

This is the last submitted version of the manuscript. A PDF-file can be accessed at <http://www.blackwell-synergy.com/toc/sjop/44/5>

The Gothenburg discothèque fire 1998.

Atle Dyregrov\*

Ann-Margret Frykholm\*\*

Lars Lilled \*\*

Anders G. Broberg\*\*\*

Ingvar Holmberg\*\*\*\*

\* Center for Crisis Psychology, Bergen Norway

Fabrikkgaten 5

5037 Solheimsvik

Norway

Ph: + 47 55596180 Fax: + 55297917

E-mail: [atle.dyregrov@psych.uib.no](mailto:atle.dyregrov@psych.uib.no)

\*\* The City Office

404 82 Gothenburg

Sweden

\*\*\* Child and Adolescent Psychiatry Centre

Queen Silvia Children's Hospital

SE 416 85 Göteborg, Sweden

Ph. + 46 31 773 1703 Fax + 46 773 4628

E-mail: [Anders.Broberg@psy.gu.se](mailto:Anders.Broberg@psy.gu.se)

\*\*\*\* Department of Statistics

School of Economics and Commercial Law

Box 660

SE 405 30 Göteborg

Sweden

E-mail: [Ingvar.Holmberg@statistics.gu.se](mailto:Ingvar.Holmberg@statistics.gu.se)

Word count: 7336

Running head: Discothèque fire

## ABSTRACT

Findings from a study of 563 adolescents' reactions following a discotheque fire that killed 63 young people in Gothenburg in October 1998 are presented. The group answered a questionnaire seven months following the disaster. The questionnaire included the Impact of Event Scale (IES) and the Birleson Depression Self-Rating Scale (DSRS). The level of trauma was found to be very high, while depression scores were less elevated. A little under a third of the students scored above a clinical cut-off point ( $> 35$ ) on the IES indicating high post-traumatic stress levels. Girls evidenced more depression and traumatic stress reactions than boys. Levels of reactions increased with more closeness (knowing victims personally) and if the adolescents were of non-Swedish origin.

Key words: disaster, adolescents, Impact of Event Scale, Birleson Depression Self-Rating Scale

*The event.*<sup>1</sup> Three hundred and ninety-nine people were inside a two-story building gathered at a discothèque party in Gothenburg when a fire erupted just before midnight on Thursday October 29<sup>th</sup>, 1998. The fire inspector had agreed to allow 150 people with regard to the emergency exits' position and width. The room used was on the second floor of the building, with the entrance located at one end and the dance floor and emergency exits at the other.

The fire started in the corridor behind the emergency exit and had lasted 20 to 60 minutes before it penetrated to the room. The overcarburated fumes lit and fire quickly blasted through the room. This started a rush but as the room narrowed at the entrance, people got squeezed together, started to fall and fastened in the exit door. A hundred youngsters were trapped in the room with no other exit other than through windows 10 feet above the floor. Horrible experiences took place inside and outside the building with an agitated atmosphere against the rescuers. A combination of lack of trust of the authorities before the disaster and an altered perception of time with an experience that it took "forever" for rescuers to respond to this disaster, led to high dissatisfaction with the rescuers.

A total of 63 people were killed and 213 others were treated at different hospitals, many of them severely injured requiring care at specialty units. The dead were between 12 and 19 years and came from 19 different nations. Survivors were exposed to extreme sensory impressions. Parents and friends experienced a tremendous amount of stress while waiting outside or searching through different hospitals to learn whether their loved ones had died or survived. As news of the event spread many young people gathered outside the building and were exposed to the situation and the grief and misery of others (including bereaved people). For several days and weeks many young people gathered at the disaster site to place flowers, pictures, poems, candles and other memorabilia to ritualise their grief and talk about their lost friends. Throughout the first weeks the media coverage was enormous, with interviews of survivors and bereaved alike, as well as a search for scapegoats. Late in 1999 the prosecutor's office arrested four young adults for arson. The four had been asked to leave the party. They were sentenced to prison from three to eight years.

*Crisis intervention.* A massive crisis intervention was instigated at the various hospitals that received dead and injured youths. The different Child & Adolescents Outpatient clinics throughout Gothenburg used about 2200 working hours during the first fourteen days (Schütz,

---

<sup>1</sup> The description of the event is based on the keynote presentation that Per Hassling of the Fire/Rescue Department of Gothenburg city made at the Fifth World Congress on Stress, Trauma & Coping in the Emergency Services Professions, Baltimore, April 1999 entitled "Disco death trap in Sweden".

1999). In addition most schools set in action their crisis contingency plans offering a variety of different services or activities to help the students. For those who were injured a variety of services were available at the different hospitals that took part in the medical follow-up.

The different municipalities within the city, churches and voluntary organizations organized around 60 different crisis centres throughout the city. Although the immediate response was rapid and comprehensive, the follow-up of the many people involved has been more problematic. Within traditional psychiatry the tradition for outreach was limited, and adolescents rarely sought out psychiatric facilities on their own. When traditional services were sought out some help-seekers dropped out following the first visit, as they found that the services provided was not helpful. Within the school system the response varied enormously. While some schools had a management well aware of the needs of the students, other principals saw it as their role to have their school return to normal (i.e. stop using time on the disaster and its consequences) after the first acute interventions. The overall aim of the study is to look at how an event of this magnitude influenced students throughout the city of Gothenburg.

