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EVALUATING RISK FOR TARGETED VIOLENCE IN SCHOOLS: COMPARING RISK ASSESSMENT, THREAT ASSESSMENT, AND OTHER APPROACHES

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In the wake of recent school shootings, fear over violence in schools has prompted increased requests for psychologists, educators, and law enforcement professionals to assist in preventing future school violence incidents. We attempt to lay a foundation for developing effective assessment and prevention approaches by first distinguishing planned school-based attacks from other forms of school and youth violence. We then review the three assessment approaches that have been advocated and used in some jurisdictions (profiling, guided professional judgment, automated decision-making) and demonstrate why they are inappropriate—and potentially harmful—in preventing planned school-based attacks. We then describe the contours of the threat assessment approach, developed by the U.S. Secret Service to prevent assassinations, and examine its utility for responding to communications or behaviors of concern that students may present in school settings. © 2001 John Wiley & Sons, Inc.

The recent school shootings that have occurred in the past few years in several communities across the country, including Pearl, Mississippi, West Paducah, Kentucky, Jonesboro, Arkansas, and Jefferson County, Colorado, have raised safety concerns and fears among students, parents, and school administrators nationwide. These rare but highly salient incidents, such as the one at Columbine High School, have garnered considerable attention from the national media (Arnette & Walsleben, 1998; Brooks, Schiraldi, & Ziedenberg, 2000; Elliott, Hamburg, & Williams, 1998; Lawrence, 2000), and appear to be largely responsible for the surge of public concern (Stossel, 1999). In the wake of these infrequent but highly publicized events, school administrators, mental health professionals, law enforcement professionals, and policymakers have come under increasing pressure to take steps to prevent school shootings in their communities (Brooks et al., 2000; Lawrence, 2000; Sugai, Sprague, Horner, & Walker, 2000). In their quest to avoid becoming the next statistic or headline, those with the responsibility to prevent school shootings have focused preventive resources primarily on increasing physical security (e.g., installing cameras and metal detectors), hiring school security officers, developing tactical plans for responding once a shooting has occurred, and implementing a range of programs such as legal education and conflict resolution. Unfortunately, these responses are not likely to be effective in preventing planned school-based attacks.

In this article, we focus specifically on approaches for preventing planned school-based attacks, rather than on other more common and recurring forms of school violence. We conceptualize and refer to such incidents as examples of "targeted violence"—violent incidents where both the

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perpetrator and target(s) are identified or identifiable prior to the incident (Borum, Fein, Vossekuil, & Berglund, 1999; Fein & Vossekuil, 1998; Fein, Vossekuil, & Holden, 1995). The defining element of targeted violence is that the perpetrator selects a target prior to the violent incident. In some instances of targeted violence, the target may not become a victim; for example, the target may avoid injury (e.g., if the perpetrator is a poor shot) or the target may not be at the site where the perpetrator believes the target to be. In others, the target may be one of several victims or may be the only victim. In still others, the target may be an institution or facility, as it was in Timothy McVeigh's bombing of the Murrah Federal Building in Oklahoma City. But each case would be an instance of targeted violence if a target was known—or was knowable—prior to the incident (Borum et al., 1999; Fein & Vossekuil, 1998; Fein et al., 1995).[1]

In the wake of recent school shootings, a cottage industry of school safety products has quickly developed (Chaddock, 2000). To date, however, schools have been given little or no empirically based guidance on how best to assess the risk posed by a student for targeted violence in schools.[2] In our view, the current options available to schools for responding to and preventing school shootings—which we review herein—are at best unproven (Hoagwood, 2000), and at worst carry the potential for serious harm (Hyman & Perone, 1998). Some violence prevention options, such as zero tolerance policies, have been criticized as overly punitive (Hyman & Perone, 1998; Tebo, 2000). Others, such as behavioral profiling and computer programs that identify students at risk, have raised widespread concern among parents, students, policymakers, and even the U.S. Secretary of Education for their potential to infringe on students' civil liberties and to unfairly label or stigmatize certain students as "dangerous" (Cooper, 2000; Morse, 2000; Sewell & Mendelsohn, 2000; Steinberg, 2000).

In this article, we attempt to lay a foundation for developing an effective assessment approach to evaluate the risk of targeted violence in schools by addressing four issues. First, we delineate the contours of the problem of targeted violence by distinguishing the fear of this violence from its actual probability and by distinguishing targeted violence from other forms of aggression in youth. Second, we examine and critique three assessment approaches—profiling, guided professional judgment, and automated decision making—that have been advocated and used in some schools to identify students at risk for violence, giving particular consideration to the potential for harm inherent in these current approaches. Finally, we describe and explore the utility of a threat assessment approach (Borum et al., 1999; Fein & Vossekuil, 1998; Fein et al., 1995) to identify and assess risk posed by a potential student perpetrator for targeted violence in school.

Delineating the Problem

The problem of "school violence" has been defined and constructed in a myriad of ways (Furlong & Morrison, 2000). While eliminating all forms of antisocial aggression and violence in youth is a laudable goal, different types of violence have different antecedents and thus require different approaches for assessment and intervention (Cornell, 1990; Dishion, McCord, & Poulin, 1999; Hoagwood, 2000; Quay, 1987). The first step in developing effective assessment approaches

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[1]This definition of targeted violence is intentionally vague. It is not intended as an operational research definition, but is proposed as a conceptual heuristic to stimulate thinking about the differences between the school-based attacks and the more prevalent, less publicized violence that commonly occurs in schools and among youth.

