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An evaluation of an urban renewal program and its effects on neighborhood resident's overall wellbeing using concept mapping



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ABSTRACT

Urban renewal programs aim to improve physical and socioeconomic position of neighborhoods. However, due to the intervention's complexity, there is often little evidence of their impact on health and health inequalities. This study aimed to identify the perception of a group of neighborhood residents towards a large-scale urban renewal program in Barcelona and to explore its effects and importance on their wellbeing using concept mapping methodology. Our results indicate that the majority of urban renewal projects within the initiative, including improved walkability, construction of new public spaces and more community programs, have positive and important effects on the overall wellbeing of participants. This study presents an innovative method that diverts from traditional outcome-based evaluations studies often used within this field.

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1. Introduction

In 2010, it was estimated that three quarters of Europe's population was residing in urban areas and it is predicted that this number will continue to grow (United Nations, 2010; World Bank, 2012). In order to accommodate these numbers, cities are continuously involved in developing areas through urban renewal projects that provide general improvements in physical infrastructure as well as boosting economic, political and cultural gains (Rydin et al., 2012; Spaans, 2004; United Nations, 2010).

Despite efforts in linking urban planning to health, there continues to be a lack of collaboration between these two sectors resulting in minimal considerations of health and health inequalities during the planning of renewal projects (Rydin et al., 2012; Thomson, 2008; Thomson et al., 2006). One of the consequences of this weak linkage is the limited research available on the evaluation of health effects of urban renewal projects due to reasons such as restrictions in the availability of data, inadequate baseline and post-intervention data, and insufficient time intervals to study the effects of projects on various health outcomes (Thomson et al., 2006). Of the existing evaluations, the Healthy Cities commission

has been successful in highlighting the importance of investment in transportation to improve accessibility, green space for physical activity, and better water and sanitation regulations to alleviate health risks (Rydin et al., 2012). Some studies focusing on smaller scale urban renewal projects have reported positive effects on the environment and economic status of the area affected in addition to small positive health impacts in self-rated health, mental health and mortality (Curtis et al., 2002; Thomson et al., 2006). However, despite this growing empirical evidence of the health effects of renewal projects, there remains limited understanding of the mechanisms causing these effects resulting in inadequate evaluations that may underestimate and undervalue the initiative as a whole (Petticrew et al., 2009; Thomson, 2008).

A possible solution to improve current evaluations would be the advancement from evaluations consisting of a single methodology, to the incorporation of various methodologies in order to explore the complex relationship between urban renewal and the health of residents. Traditionally, evaluations in this field have relied on quantitative studies looking at mortality, self-reported health status, employment status, education and household income, pre and post-intervention (Thomson et al., 2006). However, qualitative methods can contribute to these studies by providing a deeper understanding of the pathways linking urban renewal and health by capturing the resident's perspectives and experiences (Curtis et al., 2002; Muntaner et al. 2009; Petticrew et al., 2009). By studying the perceptions of overall wellbeing,

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qualitative methodologies can capture the immediate and short-term effects of urban regeneration projects while overcoming time limitation often reported by researchers conducting quantitative studies within brief time periods between the completion of the project and various health outcomes (Thomson et al., 2007; Thomson 2008). Self-perceived health or wellbeing measures have been recognized as good predictors of mortality and morbidity and a reliable indicator of overall health status (Mavaddat et al., 2011; Singh-Manoux et al. 2006). Furthermore, in a study by Simon et al. (2005), the majority of participants included aspects of health that went further than the physical dimensions of health concluding that self-perceived health is a “multidimensional concept” (Simon et al., 2005). In addition, from existing studies we know that there is an association between perceptions of neighborhood quality and self-perceived health (Haines et al. 2009; Petticrew et al., 2009).

While traditional qualitative methods like interviews and focus groups can provide some of these answers, Concept Mapping analyzes participant's perceptions on specific issues by providing pictorial depictions of the results (Burke et al., 2005; Kane & Trochim, 2007). Concept mapping (CM) was developed by Trochim (1989) as a management tool for organizations in the 1980s and later introduced in public health research in the early 2000s (Burke et al., 2005; O'Campo et al., 2005). This methodology would allow for a more objective and reliable analysis of data by using statistical tools and providing a conceptual framework that depicts how a group or a population perceived a particular population health situation (Burke et al., 2005; O'Campo et al., 2005). Furthermore, CM allows for greater involvement by participants in the analysis and interpretation of the results compared to these other qualitative methods (Kane & Trochim, 2007).

Barcelona (Catalonia, Spain), has been involved in major urban renewal projects such as the 1992 Olympics, and the revitalization of downtown areas such as the Ciutat Vella district and the Raval neighborhood in order to promote tourism while decreasing crime in the area (de Barcelona, 2011b; Borja, 2005). In 2004, the regional government of Catalonia launched one of the largest urban renewal projects to date in Europe known as the “Llei de Barris” (Neighborhoods Law) (Departament de Política Territorial i Obres Públiques (DPTOP), 2009). The initiative offered monetary resources for renewal projects within deprived neighborhoods by providing 50% of funding to the municipal governments that wanted to participate (DPTOP, 2009). Funding would go towards projects that have included the creation of parks, the improvement of traffic and transportation, the establishment of social and employment activities, and the availability of resources to reform community centers and public spaces (DPTOP, 2009). Since 2004, approximately 2 billion Euros have been invested across a total of 148 neighborhoods in Catalonia. Within Barcelona, 12 of 73 neighborhoods have participated with approximately 10% of 1.6 million people being directly affected by the changes (DPTOP, 2009). In addition, the Neighborhoods Law initiated the creation of two complementary initiatives. One being the “Health in the Neighborhoods” project that works closely with different community groups to improve the health of residents through various initiatives such as the promotion of physical activities in youth and seniors, drug intervention programs, and mental health prevention programs such as helping immobile residents have access to the outdoors (Fuertes et al., 2012). The other initiative, “Employment in the Neighborhoods”, oversaw all employment related activities by creating a space within the neighborhood where job-skill training courses are available. In addition, this program offered personalized services of Vitae preparation and job seeking within and outside the neighborhood (de Barcelona, 2011a).

