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Confirmatory factor analysis of an inventory of perception of insecurity and fear of crime*

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> This paper focuses on the study of the factorial structure of an inventory to estimate the subjective perception of insecurity and fear of crime. Made from the review of the literature on the subject and the results obtained in previous works, this factor structure shows that this attitude towards insecurity and fear of crime is identified through a number of latent factors which are schematically summarized in (a) personal safety, (b) the perception of personal and social control, (c) the presence of threatening people or situations, (d) the processes of identity and space appropriation, (e) satisfaction with the environment, and (f) the environmental and the use of space. Such factors are relevant dimensions to analyze the phenomenon. Method: A sample of 571 participants in a neighborhood of Barcelona was evaluated with the proposed inventory, which yielded data from the distributions of all the items provided. The administration was conducted by researchers specially trained for it and the results were analyzed by using standard procedures in the confirmatory factor analysis (CFA) from the hypothesized theoretical structure. The analysis was performed by decatypes according to the different response scales prepared in the inventory and their ordinal nature, and by estimating the polychoric correlation coefficients. The results show an acceptable fit of the proposed model, an appropriate behavior of the residuals and statistically significant estimates of the factor loadings. This would indicate the goodness of the proposed factor structure.

> Keywords: Fear of crime, insecurity, public space, environmental dimensions, confirmatory factor analysis.

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Análisis factorial confirmatorio de un inventario de percepción de inseguridad y miedo al delito

Este trabajo se centra en el estudio de la estructura factorial de un inventario para la estimación de la percepción subjetiva de la inseguridad y del miedo al delito. Esa estructura factorial, efectuada a partir de la revisión de la literatura sobre el tema y de los resultados obtenidos en algunos trabajos anteriores, muestra que esa actitud ante la inseguridad y el miedo al delito se identifica con una serie de factores latentes que esquemáticamente se resumen en (a) la seguridad personal, (b) la percepción de control personal y social, (c) la presencia de personas o situaciones amenazantes, (d) los procesos de identidad y apropiación espacial, (e) la satisfacción con el entorno y (f) los aspectos ambientales y el uso del espacio. Tales factores resultan dimensiones relevantes para analizar el fenómeno. Método: una muestra de 571 participantes de un barrio de Barcelona fue evaluada con el inventario propuesto obteniéndose los datos de distribuciones de todos los ítems previstos. La administración fue realizada por investigadores especialmente entrenados para ello y los resultados analizados mediante los procedimientos habituales en el Análisis Factorial Confirmatorio (AFC) a partir de la estructura teóricamente hipotetizada. El análisis se efectuó mediante decatipos a la vista de las distintas escalas de respuesta habilitadas en el inventario y del carácter ordinal de las mismas y mediante la estimación de coeficientes de correlación policóricos. Los resultados muestran un aceptable ajuste del modelo propuesto, con un comportamiento adecuado de los residuales y estimaciones estadísticamente significativas de las cargas factorial. Lo cual indicaría la bondad de la estructura factorial propuesta.

Palabras clave: miedo al delito, inseguridad ciudadana, espacio público, dimensiones ambientales, análisis factorial confirmatorio.

Introduction

We should begin with a statement which, though evident, is still of interest to our purposes: Urban insecurity is nowadays one of the most important social problems in big cities and its evolution responds to complex dynamics which escape simplistic analyses (Curbet, 2011). Opinion polls and social surveys reflect it¹. Certain studies relate urban insecurity with other uncertainties which are characteristic of our times: Those related to the work, the economic, or the emotional situation (Hollaway & Jefferson, 1997). A pressing problem, it is constantly in the media, consequently generating alarm, or, in fact, fear (Dowler, 2003) and it is directly related to social or environmental segregation (Vilalta, 2011), the stig-

¹ According to the Survey of Municipal Services of the City of Barcelona, 2010, insecurity (18.7%) and unemployment (12%) are the main problems of the city of Barcelona, while it is the third most important personal problem (7.5%) behind unemployment (22.3%) and economic problems (15.7%).

matatization of urban areas, or the abandonment of the public space as a social space (Low, 2003, 2005; Finol, 2005; Valera, 2008).

