data available in the official statistics in Spain. The data for the cities of Huesca, Segovia, Soria, and Teruel for some indicators (*) are based on figures for 2016, in the absence of more recent data.

1. POBLACION: Number of inhabitants residing in the provincial capitals. Source: INE, Municipal Register, 2019.
2. DENSIDAD: Quotient of number of inhabitants and total square kilometers pertaining to the provincial capital. Source: INE, Municipal Register, 2019/INE, Urban Indicators, 2017.
3. CRIMI: Rate of criminal offenses. Sources: MI, Criminality Assessment Report, 2019.
4. SUPURB: Urban land area, km2.
5. OCUHOTELERA: Number of hotel bed occupancies estimated for tourist spots in August 2018. Sources: INE, Survey of Hotel Occupancy, 2018.
6. PAROCAPIT (*): Unemployment rate in provincial capitals. Source: INE, Urban Indicators, Economically Active Population Survey, 2018.
7. ABANESCOLAR: Percentage of individuals under 34 that do not study, and who left school at the legal school-leaving age or under, among the total number of individuals of that age group in the province. Source: INE, Economically Active Population Survey, 2019.
8. MAYOR65: Proportion of individuals older than 65. Source: INE, Continuous Municipal Register, 2019.
9. EDADMEDIAN (*): Mean age of the population in years. Source: INE, Urban Indicators, 2017.
10. PROPEXTRAN1-EU: Proportion of non-native residents in Spain originating from non-EU countries. Source: INE, Municipal Register, 2019.
11. PROPEXTRAN2-EU: Proportion of non-native residents in Spain originating from EU countries. Source: INE, Municipal Register, 2019.
12. TAMHOG (*): Average size of dwellings. Source: INE, Urban Indicators, 2017.
13. HOGARUNIPER (*): Proportion of single occupancy dwellings versus total number of dwellings. Source: INE, Urban Indicators, 2017.

14. TASAPOL: Rate of police officers/population: Number of police officers per 100,000 inhabitants. Source: MPTFP, 2018.
15. RENMEDIAHOG (*): Average annual household income. Source: INE, Urban Indicators, 2017.

D. Method: the HJ-Biplot statistical method was applied to the socio-economic and demographic variables described above. HJ-Biplot [43] has several advantages over the more traditional JK-Biplot and GH-Biplot methods, which maintain the same representative quality for the matrix rows and columns [44,45].

HJ-Biplot is a multivariate graph representation of the data of an Xnap matrix, with j1, ... jn markers for rows and h1, ... hp markers for columns. The j1, ... jn and h1, ... hp indicators can be superimposed in the same reference system with maximum representative quality. The presentation of rows and columns with equal goodness of fit facilitates the interpretation of the position of the rows and columns, and this superimposition also helps identify the relation between the markers of the rows and columns [46–52].

HJ-Biplot interpretation is based on a set of rules used in other multivariate statistics reduction techniques, such as factor analysis, multidimensional scaling, correspondence analysis, and classic Biplots [53].

The geometric understanding of Biplots is based on geometric concepts on a representation of Cartesian plane axes [43,54].

HJ-Biplots enable us to interpret distance in terms of similarity between the row indicators (Spanish cities) and the proximity of the column indicators (variables) in covariation terms. In the interpretation of the results, the greater the distance between the row markers and the origin (Cartesian plane center of gravity), the greater the variability between the Spanish cities. In other words, the Spanish cities will possess a strong representative quality. Likewise, the order of the orthogonal projections of each row indicator on a column indicator (the position of a Spanish provincial capital in relation to a socioeconomic or sociodemographic variable) reproduces the order of the elements of the starting matrix.

These facts allow us to analyze the positions of the projections of the row indicators, and order them according to the position they reach at the moment of projection onto the column indicator.

Other aspects to be considered when interpreting the HJ-Biplots relate to the vectors:

- The direction of the vectors shows where column indicator variability increases, approximating the length of the vector to the standard deviation of the socioeconomic or sociodemographic variables.
- The angle cosine formed between two vectors shows the correlation between variables. The acute angles indicate a positive correlation, and the right and obtuse angles a null and negative correlation, respectively.

The statistical analysis was carried out using Multbiplot software [55] for matrix programing (Matlab 2018b). The data were located in an 52×15 matrix contained in the rows of the 52 Spanish provincial capitals and in the columns of the 15 socioeconomic or sociodemographic variables analyzed. Thus, for each i row (each provincial capital) and each j column (variable), there is a data matrix with an xij value that represents the value of that capital j for each variable i. The data were standardized by columns due to the plurality of the variables' measurement units. Those Spanish provincial capitals with a representative quality of less than 250 were omitted from the factor graphs.

