JOINING FORGES Joining Families

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FEATURED INTERVIEW

Development of the Decision Tree Algorithm (DTA) and Validity of the Definitions

Interview with Richard Heyman, PhD, and Amy Slep, PhD Conducted by James McCarroll, PhD

Richard Heyman, PhD

Richard Heyman, PhD, is Research Professor of Psychology in the Department of Psychology at Stony Brook University, State University of New York. He has received more than 30 grants or contracts from major U.S. funding agencies

In This Issue

This issue of *Joining Forces Joining Families* (JFJF) presents several features on the development of the Decision Tree Algorithm (the DTA), the protocol used to determine family maltreatment case substantiation by the U.S. Army and the U.S. Air Force. JFJF was privileged to interview Richard Heyman, PhD, and Amy Slep, PhD, of the State University of New York, Stony Brook, who developed the DTA. Additional background regarding the development and implementation of the DTA is also included. The regular statistics feature describes two basic psychometric processes used to characterize instruments such as the DTA: reliability and validity.

We are also pleased to provide a special article with practical information on supporting Soldiers and family members of Soldiers who have suffered traumatic brain injury (TBI) or post-traumatic stress disorder (PTSD). We refer to both of these conditions as the *invisible injuries of war*. Invisible injuries can be as challenging and disabling as physical injuries that are visible, but often require additional understanding and consideration frequently shown to individuals with visible injuries and to their families. Because many of our readers work with families who may be struggling with invisible injuries, we thought this information would be useful and valuable to all involved. As always, JFJF recognizes the important work its readers are doing to enhance the psychological health and wellbeing of our nation's soldiers and their families.

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on family topics including anger escalation in couples, the impact of family violence on children, community-level prevention of family maltreatment, substance abuse, and suicidality. Dr. Heyman has published over 90 scientific articles and chapters. His work with the U.S. Army (1994–1996) included base-level surveys on intimate partner violence (IPV) and comparison of Army IPV rates to civilian rates. Since 1998, he has conducted research with the U.S. Air Force on (a) innovative approaches to estimating the prevalence of partner and child maltreatment; (b) creating and testing reliable criteria for partner and child maltreatment; (c) risk and protective factors for secretive problems (partner and child maltreatment, suicidality, and alcohol and drug misuse); and (d) developing and testing community approaches to prevention of secretive problems. Dr. Heyman is a licensed psychologist and maintains a private practice specializing in couples therapy and depression.

Amy M. Smith Slep

Amy M. Smith Slep, PhD, is Research Associate Professor in the Department of Psychology at Stony Brook University (SBU), State University of New York. She received her Ph.D. in Clinical Psychology from SBU in 1995. With Dr. Heyman, she co-directs the Family Translational Research Group, which includes over 20 research staff and students focused on understanding violence in families. Dr. Slep's research focuses on the development of dysfunctional parenting, the connections between parenting and partner conflict, the

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Substantiation of an alleged family advocacy incident is based entirely on the incident whereas the kinds of services that families need can be very much driven by risk, which might not be tightly associated with the incident.

dynamics of conflict escalation and de-escalation in productive and destructive conflicts, facets of exposure to violence impacting children's functioning and how these impacts can be buffered, and the prevention of family violence. Her work on standardizing definitions of maltreatment has resulted in definitions that are now being used in the U. S. Army and Air Force. She has published over 50 scientific articles and book chapters and has received nearly 20 federal research grants. She is a licensed clinical psychologist.

Dr. McCarroll: Your Family Translational Research Group has a long history of working with the military.

Dr. Slep: We started in 1997. All of our research is focused on the family and, more specifically, on family violence. Translational research means translating basic research into the applied setting. An example is taking treatment and prevention protocols and figuring out how to make them work in real world settings.

Dr. McCarroll: I believe that some of your initial work with the military was with the Army on the prevalence of domestic violence. Is that correct?

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Dr. Heyman: Yes. The Army wanted to know how the rates of domestic violence in the military compared with rates in the U.S. civilian society. That work was initially done with Peter Neidig (Heyman & Neidig, 1999). It was really his data set that I was working on with him when the Army wanted to make a comparison with the civilian prevalence data controlling for demographic factors. Pete, unfortunately at that point was quite ill, so I finished that work on my own. [Editor's note: The Heyman and Neidig study is still the only published comparison of the prevalence of domestic violence in the civilian and military communities.]