However, other data point in a very different direction. Police statistics on crimes in our cities configure a situation where insecurity problems reach a really low level, especially when compared to data from American cities. Even in these, an unfounded increase in the perception of crime along with the consequent fear does not match the real decrease in cases (Cossman & Rader, 2011). The same thing happens with the victimization data: Few people state that they have been victims of a crime in the public space in percentage terms and, if so, it is usually a misdemeanor. This inconsistency between objective safety and subjective perception of insecurity requires deep thinking, both from the theoretical point of view, and from the point of view of safety policies in cities.

Theoretical dimensions of fear of crime and perception of insecurity

There exists an initial classic differentiation between fear of crime and perception of insecurity where the former is basically emotional and the latter is related to more cognitive perceived risk theories. The studies adopting it share the assumption that perceived risk and fear of crime are clearly different topics. However, we do not take a position, along with authors like Rader (2004), who proposes the more inclusive concept of victimization threat, with three components: Affective (fear of crime), cognitive (perceived risk), and behavioral (restricted behavior), with reciprocal, complex relationships between themselves.

On the other hand, the study of the perception of insecurity or fear of crime has shifted within parameters ranging from the emphasis on environmental disorder and objective data on crimes to the relationship with the perception of social disorder and the social construction of dangerous places. In light of the literature (see, for example, the reviews by Miceli, Roccato, & Rosato, 2004), we should consider several elements of analysis. Because it is statistically relevant, the first of them is the objective level of crime, even though it is well known that not all crimes have the same incidence on the feeling of fear and that, although subjective, the fear or the perception of insecurity are not usually directly related to the objective data of crimes and victimization (Garland, 2005; Torrente, 2001). On a second level -which could be defined as "low intensity" in relation to the previous one-is the behavior related to incivilities inasmuch as this phenomenon reflects social degradation or a potential threat (LaGrange, Ferraro, & Supancic, 1992; Roché, 1993). Although now is hardly the time to delve more than necessary into this construct nicknamed by Hunter (1978) and widely developed from the theory of Broken Windows (Wilson & Kelling, 1982), it is worth mentioning that it involves one of the most fruitful hypotheses in relation to our study subject: People who perceive a neighborhood as more disorderly will tend to feel

more worried about their safety. That disorder may be physical -related to the maintenance of a place (vandalism, graffiti, damaged public property, etc.)— or social -related to disorderly or threatening behaviors (homelessness, uncivil conducts, etc.)—. Another type of variables may be grouped into what Skogan and Maxfield (1981) call urban life. It involves aspects such as density-overcrowding (Thomé & Torrente, 2003), difficulties in social integration, size of buildings (Newman & Franck, 1982), presence of potentially dangerous or threatening social groups, social conflict (Di Masso, Dixon, & Pol, 2011) or levels of urban vegetation (Kuo & Sullivan, 2001). On the other hand, literature emphasizes socio-demographic variables, especially age and gender, since despite certain criticism (Reid & Konrad, 2004), numerous studies agree that fear of crime is higher in women, the elderly, or among younger people (Amerio & Roccato, 2005; Gardner, 1990; Lawton & Yaffe, 1980; Mesch, 2000; Saldívar, Ramos, & Saltijeral, 1998; Warr, 1984). In turn, people who perceive themselves as more vulnerable in terms of health apparently tend to develop greater feelings of fear of crime and insecurity (Cossman & Rader, 2011). That perspective is complemented by the relationship between fear of crime and the perception of vulnerability (Jackson, 2004), the perception of a low capacity to face a threatening situation (Moser, 1985), or the social levels of risk tolerance (Torrente, 2001). It also involves the analysis of social strategies that enable a community to control its environment to go about their daily routines safely, generically called Defensible Space (Newman, 1996).

Synthesizing, Ferraro (1995) considers two kinds of stimuli to evaluate potential threat situations: Variables related to the physical environment and socially shared information on the dangerousness of that environment. Similarly, Fernández-Ramírez and Corraliza (1996, 1997, 1998) have considered two perspectives in the configuration of the dangerous places: The 'neighborhood perspective' emphasizes the psycho-social dynamics of generation of information about insecurity on a neighborhood level; the 'contextual perspective', for its part, focuses on the socio-physical characteristics of the places people perceive as dangerous and to which they react with fear (Wilcox, Quisemberry, & Jones, 2002). Recent research has observed the predominant role of social factors over environmental ones in considering a place dangerous (Acuña-Rivera, Uzzell, & Brown, 2011).

