One of the defining characteristics of traumatic events is their capacity for provoking intense feelings of terror, horror, fear and helplessness, as they represent a serious threat to the life and well-being of individuals (APA, 2000). The profound effect of such events on many people who are exposed to them is well documented (Miguel-Tobal, González Ordi & López Ortega, 2000; Wilson, 2004), and there is no more pertinent example than that of terrorist attacks, events caused by other human beings that generate interpersonal violence in a deliberate manner (Fullerton, Ursano, Norwood & Holloway, 2003).

Widely known epidemiological studies on the repercussions of terrorist actions such as the Sarin gas attack on the Tokyo subway in 1994 and the bombing of the Federal Murrah building in Oklahoma City in 1995, or more recently, the attacks on the Twin Towers in New York and the Pentagon in Washington on September 11, 2001, clearly reveal the enormous impact, both psychological and social/community, of such events on the population.

At a psychopathological level, the research indicates that among the most prevalent disorders associated with the traumatic response in people affected by terrorism or other types of disaster with comparable effects are post-traumatic stress disorder, depression, panic disorder, generalized anxiety disorder and increased use and abuse of drugs and alcohol (Breslau, Davis, Andreski & Peterson, 1991; Kessler, Sonnega, Bromet, Hughes & Nelson, 1995; Kessler, Sonnega, Bromet, Hughes, Nelson & Breslau, 1999; North, Nixon, Shariat, Mallonee, McMillen, Spitzmagel & Smith, 1999; Vlahov, Galea, Ahern, Resnick, Boscarno, Gold, Bucuvalas & Kilpatrick, 2004).

North, Nixon, Shariat, Mallonee, McMillen,
Spitzmagel and Smith (1999) studied the psychological effects of the Oklahoma City bombing in 1995 on the survivors of the attack, finding that, as regards the most notable psychopathological consequences, 34.3% were suffering from post-traumatic stress disorder and 22.5% from depression, 9.4% were consuming excessive drugs and alcohol, 6.6% had panic disorder, and 4.4% had generalized anxiety disorder.

Since the events of September 11 in New York and Washington, research interest in the psychological impact of terrorism has increased exponentially. A range of studies carried out since the attack on the Twin Towers have reported the profound psychological effects on both New Yorkers (Boscarino, Galea, Ahern, Resnick & Vlahov, 2002; Galea, Ahern, Resnick, Kilpatrick, Bucuvalas, Gold & Vlahov, 2002; Galea, Vlahov, Resnick, Ahern, Susser, Gold, Bucuvalas & Kilpatrick, 2003; Piotrkowski & Brannen, 2002) and the American population in general (Schuster et al., 2001; Silver, Holman, McIntosh, Poulin & Gil-Rivas, 2002).

A month after the attack in Manhattan, Galea et al. (2002) found rates of incidence of 7.5% for post-traumatic stress disorder (20% in “Ground Zero”) and of 9.7% for depression among New Yorkers, even if these rates fell considerably over the following months, at least in the population directly affected (Galea et al., 2003).

Moreover, residual psychological effects endured among the US population in general. Two months after the disasters in New York and Washington, it is estimated that around 12% of the country’s inhabitants presented clinically significant psychological disturbances (Schlenger et al., 2002), while between 25% and 30% showed anxiety and avoidance behaviours with regard to situations that reminded them of 9/11 (Silver et al., 2002). Six months after the events, two-thirds of Americans reported being still afraid of future terrorist attacks that could endanger their lives and the lives of those close to them (Silver et al., 2002). Even two years after the events, two-thirds of New Yorkers continued to be fearful about the possibility of another terrorist attack on their city, and around a third of those studied claimed to have been unable to normalize their life (Kleinfield & Connelly, 2003).

At a psychosocial and community level, among the most notable effects of terrorist attacks are feelings of lack of security, fear of future attacks and their unpredictability, feelings of generalized fear, feelings of loss or mourning at a national level, lack of confidence in institutions and sensations of a disturbance of order in the community (Fullerton, Ursano, Norwood & Holloway, 2003).