The coordinates for the provincial capitals obtained in the first step by HJ-Biplot analysis were used for the cluster analysis by the K-means clustering algorithm with Euclidean distance. This enabled us to classify these cities according to their similarity in relation to the variables analyzed, and the results allowed us to characterize each of the clusters in relation to the variables analyzed.

Methodologically, HJ-Biplot analysis was shown to be suitable for associating a set of variables among themselves and with specific territories. This article's main contribution to previous methodological studies performed with HJ-Biplots is the application of this ana-

lytical methodology to criminology, a field to which HJ-Biplots are not traditionally linked.

3.2. Analysis Compared to Survey Data

The second type of analysis from which this articles drew its conclusions is a comparison of the results from the HJ-Plot analysis to data extracted from the 2018–19 Insecurity Survey (I+D Nacional, CSO2016-77549-P).

The survey specifications were as follows:

- Total number of people surveyed for the sample: 3904
- Distribution: 15 survey points among Spain's provincial capitals.
- Provincial capitals that provided data: Madrid, Sevilla, Zaragoza, Pamplona, Salamanca, Badajoz, San Sebastián, and Tarragona. The cities represented in this article provide the following subsamples: Tarragona (N = 352), San Sebastián (N = 351), Badajoz (N = 351), and Madrid (N = 704).
- Sample error and level of confidence: the sample error is 5.2% for Tarragona, San Sebastián, and Badajoz, and 3.7% for Madrid, for a confidence level of 95%.
- Field survey in three successive waves (June 2018, January and June 2019).
- Analysis variable: "scale of security" used in the questionnaire to obtain data on the feeling of insecurity among those surveyed in each of the provincial capitals: P7a. "If TOTALLY insecure is 0 and TOTALLY secure is 5, which value represents your feeling?" This variable was recoded as barely secure or not at all secure (0–1), neither secure no insecure (2–3), and quite secure and totally secure (4–5).

4. Results

The first results presented here are those obtained from a HJ-Biplot analysis. The statistical data compiled from the social risk factors studied correlate to the crime rate found in the Spanish provincial capitals. Thus, the main strength of this analysis is the synchronous, spatial, and three-dimensional visualization of all the factors studied in each of the provincial capitals represented.

Three axes were selected from all the axes obtained for a first analysis. These geometric Cartesian axes correctly characterized the behavior of the cities in relation to the different socioeconomic variables studied, and presented a high cumulative inertia of 70.29% (Table 1). The three values that corresponded to each axis were relatively separate; the first explained 31.92% of the variability, the second, 28.29%, and the third 10.07%.

The information for the columns in each axis (Table 1) clearly shows that the variables or social risk factors were well represented on the factor plane formed of axes 2–3 because the variables possess greater discriminant power on this plane. Thus, statistically, the interpretations should be based on that plane graph representation, although the information provided by the plane formed of axes 1–2 should also be considered.

Table 1. Quality of the representation for the columns.

Column	Variable	Axis1	Axis2	Axis3
1	PROPEXTRA1(-UE)	174	488	789
2	PROPEXTRA2 (UE)	176	202	630
3	CRIMI	324	766	767
4	POBLACIÓN	586	715	855
5	DENSIDAD	401	473	495
6	SUPURB	591	723	827
7	PAROCAPIT	335	553	820
8	ABANESCOLAR	339	657	680
9	MAYOR65	221	875	881
10	EDADMEDIAN	123	859	876
11	TAMHOG	279	705	729
12	HOGARUNIPER	179	651	651
13	RENTAMEDIAHOG	360	440	514
14	OCUHOTELERA	641	798	880
15	TASAPOL	31	34	52

Note: The gray color indicates the axes in which the variables have greater discriminating power.

4.1. Analysis of Impact and Collaboration, Plane 2–3

Figure 3 shows the plane 2–3 factor graph from the HJ-Biplot analysis (explained inertia 38.36%). The vectors represent the socioeconomic indicators or social risk factors. The points represent the provincial capitals.

The first quadrant contains the socioeconomic indicators with a high correlation between them, if the quality of the representation is considered (Table 1). The indicators for level of unemployment (*parocapit),* number of inhabitants (*población),* urban land area in square kilometers (*supurb),* estimated tourist hotel occupancy rate *(ocuhotelera), density (densidad),* and crime rate (*crimi*) were strongly interrelated, which the large acute angle in the graph in Figure 3 demonstrates.

Crime rate (*crimi*) was the variable with the greatest discriminatory power among the cities on factor axis 2. The cities with a higher crime rate are situated on the right of Figure 3 (positive values), with cities with a lower crime rate on the right (negative values). The left/right location for the crime rate on the graph enables us to interpret these data as a whole, or individually, for each indicator.