*Relevant previous studies.* It is hard to find comparable events for this manmade disaster triggered by a deliberate malicious human act. Terrorist attacks and wartime events are more similar to this event than natural disasters and large accidents. Following terrorist attacks like the Oklahoma bombing (Pfefferbaum, Gurwitsch, McDonald, Leftwich, Sconzo, Messenbaugh, et al., 2000) and war situations (Ahmad, Mohamed & Ameen, 1998; Dyregrov, Gupta, Gjestad, & Mukanoheli, 2000) children and adolescents react with posttraumatic stress symptoms. Reactions are not only short-term, but continue over time (Dyregrov, Gjestad & Raundalen, in press).

It is not only those in close proximity to danger that are at risk for experiencing reactions over time. Certain disasters, especially disasters with an intense media-coverage, can impact children and adolescents far removed from the scene of events, even across a whole nation as Terr and co-workers (Terr, Bloch, Michel, Shi, Reinhardt & Metayer, 1999) have shown following the explosion of the space shuttle Challenger in 1986. Terr and co-workers (1999) use the term “distant trauma” to describe reactions to a disastrous event from a remote and safe distance. When a community suffers a disaster, widespread effects can be found among students throughout a district, as following the 1995 Oklahoma City bombing (Pfefferbaum et al., 1999). When close personal consequences may be relatively low, Pfefferbaum and coworkers found media to play a role in sustaining posttraumatic stress symptoms. Following the Oklahoma bombing those who lost a friend had significantly more

posttraumatic stress symptoms than those who lost an acquaintance (Pfefferbaum et al., 2000). Also among children with no physical or emotional exposure the degree of television exposure was directly related to posttraumatic stress symptomatology (Pfefferbaum, Nixon, Tivis, Doughty, Pynoos, Gurwitch et al., 2001). Pynoos, Frederick and coworkers (1987) in their study of students in a school following a sniper attack, showed a positive correlation between PTSD symptoms and level of acquaintance with the child that was killed, and advocates the need for an intervention strategy aimed particularly at friends and acquaintances of those who are killed or injured.

There is mounting evidence that girls report more reactions following death and trauma than boys do (Balmer, 1992, reported in Fleming, & Balmer, 1996; Bolton, O’Ryan, Udwin, Boyle & Yule, 2000; Burke, Moccia, Borus, & Burns, 1986; Curle, & Williams, 1996; Dyregrov, Matthiesen, Kristoffersen, & Mitchell, 1994; Dyregrov, Gjestad et al., 1999; Giaconia et al., 1995; Green et al., 1991; Khoury et al., 1997; Vernberg, LaGreca, Silverman, & Prinstein, 1996). Higher rates of PTSD in women than men has been found to be a function of higher probability of PTSD development in women, not the prevalence or type of exposure (Breslau, Davis, Andreski, Peterson, & Schultz, 1997), a finding supported in a study of older adolescents (Giaconia et al., 1995).

This article will focus on the dramatic discothèque fire described below and address the following hypotheses:

1. Such an event will be associated with depressive or posttraumatic stress reactions in students throughout the city
2. Reactions will differ depending on psychological “closeness” to the fire or the fire-victims
3. Girls are expected to evidence higher scores than boys on measures of depression and posttraumatic stress.

## Method

*Sample.* Out of a total of 672 students enrolled in the classes, the 569 students present at the school on the day the study took place (a response rate of 85%), 265 girls and 298 boys (six students had failed to indicate their gender), answered the questionnaire. Absence was primarily due to illness, but some had left the school since the class lists last were updated, and others still were having lessons separate from their class. Their age was between 13 and 19, with a mean of 15.4 years. They attended junior and senior high school. Sixty-nine percent of the children were born in Sweden, while 31% had their background from countries outside of Sweden.

*Questionnaire and inventories.* The first part of the questionnaire concerned a few demographic questions, and questions regarding activities at the school following the death, and about support from the school, family and friends. Students were asked to state how well they knew the injured and dead, their closeness to the fire, and how they learned about the event. The questions were partly based on McNeil and co-workers (1991), and Dyregrov, Bie Wikander and Vigerust (1999).

The last part of the questionnaire consisted of two inventories. The Impact of Event Scale: (IES) (Horowitz, Wilner, & Alvarez, 1979) was used to assess the degree of intrusive thoughts and images (IES-I) and the degree of avoidance of thoughts and reminders of the event (IES-A). This inventory consists of 15 items with 4 answer categories, 0 = Not at all, 1 = Rarely, 3 = Sometimes and 5 = Often. This scale is one of the most widely used scales to measure posttraumatic distress following critical events (Paton, 1990). Cronbach's alpha was .89 for IES-I, .85 for IES-A and .92 for IES-Total. For the IES, the clinical cut-off point is usually set at 30, with those who score above 30 comprising those at high risk for having a posttraumatic stress disorder (Yule, 1992, 1998). However, Stallard and Law (1993), Yule and Udwin (1991) and Lundin (correspondence, 1997) have used 40 as a cut-off point. A cut-off score of 35 has been found to correctly identify 89% of those with a diagnosable PTSD, and this cut-off level will be used in this study (Neal, Busuttil, Rollins, Herepath, Strike, & Turnbull, 1994).

The Birleson Depression Self-Rating Scale: (DSRS) (Birleson, 1981) was used to assess the degree of depression. This inventory consists of 25 items with 3 answer categories, 0 = Never, 1 = Sometimes and 2 = Most of the time. Cronbach's alpha for DSRS was .81. Birleson (1981) suggested that the clinical cut-off point for depression should be set at 15.