[2]It should be noted, however, that the U.S. Secret Service is in the process of conducting the first empirical analysis of all known incidents of targeted school violence in the U.S., from 1974 through 2000. An interim report of findings is available at http://www.treas.gov/usss/ntac.

and appropriate policy is to identify clearly the types of behavior or outcomes that one is trying to prevent (Chavez, 1999; Furlong & Morrison, 2000).[3]

Fear of School Violence Versus Actual Probability

It is clear that many Americans fear violence in schools, but the precise nature of this fear and its relationship to the actual probability of harm are much less certain (Arnette & Walsleben, 1998; Elliott et al., 1998; Furlong & Morrison, 1994; Henry, 2000; Hyman & Perone, 1998; Hyman et al., 1997; Lawrence, 2000; U.S. Department of Education & U.S. Department of Justice, 1999). Many have argued that the extensive media coverage of incidents of targeted school violence, and its disproportion to the actual prevalence of targeted school violence, have significantly exacerbated fear over school violence (Arnette & Walsleben, 1998; Brooks et al., 2000; Elliott et al., 1998; Henry, 2000; Lawrence, 2000; Snyder & Sickmund, 1999; Stossel, 1999; U.S. Department of Education & U.S. Department of Justice, 1999).[4] People seem to fear school-based homicides most; yet, statistically, these events are so rare that the epidemic of concern would seem misplaced.

Relative to the risk of violent victimization that children face outside of school, the risk they face in school is minimal (Goldstein & Conoley, 1997; Hyman et al., 1997; Kaufman et al., 1999; U.S. Department of Education & U.S. Department of Justice, 1999). The most recent report on safety in American schools indicates that while more than 2,500 children in the U.S. were murdered or committed suicide in the first half of the 1997–1998 school year, less than 1% of those deaths—including those from multiple-victim homicides—occurred *at school* (U.S. Department of Education & U.S. Department of Justice, 1999).[5] While the odds that a student would be threatened or injured with a weapon at school during the 1996 year were approximately 1 in 15 and the odds of getting into a physical fight at school were approximately 1 in 8 (Snyder & Sickmund, 1999), recent studies have estimated that during the past 3 academic years the odds that a child would die in school (by homicide or suicide) were no greater than 1 in 1 million (U.S. Department of Education & U.S. Department of Justice, 1999)—and some argue were closer to 1 in 2 million (Brooks et al., 2000).

Although these incidents are extremely rare, they are so vexing and their impact is so great that the fear they engender can often drive radical policy change, in some cases leading to the implementation of bad policy (Hyman & Perone, 1998). Accordingly, we view the fear of school

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[3] While much discussion in the violence risk assessment literature has focused on the accuracy of predictions (Borum, 1996; Monahan, 1981; Mossman, 1994; Otto, 1992), we see an important distinction between *predicting* violence and *preventing* it. The central difference lies in the outcomes implied by each term. With the frame of "violence prediction" or even "violence risk assessment," the implicit outcome is maximizing the accuracy of the assessor's predictions—to be able to gauge accurately who is more likely to be violent, and the circumstances under which the probability is greatest (Sewell & Mendelsohn, 2000). With a frame of violence prevention, however, the outcome emphasis shifts from optimizing predictive accuracy to effecting appropriate interventions. By emphasizing prevention as the outcome, the need to provide necessary services takes precedence over the need to be "right" about whether a given child will in fact become violent. More importantly, we would argue that the need to intervene permits school officials and others to consider options that are less punitive (e.g., counseling, establishing a friendship with the child, finding a mentor, etc.) than those available when the emphasis is placed on the child's danger to others.

[4] A 1998 *Wall Street Journal*/*NBC News* poll showed that 70% of respondents believed a school shooting could happen in their community (*Washington Wire*, April 24, 1998). Also, in a critique of television coverage of these infrequent school shootings, John Stossel (1999) reported that the three major television networks, ABC, CBS, and NBC, aired a total of 296 stories on the shooting at Columbine High School in Jefferson County, Colorado. Stossel noted that, in contrast, lightning accounts for more deaths overall, and bathtub accidents account for more deaths of children, than do school shootings (Stossel, 1999; Tebo, 2000); yet, they receive comparatively little media coverage.

[5] The Centers for Disease Control and Prevention and the U.S. Department of Education define a school-associated violent death as any homicide or suicide that occurred a) on the campus of a functioning elementary or secondary school (in the U.S.); b) while the victim was on the way to or from regular sessions at school; or c) while attending or travelling to/from an official school event (e.g., a football game or school dance; Kachur et al., 1996).

violence as a distinct problem that schools face, and one that must be acknowledged and considered in developing and implementing prevention policy.

Targeted Violence Versus General Aggression

As noted above, different types of violence have different antecedents and thus require different approaches for assessment and intervention. Identifying children and adolescents who are at risk for violent behavior, broadly conceived, is not particularly difficult. There is an extensive empirical knowledge base of risk factors (Hawkins et al., 1993, 2000); and, violent behavior during adolescence is so common that, in some groups, it is virtually normative (Elliott, Ageton, Huizinga, Knowles, & Cantor, 1983; Hirschi, 1969; Moffitt, Lynam, & Silva, 1994). Events that occur so frequently are, statistically, not as difficult to predict.