Finally, other authors have considered other types of variables such as residential satisfaction, place attachment, or place identity (especially on a neighborhood level) to explain modulating factors of the perception of insecurity (Di Masso *et al.*, 2011; Taylor, 1996; Taylor, Shumaker, & Gottfredson, 1985; Tester, Ruel, Anderson, Reitzes, & Oakley, 2011; Vidal, Valera, & Peró, 2010). Behind them lies the logical premise linking feeling safe in the neighborhood, the feelings of pace attachment and identity, and their positive repercussions on psycho-social health (Hill, Ross, & Angel, 2005; Kitchen & Williams, 2010).

Consequently, and in light of all of the above, we have formulated an approach to the phenomenon of perceived insecurity by hypothesizing the following factors or hypothetical constructs:

- Personal Safety (SP): Perception of insecurity (as fear of crime and as perceived risk of victimization), defined by the feeling of lack of risk. Prototypical situations such as "I usually frequent safe places."
- Personal Control and Social Support (CPS): Social representation and social influence processes about urban insecurity in addition to personal control and tackling skills in threatening situations, situations such as, "If someone tried to mug me in this place, somebody would help me." It also involves previous experiences with threatening situations (EP): They are characterized by an assessment of the presence of preventive risk avoidance strategies and, in turn, social support.
- Regular presence of potential assailants in the public space (PPA): It summarizes the objective perception of possible assailants. Aspects related to "In this place there are people who could be criminals."
- Satisfaction and space appropriation (SA): It reflects a certain degree of space appropriation, as well as urban identity and residential satisfaction. It involves situations such as "If I could, I would move from this neighborhood."
- Space Description (DE): Description related to aspects of lighting, cleanliness, and surveillance, among others.
- Environmental quality perceived from key dimensions (CA): Use given to that specific space, therefore, assessment of activities such as strolling, shopping, going to work, etc.

Objectives

The main of this study is to analyze the properties of an assessing instrument of subjective perception of insecurity or fear of crime by means of data collected among the residents of a Barcelona neighborhood. For that purpose it will be necessary to analyze the factorial behavior of the dimensions considered as well as the relative weight of each of the indicators defined. Obviously, we are focusing here on an assessing instrument about the phenomenon of safety (or insecurity) which cannot be understood outside the values, conflicts, and problems that surround a specific society; it becomes legitimized in every specific social context (Torrente, 2007).

Method

Participants

The sample used in this study involved *N*=571 persons surveyed in the Zona Franca neighborhood of Barcelona, aged 18 or older, residing in that neighborhood, and frequently using its public spaces. The gender of the persons surveyed was balanced in order to obtain a symmetrical distribution for that variable. Sampling was accidental, controlling the time of day when the survey was obtained. Accordingly, several time slots were previously defined throughout the day (see table 1) and data collection on weekdays (340) and weekends (231) was considered. Likewise, we opted to differentiate relatively homogeneous areas, and to select independent samples in each of them. Upon choosing the number of areas and their limits, certain criteria were followed, such as homogeneity of the public space, functional organization of the neighborhood, socio-demographic characteristics, and urban structure of the area under study. Eventually the neighborhood was divided into six different areas.

	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	TOTAL
% women	54.80%	51.88%	48.62%	56.25%	50.56%	46.15%	52.51%
Time							
10-13	37	39	39	30	33	32	210
16-19	35	32	41	34	37	33	212
20-23	32	35	13	32	37	0	149
Total	104	106	93	96	107	65	571

TABLE 1: NUMBER OF SUBJECTS EVALUATED BY ZONE AND TIME SLOT.

Finally, 52.5 % of the sample were women, the mean age was 44.22 years, and standard deviation was 18.72. Moreover, 84.1 % of the people resided in the neighborhood and the rest (15.9 %) worked there and frequently used the public spaces in the area. In addition, 71.1 % admitted to not being born in the neighborhood and the average time of residence was around 30 years (mean 27.82 and standard deviation 16.76).