*Procedure.* The study was approved by the National Agency for Education and questionnaires were administered in the classroom at different schools in May 1999. Six junior and five

senior high schools representing all different city regions were represented with two classes from each school at junior level and one from each school at senior level (17 classes in all). On the junior level the aim was to have 50 students from each school, on the senior level the aim was to have 50 students from each year level 1 and 2. As classes varied in size, the number of classes from each school varied. The principals at each school were responsible for the distribution of the questionnaires to the class teachers. The principals were informed about the rationale behind the study, i.e., learning more about adolescents' reactions and how they perceived the help they received, in order to plan the continuing support in the best possible way. The principals were informed through letters, e-mail and by telephone. Based on this information the principals informed the class teachers. At the Gothenburg City Education Authority, one of the authors of the study (A.M.F) was present to answer questions about the study. The principal of each school decided whether to inform parents about the study. An information letter was made available to the principal for this purpose.

The class teacher informed the students that the rationale behind the study was to learn more about adolescents' reactions and how they perceived the help they received, in order to plan the continuing support in the best possible way. The students answered the questionnaire individually and anonymously during one lesson. At least three adults (teachers/support personnel) were present in each class to support if any reactions arose and answer any questions, but they did not in any way lead the students in how to answer the questions. The presence of adults was meant to be supportive, not controlling. One student had to stop filling in his questionnaire because he became nauseous, but insisted on completing it after a break. Some students not present on the day the questionnaire was administered were offered an opportunity to fill them in later with support personnel at hand.

## Results

*Relation to the fire.* Most students (41%) learned about the fire through television or radio, or through their parents telling them (26%). Some heard about it through friends (11.1%) or through others (9%), while 5% read about it in the papers and 4% were informed through other sources of information. Twenty-two (4%) were present at the scene of the fire. Around a fifth (20%) knew none of the dead or injured. Nineteen percent had best friends who lost one or more of their best friends. More than forty percent (44 %) lost or had one or more of their friends injured. Only 2% of the sample experienced the loss or injury of some of their family. Fourteen percent (14%) had some other "relationship" to the victims.

*General scores on the inventories.* Table 1 lists the mean score on the DSRS and the IES. Nineteen percent scored above the clinical cut-off point of 15 on DSRS. A little under a third

of the students (27%) scored above the recommended clinical cut-off point of 35 on the IES. Pearson product-moment correlations between the Birleson Depression Self-Rating Scale (DSRS) and the Impact of Event Scale revealed a statistically significant relationship ( $r = .54$ ,  $p < .05$ ). For the subscales more depression was paralleled by more intrusion ( $r = .56$ ,  $p < .05$ ), and avoidance ( $r = .54$ ,  $p < .05$ ). Using Horowitz' (1982) criteria, 20% evidenced high distress, 28% medium distress and 52% low distress on the intrusion subscale. For avoidance the percentages were 27, 29 and 44 for high, medium and low distress.

*Closeness to the victims and scores on the IES.* The students were asked to rate how well they knew any of the victims. The scores on the IES in relation to their closeness to the victims are reported in table 2. Those who knew none of the injured or deceased are listed as "distant". Those who reported that some of their best friends had lost one or more of their best friends are listed as "fairly distant", those who reported that some of their best friends were badly injured or died as "close", and lastly those who reported that one or more of their own family died are listed as "very close".

Table 2 show that the mean scores increase as the level of closeness increase, reflecting more depressive symptoms and more intrusion and avoidance as their personal closeness to those injured or killed during the fire increases. Girls reported more closeness than boys ( $F(1, 535) = 13.58$ ,  $p < .01$ ).

The fire happened to a group with a very mixed cultural background. A t-test was performed to see whether there were any differences between those who were Swedish born and those born outside of Sweden. T-tests for both the DSRS and IES (with its subscales) showed that those born outside of Sweden had significantly higher scores than those born in Sweden (for brevity only DSRS and IES-total are reported here: DSRS:  $t = 7.0$ ,  $df = 542$ ,  $p < .001$ ; IES-total:  $t = 9.6$ ,  $df = 548$ ,  $p < .001$ ). As the people present at the fire had a multicultural background, tests were undertaken to see if this relationship held up with "closeness" as a covariate. It did, probably reflecting that many of the young people with a non-Swedish background had experienced trauma before the fire (many of these young people have fled from war).



*Exposure to the fire.* Twenty-two of the adolescents were present inside or outside the discotheque when the fire started. A comparison of these 22 with the rest of the sample showed them to have significantly higher depression scores ( $t = 3.89$   $df = 521$ ,  $p < .001$ ) and IES-scores (IES-total:  $t = 5.67$ ,  $df = 527$ ,  $p < .001$ ; IES-I:  $t = 5.99$ ,  $df = 527$ ,  $p < .001$ ; IES-A:  $t = 4.53$ ,  $df = 528$ ,  $p < .001$ ) than those not present at the fire.

*Gender differences.* The inventory scores for the two genders were compared (see table 1). Girls were significantly more depressed and evidenced higher scores than boys on IES-Total as well as on the IES subscales. Analyses of variance showed that girls had talked significantly more with their friends ( $F(1/554) = 9.57$ ,  $p < .01$ ) and their parents ( $F(1/555) = 13.18$ ,  $p < .001$ ) than boys had. Girls also significantly more than boys had close friends that they could confide in that they found to be of good help following the fire ( $F(1,556) = 38.48$ ,  $p < .001$ ). More girls than boys scored above the cut-off score ( $>15$ ) on the DSRS (23% versus 15%) and on the IES  $> 35$  (33% vs. 22%). More than half the girls (54%) wished that teachers had talked more about the fire compared to 38% of the boys ( $F(1/535) = 14.56$ ,  $p < .001$ ). Although there were no differences between boys and girls regarding having received enough information about the fire in general, boys perceived the school as not having provided them with enough information regarding usual reactions during and following a crisis situation ( $F(1/549) = 5.11$ ,  $p < .05$ ).