Given the above considerations, the objective of our study was to evaluate the Neighborhoods Law and the perceptions of its effects on the overall wellbeing of residents from two Barcelona neighborhoods using a concept mapping methodology.

2. Methods

2.1. Study design and setting

The study used CM, a mixed methods methodology, to develop a conceptual map of perceptions of residents affected by recent physical, social and economic changes that had occurred within their neighborhoods. This design combined the input by the residents followed by a series of multivariate analysis to represent the participant's views and how such views are related and are important compared to one another (Kane & Trochim, 2007). The study was completed within the first two Barcelona neighborhoods that participated in the Neighborhoods Law, Santa Caterina I Sant Pere (referred to as Casc Antic in the study) and Roquetes. The Casc Antic neighborhood consists of 1.1 km sq with a population of 22,632 residents (de Barcelona, 2011c). It forms part of the Ciutat Vella (Old Historical City with Roman origins) district located in downtown Barcelona with a population of mainly manual class workers, high unemployment rates and 37.1% of immigrants resulting in one of the largest immigrant populations in Barcelona (de Barcelona, 2011c). In recent years Casc Antic has also been involved in smaller scale urban renewal projects outside of the Neighborhoods Law in areas of reform like the Santa Caterina market. The Roquetes neighborhood, built in the second half of the 20s century, located on the outskirts of Barcelona with a population of 16,050 residents within an area of 0.6 km squares. It is characterized by its steep streets due to its location within the slope of the Collserola mountain. Similar to Casc Antic, the population in Roquetes consists of mainly manual workers and high unemployment rates compared to the rest of Barcelona and a fairly high immigrant population of 22.0% compared to Barcelona's 17.4% (de Barcelona, 2011c). In recent years, the biggest urban renewal project outside of the Neighborhoods Law in Roquetes has been the arrival of the Line 3 metro station. Table 1 provides a list of the various projects that were completed within the Neighborhoods Law, including the cost and duration.

Table 1 was used as reference in order to determine if changes mentioned by participants formed part of the projects within the Neighborhoods Law.

2.2. Participants

Purposive sampling techniques were used to recruit three groups of neighbors over the age of 18 and currently residing within one of two participating neighborhoods for minimum of 5 years continuously immediately prior to participation in the study; two within Casc Antic, and one within Roquetes. This sampling strategy was designed to identify participants that would be able to best address the focus question and not with the purpose to generalize to the whole population (Tashakkori & Teddlie, 2002). Participants were recruited via existing community groups and centers in the two neighborhoods where researchers had previously established networks. In attempts to avoid response bias due to conflict of interest, participants belonging to neighborhood associations which may receive funding from the Regional or Municipal governments for their initiatives and programs, were excluded. Participants were informed and asked to attend both sessions. Because of the flexibility of the methodology, additional participants were welcomed to the second session using the same inclusion criteria and recruitment methods used in the first session in order to replace individuals who were not able to continue due to conflicting schedules or lacked commitment to the study.

2.3. Data collection and analysis procedure

Concept mapping consists of six steps; preparation, generation, structuring, representation, interpretation and utilization.

Table 1
Projects description, cost and duration of the Neighborhood Law within the Casc Antic and Roquetes neighborhoods.

Project description	Cost (Euros)	Duration	
Casc Antic			
Physical changes	<ul style="list-style-type: none"> • Urbanization and reform of the Central Plaza—"Pou de la Figuera" 	3.58 million	2006–2007
	<ul style="list-style-type: none"> • Reform of plazas and other open spaces 	634,515	2005
	<ul style="list-style-type: none"> • Reform and revitalization of residential buildings 	4.03 million	2006–2009
	<ul style="list-style-type: none"> • Reform of the Community Center "Sant Agustí" 	2.29 million	2006–2007
	<ul style="list-style-type: none"> • Creation of a pneumatic garbage collection system 	1.95 million	2006–2007
Economic and social changes	<ul style="list-style-type: none"> • Construction of the Youth Center "Palau Alós" 	571,114	2009–2011
	<ul style="list-style-type: none"> • Health in the neighborhood 	105,000	2007–present
	<ul style="list-style-type: none"> • Employment in the neighborhood 	1.22 million	2005–present
	<ul style="list-style-type: none"> • Investment in new stores 		2005–2009
	<ul style="list-style-type: none"> • Launch of program "Afternoons in Casc Antic" 		2005–2009
Physical changes	<ul style="list-style-type: none"> • Investment in television and media advertisement 	94,096	2005–2009
	<ul style="list-style-type: none"> • The event "Year of Merchants 2006" 		2005–2009
	<ul style="list-style-type: none"> • Reconstruction of the park "Pla de Fornells" 	407,811	2004–2005
	<ul style="list-style-type: none"> • Urbanization and reform of various streets 	1.25 million	2008–2009
	<ul style="list-style-type: none"> • Creation of the park "Rodrigo Caro" 	1.17 million	2006–2008
	<ul style="list-style-type: none"> • Remodeling of the Community Center "Ton i Guida" 	983,706	2005–2007
	<ul style="list-style-type: none"> • Creation of a sport center "Antoni Gilabert" 	81,256	2006–2007
	<ul style="list-style-type: none"> • Creation of a new health center 	103,969	2006–2007
	<ul style="list-style-type: none"> • Establishment of a service center for children 	671,703	2008–2009
	<ul style="list-style-type: none"> • Reform of the Ateneu complex 	908,536	2006–2007
	<ul style="list-style-type: none"> • Installation of solar panels in public buildings 	111,556	2010
	<ul style="list-style-type: none"> • Establishment of recycling and garbage drop off system 	258,054	2009–2010
	<ul style="list-style-type: none"> • Installation of traffic lights 	78,812	2008
	<ul style="list-style-type: none"> • The installation of public elevators and mechanical stairs 	963,508	2006–2010
	<ul style="list-style-type: none"> • Transformation of insecure areas 	69,836	2006–2010
	<ul style="list-style-type: none"> • Improvement of mobilization through transportation methods 	20,536	2006–2010
	Economic and social changes	<ul style="list-style-type: none"> • Reform and revitalization of residential buildings 	1.94 million
<ul style="list-style-type: none"> • Installation of telecommunication in residential buildings 		24,788	2007–2010
<ul style="list-style-type: none"> • Employment courses directed at women and immigrants 		123,989	2008–2009
<ul style="list-style-type: none"> • Courses for adults learning to read and write (Spanish/Catalan) 		149,897	2008–2009
<ul style="list-style-type: none"> • Employment in the Neighborhood 		997,761	2006–present
<ul style="list-style-type: none"> • Health in the neighborhood 	150,680	2008–present	