The data situated along the various quadrants in Figure 3 facilitate the interpretation of the indicators as a whole. Crime rate is located in the first quadrant, with the second, third, and fourth quadrants situated anticlockwise. The first and fourth quadrants contain the most significant results.

In the first quadrant, the relation between the crime rate indicator and the other variables was significant. The three variables whose vectors mark the most acute angle to a higher crime rate were high population density, high hotel occupancy rate, and large urban land area, which implies a strong correlation between them, as was the case in Madrid and Barcelona.

Cities that receive the most tourists also presented a higher rate of crime, as is shown by their correlation with the highest number of hotel beds (*ocuhotelera*) variable. Madrid and Barcelona, for their size and importance, are the cities where this phenomenon was most apparent. Sevilla and Málaga, which are among the next five most popular tourist destinations in Spain, are also represented in the first quadrant.

To a lesser extent, crime correlates with the rate of unemployment (an almost right angle). Both variables were influential in cities such as Madrid and Barcelona (the cities furthest removed from the gravity point). Córdoba, Ceuta, Huelva, and Almería, which are among the five cities with the highest unemployment rates in Spain, were also located in this quadrant.

In the fourth quadrant, the crime rate indicator was strongly and directly related (acute angle) to three variables: larger dwellings and, to a lesser extent, a higher proportion of non-native residents in Spain and the lowest mean annual income per household. Of particular interest is the correlation in some cities in the quadrant such as Girona and Palma de Mallorca, both well known as important tourist destinations and for the number of permanent foreign-born residents.

HJ-Biplots, by principal component analysis through singular value decomposition, aim to reduce the dimensionality of a data set in order to retain the largest quantity of information, generally on two factor planes (standardized data). In the factor plane 2–3 figure, the school dropout rate indicator would appear to be close to crime rate, yet it is not. The projection of the school dropout rate remains remote from the group of variables indicated in the first quadrant. This interpretation would be obvious in the three-dimensional plane.

Observing the indicators individually, we see that Madrid, Barcelona, and Valencia record high rates of crime. Cities in the south of Spain, in particular Córdoba, Almería, and Huelva, have high school dropout rates. In Palma de Mallorca and Girona, the percentage of medium-sized dwellings and the proportion of foreign residents is greater than in the rest of the cities. In contrast are, the following indicators:

○ People over the age of 65;
○ Single-occupancy households;

○   Average age of the population.

These indicators scored highly (above the mean) in cities in the north and center of the country, particularly in Salamanca, Zamora, and San Sebastián. The obtuse angle in relation to the vector for crime shows a low crime rate in these cities (quadrants 2 and 3).
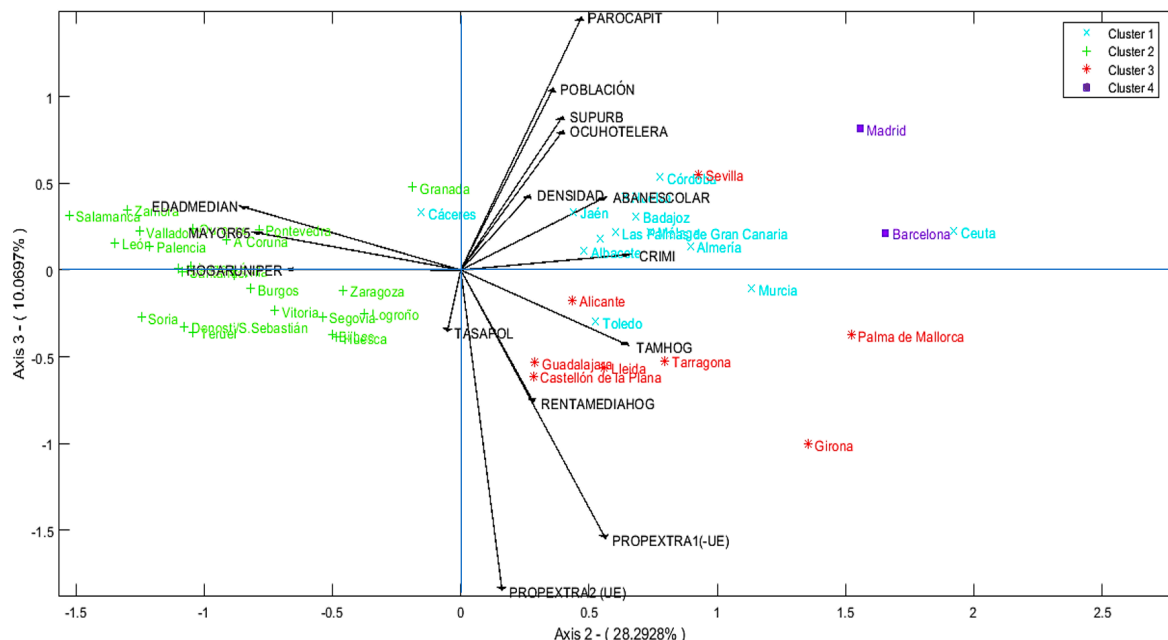

Figure 3. HJ-Biplot factor representation, plane 2–3. Note: Order of the quandrants: 1st—upper right, 2nd—upper left, 3rd—lower left, 4th—lower right. The figure shows those centers with a represenational quality equal to, or greater than, 240 points.