*Predicting reactions (IES and DSRS).* Multiple regression (forward stepwise) was used to analyse the relationship between the dependent variables IES-Intrusion, IES-Avoidance and DSRS and the following independent variables:

1. gender,
2. place of birth (Sweden – outside of Sweden),
3. psychological distance to the victims (knowledge, friendship or family relation),
4. talking with friends about the fire,
5. having a friend to confide in,
6. talking with parents.

In addition three new variables were constructed. The first variable termed ‘rituals’ was constructed from variables where the students acknowledged participation in rituals as helpful following an event such as the fire. The second one termed ‘cognitive coping’ was made up of variables such as writing about the event and using time to think about the event. The third one, finally, termed ‘communication’ concerns attitudes to talking with others. Variables that had non-significant effect were removed step by step. The results from the

tolerance levels in the multiple regression analysis indicated low degree of colinearity (range .63 to .94).

The first dependent variable studied was intrusion. The result of the regression analysis is presented in table 3. The included variables explained 43 percent of the variance in intrusion. Adolescents with the highest intrusion scores were those born outside of Sweden, who had confided in a close friend, who described a close psychological relationship to the victims, and who were female. Higher intrusion scores were also found among those who had talked much with their friends and their parents about the fire, and those who found that rituals and use of cognitive coping were of little help and made things worse. The beta-weights indicate that having confided in a close friend and reporting a close psychological relationship to the victims had the strongest influence on intrusion.

Regression analysis with avoidance as the dependent variable resulted in seven significant independent variables (see table 4). The included variables explained 38 percent of the variance in avoidance. Adolescents with the highest avoidance scores were those born outside of Sweden, who had confided in a close friend, who described a close psychological relationship to the victims, and who were female. Higher avoidance scores were also found among those who had talked much with their parents about the fire, and among those who found that rituals were of little help and made things worse. The beta-weights indicate that place of birth had the strongest influence on avoidance followed by having confided in a close friend and having a close psychological relationship to the victims.

Regression analysis with depression (DSRS) as the dependent variable resulted in four significant independent variables (see table 5). The included variables explained 22 percent of the variance in depression. Adolescents with the highest depression scores were females, those born outside of Sweden, those who described a close psychological relationship to the victims, and those who found that open communication made things worse. The beta-weights indicate that being female and being negative towards communication had the strongest influence on depression, but the other two variables had almost similar beta-weights.

### Discussion

No formal diagnostic interview was made and there is no corroborative information from parents or teachers. The study addresses trauma and depressive reactions as measured by a few instruments on only one occasion following the loss and suffers the same limitations that other cross sectional data suffers. It does not address changes that have taken place prior to the first seven months in the recovery processes, nor does it encompass the dynamic process that takes place over time.

Subjectively the students in this sample evidenced fairly strong and intense posttraumatic stress reactions from this fire, thus partly supporting hypothesis one. Most of them had reacted with shock and a sense of unreality when it happened. Traumatic reactions in the form of intrusion and avoidance, as measured by the IES, was high at the measuring point, with a little under one third of the group evidencing scores reflecting high levels of posttraumatic stress. Following Neal and co-workers (1994) suggested cut-off levels they score at a level indicative of a posttraumatic stress disorder.

The depression scores were not elevated in a similar manner. The Birleson scale does not tap grief in the manner that the Pynoos' grief scale (Pynoos, Nader, Frederick, Gonda, & Stuber, 1987) or the Hogan Grief Inventory (Hogan, 1990) does, and it is not possible to know how many of the students that were grieving. Compared to normative data (see Ivarsson, 1998) on the DSRS from comparable age groups of Swedish children from the same city as the fire took place (Gothenburg), both girls and boys scored higher following the fire (normative M for girls = 7.8 versus 10.8 following the fire, and normative M for boys 6.1 versus 8.5 following the fire). The results do indicate that the fire group primarily responded with an elevation in the post-traumatic area, and less with depressive reactions.

The scores on the Impact of Event Scale indicate that the group in general experienced a relatively high degree of intrusive images and thoughts following the fire. Avoidance levels were somewhat higher than intrusion levels, indicating a cognitive struggle to keep the disaster out of their mind. The high avoidance level might also reflect a process where the group at this time (7 months after the fire) uses much avoidance strategies to regulate the intrusive images and thoughts. The mean IES-levels were lower than adolescents surviving the sinking of a cruise ship (Yule & Udwin, 1991) and adolescents surviving a minibus accident (Stallard & Law, 1993).

In previous studies the tendency to suppress thoughts and feelings has been associated with later PTSD (Aaron, Zaglul & Emery, 1999; Warda & Bryant, 1998). Lonigan, Anthony and Shannon (1998) have found that children reporting symptoms associated with behavioral and emotional avoidance were the most likely to experience a severe posttraumatic reaction, particularly when these symptoms were combined with symptoms associated with reexperiencing phenomena. Other studies also points to unsuccessful avoidant activity as characteristic for chronic emotional processing (Joseph, Dagleish, Thrasher, Yule, Williams & Hodgkinson, 1996), often leading to more intrusive thoughts and imagery than in those who allow themselves to remember and process their experience (Aaron et al., 1999). The

high level of avoidance found among the students in this study may therefore warrant attention, as it may be associated with suffering over time.