Students at risk for targeted violence may or may not possess many of the traditional risk factors associated with general violence recidivism and delinquency in youth. The etiology and intervention for targeted violence may differ substantially from more general forms of aggressive behavior in youth. Indeed, studies of juvenile homicide suggest that youth who commit murder differ along certain dimensions from those who engage in nonviolent delinquency (Cornell, 1990; Cornell, Benedek, & Benedek, 1987a,b)—but in ways that may seem counterintuitive. For example, Cornell and his colleagues found that, compared with juveniles who were referred for evaluation after committing larceny, juveniles who were referred for evaluation after committing homicide were *less* likely to have prior mental histories, *less* likely to have a history of prior arrests or placement in a juvenile facility, and *less* likely to have had problems with school adjustment. Youth convicted of homicide were *less* likely to have histories of prior violent behavior than were juveniles convicted on assault charges (Cornell, 1990; Cornell et al., 1987a,b). Notably, there is considerable heterogeneity even among juvenile homicide offenders (Cornell, 1990; Cornell et al., 1987a,b). Youth who commit acts of targeted school violence may differ substantially not only from juveniles who engage in nonviolent delinquency but also from other juveniles who engage in different types of homicide.

The particular challenge that schools face in trying to prevent targeted violence in school is to assess the nature and degree of risk posed by a student who has come to official attention because of some threatening communication or behavior of concern. The question is not whether the student might be at increased risk for engaging in some form of aggressive behavior during adolescence, but rather whether he or she currently poses a substantial risk of harm to another identified or identifiable person(s) at school.

Current Approaches to Targeted Violence Assessment

In the sections that follow, we examine the three assessment approaches currently advocated and used in some jurisdictions[6] for evaluating risk of targeted violence in schools. These are: a) profiling; b) guided professional judgment/structured clinical assessment (including the use of warning signs and other checklists); and c) automated decision making (including the use of actuarial formulas and expert systems). For each of these approaches, we describe how the eval-

[6] It is not currently known how many schools use which type of assessment. No data yet exist that describe the prevalence of any of these three approaches (or others) schools may currently use, nor of their effectiveness—perceived or actual. Researchers at the Louis de la Parte Florida Mental Health Institute, University of South Florida, the U.S. Secret Service National Threat Assessment Center, and the Department of Education's Safe and Drug Free Schools Program are currently surveying school administrators, school-based law enforcement personnel, and others law enforcement investigators on this issue. The purpose of these surveys is to describe the "landscape" of current assessment approaches used to evaluate school-based targeted violence risk, gauge the perceived effectiveness of those approaches, and identify perceived barriers to improved evaluation effectiveness.

uation is conducted, identify its threshold for concern used to determine risk of targeted violence in school, explore its utility for evaluating risk of targeted violence in schools, and examine the potential for harm (to students and others) inherent in each. We then turn to the threat assessment approach, the strategy developed by the U.S. Secret Service for identifying, evaluating, and managing threats and other inappropriate behaviors directed toward the president and other public officials (Borum et al., 1999; Fein & Vossekuil, 1998; Fein et al., 1995). After describing the contours of the threat assessment approach, we explore its utility for school administrators, law enforcement professionals, mental health professionals, and others to determine the risk of targeted school violence posed by a student who has engaged in threatening or otherwise concerning behavior.

Profiling

The term "profiling" has become increasingly familiar in recent years. It is used broadly to connote a range of identification techniques or assessment strategies that are used in both law enforcement and non-law enforcement settings (Homant & Kennedy, 1998; Turvey, 1999a). Recently, the practice of profiling has come under considerable scrutiny, as concern has developed both over the use of racial profiles to single out types of people pulled over in traffic stops (e.g., Rogers, 2000), and over the use of demographic or behavioral profiles to identify types of students likely to become "school shooters" (Cooper, 2000; Morse, 2000). To clarify what is meant by profiling and establish a foundation for better understanding of the recent concern over its use in schools, we will review briefly the various techniques that share the term "profiling." We will then describe in greater detail the profiling techniques suggested by some to determine risk of targeted violence in schools.

Description and threshold of concern. The technique of crime scene profiling, as originally developed by the Federal Bureau of Investigation's (FBI) Behavioral Science Unit, involves using information gathered from a crime scene to generate a set of hypotheses about the characteristics—physical, demographic, personality, and others—of the person most likely to have committed the crime (Douglas, Ressler, Burgess, & Hartman, 1986; Holmes & Holmes, 1996; Homant & Kennedy, 1998). The hypotheses are then used generally to help narrow a list of suspects or to suggest other areas of investigative inquiry and thereby enhance the efficiency of an investigation. This technique is retrospective in that it works from a *behavior* (i.e., the crime and crime scene evidence) backward to infer the type of *person* who committed the crime. This technique has gained popularity among state and local law enforcement personnel, with anecdotal reports of considerable success (Douglas et al., 1986) and some limited empirical support (Homant & Kennedy, 1998; Pinizzotto & Finkel, 1990; Turvey, 1999b).