4.2. Impact and Collaboration Analysis, Plane 1–2

The analysis of plane 1–2, as shown in Figure 4, confirms the results of the interpretation of plane 2–3. Table 2 shows that the accumulated inertia in plane 1–2 is 60.2%. The indicators reflect group behavior similar to that described in factor plane 2–3. The data from this graph provide a global interpretation of the indicators. The quadrants are interpreted in order of greater to lesser relevance.

The most significant results are observed in the second quadrant, as shown in Figure 4. The *poblacion* (population), *densidad* (density), *supurb* (urban land area), *ocuhotelera* (estimated hotel occupancy), and *crimi* (crime rate) variables all showed a strong, direct correlation, which corroborates their reciprocal influence.

Table 2. Vectors of mean scores of the clusters (centroid)—Spanish provincial capitals.

	Propextra1(-UE)	Propextra2(UE)	Crimi	Población	Densidad	Supurb	Parocapit	Abanescolar
clúster	mean	mean	mean	mean	mean	mean	mean	mean
1	12.10	4.76	9.99	2,451,444	10,649.19	85.39	10.68	29.55
2	9.94	4.43	6.12	334,816	2697.40	13.74	16.86	37.93
3	5.13	2.53	3.65	171,622	2248.75	6.81	12.17	30.37
4	4.17	1.40	4.18	188,738	1105.15	4.87	20.81	42.04
	MAYOR65	EDADMEDIAN	TAMHOG	HOGARUNIPER	RENTAMEDIAHOG	OCUHOTELERA		TASAPOL
clúster	mean	mean	mean	mean	mean	mean		mean
1	21.05	44.00	2.00	31.50	39,038	82,094		101.08
2	17.74	42.44	2.78	29.00	30,848	13,049		122.89
3	22.50	46.35	2.13	30.91	31,483	3529		120.78
4	16.53	42.29	2.93	27.07	28,752	3324		156.92

Source: Authors, based on HJ-Biplot analysis by clusters, plane 2–3.

Crime rate stands out for its greater presence in cities with a high proportion of foreign residents of EU origin. The *crimi* variable, with the other second-quadrant indicators, had a combined effect on the major urban centers, such as Barcelona, Madrid, and Valencia.

Cities such as Palma de Mallorca, Sevilla, Girona, and Tarragona presented a strong relation between the crime rate variable and the high proportion of non-EU foreign residents. This is emphasized by the sharply acute angle between the vectors of both variables.