Instruments

The six factors described above were the ones used to generate the items of the initial inventory proposal that is the goal of this paper. The answer scale was defined within a closed answer system between 1 (*very unsafe*) to 4 (*very safe*) for factors SP, CPS, PPA, and SA; a 0-10 scale for factor DE; and a 1-3 scale for factor CA. Each item was obtained through the expert generation of prototypical, usual situations in urban insecurity studies. This initial proposal was used in an initial application in a previous work (Carro, Valera, & Vidal, 2010), where it was used as a pilot questionnaire.

With the data of the aforementioned work, correlation coefficients were obtained among the different items used, thus discarding those items presenting scarce internal consistency (represented by non-significant polychoric correlation coefficients). In addition, the items kept were re-qualified by a group of five independent experts, in the six factors proposed, thus discarding those items without a minimum 80 % of agreement in the factor assignment. Out of this process resulted an inventory of situations comprising 45 items, out of which 44 with an ordinal 1-4 scale and only one item (number 12) as an open-answer reactive and, therefore, it will be discarded for the later analysis here presented. That same process was used to explore, by means of successive Factor Analyses, the possibility that a new factor might appear that had not been considered initially or any other factorialization that might call into question the initial approach. The partial results obtained from factor estimations with oblique rotations indicated a certain stability of the theoretically generated factors, which allowed us to administer the definitive questionnaire later on in order to confirm the factor structure; the basic object of this paper, as mentioned above. Annex 1 comprises the questionnaire's final format (in its original version in Catalan) and the factor structure proposed is summarized as follows: (a) Personal Security factor (SP): Items 1-11; (b) Personal control and social support (CPS): Items 13-19; (c) Regular presence of potential assailants in the public space (PPA): Items 20 and 21; (d) Satisfaction and space appropriation (SA): Items 22-27; (e) Space Description (DE): Items 28-35; and finally, (f) Environmental quality perceived from key dimensions (CA): Items 36-45.

Procedure

A team of 11 survey takers was previously trained to become familiar with the questionnaire. Likewise, an initial contact took place with the different previously defined study areas. Finally, the task was distributed making it possible that each survey taker could collect information in more than two areas and in different time slots. The questionnaires were administered during the months of May and June 2006.

Results

The polychoric correlations matrix was obtained in the 44 situations proposed in the final version, previously applying to all of them a transformation of their observed distribution in decatypes in order to prevent the difficulties that arose due to the presence of different measuring scales in the original items. However, and with a strictly informative and descriptive aim, table 2 shows the basic descriptive values of each item in the definitive inventory. In addition, each item's correlation coefficients are included with the theoretical value resulting from the summation of all the items (despite the fact that it is not a scale, strictly speaking), and the estimation of Cronbach's α coefficients if every item were removed, as an approximate estimate with a certain internal consistency. Once again we remind the reader that those are merely descriptive data for a minimal approach to the distributions observed in each item, and they lack special psychometric properties.

With these data and in light of the ordinal nature of the variables transformed in decatypes, we opted to evaluate the factor structure described above by applying the Confirmatory Factor Analysis (CFA) model. Finally, to comply with the general precepts and assumptions of the CFA model, the following statistical assumptions were adopted: $E(X_i)=E(\xi_i)=0$ and $Var(X_i)=Var(\xi_i)=1$. Consequently, it was assumed that the factors were reduced, normalized variables, so that $E(\varepsilon_i\varepsilon_j)=E(\delta_i\delta_j)=E(\xi_i\delta_j$

Finally, and still with the merely informative nature of some of the data in mind, we would like to point out that the estimate obtained and derived from the CFA yielded (in agreement with what Satorra & Saris, 1985, proposed) Cronbach's α =.846 for the global scale and values within .821 and .889 for each of the six proposed factors. That leads us to consider the possibility of scaling each factor's score and the total scale's score. However, the very structure of the inventory proposed here requires a more detailed analysis of the true dimension and usefulness of one global score since, despite its empirical reliability, it seems more sensible and cautious to maintain each factor's score.