Dr. McCarroll: You developed the decision tree algorithm (DTA) that is now used by the U.S. Air Force and the U.S. Army for making case substantiation decisions. [Editor's note: See accompanying article in this edition of JFJF for a description of the DTA.]

Dr. Heyman: Amy and I began work together with this Air Force project a couple of years after the Army prevalence project. The DTA was actually based on an earlier request by the Air Force. They also wanted a way to compare the community prevalence of domestic violence at the installation level to the reported domestic violence cases that came before the Central Registry Board (CRB) at that same installation. However, before they could do that they had to standardize the definitions of domestic violence used by the CRBs. That led to the development of the DTA for the use by the CRBs to produce reliable data. So, it was a round-about process.

The Air Force wanted to be able to predict the sensitive outcomes (in this case, the prevalence of partner and child maltreatment) from non-sensitive data that is collected on a regular basis. We took on this project by first using a number of archival data sets to determine if the approach would work before collecting data. The approach worked and is explained in a publication that is due to come out in print soon, but is currently available on line (Heyman & Slep, 2010).

To be able to make good current estimations, the Air Force would need to collect the sensitive data at least one time to compare to the non-sensitive data. In other words, the estimation program needs to have data on both the predictors and the outcomes. So, we had to determine exactly what self-report measures should constitute maltreatment on the anony-

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Building Bridges to Research: The Psychometric Concepts of Reliability and Validity

By James E. McCarroll, PhD

The term, 'psychometric properties', refers to characteristics of measures that have been ob¬tained in the development of an instrument. At a minimum, these include reliability and validity.

As noted in the background article on the decision tree algorithm (DTA) and interview with Drs. Heyman and Slep, reliability of maltreatment definitions and criteria were primary goals of their research. Reliability and validity are basic psychometric properties of measures and are the subjects of this article.

The term, 'psychometric properties', refers to characteristics of measures that have been obtained in the development of an instrument. At a minimum, these include reliability and validity, two basic concepts in test development and measurement. There are many types of reliability and validity. Psychometric properties are usually considered on two levels, conceptually and mathematically. Another way of stating this is that these are both qualitative (the concept) and quantitative (the mathematical analysis) approaches to constructing and evaluating such measures.

Reliability is generally the first research priority when developing a measure of a concept of interest. Reliability refers to the consistency of a measurement. An example is test-retest reliability, the extent to which agreement is achieved when a measure is given on two different occasions. For example, an intelligence test given on two separate occasions should produce approximately the same results. Interrater reliability is a measure of the degree of

agreement of two or more persons rating the same event. An example of inter-rater reliability is the degree of agreement between persons who judge candidates for a job.

Validity is the degree to which an instrument measures the concept that one is attempting to measure. There are several types of validity. Predictive validity indicates how well a test predicts some criterion. For example, in maltreatment research, we would like to have a measure with high predictive validity for recidivism. That is, it would predict recidivism risk with high probability. High predictive validity is generally required for clinical use. Concurrent validity is the degree of agreement of a new measure, (i.e., a test), with one that has already been validated. Content validity is the degree to which a measure appears to match the concept in question. Face validity is like face value — it looks like it is appropriate to the concept measured and appears to be valid.

For further discussion and examples of psychometric concepts, please consult *Building Bridges: Using Statistics in Family Program Research.* (2008). Center for the Study of Traumatic Stress, Department of Psychiatry, Uniformed Services University of the Health Sciences, Bethesda, MD 20814. This publication can be obtained free of change from the addresses on the second page of this newsletter.

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mous Air Force-wide survey. This led to the development of the DTA. The next step would be to collect the actual prevalence of family maltreatment data and non-sensitive data, develop the final estimation equations, and test their accuracy.

Dr. McCarroll: Has the Air Force measured how the use of the DTA has impacted their prevalence or severity rates?

Dr. Slep: Yes, indeed.