Source: Districte de Nou Barris (2010) & Foment Ciutat Vella (2009)

Data collection occurs within the generation and structuring steps where participants brainstorm answers to the focus question, and then rate and sort these responses. Although more detailed explanations are provided for each of the steps elsewhere (Kane & Trochim, 2007), here we describe briefly the two data collection phases for each group. In addition to data collected through the concept mapping activities, participants were asked to complete a short questionnaire asking their age, gender, employment status, occupation and familiarity with the Neighborhood Law program. Social class was determined and divided into two groups, "non-manual", "manual" using current or past occupation information with never employed participants (including students and housekeepers) classified apart. All data collection was approved by the Clinical Research Ethical Committee of *Parc de Salut MAR*. All data collection took place from March to May 2012.

2.4. Generation of statements

A "brainstorming" session of approximately 1.5 h was held for each of the three groups. Participants were asked to complete the focus question: "One change that has occurred within my neighborhood in recent years that has affected my family's or my wellbeing is...". Key terms were further clarified; the term *change* was defined as either a positive or negative physical/structural, social or economic change; *wellbeing* was defined as the participant's physical, emotional or mental status whether positive or negative; and *recent years* referred to the last 6 or 7 years. Participants were

provided with maps of their neighborhoods and its boundaries as determined by the city council.

Although the research goal was the evaluation of the Neighborhoods Law program, we were aware that in a general evaluation conducted post-intervention in Roquetes, only 14.7% of 371 neighborhood residents were able to connect the projects to this program (Districte de Nou Barris, 2010). This was also due to the fact that the Law did not advertise projects under this name but rather used the Regional government's title. Therefore the question was broadened and from the results, specific Neighborhoods Law initiatives were identified using Table 1. At the conclusion of each session, the research team reviewed all responses and edited or grouped similar statements in order to produce a final list for subsequent steps.

2.5. Structuring of statements

A second session of approximately 2.5 h was held for each group where the activities of sorting, rating and interpreting of results were conducted. This session was conducted approximately 6–8 weeks from the initial session. First, participants were asked to sort the statements into groups or themes that made sense to them and to name each pile created. Second, participants were given a rating sheet with the same corresponding statements and asked to rate the importance of each statement on a 5-point Likert-type response scale; (1) *little importance*, (2) *somewhat important*, (3) *important*, (4) *very important*, (5) *extremely important*. In addition, participants were asked to mark whether the

change had a positive or a negative effect on their wellbeing (plus and minus columns were added next to the importance scale), which served to determine the percentage of participants who perceived the cluster as positive. Furthermore, to illustrate these percentages within the clusters, five ranges were determined and depicted by the color gradient where the darker shades represented the majority of participants perceiving the cluster and its statements as negative while lighter shades indicated a positive perception. Although concept mapping requires basic reading skills for the structuring phase of the project, individuals who did not have these skills were not excluded but instead one researcher was assigned to work with each of them in order to complete activities.

2.6. Data analyses

During the structuring session, data was entered into the software and preliminary maps and rating lists were produced to give participants an impression of how their inputs were derived into results. Group discussions were held to discuss some of the clusters with their pertaining statements and the ratings of the most important positive and negative statements.

All analyses were completed using Concept Systems software (Concept Systems Incorporated, 2005). The software uses group's sorting data to create a similarity index which is used by the non-metric multidimensional scaling, a multivariate analysis, in order to map the points representing the distances and relations between the statements (Burke et al., 2005; Kane & Trochim, 2007). From there, hierarchical cluster analysis was used to divide the map into clusters representing an idea or concept (Burke et al., 2005; Kane & Trochim, 2007). A final cluster number was derived based on the consistency between the cluster's contents, and the group's discussion on the perceived changes and also avoiding the grouping of irrelevant clusters. The rating information was used to determine each statements average mean importance rating and the proportion of subjects that considered a change as positive. Once cluster numbers were defined, average mean rankings and median rankings were calculated by cluster and used to create the cluster rating maps. These maps consisted of clusters with layers representing a value of the average importance rating (indicated in the legends of each map) for each group. Essentially, the more layers a cluster had, the more important it was perceived. Titles were derived from the descriptive label participants were asked to

provide. Furthermore, wherever possible, the maps were rotated as a whole in order to have clusters with statements related to urban renewal projects including the Neighborhoods Law, positioned at the bottom of the map with a horizontal line drawn to separate these clusters from all else.

The goodness of fit of the point map to the original similarity matrix was calculated using a diagnostic measure, the stress index, derived from multidimensional scaling. Therefore, a lower stress value indicates a better the fit and a stronger relationship between the actual and optimal results (Kane & Trochim, 2007; Kruskal & Wish, 1978). Stress index values were calculated for each of the three groups.

3. Results

3.1. Socioeconomic characteristics

Three groups were formed within the two neighborhoods with a total of 45 participants (Table 2). In Casc Antic the first group formed was recruited through the neighborhood's Senior Day Center where participants were either volunteers or family members of users ($n=12$). The group consisted mostly of older, Spanish individuals with the majority within the non-manual class. The second group in this neighborhood consisted of frequent users of the neighborhood's Youth Center ($n=19$). The group consisted of students and those within the manual working class. In addition, this was the only group containing immigrants from outside of Spain with the majority being of Dominican Republic and Morocco origins. In Roquetes, the group was recruited through the neighborhood Community Center's network of groups ($n=14$). This group was the most age diverse group, mostly consisting of women within the manual working class or those working as housekeepers (categorized within never employed). In Table 2 we provide demographic and socioeconomic characteristics of participants. Within the first session we had a total of 30 residents across the three groups. The retention rate was 53.3% for the second session with the lowest rate within the youth group due to scheduling conflicts and time constraints. For the second session, 15 new participants with similar characteristics of age and social class were recruited and are included within the Table 2 values. Although we agree that it is recommended for participants to take part in both sessions, it is not necessary and various studies have

Table 2
Demographic and socioeconomic characteristics of participants in all sessions and groups ($N=45$).