Previous studies have shown that PTSD symptoms in general are associated with the level of exposure to the traumatic event (Lonigan, Shannon, Taylor, Finch, Daugherty & Taylor, 1991; Tyano et al., 1996). This study shows that both traumatic reactions and depression increases with the closeness to those dead or injured in a disaster, supporting hypothesis two, and corroborating Pynoos, Frederick and coworkers (1987). It is not only the level of physical threat or the exposure to strong sensory impressions that lead to a form of dose relationship to the traumatic reactions, but also the “psychological” closeness to those directly involved in the disaster. The importance of this variable is emphasized by its importance in all three multiple regression analyses. It is meaningful to look at a form of subjective “closeness hierarchy” following a disaster of this magnitude. By broadening one’s focus from direct exposure to emotional exposure in the form of the “felt” distance to those involved, people in need of more follow-up can be identified.

In view of the fact that many of the students in this sample personally did not know anyone who died or survived the fire, the level of depression and traumatic reactions is surprisingly high. It seems evident that a disaster of this size in some ways is affecting all young people in the same age range as those who were present at the fire. The extensive media coverage made this an event that almost every student could identify with and share in, an event that was the subject of conversation among children, adolescents and adults alike. The media was on the scene within minutes and for days the news stories described the tragedy and the ensuing reactions in minute detail. By being exposed to the extensive loss and tragedy through the media or having friends and acquaintances that were more directly affected by the fire, other more distant adolescents were “exposed” too. The situation created a form of psychological closeness and the term distant trauma or trauma by identification or a form of emotional contagion may describe the situation for those who took on the reactions. Pfefferbaum and Pfefferbaum have used the term “community contamination” to describe the wide-reaching impact that traumatic events can have on entire communities, and contagion may account for the magnitude of distress evidenced by so many.

The “contagion” hypothesis may further be supported by the fact that the variables “having talked much with their friends and parents” and “having confided in a close friend” held up in the multiple regression analyses as related to elevated scores on the IES and Birlson Depression Inventory.

As a majority of the direct victims of the fire had a non-Swedish family or origin, we may expect that those not born in Sweden would feel somewhat more “psychologically close” than Swedish born. This conclusion was supported by analyses and supports hypothesis three. However, the raised depressive levels and higher IES-scores of non-Swedish adolescents may also reflect that many of these young people had experienced trauma before leaving their country of origin to come and live as refugees in Sweden, and a more difficult life-situation in Sweden as exiles. Without good measurement of levels of traumatization prior to the fire, it is difficult to draw firm conclusions.

Another factor that possibly can explain the high level of distress experienced by so many is the fact that going to dances at discotheques are among the activities all young people take part in. They socialize, meet friends, start to date and relax from their schoolwork by going out to dances, movies and discotheques. They easily can identify with the victims and “know” that this could have happened to them. Going to a discotheque suddenly changed from an activity filled with fun and excitement to an activity that meant fear and apprehension. If something could happen there, it could happen anywhere.

The significant gender differences on both the DSRS and the IES scale and the results from the multiple regression analyses adds to the mounting evidence that females react more to traumatic events than males (Breslau, Davis, Andreski, & Peterson, 1991; Breslau et al., 1997; Davidson, Hughes, & Blazer, 1991; Dyregrov, Gjestad et al., 1999; Helzer, Robins & McEvoy, 1987; Kessler, Sonnega, Bromet, Hughes, & Nelson 1995), and supports hypothesis three. Previous studies have indicated that adolescent girls define themselves through connections and interpersonal ties, while boys seek self-definition through separateness and independence (Douvan & Aldelson, 1966; McDermott et al., 1983). The fact that females are likely to experience more concern over other's distress than males (Trobst, Collins & Embree, 1994), and the consistent finding that women have relatively high levels of dispositional empathy in comparison to men (Eisenberg & Lennon, 1983), may partly explain why girls evidenced more reactions both on the IES and on the DSRS, and why they perceived more closeness to the victims. More girls than boys also reported the wish for more discussion in the class, a finding that may implicate gender differentiated responses in the follow-up.

*Implications for intervention.* The level of reactions more than half a year following the disaster should lead teachers and support personnel to be well prepared to respond to such events, not only immediately but over time. The intensity and duration of traumatic distress following a disaster may be greater than most teachers and support-staff imagine.

Based on the result from the follow-up at seven months it seems likely that many students would have benefited from more mental health assistance over time. However, traditional psychiatric services were not sought out to a large degree, many adolescents only came for one or a few visits (Wiberg & Broberg, 2001). New ways of meeting the needs of these adolescents have to be established. Outreach models using more activity-based methods may be a way to go. In the summer after the fire, summer camps were arranged by the city of Gothenburg with fire rescue personnel participating in each of the camps. In these camps activities like canoeing, swimming and tent building were used to create a “meeting room” for adolescents. During the activities the adolescents could talk about their traumas and losses.

In summary, some of the important clinical implications from this study worth considering when helping following a disaster are:

- a) For students who directly or indirectly are exposed to a disaster of this magnitude, follow-up may be needed for more than the first month after the event. Both depressive and traumatic reactions may persist over time.
- b) Particular attention should be given to those who perceive themselves to be “psychologically close” to the victims of the disaster, as suggested by Pynoos, Frederick and coworkers (1987). Grief or trauma groups would allow for continued help in this respect (Lohnes & Kalter, 1994; Quarmby, 1993; Tonkins, 1996).
- c) Having a detailed crisis contingency plan in place and activated shortly following a disaster situation will increase the chance of securing good follow-up for affected groups. School management need to validate students’ reactions over time.
- d) Teaching and support staff needs to be aware of possible differences in the two genders regarding how they experience and react to such events and how they seek support from friends, family and others following such losses.