Dr. Heyman: It looks like it has decreased the prevalence probably due to three things. First, with child neglect, the most prevalent form of child maltreatment, standardizing the definitions allowed them to decrease variability

among bases and to clarify the level of clinical seriousness required for case substantiation. Second, there was a perception within the CRBs that cases had to be substantiated for families to get services. However, the Air Force made it clear that families could get services even if the case was not substantiated. Finally, the reduction in recidivism is also likely due to the way the new system is structured and the likely oversight that is coming from the chain of command. The community is taking note and is intent on not having maltreatment reoccur.

Dr. Slep: Also, having clearer criteria has helped their outreach for community education about FAP. In the process of developing the definitions, they decided they had to completely dis-

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The Decision Tree Algorithm (DTA): Development of Family Advocacy Program (FAP) Substantiation Decisions

By James E. McCarroll, PhD, and Rene Robichaux, PhD*

Substantiation of an alleged family advocacy case now requires two separate decisions:
(1) whether the act of maltreatment occurred and (2) the impact (which may include actual injury, reasonable potential for injury, or fear reaction on the part of the victim) of the act.

The decision to substantiate a case of maltreatment results in the information about the offender and victim being entered into a military service central registry. From the perspective of the family, it is one of the most important decisions made by the military Family Advocacy Program (FAP). Such decisions have the potential to impact many domains of the service member's life and career including assignment, security clearance, and command actions related to punishment. Entry of substantiated cases into a service central registry also provides trend data on maltreatment for each service and for Congress.

The Decision Tree Algorithm (DTA) is based on the work of Heyman and Slep who conducted a series of studies to improve the reliability of substantiation decisions for the military (see Heyman & Slep, 2006 and Slep & Heyman, 2006). Their work is an excellent example of evidence-based research sponsored by the FAP. Heyman and Slep reviewed maltreatment criteria from a wide variety of sources including experts in the field, active clinicians, and state standards and criteria used in law enforcement and research. They found that state definitions of maltreatment are highly variable and many factors unrelated to the actual incident itself (i.e., a specific risk factor like alcohol abuse) can influence the substantiation decision. Their research was directed toward evaluating and improving the reliability of substantiation determinations. They tested if (a) more reliable substantiation definitions and processes could be developed and (b) case workers would be comfortable with and accepting of a new approach in making the determination.

Their research resulted in new conceptualizations of partner and child physical, emotional, and sexual abuse, and child neglect and their impacts or potential impacts. Draft definitions and criteria were field tested based on 650 cases. Field testing allowed fine-tuning of the definitions and criteria, which were subsequently tested in a second field test. These studies were conducted in partnership with the

U.S. Air Force, but the DTA criteria have since been adopted by the U.S. Army as well. In the Army, there are exclusions to the DTA and case review committees (CRCs) are permitted to use their own judgment in rare or unusual cases and not required to adhere to the DTA in all instances. (An example of an exclusion for child physical abuse is those acts committed during developmentally appropriate physical play such as horseplay and wrestling.)

The result of Heyman and Slep's research has been a sea change in U.S. Army and U.S. Air Force FAP procedures. In the DTA process, maltreatment criteria are applied by a CRC to an alleged incident of family maltreatment in order to make a substantiation decision. Substantiation of an incident now requires two separate decisions: (1) whether the act of maltreatment occurred, and (2) the impact of the act, which may include actual injury, reasonable potential for injury, or fear reaction on the part of the victim on whom the act was perpetrated. If the incident meets the criteria specified in the DTA, the case is considered to have met criteria and is substantiated. Decisions on case severity (mild, moderate, or severe) are set by Army Regulation 608–18. [Editor's note: See interview of Heyman and Slep in this edition of JFJF for their plans on research to develop severity criteria.]

Regardless of the substantiation decision, services are provided to high risk families when the incident fails to reach the criteria established by the DTA algorithm. These services are practically indistinguishable from services provided when the incident meets criteria.