Table 2: Mean and Standard Deviation, correlation of each item with the total (r_{jx}) and Cronbach's α when removing that element $(\alpha\text{-}j).$

Item	Mean	Standard Deviation	r_{jx}	(α-j)
1	3.27	.860	.242	.541
2	3.08	.878	.297	.540
3	2.70	.906	.278	.640
4	2.59	1.121	.293	.657
5	2.83	1.016	.257	.554
6	1.67	.909	.265	.651
7	1.28	.654	.213	.647
8	1.57	.891	.248	.656
9	2.68	.876	.331	.639
10	2.54	.869	.364	.638
11	1.48	.743	.254	.542
13	2.49	1.238	.476	.530
14	2.61	1.153	.253	.540
15	1.84	1.074	.284	.552
16	1.31	.732	.311	.645
17	1.57	1.076	.224	.654
18	1.60	1.101	.304	.653
19	1.21	.668	.267	.646
20	2.41	1.118	.253	.659
21	2.86	1.123	.324	.645
22	3.40	.895	.286	.740
23	2.67	1.314	.298	.638
24	2.65	1.074	.374	.636
25	2.77	.971	.237	.741
26	3.09	.917	.364	.637
27	2.91	1.127	.276	.739
28	6.13	2.450	.427	.728
29	6.44	2.228	.541	.619
30	4.94	2.524	.545	.617
31	4.39	2.617	.513	.519
32	7.63	1.641	.267	.539
33	4.52	2.346	.374	.632
34	2.72	2.778	.464	.624
35	7.03	1.985	.423	.729
36	4.83	.474	.394	.645
37	2.21	.934	.239	.741
38	1.35	.737	.368	.646
39	2.28	.932	.351	.638
40	1.68	.917	.331	.645
41	2.76	.617	.327	.648
42	2.02	.947	.245	.644
43	1.50	.855	.272	.546
44	1.59	.901	.331	.539
45	1.06	.331	.068	.747

Table 3: Matrix of factorial loadings (ULS) from the polychoric correlations matrix $(\lambda_{ij}).$

ITEMS	Personal safety	Personal control and social support	Presence of dangerous others	Satisfaction	Space description	Environmental quality
1 2 3 4 5 6 7 8 9 10 11 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 40 40 40 40 40 40 40 40 40 40 40 40	.743 .644 .584 .328 .551 .634 .448 .721 .532 .527 .336	.287 .487 .501 .602 .478 .432 .399	.671 .700	.548 .447 .436 .528 .441 .571	.751 .329 .441 .699 .593 .549	.771 .783 .722 .699 .648 .720 .787 .673 .629 .602

Note. All factorial values (λ ij) were statistically significant (p < .01)

SP**CPS** PPASADECA1 000 Personal safety Personal control and social support .126 1.000 1.000 Presence of dangerous others .201 .244 .199 .276 Satisfaction .281 1.000 Space description 1.000 .227 .299 .344 .387

.231

.521

.338

.361

1.000

Table 4: Correlation between factors. Ψ matrix with the ϕ_{ii} elements.

Note. All values statistically significant (p < .01).

Environmental quality

TABLE 5: PROPOSED CFA MODEL'S GLOBAL FIT VALUES.

.446

χ^2	gl	P	NFI	NNFI	GFI	AGFI	RMSEA	CI
945.33	371	.212	.932	.944	.957	.956	.041	.0307

Note, χ²=Square-Ji Fit; NFI=Normed Fit Index; NNFI=Non-normed Fit Index; GFI=Goodness-of-Fit Index; AGFI=Adjusted Goodness-of-Fit Index; RMSEA Root Mean Square Error of Approximation; CI=Confidence Interval.

Discussion

In light of the results obtained, we can corroborate the fit of our data to the six-factor structure described theoretically, thus confirming, along with authors like Rader (2004) or Miceli *et al.* (2004), the multidimensional structure of the so-called fear of crime. Therefore, the perception of insecurity (or personal safety in the positive sense) involves cognitive aspects –risk of being victimized–, emotional aspects –feeling of insecurity or fear– and social aspects –social representations of dangerous places–. For their part, the aspects pertaining to the perception of other dangers or threatening situations, the levels of perceived personal or social control, or the aspects pertaining to residential satisfaction, urban identity, or space appropriation have turned out to be relevant dimensions too. Finally, the correlations of more strictly environmental factors with the rest prove their relevance in our stricter, especially the last factor related to the use of the space.