	Casc Antic		Roquetes
	Senior group ($n=12$)	Youth group ($n=19$)	Community group ($n=14$)
Gender			
Female	6	5	12
Male	6	14	2
Age			
18–34	–	19	–
35–49	–	–	4
50–64	5	–	6
65+	7	–	4
Country of birth			
Spain	12	1	14
Other	–	18	–
Social class			
Manual	1	10	8
Non-manual	8	–	1
Never employed	3	9	5

Table 3

The top five most rated important positive and negative statements for each neighborhood.

		Importance rating
Top 5 positive ratings		
Casc Antic senior group	An increase in police surveillance.	4.43
	The lunch service at the senior's home center.	4.33
	<i>The installation of elevators in some residential buildings.</i>	4.29
	The establishment of the senior's day center.	4.29
	<i>An improvement of sidewalks for pedestrians.</i>	4.14
Casc Antic youth group	<i>The establishment of pneumatic garbage collection.</i>	4.14
	<i>New spaces for children.</i>	4.36
	<i>The construction of the youth center.</i>	4.20
	Immigrant neighbors get along and respect on another.	4.20
	<i>Availability of language courses and activities aimed at immigrant women.</i>	4.18
Roquetes community group	<i>Resources and training for employment opportunities.</i>	3.82
	The arrival of the metro L3.	5.00
	<i>The reform of the community center.</i>	4.89
	<i>The construction of a new medical center.</i>	4.70
	<i>The construction of outdoor public elevators.</i>	4.60
	<i>The installation of outdoor escalators.</i>	4.60
Top 5 negative ratings		
Casc Antic senior group	Closing of stores.	4.71
	An increase of thefts and attacks on tourists.	4.67
	Neighbors who have left.	4.67
	An increase in incivility with people leaving garage on the streets.	4.14
	Unfinished construction sites that leave a degraded image of the neighborhood.	3.86
Casc Antic youth group	The threat, abuse and violent treatment of police towards youth and immigrant residents.	4.73
	The loss of trust and respect in police authorities.	4.18
	More thefts on the streets with tourists largely targeted.	4.00
	An increase of thefts within residential areas.	3.73
	An increase in drug trafficking.	3.55
Roquetes community group	An increase in thefts and vandalism.	4.33
	An increase in conflicts and violence.	4.22
	An increase in the sense of insecurity in the streets.	4.10
	The reduction of parking spaces.	3.90
	The closing of old stores and locales.	3.56

Note: Statements in italics represent those identified as being part of the Neighborhood Law.

used similar techniques for participant selection (Rosas & Kane, 2012).

3.2. Changes in neighborhood

A set of statements were generated by each group representing the perceptions of changes affecting the wellbeing of residents within recent years. The final lists consisted of 51 and 39 statements for the Casc Antic senior group, and youth group respectively and 44 statements for the Roquetes group. These statements in addition to the percentage of participants who rated the statement positive are presented in Supplementary tables 1, 2 and 3. Since each neighborhood undertook different renewal projects, statements for each group were kept separate. Furthermore, although the senior center and youth center group were both from the Casc Antic neighborhood, because of differences in participant characteristics, statements were also maintained separate.

Using Table 1, generated responses that were part of the projects within the Neighborhoods Law were identified. Within the Casc Antic senior group, 12 of the 51 (23.5%) statements were related to the Neighborhoods Law; while in the youth group 15 of 44 (34.1%) pertained to the intervention. The Roquetes community group had the most identified statements where 15 of 44 (34.1%) responses were projects within the Neighborhoods Law.

In Table 3 we present the top five positive and negative statements for each group in addition to their perceived importance as rated by the participants. In addition, statements related to the Neighborhoods Law projects that appeared in Table 1 are highlighted using italics.

Despite variations in the groups and neighborhoods, common themes were identified in the perception of the most important

changes. Within the positive statements, 13 statements described infrastructure changes that had occurred within the neighborhoods with 10 (76.9%) of them being projects linked to the Neighborhoods Law project. The remaining three statements came from the Casc Antic neighborhoods with two from the senior group describing services offered within the neighborhood, and one from the youth group describing the relationship within immigrant residents. The arrival of the Line 3 metro (not part of the Neighborhoods Law) within Roquetes was the only statement within the study with a maximum rating of 5 and perceived positive by all participants in the group.

Looking at the negative statements, those related to thefts were the only reoccurring ones across all three groups. Within the Casc Antic senior group, the most negative statement was the closing of stores with a rating of 4.71, while in the youth center group it was the deteriorating relations between police towards youth and immigrants, with a rating of 4.73. Within the Roquetes group, the increase in thefts and vandalism was the most negative change with a rating of 4.33.

3.3. Cluster rating maps

These statements and others from the study were grouped into clusters as illustrated in Fig. 1, resulting in cluster rating maps for all three groups with each point representing each statement. While the layers represent the average importance rating, the size of the cluster indicates the relation between statements, where larger clusters indicate statements that are less closely related to one another. Cluster shapes are not relevant in the analysis. The cluster's four color gradients depict the percentage of individuals rating the statement as positive or negative with the darkest shade being that most responses agreed the change to have a negative