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The Impact of Invisible Injuries: Helping Affected Families and Children

Adapted from Courage to Care by Nancy T. Vineburgh

The injuries of war change the lives of Soldiers, families and children. Invisible injuries such as posttraumatic stress disorder (PTSD) or traumatic brain injury (TBI) can be especially difficult for families because they often result in significant changes in the injured service member's personality and behavior without changes in the Soldier's appearance. A service member with PTSD or TBI may have mood swings, or certain environments may trigger responses that do not seem appropriate to the situation. These kinds of events can be especially troubling for children and embarrassing for the family. While injuries cannot be compared or judged, invisible injuries, unlike those that are visible (i.e., loss of limb, burns) may not elicit the same level of support from outsiders who may not even realize a medical problem exists. As a result, the Soldier with invisible injuries, as well as his/her family may feel isolated from friends and one's community. There are steps that families and friends can take to manage such challenges.

Distress of a Soldier with an invisible injury and distress of family members is normal and should be expected. Family members can be especially helpful to each other during these times by recognizing their distress and helping each other cope with it. Younger children are likely to need special help due to their lack of understanding complex medical and psychological conditions. The following are among the distress responses that *children* may show.

- Increased acting out behaviors, such as disobedience, tantrums, or risk-taking behaviors
- Emotional distress, such as crying, increased anxiety, or withdrawal
- Feelings of loss and grief related to the changes in the injured Soldier parent
- Feelings of isolation
- Taking on additional responsibilities, such as caring for younger children, household tasks, and caring for the injured Soldier
- Feelings of embarrassment about the injured Soldiers' appearance or behavior

- Misinterpreting the Soldier's distress (such as shown by fatigue and apathy) as indicators that the Soldier parent no longer loves them.
- Feelings of anger or resentment about new responsibilities or changes in the family
- Feelings of self-blame for the Soldier' injury and for the distress

What Families Can Do to Understand and Cope with the Injury

Families can:

- Seek out resources and support. Examples are sports, organizations, and educational programs that provide social support and structured activities.
- Discuss the injury as a family and with others in the community, including health care providers, in order to access resources or appropriate health care treatment.
- Help children to express their emotions, to relax, or to calm themselves. Children should be encouraged to ask questions about the injury. Parents can help children by teaching them to label and express their emotions and by giving them specific strategies for dealing with strong emotions and/or stress.
- Share information with children about the injury in a way they can comprehend. Information helps children understand the injury and its effects in terms of parent functioning and what to expect over time.
- Children may need reassurance that the parent's injury is not their fault.

What Health Care and Family Support Professionals Can Do to Help Families Understand and Cope with the Injury

- Spend time talking with the Soldier and the family. Families will feel most comfortable with a provider or caregiver who has been in contact with them and with whom trust has been established.
- Explain the nature of the injury to families.

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as post traumatic stress disorder or traumatic brain injury can be especially difficult for families because they often result in significant changes in personality and behavior without changes in the Soldier's appearance.

Invisible injuries such



There are already empirically-supported interventions that can be done at a community level and by driving down the risk at an overall level, one is able to reduce the prevalence more than you ever would be in trying to serve people on a one by one basis.

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entangle the substantiation determination from clinical services. Substantiation is based entirely on the incident whereas the kinds of services that families need can be very much driven by risk, which might not be tightly associated with the incident. For example, a very risky family could have a really minor incident. So, the goal was to stop conflating those two. Service recommendations are supposed to be driven more by risk assessment and the clinical picture of the family and not by substantiation status.

Dr. McCarroll: Please describe how you are determining the validity of the definitions of maltreatment.

Dr. Slep: We believe we have done a good job of investigating the reliability of the decisions. The definitions, thresholds, and the criteria have been evaluated for face validity (the degree to which the measures appear to fit the concept) and also content validity (how well all aspects of the concept are taken into account), but that does not help us know whether we have more criteria than we really need or, whether our ability to isolate a group of perpetrators would be improved if we changed the number of criteria. To be able to do that, we have to study some people who have allegations of family maltreatment, not necessarily substantiated cases. We would do some detailed interviewing to help us make some of those distinctions so that our computer models can adjust the thresholds that are currently part of the definitions. We would then look across a couple of hundred families and see whether we get better relationships with external variables if we make changes versus keeping the thresholds and criteria exactly the way they are.