## References:

- Ahmad, A., Mohamed, H. T., & Ameen, N. M. (1998). A 26-month follow-up of posttraumatic stress symptoms in children after the mass-escape tragedy in Iraqi Kurdistan. *Nordic Journal of Psychiatry*, *52*, 357-366.
- Aaron, J., Zaglul, H., & Emery, R. E. (1999). Posttraumatic stress in children following acute psychical injury. *Journal of Pediatric Psychology*, *24*, 335 – 343.
- Balk, D. E. (1991). *Death, bereavement, and college students: a description of research at Kansas State University*. Paper presented at the Annual Meeting of the Association for Death Education and Counselling, Boston, March 6.
- Birleson, P. (1981). The validity of depressive disorder in childhood and the development of a self-rating scale: a research report. *Journal of Clinical Child Psychology & Psychiatry*, *22*, 73-88.
- Bolton, D., O`Ryan, D., Udwin, O., Boyle, S., & Yule, W. (2000). The long-term psychological effects of a disaster experienced in adolescence: II: General psychopathology. *The Journal of Child Psychology and Psychiatry*, *4*, 513 – 523.
- Breslau, N., Davis, G. C., Andreski, P., & Peterson, E. (1991). Traumatic events and posttraumatic stress disorder in an urban population of young adults. *Archives of General Psychiatry*, *48*, 216-222.
- Breslau, N., Davis, G. C., Andreski, P., Peterson, E., L., & Schultz, L. R. (1997). Sex differences in posttraumatic stress disorder. *Archives of General Psychiatry*. *54*, 1044-1048
- Burke, J. D., Moccia, P., Borus, J. F., & Burns, B. J. (1986). Emotional distress in fifth-grade children ten months after a natural disaster. *Journal of the American Academy of Child Psychiatry*, *25*, 536-541.
- Curle, C. E., & Williams, C. (1996). Post-traumatic stress reactions in children: gender differences in the incidence of trauma reactions at two years and examination of factors influencing adjustment. *British Journal of Clinical Psychology*, *35*, 297-309.
- Davidson, J. R., Hughes, D., Blazer, D. G., & George, L. K. (1991). Post-traumatic stress disorder in the community: an epidemiological study. *Psychological Medicine*, *21*, 713-721.
- Douvan, E., & Adelson, J. (1966). *The adolescent experience*. New York: John Wiley & Son.
- Dyregrov, A., Bie Wikander, A. M. & Vigerust, S. (1999). Sudden death of a classmate and friend. Adolescent's perception of support from their school. *School Psychology International*, *20*, 191-208.

- Dyregrov, A., Gjestad, R., Bie Wikander, A. M. & Vigerust, S. (1999). Reactions following the sudden death of a classmate. *Scandinavian Journal of Psychology*, *40*, 167-176.
- Dyregrov, A., Gjestad, R., & Raundalen, M. (in press). *Children exposed to warfare. A longitudinal study*. *Journal of Traumatic Stress*.
- Dyregrov, A., Gupta, L., Gjestad, R. & Mukanoheli, E. (2000). Trauma exposure and psychological reactions to genocide among Rwandan children. *Journal of Traumatic Stress*, *13*, 3-21.
- Dyregrov, A., Matthiesen, S. B., Kristoffersen, J. I., & Mitchell, J. T. (1994). Gender differences in adolescent's reactions to the murder of their teacher. *Journal of Adolescent Research*, *9*, 363-383.
- Eisenberg, N., & Lennin, R. (1983). Sex differences in empathy and related concepts. *Psychological Bulletin*, *94*, 100-131.
- Fleming, S., & Balmer, L. (1996). Bereavement in adolescence. In C. A. Corr and D. E. Balk (Eds.), *Handbook of adolescent death and bereavement* (pp. 139-154). New York: Springer Publishing Company.
- Giaconia, R. M., Reinherz, H. Z., Silverman, A. B., Pakiz, B., Frost, A. K., & Cohen, E. (1995). Traumas and posttraumatic stress disorder in a community population of older adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, *34*, 1369-1380.
- Green, B., Korol, M., Lindy, J., Gleser, G., & Kramer, L. A. (1991). Children and disaster: age, gender, and parental effects on PTSD symptoms. *Journal of American Academy, Children and Adolescent Psychiatry*, *30*, 945-951.
- Helzer, J. E., Robins, L. N., & McEvoy, L. (1987). Post-traumatic stress disorder in the general population. *New England Journal of Medicine*, *317*, 1630-1634.
- Hogan, N. S. (1990). Hogan sibling inventory of bereavement. In J. Touliatos, B. Perlmutter & M. Straus (Eds.), *Handbook of Family Measurement Techniques* (p.524). Newbury Park, CA: Sage.
- Horowitz, M. J. (1982). Stress response syndromes and their treatment. In L. Goldberger & S. Bresnitz (Eds.), *Handbook of stress - Theoretical and clinical aspects*. New York: The Free Press.
- Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: a measure of subjective stress. *Psychosomatic Medicine*. *41*, 209-218.