In plane factor 1–2, first quadrant, the crime rate had a null correlation with the rest of the variables. The superimposition of the vector on school dropout rate with other vectors is clearer to see than in plane factor 2–3, since it is impossible to perceive the three-dimensionality of the Biplot analysis on the Cartesian axes plane. In addition, plane factor 1–2, first quadrant, more clearly revealed the influence of the early school dropout rate on cities such as Córdoba, Almería, and Huelva. The unemployment rate vector also affects these three cities, which are among the five cities with the highest unemployment rate in Spain.
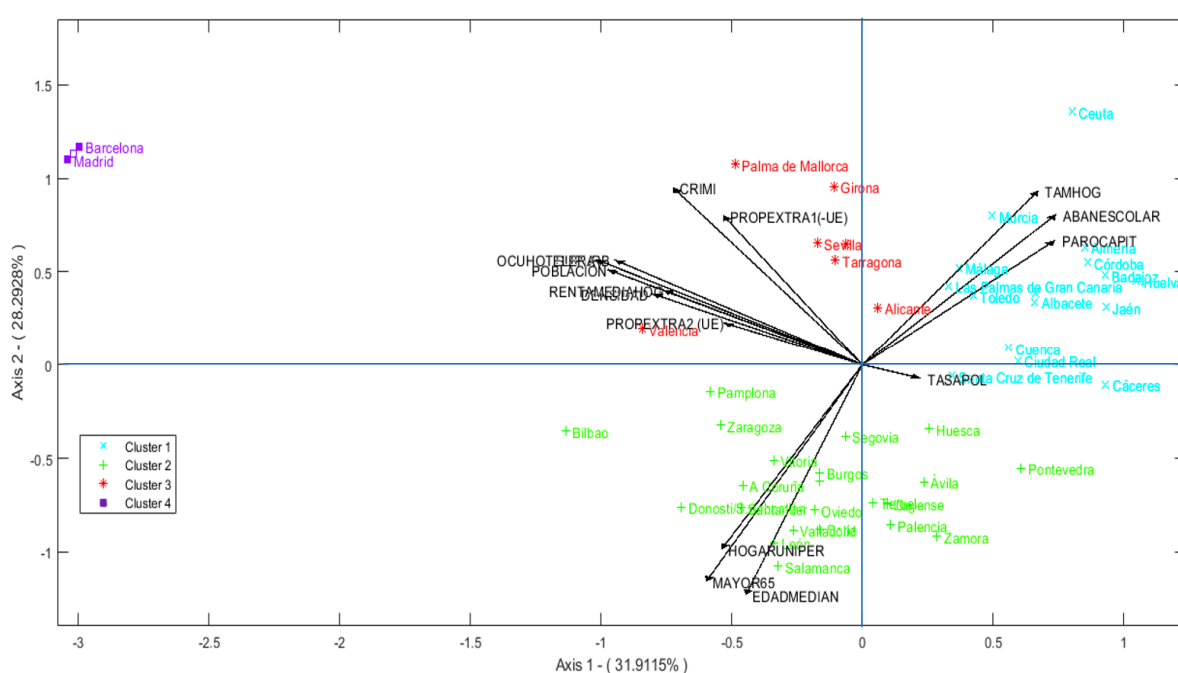

Figure 4. HJ-Biplot factor representation, plane 1–2. Note: Order of the quadrants: 1st—upper right, 2nd—upper left, 3rd—lower left, 4th—lower right. The figure shows those centers with a representational quality equal to, or greater than, 240 points.

Salamanca, Zamora, and San Sebastián are represented in the third and fourth quadrants. In these cities, in plane 1–2, the indicators for percentage of inhabitants over 65, number of single occupancy households, and mean age of population exert greater influence. These indicators, represented as vectors in Figure 4, tended towards an obtuse angle relative to the crime rate variable, which can be interpreted as a negative correlation between them, that is, it can be stated that the crime rate will fall as the following rise:

- the proportion of people over 65;
- the number of single occupancy households (in this case linked to senior citizens);
- mean age of the population.

5. Cluster Analysis and Discussion

The clusters were calculated by Biplot coordinates using the Euclidean distance and K-means method. Figure 5 (plane factor 2–3) shows that four clearly defined clusters were obtained.

The HJ-Biplot by clusters clearly shows the spatial behavior of the set of variables considered (social risk factors) in different cities.

In Figure 5, the variables are grouped according to the relation established between them. In each group of variables, the relation was strong and direct. The variables in the first quadrant, in blue, exercise their group action (acute angle) on cluster 1, formed of Madrid and Barcelona, with a presence that exceeds the mean.

Cluster 3, in red, confirms its relation with the following variables: mean age *(edadmedian)*; proportion of the population over 65 *(mayor65)*; proportion of single occupancy households *(hogaruniper)*.
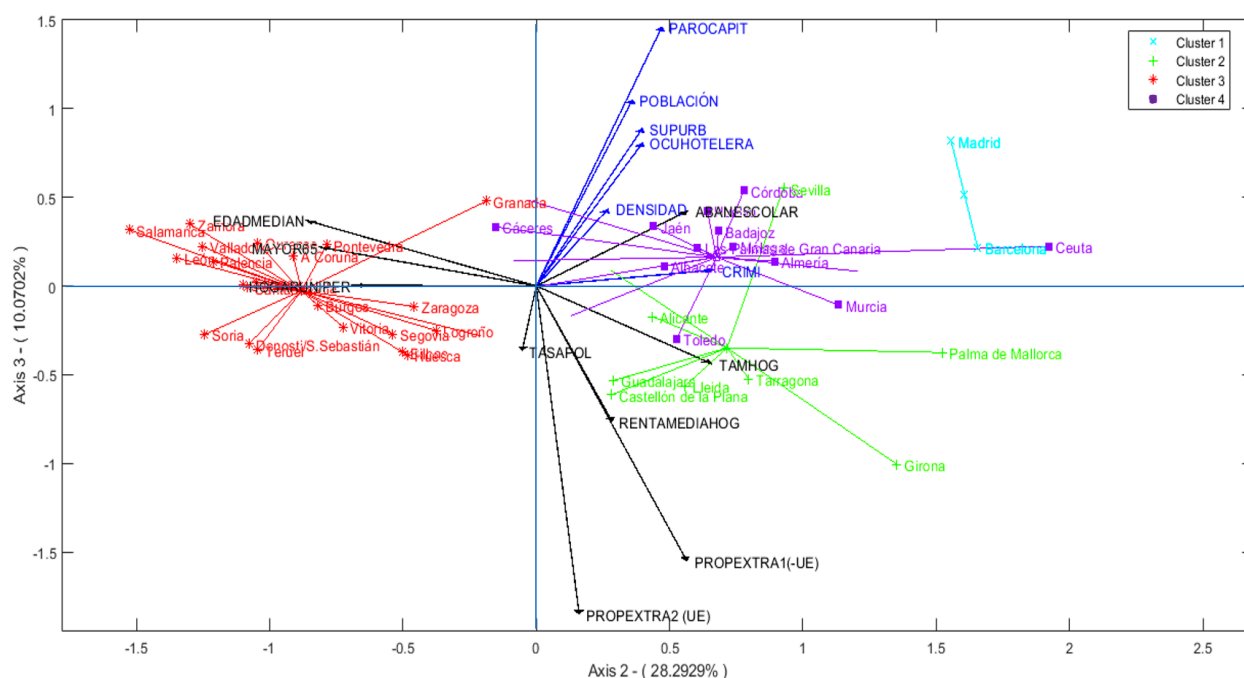