The technique of criminal profiling has since been extended to include techniques for *prospective* identification of would-be criminals. Rather than starting with a crime and working backward to the type of person who committed the crime, the prospective form of profiling begins with a specific person (one suspected of being, for example, the next "school shooter") and projects forward to try to predict the future likelihood that the person in question will commit the crime of concern. In this version of profiling, a profile or description of the typical perpetrator of a particular type of crime—such as serial murder or school shootings—is compiled from characteristics shared by known previous perpetrators (Homant & Kennedy, 1998; Pinizzotto, 1984). This prospective profile is then used as a prototype or template against which an individual who is suspected of being (or of becoming) a perpetrator may be compared. Prospective profiling is used both to *identify* types of individuals likely to become perpetrators (absent a behavior or communication that brings someone to official attention) and to *assess* a given individual who has come

to someone's attention for some troubling communication or behavior. The threshold for concern in both cases is a sufficient degree of "fit"[7] or similarity between the characteristics of prior perpetrators and those of the person under consideration. Various agencies and professionals have developed prospective profiles of "the school shooter," including the school shooter profile developed by the FBI (Band & Harpold, 1999) and the "classroom avenger" profile developed by McGee and DeBernardo (1999).[8]

Attendant problems. Numerous concerns have arisen over the use of prospective profiling to identify and assess the risk students pose for targeted violence in school. First, prospective profiling is not sufficiently sensitive nor specific to identify a child who may be at risk for engaging in targeted school violence, nor for evaluating the child's likelihood of doing so (Sewell & Mendelsohn, 2000). Prospective profiling to identify students likely to become "school shooters" carries with it considerable risk of false positives; that is, because targeted violence in school is such a rare event, most who "fit" the profile will *not* engage in acts of targeted school violence (Sewell & Mendelsohn, 2000). In addition, use of prospective profiles would inappropriately exclude students who do not fit the profile, but who may in fact pose a risk of targeted violence. By way of example, the use of a prospective profile derived from previous assassins would have failed to identify Sarah Jane Moore prior to her assassination attempt on President Ford in San Francisco in 1975. The profile most accepted at that time would have predicted Ford's attacker to be male, between the ages of 20 and 40, of slight build, born overseas, unemployed, a loner, and someone who suffered from delusions of grandeur or persecution (Weisz & Taylor, 1969). At the time she shot at Ford, Moore was female, in her mid-40s, of stocky build, born in the U.S., employed full-time as an accountant, had been married and had a son, and had no history of delusions.

The second concern is that the accuracy of school shooter profiles is questionable. The FBI's offender profile is based on only six school shootings (Band & Harpold, 1999; p. 14), whereas other research has identified nearly 40 cases of school shootings in the past 20 years (Henry, 2000; Vossekuil, Reddy, Fein, Borum, & Modzeleski, 2000). There is no discussion in the FBI's profile regarding the extent to which the information taken from the six shootings is representative of the more than 30 school shootings not included in the profile. Given that incidents of targeted violence in school are so infrequent, we would caution against any generalizations made from such a minority of cases. In addition, the classroom avenger profile (McGee & DeBernardo, 1999) erroneously describes all of the perpetrators they included as white males, when in fact three of them were not (Sincino was African American, Sirola was Hispanic, and Ramsey is half Native Alaskan). This kind of inaccuracy calls into question the accuracy of the other characteristics presented. It also highlights the fact that information about the perpetrators and offenses is only as

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[7] The threshold for concern is not specified with sufficient clarity in the school shooter profiles, nor in the warning sign checklists. In a few places, the instruction given indicates that the greater number of characteristics present, the greater should be the evaluator's concern (e.g., Dwyer et al., 1998). Others in the field of violence risk assessment have argued that this may not be an appropriate threshold (e.g., Borum et al., 1993).

[8] Although we postpone discussion of warning sign checklists until the following section (on guided professional judgement), we recognize that such lists belong equally in a discussion of concerns about profiling (Sewell & Mendelsohn, 2000). We note that the Department of Education warning sign checklist explicitly states that their list does not constitute a profile and cautions that the list was never intended to serve as a predictor of violent behavior; rather, it was intended to provide educators and others working with youth with a better idea of which students needed help and assistance (see e.g., Dwyer et al., 1998). However, despite such cautions, others have argued that in school settings, warning sign checklists are often applied as profiles and their explicit cautions disregarded (Sewell & Mendelsohn, 2000). We believe the concerns about profiling for identifying and assessing risk of targeted school violence also apply to the use of warning sign checklists for the same purposes.

accurate as the source from which it is derived. Verlinden, Hersen, and Thomas (2000a,b), for example, relied exclusively on media accounts of school shootings. Yet, preliminary findings from the first empirical study of incidents of targeted school violence suggest that, when compared with investigative and court records, media depictions of school shootings are in many cases incomplete or even inaccurate (Henry, 2000; Vossekuil et al., 2000).

Third, there are no data that demonstrate the validity or effectiveness of prospective profiling to identify potential perpetrators for any type of crime. What little empirical support exists for the use of profiling exists for retrospective identification only (Grubin, 1995; Homant & Kennedy, 1998).[9] Moreover, research on decision making suggests that the use of prototypes to determine whether someone or something belongs in a particular category (for example, whether a student may be a "future school shooter") can increase the effects of judgment bias. Decision makers who rely on characteristics that appear to be more typical or representative of the category, to determine whether an object belongs in that category, may inadvertently render faulty decisions (Kahneman & Tversky, 1972, 1973; Nisbett & Ross, 1980; Sewell & Mendelsohn, 2000; Tversky & Kahneman, 1974). For example, a school administrator who believes she should be concerned about a particular student because the student wears a black trench coat similar to the ones worn by the shooters at Columbine High School would be relying inappropriately on such information to determine risk. This use of what is called the representativeness heuristic can bias decision making, when the characteristics an evaluator uses (e.g., "wears black trench coat") are in fact less informative than others that may appear less typical of previous shooters (e.g., has asked friends where he could get a gun).