- Ivarsson, T. (1998). *Depression and Depressive Symptoms in Adolescence: Clinical and Epidemiological Studies*. From the Department of Child and Adolescent Psychiatry, Göteborg University, Göteborg, Sweden.
- Joseph, S., Dalgleish, T., Thrasher, S., Yule, W., Williams, R., & Hodgkinson, P. (1996). Chronic emotional processing in survivors of the Herald of Free Enterprise disaster: the relationship of intrusion and avoidance at 3 years to distress at 5 years. *Behavior, Research & Therapy, 34*, 357-360.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry, 52*, 1048-1060.
- Khoury, E. L., Warheit, G. J., Hargrove, M. C., Zimmerman, R. S., Vega, W. A., & Gil, A. G. (1997). The impact of hurricane Andrew on deviant behavior among a multi-racial/ethnic sample of adolescents in Dade County, Florida: a longitudinal analysis. *Journal of Traumatic Stress, 10*, 71-91.
- Lohnes, K. L., & Kalter, N. (1994). Preventive intervention groups for parentally bereaved children. *American Journal of Orthopsychiatry, 64*, 594-603.
- Lonigan, C., Anthony, J. & Shannon, M. (1998). Diagnostic efficacy of posttraumatic symptoms in children exposed to disaster. *Journal of Clinical Child Psychology, 27*, 255 – 267.
- Lonigan, C. J., Shannon, M. P., Taylor, C. M., Finch, A. J., Daugherty, T. K. & Taylor, C. M. (1991). Children's reactions to a natural disaster: symptom severity and degree of exposure. *Advances in Behavioral Research & Therapy, 13*, 135-154.
- McDermott, J., Robillard, A. B., Char, W. F., Hsu., J., Tseng W., & Ashton, G. (1983). Reexamining the concept of adolescence: differences between adolescent boys and girls in the context of their families. *American Journal of Psychiatry, 140*, 1318-1322.
- McNeil, J. N., Silliman, B. & Swihart, J. J. (1991). Helping adolescents cope with the death of a peer: a high school case study. *Journal of Adolescent Research, 6*, 132-145.
- Milgram, N., Toubiana, Y. H., Klingman, A., Raviv, A., & Goldstein, I. (1988). Situational exposure and personal loss in children's acute and chronic stress reactions to a bus disaster. *Journal of Traumatic Stress, 1*, 339-352.
- Neal, L. A., Busuttil, W., Rollins, J., Herepath, R., Strike, P., & Turnbull, G. (1994). Convergent validity of measures of post-traumatic stress disorder in a mixed military and civilian population. *Journal of Traumatic Stress, 7*, 447-455.

- Paton, D. (1990). Assessing the impact of disasters on helpers. *Counselling Psychology Quarterly*, 3, 149-152.
- Pfefferbaum, B., Gurwitch, R., McDonald, N., Leftwich, M., Sconzo, G., Messenbaugh, A. & Schultz, R. (2000). Posttraumatic stress among young children after the death of a friend of acquaintance in a terrorist bombing. *Psychiatric Services*, 51, 386 – 388.
- Pfefferbaum, B., Nixon, S. J., Krug, R. S., Tivis, R. D., Moore, V. L., Brown, J. M., Pynoos, R. S., Foy, D., & Gurwitch, R. H. (1999). Clinical needs assessment of middle and high school students following the 1995 Oklahoma City bombing. *American Journal of Psychiatry*, 156, 1069 – 1074.
- Pfefferbaum, B., Nixon, S. J., Tivis, R. D., Doughty, D. E., Pynoos, R. S., Gurwitch, R. H., & Foy, D. W. (2001). Television exposure in children after a terrorist incident. *Psychiatry Fall*, 64, 202-211.
- Pfefferbaum, B. & Pfefferbaum, R. L. (1998). Contagion in stress. An infection disease model for posttraumatic stress in children. *Child and Adolescent Psychiatric Clinics of North America*, 7, 183-194.
- Pynoos, R., Frederick, C., Nader, K., Arroyo, E., Steinberg, A., Eth, S., Nunez, F., & Fairbanks, L. (1987). Life threat and posttraumatic stress in school age children. *Archives of General Psychiatry*, 44, 1057-1063.
- Pynoos, R. S., Nader, K., Frederick, C., Gonda, L., & Stuber, M. (1987). Grief reactions in school age children following a sniper attack at school. *Israeli Journal of Psychiatry and Related Sciences*, 224, 53-63.
- Quarmby, D. (1993). Peer group counselling with bereaved adolescents. *British Journal of Guidance & Counselling*, 21, 196-211.
- Schachter, S. (1991-92.) Adolescent experiences with the death of a peer. *Omega*, 24, 1-11
- Schütz, E. (1999). Utvärdering av BUP:s akuta insatser i samband med brandkatastrofen vid Backaplan. *Aetolia*, 1, 1 – 19.
- Stallard, P. & Law, F. (1993). Screening and psychological debriefing of adolescent survivors of life-threatening events. *British Journal of Psychiatry*, 163, 660-665.
- Terr, L.C. (1983). Chowchilla revisited: The effect of psychic trauma four years after a school-bus kidnapping. *American Journal of Psychiatry*, 140, 1543-1550.
- Terr, L. C., Bloch, D. A., Michel, B. A., Shi, H., Reinhardt, J. A. & Metayer, S. (1997). Children's thinking in the wake of *Challenger*. *American Journal of Psychiatry*, 154, 744 – 751.