Figure 5. HJ-Biplot factor representation by clusters, plane 2–3. Note: Order of the quadrants: 1st—upper right, 2nd—upper left, 3rd—lower left, 4th—lower right. The figure shows those centers with a representational quality equal to, or greater than, 240 points.

The use of clusters within the Biplot analysis enables the grouping of territories that share the same behavior in relation to the social risk factors used. This analysis yielded a typology of Spain's provincial capitals. The spatial distribution provided by the Biplot analysis by clusters showed four different city groupings, as shown in Figure 5. Each model presents the correlation between the various social risk factors, including crime rate, in each group of cities of the clusters.

Table 2 shows the mean scores underpinning the graph's vectors for each cluster. This table provides a clearer vision of the variables most differentiated among the clusters.

The groupings of the cities generated in the various clusters related to subjective security, so we checked whether the results in the questionnaire on feelings of security differed within each of these groupings. The data obtained were from the 2018–2019 survey on security presented in the methodology. The sample totaled 3904 individuals distributed in subsamples in various cities across Spain. The subsamples were randomized and representative for sex and age of population in each city.

For the comparative analysis of the data, one city for each cluster was selected with attention to the most statistically significant results (based on Jhi^2) from crossing the data of the cities with the degree to which those surveyed felt secure. According to the Jhi^2 statistic, the municipality and degree of security variables had a statistically significant association, with $Jhi^2 = 55.512$, g.l. = 21, and with a *p*-valor = 0000 < 0.005.

Table 3 presents in column percentages and Jhi^2 values the responses to the question on feelings of security in the cities selected: Madrid, Tarragona, San Sebastián, and Badajoz.

Table 3. Feelings of security in a selection of Spanish cities.

% Verticals Jhi² value		Clúster 1 Madrid	Clúster 2 Tarragona	Clúster 3 San Sebastián	Clúster 4 Badajoz
Total	3904	742	352	351	351
P7A_2_2	3865	730	350	351	349
Barely secure, not at all secure	13.3	14.0 0.27	19.1 9.09	10.5 1.97	11.5 0.86
Neither secure nor insecure	35.4	37.9 1.29	36.9 0.20	29.9 3.03	35.2 0.00
Quite or totally secure	51.3	48.1 1.46	44.0 3.62	59.5 4.67	53.3 0.28

Source: Authors. Insecurity Survey, June 2018/2019. Note: the value of the test statistic (Jhi²) is a measure of the difference between the frequencies observed and expected; thus, the greater the difference, the easier it will be to reject the null hypothesis. The total of row frequencies does not coincide with the sum of frequencies for each of the cities, because only four were selected from those that form this "municipality" variable.

In Table 2, Madrid (cluster 1) is characterized by the highest mean score for:

○ proportion of foreign residents (EU and non-EU);
○ number of inhabitants;
○ population density;
○ urban land area;
○ mean annual household income;
○ hotel occupancy rate;
○ single-person households.

Madrid presented the second highest mean of the four cities studied for population over 65 and mean age of the population.

Cluster 1, as shown in Table 2, is characterized by the lowest mean for:

○ unemployment rate;
○ school dropout rate;
○ number of police officers;
○ household size.

Madrid is characterized by the highest crime rate among the four cities analyzed. Yet, the inhabitants of Spain's capital state that they do not feel insecure. The results of the survey show that Madrid's inhabitants felt "quite secure or very secure" (48%) or "neither secure not insecure" (37.9%); only 14.1% of those polled felt insecure.