Still other research suggests that when decision makers set out to determine the validity of a working hypothesis (e.g., that a particular student fits the school shooter profile), they may inadvertently search only for information that confirms their hypothesis and fail to search for—or tend to discount—any information inconsistent with the hypothesis (Borum, Otto, & Golding, 1993; Nisbett & Ross, 1980; Snyder & Swann, 1978). Known as the hypothesis confirmation bias, this effect may increase the risk of false positives if the evaluator begins with the hypothesis that the student in question fits the profile—rather than beginning with the hypothesis that the student does not fit the profile (Borum et al., 1993; Sewell & Mendelsohn, 2000).

Finally, use of prospective profiling in schools has received extensive criticism from those the approach is designed to benefit, including parents, students, and even the Secretary of Education (Cooper, 2000; Morse, 2000). This criticism has focused primarily on the risk of unfairly labeling students as dangerous and the potential for stigmatizing them and depriving them of their civil liberties as a result (Sewell & Mendelsohn, 2000). Criticism has also focused on the potential for profiling to produce bias, particularly bias against students who differ from the majority in terms of appearance, race, sexual preference, etc. Results from a 2000 survey conducted by *Time* magazine and the Discovery Channel indicate that the majority of students polled (60%) disapprove of the use of profiling in schools (Morse, 2000). Their concerns and fears are based on the potential for unfair use of profiling against students who are not likely to be violent. Secretary of Education Richard W. Riley publicly opposed the use of profiling in schools to identify potentially

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[9] With respect to the utility of current school shooter profiles, one aspect of the FBI school shooter profile in particular bears scrutiny: The FBI's school shooter profile includes the characteristic that prior school shooters showed no remorse after the shooting (Band & Harpold, 1999). We question the utility of including a behavior that can only be detected *after* an incident (no remorse over the shooting) in a profile intended to be used to identify children *before* a critical incident occurs (see also Sewell & Mendelsohn, 2000, for a similar discussion of violent behaviors included in profiles and checklists for violence risk). In interviews conducted by the Secret Service with several recent school shooters, many of the shooters have shown considerable remorse over their actions (see *60 Minutes II*, 2000).

violent students, saying that we "simply cannot put student behaviors into a formula to come up with the appropriate response" (Cooper, 2000; p. A11).

Guided Professional Judgment

The second approach used in schools to evaluate the risk of violence posed by a student is that of guided professional judgment, also referred to as structured clinical assessment. In general, clinical assessments that form the basis for professional risk judgments involve an interview and evaluation of an individual that is informed by the base rates for violence within the individual's population, and by relevant risk factors known to be related to the risk of violent behavior (Borum, 1996, 2000; Otto, 2000). When the evaluator uses instruments or checklists that help to structure or guide the collection and analysis of appropriate information, the approach is referred to as guided professional judgment or structured clinical assessment (Borum, 2000; Otto, 2000). We use the former term here since those conducting these assessments in schools may not necessarily be mental health professionals. Risk judgements based on guided or structured assessments have been shown to produce greater rates of accuracy than those based on unstructured assessments for civil and forensic psychiatric patients, sex offenders, and domestic violence offenders (Dempster, 1998; Hanson, 1998; Kropp, Hart, Webster, & Eaves, 1999).

Guided professional judgments are traditionally conducted by trained and licensed mental health professionals (Borum, 1996; 2000). However, school officials and law enforcement personnel also use checklists of risk factors and warning signs—such as those put out by the Departments of Justice and Education (Dwyer, Osher, & Warger, 1998),[10] the International Association of Chiefs of Police (1999), and the American Psychological Association (APA)/MTV collaboration (American Psychological Association, 1999)—in a less formal but similar manner to that used in structured clinical assessment. Therefore, we have broadened our discussion to include the use of checklists and warning signs by school and law enforcement personnel. Many of the concerns about the use of guided professional judgment to evaluate risk of targeted school violence apply to school and law enforcement use of checklists and warning signs as well.[11]

Description and threshold of concern. In guided professional judgment, to the extent that the assessment requires an estimate of probability or relative risk, the evaluator may begin by determining the base rate for the type of violence in question among individuals with similar demographic or clinical characteristics. This provides a baseline estimate of the probability of violence among people in relevant populations. The evaluator then gathers information from and about the individual by consulting a checklist of factors, each of which has a demonstrated relationship to violence recidivism based on existing professional literatures, and each of which may have some form of scoring criteria (Borum, 2000). This approach helps the evaluator to gather all relevant data during the course of interviews with the individual and reviews of existing records (e.g., school, mental health, etc.). The evaluator may then adjust (or not) the baseline probability of risk up or down, depending on the presence or absence of relevant risk factors, to determine the

[10] The Department of Education emphasizes that the warning sign list included in their publication, *Early warning, Timely response*, was never intended to serve as a predictor of youth violence but rather to provide a better idea of which students may need assistance.