- Tonkins, S. A. M. (1996). A treatment outcome study of bereavement groups for children. *Child & Adolescent Social Work Journal, 13*, 3-21.
- Trost, K. K., Collins, R. L., & Embree, J. M. (1994). The role of emotion in social support provision: gender, empathy and expressions of distress. *Journal of Social and Personal Relationships, 11*, 45-62.
- Tyano, S., Iancu, I., Solomon, Z., Sever, J., Goldstein, I., Touviana, Y., & Bleich, A. (1996). Seven-year follow-up of child survivors of a bus-train collision. *Journal of the American Academy of Child & Adolescent Psychiatry, 35*, 365-373.
- Vernberg, E. M., La Greca, A. M., Silverman, W. K., & Prinstein, M. J. (1996). Prediction of posttraumatic stress symptoms in children after hurricane Andrew. *Journal of Abnormal Psychology, 105*, 237-248.
- Warda, G., & Bryant, R. A. (1998). Cognitive bias in acute stress disorder. *Behaviour-Research and Therapy, 36*, 1177-1183.
- Wiberg, C., & Broberg, A. (2001). "Det fick inte hända". *Skriftserie från verksamhetsområde Barn- och ungdomspsykiatri, 3*, Nr:1, 1-43.
- Yule, W. (1992). *Objective and subjective predictions of PTSD in adolescents*. Paper presented at the World conference of the International Society for Traumatic Stress Studies. June 21-26, Amsterdam, the Netherlands.
- Yule, W. (1998). Anxiety, depression and Post-traumatic stress in childhood. In I Sclare (Ed.), *Child Psychology Portfolio*. London: NFER-Nelson tests and assessments.
- Yule, W. & Udwin, O. (1991). Screening child survivors for post-traumatic stress disorders: Experiences from the "Jupiter" sinking. *British Journal of Clinical Psychology, 30*, 131-138.

Table 1. Total scores and gender differences on the Birleson Depression Self-Rating Scale and the Impact of Event Scale

	Number of girls/boys	Total M (SD)	Girls M(SD)	Boys M(SD)	t
Depression	(N=255/283)	9.7. (5.5)	10,8 (5.6)	8,5 (5.0)	4.95***
IES Total	(N=263/282)	10.1 (9.1)	25.6 (17.6)	18.7 (16.6)	4.69 **
IES Intrusion	(N=263/282)	11.9 (9.7)	12.0 (9.4)	8.4 (8.5)	4.75 **
IES Avoidance	(N=264/282)	22.0 (17.4)	13.6 (9.7)	10.3 (9.4)	4.05 **

\*  $p < 0.00006$  \*\* $p < 0.000004$  \*\*\* $p < 0.000002$

Table 2. Mean scores and SD (in parentheses) for DSRS and IES (with subscales) in relation to how well they knew victims

	Distant <sup>1</sup>	Fairly distant	Close	Very close
DSRS <sup>1</sup>	7.7 (4.0)	9.0 (5.0)	11.0 (5.8)	14.0 (6.4)
IES-Intrusion	3.7 (5.4)	7.9 (7.1)	14.3 (9.2)	16.5 (10.6)
IES-Avoidance	6.0 (7.5)	10.8 (8.9)	15.5 (9.5)	19.5 (12.2)
IES-Total	9.7 (11.6)	18.7 (14.8)	29.8 (16.9)	36.1 (20.0)

<sup>1</sup> Number of respondents: Distant: 104-105, fairly distant: 98, close: 229-233, very close: 10-11. 77-78 persons checked a category of "other alternatives".

Table 3: Multiple regression with intrusion as dependent variable.

Variables	Intrusion (Corr. with dep. var.)	Regression coefficient B	$\beta$ -coefficient	Semipartial corr.
Gender	-.21	-1.81	-0.10	-.10
Place of birth	.36	3.45	0.18	.17
Psychological closeness	.50	2.41	0.24	.20
Talking with friends	-.37	-0.79	-0.10	-.09
Having confided in close friend	-.54	-2.57	-0.28	-.22
Talking with parents	-.34	-0.72	-0.10	-.09
Positive towards use of rituals	.00	0.30	0.09	.09
Intercept		5.56		
	$R^2 = 0.43$			
	F (7/370) =	39.72,	p < .0001	

*Note.* All regression parameters were statistically significant at  $p < .05$

Table 4: Multiple regression with avoidance as dependent variable.

Variables	Avoidance (Corr. with dep. var.)	Regression coefficient B	$\beta$ -coefficient	Semipartial corr.
Gender	-.20	-3.73	-0.16	-.15
Place of birth	.41	5.69	0.25	.23
Psychological closeness	.42	2.23	0.20	.17
Having confided in close friend	-.44	-2.15	-0.21	-.17
Talking with parents	-.28	-0.75	-0.09	-.09
Positive towards use of rituals	.07	0.36	0.10	.09
Use of cognitive coping	.21	0.61	0.15	.13
Intercept		2.17		
	$R^2 = 0.38$			
	F (7/370) =	32.51,	p < .0001	

*Note.* All regression parameters were statistically significant at  $p < .05$

Table 5: Multiple regression with DSRS (depression) as dependent variable.

Variables	Depression (Corr. with dep. var.)	Regression coefficient B	$\beta$ -coefficient	Semipartial corr.
Gender	-.20	-2.69	-0.25	-.24
Place of birth	.29	2.66	0.23	.22
Psychological closeness	.27	1.10	0.18	.17
Negative towards open communication	.22	1.30	0.25	-.24
Intercept		3.21		
	$R^2 = 0.22$			
	F (4/369) =	25.95,	p < .0001	

*Note.* All regression parameters were statistically significant at  $p < .02$