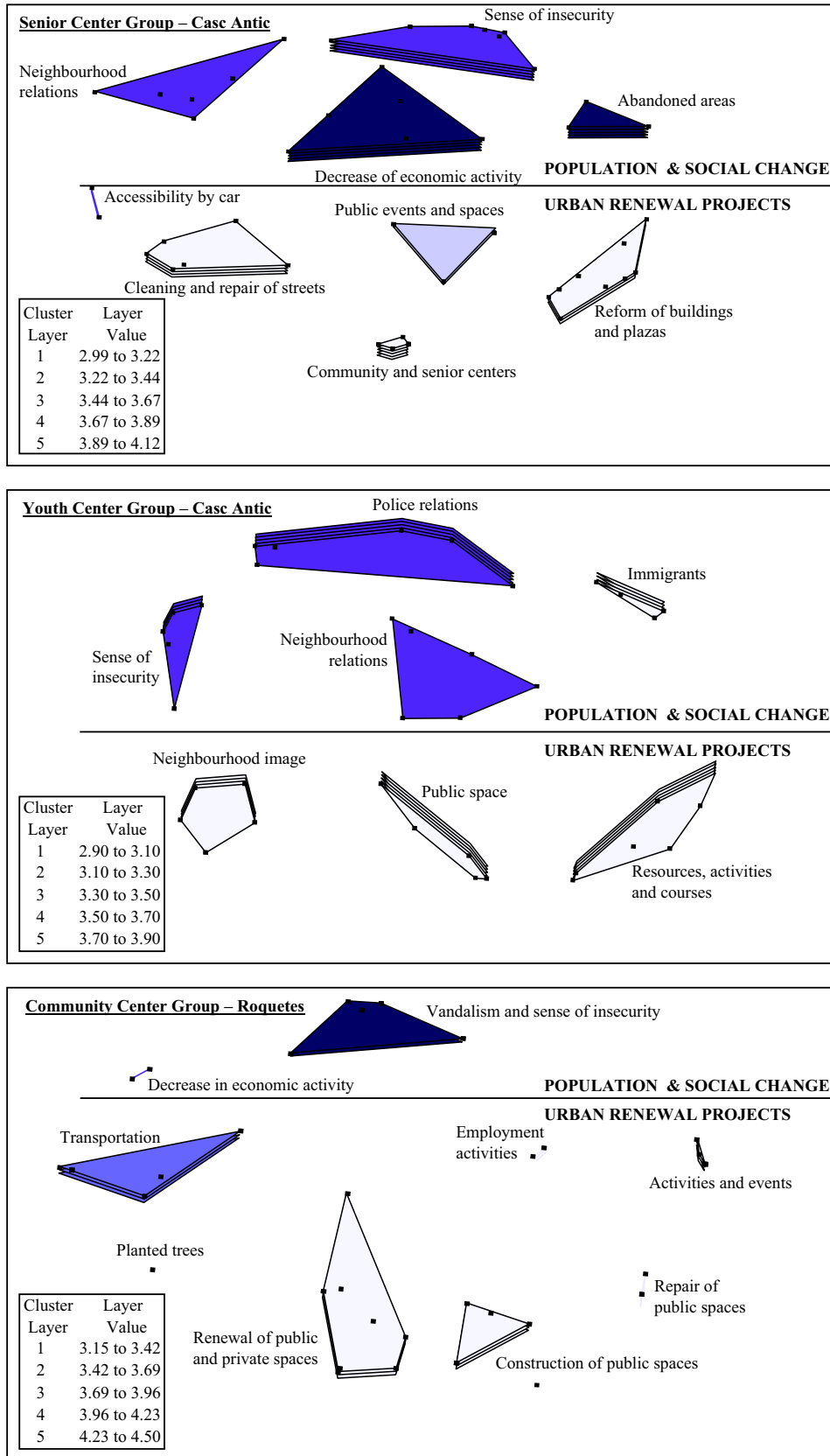


Fig. 1. Cluster rating maps for all three participating groups.

effect while the lightest shade represented most responses determined the change to have a positive effect (0–20%; 21–40%; 41–60%; 61–80%; 81–100%). All maps were rotated in order to

divide the map in two groups, with the “Urban renewal projects” group containing clusters related to the physical changes and social services that formed part of renewal projects including the

Neighborhoods Law, within the neighborhood. All other clusters associated with the population demographics, neighborhood relations and crime, were placed into the group “Population and social changes”.

Across all groups there was a range of clusters perceived as very positive to very negative, with only the Roquetes community group's cluster *Transportation* being perceived as equally positive and negative (neutral).

Common themes were observed for all groups including the cluster, *Sense of insecurity* and clusters describing the reform and construction of public spaces. Within the Casc Antic neighborhood, both the senior and youth groups shared the cluster *Neighborhood relations* and perceived it as having fairly negative effects on their wellbeing with an importance ratings of 2.99 and 2.90, respectively. This cluster contained common statements pertaining to the interaction between residents and the departure of those who have left. However, the senior group extended this cluster to also include issues with the immigrant population in the neighborhood. On the contrary, while similar statements were brought up by the youth center, they were clustered separately in the *Immigrant* cluster perceived as very positive and having an importance rating of 3.62. Within the Roquetes group and the Casc Antic senior groups, the cluster *Decrease in economic activity*, was rated as fairly and very negative respectively and both contained the statement pertaining to the closing of stores and locals.

All groups also had similar positively perceived clusters related to public spaces with statements associated with the construction or repair of these spaces and buildings. Furthermore, these tended to be the clusters that contained statements that were linked to the projects carried out by the Neighborhoods Law intervention such as the construction of the youth center in Casc Antic, and the construction of green spaces in Roquetes.

The division of clusters in the maps by the two sections “Urban renewal projects” and “Population and social change” resulted in the grouping of positive and negative clusters in most cases. The majority of clusters within the “Urban renewal projects” were rated as being very important positive changes across all groups. Exceptions were in the cluster *Accessibility by car*, perceived as fairly negative by the Casc Antic senior group and in the clusters, *Transportation*, and *Planted trees* which were perceived as neutral and very negative respectively by the Roquetes community group. Furthermore, the cluster *Planted trees* appeared as one point although it consists of two overlapping statements, the *surfacing of tree roots in the sidewalks and streets* and the *little maintenance of planted trees*, due to all participants sorting the two statements together in one group.

Within the “Population and social change” section, the majority of clusters were perceived as very or fairly negative by all the groups. The only exception was within the Casc Antic youth group that perceived the cluster of *Immigrants* as very positive for their overall wellbeing.