[11] It is important to distinguish between "risk factor" and "warning sign." These terms have been used interchangeably in the broader public debate about profiles, warning signs, and school violence prevention. We emphasize that the concept of a risk factor is based upon an empirically established relationship with a particular outcome. Last (1988) defines risk factor as an attribute or exposure that is associated with an increased probability of a specified outcome, such as the occurrence of a disease (although not necessarily a *causal* factor). In contrast, a warning sign does not necessarily imply an empirical relationship with a particular outcome, but rather is used as a rule of thumb or heuristic to suggest the presence or impending existence of that outcome (see *American Heritage Dictionary*, 1996).

individual's risk for violent behavior.[12] The goal of a guided professional judgment is to reach an appraisal of risk that is well informed by the best available research (Borum, 2000). The threshold of concern is the presence, within the individual or his or her situation, of a sufficient number (or severity) of risk factors known to be related to increased risk for violent behavior.

Attendant problems. We recognize that guided professional judgment represents a best practice approach in the mental health professions for assessing risk of general aggression, in school as well as in other settings. However, we believe there are several limitations to its use for determining the risk that a student poses for *targeted* violence in school. First, because the prevalence of targeted school violence is so small, an evaluation of risk for targeted school violence cannot be driven primarily by the base rate (Sewell & Mendelsohn, 2000).[13] If it were, the evaluator would have to start with such a low probability baseline that even if all known risk factors were present in a given student, the final appraisal of violence likelihood would necessarily be low. For example, if a student was known to have recently acquired a weapon, and had told several friends that they should not go near the library at 9:00 a.m. on Friday, a school administrator could not reasonably ignore this information just because the base rate for school shootings is miniscule. Sewell and Mendelsohn (2000) have argued, and we agree, that the cost of making a Type I error in such a case—that is, of assessing the student as not posing a risk when in reality he or she does—would be too high.

The second limitation is that empirical research is not yet available on risk factors for targeted school violence, so evaluators do not yet know what information to gather for a school-based, targeted violence risk assessment (Borum, 2000). As we noted earlier, different types of violence have different antecedents. Thus, we believe it will be necessary to conduct empirical research on the antecedents of targeted school violence before a sufficient knowledge base can inform guided professional judgments for this type of violence. Third, and relatedly, existing empirical research on general violence may have limited utility for assessments of risk for targeted school violence (Borum, 2000; Borum et al., 1999). It is unclear how aggregate data from research studies on other types of youth-perpetrated violence will generalize to specific targeted violence fact patterns (Borum, 2000). Most of this research has examined only general violence recidivism as a criterion. Moreover, most of this research has been conducted on criminal offenders and psychiatric patients, populations to which the perpetrators of targeted school violence may not belong. Although some of the checklists of warning signs and risk factors currently used by schools are derived from empirical research on youth violence and aggression, the relationship between these factors and risk of targeted school violence is not yet known.

Fourth, standard psychological tests and other instruments traditionally used in guided professional judgments are of questionable utility to school-based targeted violence risk assessments. Many psychological tests are designed primarily to assess mental disorders; yet, the prevalence, nature, or role of mental disorder among perpetrators of targeted violence is not yet known. Nor has research demonstrated any useful relationship between the results of standard psychological tests and instruments and the risk of targeted violence in schools (Borum, 2000).

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[12] As a point of clarification, the distinction between guided professional judgment and actuarial assessment is the clinician's involvement in any decision or judgement. Any assessment approach where the evaluation is made by means other than a strict statistical or formulaic combination of variables is considered to be a clinical assessment (Borum, 2000). Please refer to the section on automated decision making for a more in-depth discussion of the use of actuarial formulas in violence risk assessment decisions.

[13] Interestingly, this concern about over-reliance on base rates in targeted violence risk assessments runs counter to the more common concern that general violence risk assessments do not take base rates into account sufficiently (e.g., Borum et al., 1993).

Automated Decision Making

The two final approaches to assessing risk of targeted violence in schools fall under the heading of what we term automated decision making. They are: 1) actuarial formulas, and 2) expert systems and other artificial intelligence/artificial intuition approaches. We review these together because both procedures produce a decision (although one that can be framed in more or less definitive terms), rather than leaving the decision to the person conducting the assessment.

Description and threshold of concern. Actuarial tools are equations consisting of weighted risk factors that are statistically or mechanically combined to yield a decision about the likelihood of a condition or outcome (see, e.g., Dawes, Faust, & Meehl, 1989). They are created based on empirical research on the behavior in question (e.g., violence), and typically are standardized for specific populations and subtypes of the behavior in question (e.g., sexual assault or domestic abuse). The development of such formulas is optimized when there exists a sufficient knowledge base of known variables that contribute to the outcome in question (e.g., risk factors for a particular type of violence within that population), and where there is a sufficient frequency of occurrence of the event/outcome to permit statistically derived prediction. Where such actuarial equations can be standardized and validated, they have been shown to perform as well or better than clinical judgements in a range of decision tasks (Borum, 2000; Borum et al., 1993; Dawes et al., 1989; Grove, 2000; Grove & Meehl, 1996). In short-term assessments of violence risk, however, the formulas have not been significantly more accurate than even unstructured clinical judgments (Mossman, 1994).

Expert systems and artificial intelligence/intuition are defined here as computer-based or automated applications of expert knowledge on a particular issue to solve a problem or render a decision in an instant case. Through various methods and structures, expertise that has been compiled on a particular topic or issue is represented in a computer program through the use of algorithms or other computer-based rules (see Beaumont, 1991; Fox, 1996). The computer then compares its store of expertise to the facts in the instant case and arrives at a decision or outcome, based on the rules in its program and the content of expertise to which the case was compared. The advantage of using an automated system is the reduction in any errors introduced through human involvement in the decision, such as through biased information collection or subjective decision making (Borum, 1996). The threshold for concern in both actuarial tools and expert systems is determined by the formula or system, in theory based upon an empirical or experiential knowledge base about the issue.

