Is a geographical approach worthwhile for epidemiological research in mental health?

Commentary on: Astell-Burt T Feng X (2015). Present and future challenges for understanding the role of geographic context on mental health. *Epidemiology and Psychiatric Sciences* (doi: xxx).

The article from Astell-Burt and Feng, published on this issue of *Epidemiology and Psychiatric Sciences*, gives us a good opportunity to discuss the use of the health geography approach in mental health research.

The study of the relationship between socioeconomic conditions and mental health is of crucial importance for all those interested in the determinants of mental health and in the evaluation of mental health services at different spatial levels. Socioeconomic conditions can be measured both at the individual level and ecological level. In the past, the ecological level was used as a proxy of individual conditions when it was difficult to obtain data on single patients. In mental health research, in particular, we are interested in measuring ecological variables *per se*, as we should imagine a model where the socioeconomic conditions of the place where a person lives, together with his/her individual characteristics, could influence the onset of a mental disorder, could act as a mediator of service utilisation, and could delay or speed up the recovery process.

Socioeconomic status (SES) is a complex concept with no universal definition. When one looks at the international research literature on SES, it is evident that it is related to social class, social position, occupational status, educational attainment, income, wealth and standard of living (Bonizzato & Tello, 2003). It also appears that there are different ways of measuring SES; more often, the measure is country-specific and related to the different questions asked in national population censuses. For example, a number of well-known census-based SES indices in the UK, such as those developed by Jarman (1983) and Townsend (1987), include the census variable 'car ownership' as an indicator of SES. However, in other countries, such as Italy, this question is not asked in a national census. Accordingly, many SES indices are country or even place-specific – for example, the Carstairs indices developed in Scotland (Carstairs & Morris, 1991), a community-based index created in Turin, Italy (Cadum *et al.* 1999), the Rome SES index (Michelozzi *et al.* 1999), the deprivation index of the Tuscany region in Italy (Regione Toscana, 2001), the Barcelona index from Spain (Benach *et al.* 2001), and recently, a deprivation index based on structural equations applied in Andalusia (Rodero-Cosano *et al.* 2014).

Most of these indices of SES are based on the economic concept of *utility*, which refers to the amount of material goods that a person owns or desires. The Nobel Prize winner Amartya Sen (1992) has proposed replacing the concept of *utility* with the concept of *capability* in assessing inequalities. Capability is defined by Sen as: '*The capability of a person reflects the alternative combination of functionings the person can achieve, and from which he or she can choose one collection. The approach is based on a view of living as a combination of various "doings and beings", with quality of life to be assessed in terms of the capability to achieve valuable functionings.*'

Sen demonstrated that the incidence of *deprivation*, in terms of *capability*, can be surprisingly high, even in the most developed countries of the world. For this reason, interest on this new concept has grown among mental health researchers, aware that relative deprivation in their own countries has an impact upon the epidemiology of disease and on the utilisation of mental health services.

Astell-Burt and Feng show in their article how complex the task of studying the relations between the place where a person lives and her/his mental health is ('place effects').

Most of the studies conducted in this field, using a geographical approach, have reached discordant results. Generally, people with a more deprived