For concept mapping projects, the average stress values range from 0.205 and 0.365 indicating how accurate the point maps were in indicating the original values of the similarity matrix input (Kane & Trochim, 2007). The Casc Antic senior group had a stress index of 0.30, the youth group 0.25 and the Roquetes community group 0.24, placing all the generated values within the stated accepted ranges.

4. Discussion

Through concept mapping methodology, results from this study indicate that urban renewal projects have some positively perceived effects on the overall wellbeing of residents within our study. As explained within the methods section, the focal question

did not specify the Neighborhoods Law in order to capture a broader sense of changes occurred in the neighborhoods. Furthermore, during the three brainstorming sessions none of the residents made an explicit reference to the Neighborhood Law; however, the majority of projects within the Law were mentioned and perceived as having important positive impacts on participant's overall wellbeing. These findings contribute to a growing area of research dominated mainly by traditional quantitative studies and represent a mixed methods alternative to capture the views of neighborhood residents regarding physical, social and economic changes affecting their wellbeing.

The two neighborhoods had different renewal projects completed based on the needs of each neighborhood and lifecourse trajectories. For example, the aging population and the terrain slopes in Roquetes were driving forces in focusing most of the regeneration on mobility and access throughout the neighborhood, as it is a neighborhood with steep streets. Although the groups formed differed in sociodemographic characteristics, similarities were observed in the perceptions of the changes that had occurred, their importance and effects on the overall wellbeing of neighborhood residents. The majority of clusters across all three groups within the “Urban renewal projects” groups showed as being perceived positive while those within the “Population and social change” groups as mostly negative. However, some exceptions to this pattern highlighted the conflicting perceptions across the different groups. For example, the *Immigrants* cluster in the Casc Antic youth group (mainly consisting of immigrants from Morocco and the Dominican Republic) included statements describing the positive relations amongst immigrants, an example of how ethnic density facilitate cultural networks and social cohesion among immigrants (Bernard et al., 2007). On the other hand, the senior group (all of them of Spanish origin) perceived the arrival of immigrants as having negative effects on their wellbeing. These observations help highlight the importance of considering different populations when evaluating an intervention and its effects on the population's overall wellbeing.

Concept mapping also helped uncover mechanisms of how the Neighborhoods Law and its projects influenced the wellbeing of residents. Within the “Urban renewal projects” section of the map, only two clusters were perceived as negative across all groups, and each consisted of two statements. One was the *Planted trees* cluster in the Roquetes community group containing negative statements describing the poor maintenance of recently planted trees in the area. However, the actual planting of the trees was part of the Neighborhoods Law's project to make the neighborhood greener and was mentioned within the *Renewal of public and private spaces* cluster as a positive change. Another example came from the other negatively perceived cluster, *Accessibility by cars*, within the senior center group in Casc Antic. Even though in recent years urban renewal projects had expanded plazas and created pedestrian friendly zones, participants complained about limited accessibility by car throughout the neighborhood. Such examples not only highlight the problems associated with the sustainability and follow up of projects once the intervention is completed, they also indicate that an intervention can have both positive and negative outcomes.

Our results were consistent with existing research showing the link between urban renewal projects and individual health outcomes through various mechanisms such as mobility within and outside the neighborhood and access to social and employment centers (Northridge et al., 2003; Rydin et al., 2012). Within the two older groups, the senior and community center groups, interventions dealing with mobility within the residence (e.g. installation of elevators) and across the neighborhood (e.g. installation of outdoor public elevators, improvement of sidewalks) were perceived as some of the most important positive changes that had

occurred. Studies have indicated that connectivity throughout the neighborhood and improved sidewalks are key factors in enhancing walkability (Giles-Corti & Donovan, 2003; Renalds et al., 2010; Rydin et al., 2012). Furthermore, these findings contribute to existing studies that describe improvements in traffic conditions and walkability as positively associated to increased physical activity, improved mental health and a decrease in food insecurity (Chung et al., 2011; Edwards & Tsouros, 2006; Eyler et al., 2003; Renalds et al., 2010).

On the other hand, while improvements were made in public transportation, in neighborhoods like Roquetes, participants perceived that in recent years, vehicle traffic worsened with increased traffic flow, and a decrease in parking spaces. Similar perceptions were reported in a health impact study of the renewal of a major street in Sevilla, Spain. Here Venegas-Sánchez et al. (2012) reported that although the overall renewal may be successful in improving general health outcomes such as mortality, self-rated health and mental health, it may also at the same time have negative effects such as an increase in risk of respiratory and cardiovascular disease, migraines, and hearing problems due to reported increases in both air and noise pollutions. This relation is also confirmed in other studies concluding that improvement in transportation and mobility may result in increased traffic flow throughout the neighborhood associated with an increase in air and sound pollution and a decrease in perceptions of traffic safety by residents (Curtis et al., 2002; Morrison et al., 2003).

In addition to physical changes the Neighborhoods Law presented social and employment opportunities. Across all three groups, clusters associated with social and community activities were perceived as having important positive effects on the health of participants. Individuals described the activities offered within the community centers (e.g. language, dance, and painting) as opportunities for the residents to learn new skills while integrating and meeting other residents. A study by Cattell et al. (2008) showed that such spaces provided a social value which decreased stress and helped maintain good health and wellbeing. The Casc Antic youth group and the Roquetes community group discussed employment opportunities including the establishment of employment programs like "Barcelona Activa" and the skills-based courses available, as being important changes with positive effects on their wellbeing. Through discussions, the youth pointed out that the program had given them the support for the job seeking process and opportunities to gain skills in different sectors like construction, tourism and culinary. These findings are in line with studies reporting a positive relationship between employment training centers and health outcomes like mental health attributed to some of the outcomes discussed including an increase in self-confidence to seek jobs (Curtis et al., 2002; Vinokur et al., 2000).