The scientific literature on crime provides some interesting perspectives that could explain this behavior [37,56].

○ Inhabitants of big cities are anonymous citizens.
○ This anonymity favors criminal activity.
○ There is a greater probability of being a victim of crime in urban areas than in rural areas.
○ Population density is a strong determinant of crime.

Traditional discourse on crime rates insists that the higher the crime rate, the lower the feeling of security, which does not fit with the results described in this article (Table 3). Madrid's citizens feel more secure than insecure despite the high level of crime in their city. The explanation for this could be in the behavior of the social risk factors in Madrid as opposed to those in other Spanish cities (Table 2): lower rates of unemployment and school dropouts, a higher number of EU and non-EU foreign residents, and a higher per capita household income [36].

Cluster 2 stands out for having none of the highest means in any of the variables in Table 2. Nearly all the social risk factors appear in this cluster as the second highest mean—except three, in third place (mean age, single-person households, and household income)—Cluster 2 contains the results for the city of Tarragona.

In Table 2, Tarragona (cluster 2) is characterized by the second highest mean for:

○ proportion of foreign residents (EU and non-EU);
○ number of inhabitants;
○ population density;
○ urban land area;
○ unemployment rate;
○ school dropout rate;
○ size of dwelling;
○ hotel occupancy rate;
○ number of police officers.

In Table 2, Tarragona (cluster 2) is characterized by the second lowest mean for:

○ average age of population;
○ single-person households;
○ household income.

Tarragona is characterized by the second highest crime rate among the four cities analyzed. The inhabitants of Tarragona feel more insecure than the rest of the country.

Those surveyed in Tarragona are the ones who most feel barely secure or not at all secure (19.1%). Only 44% of those polled in this city feel quite secure or very secure, the lowest percentage of the four cities analyzed. The fundamental difference is that the rate of unemployment, school dropout rate, and police numbers are high, unlike in cluster 1, where they are low.

From a criminology perspective, cluster 2 presents some interesting aspects, such as the clear relation between the social risk factors and the two dimensions of citizen security (objective and subjective). Objectively, the high rate of crime again relates to the variables of anonymous criminal activity that affect big cities. Subjectively, high unemployment and high school dropout rates relate to stronger feelings of insecurity.

A high unemployment and school dropout rate, as well as correlating to stronger feelings of insecurity, have also been indicated by researchers as a source of criminal activity [37,56]. Thus, the psychological effect of the unsuccessful search for work generates a sense of hopelessness as a ramification of social uncertainty. Dropping out of school leads young people to indulge in unstructured social activities that set them apart from the rest of the citizenry, which generates a feeling of vulnerability in the population.

The number of police officers as a formal tool for law enforcement is accentuated in those areas where the social mechanisms of informal control have failed to perform adequately. The demand for greater police presence, or the sudden rise in the number of police officers in particular areas, is often the result of subjective levels of insecurity or uncertainty in the face of possible victimization.

Cluster 3 shows some aspects that differ from the first two clusters. In this case, the city of San Sebastián has the smallest population of the four cities studied, and registered the highest mean score for:

● proportion of citizens over 65;
● average age of the population.

San Sebastián (cluster 3) ranks second highest for:

● proportion of one-person households;
● mean annual household income;
● hotel occupancy rate.

San Sebastián (cluster 3) ranks second lowest for:

● proportion of foreign residents (EU and non-EU);
● population density;
● urban land area;
● unemployment rate;
● school dropout rate;

- size of dwelling;
- number of police officers.

San Sebastián also stands out for the lowest mean crime rate of the four cities analyzed. The survey showed that the inhabitants of San Sebastián feel more secure than the rest of the urban population of Spain (quite secure or totally secure, 59.5%). In this city, only 10.5% felt barely secure or not at all secure, the lowest level of the four cities.

Some criminologists acknowledge the "older people-low crime rate" phenomenon, and attribute this to this cohort's reluctance to report criminal acts, and their reduced exposure to crime. Nevertheless, Thomé [37] stated that while it is true that this age group is less likely to be the victims of crime, they also register the highest levels of perceived insecurity as uncertainty. According to Thomé, this insecurity in the form of uncertainty is due to the physical vulnerability that older people perceive in themselves, among other aspects. To counter this feeling, the elderly take preventive measures such as not leaving the house or frequenting certain areas of the city, and restricting the time they spend outside.

In San Sebastián, despite the high proportion of over 65s, the percentage in relation to feelings of security is high, possibly explained by the fact that the uncertainty generated by physical vulnerability is offset by a high mean annual income and good socio-sanitary care.