Attendant problems. We have three main concerns about the use of automated decision making to assess risk of targeted violence in schools. First, appropriate actuarial equations do not yet exist to determine risk of targeted violence, particularly school-based targeted violence. As we noted earlier, a sufficient knowledge base on the antecedents and risk factors for targeted violence in schools has yet to be created, thus precluding the derivation of any meaningful statistical equations to assess the likelihood of its occurrence from known risk factors. More importantly, however, the base rate of targeted school violence is too low for any statistically derived equation to attain any reasonable discriminant accuracy. Any equation derived from empirically researched risk factors for targeted school violence would never be sufficiently sensitive (minimizing the number of false negatives) nor specific (minimizing the number of false positives) to reasonably estimate the probability that a given student would engage in targeted violence in school (Sewell & Mendelsohn, 2000).

Second, expert consensus on evaluating risk of targeted violence generally, and targeted school violence in particular, has not yet been formed. This area of research is clearly in its infancy, with the first known empirical study of violence targeted against public officials and

public figures just published in 1999 (Fein & Vossekuil, 1999). As previously noted, the appropriate empirical research on targeted school violence has yet to be conducted, making the utility of existing knowledge on other forms of youth violence as yet unknown. Expert systems and artificial intuition programs that claim to compare the student in question with thousands of known cases (e.g., Morse, 2000; Steinberg, 2000) are not comparing the student to cases of targeted school violence because the incidence of such cases is far lower (see Henry, 2000).

Finally, research on the use of expert systems in other contexts has raised concerns regarding the creation of expectations that exceed what expert systems can reasonably accomplish (Winegrad & Flores, 1987). To the extent that existing actuarial formulas and expert systems are not yet informed by empirical research on targeted violence in schools, they may fail to gather information on the student or situation that may be relevant to appraising risk and thus produce a flawed assessment. Still other research has documented that users of expert systems may rely inappropriately on the decisions produced by a computer (Will, 1991). In one study, users of an expert system (both experts and novices for the task in question) reported considerable satisfaction with what were in fact flawed decisions the system produced (only one participant figured out the decision was fundamentally flawed; Will, 1991). By extension, when an expert systems approach is used to determine risk of targeted school violence, there is a risk the user may discount their own knowledge of the student in question and rely primarily, if not solely, on the computer-generated decision instead.

Threat Assessment Approach

The common conceptual element in each of these approaches is that they are fundamentally *inductive* (see Turvey, 1999b): they rely on aggregate information about prior events to guide inferences about facts in a specific case. In our view, what is needed to evaluate the risk of school-based targeted violence posed by students is an approach that is *deductive* (see Turvey, 1999c): one that focuses primarily on the facts of the particular case in question to guide inferences (rather than on a series of factors shared by similar perpetrators or other violent youth); that examines closely the progression of ideas and planning behaviors over time; and, that corroborates information gathered in the case from multiple sources in contact with the student.

Based upon their empirical research on assassinations and attacks of public officials and public figures, Fein, Vossekuil, and colleagues (1998, 1999; Fein et al., 1995) developed the threat assessment approach, a framework for identifying, assessing, and managing persons who pose a risk for targeted violence. Threat assessment is guided by several operational principles and relies on key questions that this research suggests are important to ask when evaluating the risk posed by an individual for acts of targeted violence (Borum et al., 1999; Fein & Vossekuil, 1998, 1999; Fein et al., 1995). We believe this approach holds promise for assessing risk of targeted violence in schools.

Guiding Principles of the Threat Assessment Approach

Certain guiding principles derived from the public official violence research underlie the threat assessment approach. First among these is that there is no profile or single "type" of perpetrator of targeted violence. Rather, violence is seen as the product of an interaction among the perpetrator, situation, target, and the setting. In their study of assassins and near-assassins, Fein and Vossekuil found a wide range of ages, both genders, varying educational backgrounds, and other differing demographic features (Fein & Vossekuil, 1998, 1999). It is possible that school shooters will show similar heterogeneity, as prior research attempting to identify the prototype of a violent youth has been wholly unsuccessful. As Herbert Quay noted over a decade ago:

> The assumption that all delinquents exhibit some common set of psychological characteristics has been the basis for most of the early research into the psychological characteristics of delinquents . . . and unfortunately, remains so . . . If, in fact, delinquent youth are behaviorally and psychologically heterogeneous, the search for single psychological variables that can reliably separate delinquents from non-delinquents is not an effective research strategy (Quay, 1987; p. 118).

We extend this comment by suggesting that it is also not a useful clinical assumption or an effective assessment strategy.

The second key guiding principle underlying the threat assessment approach is that there is a distinction between making a threat (expressing, to the target or others, an intent to harm a target) and posing a threat (engaging in behaviors that further a plan to harm a target). Many people who make threats do not pose a serious risk of harm to a target. Conversely, many who pose a serious risk of harm will not issue direct threats prior to an attack. For example, no public official/public figure assassin or attacker directly threatened their target prior to the attack (Fein & Vossekuil, 1998, 1999). The implication derived from this finding is that, while all threats (direct, indirect, conditional, or otherwise) should be taken seriously, they are not the most reliable indicator of risk and therefore should not be a necessary condition to initiate an inquiry or preliminary evaluation. Indeed, a youth who is committed to mounting an attack may be less inclined to threaten a potential target directly, particularly if he or she does not want to be stopped. The youth may, however, discuss ideas of harm among friends and peers.

