

Geoethics and hazard education. A comparison between Calabria (Southern Italy) and Malta

F. De Pascale¹, M. Bernardo¹, F. Muto¹, S. D'Amico², R. Zumbo²

¹ University of Calabria, Cosenza, Italy;

² University of Malta, Msida, Malta.

E-mail: francesco.depascale@unical.it, bernardo@unical.it, francesco.muto@unical.it, sebdamico@gmail.com



Abstract

The occurrence of moderate and large natural disasters has shown the importance of the understanding the psychological damage resulting from such catastrophic events. In this context the relatively new discipline known as Emergency Psychology plays a key role. It deals with the study, prevention and treatment of psychic phenomena, cognitive and behavioral arising in emergency situations, in harmony with geoethical principles. It can work in collaboration with Medical Geography. The name of Medical Geography was first used by doctors of the eighteenth and nineteenth century to denote the complex relationships between the morbid phenomena and the different environments and cultures, according to an intuition of Hippocrates (Fig. 1, "Hippocratic Triangle"), who placed well in evidence the importance of cultural and environmental factors in the spread of diseases.

Emergency Psychology also promotes the management of human defenses in order to prevent a particularly stressful event procure a permanent discomfort in the individual and in the community. It consists of two general areas: Collective Emergency Psychology: deals with the effects of extreme traumatic events that affect entire communities, such as: natural disasters, disasters and serious socio-political situations. In these cases the critical event is collective. The Individual Emergency Psychology is concerned, however, the effects of extreme events that affect the individual directly or to which is to assist or information obtained in relation to loved ones, such as socio-existential events, clinical situations. In all these cases, the critical event threatens the individual's left traumatized.

Children who have experienced traumatic stress often require an individual approach in order to help him to revisit the traumatic event and to give proper meaning to the experience.

It is recommended, therefore, a specific therapeutic procedure to enable the child to describe in detail the traumatic experience and understand the meaning of their reactions.

The design, the game and handling are a key to access the mental representation of the traumatic event that the child has formed. They are also used as indicators of the child experience and how he solves the traumatic elements of the event.

The present work aims to collect testimonies and mental maps of drawn by Calabria (Southern Italy) and Malta students. A critical comparison was made on the natural disasters experiences reported by students.

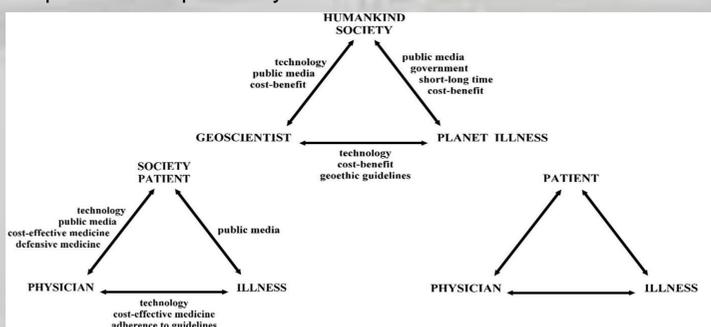


Fig. 1. Factors affecting the Hippocratic triangle [inspired by Antoniou et al. 2010], in medicine (physician, illness, patient/society) and the geological sciences (geoscientists, Planet 'illness' – hazards, human imprinting – and society). Bottom right: The early relationships according to Hippocrates. Bottom left: In medicine today. Top: The geoscientists equivalent. From: Matteucci et al., 2012.

Methodology

A questionnaire was given to students and adults in Calabria (southern Italy), a region of medium-high seismic hazard. The same questionnaire was given to students in Malta, a zone of low-to-moderate seismic hazard where awareness of human action, decisive in turning an extreme event in a disaster has emerged in the results (Fig. 4). In this questionnaire, the knowledge effectively possessed on the behaviors to adopt in case of earthquake is evaluated (relating to age, experience and area of origin), and analogous and differing perceptions of earthquakes are highlighted (Fig. 2-4). The final question asked the pupil to design a "mental map" regarding what to do should an earthquake occur while they are in the classroom with classmates and the teacher. The earthquake produces an intense emotional shock: the purpose of the research is to explore emotions, to be able to dominate them in emergency situations.

Results

Firstly fear and then confusion are the most widespread reactions among the pupils. As suggested by Boschi (Minciaroni, 2012), fear is a justified and positive sentiment when buildings are poorly constructed. The fear which true danger triggers causes us to behave in such a way as to avoid that danger, while panic, even when generated by true danger, leads to dysfunctional and, sometimes, dangerous behaviour.