Both the post-traumatic impact at an individual psychological level and the psychosocial consequences for the community, which can reverberate for a very long time after the traumatic events themselves, lend great current relevance to the study of the effects of terrorist attacks in the fields of psychology, medicine and sociology.

The terrorist bombings of March 11, 2004 in Madrid – popularly referred to as 11-M –, which left 192 dead and more than 1800 injured, had consequences for a large number of people in the form of psychological effects of different types and severity, with the result that a substantial proportion of Madrid’s citizens reacted in a clinically significant manner.

HOW THE RESEARCH PROJECT ON 11-M ORIGINATED

The authors of the present article participated in the psychological support operations organized by the Madrid branch of the Spanish Psychological Association (Colegio Oficial de Psicólogos, COP). Specifically, we were part of the team providing psychological support for the professionals and volunteers working in the IFEMA (crisis centre for victims and families) on March 11th and 12th. This initial function became extended, as the hours passed, to direct assistance to relatives and close friends of the victims.

The intense experiences of those days and the enormous impact of the events led us to consider the need to assess the consequences they might have, not only for those most directly exposed to the effects of the attacks (victims, relatives, emergency services personnel, etc.), but also on the population of Madrid in general. Thus, on March 13th, we contacted Dr. Sandro Galea of the Center for Urban Epidemiologic Studies at the New York Academy of Medicine, the director of the studies carried out on the psychological consequences of 9/11 on the population of New York (see Galea et al., 2002 and 2003).

Over the next few days we sketched out the general outline of the research project, the methodological aspects and the adaptation of the WTCD – the instrument used in the New York study – to the characteristics
of the events that occurred in Madrid and to those of the city’s population.

Framework of the studies and samples
We carried out three longitudinal studies, with assessments at three points: 5-12 weeks, 6-7 months and 1 year after the terrorist attacks. The results presented in this article refer to the data obtained in the first assessment.

Study on the general population
The study included 1265 people aged over 18 and resident in the 21 urban districts of the city of Madrid. We also carried out oversampling of the three areas most directly affected by the explosions (Atocha, El Pozo and Santa Eugenia), with n=324. A total of 1589 interviews were carried out.

Study on victims and close friends
This study included 117 people who had been directly exposed to the bombings (passengers on the trains involved) or who had dead or injured among their families or close friends.

Study on emergency services personnel
Participants in this study were 165 people directly involved in the rescue and support operations, including, among others, police, psychologists and doctors.

The main objectives of these studies were to assess the prevalence of psychopathology and its evolution and to establish predictors of vulnerability and protection or resistance. In addition to these main objectives, we considered a series of others related to the impact on the population of Madrid in aspects such as use of alcohol, tobacco and other drugs, worry, other traumatic experiences, or stressful life events.

DATA COLLECTION
Data were collected by means of telephone interview using the PE-11M instrument (an adaptation and modification of the WTCD employed in New York). This interview consists of 16 modules, with more than 300 variables, including demographic data, experiences related to the attack, substance use, social support, panic attack, exposure to traumatic events in the course of one’s life, recent stressors, depression, and post-traumatic stress disorder. The clinical scales follow the diagnostic criteria of the DSM.

It is important to point out that the aim of this interview was not simply to gather data for a research project, but also to assess the needs of the person interviewed. Thus, the module with which the interview concludes is devoted to rating the current state of the interviewees, so that, where appropriate, they can be counselled and provided with help.

Duration of the interview was approximately 30 minutes. For collecting the data for the different studies it was necessary to set up 30 telephone lines at the Psychology Faculty of Madrid’s Complutense University (UCM) and to train 80 volunteer interviewers, in order to provide a service from 10.00 to 21.00 hrs from Monday to Saturday for the duration of this study phase. The majority of those employed were psychologists who had completed or were still studying for the Masters course in Intervention in Anxiety and Stress at the UCM, but the volunteers also included doctoral students and psychologists from the training courses in Emergencies and Disasters run by the COP.