In contrast, all three groups mentioned a worsening of neighborhood relations and the decrease of economic activity within the neighborhood. We know from existing studies that urban renewal projects can increase the cost of living within a neighborhood resulting in displacement of lower socio-economic individuals (Thomson et al. 2009). Furthermore, within the senior group in Casc Antic, some attributed the closure of stores and businesses to the temporary closure of the Santa Caterina market and its effect on local businesses. However, since the perception of closing businesses was viewed amongst both neighborhoods, these changes could once again be attributed to the current economic recession. A quantitative evaluation using control neighborhoods (affected by the recession but unaffected by the regeneration plan) could further test this hypothesis.

One of the strengths of concept mapping for evaluation is its potential to identify various mechanisms that could contribute to the evaluation of complex interventions compared to quantitative

studies that tend to rely heavily on outcome based variables often resulting in premature conclusions of interventions (Curtis et al. 2002). For example, our study highlighted the different perceptions of how employment programs had positive effects on the overall wellbeing of residents. On the other hand, traditional quantitative evaluations would tend to focus on general outcomes (percentage of unemployed pre and post intervention). Such general outcomes may undervalue the intervention due to confounding effects like the current economic recession resulting in Spain's highest unemployment rates (New York Times, 2012). Another strength of the methodology is the ability for participants to not only generate the data but also analyze, interpret the results and provide a collective account of the problem unlike other traditional qualitative methodologies. This data is then illustrated in easy to understand maps which represent the "lived experiences and opinions" of participants.

There were some limitations in the study. The purposive sampling technique used was not ideal but practical for the study in order to find participants who had lived within the neighborhood for the last five years. However, like other traditional qualitative methodologies, concept mapping does not seek to generalize findings to larger populations. Within our three groups, the Casc Antic senior group had slightly fewer participants (12) than the recommended 15 for this methodology (Jackson & Trochim, 2002). However, the number of participants within all our groups was well within the range of studies conducted so far using concept mapping (Rosas & Kane, 2012). In addition, although this sample size did not allow for stratification by age, gender or social class, it was important to consider the demographics of the groups when looking at the changes that were discussed. We know from existing research that the accessibility or usage of an intervention depends on various factors including age, gender and socioeconomic position (Northridge & Freeman, 2011). This led us to conduct the study within two very different groups in the Casc Antic neighborhood, although it is recommended that future studies incorporate more groups in order to strengthen the results. Another limitation was the potential of selection bias where our selection methods overlooked neighbors that had left the neighborhood in recent years and the probability that the move was attributable to changes resulting from the renewal project. The gentrification effect of the "Neighborhoods Law" should be explored with other study designs.

5. Conclusion

This study used concept mapping to evaluate the perceptions of residents living in two neighborhoods intervened by the large-scale urban renewal program Neighborhoods Law. Results indicate that the majority of projects within the Neighborhoods Law were perceived to have both positive and important effects on the wellbeing of residents. These results contribute to the limited evidence of the impacts of urban renewal programs on the health and wellbeing of residents affected.

Furthermore, we highlight key considerations for future evaluations of complex interventions including the need to incorporate different populations of participants, the importance of understanding both positive and negative outcomes of interventions, and to avoid the heavy reliance on traditional general outcome evaluation measures.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.healthplace.2013.04.009>.