With the continuous repetition of the shock, the addiction takes the place of fear and it begins to fit in his intervals. In this research, students tend to get used and in some cases replaced by indifference. But the fear remains. According to studies by Gabriella Arena (1992), people living in seismogenic areas coexist with the seismic risk, knowing in advance that the earthquake can destroy their possessions and their lives, but they do not know when. Therefore, every shock generates panic, because even the slightest telluric movement, even one due to simple adjustment, can be the beginning of the catastrophe. And then perhaps, it is precisely in areas of high seismic risk that you can die of fear, before, during and after the disaster. First, because it is feared that then disaster strikes, later, because it is feared that it heralds another (Arena, 1992, p. 92).

Another study by researchers of the European Mediterranean Seismological Centre (EMSC) assumes that the more frequently earthquakes are felt, the higher the level of shaking needed for the public to become alarmed. The approach, named *flash sourcing* (Bossu et al., 2011), is based on the real-time detection and processing of traffic surges observed on the EMSC Website after widely felt earthquakes. Such surges are common on rapid earthquake information websites such as that of the EMSC (Wald and Schwarz, 2000; Schwarz, 2004). More studies are needed to evaluate whether the intensity above which people become alarmed changes as a function of the frequency of felt earthquakes. The flash-sourcing approach does not replace any monitoring techniques or any macroseismic studies, but it does give insight on the public reaction to a significant earthquake. As such, it could probably help to better target awareness initiatives and communication of earthquake risk and might provide new insights into the reporting of historical earthquakes (Bossu et al., 2014).

In the minutes following the Mineral earthquake, by considering the visitors as earthquake sensors, the researchers were able to locate the epicenter with 30 km accuracy. This further supports the hypothesis that the traffic surges observed immediately after felt earthquakes are caused by eyewitnesses who felt the ground shaking and rushed onto the Internet for earthquake information. Identifying a higher ratio of the number of new visitors to the number of inhabitants could discriminate localities where the public is alarmed by the shaking (Bossu et al., 2014).

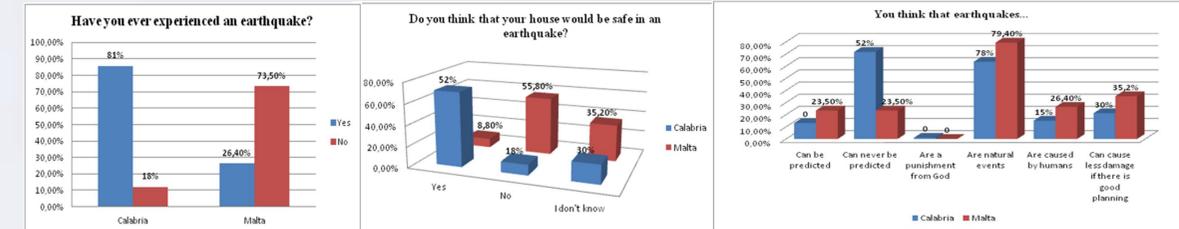


Fig. 2-4. Data as a percentage of Calabria and Malta students' answers to the questions: "Have you ever experienced an earthquake?"; "Do you think that your house would be safe in an earthquake?" and "You think that earthquakes..."