This project has not yet started. The interviews would be anonymous. We would ask participants very detailed questions about the incident on which an allegation is based. The interview would match the criteria, but ask open ended questions with more detail, as you would in a clinical assessment. The criterion includes fear of bodily injury and symptoms that last at least 48 hours. For example, we would ask about concentration, difficulty sleeping, how long the disruption has lasted and how significant it has been. We would find a very full picture of the nature and impact of the maltreatment with respect to all the criteria.

We have been asked by the Department of Defense to develop a scale to make reliable judgments of the severity of the different forms of maltreatment. These severity definitions can be used by the services when they make the substantiation decision. The goal is to develop a severity rating and that is as reliable as the substantiation decisions. Once the scale is developed, we will see if it can be implemented in the field. We are currently piloting it at four installations across the services. We think we are close to having the final version of the scale. Currently, we discuss every case at these installations with the assessing clinician and make severity ratings on their cases. We talk about what is not clear or should be changed. Soon, we will transition from this phase where it is about trying to make everything work into more of a research phase. In that phase, we will make ratings along with the clinicians, but not discuss them, and then compare clinicians' decisions with our own.

Dr. McCarroll: I wondered if the severity of maltreatment by female offenders might be judged in a different way than for males because males are generally stronger and are more likely to produce injury.

Dr. Heyman: It is hard to know for sure. The intent in setting up the maltreatment criteria was to make them gender-sensitive. For example, for physical abuse you need to have an act and an impact. If a woman pushes or grabs a man (act) and he is not injured or afraid of her (impact) and there is nothing about the situation that would have made that inherently dangerous, (she was not pushing him while he was on a balcony), then that incident would not meet the criteria for abuse.

Dr. Slep: That said, we have no problem with an incident in which there is alleged maltreatment by both of the people. So, if they were fighting and both hurt each other, then the appropriate way to handle that is to substantiate both as perpetrators.

Dr. McCarroll: Let's spend a few minutes on psychological abuse or emotional abuse.

Dr. Heyman: Having acts and impacts in the definitions has helped substantially. I think that one of the biggest problems is that with emotional abuse you are only looking at the act. You have no way of easily being able to measure the impact of what was said or whether it is emotionally abusive. The prevalence is much

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lower than you would get if you were using something like the psychological abuse items from the Conflict Tactics Scale (Straus, 1979), in which almost everybody says that somebody yelled at them or they yelled at their partner or their child. Using the maltreatment definitions, the prevalence of substantiated, self-reported emotional abuse in the community is slightly over 10% in both directions — male-to-female and female-to-male. We looked at the items that they reported in terms of the impact, such as whether the person felt depressed or felt substantially stressed due to these behaviors by their partner in the last year. The reports seem to work out in a way that appears to be valid. They are internally consistent and they relate to outcomes like depression and health and a variety of other kinds of outcomes in a way that one would expect clinically significant emotional abuse to work.

Dr. McCarroll: Please give me some examples of other projects you are currently working on.

Dr. Heyman: We just finished a large-scale community prevention trial with the Air Force that was trying to improve community risk and protective factors. This project is called NORTH STAR. We also have a small grant to do the same thing at our university.

The goal of this study is to decrease risk factors such as alcohol abuse, prescription drug misuse and illicit drug use, suicidality, partner emotional and physical abuse and child emotional and physical abuse.

It is based on the Air Force's Community Assessment data set for active duty members and spouses. This is a very large anonymous survey of individual functioning that includes measures of mental and physical health, family factors, relationship satisfaction, parent-child satisfaction, the workplace environment, support from leadership, work group cohesion and hours worked per week, and community factors. The community factors include community safety and unity, social support, intimate partner violence, child maltreatment, alcohol problems, prescription drugs and illicit drug use, and suicidality and suicide attempts. Using this data set, we are looking at risk factors and the factors that buffer risk for those outcomes.

The data on risk and protective factors and outcomes are used for empirically guided prevention planning and prevention. People do not want to admit sensitive issues like family maltreatment, alcohol and substance abuse and suicidality. These are all things that people try to keep secret and they do not tend to participate in prevention or intervention services unless they are forced to do so. So, to prevent these negative outcomes, rather than trying to drive them into formal services, another approach would be to develop a better understanding of how risk and protective factors relate to these multiple negative outcomes. A community prevention team would then choose the factors that would have the greatest impact at the community level and work on these less stigmatizing risk and protective factors at a community level.