References

- de Barcelona, Ajuntament, 2011a. Projecte: treball als barris. Available from: (<http://w27.bcn.cat/porta22/cat/ocupacio/010/index.jsp>) (accessed 12.09.12.).
- de Barcelona, Ajuntament, 2011b. Barcelona, posat guapa. Available from: (http://www.bcn.es/habitatge/esp/reh_bcn_que.shtml) (accessed 28.02.11.).
- de Barcelona, Ajuntament, 2011c. Statistical guides. Barcelona in numbers. Available from: (<http://www.bcn.cat/estadistica/angles/dades/guiabcn/index.htm>) (accessed 22.12.11.).
- Bernard, P., Charafeddine, R., Frohlich, K.L., Daniel, M., Kestens, Y., Potvin, L., 2007. Health inequalities and place: A theoretical conception of neighborhood. *Social Science & Medicine* 65, 1839–1852.
- Cattell, V., Dines, N., Gesler, W., Curtis, S., 2008. Mingling, observing, and lingering: everyday public spaces and their implications for wellbeing and social relations. *Health and Place* 14, 544–561.
- Borja, J., 2005. Un futuro urbano con un corazón antiguo. *Geograficando*. Available from: (http://www.fuentesmemoria.fahce.unlp.edu.ar/art_revistas/pr.3503/pr.3503.pdf).
- Burke, J., O'Campo, P., Peak, G., Gielen, A., McDonnell, K., Trochim, W., 2005. An introduction to concept mapping as a participatory public health research method. *Qualitative Health Research* 15, 1392–1410.
- Chung, W.T., Gallo, W.T., Giunta, N., Canavan, M., Parikh, N.S., Fahs, M.C., 2011. Linking neighborhood characteristics to food insecurity in older adults: the role of perceived safety, social cohesion, and walkability. *Journal of Urban Health* 89, 407–418.
- Concept Systems Incorporated, 2005. The concept system (version 4.0) Ithaca, NY: Concept Systems Incorporated. Available from: (<http://www.conceptsystems.com>).
- Curtis, S., Cave, B., Coutts, A., 2002. Is urban regeneration good for health? Perceptions and theories of the health impact of urban change. *Environment and Planning C: Government and Policy* 20, 517–534.
- Departament de Política Territorial i Obres Públiques (DPTOP), 2009. La Llei de Barris: Una aposta col·lectiva per la cohesió social. Generalitat de Catalunya, Catalunya.
- Districte de Nou Barris, 2010. Projecte d'intervenció integral del barri de Les Roquetes 2004–2010. Ajuntament de Barcelona & Generalitat de Catalunya, Barcelona.
- Edwards, P., Tsouros, A., 2006. Promoting physical activity and active living in urban environments: the role of local governments. World Health Organization, Regional Office for Europe.
- Eyler, A.A., Brownson, R.C., Bacak, S.J., Housemann, R.A., 2003. The epidemiology of walking for physical activity in the United States. *Medicine & Science in Sports and Exercise* 35, 1529–1536.
- Fuertes, C., Pasarín, M.I., Borrell, C., Artazcoz, L., Díez, E., Group of Health in the Neighborhoods., 2012. Feasibility of a community action model oriented to reduce inequalities in health. *Health Policy* 107, 289–295.
- Giles-Corti, B., Donovan, R.J., 2003. Relative influences of individual, social environmental, and physical environmental correlates of walking. *American Journal of Public Health* 93, 1583–1589.
- Haines, V.A., Godley, J., Hawe, P., Shiell, A., 2009. Socioeconomic advantage within a neighborhood, perceived financial security and self-rated health. *Health and Place* 15, 383–389.
- Jackson, K.M., Trochim, M.K., 2002. Concept mapping as an alternative approach for the analysis of open-ended survey responses. *Organizational Research Methods* 5, 307–336.
- Kane, M., Trochim, W.M.K., 2007. *Concept Mapping for Planning and Evaluation*. Sage Publications, California.
- Kruskal, J.B., Wish, M., 1978. *Multidimensional Scaling*. Beverly Hill, CA. Sage Publications.
- Mavaddat, N., Kinmonth, A.L., Sanderson, S., Surtees, P., Bingham, S., Khaw, K.T., 2011. What determines Self-Rated Health (SRH)? A cross-sectional study of SF-36 health domains in the EPIC-Norfolk cohort. *Journal of Epidemiology and Community Health* 65, 800–806.
- Morrison, D., Petticrew, M., Thomson, H., 2003. What are the most effective ways of improving population health through transport interventions? Evidence from systematic reviews. *Journal of Epidemiology and Community Health* 57, 327–333.
- Muntaner, C., Sridharan, S., Solar, O., Benach, J., 2009. Against unjust global distribution of power and money: the report of the WHO comisión on the social determinants of health: global inequality and the future of public health policy. *Journal of Public Health Policy* 30, 163–175.
- Northridge, M.E., Sclar, E., Biswas, P., 2003. Sorting out the connections between the built environment and health: a conceptual framework for navigating pathways and planning health cities. *Journal of Urban Health* 80, 556–568.
- Northridge, M.E., Freeman, L., 2011. Urban planning and health equity. *Journal of Urban Health* 88, 582–597.
- O'Campo, P.O., Burke, J., Peak, G.L., McDonnell, K.A., Gielen, A.C., 2005. Uncovering neighborhood influences on intimate partner violence using concept mapping. *Journal of Epidemiology and Community Health* 59, 603–608.
- Petticrew, M., Kearns, A., Mason, P., Hoy, C., 2009. The SHARP study: a quantitative and qualitative evaluation of the short-term outcomes of housing and neighborhood renewal. *BMC Public Health* 9, 415–429.
- Renalds, A., Smith, T.H., Hale, P.J., 2010. A systematic review of built environment and health. *Family and Community Health* 33, 68–78.
- Rosas, S.R., Kane, M., 2012. Quality and rigor of the concept mapping methodology: a pooled study analysis. *Evaluation and Program Planning* 35, 236–245.
- Rydin, Y., Bleahu, A., Davies, M., Dávila, J.D., Friel, S., DeGrandis, G., et al., 2012. Shaping cities for health: complexity and the planning of urban environments in the 21st century. *The Lancet/UCL*, London.
- Simon, J.G., De Boer, J.B., Joung, I.M.A., Bosma, H., Mackenbach, J.P., 2005. How is your health in general? A qualitative study on self-assessed health. *European Journal of Public Health* 15, 200–208.
- Singh-Manoux, A., Martikainen, P., Ferrie, J., Zins, M., Marmot, M., Goldberg, M., 2006. What does self rated health measure? Results from the British Whitehall II and French Gazel cohort studies. *Journal of Epidemiology and Community Health* 60, 364–372.
- Spaans, M., 2004. The implementation of urban regeneration projects in Europe: Global ambitions, local matters. *Journal of Urban Design* 9, 335–349.
- Tashakkori, A., Teddlie, C.B., 2002. *Handbook of Mixed Methods Social and Behavioural Research*. Sage Publications, California.
- The New York Times, 2012. Topics: Spain. Available from: (<http://topics.nytimes.com/top/news/international/countriesandterritories/spain/index.html>) (accessed 18.09.12.).
- Thomson, H., Atkinson, R., Petticrew, M., Kearns, A., 2006. Do urban regeneration programmes improve public health and reduce health inequalities? A synthesis of the evidence from UK policy and practice (1980–2004). *Journal of Epidemiology and Community Health* 60, 108–115.
- Thomson, H., Morrison, D., Petticrew, M., 2007. The health impacts of housing-led regeneration: a prospective controlled study. *Journal of Epidemiology and Community Health* 61, 211–214.
- Thomson, H., 2008. A dose of realism for healthy urban policy: lessons from area-based initiatives in the UK. *Journal of Epidemiology and Community Health* 62, 932–936.
- Thomson, H., Thomas, S., Sellstrom, E., Petticrew, M., 2009. The health impacts of housing improvements: A systematic review of intervention studies from 1887 to 2007. *American Journal of Public Health* 99, 681–692.
- Trochim, W., 1989. An introduction to concept mapping for planning and evaluation. Found in: *Special Issue of Evaluation and Program Planning* 12, 1–16.
- United Nations, 2010. *World urbanization prospects: the 2009 revision*. Department of Economic and Social Affairs, Population Division, New York.
- Venegas-Sánchez, J., Rivadeneyra-Sicilia, A., Bolívar-Muñoz, J., López-Fernández, L.A., Martín-Olmedo, P., Fernández-Ajuria, A., et al., 2012. Evaluación del impacto en la salud del proyecto de reurbanización de la calle San Fernando en Alcalá de Guadaíra (Sevilla). *Gaceta Sanitaria* 27, 233–240.
- Vinokur, A.D., Schul, Y., Vuori, J., Price, R.H., 2000. Two years after a job loss: long-term impact of the JOBS program on reemployment and mental health. *Journal of Occupational Health and Psychology* 5, 32–47.
- World Bank, 2012. *Urban population Percentages*. Available from: (<http://data.worldbank.org/topic/urban-development>) (accessed 4.09.12.).