For the study of the general population it was necessary to carry out a careful random sampling of residents in the 21 urban districts of Madrid so that the sample was representative of the population, assigning to each district a weight in the total sample equivalent to that district’s percentage of the total population of Madrid. We controlled for the sex variable using a ratio of 1 man to 1.1 women, in accordance with the most recent Madrid census; this criterion was also used in the oversampling of the affected areas, which was carried out among residents in a radius of 1 km around the points at which the bombs exploded.

The studies on victims and those close to them, and on emergency services personnel, obviously did not require a random sampling process. Data for these studies came from interviews carried out with people from these two groups who had previously provided their telephone number.

RESULTS
We report the principal results of a psychopathological nature obtained in each one of the studies. These results and others specific to each study can be consulted in the recent Special Issue of the Spanish journal Ansiedad y Estrés, vol. 10, 2-3, 2004, which includes four detailed works on the issues dealt with here (Miguel Tobal & Martínez Sánchez, 2004).
**General population**

As already mentioned, the total sample was made up of 1589 participants, of whom 1265 were residents of the 21 urban districts of Madrid and 324 were from the areas directly affected. By gender, 47.1% of the sample were men and 52.1% were women; the remaining 0.8% did not specify their sex. Age range was 18 to 92 years, with a mean of 47 years.

As data relevant to exposure to the terrorist attacks, 5.6% of the sample from the 21 urban districts of Madrid personally witnessed some relevant aspect of the events, compared to 29.7% of those living in the affected areas. Likewise, among the first group, 8.8% knew someone who was injured, 7.5% someone who died, and 3% both someone who was injured and someone who died. In the affected areas, these percentages rose to 17.3%, 16% and 12.3%, respectively. Clearly, proximity of residence to the scenes of the bombings considerably increased their impact.

Of particular interest is the time interval between hearing about the events and finding out that one’s loved ones are safe. This period is experienced with great negative emotionality, and serves as a breeding ground for psychopathological reactions, among them panic attack. It should also be borne in mind that in many disaster situations the telephone lines become jammed, as indeed occurred on this occasion, increasing anxiety, frustration and the anticipation of negative consequences. Mean time elapsed for the inhabitants of Madrid between learning about the attacks and discovering that their close ones were safe was 3.5 hours. This figure rose to 5.5 hours in the case of friends and acquaintances.

A total of 10.9% of the general population experienced symptoms that on the whole meet the diagnostic criteria of panic attack. Women were 2.2 times more likely to suffer than men, with 14.6% of women affected compared to 6.7% of men. In the areas most directly affected, incidence of panic attack rose to 16.3% of the population.

As regards the prevalence of depression, 8% of Madrid’s population have presented, since 11-M, symptoms that fulfill the diagnostic criteria of major depression. In this case, women were affected twice as much as men, with rates for major depression of 5.1% in men and 10.6% in women. The overall figure rose to 9.8% in the areas directly affected.

Assessment of post-traumatic stress disorder is more complex, since it involves knowing the percentage of those affected after an event and how many of these cases are unequivocally attributable to the event in question, since there may be cumulative effects, or cases attributable to other factors (e.g., a mugging or a serious accident, which, naturally, continued to occur independently of the event that concerns us here). Some 4% of Madrid’s population was affected by post-traumatic stress disorder one month after the events of 11-M, with 2.8% of men meeting the diagnostic criteria, as against 5.1% of women. The figure for those affected rose to 4.8% in the areas directly affected. Nevertheless, the percentage of post-traumatic stress directly attributable to the terrorist attacks is estimated at 2.3% of the general population.

From the data presented it can be estimated that since 11-M, 9.5% of the population of Madrid has been affected by depression or post-traumatic stress, 8.4% of which can be directly attributed to the terrorist bombings. A smaller number of people have been affected by the two disorders concurrently: in this case, 2% of the population in the wake of 11-M, of which 1.4% can be directly attributed to the attacks.