Dr. Slep: There are already empirically-supported interventions that can be done at a community level and by driving down the risk at an overall level, one is able to reduce the prevalence more than you ever would be in trying to serve people on a one by one basis.

Dr. McCarroll: Do you think that the same risk factors are applicable in both the civilian and military environments?

Dr. Slep: We just finished collecting the survey data at the university and so we have not yet analyzed it. At this point, there is nothing to suggest that there is any finding that is unique to the military.

Dr. Heyman: We have two studies looking at transition to parenthood in civilian samples — intervention studies of a prevention program for parents of new babies.

We have another project funded through the National Institute of Child Health and Human Development and the National Institute of Dental and Craniofacial Research to do a prospective longitudinal study of a sample of families that are in our county looking at the effects of family environment, including detailed measures of the impact of conflict and violence on the adults and kids in the family. We are looking at the psychological impact, the impact on cognitive development and the impact of neuro-immune functioning and autonomic nervous system reactivity and oral health.

Dr. McCarroll: Thank you for the interview and for the work you are doing for the military.

Drs. Heyman and Slep: You are welcome.

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I think that one of the biggest problems is that with emotional abuse you are only looking at the act. You have no way of easily being able to measure the impact of what was said or whether it is emotionally abusive.

Websites of Interest

The Centers for Disease Control and Prevention (CDC) has a manual for uniform child maltreatment definitions entitled Child Maltreatment Surveillance: Uniform Definitions for Public Health and Recommended Data Elements (see http://www. cdc.gov/ncipc/dvp/cmp/cmp-surveillance.htm). The definitions and data elements in this document are intended to promote and improve consistency of child maltreatment surveillance for public health practices. [Editor's note: Surveillance is a type of oversight that is used in public health to determine the extent of a condition or disease. Case substantiation is performed by a jurisdictional body such as the military or a state.] The CDC manual is designed to be used by state and local health department staff to assist in and provide a framework for the collection of data on child maltreatment. Since child maltreatment is a matter of State (and sometimes Federal) law, CDC cannot mandate these definitions whereas the military can do so within its jurisdiction. The CDC definitions draw upon definitions currently in the literature, and were adapted in collaboration with a panel of experts on child maltreatment and public health surveillance. The definitions and data elements are designed as flexible tools for developing an ongoing surveillance system. Agencies that use the document can modify data elements to fit their system. The website has links to other child maltreatment and health resources including data and statistics, injury, violence prevention, and others.

The Report to Congress of the Fourth National Incidence Study of Child Abuse and Neglect (NIS-4) can be found at http://www.acf.hhs.gov/programs/opre/abuse_neglect/natl_incid/nis4_report_congress_full_pdf_jan2010.pdf. The NIS-4 is a Congressionally mandated, periodic research project funded by the United States Department of Health and Human Services to provide updated estimates of the incidence of child abuse and neglect in the United States and to measure changes in incidence from earlier NIS studies.



The Impact of Invisible Injuries, from page 5

It is particularly important for health-related language to be at the level of the family member, especially children. For those providers who are uncomfortable with this sometimes difficult task, help may be requested from other providers who are comfortable working with children such as pediatricians and some mental health workers.

Describe the types of support that can help the soldier and the family over a long period of time. This requires an explanation of the long-term course of the injury and the types of support that may be necessary in different periods of time. The provider can help the family directly and refer them to services that may be required in the future. ■ Provide a sense of hope and optimism for recovery.

Through the course of a difficult situation such as an invisible injury, soldiers and families will have to manage most aspects of recovery on their own. A sense of realistic hope can help them greatly during difficult times.

Acknowledgements:

This information is taken from a health communication fact sheet, Courage to Care, developed by experts in injury communication at the Center for the Study of Traumatic Stress. To view electronic versions of this information in a Courage to Care fact sheet that can be given to families with whom you are working, go to: www.cstsonline.org and access Resources > Category Listing > Courage to Care series.