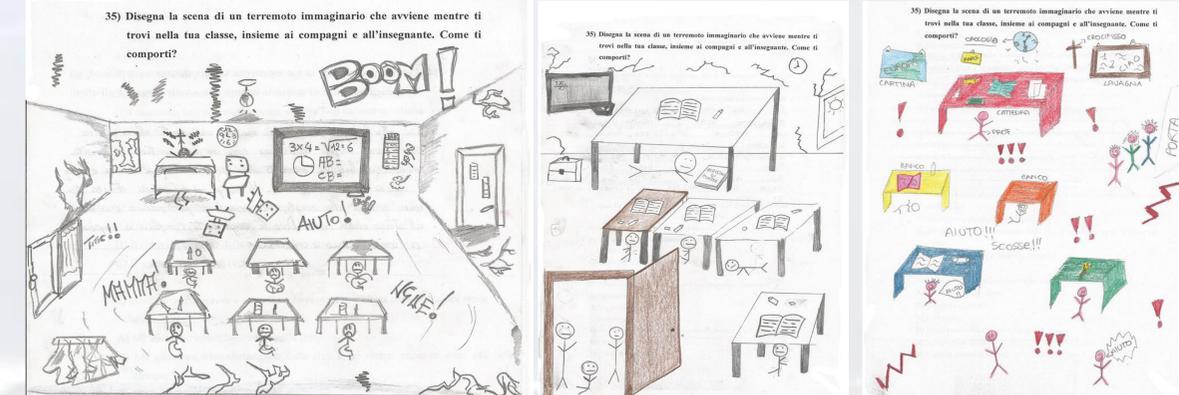


Fig. 5-7. Advanced mental maps of fifth-class, in which the particular moment of chaos during the earthquake is depicted in detail.

Analyzing the mental maps, the most unique were designed by the students of secondary school of Tortora, Calabria, South Italy: in fact, some detailed maps of "fourth and fifth grade" in which they are also depicted objects in the classroom, as clock, map, books, pens, the crucifix, calendar etc., are distinguished in this context (Fig. 5-7). In some maps, the students were proficient to represent the moment of typical chaos of an earthquake, bringing well exclamations help and panic (Fig. 5-7). In others maps, we can notice even the clock to pieces as a symbol of the time that it is "broken", which it stopped during the shock. A strong shock, in fact, is as if it would block the space-time knowledge in a given time and then it dilates the event moment marking it in the memory (Mazzoleni, 2005, p. 147).

Conclusions

Geoethics, in collaboration with Medical Geography, can find the correct solutions for the preservation of the Earth system and the health of its inhabitants. Any failure of the natural environment also produces untold damage to human health (Palagiano and Pesaresi, 2011, p. 86). The risk education, although is not the most effective tool in the immediate time, is certainly effective in a long time, and especially it allows to obtain a lasting effect over time (Peppoloni, 2014, p. 131). Therefore, the challenge of the transfer of effective information and proper education to new generations must be won, and geographers and geologists, together with the scientific community, have an ethical obligation to be at the forefront in this context.

References

- G. Arena, *Convivere con il rischio sismico. Assuefazione allo stress?*, in C. Palagiano, G. De Santis e M.G. Scifoni (a cura di), *Atti del Quarto Seminario Internazionale di Geografia Medica (Roma, 4-6 dicembre 1991)*, Perugia, Ed. Rux, 1992, pp. 75-94.
- R. Bossu, S. Gilles, G. Mazet-Roux, F. Roussel, L. Frobert, L. Kamb, *Flash sourcing, or rapid detection and characterization of earthquake effects through website traffic analysis*, in "Ann. Geophys.", 2011, 54, no. 6: 716-727, doi: 10.4401/ag-5265.
- R. Bossu, S. Lefebvre, Y. Cansi, G. Mazet-Roux, *Characterization of the 2011 Mineral, Virginia, Earthquake Effects and Epicenter from Website Traffic Analysis*, in "Seismological Research Letters", 2014, 85, 1: 91-97.
- R. Matteucci, G. Gosso, S. Peppoloni, S. Piacente, J. Wasowski, *A Hippocratic Oath for geologists?* In "Annals of Geophysics", 2012, 55 (3), pp. 365-369; doi:10.4401/ag-5650.
- D. Mazzoleni, A. Verderosa, E. Colaci, *Identità ambientale e terremoto del 1980 nella percezione soggettiva: il caso di Lioni*, in D. Mazzoleni, M. Sepe (a cura di), *Rischio sismico, paesaggio, architettura: l'Irpinia, contributi per un progetto*, Napoli, CRdC, AMRA, 2005, pp. 130-157.
- S. Minciaroni, *Terremoto, Boschi: "la paura? Non l'ho mai provata. Santamecchi" è come un cobra*. Intervista ad Enzo Boschi, in <http://tuttoggi.info/articolo/49154/>, 26 ottobre 2012.
- C. Palagiano, C. Pesaresi, *La salute nel mondo. Geografia medica e qualità della vita*, Roma, Carocci editore, 2011.
- S. Peppoloni, *Convivere con i rischi naturali. Conoscerci per difendersi*, Bologna, Il Mulino, 2014.
- S. Schwarz, *Cyberseismology and teachable moments*, in "Seismol. Res. Lett.", 2004, 75, no. 6:749.
- L. Wald, S. Schwarz, *The 1999 Southern California network bulletin*, in "Seismol. Res. Lett.", 2000, 71, 2000, no. 4: 401-422.