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individual SES are more likely to have higher levels of psychiatric morbidity, especially in relation to rates of depression and anxiety disorders (Amaddeo & Jones, 2007). At the individual level, lower SES groups are more likely to be compulsorily admitted and to have a longer average length of stay in the hospital (Lorant *et al.* 2003). The risk of schizophrenia proved to be inversely associated with SES, and the SES of the family of origin was significantly associated with schizophrenic subtype (Jones *et al.* 2008). Low SES is also associated with an increased risk of suicide (Li *et al.* 2011) and depression persistence (Melchior *et al.* 2010). Although the differences among studies make a comparison difficult, a large body of evidence from US and European cities is summarised in Curtis *et al.* (2006), who report that poverty and socioeconomic deprivation, social fragmentation, high concentration of minority ethnic groups and close spatial proximity to services are positively associated at the local level with higher levels of psychiatric hospital use. Moreover, as summarised in Drukker *et al.* (2007), evidence for an association between neighbourhood SES and community mental health service use has also been found, especially for children, and neighbourhood socioeconomic deprivation was found to be positively associated with psychopharmacological prescription of antipsychotic and anxiolytic drugs (Crump *et al.* 2011). Among a wider range of environmental factors, resources, such as leisure and park facilities, day-care centres, social activities and other institutional resources, are usually more scarce in poor neighbourhoods (Leventhal & Brooks-Gunn, 2000), and it seems plausible that the effect of neighbourhood characteristics increases in particular groups, such as the elderly and people in psychiatric treatment, whose activity space and mobility are limited (Gale *et al.* 2011; Vallée *et al.* 2011). Concerning urban–rural differences, Peen *et al.* (2010), reviewing the literature, suggested marginally higher overall prevalence rates of psychiatric disorders in urban areas. A range of socioenvironmental markers measured across the life course (including discrimination, social fragmentation, isolation and other forms of social disadvantage) are known to be associated with increased rates of psychotic illness (Kirkbride *et al.* 2010). However, when more advanced techniques of spatial analysis are used and combined with standard service mapping, the urban–rural differences in schizophrenia are not so clear. The spatial analysis of schizophrenia in Granada (Andalusia, Spain) used a combined MOEA/HS technique and the DESDE mapping tool for standard assessment of service availability (Salvador-carulla *et al.* 2006). It showed that the main clusters of schizophrenia were actually in rural areas, some of them with very low service availability

(Moreno *et al.* 2008). These findings show the importance of using combined spatial and non-spatial approaches.

Donisi *et al.* (2013) showed that treated prevalence for schizophrenia increases with deprivation, while the incidence does not significantly vary according to SES. If we consider incidence as being a proxy of access to care and prevalence as being a proxy of continuity of care, this result seems to indicate that patients from more deprived areas keep more in contact with services, while SES does not influence accessibility. In the same study, the role of socioeconomic deprivation on the quantity of service use was explored; deprivation increased the number of community service contacts and decreased the number of home visits but not of inpatient admissions.

In addition to SES studies, various spatial data analysis methods are used to identify and locate groups of close spatial units (i.e., small health areas or municipalities) where the psychiatric prevalence/incidence is significantly high (hot spots) or low (cold spots). Examples of this approach are the study of the relationship between clusters of mental disorders due to psychoactive substance use; neurotic, stress-related and somatoform disorders; and poverty and neighbourhood social disorganisation in Malmö (Sweden) (Chaix *et al.* 2006); the variation in the incidence of psychotic disorders in urban areas in Southeast London (Kirkbride *et al.* 2007); the relationship between schizophrenia admission rates and socioeconomic characteristics in counties in the USA (Fortney *et al.* 2009); the study of the correlation between mental retardation and clusters of developmental delay (Zhen *et al.* 2009); the analysis of spatial patterns of mental health in the slums of Dhaka (Bangladesh) (Gruebner *et al.* 2011); or the detection of spatial clusters of schizophrenia in Andalusia and depression in Catalonia (Spain) (Moreno *et al.* 2008; García-Alonso *et al.* 2010; Salinas-Perez *et al.* 2012).

Another relevant spatial component that can be assessed with a geographical approach is distance, considered as a proxy of spatial accessibility to health services. Haynes *et al.* (1999) used distance as a convenient, although crude, summary measure of relative differences in geographical accessibility. They were interested in the effect of distance on hospital inpatient episodes, and they pointed out that, controlling for needs and provision, distance to hospital produced a 37% reduction in psychiatric episodes. Later, Zulian *et al.* (2011) demonstrated in an Italian Department of Mental Health that the caseload (number of patients using services) decreased with increasing distance; at a distance of 10 km, there was a decrease of 80, 60 and 85% for day-care facilities, inpatients wards and outpatients clinics, respectively. Again, in this case, different techniques to estimate geographical

accessibility may yield very different results, and combined approaches may be needed in future studies.

For example, in a recent study published in 2012 by Ngamini-Ngui and Vanasse (2012), a complex measure of spatial accessibility to mental health facilities was used in an urban context; the results of this study show that mental health services are not equally distributed in the city of Montreal. The approach to estimate the spatial accessibility in this study combined two types of measures into a single index: geographical accessibility (how physically accessible resources are for the population) and availability (what resources are available and in what amount).

The results of studies that include a geographical approach will contribute to a deeper insight into the contextual determinants of mental disorders and will help us to develop the principal tools required for promoting mental health, prevent illnesses, and develop and maintain modern, effective and safe mental health services that can be accessed and used by all those who need them.

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