Finally, cluster 4 presents some interesting aspects in relation to the results for the social risk factors and those surveyed in Badajoz.

In Table 2, Badajoz (cluster 4) is characterized by the highest mean scores in:

- unemployment rate;
- school dropout rate;
- medium household size;
- number of police officers.

This provincial capital ranked third of the four cities studies in terms of population size. In Table 2, cluster 4 is characterized by the lowest mean scores for:

- proportion of foreign residents (EU and non-EU)
- population density;
- urban land area;
- proportion of people over 65;
- average age of population;
- proportion of single-person households;
- mean annual household income;
- hotel occupancy.

Badajoz is characterized by a medium-to-low crime rate, and occupies third place among the four cities analyzed; yet, its inhabitants state that they feel secure (quite or very secure, 53.3%) against 11.5% who feel barely or not at all secure. Considering the values of all the cities analyzed, Badajoz is the city with the second highest rate of subjective security.

The scientific literature on criminology emphasizes the incongruence that occasionally manifests in the inverse correlation between the objective and subjective dimensions of crime. In this case, the lack of dense macro-geographical spaces, as in clusters 1 and 2, confirms lower crime rates. Additionally, the absence of more densely populated scenarios, together with low migratory flows, encourages greater social interrelation and, with it, greater informal control. The confluence of these factors propitiates a stronger perception of stability and social security. This sense of security is countered by two factors with very high mean scores (higher than the rest of the cities), namely, rates of unemployment and school dropouts. This could be why Badajoz lies second in the survey, and not first, in terms of sense of security among its citizens. It is feasible to conclude that specific actions aimed at increasing employment and levels of education among young people would generate a substantial improvement in feelings of security.

We conjecture that the development of socioemotional competences could offset individual feelings of uncertainty about life in each of the cities represented by the four clusters.

This would be a transversal protection factor by which individuals would learn to manage their feelings of uncertainty generated by the unfavorable risk factors affecting them.

6. Conclusions

HJ-Biplot has proved to be a valid methodology for studying the reality of society. HJ-Biplot is an emerging contribution to social research methodology that is usually specific to the natural sciences.

This work has certain limitations, as the analysis was based on official statistics and our choice of variables was determined by the data published by official bodies; some interesting indicators had to be discarded for lack of data, and no information was available on underpopulated areas in Spain.

The methodology was able to produce graph representations of the correlations between various social risk factors. It also enabled these social risk factors, including crime, to be applied to a range of Spanish provincial capitals in a Cartesian representation of the different degrees of correlation.

That said, the field of criminology has dedicated little research to objective insecurity via the social risk factor approach. Again, the HJ-Biplot methodology used in this study supports the application of these variables to the study of objective insecurity.

Nevertheless, the main advance of our study is to demonstrate the relation between social risk factors, crime rate, and the feeling of insecurity. The results that justify this derive from grouping the Spanish provincial capitals in four clusters, from each of which we selected an individual city with the highest statistical significance. The sense of insecurity among their citizens, as shown by the survey, was compared to the corresponding statistics.

Definitively, the growing feelings of uncertainty and insecurity among citizens are motivated by the adverse socioeconomic conditions of their environment. The reduction in social welfare drives the growing sense of uncertainty that is apparent in our society today. This diminishing of citizens' welfare negatively affects social sustainability.

The final proposal of this research is to develop emotional intelligence to empower individuals with the resilience to manage their emotions in order to avoid the negative consequences caused by uncertainty in their everyday lives. This would generate the personal resources to help offset the incidence of sociodemographic factors such as those analyzed in our study. Using emotional intelligence [10,57] as a vehicle for strengthening individuals and communities, and as a contributory factor for harmonization, as described by Di Fabio and Tsuda [58], could lead to a substantial improvement in citizen security in developed nations.

This study reported the direct relation between citizen insecurity (crime rate) and sociodemographic factors such as population, unemployment, urban land area, and hotel occupancy (and to a lesser extent, density proportion of non-native Spanish). Our study also showed the complex relations between objective and subjective security, recognizing the role played by personal variables in the experience and regulation of feelings of insecurity.

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Institutional Review Board Statement: There are no significant risks associated with participation. The answers collected have be made Anonymous and stored encrypted in agreement woth Regulation

(EU) 2016/679 of the European Parliament on the protection of natural persons concerning the processing of personal data. Answers are analyzed and reported as statistics results (i.e., aggregated with other participant's responses). Thus, replies cannot be identified, and the privacy is self-guarded.

Informed Consent Statement: There is an informed consent from each of the respondents. Respondents expressly accepted their participation after being informed of the anonymous and aggregated treatment of their responses.

Data Availability Statement: Data are available from the corresponding author on a reasonable request.

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