The third assumption underlying the approach is that targeted violence is not random or spontaneous; it does not occur because someone "just snapped." The research on public official/public figure violence indicates that this type of targeted violence is the result of an understandable, and an often discernible, pattern of thinking and behavior (Borum et al., 1999; Fein & Vossekuil, 1998; Fein et al., 1995). What this finding suggests is that many incidents of targeted violence may be preventable. Conceptually, this principle is very important since assessing risk for events that are considered to be random would seem to be a contradiction. If, however, they are viewed as the result of a behavioral process, then a fact-based assessment makes sense.

What Constitutes Threat Assessment

The threat assessment approach is a set of operational activities that combine the use of an investigative process and information-gathering strategies with target-violence relevant questions (see Borum et al., 1999 for a detailed description of the threat assessment approach; see also International Association of Chiefs of Police, 1999; p. 67). These activities are designed to identify, assess, and manage individuals who pose a risk of violence to an identified, or identifiable, target.

A threat assessment may be initiated by any communication or behavior of concern. Threats are not a necessary threshold for concern; however the threat assessment approach also dictates that no threat should be ignored. The process of gathering information about the individual includes an investigative emphasis on corroboration of facts to establish their veracity (in contrast with the typical clinical emphasis on the patient's story or their perception of events). The focus of the inquiry is on the individual's behavior in the instant case, and what the progression of their behaviors may suggest (i.e., movement from development of an idea to implementation of a plan). The threshold for concern is evidence that suggests the individual may be on a pathway toward violent action. The threshold is deliberately set low enough to facilitate early intervention, as the emphasis of this approach is on prevention and the development of effective case management strategies.

The threat assessment approach asks the person conducting the inquiry to gather information, and answer key questions about the instant case, to determine whether there is evidence to suggest movement toward violent action. The questions focus on: 1) motivation for the behavior that brought the person being evaluated to official attention; 2) communication about ideas and intentions; 3) unusual interest in targeted violence; 4) evidence of attack-related behaviors and planning; 5) mental condition; 6) level of cognitive sophistication or organization to formulate and execute an attack plan; 7) recent losses (including losses of status); 8) consistency between communications and behaviors; 9) concern by others about the individual's potential for harm; and 10) factors in the individual's life and/or environment or situation that might increase or decrease the likelihood of attack.

Taken together, the information learned from these questions—as gathered from the student and from corroborating sources (family members, friends, teachers, classmates, school and mental health records, etc.)—should provide evidence to answer the question of whether the student is moving on a path toward violent action. The answer to the last set of questions in particular can inform the development of a risk management plan. For example, school officials could decide to take active steps to minimize factors that could put the student at greater risk for an attack, such as through referral to appropriate services. Or they could opt instead to monitor the student (perhaps with assistance from family and others close to the student) for changes in factors that could increase the student's targeted violence risk.

Conclusion

When considering how best to prevent (rather than optimally predict) targeted violence in circumstances where a student has come to official attention because of threatening or concerning behavior, traditional inductive approaches are unlikely to be helpful. The use of profiles is ineffective and inefficient, carries with it a considerable risk of false positives (most youth who fit the profile are not a targeted violence risk), has a potential for bias, and has been sharply criticized for its potential to stigmatize students and deprive them of civil liberties. The use of guided professional judgment—while highly appropriate and effective for evaluating risk of more general forms of violence and aggression—is currently inappropriate for evaluating risk of *targeted* school violence. The knowledge base of empirically researched risk factors for targeted school violence has not yet been developed, nor has any relationship been established between general youth violence risk factors or standard psychological tests/instruments and the occurrence of targeted violence. And finally, because targeted school violence is such an infrequent event, it is not amenable to statistical prediction by actuarial tools. Nor is it amenable to evaluation by expert systems or artificial intuition programs because expert consensus on this topic has not yet been reached, and the validity (i.e., accuracy) of the programs or their decision rules has not been established.

We suggest that a deductive, fact-based approach is needed to investigate and assess the risk for targeted violence in schools. The threat assessment approach developed by the U.S. Secret Service represents a good first step toward identifying and assessing risk posed by students for targeted violence in schools. We have promoted this approach as one that is suitable for use right now by mental health professionals, school administrators, law enforcement professionals, and others who have responsibilities for maintaining school safety. We believe, however, that what is most needed for effective prevention of planned school-based attacks is empirical research on incidents of targeted school violence. Many of the shortcomings that we highlighted about current assessment approaches for targeted school violence center around the lack of empirical research on *targeted* violence perpetrated by students at school. We recognize that although the threat assessment approach is based upon empirical research on targeted violence, it too lacks the benefit of comprehensive empirical knowledge on targeted violence in schools. The most effective approach

for understanding and preventing planned school-based attacks will be the one that is informed by empirically derived knowledge about the antecedents, motives, idea development, communications, and planning behaviors of all known perpetrators of targeted school violence. We see these as the most critical unanswered questions that school and law enforcement professionals currently face in attempting to prevent targeted violence in schools.

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