**Victims and their families and friends**

The study sample was made up of 117 people who were direct victims of the bombings or whose relatives and/or close friends were among the dead and/or injured. By gender, 59% of the sample were women and 40% were men (1% did not specify); mean age was 39.8 years.

A total of 66.1% of the sample had a family member who died in the attacks, and 87.9% had a friend or acquaintance among the dead. Just 7.7% of those interviewed suffered injuries themselves, with different degrees of seriousness.

As expected, given the intensity of the impact, this group presents the highest psychopathological prevalence of all those studied. Panic attack was suffered by 45.3% on receiving the news or shortly afterwards, and women were affected almost three times more than men, with figures of 73.6% and 26.4%, respectively.

Depression affected 31.3% of those in this group, with women once again more susceptible than men: 71.4%, compared to 22.9%.

As regards post-traumatic stress, the figures here are also considerably higher than those found in the general population. A total of 35.9% of the members of this
group met the diagnostic criteria one month after the bombings. In this case, the percentage of women is four times higher than that of men, at 76.2%, compared to 19%. It is especially significant that more than 3 out of 4 women in this group developed post-traumatic stress disorder.

Finally, comorbidity between depression and post-traumatic stress is also much higher than in the general population, with 18.8% of this group presenting the two disorders concurrently.

**Emergency services personnel**

This group consisted of 165 people who participated in different rescue and support operations, of whom 30.1% were men and 69.9% were women, with a mean age of 34.9 years. Among the professionals in this group were psychologists, police, doctors, social workers, educators and teachers.

Of these, 20.6% were involved in rescue work inside the bombed trains; the rest, as well as part of this 20.6%, provided direct help to survivors, families and friends, in locations such as the IFEMA crisis centre, hospitals, funeral homes, and so on.

The percentage of those affected by panic attack in this group is 13.9%, higher than the figure for the general population. Nevertheless, the percentage of those affected by depression is just 2%, much lower than in the general population. Likewise, only 1.2% are affected by post-traumatic stress, also a much lower figure than that for the general population. These data suggest that emergency service personnel (the majority of whom are trained professionals with experience in these tasks), even if they cannot avoid adverse peritraumatic psychological reactions due to the high degree of exposure to the stressor, are indeed capable of managing their emotions so as to avoid the chronification of those reactions that gives rise to disorders such as depression or post-traumatic stress.

However, it should be pointed out that it was the members of this group who most increased their use of tobacco (29.7%, compared to 10.7% in the general population) and alcohol (13.9%, as against 1.9% in the general population), as a somewhat unhealthy form of coping with the stress; on the other hand, consumption and increase in use of psychoactive drugs were lower in this group than in the general population.

Nevertheless, there are considerable differences between the different professional groups making up this sample (a detailed analysis of these differences can be found in the Special Issue mentioned above: *Ansiedad y Estrés, vol. 10, 2-3, 2004*).

**Final considerations**

On the whole, the results reported here constitute a summarized picture of the psychological consequences in different groups of the 11-M terrorist attacks. The populational study carried out with a large representative sample provides reference values for interpreting the results of the other groups, values that were lacking in the Spanish research context and that are also rare in the international literature. Moreover, the use of methodology and instruments compatible with the study carried out by Galea et al. (2002) in New York after 9/11 is making possible a fluid interchange of data and an analysis of the similarities and differences between different countries (Miguel-Tobal, Cano-Vindel, González Ordi, Iruarrizaga, Vlahov & Galea, submitted).

Currently, multivariate analyses are being carried out to establish predictors of vulnerability and resistance to depression and post-traumatic stress; such studies have already found several variables – among them sex, age, social support, number of stressors prior to the traumatic event, presence of panic attack during the event, degree of exposure and fear of suffering serious injury or death – to show powerful predictive capacity (Miguel-Tobal & Martínez Sánchez, 2004).

Finally, the completion of the second and third phases of the studies (currently in progress) will permit us to assess the evolution of the psychological effects reported throughout this article, in accordance with which we expect to find a significant amelioration of the negative effects of the 11-M bombings in the population of Madrid.

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