Nevertheless, we are still far from proposing an explanation that is sufficiently complete of the phenomena related to fear in the public space of our cities. In too many occasions, we approach the subject only to describe processes such as the stigmatization of places or social groups, the substitution and transfer of certain functions pertaining to the public agora toward the new spaces sheltered from the masses, or certifying the increased presence of police and control and video-surveillance systems as the only response to the social demand for more security. The results of a factor analysis like the one presented here contribute to consoli-

date knowledge on the dimensions involved in such phenomena, although it is necessary to take a step further. In that line, we have begun exploring other types of analyses from structural equation models (Guàrdia, Valera, Carro, & De la Fuente, 2009), or using methodologies that allow us to describe in detail and depth the uses of the public space (Pérez, Valera, & Anguera, 2011). In conclusion, in order to continue progressing in research, it is necessary to consider complementary approaches that allow us to continue unraveling the complex relationships between the environmental, social, and personal factors that determine the appearance of the fear of crime or the perception of urban insecurity.

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ANNEX 1

FINAL FORMAT OF THE QUESTIONNAIRE OF SUBJECTIVE PERCEPTION OF INSECURITY.

Personal safety

(1 very unsafe; 4 very safe)

- 1. Immediately before talking to me, you felt in this space...
- 2. Usually, when you are in this place, you feel...
- 3. In relation to other areas of Barcelona you frequent, you would say this space is...

(1 very unlikely; 4 very likely)

- 4. Do you consider it likely that you may ever have a problem in this place?
- 5. Do you consider it likely that others may ever have a problem in this place?

(1 never; 4 many times)

- 6. In the last few weeks, how frequently have you heard other people close to you say that they had a problem in this place?
- 7. In the last few weeks, how many times did you have a problem in this place or did you see others having it?
- 8. In the last few weeks, how frequently have you been afraid that something might happen to you in this place?

(1 very unsafe; 4 very safe)

- 9. In your experience, you would say this neighborhood is...
- 10. In general, people close to me consider this neighborhood...
- 11. Most people in Barcelona probably consider this neighborhood...
- 12. Do you remember a specific incident that happened to you or someone else and which later made you feel worried when you were in this place or other similar places in the neighborhood?

Personal Control / Support (1 absolutely disagree; 4 absolutely agree)

- 13. If someone tried to rob me or assault me in this place, there are people who could help me.
- 14. If someone tried to rob me or assault me in this place, I could somehow defend myself and avoid it.
- 15. Generally I am easily scared.
- 16. When I am in this place, I feel I am being watched.
- 17. Sometimes I try to take a different path to avoid this place.
- 18. Sometimes I try to avoid this place if I am alone.
- 19. I try to carry on me an instrument that can help me defend myself or ask for help in case of trouble (example: Cellular phone, self-defense spray...)

Presence of dangerous "others" (1 absolutely disagree; 4 absolutely agree)

- Frequently there are people around here who I think might try to rob or assault me or others.
- 21. Generally, the people who could cause me or others trouble in this place are most likely from out of the neighborhood.

Satisfaction / **Cohesion** (1 absolutely disagree; 4 absolutely agree)

- 22. I like living in this neighborhood.
- 23. Even if I could, I would not live in any other neighborhood of the city.
- 24. The majority of the people in this neighborhood are very close to each other.
- 25. The majority of the people living in this neighborhood have similar likes and habits.
- 26. We all know each other in the neighborhood.
- 27. I feel very identified with this neighborhood.

Space description (0 minimum score – 10 maximum score)

- 28. Daytime lighting.
- 29. Nighttime lighting.
- 30. Well preserved.
- 31. Nice.
- 32. Clean.
- 33. Busy in the daytime.
- 34. Busy in the nighttime.
- 35. Width and spaciousness

Personal use (1 *absolutely disagree*; 4 *absolutely agree*)

- 36. How frequently do you visit this place? (1 First time / Tourist; 5 Every day or almost). When you come here, why do you do so?
- 37. Take a walk
- 38. Dog walking
- 39. Meet people
- 40. Children leisure
- 41. It's a step side
- 42. Shopping
- 43. Work
- 44. Sport or leisure activities
- 45. Others

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